CropLife LATIN AMERICA

Simulación de la **Exposición Ambiental** de **Plaguicidas** en **Agua**

Esquema de Evaluación por Niveles para Países Andinos

Autores: **Amy Ritter & Ximena Patiño**

Fecha junio 5, 2021

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Representando la Industria de la Ciencia de los Cultivos

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1 Resumen Ejecutivo

El propósito de este informe es generar las herramientas necesarias para realizar una evaluación de la exposición acuática escalonada que cumpla con los requisitos y esquema regulatorios establecidos por el Manual Técnico Andino, proporcionando un enfoque consistente y transparente para el registro de Productos de Control de Cultivos.

El procedimiento escalonado de evaluación proporciona un procedimiento de estimación lógico y progresivo, estimaciones que se distribuyen en niveles de evaluación cada vez más realistas pero que también demandan cada vez más datos. De acuerdo con el Manual Técnico Andino, el procedimiento escalonado establece cuatro niveles de evaluación.

En un primer nivel, comienza con una evaluación simple, utilizando criterios conservadores para expresar un juicio que proporciona una evaluación rápida de aquellos plaguicidas que no representan un riesgo significativo para el ecosistema, y avanzando a los siguientes niveles donde la evaluación es más reales y exigentes y puede requerir nuevos estudios que permitan determinar con mayor precisión el potencial de riesgo. Los niveles difieren básicamente en el grado de refinamiento de los datos, caracterización del riesgo y, por lo tanto, reduciendo la incertidumbre asociada a la evaluación.

Este documento proporciona información detallada sobre los tres niveles de simulación de exposición ambiental:

- Ecuación de nivel I para predecir concentraciones en aguas superficiales
- Modelo de hoja de cálculo de tamizaje de nivel II para predecir concentraciones en aguas superficiales
- Modelo de aguas superficiales de Nivel III con escenarios de cultivos desarrollados específicamente para cultivos importantes en los países andinos.

Este informe también contiene información detallada sobre los supuestos utilizados en los modelos, la justificación y los principios subyacentes de los modelos, así como manuales de usuario para los modelos.

2 Introducción

2.1 Marco Regulatorio Vigente fijado por la Norma Andina

Bajo la nueva Decisión 804, la Comunidad Andina estableció requisitos y procesos comunes de registro para productos químicos para control de cultivos para los países de la región, así como la implementación del Manual Técnico Andino con descripción de los mismos (Secretaría de la Comunidad Andina, 2002).

Dado que la Decisión y el Manual Técnico Andino antes mencionados son leyes supranacionales y de obligado cumplimiento, los países sólo pueden adoptar los requisitos técnicos y legales necesarios para aplicarlas. En este sentido y de acuerdo con el principio de "complemento mínimo indispensable", los países pueden crear normativas locales solo para implementar la Decisión 804 y el Manual Técnico (Artículos 5 y 6, Decisión 804).

2.2 Procedimientos de evaluación de riesgos en países andinos

La evaluación de compartimentos ambientales tales como aguas superficiales, subterráneas, suelo y aire, todos incluidos en la Sección 7 del Manual Técnico Andino, debe realizarse en un proceso escalonado, tomando en cuenta los resultados de las propiedades fisicoquímicas, el destino ambiental y los estudios de ecotoxicología, así como los datos de la aplicación.

El procedimiento de evaluación escalonado proporciona un procedimiento de aproximación lógico y progresivo, aproximaciones que se distribuyen en niveles de evaluación cada vez más exigentes. De acuerdo con los criterios de Evaluación de Riesgos establecidos por la FAO y la Agencia de Protección Ambiental de los Estados Unidos (USEPA), el procedimiento escalonado establece cuatro niveles de evaluación.

En un primer nivel, comienza con una evaluación simple, utilizando criterios conservadores para expresar un juicio que proporciona una evaluación rápida de aquellos plaguicidas que no representan un riesgo significativo para el ecosistema, y avanzando a los siguientes niveles donde la evaluación es más real y exigente y requiere nuevos estudios que permitan determinar con mayor precisión el potencial de riesgo.

Los niveles difieren básicamente en el grado de refinamiento de los datos y caracterización del riesgo, reduciendo la incertidumbre asociada a la evaluación.

Dado que el Manual Técnico Andino solo proporciona una descripción detallada de los cálculos simples a realizar en las evaluaciones del Nivel I, mencionando la necesidad de refinar la exposición tanto en el Nivel II como en el III y las actividades de monitoreo y vigilancia en el Nivel IV, se han establecido varios esfuerzos para proporcionar herramientas de exposición que se adapten a las condiciones locales. La primera iniciativa se realizó en 2007 y las herramientas de modelaje presentadas en este informe pueden considerarse una evolución de la misma.

2.3 Esquemas de evaluación escalonada para aguas superficiales

El esquema de evaluación escalonado para las aguas superficiales establecido por el Manual Técnico Andino indica comenzar desde métodos simples, pero extremadamente conservadores hasta métodos más complejos y realistas.

- Nivel I:
  Las concentraciones ambientales esperadas de las aguas superficiales se calculan de acuerdo con las fórmulas incluidas en el Manual Andino o utilizando las concentraciones de sobre aspersión directa de la Tabla 2, Anexo 7 del Manual Técnico Andino. Las concentraciones ambientales estimadas (CAE) se comparan con los parámetros de toxicidad acuática aguda de las especies más sensibles.

- Nivel II:
  Para los plaguicidas que están por encima de los parámetros de toxicidad del Nivel I, las concentraciones ambientales estimadas en aguas superficiales deberían calcularse utilizando la Herramienta Acuática Andina de Tamizaje (AAST) basada en una hoja de cálculo, con la cual se pueden considerar refinamientos simples y medidas básicas de mitigación.

- Nivel III:
  Las concentraciones se evalúan utilizando el Modelo de Exposición de Plaguicidas en Agua ANDES que incluye modelos de destino ambiental tales como el Modelo de Zona Raíz de Plaguicidas (PRZM), el Modelo de Calidad del Agua de Arroz (RICEWQ) y el Sistema de Modelaje de Análisis de Exposición (EXAMS) con criterios conservadores.

  Un paso adicional dentro del Nivel III incluye la estimación de la concentración en agua superficial utilizando el Modelo de Exposición de Plaguicidas en Agua ANDES es la inclusión de opciones de mitigación y / o refinamiento. Se puede considerar la mitigación tanto en la deriva como en la escorrentía.

- Nivel IV:
  Según lo define el Manual Técnico Andino, si después de agotar todas las opciones de exposición de refinamiento y el uso de estudios de nivel superior, todavía existe un riesgo potencial, tanto las autoridades como el registrante deben definir juntos las medidas de mitigación, control y monitoreo necesarias. Este documento no proporcionará información para este nivel, ya que la intención de este documento es abordar el esquema por niveles en lo que respecta al uso de modelos de simulación.

3 Objetivos de este proyecto

Este proyecto se inició para proporcionar a los reguladores de los países andinos las herramientas necesarias para realizar evaluaciones de exposición acuática con base en un enfoque escalonado para cumplir con los objetivos establecidos en la Norma Andina. Como se señaló en las secciones anteriores, el proceso escalonado comienza con suposiciones conservadoras sencillas. En los primeros niveles se utiliza un número limitado de insumos para separar los productos que pueden considerarse seguros para el medio ambiente e identificar aquellos productos para los que se necesitará más información. Esta información adicional se utiliza luego en los modelos de nivel superior para simular las propiedades de degradación / disipación del producto y proporcionar una estimación más realista de la exposición para la evaluación del riesgo acuático.

El concepto de enfoque escalonado se utiliza en otras regiones del mundo, al igual que las herramientas de modelaje contenidas en este documento. Los modelos han sido verificados para garantizar que representen los procesos esenciales que se necesitan para estimar la exposición de plaguicidas al agua superficial en los países andinos y los escenarios utilizados en los modelos de nivel superior se basan en las condiciones climáticas y de cultivo reales en esos países. Los escenarios particulares utilizados en el modelo de la Herramienta Andina de Simulación de Exposición a Plaguicidas son de hecho aplicables a varios cultivos. Por ejemplo, el escenario del tomate en Colombia es aplicable a cultivos similares de hortalizas de dos ciclos, y el escenario de montaña de maíz de Perú es aplicable a cultivos similares de un ciclo en hileras. En las secciones siguientes se detallan los datos utilizados en las evaluaciones, las justificaciones de los modelos y los escenarios de cultivos, y la orientación sobre los datos utilizados como insumos para los modelos.

Este documento describe el desarrollo de escenarios de modelación para Colombia y Perú. Los escenarios colombianos fueron desarrollados por primera vez para la Calculadora de Exposición Colombiana (Crop Life LATAM, 2008). Posteriormente se ha actualizado el modelo (ahora Modelo de Exposición de Plaguicidas en Agua ANDES, Andean Pesticide Exposure Simulation Tool ANDES en ingles) y los escenarios (2019 y 2021). Como tal, este documento presenta el desarrollo de los escenarios para ANDES tanto para Colombia como para Perú (Crop Life LATAM, 2021).

4 Esquemas de evaluación escalonada para aguas superficiales

La exposición acuática para los tres niveles está representada con un ecosistema acuático vulnerable para el uso de productos químicos agrícolas en los cultivos. Las evaluaciones suponen una aplicación de plaguicidas a un campo estándar de 10 ha que tiene el potencial de escorrentía durante un evento de lluvias que proporciona cargas fuera del objetivo a una laguna estándar (1 ha x 2 m de profundidad). La deriva por aspersión también es una fuente potencial de cargas de masa química en la laguna.

4.1 Nivel I:

Una CAE puede calcularse para el peor escenario, considerando la tasa máxima recomendada y la profundidad de la masa de agua, a partir de la Tabla 2 en el Apéndice 8

del Manual Técnico para la Norma Andina Armonizada (Secretaría de la Comunidad Andina, 2002). El valor resultante de la CAE procede de la fórmula:

$$CAE = A/B \quad (1)$$

donde:

CAE: Concentración ambiental estimada en mg/L
A: Tasa máxima de aplicación (kg i.a./ha) x base de drenaje (10 ha) x % de escorrentía (1-10 %) x 1E+06 mg/kg
B: Área de la masa de agua (ha) x profundidad (m) x 10000 m^2/ha x 1000 L/m^3.

El peor de los casos se considera la aplicación directa a las aguas superficiales (donde el área tratada es de 1 ha, el porcentaje de escorrentía es del 100% y el área de la masa de agua es de 1 ha; Urban y Cook, 1986) o, de manera equivalente, el actual escenario de escorrentía USEPA de nivel I (el área tratada es de 10 ha, el porcentaje de escorrentía es del 10%, y el área del cuerpo de agua es de 1 ha; Urban y Lee, 1994).

Si la evaluación del riesgo realizada con el CAE del peor escenario no se aprueba, el factor de escorrentía porcentual puede ajustarse para refinar la evaluación de la exposición. Urban y Lee (1994) recomendaron los siguientes valores para el porcentaje de escorrentía (Tabla 1), basados en la solubilidad en agua del compuesto.

Tabla 1 . Porcentaje de escorrentía basada en solubilidades en agua

Solubilidad en agua (mg/L)	Escorrentía (%)
> 100	5
1-100	2
0.001-1	1
<0,001	0.1

4.2 Herramienta Acuática Andina de Tamizaje Nivel II

La Herramienta Acuática Andina de Tamizaje (AAST) es un modelo basado en hojas de cálculo que se originó con el modelo de USEPA GENeric estimated environmental concentration (Concentración Ambiental Estimada Genérica). (GENEEC2) de USEPA. GENEEC2 es un modelo de tamizaje desarrollado por la USEPA para estimar concentraciones en aguas superficiales con destino ambiental limitado e información de aplicación (USEPA, 2000). El programa calcula una concentración promedio estimada para períodos de 1 día, 4 días (96 horas) y 21 días. Tanto los mecanismos de pérdida de escorrentía como los de deriva por aspersión se consideran en el modelo. El modelo por defecto asume que el 10 por ciento del plaguicida en el momento del evento de escorrentía entra en la laguna debido a la escorrentía y agrega la masa de escorrentía a los residuos en el cuerpo de agua debido a la deriva por aspersión. Las ecuaciones del modelo para la partición en GENEEC2 se cambiaron a una ecuación de particionamiento más sencillo (Ecuación 3).

$$KDfrac = Profundidad_w / (Profundidad_w + (Profundidad_s * BD * KD)) \quad (2)$$

Donde:

KDfrac: Fracción de plaguicida en fase de agua a través de la escorrentía
$Profundidad_w$: Profundidad del cuerpo de agua (cm)
$Profundidad_s$: Profundidad del sedimento activo (cm)
BD: Densidad a granel (g/cc)
KD: Coeficiente de partición (cc/g) = KOC (cc/g) * Carbono orgánico (%) /100

Adicionalmente, las curvas de deriva utilizadas en GENEEC2 se actualizaron a los porcentajes de deriva del modelo AgDRIFT (Teske, *et al*., 2003). AAST también incluye la posibilidad de considerar adicionalmente refinamientos y opciones de mitigación que no estaban disponibles en GENEEC2, tales como el porcentaje de escorrentía basado en la solubilidad como ya se usa en el Nivel I, una tira de filtro vegetativo y la escorrentía reducida de las prácticas de labranza. Apéndice A presenta más detalles y un manual del usuario para el AAST.

4.3 Modelo de Exposición de Plaguicidas en Agua ANDES – Nivel III

El modelo de simulación de exposición de plaguicidas en agua ANDES fue desarrollado específicamente para las evaluaciones de exposición en el marco del registro de plaguicidas en los países andinos como Colombia y Perú. El modelo consta de tres módulos, PRZM (Pesticide Root Zone Model) que entre otros procesos predice la escorrentía y la erosión y el movimiento químico de los campos, RICEWQ (Rice Water Quality Model) que predice el destino y el transporte de productos químicos de los campos de arroz, y el modelo de aguas superficiales EXAMS (Exposure Analysis Modelling System) que predice las concentraciones en un cuerpo de agua. El modelo ANDES fue desarrollado para los países andinos con escenarios de cultivos usando suelos, clima y prácticas agrícolas en esos países. Apéndice B presenta más detalles sobre la ejecución del modelo ANDES. Las secciones 5 a 8 dan más detalles acerca del desarrollo de los escenarios en el modelo ANDES.

4.3.1 Antecedentes del modelo PRZM

El modelo PRZM fue desarrollado por la USEPA para uso en la evaluación de riesgos regulatorios (Carrusel, *et al*., 2005). El PRZM es un modelo numérico del proceso o de "simulación" que calcula lo que le sucede a un plaguicida diariamente en el campo de un agricultor. Considera factores tales como lluvia y la transpiración del agua por parte de las plantas, así como cómo y cuándo se aplica el plaguicida. Tiene dos componentes principales: la hidrología y el transporte químico. El componente hidrológico para calcular la escorrentía y la erosión del suelo se basa en la técnica de curva de números del Servicio de Conservación de Suelos y la Ecuación Universal de Pérdida de Suelos (USLE) La evapotranspiración del agua se estima directamente a partir de los datos de evaporación de bandeja o se basa en una fórmula empírica. La evapotranspiración total del agua incluye la evaporación de la interceptación del cultivo, la evaporación del suelo, y la transpiración del cultivo. El movimiento del agua se simula utilizando parámetros generalizados del suelo, incluida la capacidad del campo, el punto de marchitamiento y el contenido de agua de saturación. El componente de transporte químico puede simular la aplicación del plaguicida en el suelo o en el follaje de la planta. Las concentraciones de fase disuelta, absorbida y de vapor en el suelo son estimadas simultáneamente considerando los procesos captación del

plaguicida por las plantas, la escorrentía superficial, erosión, descomposición, volatilización, lavado foliar, advección, dispersión y retraso.

Cada escenario de modelación de PRZM representa una combinación única de condiciones climáticas, prácticas de manejo específicas al cultivo, propiedades específicas del suelo, hidrología específica del sitio, y los procesos específicos de la aplicación y la disipación del plaguicida. Cada simulación PRZM se realiza usando varios años de datos diarios de pluviosidad para cubrir la variabilidad de escorrentía año a año. Las cargas diarias de plaguicidas al borde del campo disueltas en aguas de escorrentía y absorbidos por el sedimento, tal y como lo predice el PRZM, son descargadas a un cuerpo de agua estándar. La Calculadora Colombiana de Exposición usó la versión 3.12 de PRZM. La versión del PRZM en ANDES es una versión actualizada: winPRZM (la versión usada para la evaluación de riesgo regulatorio europeo, versión 4.73, 3 de marzo de 2019). WinPRZM incluye la adsorción no linear del tipo Freundlich, así como la degradación dependiente de la temperatura/ humedad en el suelo.

4.3.2 Antecedentes del modelo RICEWQ

Para simular el destino y el transporte de productos químicos en el ambiente del arroz, el modelo de RICEWQ (Williams, y otros, 2020) se utiliza conjuntamente con EXAMS. RICEWQ se usa actualmente para modelamiento de mayor nivel para registro de plaguicidas en la Unión Europea. La agricultura de arroz húmedo presenta un tipo de agricultura única respecto de la escorrentía agroquímica debido a las prácticas del manejo del agua en el campo. RICEWQ es un modelo de simulación numérico que se puede utilizar para evaluar la disipación de un producto químico en un sistema acuático y para predecir las pérdidas de agroquímicos por escorrentía a las aguas receptoras. El modelo fue desarrollado para simular el equilibrio de masa de agua y de químicos asociados a las condiciones de inundación, desborde, y liberaciones controladas de agua, típicos de la producción de arroz húmedo.

RICEWQ incluye los algoritmos de equilibrio de agua que explican la precipitación, evaporación, filtración, irrigación, liberaciones y desbordes de varias configuraciones de arrozales, y el drenaje controlado antes de la cosecha. Algoritmos de aplicación de plaguicidas, para múltiples aplicaciones, perdidas de productos químicos por la deriva e interceptación de follaje y agua. Los algoritmos del cultivo incluyen crecimiento vegetal desde la aparición a la maduración, interceptación del cultivo, escorrentía y degradación del plaguicida en el follaje, y la deposición de residuos de plaguicida del follaje después de la cosecha. Los algoritmos de la calidad del agua incluyen la dilución, volatilización, partición entre sedimentos del agua y sedimentos del lecho, descomposición en agua y en sedimento, y re-suspensión de los sedimentos del lecho.

4.3.3 Antecedentes del modelo EXAMS

Para calcular CAE en cuerpos de aguas superficiales, EXAMS (Burns, 2004) se utiliza conjuntamente con winPRZM y RICEWQ. El EXAMS también es un modelo de proceso numérico, pero simula los procesos que ocurren en el cuerpo de agua más que en el campo agrícola. El EXAMS recibe la escorrentía (ej. masa) y carga de deriva por aspersión del winPRZM o de los archivos de transferencia de RICEWQ y calcula la concentración en el cuerpo de agua (lago) en mediciones diarias.

El EXAMS puede ser utilizado para evaluar el destino, la exposición y la persistencia de productos químicos orgánicos sintéticos en ecosistemas acuáticos. Da cuenta de la volatilización, adsorción, hidrolisis, biodegradación, y la fotolisis del plaguicida. Puesto que el EXAMS es un modelo de estado estable, los cuerpos de agua se modelan como si tuvieran volumen constante. Las concentraciones de plaguicidas de varios años en una columna de agua se calculan de las simulaciones como el máximo anual de 24 horas, promedio del máximo anual de 4 días (96 horas), promedio del máximo anual de 21 días, promedio del máximo anual de 60 días, promedio del máximo anual de 90 días y el promedio anual. La versión de EXAMS usada en ANDES es la versión 2.98.04 de abril de 2005. Una versión independiente del modelo se puede obtener de: https://www.epa.gov/ceam/exams-version-2980403

5 Datos geográficos disponibles para la derivación de escenarios de exposición representativos de Colombia

5.1 Datos de Cultivos

Para la Calculadora original Colombiana de Exposición, el Censo Estadístico Agrícola de 2005 (http://www.agronet.gov.co) fue utilizado para cuantificar la distribución y la cantidad de producción de banano, papa, arroz y tomate (cultivos objetivo) en Colombia. Después se retiró el arroz como cultivo objetivo, pero ha sido incluido en esta actualización que también incluye el café. El Censo Estadístico Agrícola de 2013 (DANE, 2016) se utilizó para cuantificar la producción de cultivos para café y arroz. El nivel de reporte más pequeño públicamente disponible es el nivel de departamento administrativo, que consta de 32 unidades. Por lo tanto, las relaciones entre la producción de cultivos y otros factores (precipitación, suelos, etc) se limitan al nivel del departamento. La producción total de cultivos (ha) y la densidad de la producción de cultivos (cultivo ha/departamento ha) se usaron para ayudar a seleccionar las estaciones meteorológicas relacionadas con los cultivos objetivo.

Todas las clases/variantes de los cultivos objetivo fueron seleccionadas y sumadas; por ejemplo, los bananos y "bananos para exportación" se sumaron para generar la clase de bananos. Tabla 2 da una lista completa de grupos de cultivos usados en este estudio.

Tabla 2 . Cultivos objetivo y clases relevantes en datos del censo agrícola

Cultivo Objetivo	Grupo de cultivo en datos del censo
Banano	Bananos Bananos de Exportación
Tomate	Tomate Tomate de árbol
Papa	Papa
Arroz	Arroz Arroz secano manual Arroz secano mecanizado
Café	Café

Figura 1 hasta la Figura 5 se muestra la producción de cultivos basada en el Censo Estadístico Agrícola de 2013 ((DANE, 2016) para banano/ plátano, papa, tomate, arroz y café respectivamente.

Figura 1. Producción de banano y plátano en Colombia

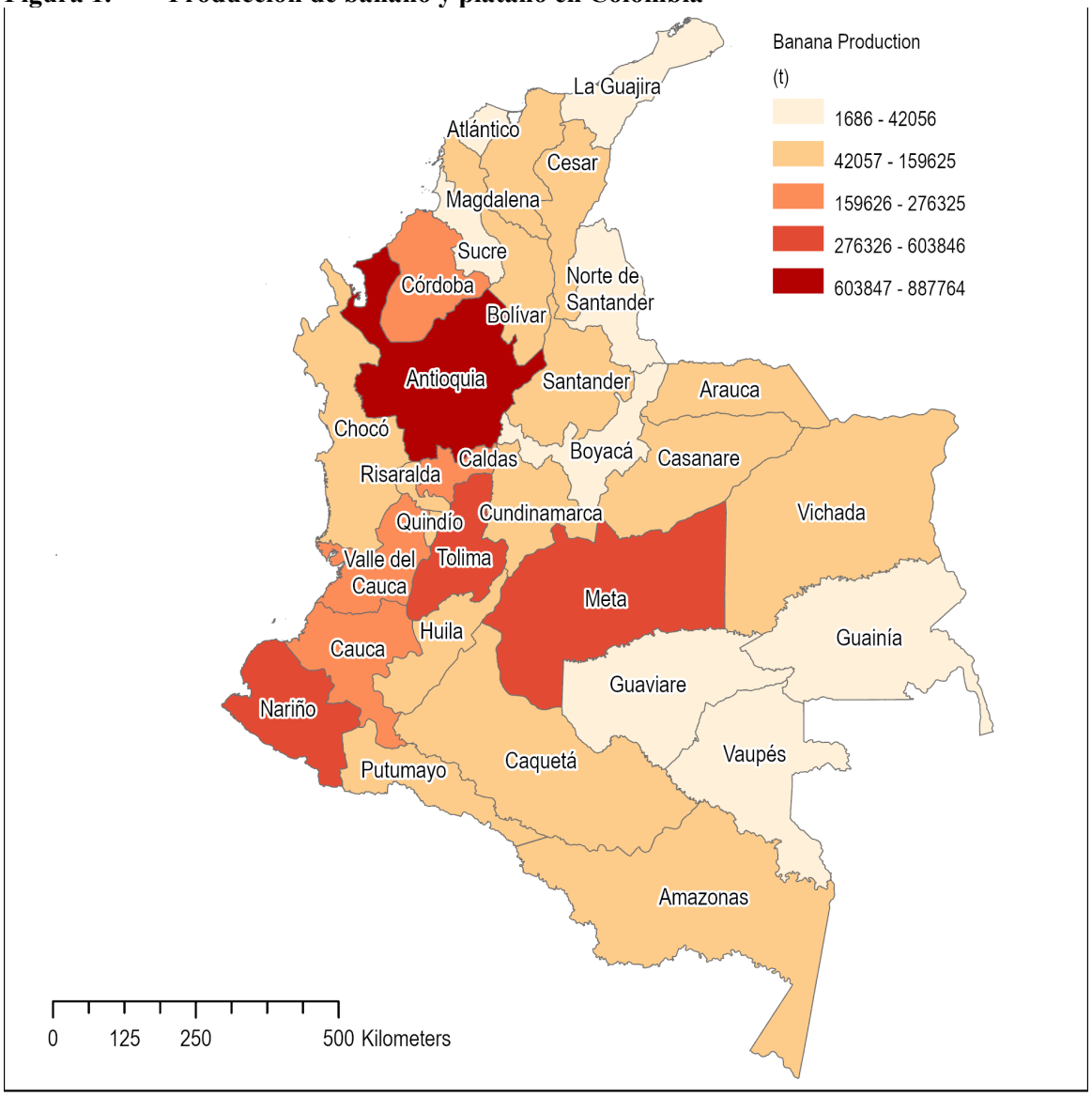


Figura 2. Producción de papa en Colombia

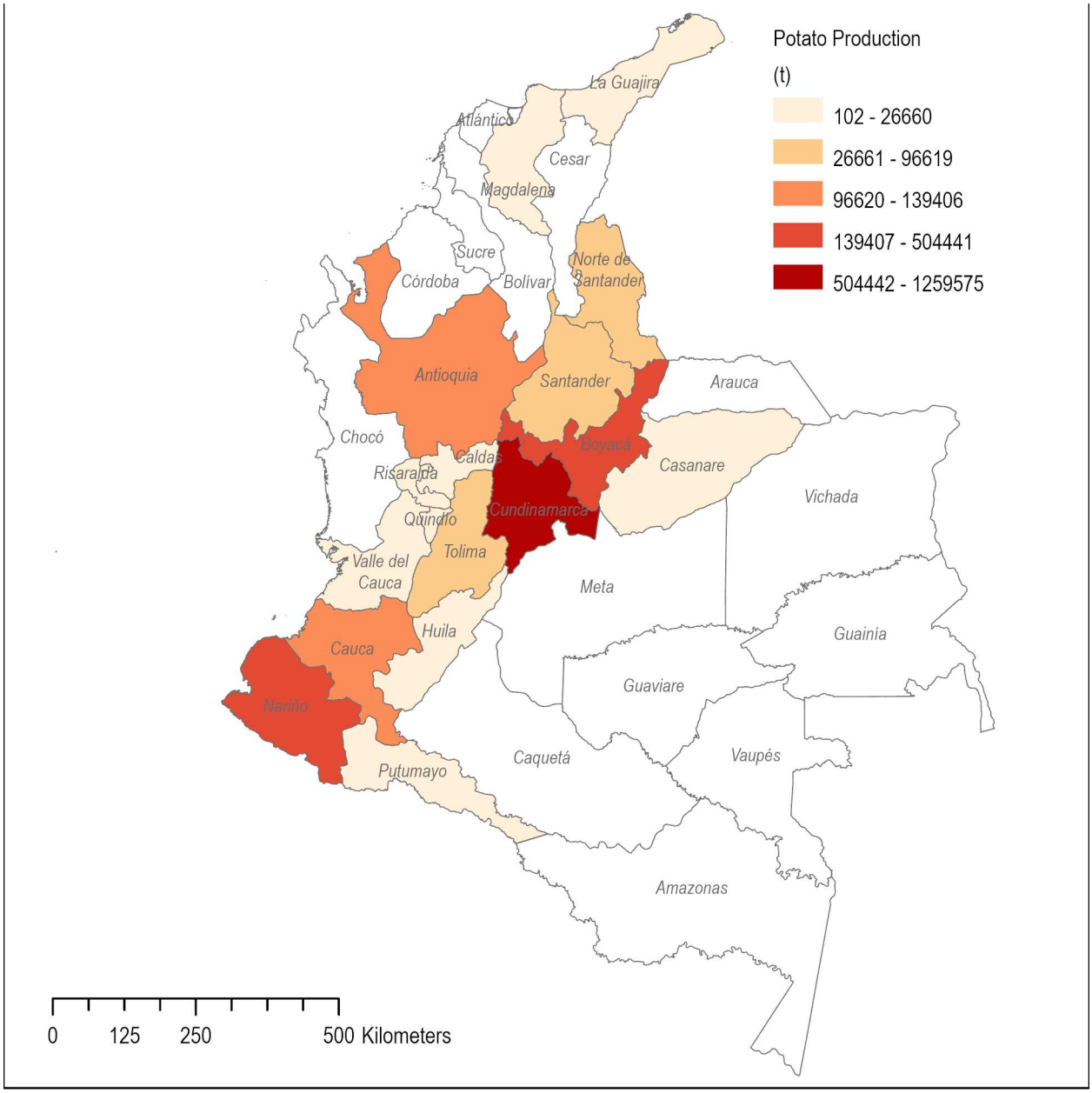


Figura 3. Producción de tomate en Colombia

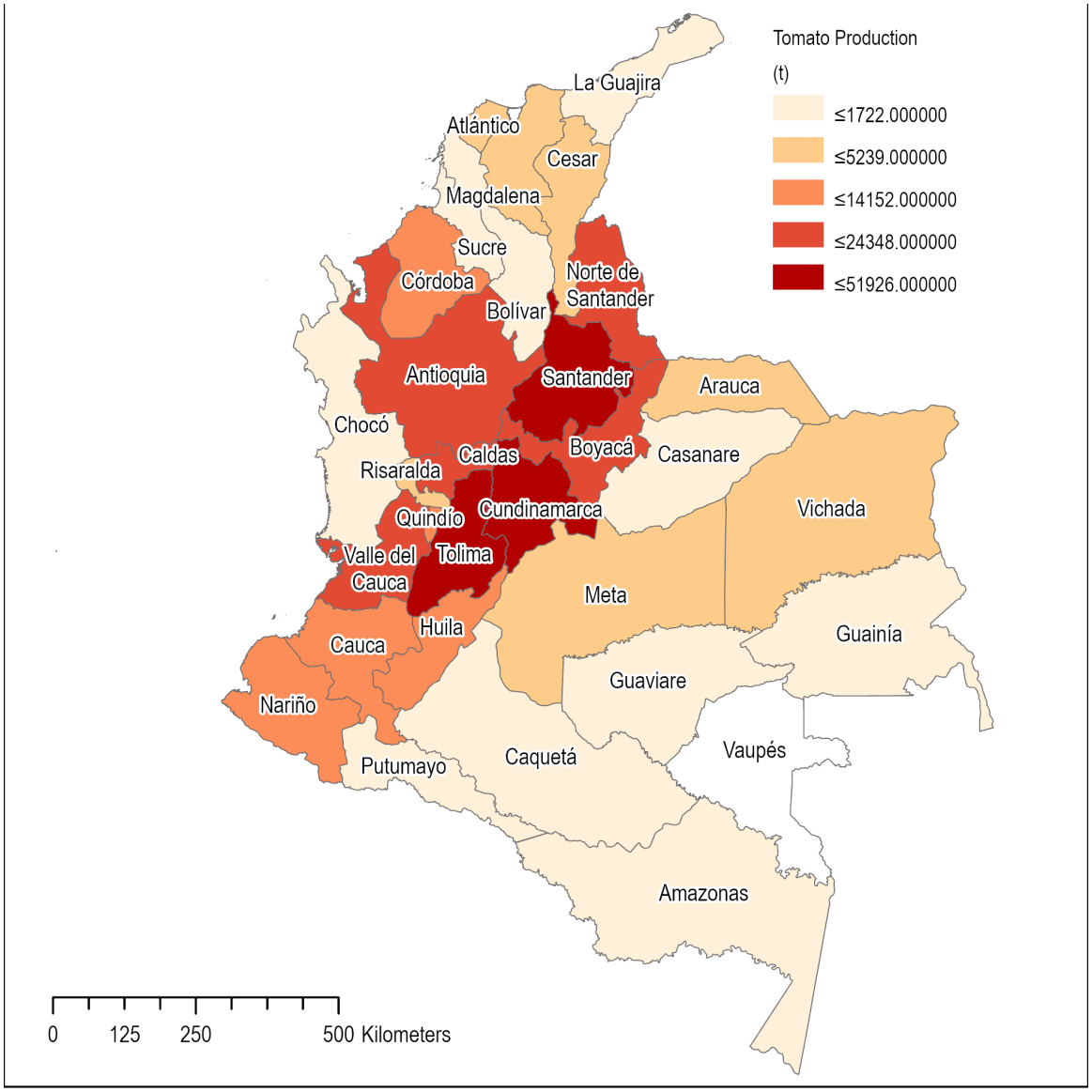


Figura 4. Producción de arroz en Colombia

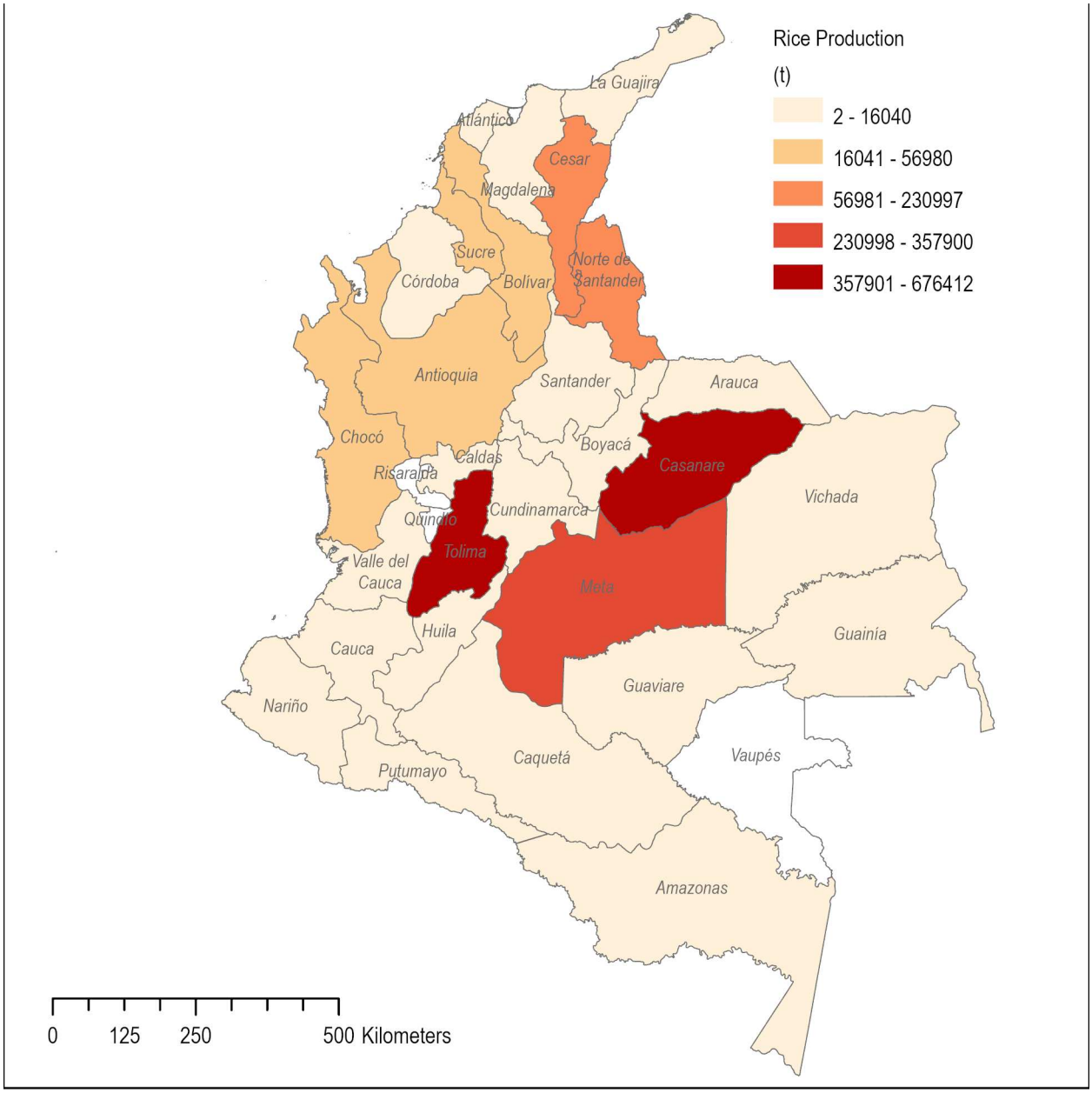
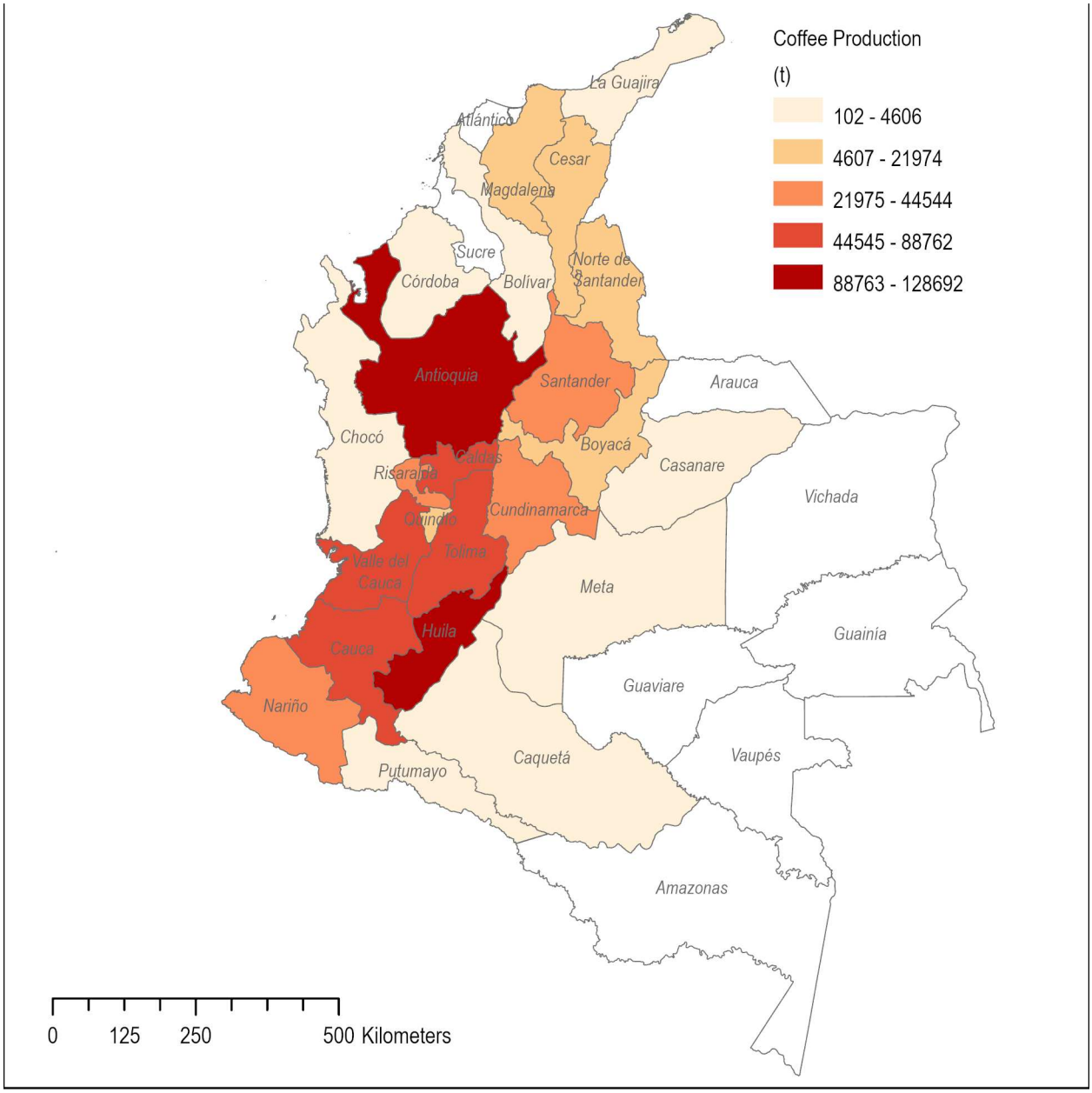


Figura 5. Producción de café en Colombia



5.2 *Datos del clima*

Para los cultivos originales de Colombia (banano, papa y tomates) los datos climáticos diarios de series de tiempo para 50 estaciones en Colombia se obtuvieron del producto de la Global Summary of the Day (Resumen Global del Día) de la NOAA para el período de tiempo de inicio de estación hasta diciembre de 2006 (http://www.ncdc.noaa.gov/oa/ncdc.html[1]). Estas 50 estaciones representan todas las estaciones de GSOD en Colombia, disponibles por NOAA en el momento de la extracción (diciembre de 2006). Las estaciones fueron examinadas para la localización con respecto a

[1] El resumen global de la información de los datos está disponible en https://gis.ncdc.noaa.gov/maps/ncei/cdo/daily.

los departamentos que contenían cultivos objetivo, alcance del período de reporte, y exhaustividad de los registros diarios dentro de ese período de reporte.

Figura **6.** **Localización de las estaciones climáticas NOAA con datos del clima disponibles al público para Colombia (2006)**

A cada cultivo objetivo se le asignó una o más estaciones climáticas con base en la presencia en (o en proximidad cercana a) un departamento con alta producción de cultivos o densidad de cultivos. Para ser consideradas para mayor análisis, las estaciones deben haber tenido un período de registro de 10 años consecutivos o más con por lo menos un 55% de integridad para los registros de precipitación diaria.

La serie gradual de filtros se utilizó para seleccionar las estaciones GSOD:

1. El filtro inicial quitó 22 estaciones del grupo de 50 porque el período de registro era de menos de diez años, lo que dio como resultado 28 estaciones.
2. El segundo filtro quitó 7 estaciones debido a su aislamiento de los departamentos que contenían cultivos objetivo, dando como resultado 21 estaciones.

3. El último filtro seleccionó estaciones con al menos un 55% de integridad de los registros de precipitación diaria para un período de 10 o más años con el tiempo entre 1945 y 2006, lo que resultó en 12 estaciones (Tabla 3).

El período de registro para cada estación (es decir, 1975 - 1998) varió porque ninguna estación en la red colombiana GSOD tuvo un período idéntico de 10 años con un 55% de integridad. El número de años para cada estación meteorológica se indica en la Tabla 3.

Tabla 3. Estaciones meteorológicas seleccionadas y cultivos representativos (banano, plátano, tomate y papa en 2006) para cada ubicación

WBANID	Nombre	Años	Lat.	Longitud	Alt. (m)	Cultivos	Departamento
801100	MEDELLÍN/OLAYA HERR	13	6.22	-75.60	1499	Papa, Banano	Antioquia
801120	RIONEGRO/J.M.CORDOV	20	6.13	-75.43	2142	Papa, Banano	Antioquia
800280	BARRANQUILLA/ERNEST	20	10.88	-74.78	30	Banano	Atlántico / Magdalena
803700	IPIALES/SAN LUIS	10	0.82	-77.63	2961	Papa	Nariño
800090	SANTA MARTA/SIMÓN B	20	11.13	-74.23	14	Banano	Magdalena
803420	PASTO/ANTONIO NARIN	10	1.42	-77.27	1826	Papa	Nariño
803360	TUMACO/LA FLORIDA	10	1.82	-78.75	6	Papa	Nariño
803150	NEIVA/BENITO SALAS	16	2.97	-75.30	443	Tomate	Huila
802590	CALI/ALFONSO BONILL	20	3.55	-76.38	969	Plátano, Tomate	Valle del Cauca
802220	BOGOTÁ/ELDORADO	20	4.70	-74.13	2546	Tomate, Papa	Cundinamarca
802140	IBAGUÉ/PERALES	11	4.43	-75.15	928	Tomate	Tolima
802100	PEREIRA/MATECANA	20	4.82	-75.73	1342	Banano	Risaralda

Al mantener un grupo de 12 estaciones, los paisajes agrícolas altamente variables y ampliamente distribuidos de cada uno de los cultivos objetivo podrían estar mejor representados. De las 12 estaciones seleccionadas, los bananos/plátanos están representados por 6 estaciones, los tomates por 4 estaciones y las papas por 6 estaciones. Las estaciones están ubicadas en 9 de los 32 departamentos, estos 9 comprenden aproximadamente el 64% del total de la agricultura en Colombia. Para cultivos individuales en 2005: ~ 81% de la producción total de banano, 66% de la producción total de papa y 53% de la producción total de tomate estuvieron representados por los 9 departamentos (Tabla 4).

Tabla 4 . Producción de cultivos en % de la producción nacional de 2005 (hectáreas)

Regiones bananeras/plátanos	Regiones de papa	Regiones de tomate
Antioquia (51%)	Antioquia (10%)	Cundinamarca (14%)
Magdalena (18%)	Cundinamarca (39%)	Huila (12%)
Risaralda (2%)	Nariño (17%)	Norte de Santander (11%)
Valle del Cauca (10%)		Tolima (6%)
		Valle del Cauca (10%)

Fuente: Censo Estadístico Agrícola de 2005

5.3 Datos sobre el suelo y la cubierta terrestre

La Base de Datos de Suelos y Terrenos para América Latina y el Caribe (SOTERLAC: http://www.isric.org/) fue la base de datos de suelos a escala nacional más refinada y actualizada disponible en el momento de su procesamiento (2006). Los datos tienen una resolución de 5 kilómetros y son desarrollados por la Sociedad Internacional de Ciencias del Suelo (ISRIC). Las unidades de mapeo SOTERLAC tienen múltiples componentes, pero no

hay información sobre la ubicación de estos componentes dentro de la unidad de mapa. Para presentar visualmente la información de una propiedad específica del suelo, se utilizaron una serie de mapas para representar las propiedades de cada componente. En algunos casos, se calculó un único "promedio ponderado por componente" para toda la unidad de mapeo, agregando las propiedades de nivel de componente hasta la unidad de mapa en función del área de cada componente. Las propiedades verticales del horizonte del suelo que describen las profundidades por debajo del horizonte superior se agregaron de acuerdo con su profundidad para calcular una propiedad de horizonte promedio ponderado por profundidad (por ejemplo, los 3 horizontes superiores de una sola unidad de mapa).

Las clases de agricultura del conjunto de datos Global Land Cover 2000 (GLC2000: http://www-gvm.jrc.it/glc2000/legend.htm) se incorporaron en el análisis de suelos con el fin de identificar los suelos donde se practicaba la agricultura. El GLC2000 es de cobertura mundial, con una resolución de 1 km, clasificada a partir de imágenes de satélite SPOT 4 recogidas entre 1999 y 2000, y producidas por el Centro Común de Investigación de la Comisión Europea. Las clases de agricultura del GLC2000 se agregaron para crear una clase amplia que representa las áreas en Colombia donde la agricultura podría estar presente. Debido a la resolución general y a la clasificación mundial de los datos sobre la cubierta terrestre del GLC2000, se seleccionaron todas las clases agrícolas (no sólo las identificadas como tomate, papa y banano). En la tabla siguiente se enumeran las clases utilizadas y la Figura 7 presenta la distribución espacial de esta clase agregada.

Tabla 5. Clases de cubierta terrestre agrícola en la base de datos Global Land Cover

Código GLC2000	Clase de Cubierta Terrestre
50	Agricultura - intensiva
51	Agricultura de mosaico / vegetación degradada
52	Agricultura mosaico / bosques degradados

Se hizo una referencia cruzada para asignar Clases de Drenaje de SOTERLAC al Grupo de Suelos Hidrológicos con el fin de permitir la comparación entre los conjuntos de datos de EE. UU. y Colombia. De acuerdo con la documentación de apoyo de SOTERLAC, los orígenes de las asignaciones de clase de drenaje siguen el Manual de Estudio de Suelos de USDA, NRCS (Capítulo 3, "Clases de drenaje natural"). La siguiente tabla identifica las asignaciones realizadas de la Clase de Drenaje de Suelo al Grupo de Suelos Hidrológicos. Sin embargo, la clasificación de suelos "moderadamente bien drenados" no cae directamente en un solo grupo de suelos hidrológicos y podría considerarse un suelo C o B.

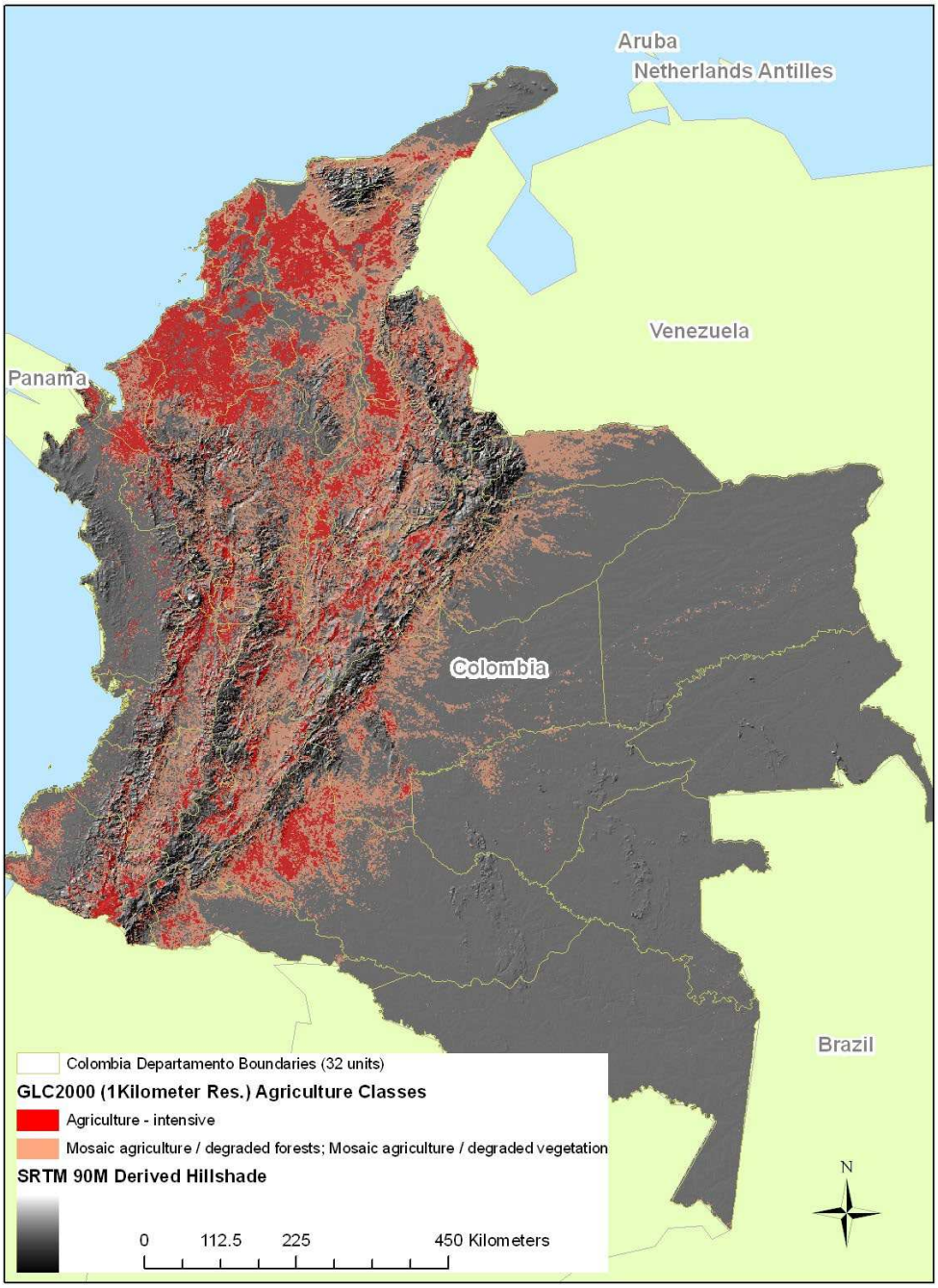
Tabla 6. Clase de drenaje de suelo SOTERLAC y asignaciones del Grupo Hidrológico

Clase de Drenaje del Suelo	Grupo de Suelos Hidrológicos
excesivamente drenados	A
algo excesivamente drenados	A
bien drenados	B
Moderadamente bien drenados	C[1]
imperfectamente drenados	C

Pobremente drenados	D
muy pobremente drenado	D

[1] – También podría clasificarse como grupo B

Figura 7. Tierra agrícola en Colombia de la base de datos de Global Land Cover

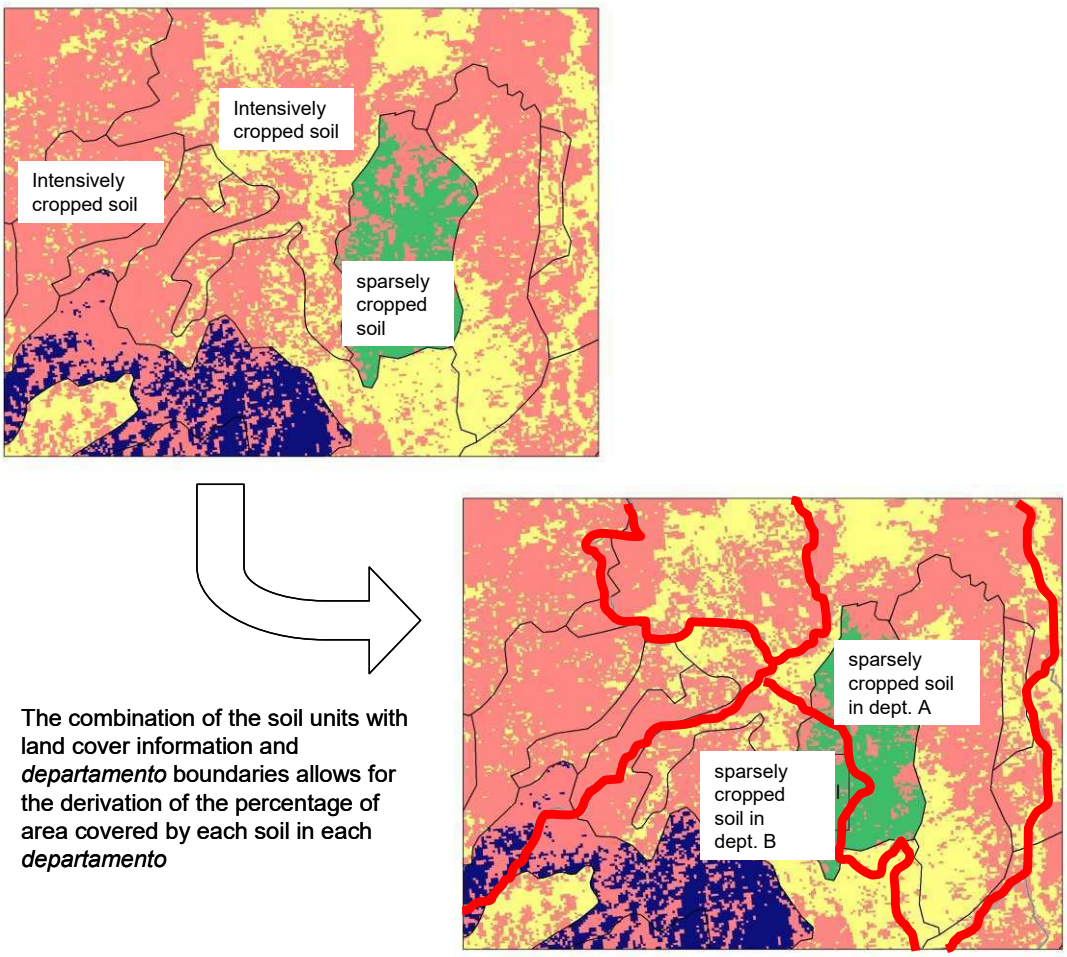


Debido a la limitación de resolución de las estadísticas de cultivos, la unidad departamental fue la escala más refinada en la que fue posible resumir tanto los suelos como los datos de cultivos, con el fin de hacer preguntas como, "¿cuál es la distribución espacial de los suelos vulnerables a la lixiviación en relación con el cultivo de banano?", o "¿qué porcentaje de la producción total de tomate en Colombia existe en departamentos con suelos predominantemente bien drenados?"

En un sistema de información geográfica (SIG), las unidades de cartografía de suelos de SOTERLAC se superponen espacialmente con las unidades administrativas del departamento y el conjunto de datos de cobertura del suelo GLC2000, para producir una única capa de datos unificada de las tres capas de entrada. Esto se exportó a una base de datos relacional en la que las propiedades del suelo para los "suelos agrícolas" (según la definición de la clase de agricultura de cobertura de la tierra GLC2000) en los 20 cm superiores y los 100 cm superiores, respectivamente, se ponderaron por el área por porcentaje del suelo con agricultura a la unidad administrativa del departamento.

Figura 8 representa este proceso gráficamente. La figura superior ilustra cómo se combinaron las unidades de mapeo de suelos y la cobertura terrestre del GLC2000 para determinar la cantidad de suelos (ha y% de unidad de mapeo) ubicados "debajo" del área cultivada. La figura inferior ilustra la adición de los límites del departamento. Se puede ver que el "suelo escasamente cultivado" se encuentra tanto en el departamento "A" como en el departamento "B". El área (ha) de este suelo en cada departamento se utilizó para generar la métrica a nivel de departamento de las propiedades del suelo agrícola.

Figura 8. Derivación de la extensión espacial relativa de las unidades de suelo en cada departamento



Se mapearon las propiedades del suelo para el perfil superior de 20 cm y el perfil de 20-100 cm a nivel de departamento. Entre tales propiedades se encuentran:

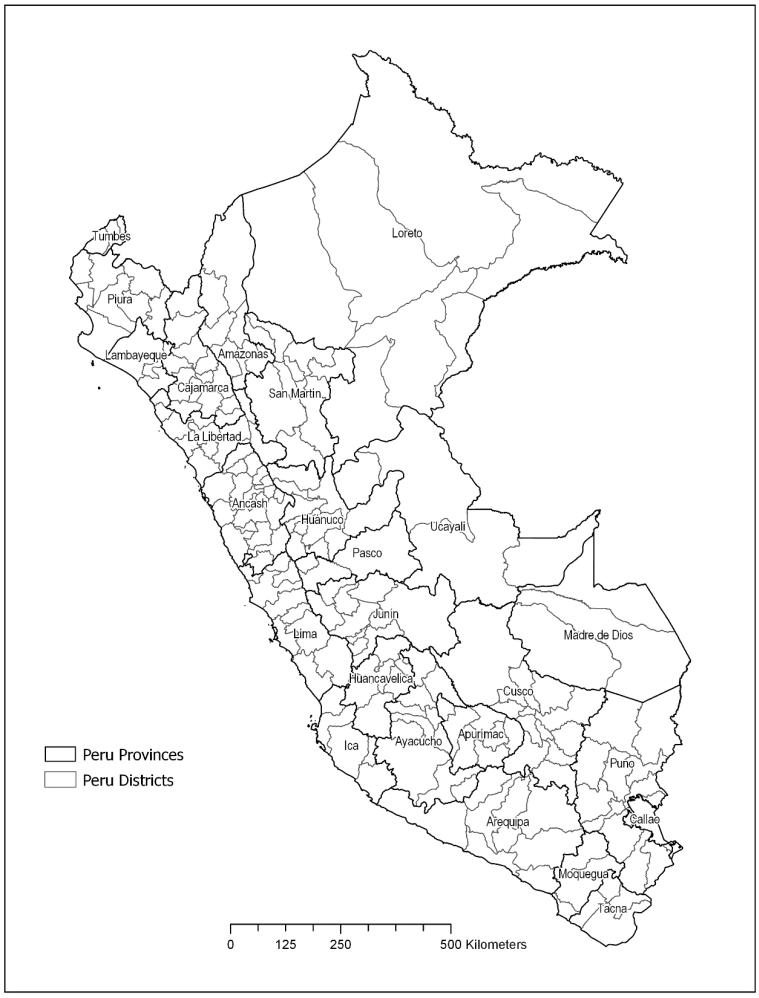
- % Carbono Orgánico
- Densidad Aparente
- Capacidad de Retención de Agua
- %Arena
- % Sedimento
- % Arcilla
- Clase de Textura y,
- Clase de Drenaje.

6 Datos geográficos disponibles para la derivación de escenarios de exposición representativos de Perú

6.1 Límites administrativos

Los límites administrativos de Perú se extrajeron de las Áreas Administrativas Globales (GADM[2]) Versión 2.0 en una capa que representa únicamente a Perú (Figura 9).

Figura 9. Límites administrativos para Perú



6.2 Datos de Cultivos

Los datos trimestrales de producción de Cultivos Agrícolas de 2017 obtenidos del Ministerio de Agricultura de Perú (http://siea.minag.gob.pe/siea/?q=publicaciones/boletin-estadistico-de-produccion-agricola-pecuaria-y -avicola-0/) se utilizó para cuantificar la distribución y cantidad de producción de tomate y maíz y se utilizó la hoja de cálculo "Datos-excel-anuario-agricola-2017-171218.xls" para determinar la distribución y cantidad de aguacate, uva y arroz (los "cultivos objetivo") en Perú. La información para los

[2] www.gadm.org

espárragos se proporcionó a nivel departamental más detallado, mientras que el maíz y el tomate se proporcionaron a nivel provincial. Para cada cultivo, según fue necesario, los datos mensuales se agregaron a una producción total anual en toneladas. Para cada nivel administrativo, la producción total se vinculó con el nivel administrativo. Los mapas de producción de cultivos resultantes se muestran en la Figura 10 a 15.

Figura 10. Producción de cultivos de espárragos en Perú

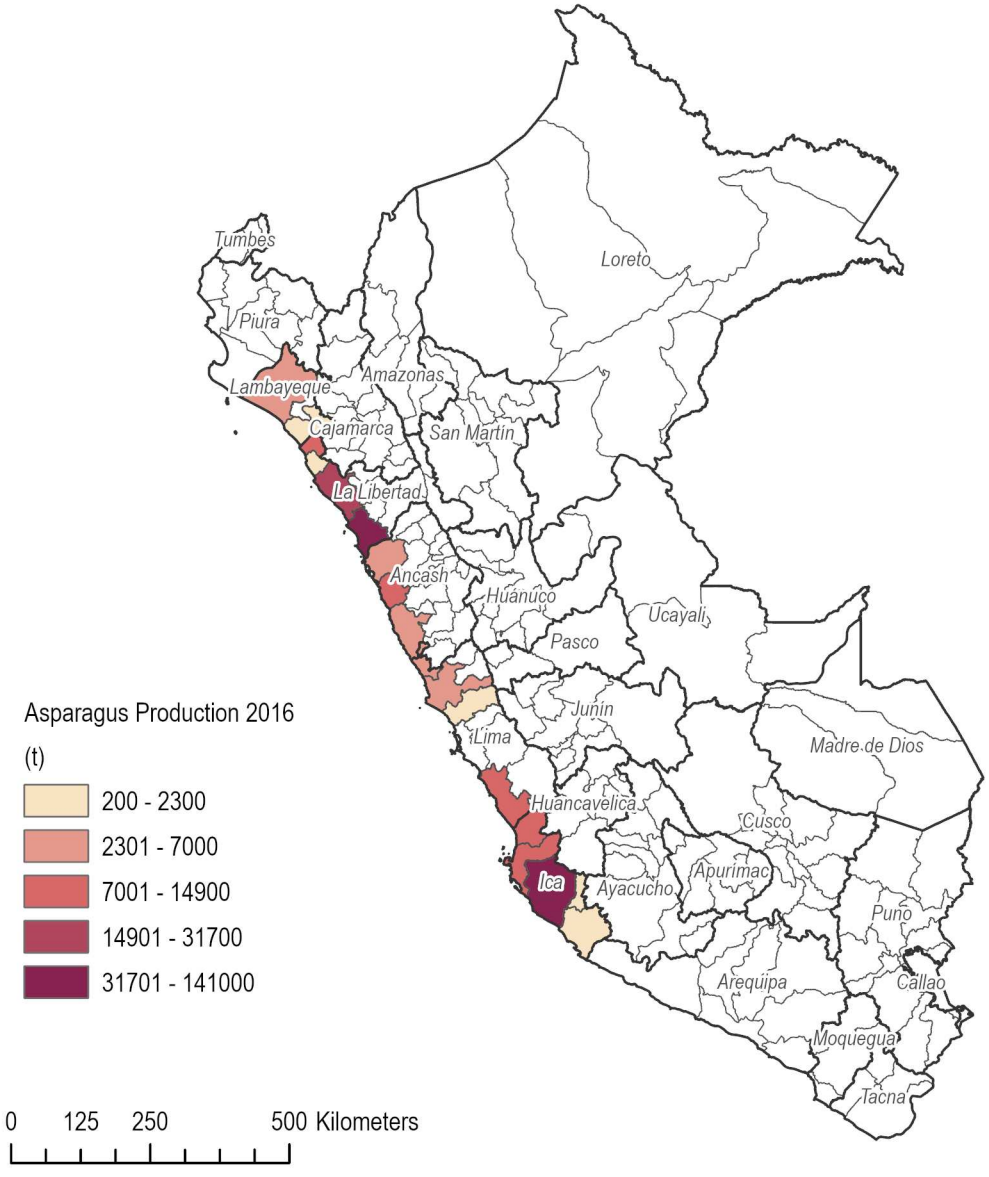


Figura 11. Producción de cultivos de maíz en Perú

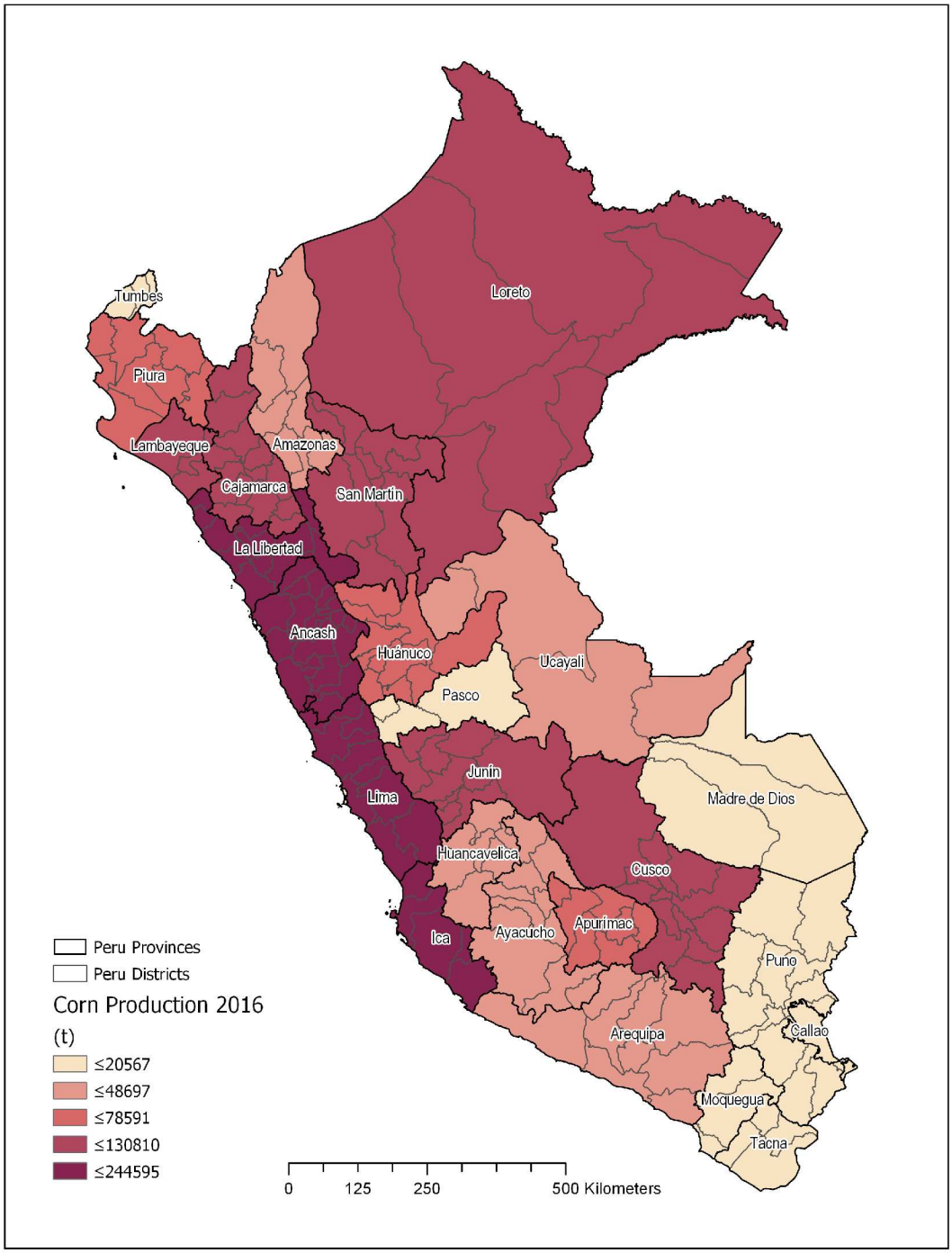


Figura 12. Producción de cultivos de tomate en Perú

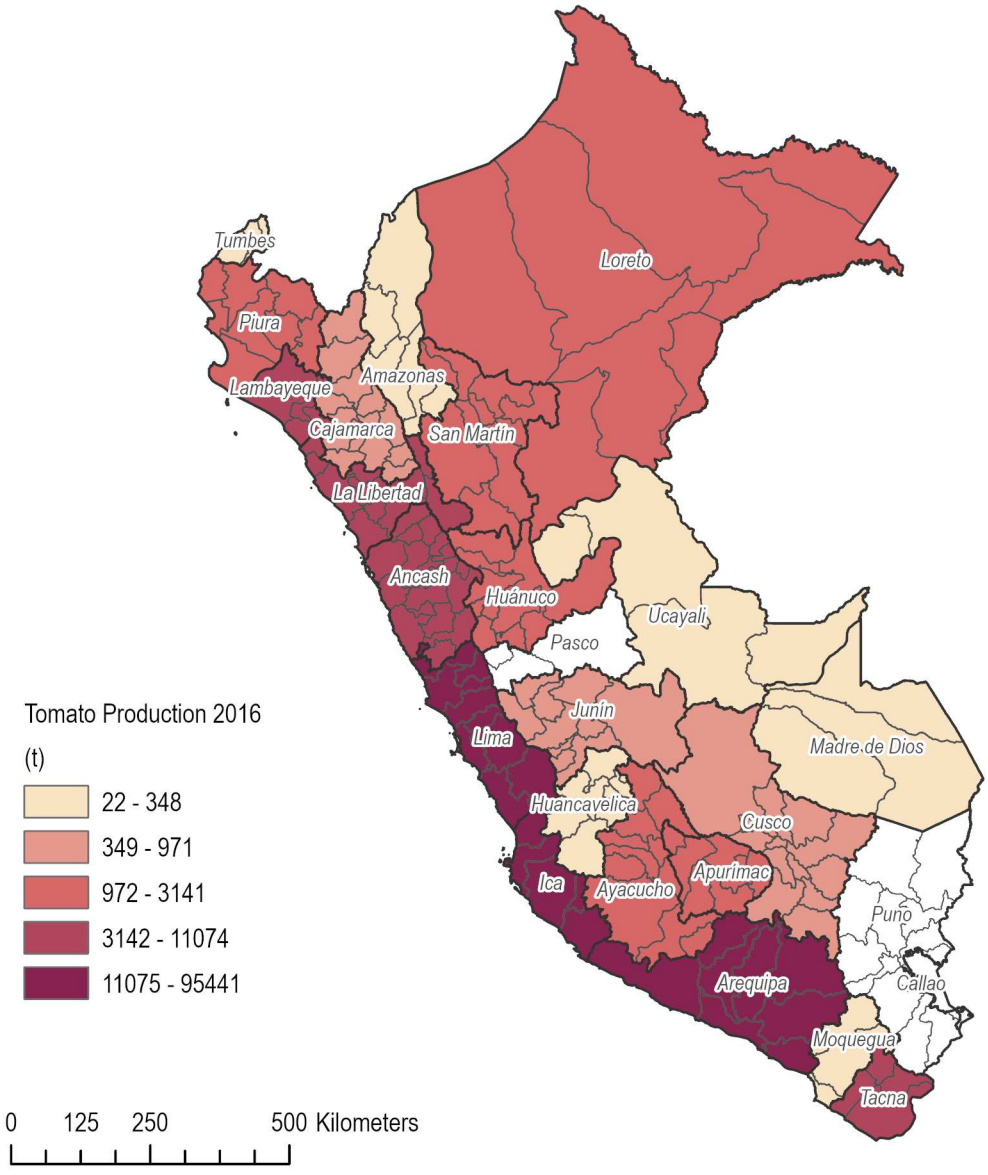


Figura 13. Producción de cultivos de arroz en Perú

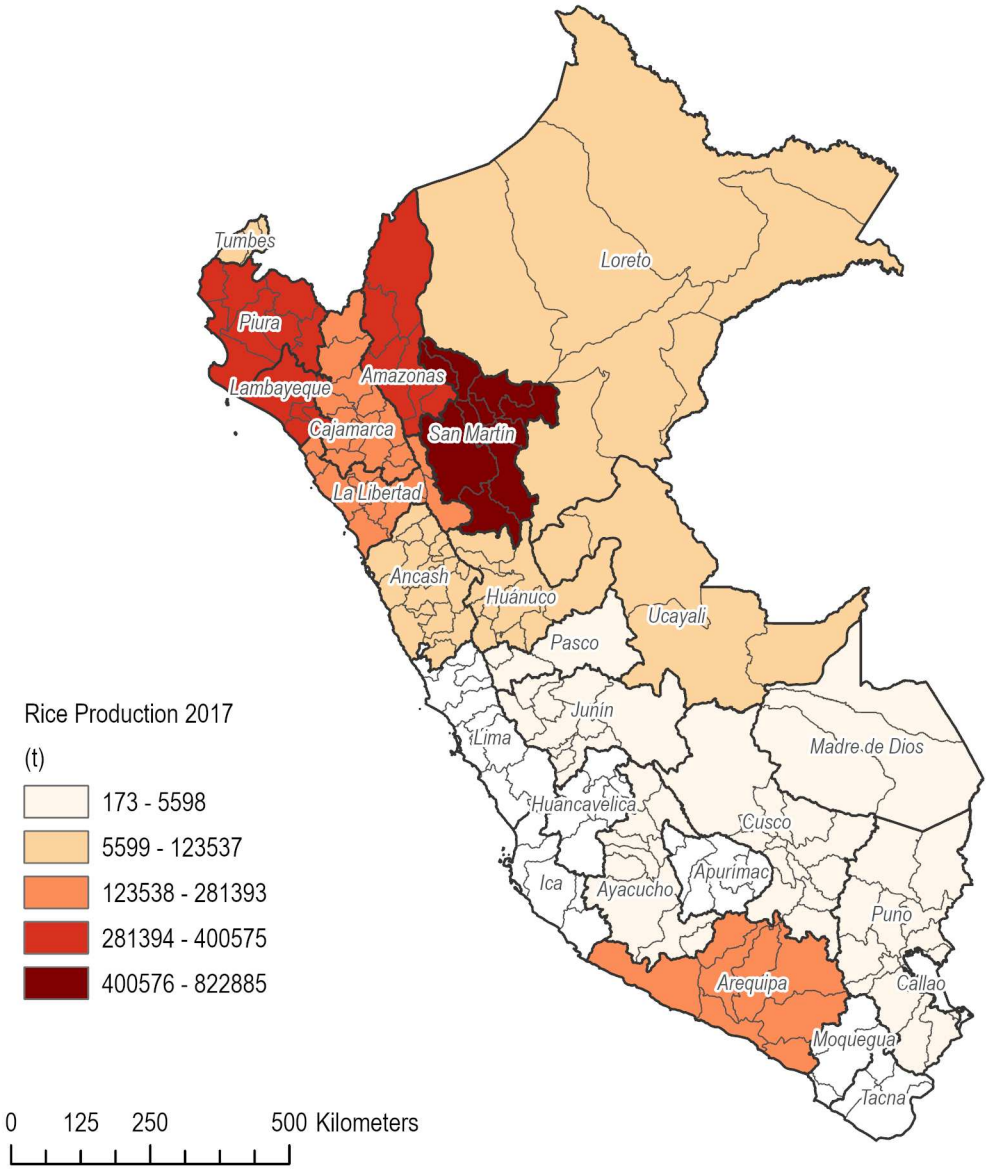


Figura 14. Producción de cultivos de uva en Perú

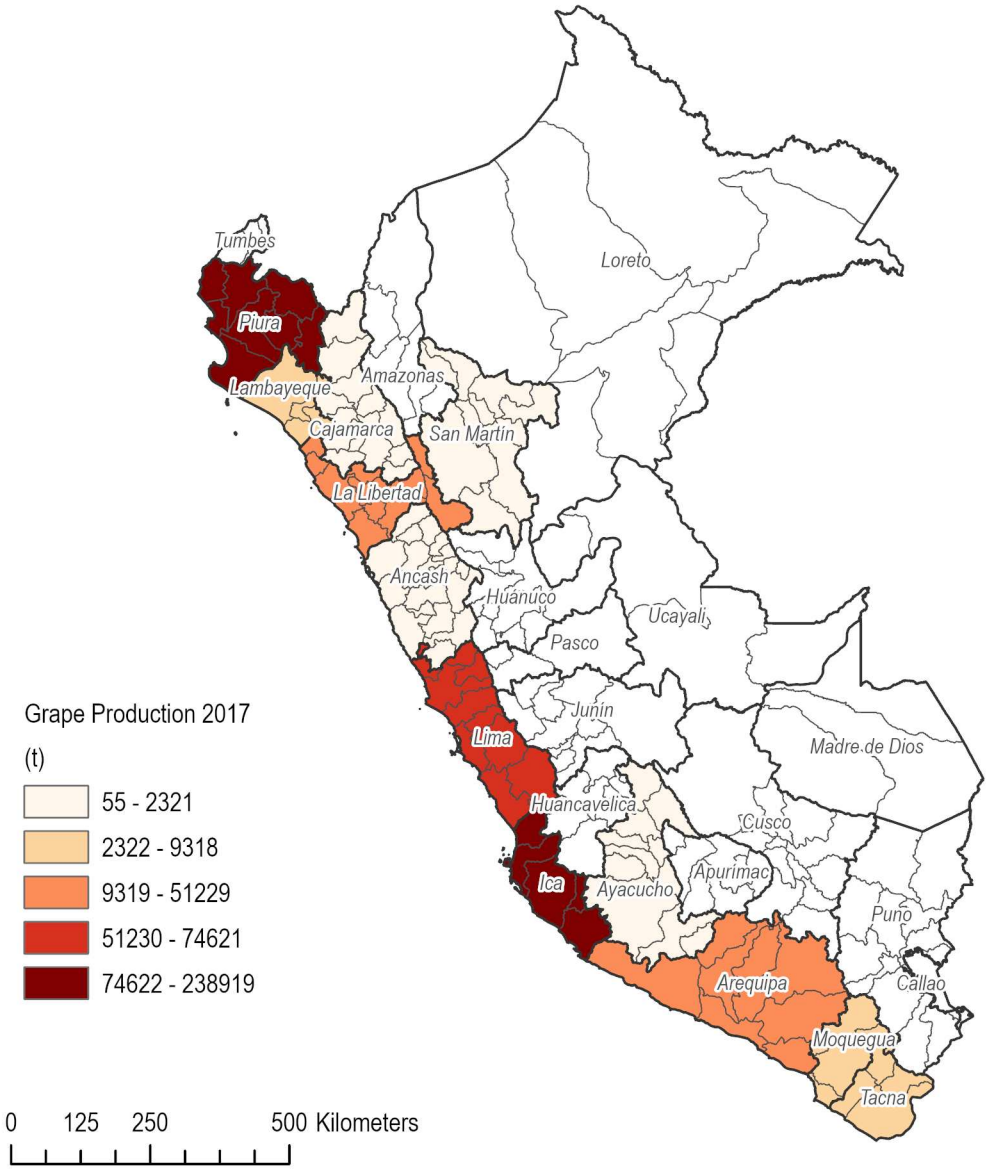
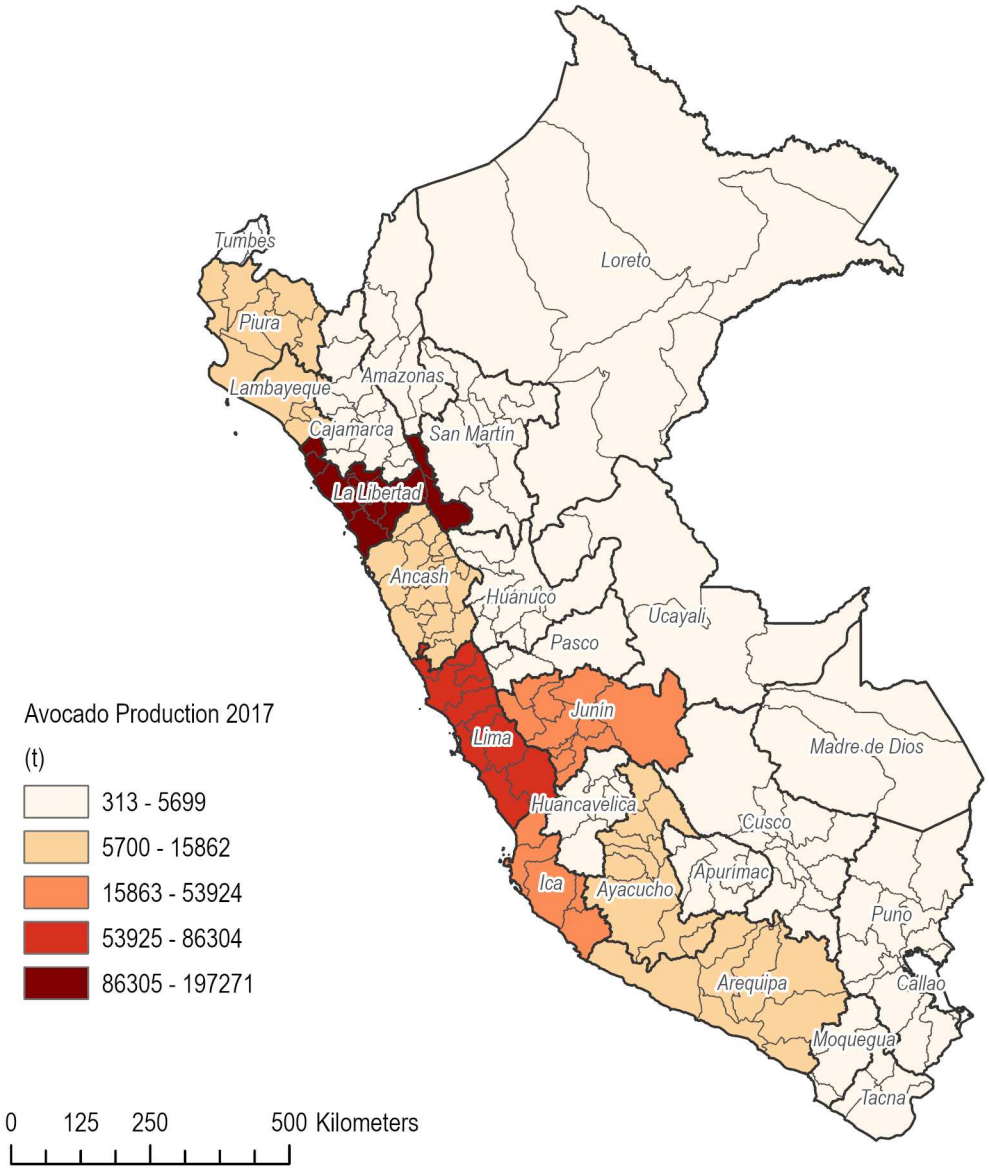


Figura 15. Producción de cultivos para aguacate en Perú



Se analizaron las estadísticas de hectáreas de cultivo para los años 2014 a 2017 para espárragos, maíz, tomates y arroz (Tabla **7**). El área en hectáreas se promedió durante los tres años para cada región y los porcentajes promedio de cada cultivo se calcularon a partir de la cantidad total promedio de cultivo sembrado durante los tres años. Las estadísticas de maíz incluyen maíz con almidón y maíz amarillo. Se analizaron las estadísticas sobre hectáreas de cultivos sembrados en 2017 para aguacate, uva y arroz (Tabla **8**).

Tabla 7 . Principales regiones de cultivo como porcentaje de la producción media total (2014-2017 hectáreas)

Regiones de espárragos	Regiones de maíz	Regiones de tomate
La Libertad (39%)	Cajamarca (11,7%)	Arequipa (16,9%)
Ica (21%)	San Martín (10,1%)	Ica (15,9%)
Lima (13%)	Loreto (7.7%)	Cajamarca (11,6%)
Áncash (13%)	La Libertad (7.2%)	Lima (8,1%)
Lambayeque (13%)	Piura (6,8%)	Pasco (6,8%)
	Cusco (5,7%)	Loreto (6.0%)
	Áncash (5,4%)	Huánuco (5,6%)
	Apurímac (5,3%)	La Libertad (5.5%)
	Huánuco (5,2%)	Tacna (4,1%)
	Lima (4.7%)	Huancavelica (3,4%)

Fuente: ENIS 2017 y EMDA 2014-2015-2016-2017

Tabla 8 . Principales regiones de cultivo como porcentaje de la producción total 2017 (hectáreas)

Regiones de aguacate	Regiones de uva	Regiones de arroz
La Libertad (35,3%)	Ica (40,7%)	San Martín (26,1%)
Lima (16.4%)	Piura (23,7%)	Piura (12,2%)
Ica (9,6%)	Lima (13.3%)	Lambayeque (11,8%)
Junín (9,5%)	La Libertad (8,4%)	Amazonas (10,5%)
Áncash (6,6%)	Arequipa (4,5%)	Loreto (8,2%)
Lambayeque (3,6%)	Lambayeque (3,4%)	La Libertad (7,4%)
Ayacucho (2,7%)	Tacna (2,2%)	Cajamarca (5,6%)
Moquegua (2,4%)	Moquegua (1,4%)	Arequipa (4,8%)
Cusco (2,0%)	Áncash (1,2%)	Ucayali (4,3%)
Piura (1,8%)	Cajamarca (0,5%)	Tumbes (3,4%)

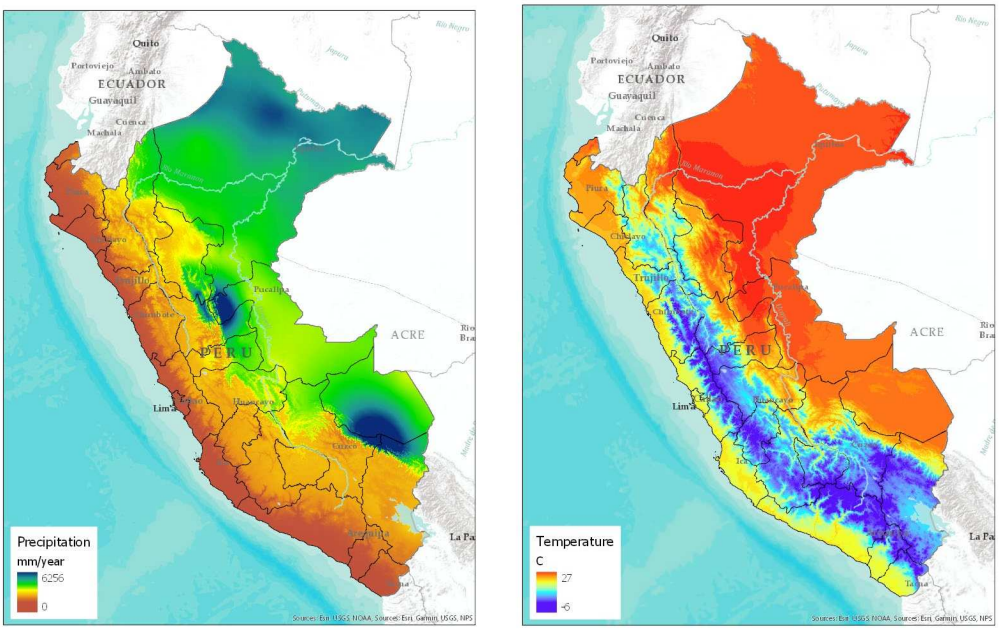
Fuente: Datos-excel-anuario-agricola-2017-171218.xls[3]

6.3 Datos del clima

Las tendencias climáticas se examinaron para Perú utilizando los mapas de resumen anual de WorlClim 1950 – 2000. Tanto la precipitación total anual promedio como la temperatura media anual se examinaron para Perú como se muestra en la Figura 16. La precipitación muestra una tendencia clara seca en el oeste (costero) y húmeda en el este (tropical). Los rangos de temperatura más altos se pueden encontrar en el este y los más bajos en las zonas montañosas del Perú.

[3] Acceso desde _19-May-2019 desde https://www.scribd.com/document/411248782/Datos-Excel-Anuario-Agricola-2017-171218-0

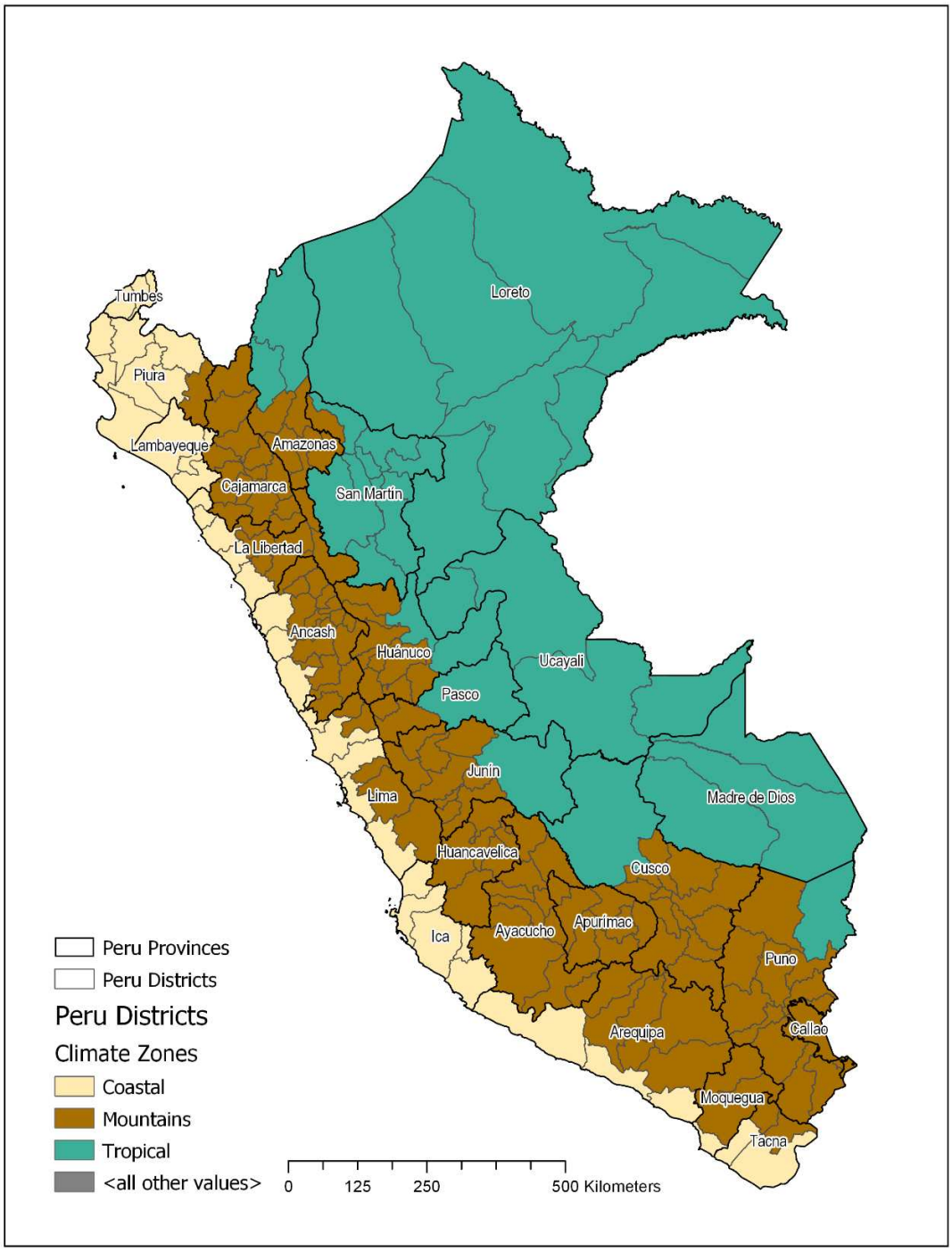
Figura 16. Precipitación y temperatura para Perú



Una evaluación de las estaciones meteorológicas que tienen al menos 10 a 30 años de clima diario resultó en 14 estaciones en el Perú (Figura 17). La evaluación se llevó a cabo utilizando estaciones meteorológicas GSOD (ver sección 8.2). Al observar la precipitación y la temperatura, se observó que había tres zonas climáticas distintas: Costera, montañosa y tropical (Figura 18.).

Figura 17. Estaciones meteorológicas potenciales para Perú

Figura 18. Zonas climáticas para Perú

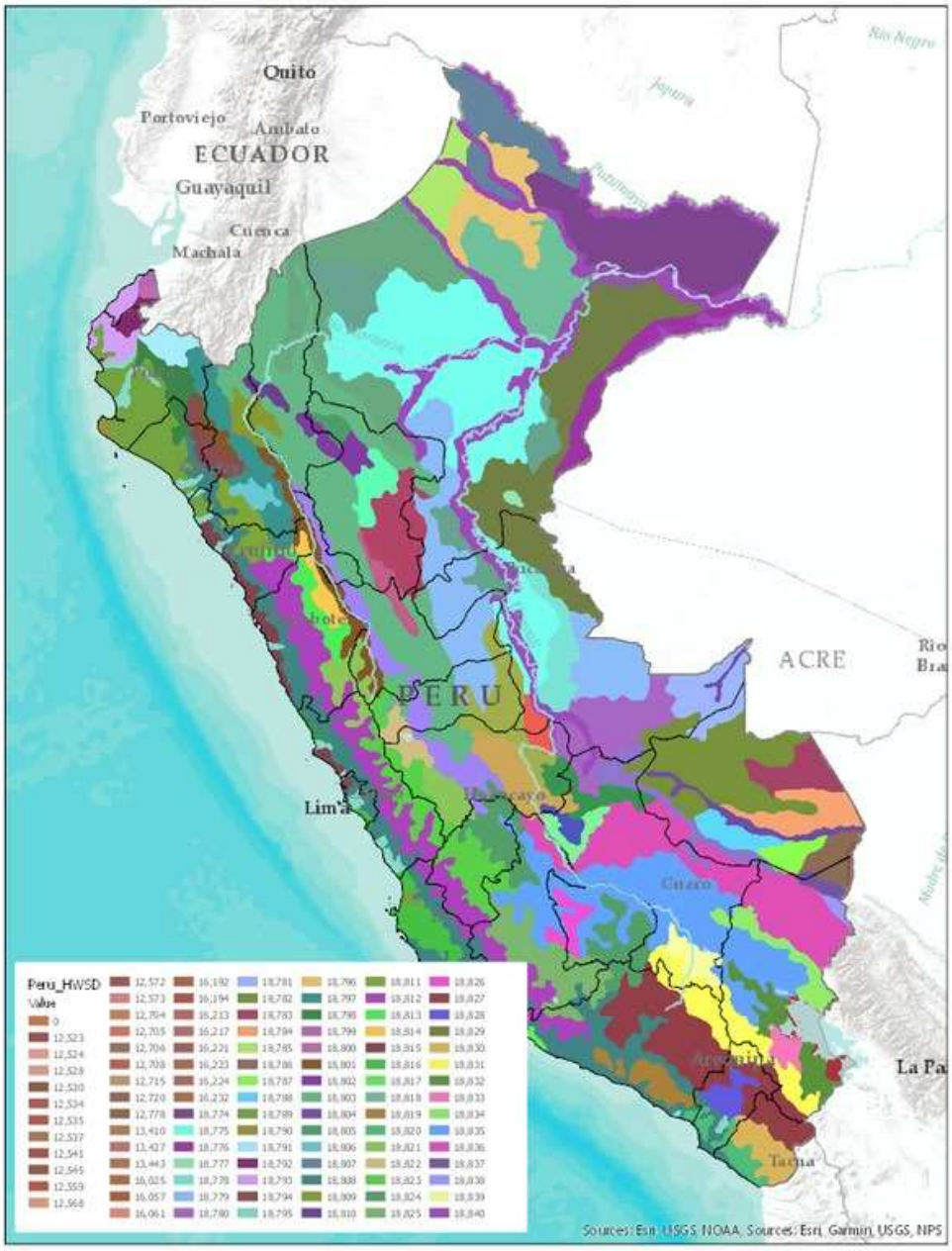


6.4 Datos sobre el suelo y la cubierta terrestre

Los datos de suelos para Perú se obtuvieron de la Base de Datos Mundial Armonizada de Suelos (FAO/IIASA/ISRIC/ISSCAS/JRC, 2012). La HWSD proporcionó información global de suelos a una resolución de 1 km en una formación estandarizada. La base de datos

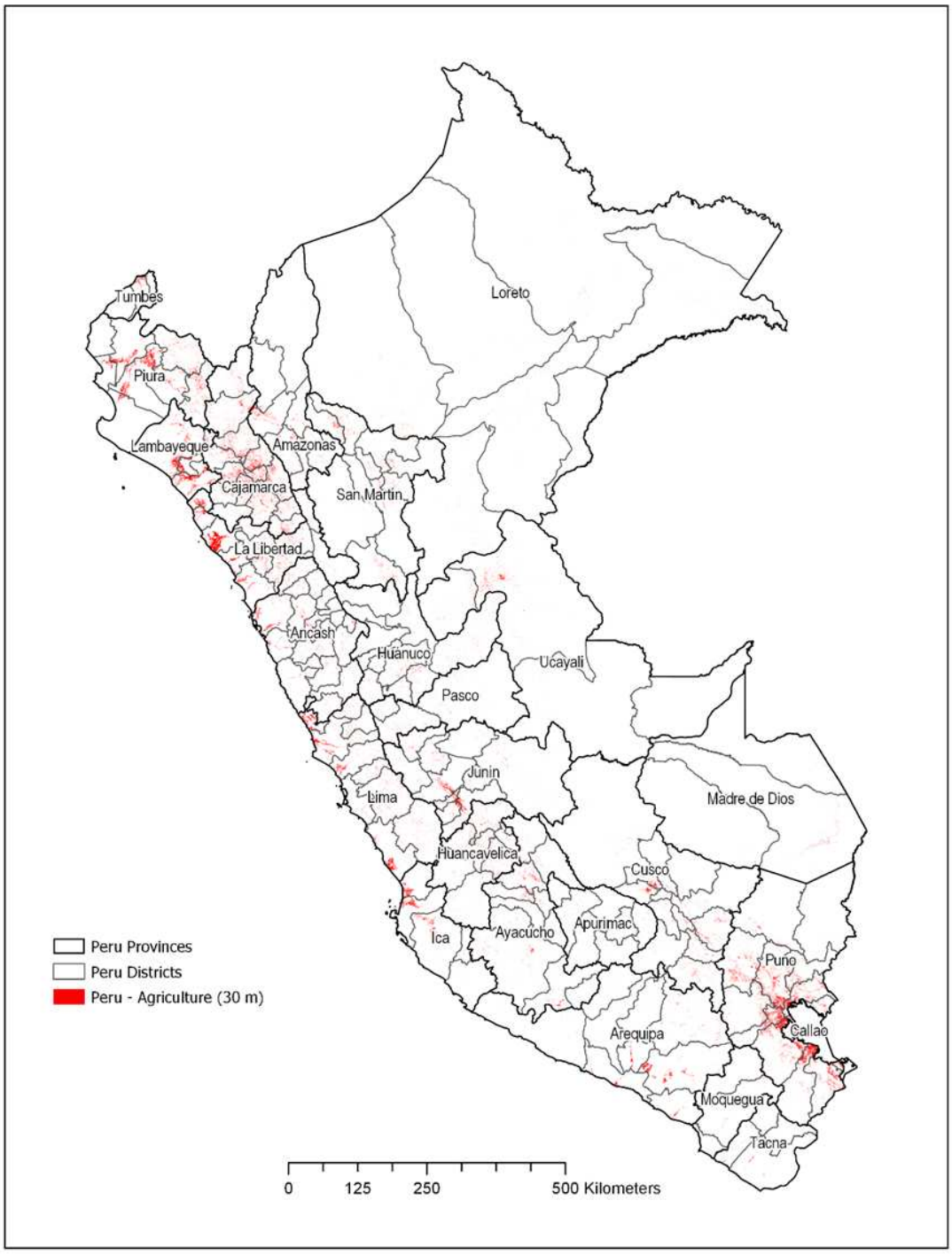
contiene información geográfica sobre la ubicación de los suelos e información de perfil para dos capas de suelos (0-30 cm y 30-100 cm de profundidad). Utilizando un SIG, se extrajeron suelos relevantes para el Perú (Figura 19). Cada unidad de mapeo de suelos contiene un suelo dominante y hasta otros dos suelos. Para efectos del desarrollo del escenario, sólo se consideró la información del suelo dominante.

Figura 19. Distribución de suelos en Perú



Las ubicaciones de los campos agrícolas en Perú se obtuvieron del conjunto de datos Global 30m Cropland Extent 2015. El conjunto de datos Global 30m Cropland es una iniciativa del Proyecto Global Food Security Analysis-Support Data at 30 Meters (GFSAD30) con el objetivo general del GFSAD30 de mapear y producir productos de tierras de cultivo del mundo a una resolución de 30 metros (Thenkabail et al., 2012 y Teluguntla et al., 2014).
La Figura 20 representa la ubicación de los campos agrícolas en el Perú. La capa de campos agrícolas se utilizó como máscara para determinar qué suelos están presentes en condiciones agrícolas.

Figura 20 Distribución de tierras agrícolas en Perú



7 Desarrollo de escenarios de Colombia

7.1 Clima

Para los cultivos originales colombianos, las 12 estaciones meteorológicas que definen ampliamente el paisaje agrícola de bananos, papas y tomates se refinaron utilizando los siguientes pasos:

1. Incluir sólo aquellas estaciones ubicadas en (o muy cerca) de departamentos con los porcentajes más altos de producción de cultivos objetivo nacionales y precipitaciones anuales totales;
2. Las estaciones estaban vinculadas al cultivo objetivo por departamento y se clasificaban en función de la producción de cultivos;
3. Múltiples estaciones en un solo departamento fueron clasificadas de acuerdo con la precipitación anual total;

Seis estaciones en siete departamentos (Antioquia, Atlántico/Magdalena, Huila, Valle del Cauca, Cundinamarca y Norte de Santander) fueron finalmente seleccionadas para representar los cultivos objetivo (

4. 21 y Tabla 9).

Para los cultivos más nuevos, café y arroz húmedo/seco, se agregaron tres nuevas estaciones meteorológicas para tres departamentos (Tolima, Meta y Nariño). Dos de las estaciones meteorológicas existentes también se utilizaron para el café en los departamentos (Antioquia y Huila).

Figura 21. Distribución de 6 estaciones meteorológicas seleccionadas para ANDES

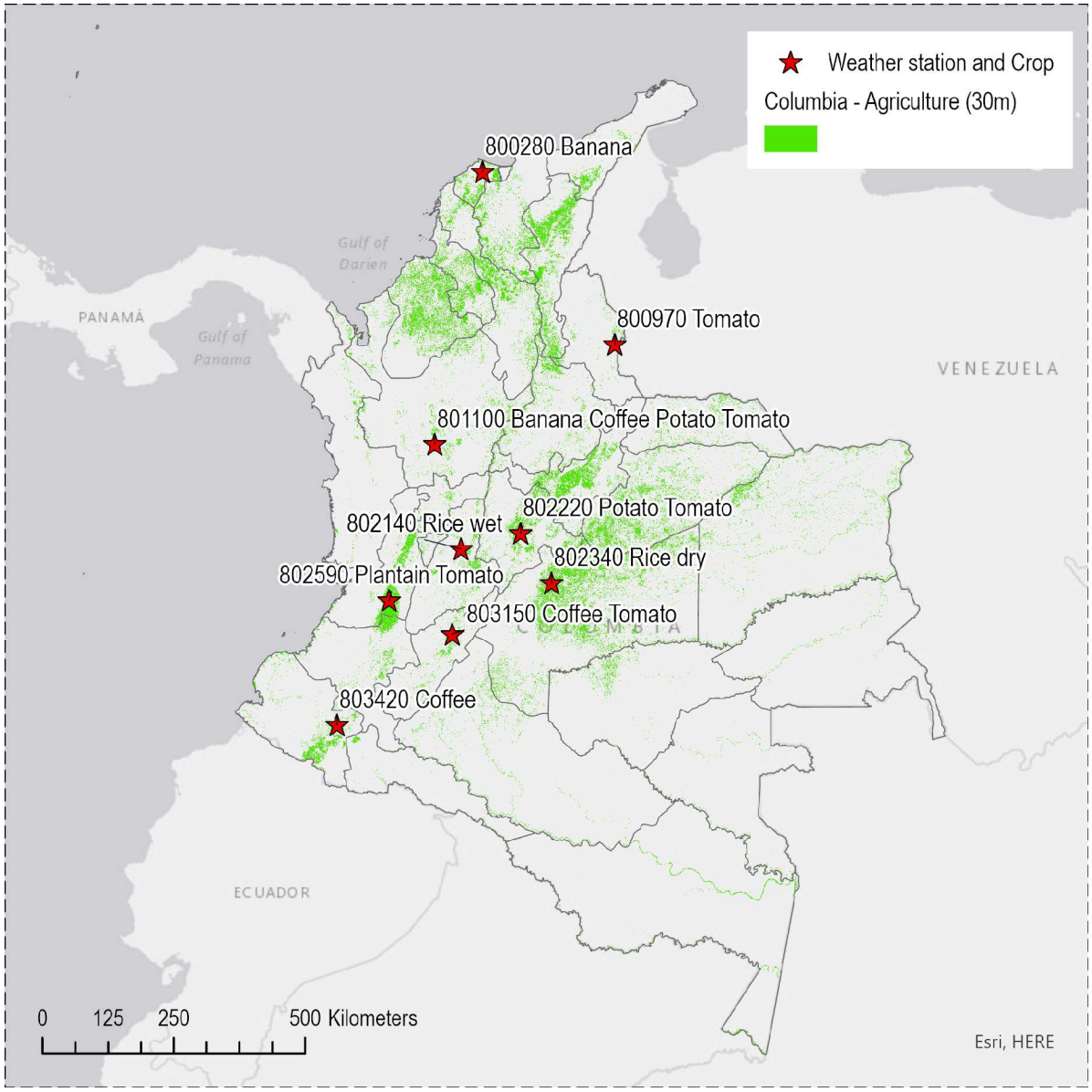


Tabla 9. Estaciones meteorológicas seleccionadas y sus cultivos asignados en ANDES

Id.	Nombre	Dpto.	Lat.	Longitud	Elevación	Cultivos
801100	Medellín	Antioquia	6.22	-75.60	1499 m	Papa, Banano, Tomate, Café
800280	Barranquilla	Atlántico / Magdalena	10.88	-74.78	30 m	Banano
803150	Neiva	Huila	2.97	-75.30	443 m	Tomate, Café
802590	Cali	Valle del Cauca	3.55	-76.38	969 m	Plátano, Tomate
802220	Bogotá	Cundinamarca	4.70	-74.13	2546 m	Tomate, Papa
800970	Cúcuta	Norte de Santander	7.93	-72.52	317 m	Tomate
802140	Perales	Tolima	4.42	-75.13	949 m	Arroz húmedo
802340	Vanguardia	Meta	4.17	-73.61	425 m	Arroz seco
803420	Antonio Nariño	Nariño	1.393	-77.29	1814 m	Café

Originalmente, los bananos/plátanos estaban representados por 3 estaciones ubicadas en los 3 departamentos de mayor producción de banano que representaban el 79% de la producción nacional de banano. A partir de las estadísticas agrícolas de 2013 (DANE, 2016), las 3 estaciones representan el 21% de la producción nacional de banano, pero aún incluyen el departamento de mayor producción de banano (Antioquia). Los tomates están representados por 5 estaciones ubicadas en 3 de los 6 departamentos de mayor producción de tomate y el 33% de la producción nacional de tomate en 2013. Antioquia fue el segundo departamento productor de tomate detrás de Santander (9,9%). En 2005, los departamentos seleccionados de tomate representaron el 53% de la producción nacional de tomate. Las papas están representadas por 2 estaciones ubicadas en los departamentos de mayor producción y cuarto mayor productor de papa que representan el 49% de la producción nacional de papa en 2005 y 2013. El arroz está representado por 2 estaciones meteorológicas ubicadas en los departamentos de mayor producción de arroz y el tercero mayor productor que representan el 38% de la producción nacional de arroz en 2013. Tres estaciones representan el café (norte, centro y sur) y se encuentran en los 2 principales departamentos de cultivo de café y el noveno más alto en 2013. Las 3 localidades representan el 35% de la producción nacional de café en 2013. Las estadísticas de producción de cultivos para los departamentos seleccionados se muestran en la Tabla 10 .

Tabla 10 . Producción de cultivos en % de la producción nacional de 2013 (hectáreas)

Regiones Bananeras/Plataneras	Regiones de Papa	Regiones de Tomate	Regiones de Arroz	Regiones Cafeteras
Antioquia (14%)	Antioquia (6%)	Antioquia (9%)	Meta (15%)	Antioquia (15%)
Magdalena (2%)	Cundinamarca (43%)	Cundinamarca (7%)	Tolima (23%)	Huila (15%)
Valle del Cauca (5%)		Huila (4%)		Nariño (5%)
		Norte de Santander (6%)		
		Valle del Cauca (7%)		

Fuente: DANE (2016).

Los registros completos de series de tiempo diarias para precipitación, temperatura y evaporación de bandeja para un período de 30 años son ideales para cada escenario climático ejecutado en ANDES. Los registros climáticos diarios de las 6 estaciones originales de GSOD seleccionadas para representar las condiciones de los cultivos objetivo en Colombia formaron la base de cada uno de los escenarios climáticos. Debido a que cada una de las estaciones GSOD reportó registros diarios de temperatura y precipitación durante diferentes períodos de tiempo (*es decir,* 1950-2000 o 1975-2006) y con datos faltantes, fue necesario aplicar un enfoque basado en estadísticas para llenar el vacío de los constituyentes faltantes y estandarizar los períodos de registro. Para los 6 escenarios climáticos, se generaron registros sintéticos de precipitación diaria, temperatura y evaporación de bandeja para un período idéntico de 30 años a partir de los datos de GSOD utilizando la herramienta ClimGen (http://www.bsyse.wsu.edu/climgen) de la Universidad Estatal de Washington. El Generador Climático había sido validado con éxito mediante la comparación de datos meteorológicos simulados y observados (Figura 22). Una descripción detallada del estudio de validación se puede encontrar en el sitio web de la Universidad Estatal de Washington (http://www.bsyse.wsu.edu/climgen).

Figura 22. Comparación de parámetros meteorológicos simulados y medidos obtenidos del estudio de validación del Generador Climático

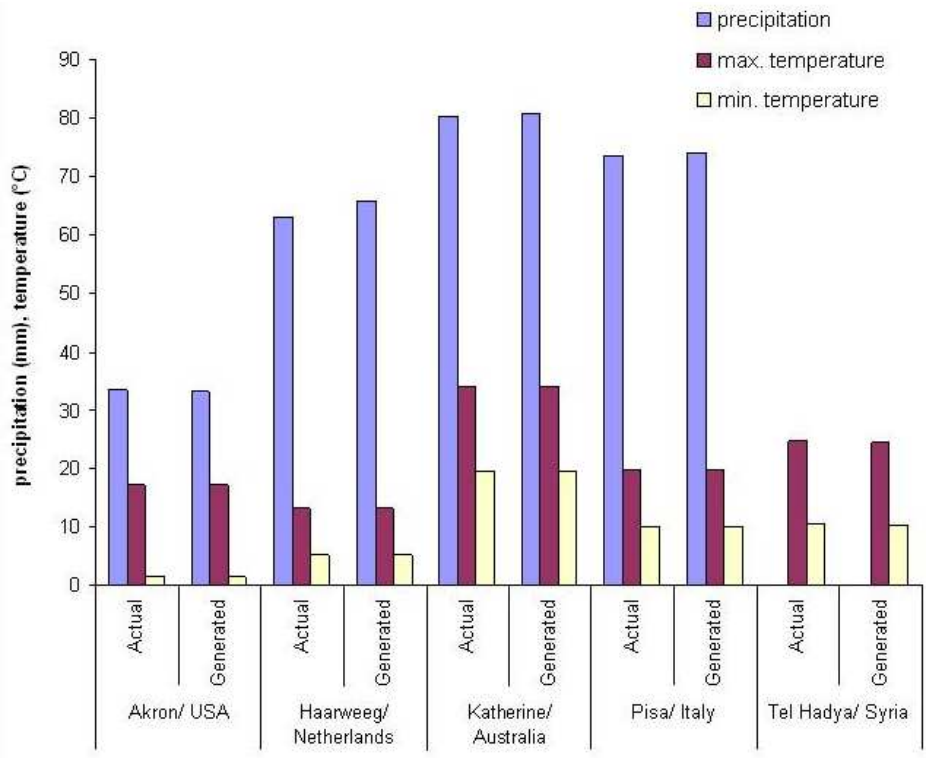


Gráfico basado en datos de http://www.bsyse.wsu.edu/climgen

Cada una de las 6 estaciones GSOD se clasificó de acuerdo con su precipitación anual total (a partir de los datos diarios) desde el inicio de la estación (que varía por estación) hasta 2006. Los registros diarios de los 25 años más altos para cada estación fueron elegidos para usar con ClimGen. El propósito de seleccionar los años-estación con la precipitación más alta era mantener el conservadurismo eliminando los años con la menor precipitación, que son más propensos a tener el mayor número de registros faltantes. Preservar un conjunto de 25 años era necesario para que ClimGen generara registros diarios confiables durante un período de 30 años con características estadísticas similares a los datos de GSOD de los que se derivó.

Los escenarios climáticos más recientes solo tienen 10 años de datos meteorológicos y están en departamentos con precipitaciones relativamente altas (Tolima, Meta, Nariño). La precipitación total media anual y la temperatura media para todas las estaciones meteorológicas en escenarios climáticos se muestran en la Tabla 11 . El Apéndice C muestra las ubicaciones de las estaciones meteorológicas con producción de cultivos ara cada escenario de cultivos. El Apéndice C también incluye una comparación de los datos meteorológicos actuales del banano (estaciones meteorológicas 80110 y 800280) con datos meteorológicos más recientes (2010 a 2017).

Tabla 11 . Estadísticas de estaciones meteorológicas de Colombia en ANDES

ID de la estación	Nombre	Dpto.	Número de Años	Precipitación Anual Media (mm)	Temperatura Media (oC)	Cultivos
801100	Medellín	Antioquia	30	1116.1	22.2	Papa, Banano, Tomate, Café
800280	Barranquilla	Atlántico / Magdalena	30	507.5	28.3	Banano
803150	Neiva	Huila	30	785.1	28.0	Tomate Café
802590	Cali	Valle del Cauca	30	525.5	24.3	Plátano, Tomate
802220	Bogotá	Cundinamarca	30	599.3	13.5	Tomate, Papa
800970	Cúcuta	Norte de Santander	30	500.5	27.6	Tomate
802140	Perales	Tolima	10	1380.7	25.3	Arroz húmedo
802340	Vanguardia	Meta	10	3556.3	27.2	Arroz seco
803420	Antonio Nariño	Nariño	10	1060.6	20.2	Café

7.2 Selección de suelos para escenarios de Colombia

El objetivo del proyecto era definir un suelo con escorrentía relativamente conservador. Por lo tanto, el suelo debe ser de la clase de drenaje de imperfectamente drenado hasta pobremente drenado. Con base en la intersección previamente mencionada de la base de datos SOTERLAC de suelos y las estadísticas de cultivos, se determinó que el suelo CO47 era el que mejor encajaba con estos criterios. Se encontró que le suelo CO47 existía en todos los departamentos en donde se reportó que se cultivaban papas, tomates, bananos, arroz seco, y café. Debe anotarse que el suelo CO47 va desde el que está bien drenado hasta el imperfectamente drenado y el pobremente drenado. Sin embargo, cuando se dan los parámetros para ANDES los números de la curva fueron fijados para representar un suelo hidrológico “C” que es propenso a la escorrentía, pero no el peor caso que sería el suelo hidrológico “D” para evitar un escenario excesivamente conservador. Tabla 12 enumera datos de perfil de suelos incorporados en el fichero de entrada de PRZM. Obsérvese que el modelo utiliza capacidad del campo y el punto de marchitamiento como parámetros de la entrada en vez de textura.

Tabla 12. Perfil de suelo seleccionado para todos los escenarios de escorrentía

Profundidad	Capacidad del campo (-)	Punto de marchitamiento (-)	OC (%)	Densidad aparente (g/cm^3)
0 - 10	40.1	20.4	3.10	1.01
10 - 20	40.1	20.4	3.10	1.01
20 – 40	38.0	21.7	0.86	1.30
40 – 60	34.9	22.2	0.40	1.43
60 - 100	43.9	29.9	0.02	1.44

La base de datos de SOTERLAC proporciona los valores representativos para el contenido de la arena y el carbono orgánico para este grupo del suelo, que consta de 3 unidades del suelo diferentes. El contenido representativo de arena es de 19,6 % para este suelo, el contenido representativo de carbono orgánico es de 4,3 %. En el actual escenario del suelo, se usa un contenido de carbono orgánico más bajo, de 3,1%. Este valor se origina de la unidad media de suelo dentro de la asociación de suelo CO47. Las comparaciones con todos los suelos de porcentaje de arena y carbono orgánico en el suelo seleccionado se muestran en la Figura 23 y Figura 24, respectivamente.

Figura 23. Comparación del contenido de la arena de la unidad seleccionada CO47 del suelo con todas las unidades del suelo en Colombia

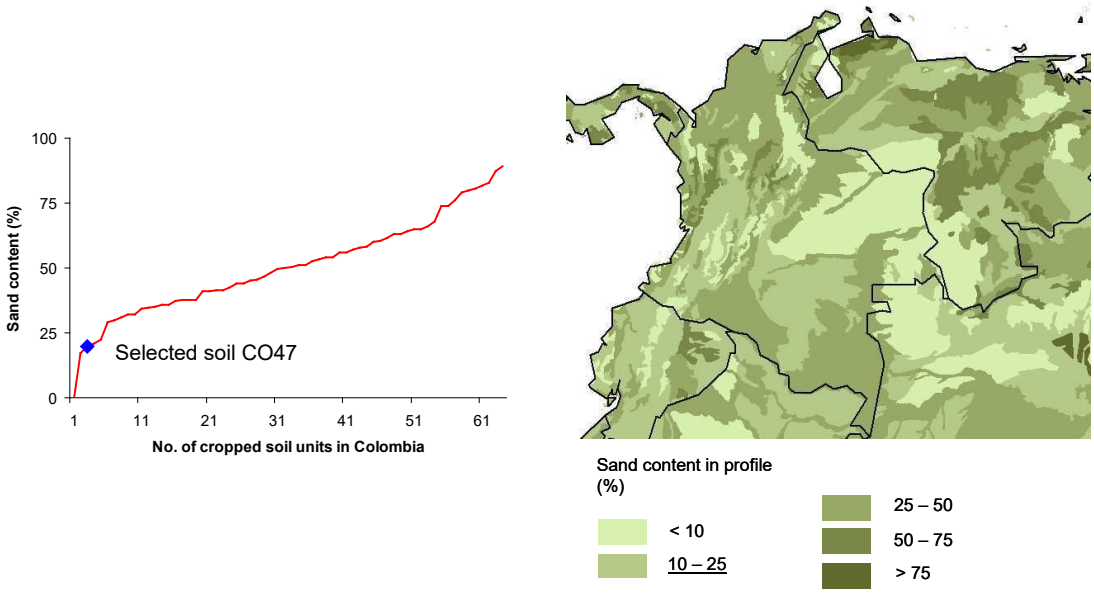
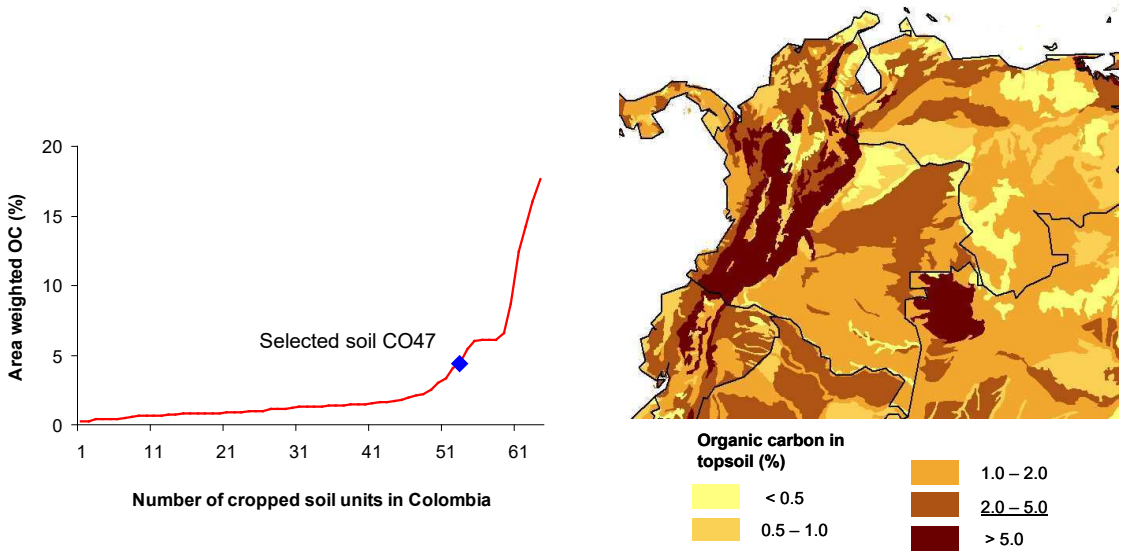


Figura 24. Comparación del contenido del carbono orgánico de la unidad de suelo CO47 seleccionada con todas las unidades del suelo en Colombia



Para el escenario de arroz húmedo, las propiedades del suelo fueron seleccionadas de los estudios en el campo realizados en el departamento de Tolima (Takeda, y otros, 2019). La capacidad del campo y el punto de marchitamiento son 32 y 26, respectivamente. La densidad aparente es de 1,42 g/cm^3 con un carbono orgánico de 1,48%.

7.3 Escenarios de Cultivos

ANDES contiene 5 escenarios diferentes de cultivos para Colombia (banano, papa, tomate, café, y arroz seco) para las simulaciones del winPRZM. Para los tomates y las papas de Colombia, los ciclos de la dos-cultivos se calculan por separado. Un total de 21 escenarios de cultivos usando winPRZM. Además, hay dos escenarios de arroz húmedo que representan ciclos de dos cultivos y que son modelados con RICEWQ. Los mapas que muestran la localización de los diferentes escenarios dentro del contexto de la producción nacional de bananos/plátanos, tomates, papas, café y arroz se dan en el Apéndice C.

Las fechas típicas para la germinación o aparición y la cosecha, al igual que otros parámetros del cultivo fueron asignados según la práctica agrícola en Colombia (Tabla 13). La cubierta máxima de tierra, la profundidad de las raíces, y la altura de los bananos se actualizaron de los escenarios de 2008 y las papas se actualizaron a un ciclo de la dos-cultivos. Apéndice D presenta los archivos del escenario del winPRZM para cada panorama colombiano y los archivos EXAMS.

Tabla 13 . Parámetros de cultivos usados en escenarios de escorrentía y arroz en Colombia

Escenario de Cultivos	Cubierta terrestre máxima	Profundidad máxima de raíces	Altura máxima del dosel	Pendiente	Día de germinación	Día de máxima cubierta de cultivo	Día de cosecha
Banano	90%	120 cm	300 cm	2%	1 enero	10 enero	31 dic
Plátano	90%	150 cm	250 cm	2%	1 enero	10 enero	31 dic[ha]
Papa 1er ciclo	95%	60 cm	90 cm	2%	1 de mayo	15 de agosto	1 sept.
Papa 2do ciclo	95%	60 cm	90 cm	2%	15 nov	1º mar.	20 de marzo
Tomate 1er ciclo	80%	90 cm	150 cm	2%	1 sept.	15 nov	31 enero
Tomate 2do ciclo	80%	90 cm	150 cm	2%	1º mar.	15 de mayo	31 de julio
Café (norte)	100%	100 cm	250 cm	16%	1 enero	10 enero	31 dic
Café (central)	100%	100 cm	250 cm	38%	1 enero	10 enero	31 dic
Café (sur)	100%	100 cm	250 cm	30%	1 enero	10 enero	31 dic
Arroz seco	80%	60 cm	100 cm	1,7%	16 de abril	10 jun	15 sept.
Arroz húmedo 1er ciclo	80%	--	--	--	16 de abril	30 jun	15 de agosto
Arroz húmedo 2do ciclo	80%	--	--	--	1 sept.	15 nov	31 de diciembre

[a] los bananos, los plátanos y el café se simulan como cultivos perenes por lo tanto el cultivo se simula como si estuviera maduro durante todo el año

8 Desarrollo de escenarios de Perú

El desarrollo de los escenarios en el modelo para Perú fue realizado de manera ligeramente diferente pero más refinada comparados con aquellos para Colombia. Las secciones siguientes detallan la selección junto con el Apéndice E . Se muestran mapas en el Apéndice F que indican la ubicación de los diversos escenarios dentro del contexto de la producción nacional de espárragos, maíz, tomates, uvas, arroz y aguacate. El Apéndice G enumera los archivos de escenarios de winPRZM para los escenarios de Perú.

8.1 Selección de suelos para Perú

La selección de suelos representativos para uso en los escenarios del modelo se guio por una serie de criterios de selección, que incluyeron:

1. El cultivo o cultivos de interés deben estar presentes en la provincia o distrito superpuesto
2. Los suelos deben estar bajo producción agrícola
3. Los suelos no pueden estar a más de 50 km de una estación meteorológica
4. Los suelos deben tener por lo menos un 5% de área

5. Los suelos deben ser del grupo de suelo hidrológico (HSG) D o C con base en la capacidad del campo

Se evaluaron los criterios 1 - 3 usando GIS y los criterios 4 y 5 se evaluaron en una hoja de cálculo MS Excel® En el GIS se ejecutaron los siguientes pasos de análisis:

- Crear capas con los límites administrativos de Perú, incluidas las provincias y los distritos (Figura 9)
- Añadir datos de producción de cultivos al mapa administrativo (Figura 10, Figura 11y Figura 12)
- Generar el mapa de la zona climática (Figura 18.) y agregar datos a la capa administrativa y de cultivo resultante de las dos acciones anteriores
- Extraer los datos agrícolas de 30 m para Perú del conjunto de datos de Extensión Global de Tierras de Cultivo de 30 m 2015 (Global 30m Cropland Extent) (

20)

- Volver a muestrear los datos de HWSD de 1 km a 30 m para que coincidan con el conjunto de datos Global 30m Cropland Extent 2015
- Recortar los datos de HWSD en la capa de tierras agrícolas creada en el paso anterior
- Calcular la producción de cultivos normalizada en toneladas / píxel con la herramienta de geoprocesamiento ArcGIS Zonal Statistics (las cifras de densidad de cultivos se muestran en el Apéndice F)
- Combinar (usando la herramienta de geoprocesamiento Intersect) los datos de cultivos y las tierras agrícolas
- Convierta la trama de capa resultante en una capa de polígono.
- Volver a proyectar los datos (utilizando la herramienta de geoprocesamiento del proyecto) de una proyección de mapa Geographic a una de Albers Equal Area para garantizar que tengamos unidades lineales como el metro con la cual trabajar en lugar de grados decimales
- Regular las estaciones meteorológicas (Figura 17) en 50 km (Figura 25) utilizando la herramienta de geoprocesamiento ArcGIS Buffer
- Extraer (usando la herramienta de geoprocesamiento ARCGIS Clip) las unidades administrativas combinadas / zonas climáticas / producción de cultivos / capa de tierras agrícolas usando la zona de influencia de 50 km (Figura 26)

- En el paso final de GIS, se extrajeron los datos del suelo para cada cultivo y se trasladaron a una hoja de cálculo de MS Excel. Para cada cultivo se seleccionaron los registros relevantes utilizando los siguientes criterios de selección:
    - Distrito o Provincia
    - Zona climática
    - GSOD (estación meteorológica)
    - Suelo
    - Densidad de producción de cultivos

En el Apéndice E se proporcionan notas detalladas paso a paso, incluidas acciones más pequeñas, sobre el trabajo de SIG, y en el Apéndice F se muestran mapas de las propiedades del suelo.

Figura 25 . Zona de amortiguación de 50 km alrededor de las estaciones meteorológicas con al menos 20 años de datos meteorológicos diarios

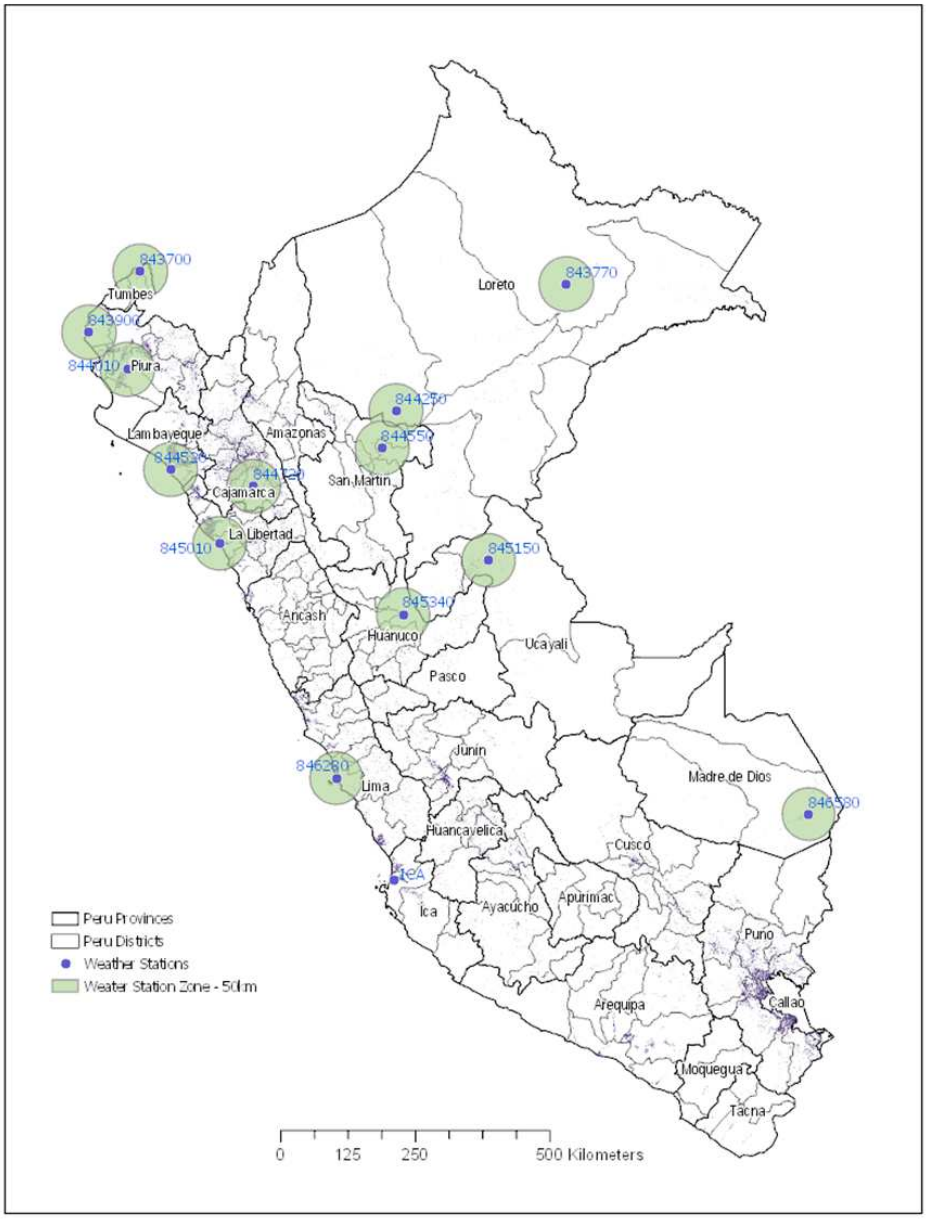
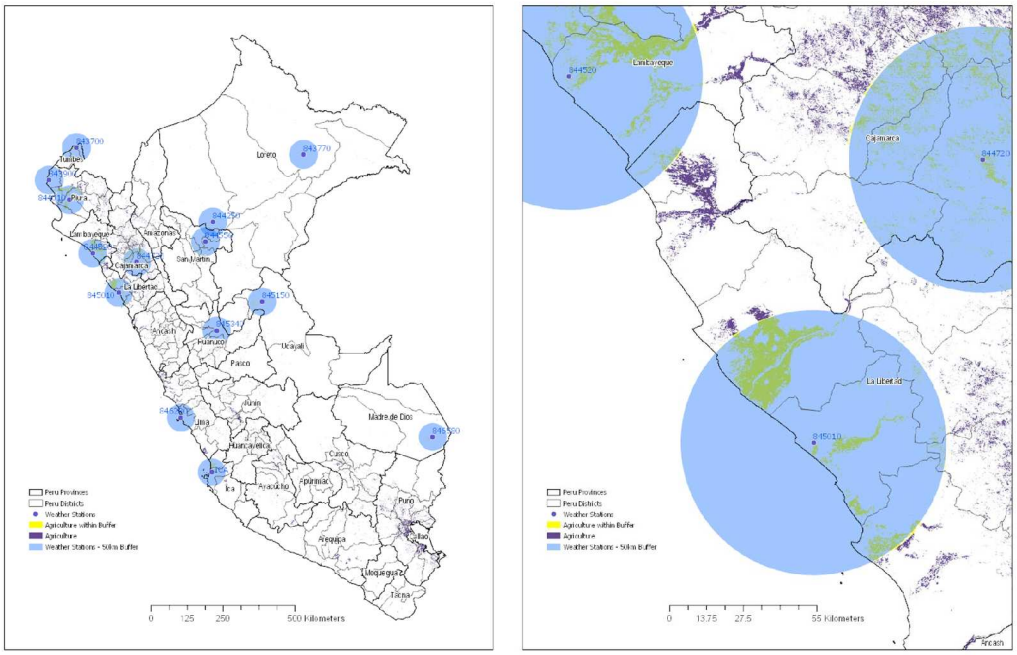


Figura 26. Suelos agrícolas dentro de la zona de amortiguación de 50 km desde una estación meteorológica con vista de cerca mostrada a la derecha



En la hoja de cálculo de MS Excel, la capacidad de campo para cada suelo se calculó con base en la ecuación de Rawls y Brakensiek (Rawls y Brakensiek, 1982). Después, para cada suelo se calculó el área total y la fracción del suelo dentro de la zona de amortiguación de 50 km. En el paso final de selección, los suelos se clasificaron según la capacidad del campo y la precipitación. El Apéndice E muestra la clasificación de suelos para cada cultivo y la distribución acumulativa asociada para el área.

Para tomates, maíz y espárragos, se seleccionaron los suelos con> 5% de área dentro de las áreas de amortiguación de 50 km para cada uno de estos cultivos. Usar estos criterios significó que se seleccionaron suelos en las zonas costeras o montañosas, y no se seleccionó la zona tropical (precipitación más alta) para estos cultivos. Para el tomate y el maíz, los suelos dentro de Piura se eliminaron por recomendación de los expertos peruanos en que Piura no es un área de alta producción para estos cultivos. El subconjunto de suelos que cumplían con los criterios se clasificó por capacidad de campo (de mayor a menor), precipitación (de mayor a menor) y área (de mayor a menor). Se seleccionaron la capacidad de campo y la precipitación para clasificar, ya que estos parámetros son los principales impulsores de la vulnerabilidad a la escorrentía. El área cumulativa de aproximadamente el percentil 10° superior del subconjunto de suelos se seleccionó como el suelo de primera elección para el escenario. Para tomates y maíz, se seleccionó el área cumulativa de aproximadamente el percentil 10° del área cumulativa de todos los suelos de cultivo dentro de la zona de amortiguación de 50 km.

Para aguacate, solo se evaluaron los suelos de La Libertad por ser la región con mayor producción. Igualmente, la mayor parte de la producción de aguacate está más cerca de la estación meteorológica W845010, por lo que solo se analizaron los suelos dentro de esa región y dentro de los 50 km de la estación meteorológica. Estos suelos se clasificaron por capacidad de campo (de mayor a menor) y área (de mayor a menor), luego se seleccionó el suelo del percentil 10° superior basado en el área cumulativa. Este mismo tipo de evaluación

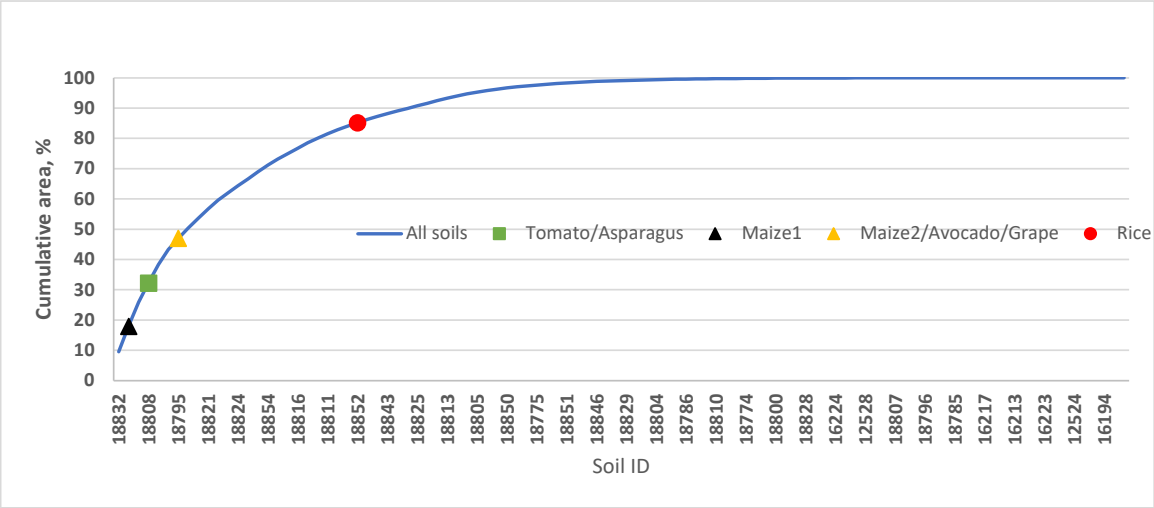
se realizó para las uvas, excepto que solo se analizaron los suelos de Piura e Ica. Para el arroz, solo se evaluaron los suelos en San Martín y San Martín se encuentra en la zona tropical para precipitación. Los expertos peruanos recomendaron limitar la selección de suelos en las regiones productoras de uvas y arroz.

Tabla 14 muestra las propiedades del suelo seleccionadas para los escenarios para la capa superficial. Figura 27 y **Figura** 28. muestran los suelos en contexto con todos los suelos agrícolas peruanos y en contexto con los suelos cercanos a una estación meteorológica, respectivamente.

Tabla 14. Propiedades para suelos seleccionados

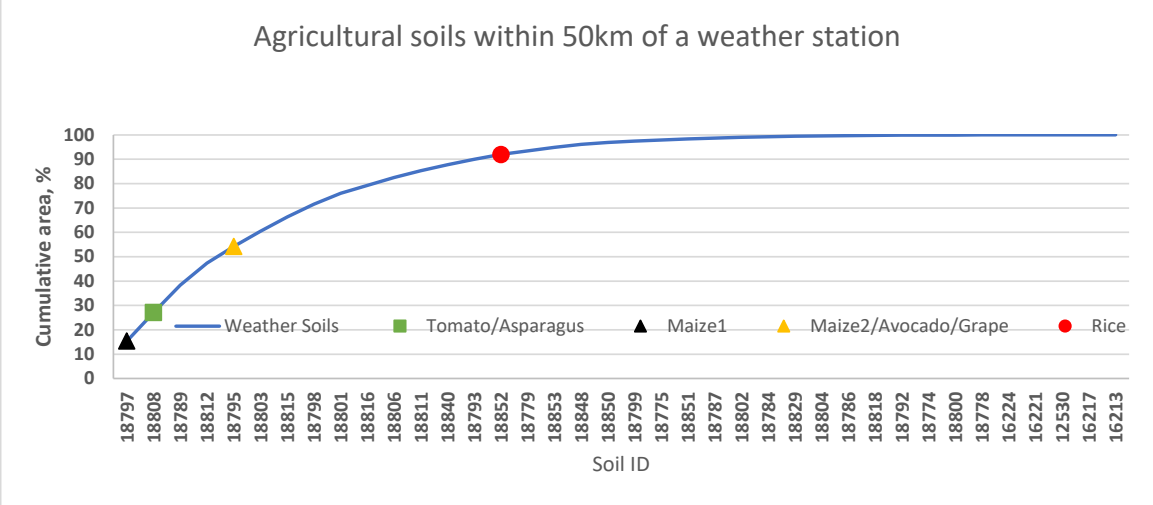
Cultivo	Región	ClimZone (estación meteorológica)	Identificación del suelo	% Arcilla	%Arena	OC (%)	Densidad a granel (g/cc)	HSG	Textura
Espárragos	La Libertad	Costero (845010)	18808	16	54	0.26	1.46	C	Arenosos Limosos
Tomate	Cajamarca	Montañas (844720)	18808	16	54	0.26	1.46	C	Arenosos Limosos
Tomate	La Libertad	Costero (845010)	18808	16	54	0.26	1.46	C	Arenosos Limosos
Maíz	Cajamarca	Montañas (844720)	18797	45	24	1.75	1.25	D	Arcilla
Maíz	La Libertad	Costero (845010)	18795	20	38	0.32	1.40	D	Limoso
Aguacate	La Libertad	Costero (845010)	18795	20	38	0.32	1.40	D	Limoso
Uvas	Piura	Costero (844010)	18795	20	38	0.32	1.40	D	Limoso
Arroz	San Martin	Tropicales (844550)	18852	45	24	1.75	1.25	D	Arcilla

Figura 27. Selección de suelos en contexto con respecto a todos los suelos agrícolas del Perú (clasificados en área de mayor a menor)



* Maíz1 = Suelo 18797; Maíz2 = Suelo 18795

Figura **28.** **Selección de suelos en contexto con respecto a los suelos agrícolas del Perú dentro de 50 km de las estaciones meteorológicas (clasificados en área de mayor a menor)**



* Maíz1 = Suelo 18797; Maíz2 = Suelo 18795

8.2 Clima

Los datos se obtuvieron de NOAA (NOAA, 2018) para el período 1973 - 2018 para la estación Resumen Global del Día (GSOD) 844720 Cajamarca, de la Región Cajamarca y Provincia de Cajamarca con una latitud de -7.1413 y longitud de -78.49575. También se descargaron datos de NOAA, período 1973 - 2018, para la estación GSOD 845010 Trujillo, de la Región La Libertad y Provincia Trujillo con una latitud de -8.09375 y longitud de -79.06275. Para la región de Piura, los datos meteorológicos para la estación 844010 (latitud -5.206 y longitud -80.616) se obtuvieron de 1963 a junio de 2019 de GSOD (NOAA, 2019a). Los datos de la estación meteorológica 844550 (latitud -6.50874 longitud -76.3732) para la región de San Martín se descargaron de GSOD para el clima de 1963-2019 (NOAA, 2020a). Estos datos se originaron en el GSOD con campos que incluyen el número de estación, la fecha de la muestra, la temperatura promedio (F), el punto de rocío (F), la velocidad del viento (nudos), la precipitación (pulgadas) y la profundidad de la nieve (pulgadas).

Los años en los que se informó al menos el 60% de datos no incompletos y las mediciones de precipitación de al menos 12 horas por día se consideraron aceptables para la interpolación. La estación 844720 (Cajamarca) tuvo 12 años de datos continuos disponibles desde 1973-1984 con un promedio anual de datos completos de 82%. La estación 845010 (La Libertad) tuvo 30 años continuos de datos aceptables de 1988 a 2017 con un promedio anual de datos completos de 92%. La estación 844010 (Piura) tuvo 30 años continuos de datos aceptables de 1989 a 2018 con un promedio de 90% de integridad. Al examinar los datos de 1973 a 2018, se determinó que la Estación 844550 (San Martín) no tenía 30 años de datos continuos con al menos un 60% de datos no faltantes. Por lo tanto, se eliminaron los años con datos faltantes y los 30 años restantes tuvieron una integridad promedio del 93%. La regresión lineal se utilizó como una sustitución confiable para los datos climáticos faltantes, excepto para la precipitación, que no fue interpolada y asumió un valor de cero

para los datos faltantes. NOAA GSOD no proporcionó datos de evapotranspiración. En su lugar, se calculó una aproximación utilizando el software Ref-ET (Allen, 2012).

Los cultivos asociados con las estaciones meteorológicas seleccionadas se muestran en la Tabla 15 . El Apéndice F contiene cifras que muestran las ubicaciones de las estaciones meteorológicas con la producción de cultivos para cada escenario.

Tabla 15 . Estaciones meteorológicas seleccionadas y sus cultivos asignados en ANDES para Perú

ID de la Estación	Nombre	Región	Zona	Lat.	Longitud	Elevación	Cultivos
845010	Capitán Carlos Martínez de Pinillos	La Libertad	Costera	-8.09375	-79.06275	32.3 m	Espárragos Aguacate Maíz Tomate
844720	Gen FAP Armando Revoredo Iglesias	Cajamarca	Montaña	-7.14125	-78.49575	2676,4 m	Maíz Tomate
844010	CapitanFAP Guillermo Concha	Piura	Costera	-5.206	-80.616	35.4 m	Uvas
844550	Cadete Guillermo del Castillo Paredes	San Martin	Tropical	-6.50874	-76.3732	274,32 m	Arroz

Se realizó una revisión de eventos de alta precipitación (más de 3 pulgadas [7,62 cm] de lluvia por día) para la estación GSOD 844720 en la que los registros individuales de interés se cruzaron con datos del conjunto de datos climáticos GHCN de NOAA. Hubo seis registros de interés para eventos de alta precipitación. Cinco de los seis registros tenían datos de GHCN que respaldaban los valores altos originales. Un registro, el 4 de febrero de 1983, con 7,87 pulgadas (19,99 cm) de lluvia, tenía datos de GHCN correspondientes que no informaron precipitaciones durante el día. Adicionalmente, la precipitación mensual promedio de febrero para esta estación es de 3,99 pulgadas [10,13 cm] (calculada con datos de (1970-2016). Por lo tanto, la cantidad de lluvia de precipitación del 4 de febrero de 1983 ya no se acepta y se ha cambiado a un valor de 0 pulgadas, de acuerdo con NOAA GHCN. Se realizó un análisis idéntico para eventos de alta precipitación para las estaciones GSOD 845010, 844010 y 844550. Todos los registros de interés para 845010 fueron validados por datos de GHCN y no fueron alterados. La mayoría de los registros de interés para 844010 fueron validados por datos de GHCN. Sin embargo, los datos de GHCN no se incluyen todos los años. Por ejemplo, el año de 1983 para la estación 844010 no se pudo confirmar, pero era un año del fenómeno del Niño. Los datos de GHCN para 844550 solo estaban disponibles para 1977 hasta 1997 y algunos de esos años no tenían datos. Sin embargo, los años que tenían datos confirmaron que la precipitación máxima diaria era correcta. La Tabla 16 presenta la precipitación media anual y la temperatura media para las estaciones meteorológicas seleccionadas.

Tabla 16. Estadísticas de estaciones meteorológicas para el clima de Perú en el Modelo de Exposición de Plaguicidas en Agua ANDES

ID de la estación	Región	Zona	Número de Años	Precipitación Anual Media (mm)	Temperatura Media (oC)	Cultivos
845010	La Libertad	Costera	30	35.29	19.7	Espárragos, Aguacate, Maíz, Tomate
844720	Cajamarca	Montaña	12	506.98	16.3	Maíz, Tomate
844010	Piura	Costera	30	166.35	23.9	Uvas
844550	San Martin	Tropical	30	982.71	26.9	Arroz

8.3 Escenarios de Cultivos

ANDES contiene seis escenarios de cultivo diferentes para Perú (espárragos, tomate, maíz, uvas, arroz y aguacate). En Perú, tanto el tomate como el maíz tienen 3 escenarios asociados al cultivo. Los escenarios costeros de tomate y maíz tienen cada uno ciclos de dos cultivos que son escenarios separados. El número total de escenarios para Perú es de once (nueve con winPRZM, dos con RICEWQ). Los parámetros de cultivo y riego en la Tabla 17 se obtuvieron del asesoramiento de un experto peruano transmitido a un miembro de Crop Life LATAM[4]. Los escenarios costeros peruanos incluyen el riego. Los parámetros de riego se calibraron en winPRZM para aproximar los totales estacionales promedio que los productores usan para cada cultivo. El primer ciclo de cultivo del maíz es de 6 meses (9000 m3 / ha) y el segundo ciclo de cultivo es de 5 meses (7500 m^3/ ha). El primer ciclo de cultivo del tomate es de 6 meses (9000 m^3 / ha) y el segundo ciclo de cultivo es de 5 meses (7500 m3/ ha). Los espárragos tienen un riego medio de 4500 m^3/ ha. El aguacate y la uva tienen 30 m^3/ ha y 60 m^3/ ha, respectivamente. El riego se modeló como bajo dosel sin escorrentía (tipo de riego = 6 para espárragos, aguacate, uva y tomates, tipo = 7 (fijo) para maíz). El arroz se modela como agricultura inundada y los arrozales se riegan durante la temporada de crecimiento cuando el nivel del agua cae por debajo de una profundidad mínima.

Tabla 17 . Parámetros de cultivos usados en escenarios de escorrentía en Perú

Escenario de Cultivos	Máx. cobertura terrestre	Máx. profundidad de enraizamiento	Máx. altura de dosel	Pendiente	Día de germinación	Día de máxima cubierta de cultivo	Día de cosecha	Riego (promedio de m3 / ha por temporada)
Espárragos	80%	50 cm	120 cm	1.8%	1 dic.	4 abr	31 de mayo	4500
Aguacate	100%	35 cm	100 cm	2.0%	1 enero	10 enero	31 dic[ha]	30
Uvas	100%	60 cm	200 cm	2.0%	10 jun	20 sept.	30-oct	60

[4] Ximena Patiño, correos electrónicos de comunicación personal: Riego para los escenarios de cultivos de la Costa de Perú, 18 de febrero de 2019; Información sobre riego de la costa para tomate, 29 de enero de 2019; Información sobre riego de la costa para maíz, 22 de enero de 2019; Información sobre riego para espárragos, 14 de diciembre de 2018; Datos de cultivo de tomate, maíz, espárragos, 27 de noviembre de 2018. Datos de cultivo y riego de aguacate y uva, 10 de mayo de 2019.

Escenario de Cultivos	Máx. cobertura terrestre	Máx. profundidad de enraizamiento	Máx. altura de dosel	Pendiente	Día de germinación	Día de máxima cubierta de cultivo	Día de cosecha	Riego (promedio de m3 / ha por temporada)
Maíz costero 1er ciclo	80%	90 cm	150 cm	1.1%	2 feb.	15 de mayo	31 de julio	9000
Maíz costero 2do ciclo	80%	90 cm	150 cm	1.1%	1 sept.	15 nov	31 enero	7500
Maíz montaña	70%	50 cm	180 cm	16.8%	1º nov.	15 de febrero	31 de mayo	--
Tomate costero 1er ciclo	80%	70 cm	50 cm	1.8%	1 abr	15 de julio	31 de agosto	2625
Tomate costero 2do ciclo	80%	70 cm	50 cm	1.8%	1º sept.	15 nov	31 dic.	2100
Tomate montaña	80%	40 cm	50 cm	28%	1 abr	15 de julio	31 agosto	--
Arroz húmedo semilla directa	100%	--	--	--	25 enero	9 abr	4 de junio	Varía
Trasplante de arroz húmedo	100%	--	--	--	20 enero	4 abr	1 de junio	Varía

[a] el aguacate es simulado como cultivo perene, por lo tanto, el cultivo se simula como si estuviera maduro durante todo el año

La pendiente de los campos agrícolas en Perú se derivó utilizando un modelo de elevación digital (DEM) de 90 m para Perú. Los datos para el DEM se obtuvieron de Shuttle Radar Topography Mission (STRM) y se descargaron del sitio web de CIAT-CSI SRTM en http://srtm.csi.org (Jarvis *et al.*, 2008). Utilizando la función de geoprocesamiento de pendientes basada en GIS, se calculó la pendiente. Después, el conjunto de datos de pendientes se recortó a las áreas agrícolas relevantes y se calculó una pendiente promedio.

9 Recomendaciones para la selección de parámetros de entrada de plaguicidas

9.1 Parámetros de degradación

Para las simulaciones de Nivel II y III, la tasa de degradación generalmente se obtiene de los resultados de los estudios de metabolismo aeróbico realizados con diferentes suelos a 20-25 ° C. La media geométrica de distintas vidas medias del suelo se utiliza cuando se dispone de cuatro o más valores. El valor de vida media máxima se utiliza cuando hay menos de cuatro valores disponibles. La media geométrica se utiliza para que se obtenga el mismo resultado si se promedian las tasas de degradación de primer orden o las vidas medias.

En caso de que la tasa de degradación de un plaguicida sea bastante sensible a una propiedad específica del suelo (por ejemplo, pH para plaguicidas ionizables o contenido de

arcilla), el promedio de las tasas de degradación puede no ser apropiado. En estos casos, los datos existentes deben evaluarse para obtener la mejor estimación del suelo que se está simulando.

Los datos de campo también se pueden utilizar cuando estén disponibles, especialmente en el caso de que otros procesos, como la fotólisis, sean importantes además de la degradación mediada por el suelo. Si se utilizan tasas de disipación de campo en el Nivel III, entonces los procesos de volatilización y fotólisis deben apagarse para evitar contar estos procesos de degradación dos veces en las simulaciones.

9.2 Parámetros de degradación acuática

En los niveles II y III, la entrada más apropiada para la tasa de degradación acuática se obtiene generalmente de estudios aeróbicos de agua y sedimentos o, en casos especiales, de un estudio acuático anaeróbico. Generalmente, se dispone de degradación para dos sistemas de agua / sedimentos y se recomienda calcular la media geométrica de los dos valores. La tasa de hidrólisis del agua destilada a pH 7 y las tasas de degradación por fotólisis acuosa también se pueden ingresar en los modelos. EXAMS también requiere la tasa de degradación en sedimentos que se puede obtener de un análisis del estudio de sedimentos en agua. En casos especiales, el estudio del metabolismo acuático anaeróbico puede utilizarse para derivar el parámetro de entrada relevante. Cabe señalar que el escenario de un lago simulado representa un sistema acuático aeróbico.

Para los escenarios de arroz húmedo, el usuario debe ingresar un valor acuático aeróbico y anaeróbico adicional en la hoja de trabajo químico de ANDES. Para el Nivel III, estos valores serían los mismos que los de entrada para el cuerpo de agua en “Entradas universales”. Para un nivel más alto o un modelaje más refinado, las vidas medias de disipación acuática se pueden utilizar para los arrozales.

9.3 Parámetros de adsorción

Para las simulaciones de Nivel II, los parámetros de sorción se obtienen a partir de los resultados del estudio de adsorción-desorción. Los valores de Koc de estos estudios (normalmente definidos como kf en condiciones de referencia normalizadas para el carbono orgánico) se promedian aritméticamente cuando se dispone de cuatro o más valores, y se utiliza el valor más bajo si hay menos de cuatro valores.

El Koc usado en el Nivel II también se puede usar en el Nivel III. El modelo winPRZM implementado en ANDES ofrece la posibilidad de considerar la adsorción de Freundlich no lineal y la adsorción envejecida. En caso de que se disponga de isotermas de adsorción de cuatro o más suelos, se debe utilizar el valor medio aritmético para el exponente de Freundlich (valor 1 / n). Si hay menos de cuatro valores disponibles, se debe utilizar el mayor exponente de Freundlich.

9.4 Tasas de aplicación

Para las simulaciones de Nivel II y III, especificar la tasa de aplicación es sencillo. El número máximo de aplicaciones combinado con la tasa máxima por aplicación (en términos de ingrediente activo) y el intervalo mínimo de aplicación representa el peor escenario de aplicación. Sin embargo, en algunos casos, la etiqueta especifica una tasa anual más baja. En estos casos, la tasa de aplicación única o el número de aplicaciones debe reducirse en consecuencia para evitar que se supere la tasa anual. Por ejemplo, si un compuesto se puede aplicar hasta 5 veces al año a una tasa de 20 a 60 g de ia / ha, pero con la restricción general

de que no se pueden aplicar más de 100 g de ia / ha en un año, entonces se realizará una simulación. con una aplicación de 60 g de ia / ha con una segunda aplicación de 40 g de ia / ha en el intervalo mínimo se debe modelar. Además, se deben modelar cinco aplicaciones a 20 g de ia / ha con el intervalo mínimo para ayudar a evaluar la exposición potencial, ya que es posible que el número máximo de aplicaciones domine la concentración prevista en el agua superficial utilizando el menor número de aplicaciones que incluye el máximo. tasa de aplicación única.

Los modelos Nivel II y III incluyen curvas de deriva según el tipo de aplicación y el tamaño de la gota. El tamaño de gota predeterminado para aplicaciones aéreas es de fino a medio. El tamaño de gota predeterminado para la aspersión terrestre es de muy fino a fino con un brazo alto. El usuario debe usar una distancia de 0 m desde el borde del campo hasta el cuerpo de agua si se simulara el peor de los casos. Sin embargo, ambos modelos brindan opciones de mitigación al usuario para cambiar el tamaño de la gota y / o establecer la distancia de deriva de la aspersión desde el campo hasta el cuerpo de agua. Esto podría ser útil si las regulaciones legales exigen distancias entre las áreas de aplicación y las aguas superficiales (por ejemplo, para aplicaciones aéreas) o si la estructura del paisaje es tal que existen zonas de amortiguación naturales entre los campos agrícolas y las masas de agua superficial. Cuanto mayor sea la distancia, menor será la deriva de la aspersión.

Para las simulaciones de Nivel III, se debe especificar el día de cada aplicación. Esto se puede hacer especificando una fecha de calendario (día y mes) o una hora (en días) relativa a la fecha predeterminada de germinación del cultivo. Además, se debe especificar el método de aplicación de productos químicos (CAM). WinPRZM tiene las siguientes ocho entradas CAM. Para aspersión terrestre normal, se debe utilizar CAM 1 (los 4 cm reflejan la aspereza de la superficie). Las opciones de aplicación para PRZM se muestran en la Tabla 18 .

Tabla 18 . Configuraciones para simular diferentes técnicas de aplicación en ANDES Nivel III

Opción CAM	Definición	Recomendaciones
1	suelo aplicado, profundidad de incorporación predeterminada = 4 cm, disminuyendo linealmente con la profundidad.	Ajuste recomendado para aplicaciones estándar en suelo desnudo *Ejemplos*: *- Herbicidas de preemergencia en cultivos de campo* *- Tratamiento herbicida entre hileras de cultivos perennes*
2	foliar lineal basado en el dosel del cultivo, la profundidad de incorporación de suelo predeterminada para el químico no foliar interceptado es de 4 cm, disminuyendo linealmente con la profundidad.	Ajuste recomendado para aplicaciones estándar para follaje del cultivo. *Ejemplos:* *- Generalmente todas las aplicaciones de insecticidas y fungicidas* *- Herbicidas de preemergencia en cultivos de campo*
3	foliar no lineal usando filtración exponencial, la misma incorporación de suelo por defecto que en CAM = 2.	Opción de nivel superior, no recomendada en ejecuciones estándar
4	aplicado al suelo, profundidad de incorporación definida por el usuario	Configuración para simular la incorporación completa de plaguicida en la capa superior del suelo

Opción CAM	Definición	Recomendaciones
	(DEPI), uniforme con la profundidad.	*Ejemplo:* *Incorporación de formulaciones granuladas o líquidas mediante rastrillado u otras técnicas*
5	aplicada al suelo, profundidad de incorporación definida por el usuario, que aumenta linealmente con la profundidad.	Opción de nivel superior, no recomendada en ejecuciones estándar
6	aplicada al suelo, profundidad de incorporación definida por el usuario, disminuyendo linealmente con la profundidad.	Opción de nivel superior, no recomendada en ejecuciones estándar
7	aplicada al suelo, aplicación granular T-Band, profundidad de incorporación definida por el usuario.	Configuración para simular la incorporación heterogénea al suelo (no recomendado para corridas estándar)
8	aplicada al suelo, químico incorporado completamente a la profundidad especificada por el usuario.	Configuración para simular la incorporación a una profundidad específica *Ejemplos:* *Formulaciones para el tratamiento de semillas*

Se advierte al usuario que deben usarse fechas absolutas al simular aplicaciones de preemergencia en bananos / plátanos, aguacate y café. RICEWQ no usa CAM, en ANDES todas las aplicaciones para arroz húmedo se establecen en CAM = 2. La interceptación al follaje depende del momento de la aplicación en relación con el crecimiento del cultivo.

9.5 Interceptación de cultivos

En el Nivel II, el usuario puede especificar una fracción para la interceptación de cultivos para aplicaciones foliares. En el modelo se proporciona una tabla de valores recomendados para cultivos asociados con los tiempos del cultivo. Para el Nivel III, los modelos PRZM y RICEWQ tienen una rutina de crecimiento del cultivo que ajusta la cantidad de plaguicida interceptado por el follaje si la aplicación se produce entre la germinación o emergencia y la cosecha.

9.6 Otros parámetros de entrada

Otros parámetros requeridos por los modelos Nivel III son generalmente sencillos y generalmente están disponibles. Estos incluyen peso molecular, solubilidad en agua y presión de vapor. Si se desea la simulación de aplicaciones foliares al follaje, generalmente se selecciona CAM 2 y se ingresa la degradación del follaje. Se prefieren los valores específicos del producto, pero en ausencia de datos, los valores predeterminados para la degradación foliar oscilan entre las vidas medias de 10 a 35 días (FOCUS, 2015, USEPA, 2012). Todos los escenarios asumen que el lavado foliar se establece en un valor predeterminado de 0.5 por cm de lluvia y el factor de absorción de la planta se establece en un valor predeterminado de 0.0 (USEPA, 2004).

10 Recomendaciones para la presentación de informes de resultados de modelos

La intención de este capítulo es indicar un conjunto MÍNIMO de lo que debe informarse cuando se informa sobre una evaluación de exposición. Cada ejemplo individual es único y puede ser necesario informar material adicional más allá del mínimo que se describe a continuación para garantizar que el lector pueda comprender (y reproducir) la evaluación (si es necesario).

Estos principios se aplican tanto al modelaje simple de Nivel II / III como al modelaje de exposición más sofisticado que posiblemente sea necesario para refinar o investigar las sensibilidades de las evaluaciones de nivel inferior. Básicamente, este documento resume brevemente las buenas prácticas de modelaje; Estos han sido discutidas con más detalle por Estes y Coody (1993) y Görlitz *et al.* (1993) y más recientemente por Engel (2007).

Las secciones de cualquier informe de evaluación de exposición que se ocupan de la evaluación de la exposición deberían seguir los principios fundamentales subyacentes a las buenas prácticas de modelamiento que se van a aplicar y ser lo suficientemente transparentes para que se proporcione suficiente información para permitir la reproducción independiente de los resultados. El material introductorio debe indicar claramente por qué se realiza la evaluación y qué nivel de evaluación aborda el informe. Cualquier informe de evaluación de la exposición que implique modelaje (Nivel II y III) debe incluir el número de versión del modelo y la fecha. Los parámetros de destino químico ambiental deben informarse en detalle con la fuente de todos los valores y deben proporcionarse los pasos utilizados en el cálculo de los valores modelados. En el informe se debe proporcionar información sobre la aplicación, como el número máximo de aplicaciones, la tasa máxima de aplicación única, la tasa máxima de aplicación anual, el intervalo mínimo, el tipo de aplicación y las fracciones de deriva. El informe debe incluir una sección de resumen que describa la evaluación paso a paso de una manera que sea comprensible para los evaluadores que tengan conocimientos básicos de ciencias ambientales.

Las siguientes secciones indican documentación adicional que se debe informar para el Nivel III y el Nivel II / III con refinamientos o mitigación.

10.1 Modelaje en Nivel III

La documentación del modelaje de Nivel III se simplifica mediante el Archivo del Proyecto Maestro. Los resultados de la simulación se pueden documentar proporcionando una explicación para la selección de los diversos parámetros de entrada y proporcionando copias de los Archivos de Proyecto Maestro relevantes (Master.fpj).

10.2 Modelaje de Nivel II / III con Parámetros Refinados o Mitigación

Cuando se realiza un modelaje no estándar, el principio de una buena práctica de modelaje es que se proporciona suficiente información para permitir la replicación independiente de los resultados. El modelaje de Nivel II / III requiere mucha más documentación. Los siguientes puntos pueden ser relevantes al presentar dichas evaluaciones:

- Si se utilizan datos que no se han presentado previamente a la Agencia Reguladora, los informes de respaldo deben agregarse a la evaluación de la exposición como un apéndice y deben enviarse a través de los canales normales cuando sea necesario.

- Si se deben realizar nuevas estimaciones de los parámetros cinéticos (por ejemplo, cuando se combinan varios conjuntos de vida media en laboratorio de degradación del suelo) específicamente para una evaluación de modelos de exposición, entonces todos los cálculos de soporte y los datos brutos deben mostrarse en detalle.
- Si los archivos de entrada del clima se ajustaron para abordar anomalías o cubrir brechas (datos faltantes), el procedimiento exacto utilizado para corregir estos problemas debe informarse en detalle junto con la fecha en que se realizaron dichos cambios. Para los datos meteorológicos que no forman parte de los paquetes estándar, proporcionar las coordenadas de ubicación y un resumen apropiado puede ser útil para el revisor.
- Cuando los insumos químicos son diferentes de los desarrollados usando la guía en la Sección 9, se deben registrar los detalles y fechas de los ajustes, así como los detalles completos de las razones y la justificación que respaldan el cambio.
- Cualquier cambio en los conjuntos de entrada del modelo estándar o los parámetros del escenario debe describirse con todos los detalles junto con el material de referencia de apoyo y la lógica de apoyo que justifica el reemplazo del método estándar.
- Cuando se informan refinamientos de nivel superior más allá de las evaluaciones estándar de Nivel III Andino, el modelo de exposición (y la documentación asociada) para el modelaje de Nivel III debe proporcionarse con el modelo refinado para comparar y ayudar a los reguladores a comprender rápidamente la naturaleza de los refinamientos realizados.
- Cuando se utilizan opciones de deriva de aspersión y no las predeterminadas (tamaño de la gota y distancia de deriva de aspersión de 0 m), los valores deben documentarse.
- Si se incluye un VFS en el modelaje, se debe especificar la distancia. La opción VFS no se aplica a los escenarios de arroz húmedo.
- Si se modela una opción de labranza diferente a la convencional, se debe especificar el tipo (la opción de labranza no es aplicable para escenarios de arroz húmedo).

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Processing software for Colombia scenarios

Spatial data processing and thematic mapping were accomplished using ArcGIS version 9.1, Service Pack 1. Spatial data sets were imported from their native file formats to geodatabase vector feature class file format, in preparation of spatial processing. Tabular data processing was performed in a Microsoft Access 2003 relational database & with Microsoft Excel 2003. Time series climatic constituents' analysis was performed using RADAR, Version 1.14, written for ECOFRAM by Waterborne Environmental, Inc, 2000. Synthetic time series climatic constituent generation was performed using ClimGen (http://www.bsyse.wsu.edu/climgen/), designed by Gaylon S. Campbell of Washington State University in 1990.

Processing software for Peru scenarios

Spatial data processing and thematic mapping were accomplished using ArcGIS version 10.5, Service Pack 1 and ARCGIS Pro 2.7. Spatial data sets were imported from their native file formats to geodatabase vector feature class file format, in preparation of spatial processing. Tabular data processing was performed in Microsoft Excel Office 365.

Apéndice A : Herramienta Acuática Andina de Tamizaje (AAST)

La Herramienta Acuática Andina de Tamizaje (versión, abril de 2021) es un modelo de hoja de cálculo que tiene como objetivo evaluar el riesgo para los organismos acuáticos tras el uso de plaguicidas de acuerdo con las Buenas Prácticas Agrícolas (BPA). La exposición (también denominada PECsw = Concentración Ambiental Prevista o EEC = Concentración Ambiental Estimada) se calcula en el modelo adaptando el modelo GENEEC2 (Parker, *et al*., 1995, USEPA, 2000). GENEEC2 (GENeric Estimated Environmental Concentrations) es un modelo desarrollado por la US-EPA que calcula la concentración máxima y la concentración media ponderada en el tiempo en un estanque. Su código en Fortran ha sido reprogramado en esta herramienta en VBA. Los cambios en el código GENEEC2 incluyen la simplificación del código para las ecuaciones de particionamiento (ver ecuación a continuación).

$$KDfrac = profundidad_W / (profundidad_W (Profundidad_s * BD * KD))$$

Donde

KDfrac: Fracción del pesticida en fase del agua vía escorrentía
$Profundidad_W$: Profundidad del cuerpo del agua (cm) = 200 cm
$Profundidad_s$: Profundidad del sedimento activo (cm) = 5 cm
BD: Densidad en bruto (g/cc) = 1.35
KD: Coeficiente de partición (cc/g) = KOC (cc/g) * OC (%) / 100
Koc: Coeficiente de Partición (cc/g) = acciones del usuario
OC: Carbono orgánico (%) = 4%

Además, los porcentajes de la deriva se han puesto al día con la versión más reciente de AgDRIFT (versión 2.2.1, Teske*, y otros*., 2003). Esta herramienta también calcula el riesgo utilizando el método del cociente del riesgo (RQ). El valor de la exposición es dividido por el valor de la toxicidad y comparado a un nivel de interés (LoC). Para el organismo acuático, un LoC de 0.1 se recomienda para el riesgo agudo y un LoC de 1 se recomienda para el riesgo crónico. Un RQ < LoC indica un riesgo aceptable, un RQ > LoC indica la necesidad de refinar la valoración de riesgo.

El programa asume que la precipitación y la escorrentía que resulta son suficientes para quitar hasta un 10 por ciento del plaguicida del campo agrícola tratado de 10-ha. El evento de escorrentía se asume que ocurre 2 días después de la ÚLTIMA aplicación. La porción del producto químico que se elimina del campo de esta manera fluye hacia el estanque y se disuelve en el agua del estanque. Estos residuos de escorrentía se suman a los residuos en el estanque generados por la deriva por aspersión. Se supone que el estanque tiene una superficie de 1 ha y una profundidad de 2 m.

Instrucciones para el USUARIO

Formulación
El usuario puede diligenciar la información de la formulación (como se ve en la pantalla a continuación). Estos datos son opcionales.

Figura A - 1. Información de formulación opcional

Formulation information	
Formulation Name	
Formulation Type	
A.I. Name	
A.I. Concentration (%)	

Destino Ambiental y Criterios de Valoración Ecológicos

El usuario diligencia la información de destino ambiental y los criterios de valoración eco toxicológicos (según lo visto en pantalla a continuación). Si la vida media es estable, el usuario puede introducir cero. Si las celdas de la vida media se dejan en blanco, entonces se utiliza un período de 1000 días. La hidrólisis y la fotólisis acuosas son opcionales. Si los datos eco toxicológicos faltan, deje en blanco el espacio de la celda.

Figura A - 2. Destino Ambiental y Criterios de Valoración Ecológicos

Environmental Fate endpoints		Ecotoxicological endpoints	
DT50, soil (days)		Fish acute - LC50 (mg/L)	
Koc (ml/g)		Fish chronic - NOEC (mg/L)	
DT50, total water-sediment system (days)		Invertebrates acute - EC50 (mg/L)	
Solubility (mg/L)		Invertebrates chronic - NOEC (mg/L)	
Aqueous Hydrolysis DT50 (optional)		Algae EC50 (mg/L)	
Aqueous photolysis DT50 (optional)			

La concentración disuelta del pesticida también es reducida por la degradación en el campo antes de un evento de precipitación/escorrentía. El programa asume la degradación por el metabolismo aerobio del suelo entre aplicaciones y por dos días después de la aplicación final. El valor del EEC crónico (múltiples días) se calcula sumando las vías de degradación acuáticas para la tasa de degradación global en el agua. Para los datos de destino ambiental, siga las instrucciones en la sección 9 para el valor apropiado.

Criterios de valoración de destino ambiental

DT50, soil: Introduzca la vida media del metabolismo aeróbico del suelo en días. La media geométrica de las vidas medias del suelo se utiliza cuando cuatro o más valores están disponibles. Se utiliza el valor máximo del período cuando menos de cuatro valores están disponibles. Si los datos son estables, introduzca cero (0). Si la celda se deja en blanco, el DT50 para el suelo se fija en 1000 días.

Koc: Ingrese un valor Koc (mL/g) para la partición. Se debe usar la media aritmética de los valores de Koc. Si la celda se deja en blanco, el Koc se fija en cero (0). **Nota** La concentración química en el estanque representa la parte que se disuelve y no está enlazada al suelo del campo o a los sedimentos del fondo del estanque. Las concentraciones disueltas del plaguicida en el

estanque se calculan por la substracción de la porción del producto químico que está enlazada al suelo del campo, a la materia orgánica o al fondo del estanque. La fracción enlazada se estima por medio del coeficiente de partición del equilibrio del suelo/ agua (Koc).

DT50, total water-sediment system: Introduzca una vida media metabólica acuática aerobia en días del sistema total de los estudios del agua-sedimento. La media geométrica de las diferentes vidas medias del sistema total de agua-sedimento se utiliza cuando cuatro o más valores están disponibles. Se utiliza el valor máximo de vida media cuando menos de cuatro valores están disponibles. Si no están disponibles, el valor por defecto recomendado por USEPA es 2 x el valor aerobio de la entrada del suelo. Si son estables, introduzca cero (0). Si la celda se deja en blanco, el DT_{50}, sistema de agua-sedimento total, se fija en 1000 días.

Solubility: Introduzca la solubilidad en mg/L (ppm). Las concentraciones disueltas del plaguicida en un cuerpo de agua no pueden exceder la solubilidad del químico. Si la celda se deja en blanco, la solubilidad se fija en 10000 mg/l.

Aqueous Hydrolysis DT_{50}: Ingrese la vida media de la hidrólisis de pH 7 en días. Este es un valor opcional. Si el químico es estable, introduzca cero (0). Si esta celda está en blanco, la hidrólisis acuática DT_{50} se fija en 1000 días.

Aqueous Photolysis DT_{50}: Ingrese la vida media de fotólisis acuática en días. Este es un valor opcional. La vida media efectiva de la fotólisis será 124 veces más larga que la que se introduce en el programa debido a la ligera atenuación en el estanque. Si el químico es estable a la fotólisis acuosa, introduzca cero (0). Si esta celda está en blanco, la fotólisis acuática DT_{50} se fija en 1000 días.

Criterios de Valoración Eco toxicológicos

La siguiente tabla muestra los valores recomendados para los criterios de valoración eco toxicológicos para las acciones del usuario en la hoja de cálculo. Si los datos no están disponibles, el usuario debe dejar la celda en blanco.

Tabla A - **1. Valores recomendados y estudios para los criterios de valoración eco toxicológicos**

Criterios de Valoración Eco toxicológicos	Valor recomendado	Estudio recomendado
Peces agudo- LC50 (mg/L)	menor valor disponible	OECD 203
Peces Crónico- NOEC (mg/L)	menor valor disponible	OECD 210
Invertebrados agudo - EC50 (mg/l)	menor valor disponible	OECD 202
Invertebrados crónico - NOEC (mg/l)	menor valor disponible	OECD 211
Algas EC50 (mg/l)	menor valor disponible	OECD 201 o 221

Información de uso previsto

Figura A - 3. Información de uso previsto

Intended use information				
Crop name	N° Appl.	Appl. rate (g_ai/ha/application)	Appl. Interval (days)	Crop Interception (fraction)
				0.00

Crop name: El usuario puede ingresar el nombre del cultivo en la celda apropiada. De esta manera el usuario puede realizar un seguimiento de los datos de la aplicación asociados con el cultivo.

Nº Appl: Introduzca el número máximo de los aplicaciones anuales requeridas para el cultivo.

Appl. rate: Introduzca la tasa máxima aplicación única permitida para el cultivo en g a.i./ha.

Appl. Interval: Introduzca el mínimo intervalo de aplicación permitido entre aplicaciones en días. **Nota** - el programa asume que el plaguicida se degrada en el campo a la tasa del metabolismo aeróbico del suelo entre múltiples aplicaciones y por dos días luego de la aplicación final. La cantidad real de plaguicida que está disponible en el campo para descargarse en el estanque es la cantidad restante en el campo tratado dos días después de la aplicación final. Además, el programa asume que el pesticida se degrada en el cuerpo de agua mediante la tasa de degradación acuática global entre múltiples aplicaciones.

Crop Interception: El usuario podrá ingresar una fracción para la interceptación del cultivo. El valor por defecto es cero (0), sin interceptación. Sin embargo, algunos químicos se aplican durante diferentes etapas del cultivo. La tabla a continuación de guía del agua de superficie FOCUS (FOCUS, 2015) para el paso 2 de la valoración de riesgo EU se puede utilizar como referencia. La tabla a continuación incluye la sincronización y la fracción de la interceptación para diversos cultivos. Esta tabla se proporciona en la herramienta andina de tamizaje acuático.

Tabla A - 2. Interceptación del cultivo:

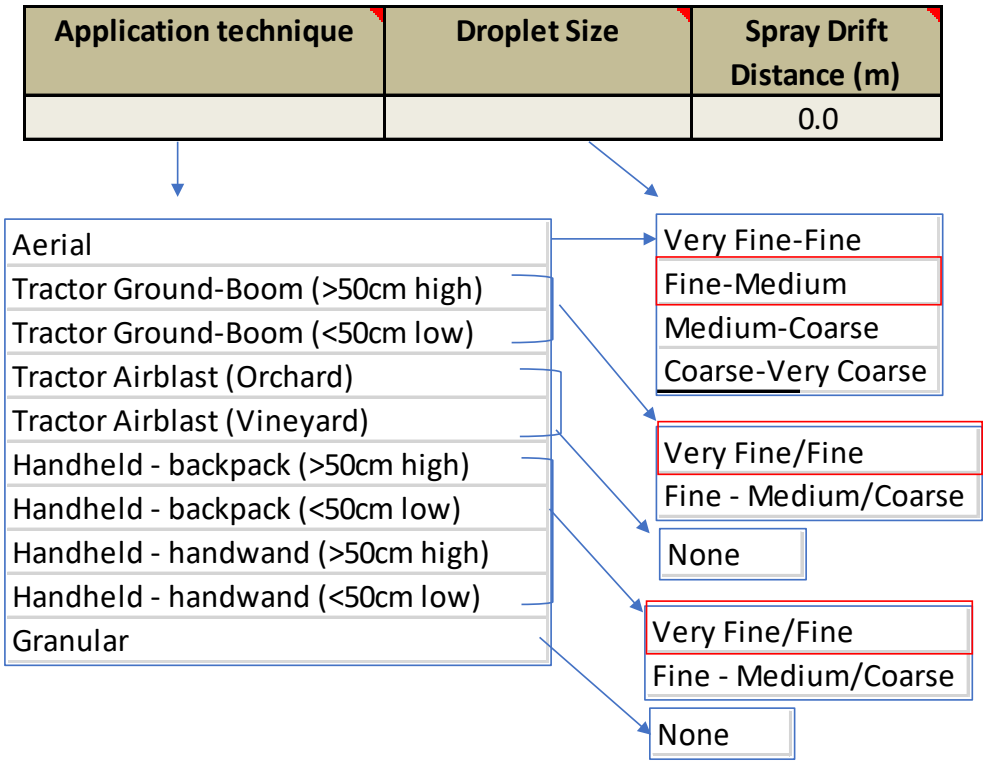
Cultivo	Sin interceptación	Cubierta mínima del cultivo	Cubierta intermedia del cultivo	Cubierta completa
Código BBCH-	00 - 09	10 - 19	20 - 39	40 - 80
Cereales, primavera e invierno	0	0.0	0.2	0.7
Cítricos	0	0.8	0.8	0.8
Algodón	0	0.3	0.6	0.75
Haba común	0	0.25	0.4	0.7
Pasto/alfalfa	0	0.4	0.6	0.75
Lúpulos	0	0.2	0.5	0.7
Legumbres	0	0.25	0.5	0.7
Maíz	0	0.25	0.5	0.75
Aceite de colza, primavera e invierno	0	0.4	0.7	0.75
Olivos	0	0.7	0.7	0.7

Cultivo	Sin interceptación	Cubierta mínima del cultivo	Cubierta intermedia del cultivo	Cubierta completa
Manzana/frutas con hueso, tempranas y tardías	0	0.2	0.4	0.65
Papas	0	0.15	0.5	0.7
Sojas	0	0.2	0.5	0.75
Girasol	0	0.2	0.5	0.75
Tabaco	0	0.2	0.7	0.75
Vehículos, bulbo	0	0.1	0.25	0.4
Vegetales, fructificación	0	0.25	0.5	0.7
Vegetales, frondosos	0	0.25	0.4	0.7
Vegetales, raíz	0	0.25	0.5	0.7
Vides, tempranos y tardíos	0	0.4	0.5	0.6

En la siguiente sección del modelo, la masa de la deriva por aspersión se agrega al estanque.

La concentración disuelta del plaguicida se puede aumentar por la deposición directa de la deriva por aspersión en el estanque. El estanque tiene un área superficial de 1 ha. La deriva por aspersión con diversas técnicas de aplicación, tamaño de la gota y distancia de la deriva por aspersión se basa en los valores calculados por el modelo de AgDRIFT® [para] un estanque que tiene un ancho de 63.61 m (Teske*, y otros*., 2003). La deriva por aspersión entra en el estanque al momento de cada aplicación, aun cuando la escorrentía ocurre solamente después de dos días. El usuario tiene opciones del menú desplegable para seleccionar la técnica de aplicación, el tamaño de la gota, y la distancia de la deriva por aspersión (se muestra en la **figura A - 4 a Figura A -.4continuación).**

Figura A -.4. Opciones de aplicación



A*pplication technique*: Seleccione la técnica de aplicación en la lista del menú expandible: aérea, brazo de aspersión terrestre de tractor (>50 cm alto), brazo de aspersión terrestre de tractor (<50 cm bajo), pulverizador de tractor (huerta), pulverizador de tractor (viñedo), mochila portátil (>50 cm alta), mochila portátil (<50 cm baja), lanza portátil (>50 cm alta), lanza portátil (<50 cm baja), o granular. El tipo de aplicación se especificará en las instrucciones de la etiqueta;

Para las aplicaciones de aspersión en tierra, la cantidad de deriva por aspersión fuera del lugar depende de la configuración del aspersor (brazo de aspersión alto o brazo de aspersión bajo). A menos que se especifique en la etiqueta, la configuración será el brazo de aspersión alto. La mochila portátil y la lanza portátil (>50 cm alta) tienen la misma deriva por aspersión que el brazo de aspersión terrestre de tractor (>50 cm alto). La mochila portátil y la lanza portátil (>50 cm baja) tienen la misma deriva por aspersión que el brazo de aspersión terrestre de tractor (>50 cm alto).

El pulverizador de tractor para huerta se debe utilizar para aplicaciones a cítricos, a manzanas, o a nueces. Los pulverizadores de tractor para viñedos deben usarse para aplicaciones de pulverización a las uvas. Solo para la aplicación de pulverizadores, se aplica un factor de seguridad de 3.0 a la estimación de la deriva.

Si se selecciona el tipo de aplicación granular, este tipo de aplicación asume que no hay deriva por aspersión.

El programa asume que las aplicaciones aéreas tienen una eficiencia del 95%. El aspersor terrestre, los aspersores manuales y el pulverizador tienen una eficiencia del 99%. Una aplicación granular tiene una eficiencia del 100%.

Droplet size: Seleccione el tamaño de gota asociado con la técnica de aplicación de la lista desplegable. La distribución del tamaño de las gotas en la aspersión de plaguicidas (calidad de la aspersión) afecta la distancia de desplazamiento y la cantidad de plaguicida que se desplazará fuera del sitio con el viento. A menos que se especifique en las instrucciones de la etiqueta, el usuario debe usar el tamaño de gota predeterminado.

Para aplicaciones aéreas, el usuario tiene las siguientes distribuciones de tamaño de gota: De muy fina a fina, de fina a media (predeterminada), de media a gruesa o de gruesa a muy gruesa.

Para aplicaciones de aspersión terrestres, el usuario tiene las siguientes distribuciones de tamaño de gota: Muy fina a fina o fina a media / gruesa (predeterminada).

Para aplicaciones granulares y de pulverización, no hay opciones para el tamaño de la gota, por lo que el usuario seleccionará "Ninguna".

En la siguiente sección del modelo, el usuario puede simular el impacto de una zona de no aspersión.

El programa permite al usuario del modelo simular el impacto de una zona de no aspersión entre el campo agrícola tratado con pesticidas y el estanque estándar. La cantidad real de deriva es mayor en el lado del estanque más cercano al campo y menor en el lado opuesto. Sin embargo, el programa integra esta cantidad variable a lo largo del ancho de este cuerpo de agua de 63,61 m de ancho. Una zona de no aspersión solo se simula si se especifica con un lenguaje obligatorio en la etiqueta del plaguicida. De lo contrario, el ancho de la zona de no aspersión se especifica como cero. La distancia máxima que se puede introducir en el modelo es de 304 m. El porcentaje de deriva por aspersión en el estanque es interpolado por el programa con base en la deriva por aspersión calculada de AgDRIFT® según la técnica de aplicación, el tamaño de la gota y la distancia (ver Tabla A -3).

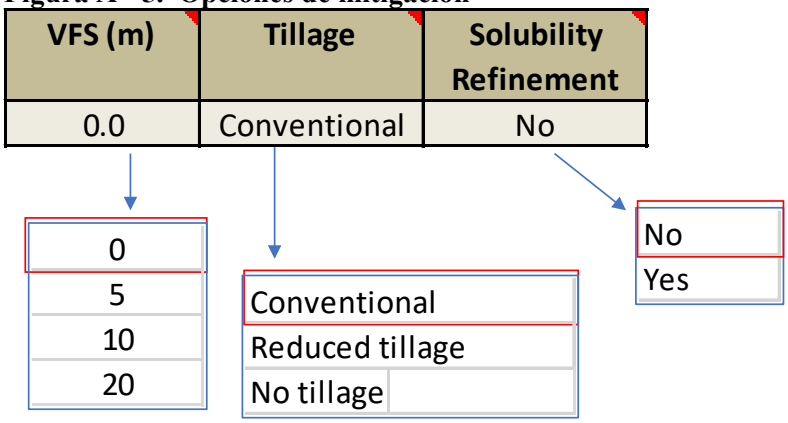
Tabla A -3 . Porcentaje de deriva para el tipo de aplicación, tamaño de gota y distancia de deriva por aspersión

	Aerial				Groundspray				Airblast	
					Low boom	High boom	Low boom	High boom		
Droplet Distance (m)	Very fine / Fine	Fine / Med	Med / Coarse	Coarse / Very coarse	Fine	Fine	Med / Coarse	Med / Coarse	Vineyard	Orchard
0	24.2147	12.5447	8.8494	6.8121	2.6805	6.1635	1.0900	1.6497	0.2433	2.1803
2	23.1502	11.3070	7.5879	5.5580	1.5491	4.2508	0.6124	0.9842	0.1658	1.6418
4	22.2222	10.3831	6.7066	4.7270	1.2501	3.4255	0.5272	0.8413	0.1274	1.3012
6	21.3862	9.6512	6.0546	4.1351	1.0873	2.9358	0.4774	0.7572	0.1039	1.0672
8	20.6151	9.0479	5.5476	3.6911	0.9800	2.6066	0.4422	0.6978	0.0883	0.8998
10	19.8934	8.5273	5.1368	3.3444	0.9006	2.3637	0.4147	0.6515	0.0771	0.7748
12	19.2139	8.0492	4.7849	3.0677	0.8380	2.1732	0.3922	0.6135	0.0686	0.6784
14	18.5766	7.5973	4.4668	2.8388	0.7864	2.0173	0.3730	0.5813	0.0619	0.6021
16	17.9818	7.1691	4.1715	2.6373	0.7426	1.8859	0.3563	0.5534	0.0564	0.5404
18	17.4249	6.7723	3.8927	2.4521	0.7047	1.7727	0.3416	0.5287	0.0519	0.4896
20	16.8953	6.4165	3.6334	2.2817	0.6714	1.6738	0.3284	0.5067	0.0480	0.4472
22	16.3830	6.1011	3.4034	2.1303	0.6417	1.5861	0.3165	0.4868	0.0447	0.4112
24	15.8872	5.8181	3.2060	2.0005	0.6150	1.5077	0.3056	0.4686	0.0419	0.3805
26	15.4141	5.5570	3.0361	1.8882	0.5908	1.4369	0.2956	0.4520	0.0393	0.3539
28	14.9696	5.3110	2.8828	1.7872	0.5687	1.3725	0.2863	0.4367	0.0371	0.3307
30	14.5547	5.0815	2.7398	1.6946	0.5484	1.3136	0.2778	0.4225	0.0351	0.3103
32	14.1675	4.8727	2.6075	1.6084	0.5296	1.2595	0.2698	0.4093	0.0333	0.2922
34	13.8044	4.6834	2.4889	1.5287	0.5122	1.2096	0.2623	0.3970	0.0316	0.2761
36	13.4602	4.5128	2.3827	1.4567	0.4960	1.1633	0.2553	0.3854	0.0301	0.2617
38	13.1301	4.3583	2.2847	1.3919	0.4809	1.1202	0.2487	0.3745	0.0288	0.2487
40	12.8109	4.2160	2.1946	1.3331	0.4667	1.0801	0.2425	0.3643	0.0275	0.2369
42	12.5022	4.0831	2.1119	1.2797	0.4534	1.0425	0.2366	0.3546	0.0264	0.2262
44	12.2051	3.9576	2.0350	1.2304	0.4409	1.0072	0.2311	0.3454	0.0253	0.2164
46	11.9211	3.8382	1.9625	1.1843	0.4290	0.9740	0.2258	0.3368	0.0243	0.2075
48	11.6537	3.7240	1.8935	1.1413	0.4178	0.9427	0.2207	0.3285	0.0234	0.1992
50	11.4044	3.6150	1.8279	1.1012	0.4072	0.9132	0.2159	0.3206	0.0225	0.1916
Rows removed for brevity										
304	3.919234	1.120782	0.5051903	0.296003	0.0860272	0.1209912	0.0552854	0.0685511	0.0026717	0.0319412

En la siguiente sección del modelo, el usuario puede simular el impacto de otros refinamientos.

El usuario tiene la opción de simular refinamientos de nivel superior que reducen la escorrentía, como una franja de filtro vegetativo (VFS), prácticas de labranza y solubilidad.

Figura A - 5. Opciones de mitigación



Una opción de mitigación que el usuario puede seleccionar es una franja de filtro vegetativo. El valor predeterminado es 0 m (sin VFS). Sin embargo, el usuario puede seleccionar 5m, 10 m o 20 m como mitigación. La escorrentía se reduce un 40% con un VFS de 5 m, un 65% con un VFS de 10 m y un 80% con un VFS de 20 m. Estos valores se recomiendan en la UE basándose en la caja de herramientas MAgPIE (SETAC, 2013).

El usuario puede elegir la práctica de labranza adecuada. El valor predeterminado es la labranza convencional. El usuario puede cambiar a la labranza reducida o sin labranza como una práctica de mitigación. La labranza reducida o nula reduce la masa de escorrentía en un 50%. Estos valores se recomiendan en la UE basándose en la caja de herramientas MAgPIE (SETAC, 2013).

La concentración de exposición de nivel I se calcula en función de la solubilidad del producto químico. Para el nivel II, esto le da al usuario la opción de reducir el porcentaje de escorrentía para que coincida con la escorrentía utilizada en el nivel I. El refinamiento de solubilidad predeterminado es "No", que utiliza un porcentaje de escorrentía del 10%. Si el usuario selecciona "Sí", si la solubilidad es <.001 ppm, el porcentaje de escorrentía es 0.1%, si la solubilidad es mayor o igual a 0.001 ppm y menor o igual a 1 ppm, entonces el porcentaje de escorrentía es 1%, si la solubilidad es mayor que 1 ppm y menor o igual a 100 ppm, el porcentaje de escorrentía es 2%, y si la solubilidad es mayor que 100 ppm, entonces el porcentaje de escorrentía es 5%.

Producción

La evaluación del riesgo para los organismos acuáticos se presenta en la hoja "Output_Ecotox_1". Los resultados se muestran como EECsw y RQ para peces, invertebrados y algas:

- EECsw Agudo [µg/L] = Concentración ambiental pronosticada en aguas superficiales, valor máximo para peces e invertebrados, valor de 4 días para algas
- RQagudo [-], si la relación es <0.1 el riesgo agudo es aceptable, si la relación es >0,1 se necesita una valoración de nivel un superior
- EECswcrónica [µg/L] = concentración media ponderada por tiempo durante 21 días

- RQcrónico [-], si la relación es <1 el riesgo crónico es aceptable, si la relación es >1 se necesita una valoración de un nivel superior

AAST calcula el RQ dividiendo el valor EEC por el valor de toxicidad y se compara con un nivel de interés (LoC). Para el organismo acuático, un LoC de 0.1 se recomienda para el riesgo agudo y un LoC de 1 se recomienda para el riesgo crónico. Un RQ < LoC indica un riesgo aceptable, un RQ > LoC indica la necesidad de refinar la valoración de riesgo. Se utiliza una codificación de colores que muestra los resultados:

- verde cuando el riesgo es aceptable, es decir, RQagudo <LoC o RQcrónico <LoC
- rojo cuando se necesita una evaluación de nivel superior, es decir, RQagudo >LoC o RQcrónico >LoC

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Apéndice B: Modelo de Exposición de Plaguicidas en Agua - ANDES

Introducción

El Modelo de Exposición de Plaguicidas en Agua - ANDES fue desarrollado para mejorar la Calculadora de Exposición Colombiana que fue creada para facilitar la evaluación de la exposición en nivel III como parte del proceso de registro en Colombia (CropLife Latin América, 2008). El Modelo de Exposición de Plaguicidas en Agua - ANDES se ha actualizado y expandido para incluir escenarios para Perú. El Modelo de Exposición de Plaguicidas en Agua - ANDES incluye datos climáticos, propiedades del suelo y datos de cultivos necesarios para llevar a cabo las simulaciones. El usuario necesita suministrar información sobre el plaguicida tal como la tasa de degradación y los parámetros de adsorción, así como las tasa, tiempo y método de aplicación. La codificación Modelo de Exposición de Plaguicidas en Agua - ANDES se basa en el anteriormente desarrollado EXPRESS y FOCUS PRZM (agua superficial y suelo) la estructura y la codificación la llevó a cabo Waterborne Environmental, Inc.

El Modelo de Exposición de Plaguicidas en Agua - ANDES utiliza tres modelos para evaluar los escenarios. winPRZM es utilizado para estimar la escorrentía/erosión y la masa química asociada a la porción terrestre (Carousel, *et al.*, 2005) y EXAMS utiliza esta carga estimada de escorrentía para simular la concentración en un estanque estándar (Burns, 2004). El modelo RICEWQ evalúa la disipación de una sustancia química en un sistema acuático (arroz inundado) y predice la entrada de agroquímicos por escorrentía hacia cuerpos de agua receptores después del drenaje o desbordamiento de un campo de arroz (Williams, et al., 2020).

Requisitos de Hardware

El Modelo de Exposición de Plaguicidas en Agua – ANDES corre en PC´s bajo el sistema operativo Windows (la instalación se ha probado en Windows 7 y 10). Se requiere de Adobe Reader para leer las guías de usuario del modelo.

Instalación y Remoción

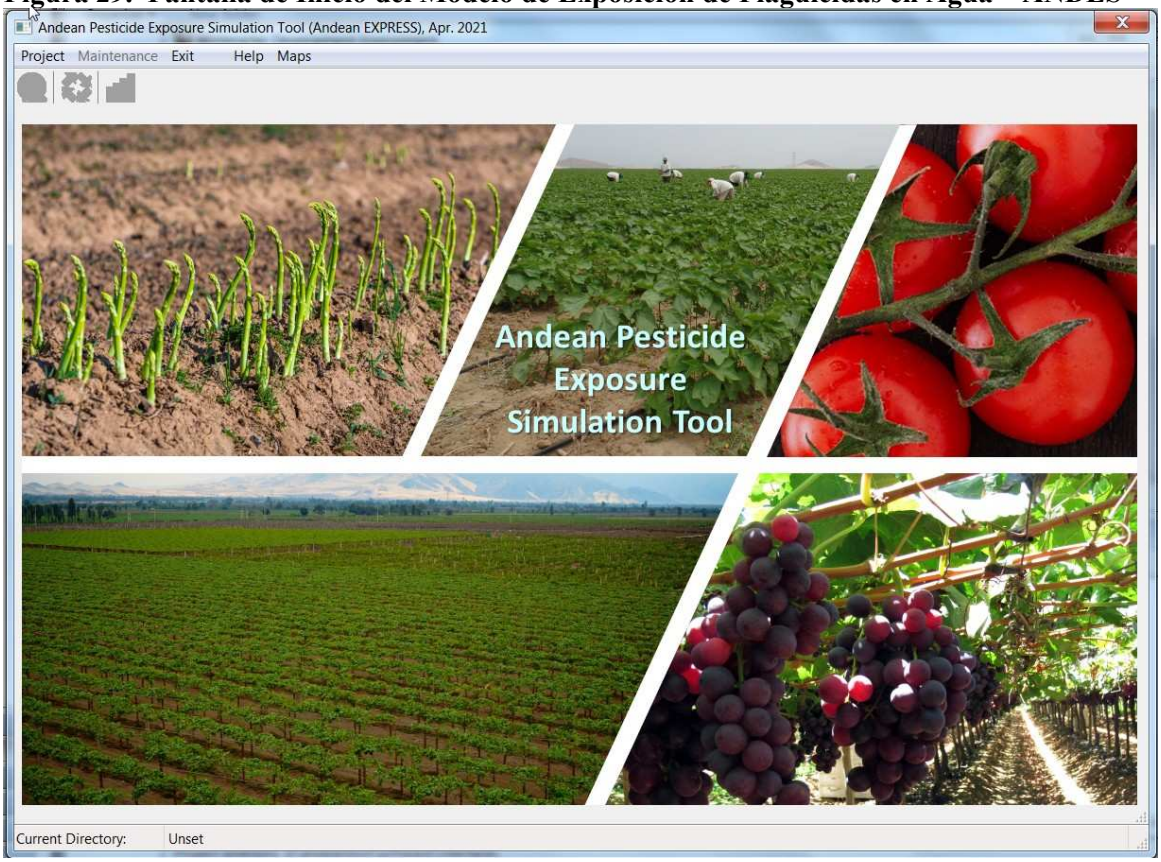
Realice un doble clic en el archivo AndeanTool*.*.exe y se iniciará el programa de configuración y luego se instalarán todos los archivos requeridos en C:\ANDES o cualquier otra vía de instalación seleccionada por el usuario. El *.* serán fechas asociadas con las modificaciones del programa.

El modelo de Exposición de Plaguicidas en Agua - ANDES puede ser removido usando el procedimiento de desinstalación estándar de Windows, ej., a través de “Configuraciones – Panel de Control – Instalar/Desinstalar Programas”, seguido por la eliminación de la estructura del directorio junto con cualquier proyecto restante modificado por el usuario o archivos de datos meteorológicos.

Iniciando el Modelo de Exposición de Plaguicidas en Agua - ANDES

El Modelo de Exposición de Plaguicidas en Agua - ANDES puede iniciarse al hacer un doble clic en ANDES.EXE en la carpeta del Modelo de Exposición de Plaguicidas en Agua o a través de cualquier atajo ejecutable del Modelo. La pantalla de inicio que se muestra en la Figura 29 debe aparecer.

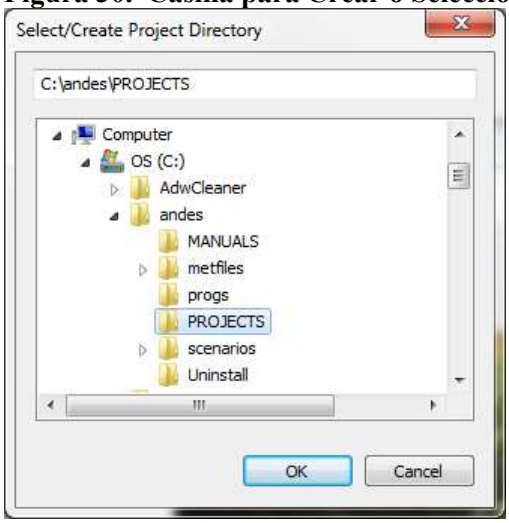
Figura 29. Pantalla de Inicio del Modelo de Exposición de Plaguicidas en Agua – ANDES



El primer paso para usar el Modelo de Exposición de Plaguicidas en Agua - ANDES es seleccionar (o crear) un archivo en el directorio de proyectos. Todos los datos de entrada/salida relevantes para una simulación serán guardados en este directorio. Por lo tanto, el Modelo de Exposición de Plaguicidas en Agua - ANDES requiere un permiso completo de lectura/escritura para el directorio especificado.

El directorio se establece al seleccionar “Projects” en la esquina superior izquierda de la pantalla de apertura. Posteriormente aparece la casilla de “Select/Create Project Directory” como se muestra en la Figura 30.

Figura 30. Casilla para Crear o Seleccionar un Directorio de Proyecto



La visualización inicial del directorio de proyectos siempre es la carpeta del proyecto por defecto ...\ANDES\PROJECTS. Sin embargo, los directorios pueden llegar a localizarse en otras partes del disco duro o dispositivos de red que usen el Modelo de Exposición de Plaguicidas en Agua - ANDES como tal, Windows Explorer u otras herramientas. Se admiten nombres largos para los archivos.

Para seleccionar un directorio existente, utilice la barra de navegación para moverse hacia el directorio/unidad deseada (si aún no está visible en la ventana de selección), y posteriormente haga doble clic sobre esta. La carpeta seleccionada (los términos "unidad\directorio" y "carpeta" son equivalentes) va a reemplazar el texto mostrado inicialmente de "...\ANDES\PROJECTS" (ver Figura 30). Presionando el botón de "OK" en este momento se va a establecer la unidad/directorio seleccionado como el directorio de proyecto actual. Para crear un nuevo directorio de proyecto, escriba un "\" seguida por el nuevo nombre del directorio del proyecto en la línea de ruta en la Figura 30. Por ejemplo, escribir "\newchem1" al final de la ventana de selección de la carpeta crea un nuevo directorio de proyecto llamado "...\ANDES\projects\newchem1." Sólo se puede crear un subdirectorio en un mismo paso: ingresando, por ejemplo, "\newchem1\app1", no es compatible. Para crear subdirectorios dependientes (ej. Carpetas dentro de carpetas), primero se debe crear \newchem1, después presione el botón de "OK", luego vuelva a seleccionar "Select/Create Project Directory" e ingrese "\app1." Esto creará el directorio de proyectos "...\ANDES\projects\newchem1\app1".

Se debe elegir un directorio de proyecto diferente para cada conjunto de escenarios. Cada escenario de simulación se puede volver a ejecutar o volver a analizar en un momento posterior. Sin embargo, tenga en cuenta que si se vuelve a ejecutar el escenario de simulación, los resultados anteriores no se conservarán.

Durante la creación de una simulación, se crea un Archivo de Proyecto Maestro (MPF) que contiene toda la información necesaria para caracterizar la simulación. Esto se almacena en el directorio del proyecto con el nombre master.fpj. Compartir el MPF es una buena forma de transferir información sobre un escenario específico entre diferentes usuarios y computadoras cuando se intenta resolver dificultades o resultados inusuales.

Luego de que el usuario ha especificado un directorio del proyecto activo, el Modelo de Exposición de Plaguicidas en Agua - ANDES verifica directamente si existe un MPF en este

directorio. Si no se encuentra ninguno, se despliega la pantalla de inicio, pero esta vez mostrando el directorio de proyecto seleccionado

Creando Archivos de Entrada

Después de haber seleccionado un directorio de proyecto, haga clic en el ícono de "*World*" (justo debajo del botón de "*Project*"). La ventana que se muestra en la Figura 31 deberá aparecer. El usuario tiene la opción de escoger escenarios en el "Andean SW (WinP", estos son escenarios de cultivos que correrán con el winPRZM unido a EXAMS. El usuario También tiene la posibilidad de seleccionar escenarios en "Andean Rice SW" y que son escenarios de arroz que irán a correr con RICEWQ unido a EXAMS (Figura 32). Si el usuario quiere visualizar la ubicación de los escenarios, existe un botón para el mapa y donde se puede observar la ubicación de los escenarios de los cultivos tanto para Perú como para Colombia (Figura 33).

Figura 31. Ventana con los Escenarios

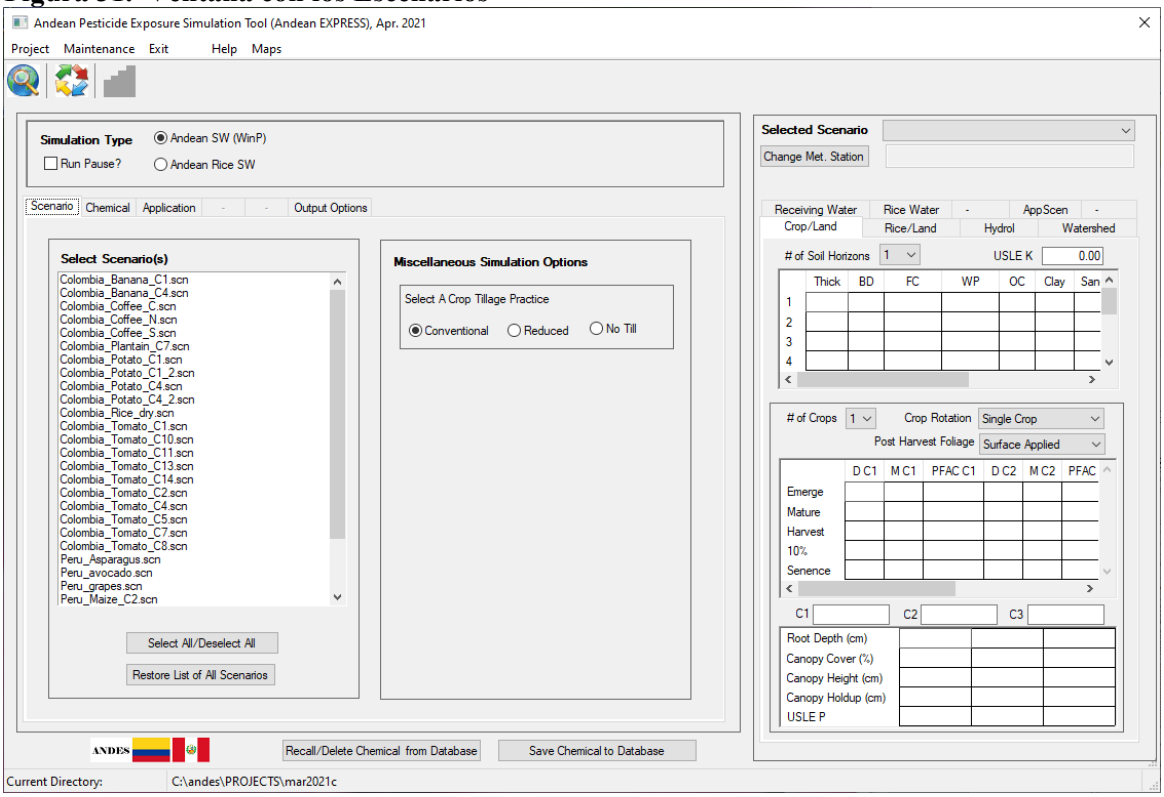


Figura 32. Ventana con Escenarios (Escenarios de Arroz Inundado)

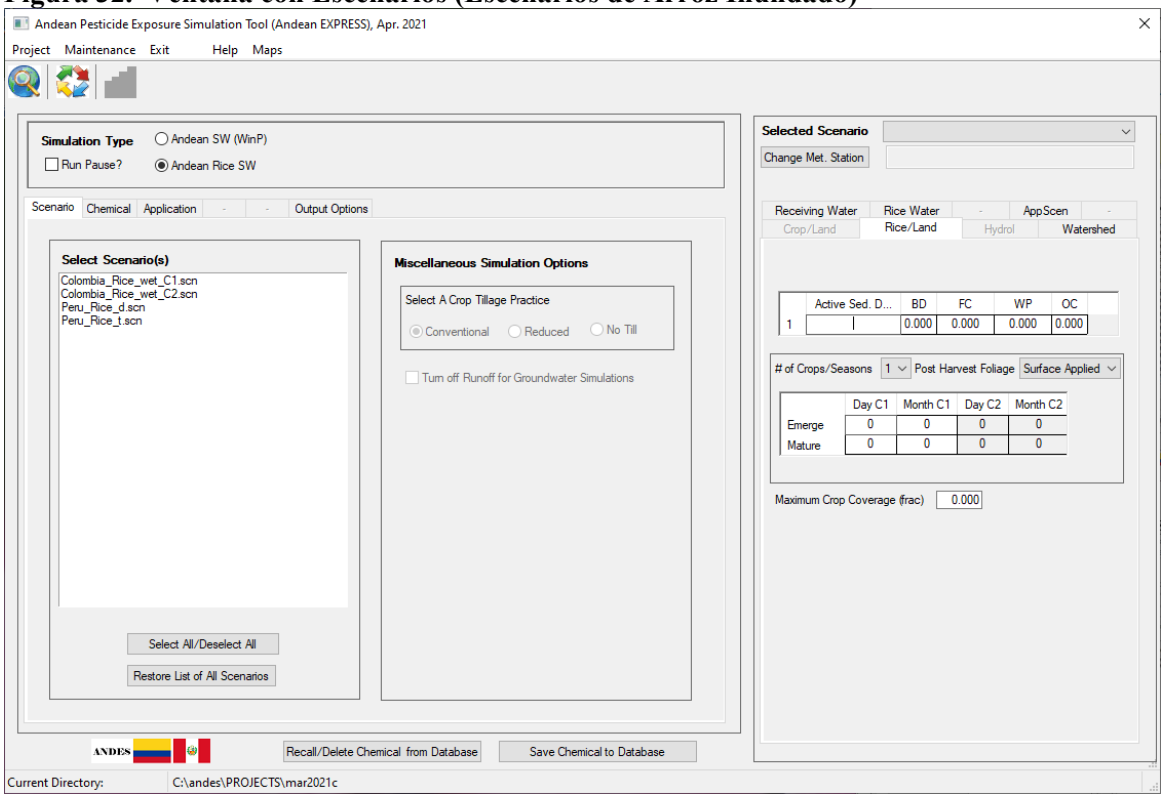
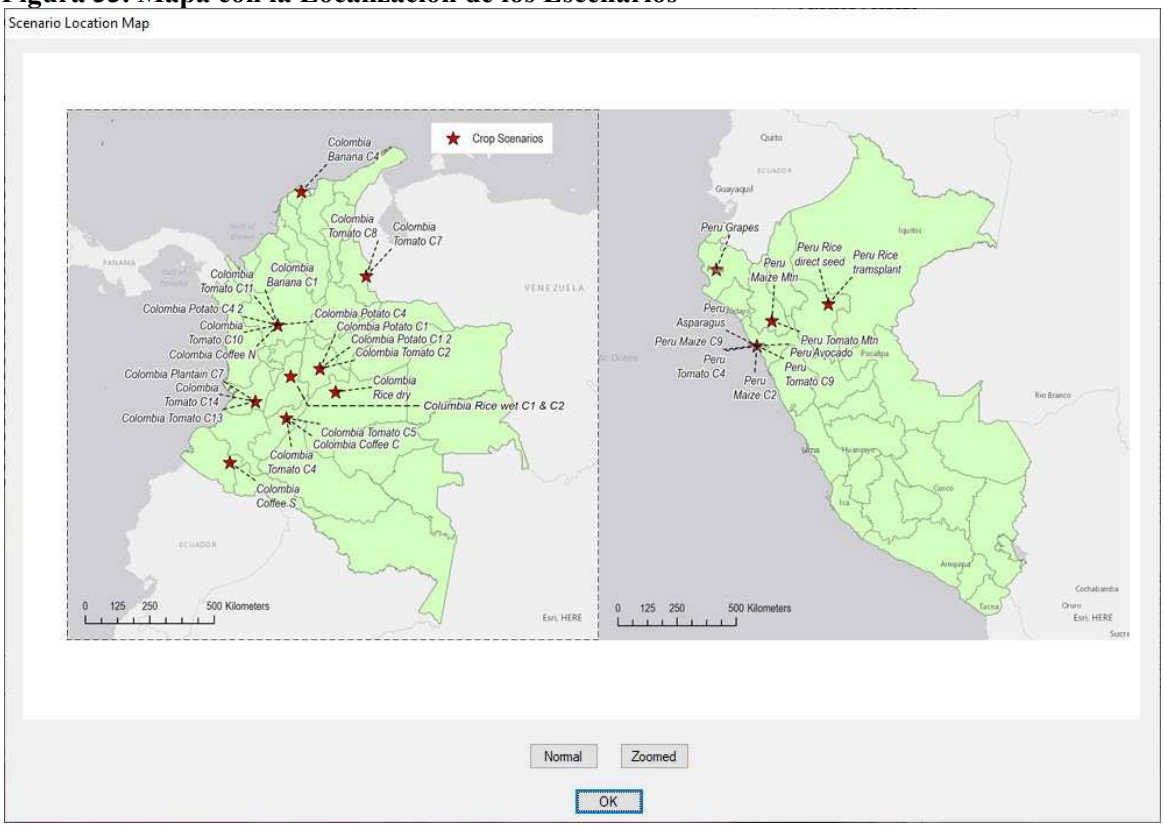


Figura 33. Mapa con la Localización de los Escenarios



La creación de parámetros de entrada para un conjunto de simulaciones es un proceso de tres pasos:

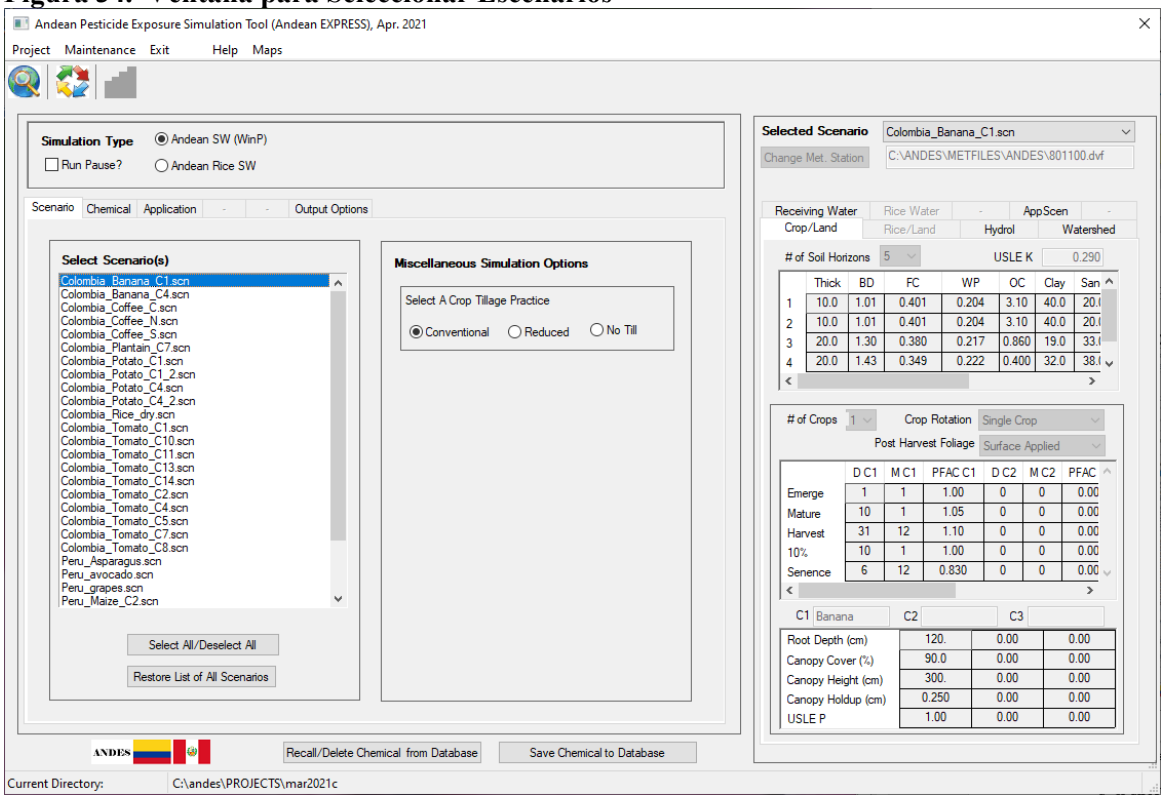
1. Escenario: Seleccione uno o más de los escenarios predefinidos
2. Químico: Defina las propiedades fisicoquímicas y de destino ambiental del plaguicida necesarias para winPRZM y EXAMS o para RICEWQ y EXAMS
3. Aplicación: Elija la(s) fecha(s) de aplicación, el método, la(s) tasa(s), la deriva

Todos los tres pasos de creación de datos deberían completarse inicialmente en el orden sugerido (Escenario, Químico, Aplicación) para garantizar la creación apropiada del conjunto de archivos de entrada. Después de completar estos tres pasos, el usuario selecciona el botón con las flechas de colores para escribir las entradas y ejecutar los modelos.

Escenario

Para iniciar la definición de un escenario, haga clic en el ítem del menú "*Scenario*". Luego aparecerá la ventana de Crear un Escenario (Figura 34). Uno, varios o todos los escenarios se pueden seleccionar para ser incluidos en la simulación. Si el usuario quiere ejecutar todos los escenarios, el usuario puede hacer clic en el botón "*Select All/Deselect All*". Si un usuario ha cargado un proyecto anterior, únicamente aparecerán los escenarios de ese proyecto anterior. Si el usuario quiere agregar más escenarios puede hacer clic en el botón "*Restore List of All Scenarios*".

Figura 34. Ventana para Seleccionar Escenarios



La información del escenario seleccionado se encuentra en la parte derecha de la pantalla Figura 34. Algunos cultivos poseen dos escenarios según ciclo del cultivo: papa, tomate y maíz (Tabla 19). Para los escenarios de arroz inundad de Perú, la diferencia radica en que la "t" es de arroz trasplantado y la "d" se refiere a arroz con plantío directo.

Tabla 19. Información sobre los Escenarios - Cultivos y Clima

País	Cultivo	Escenario	Región (descripción)	Estación Climática	Emergencia	Cosecha
Colombia	Banano	Colombia_Banana_C1.scn	Antioquia	801100.dvf	1-Ene	31-Dic.
Colombia	Banano	Colombia_Banana_C4.scn	Magdalena	800280.dvf	1-Ene	31-Dic.
Colombia	Plátano	Colombia_Plantain_C7.scn	Valle De Cauca	802590.dvf	1-Ene	31-Dic.
Colombia	Café	Colombia_Coffee_C.scn	Huila (central)	803150.dvf	1-Ene	31-Dic.
Colombia	Café	Colombia_Coffee_N.scn	Antioquia (norte)	801100.dvf	1-Ene	31-Dic.
Colombia	Café	Colombia_Coffee_S.scn	Nariño (sur)	803420.dvf	1-Ene	31-Dic.
Colombia	Papa	Colombia_Potato_C1.scn	Cundinamarca (ciclo cultivo 1)	802220.dvf	1-May	1-Sept.
Colombia	Papa	Colombia_Potato_C1_2.scn	Cundinamarca (ciclo cultivo 2)	802220.dvf	15-Nov.	20-Mar.
Colombia	Papa	Colombia_Potato_C4.scn	Antioquia (ciclo cultivo 1)	801100.dvf	1-May	1-Sept.
Colombia	Papa	Colombia_Potato_C4_2.scn	Antioquia (ciclo cultivo 2)	801100.dvf	15-Nov.	20-Mar.
Colombia	Arroz	Colombia_Rice_dry.scn	Meta	802340.dvf	16-Abr.	15-Sept

País	Cultivo	Escenario	Región (descripción)	Estación Climática	Emergencia	Cosecha
	secano					
Colombia	Tomate	Colombia_Tomato_C1.scn	Cundinamarca (ciclo cultivo 1)	802220.dvf	1-Sept.	31-Ene
Colombia	Tomate	Colombia_Tomato_C10.scn	Antioquia (ciclo cultivo 1)	801100.dvf	1-Sept.	31-Ene
Colombia	Tomate	Colombia_Tomato_C11.scn	Antioquia (ciclo cultivo 2)	801100.dvf	1-Mar.	31-Jul.
Colombia	Tomate	Colombia_Tomato_C13.scn	Valle De Cauca (ciclo cultivo 1)	802590.dvf	1-Sept.	31-Ene
Colombia	Tomate	Colombia_Tomato_C14.scn	Valle De Cauca (ciclo cultivo 2)	802590.dvf	1-Mar.	31-Jul.
Colombia	Tomate	Colombia_Tomato_C2.scn	Cundinamarca (ciclo cultivo 2)	802220.dvf	1-Mar.	31-Jul.
Colombia	Tomate	Colombia_Tomato_C4.scn	Huila (ciclo cultivo 1)	803150.dvf	1-Sept.	31-Ene
Colombia	Tomate	Colombia_Tomato_C5.scn	Huila (ciclo cultivo 2)	803150.dvf	1-Mar.	31-Jul.
Colombia	Tomate	Colombia_Tomato_C7.scn	Norte De Santander (ciclo cultivo 1)	800970.dvf	1-Sept.	31-Ene
Colombia	Tomate	Colombia_Tomato_C8.scn	Norte De Santander (ciclo cultivo 2)	800970.dvf	1-Mar.	31-Jul.
Colombia	Arroz inundado	Colombia_Rice_wet_C1.scn	Tolima (ciclo cultivo 1)	802140.dvf	16-Abr.	15-Ago.
Colombia	Arroz inundado	Colombia_Rice_wet_C2.scn	Tolima (ciclo cultivo 2)	802140.dvf	1-Sept.	31-Dic.
Perú	Esparrago	Peru_Asparagus.scn	La Libertad	845010.dvf	1-Dic.	31-May
Perú	Esparrago	Peru_avocado.scn	La Libertad	845010.dvf	1-Ene	31-Dic.
Perú	Uva	Peru_grapes.scn	Piura	844010.dvf	10-Jun.	30-Oct.
Perú	Maíz	Peru_Maize_C2.scn	La Libertad (ciclo cultivo 1 en mes 2)	845010.dvf	1-Feb.	31-Jul.
Perú	Maíz	Peru_Maize_C9.scn	La Libertad (ciclo cultivo 2 en mes 9)	845010.dvf	1-Sept.	31-Ene
Perú	Maíz	Peru_Maize_Mtn.scn	Cajamarca	844720.dvf	1-Nov.	31-May
Perú	Tomate	Peru_Tomato_C4.scn	La Libertad (ciclo cultivo 1 en mes 4)	845010.dvf	1-Abr.	31-Ago.
Perú	Tomate	Peru_Tomato_C9.scn	La Libertad (ciclo cultivo 2 en mes 9)	845010.dvf	1-Sept.	31-Dic.
Perú	Tomate	Peru_Tomato_Mtn.scn	Cajamarca	844720.dvf	1-Abr.	31-Ago.
Perú	Arroz inundado	Peru_Rice_t.scn	San Martin (transplante)	844550.dvf	20-Ene	1-Jun.
Perú	Arroz inundado	Peru_Rice_d.scn	San Martin (plantación	844550.dvf	25-Ene	4-Jun.

País	Cultivo	Escenario	Región (descripción)	Estación Climática	Emergencia	Cosecha
			directa)			

Esta ventana le permite al usuario cambiar de la práctica de labranza convencional por defecto a una labranza de "mayor nivel" de labranza reducida o de no labranza. La labranza convencional asume que menos del 30 por ciento de la cubierta del suelo se deja en el campo. Esta opción produjo la mayor cantidad de escorrentía y erosión. Si se selecciona labranza reducida, los números de la curva se reducen en un 5%. La labranza reducida deja aproximadamente un 30 por ciento o más de cubierta del suelo. Si se selecciona la opción de no labranza, los números de la curva se reducen en un 10%. La no labranza deja un 50% o más de cobertura del suelo porque la superficie del suelo se deja sin alteraciones desde la cosecha a la siembra. Para bananos/plátanos, se asume que no hay ninguna reducción de la labranza ya que es un cultivo perenne. Para el maíz, los factores-c también se reducen. Las prácticas de labranza no son aplicables para las corridas de arroz inundad con RICEWQ.

Químico

La ventana de entrada para los parámetros de destino ambiental químico (Figura 35 y Figura 36) incluye campos de ingreso de datos para las siguientes propiedades de compuestos: peso molecular, solubilidad, koc/kd, presión de vapor, vida media de la degradación aeróbica del suelo (aplicada por igual a las fases disueltas y absorbidas), la vida media del metabolismo acuático béntico y la columna de agua, la fotólisis acuosa, y si se están modelando procesos foliares, la vida media foliar. El usuario puede introducir una constante K de Henry o hacer que el modelo estime la constante K de Henry. El coeficiente de difusión del aire y la entalpía de la evaporación se utilizan para la volatilización. El usuario puede introducir el coeficiente de adsorción como Koc a como Kd. También existe la opción de utilizar el Exponente Freundlich (1/n). Por defecto el Exponente Freundlich esta activado "on" con un valor de 0.9.

El usuario puede chequear si la vida media está ajustada para temperatura (por defecto = casilla seleccionada). Si la casilla está seleccionada, el usuario puede ingresar el factor Q10. De acuerdo con la opinión científica de EFSA sobre el valor Q10 (EFSA, 2007) un valor por defecto del Q10 de 2.58 deberá utilizarse. La degradación está ajustada al suelo (PRZM) o al cuerpo de agua (EXAMS) con base a la temperatura del agua o del suelo (t_{act}) y una temperatura de referencia (t_{ref}) (usualmente 20ºC para suelo y 25ºC en EXAMS). Ver la ecuación a continuación.

$$DT_{50} \text{ Ajustado} = DT_{50} * Q10^{[(tact-tref)/10]}$$

Se pueden simular dos metabolitos. El usuario puede seleccionar la vía:

- matriz a metabolito 1,
- matriz a metabolito 1 a metabolito 2,
- matriz a metabolito 1y matriz a metabolito 2.

El usuario tendrá que completar la información del destino ambiental del metabolito. También, si se simulan los metabolitos, la proporción formación molar:decaimiento en fracciones deben diligenciarse para indicar el proceso de degradación mediante el cual se forma el metabolito. Estas celdas de datos se nublan cuando se simula únicamente al ingrediente activo base.

El usuario tiene la opción de seleccionar los parámetros "WinPRZM Specific" (Figura 35). El primer conjunto de opciones tiene que ver con la adsorción retardada. El valor por defecto es "Off". Por otra parte, el usuario puede escoger entre usar los valores definidos PEARL o PRZM para las fracciones en equilibrio. Estos valores (FEQ, Kdes, S2 Non-Eq, and t1/2 Sorb) son

usados durante el modelaje de sorción que no está en equilibrio. Las recomendaciones para incorporar una sorción no equilibrada están descritas en la sección 7.1.6 de FOCUS (2009).

Para el segundo conjunto, el usuario tiene la opción de usar la vida media del suelo ajustada con la humedad. Las opciones son Abs (la humedad del suelo de referencia se ingresa en términos absolutos), Rel (FC) (la humedad del suelo de referencia se ingresa relativa a la capacidad del campo), u Off (no ajustar la vida media con la humedad). El valor por defecto es "Abs" la opción absoluta. El valor por defecto para el exponente de corrección de humedad "M. Exponent" es 0.7 y el valor por defecto "M. Content" es 100 (FOCUS, 2003 y 2010).

Todos los escenarios asumen que el lavado foliar está ajustado a un valor por defecto de 0.5 y el factor de captación de la planta se ajusta al valor por defecto de 0.0 (USEPA, 2004). Estos no son valores ingresados por el usuario.

Para el arroz inundado, el usuario debe introducir la vida media aeróbica de metabolismo acuático y la vida media anaeróbica en la pantalla de los "Universal Inputs" Y en la pantalla de "WINPRZM/RICEWQ" (Figura 36) – "t1/2 Rice WC (Day)" y "t1/2 Rice Sed. (Day)". El valor "t1/2 Rice WC" corresponde a la vida media en la columna de agua y el valor "t1/2 Rice Sed." corresponde a la vida media en el sedimento (metabolismo béntico). Estos valores serán los mismos para los primeros niveles.
En los niveles superiores, el usuario tiene la opción de colocar las vidas medias de metabolismo aeróbico/anaeróbico de un estudio de disipación para recrear la degradación en la fase del agua y en el sedimento. En la pantalla de los "Universal Inputs", la vida media acuática aeróbica y anaeróbica son utilizadas en el cuerpo de agua que recibe del modelo EXAMS. Las vidas medias de la pantalla "WINPRZM/RICEWQ" son utilizadas en el modelo RICEWQ. El modelo RICEWQ También usa los valores de destino ambiental de la pantalla "Universal Inputs" (Koc, fotolisis acuosa, hidrolisis, vida media en suelo, vida media foliar y solubilidad). En los escenarios de arroz inundado, el usuario tiene la opción de colocar una tasa de liberación más lenta (dia^{-1}). Esta opción es útil cuando el usuario está simulando un tratamiento de semillas o uso de formulaciones granulares y donde la liberación del ingrediente activo de la semilla o granulo presenta una tasa de primer orden.

Figura 35. Ventana de Ingreso de los Parámetros del Químico

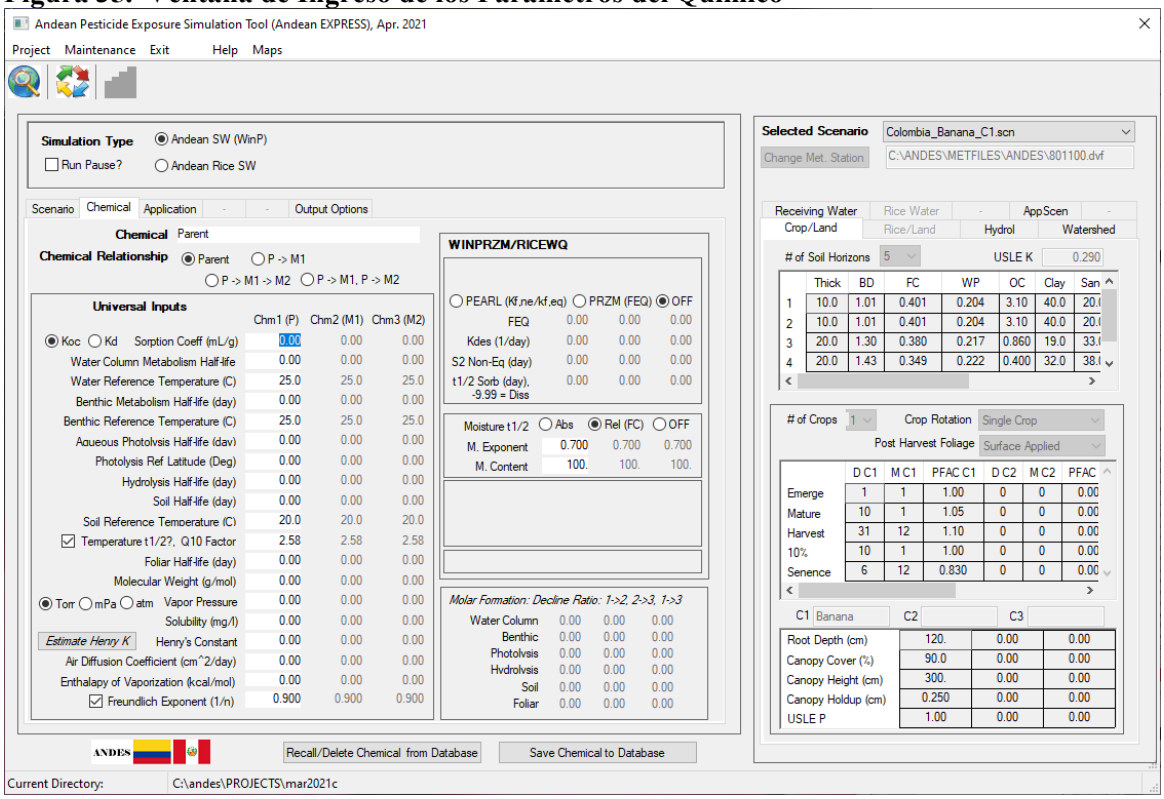
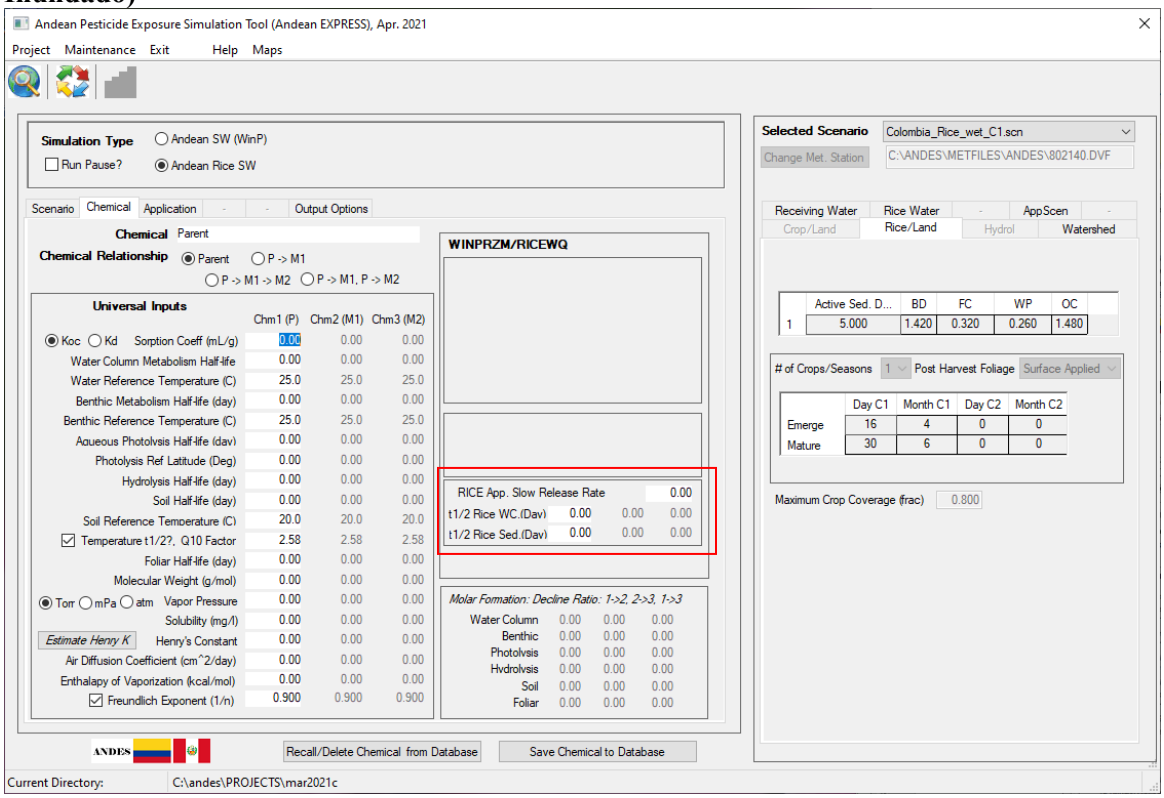


Figura 36. Ventana de Ingreso de los Parámetros del Químico (Escenarios Arroz Inundado)



Después que el usuario ha completado todos los datos del químico evaluado, este tiene la opción de guardar los datos del químico para corridas futuras presionando el botón "Save Chemical to Database". Si el usuario necesita usar los datos mas adelante deberá presionar el botón "Recall/Delete Chemcial from Database".

Endpoints de Destino Ambiental

Vida media en el suelo: Ingrese la vida media del metabolismo aeróbico del suelo en días. cuando se dispone de cuatro o más valores se utiliza la media geométrica de las distintas vidas medias en suelo. El mayor valor de vida media se utiliza cuando hay menos de cuatro valores disponibles. Si los datos son estables, ingrese cero (0) o déjelo en blanco

Koc: Ingrese un valor de Koc (mL/g) para la partición. Debe utilizarse la media aritmética de los valores de Koc. Si la celda se deja en blanco, la Koc se establece en cero (0)

Vida media de metabolismo en la columna de agua:
Ingrese una vida media metabólica acuática aeróbica en días del sistema completo de estudios agua/sedimento. La media geométrica de las diversas vidas medias del sistema completo agua-sedimento se utiliza cuando se dispone de cuatro o más valores. El mayor valor de vida media se utiliza cuando hay menos de cuatro valores disponibles. Si no está disponible, el valor predeterminado recomendado por la USEPA es 2 x valor de la vida media del metabolismo aeróbico del suelo. Si es estable, ingrese cero (0) o déjelo en blanco.

Vida media de metabolismo béntico:
Ingrese una vida media metabólica acuática anaeróbica en días del sistema completo de estudios agua/sedimento. La media geométrica de las diversas vidas medias del sistema completo agua-sedimento se utiliza cuando se dispone de cuatro o más valores. El mayor valor de la vida media se utiliza cuando hay menos de cuatro valores disponibles. Si no está disponible, el valor predeterminado recomendado por la USEPA es 2 x valor de vida media del metabolismo del suelo anaeróbico. Si es estable, ingrese cero (0) o déjelo en blanco.

Solubilidad: Ingrese la solubilidad en mg/L (ppm). La concentración del plaguicida disueltos en un cuerpo de agua no puede exceder la solubilidad del químico.

Hidrolisis Acuática DT50: Introduzca la vida media de hidrólisis en días a pH 7. Este es un valor opcional. Si el químico es estable, ingrese cero (0) o deje esta celda en blanco

Fotolisis Acuática DT50: Introduzca la vida media de fotólisis acuática en días. Este es un valor opcional. La vida media efectiva de la fotólisis será 124 veces más larga que la ingresada en el programa debido a la atenuación de la luz en el estanque. Si la sustancia química es estable a la fotólisis acuosa, ingrese cero (0) o déjelo en blanco

Parámetros de Aplicación
La pantalla de ingreso de los parámetros de aplicación (Figura 37) contiene campos para ingresar datos sobre el número de aplicaciones, momento de aplicación, método de aplicación, dosis de la aplicación, profundidad de la incorporación y método de aplicación química. Estos mismos valores pueden aplicarse a todos los escenarios seleccionados (con el botón “Copy Application Data to All Selected Scenarios”) o se pueden introducir valores específicos para cada escenario (con el botón “Copy Application Data to Currently Selected Scenarios”). El escenario seleccionado se muestra en la esquina superior derecha. El usuario puede seleccionar la pestaña “AppScen” a la derecha para ver si la aplicación ha sido copiada en el escenario.

Las fechas de aplicación del plaguicida pueden establecerse de manera absoluta (por fecha calendario), o relativo al surgimiento del cultivo. Esta característica facilita la configuración rápida de los escenarios de aplicación para múltiples escenarios. Por ejemplo, cuando la intención es aplicar el plaguicida 7 días antes de la pre-siembra, el usuario puede introducir 7 días relativos a la siembra y la fecha correcta de aplicación será calculada de la información de los cultivos incorporados en el archivo de escenario de cultivo. Sin embargo, para cultivos de árboles (bananos, plátano, café y aguacate) es mejor utilizar fechas absolutas.

Para PRZM, el usuario puede escoger 8 tipos de Métodos de Aplicación del Químico (CAM):

CAM 1 – Cultivos bajos
CAM 2 – Sobre el cultivo, una fracción foliar es interceptada como función directa al desarrollo del cultivo
CAM 3 – Sobre el cultivo, una fracción foliar es interceptada exponencialmente con el desarrollo del cultivo
CAM 4 – Uniforme bajo el cultivo, el usuario define la profundidad
CAM 5 – Bajo el cultivo, aumenta con la profundidad
CAM 6 – Bajo el cultivo, disminuye con la profundidad
CAM 7 – En banda T
CAM 8 – En profundidad

Estos métodos de aplicación se pueden observar se describen si el usuario presiona el botón "App. Method Help" en la parte inferior de la ventana de aplicación, ver Figura 37. En la Figura 38 se puede ver la información que es desplegada al presionar el botón "App. Method Help".

Para arroz se ha preestablecido el CAM 4. La aplicación es efectuada sobre la superficie del suelo de la lámina de agua (si la hay) del arroz inundado. Si existe follaje al momento de la aplicación, se utiliza una interceptación foliar del cultivo directamente proporcional al desarrollo del cultivo y el remanente es aplicado al suelo o agua.

En caso de aplicaciones múltiples el usuario debe escoger el intervalo entre las aplicaciones en el botón de "Uniform Application Interval". Generalmente este valor debe corresponder al intervalo mínimo sugerido en la etiqueta. El valor predeterminado en "Application occur every" es de 1 año, sin embargo, este valor puede ser cambiado por el usuario.

El Modelo de Exposición de Plaguicidas en Agua - ANDES incluye una herramienta de deriva para el estanque con base en el AgDRIFT® (Teske, *et al*., 2003). El usuario tiene la opción de elegir el tipo de aplicación con el tamaño de la gota. El valor por defecto es "0" distancia al estanque. Sin embargo, el usuario puede seleccionar una distancia de deriva de aspersión y el porcentaje de deriva será ajustado a la aplicación del tipo/tamaño de la gota correspondiente. El valor por defecto de las gotas para aéreo es fino a medio (F/Med) y el valor por defecto para la aspersión terrestre es la barra de aspersión alta con muy fina a fina (Suelo-Alta, Fina). Si el usuario usa la herramienta de deriva, hacer clic en "*Apply Drift to Current Appl. Row*" completa la deriva y eficiencia para la fila actual en la cual se encuentra el usuario. La deriva y eficiencias se ingresan como fracciones como fracciones. La eficiencia para aérea es 0.95 (95 por ciento) y 0.99 (99 por ciento) para aspersión terrestre o pulverizadora de aire a presión. El usuario puede ingresar su propia deriva y eficiencia si no quiere utilizar la herramienta de derivación. Por ejemplo, se asume que no hay deriva para aplicaciones granulares por lo que el usuario puede usar 0.00 para deriva y 1.00 (100 por ciento) para eficiencia.

Si el usuario utiliza un Proyecto existente, se puede observar la información de la corrida anterior en la sección derecha al presionar la barra de "AppScen". Estos datos de la corrida previa serán usados para la nueva corrida. Sin embargo, al presionar "Make this the currently displayed application date" en la sección derecha para copiar los datos de aplicación en la ventana principal. Si el usuario quiere nuevos datos de aplicación esto pueden ser cambiados en la ventana principal de aplicación y luego presionar "Copy Application Data to All Selected Scenarios" o "Copy Application Data to Currently Selected Scenarios".

Figura 37. Ventana de Ingreso para los Parámetros de Aplicación

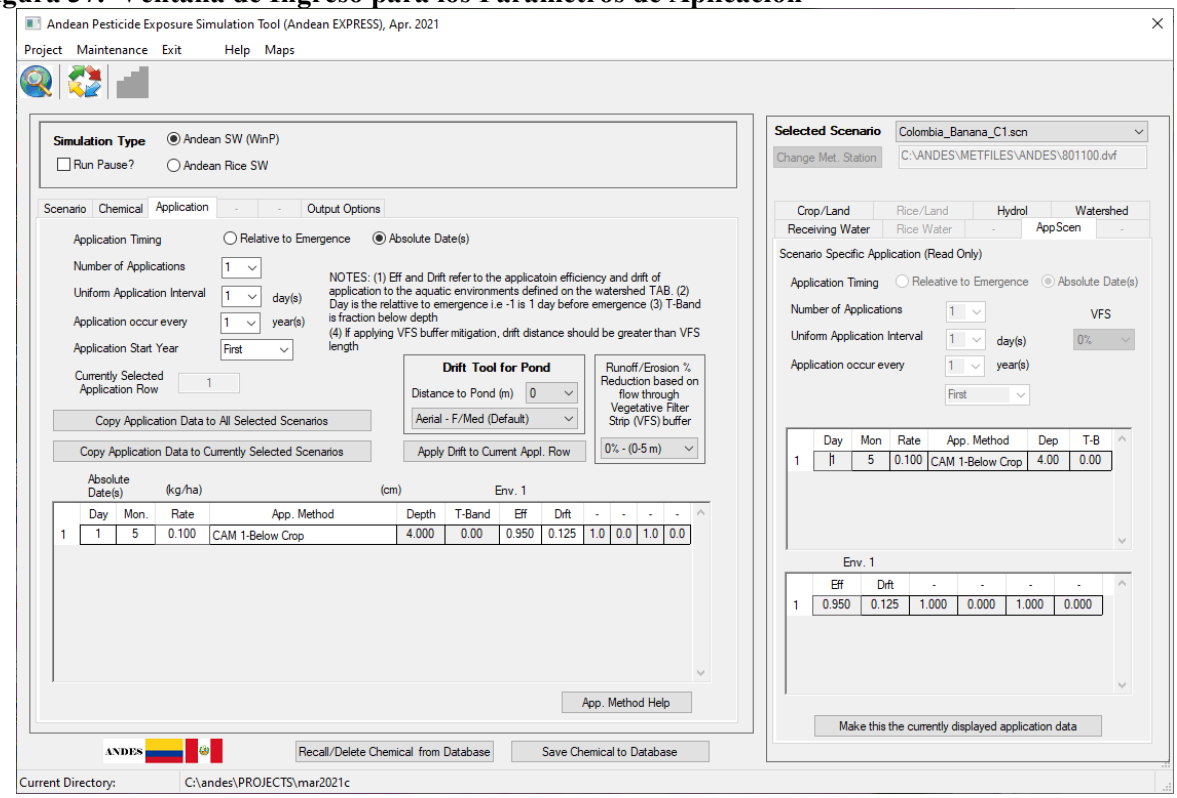
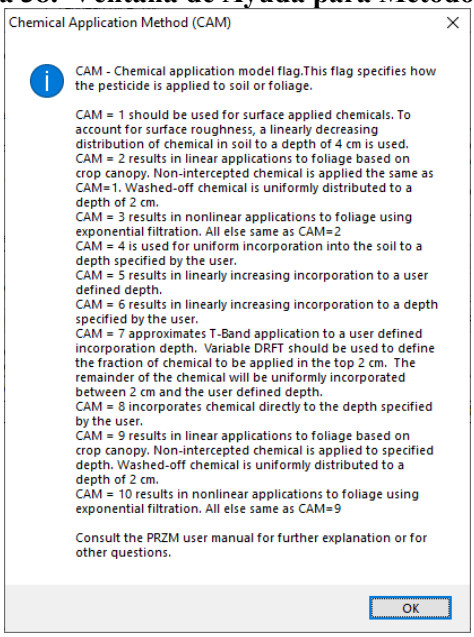


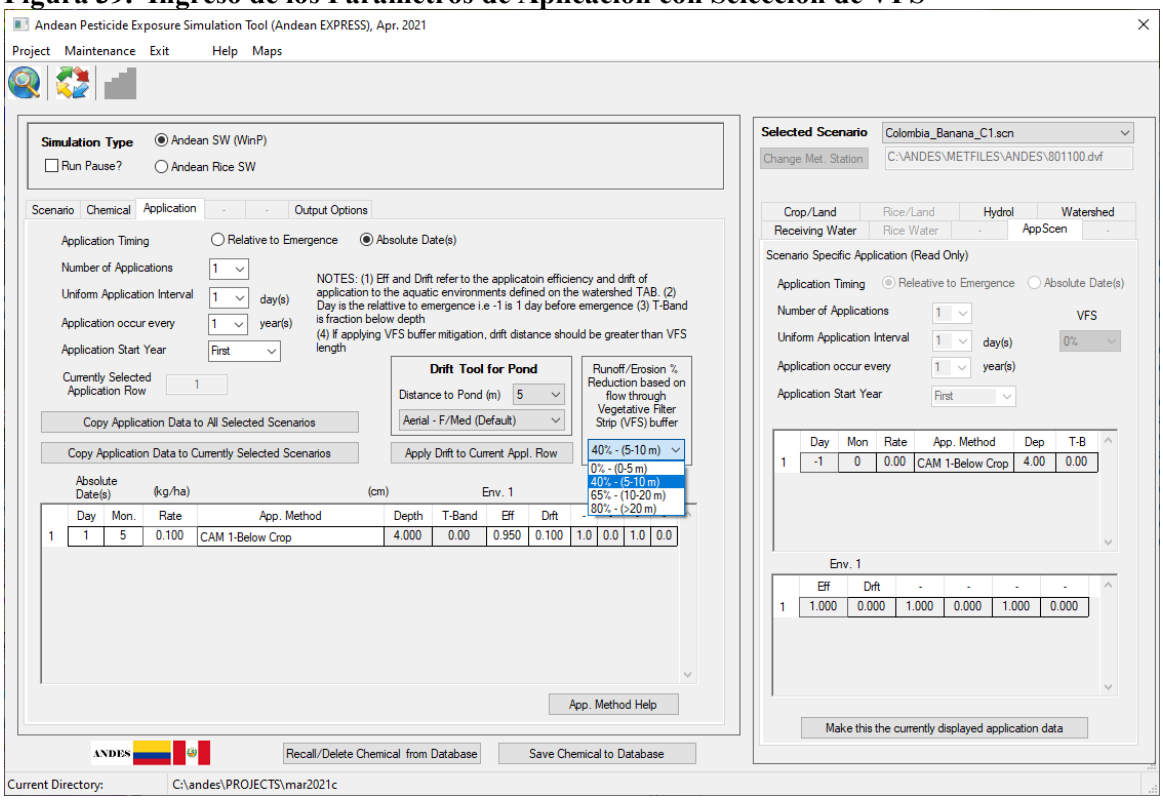
Figura 38. Ventana de Ayuda para Métodos de Aplicación del Químico (CAM)



En la ventana de aplicación, el usuario también tiene la opción de simular un “Vegetative Filter Strip” - VFS. El valor por defecto es 0 m (no VFS). Sin embargo, similar a la Herramienta andina de tamizaje acuático de nivel II, el usuario puede seleccionar 5m, 10 m or20 m VFS como

mitigación. La escorrentía se reduce en un 40% con un VFS de 5 m, 65% con un VFS de 10 m y un 80% con un VFS de 20 m. Estos valores son recomendados en la UE con base en la Caja de Herramientas MAgPIE (SETAC, 2013). La Figura 39 muestra la ventana de ingreso de aplicación con la lista de opciones VFS. Si el usuario ha seleccionado "Copy Application Data to All Selected Scenarios" o "Copy Application Data to Currently Selected Scenario" entonces la pantalla a la derecha va a reflejar la selección de VFS, así como los datos de aplicación (en la figura se muestra como 40% seleccionado para los VFS). Si el usuario selecciona un VFS y tiene un tipo de aplicación que es aérea, aspersión terrestre, o pulverización entonces el usuario también debe actualizar la distancia "Drift Tool for Pond" para que sea igual o mayor a la distancia del VFS. Esta opción no está disponible para los escenarios de arroz.

Figura 39. Ingreso de los Parámetros de Aplicación con Selección de VFS



En los escenarios de arroz inundado se encuentra una barra de "Rice Water" donde se puede ver el número de eventos de irrigación/drenaje y los datos asociados con estos eventos (profundidad al inicio del inicio de la irrigación, profundidad cuando se detiene la irrigación, tasa de irrigación, tasa de drenaje, altura de la salida). Esta barra también muestra la información sobre las propiedades del campo de arroz como es la altura de la berma, la tasa de infiltración y velocidad de establecimiento.

Ventana a la derecha

Las ventanas as la derecha muestran los parámetros asociados al escenario. La pestaña "Crop/Land" o "Rice/Land" muestra las características del suelo y parámetros del cultivo. La pestaña "*Hydrol*" muestra los factores-c USLE y los números de la curva usados en winPRZM. También muestra si hay irrigación en los escenarios de winPRZM. La pestaña "*Watershed*" muestra información sobre sobre sobre la vertiente tal como el área del campo y datos sobre el cuerpo de agua. La pestaña "*waterbody*" brinda información sobre el cuerpo de agua tal como los

sedimentos suspendidos, la densidad del volumen y el carbono orgánico béntico. La pestaña "AppScen" se completa después de llenar la ventana de aplicación para cada escenario y el usuario selecciona el botón "Copy". Para los escenarios de arroz inundado, existe una barra de "Rice Water" donde se muestra el número de eventos de irrigación/drenaje y los datos asociados a cada evento (profundidad al inicio de la irrigación, profundidad cuando se suspende la irrigación, tasa de irrigación, tasa de drenaje, altura de salida). En esta barra También se encuentra la información sobre las propiedades del campo de arroz como son altura de la berma, tasa de infiltración en la lámina de agua y velocidad de sedimentación.

Escribir y ejecutar los archivos de entrada

Luego de completar las ventanas de entrada. El último paso de escribir los archivos de entrada y ejecutar los modelos se inicia al seleccionar el botón en la parte superior izquierda de la pantalla con las flechas de colores.

La información necesaria para ejecutar winPRZM-EXAMS o RICEWQ-EXAMS está incluida en varios archivos de los datos de entrada:

winPRZM

- archivo de parámetro anotado incorporando la definición de escenario, *.inp
- archivo del clima proporcionando los datos del clima utilizados, *.dvf
- archivo con la definición de las opciones de ejecución de winPRZM, *.run

RICEWQ

- archivo de parámetros anotados incorporando la definición del escenario, *.rce
- archivo de clima proporcionando los datos de clima utilizados, *.dvf
- archivo con la definición de las opciones de ejecución de winPRZM, *.run

EXAMS

- archivo de parámetros incluyendo la selección del escenario, *.exa
- múltiples archivos de transferencia de winPRZM a EXAMS, *.dyr (yr representa el año de ejecución)
- archivo del ambiente del cuerpo de agua (laguna), *.exv

Each standard scenario is assigned a unique name that identifies the location and crop. Figura 40 shows the window that appears when the models are running.

A cada escenario estándar se le asigna un nombre único que identifica la ubicación y el cultivo. La Figura 40 muestra la ventana que aparece cuando los modelos están en ejecución.

Figura 40. Ventana durante la Ejecución de las Simulaciones winPRZM-EXAMS o RICEWQ-EXAMS

Luego de una ejecución de simulación completa, los datos de salida relevantes del escenario se proporcionan en tres archivos winPRZM ASCII (*.hyd, *.cnc, and *.out), y tres archivos EXAMS ASCII (*.xms, *.yms, and *.zms). Estos archivos son analizados automáticamente por el Modelo de Exposición de Plaguicidas en Agua - ANDES para generar tablas y gráficos de los resultados. El generador de salida también puede exportar resultados para cada escenario simulado en un archivo ASCII con una extensión de ".txt." Estos archivos se crean en el actual directorio del proyecto. Estos archivos se pueden utilizar para análisis de datos posteriormente.

Salidas de winPRZM

*.out = resumen de la salida winPRZM. Contiene tosa la salida winPRZM

*.cnc = Concentración media del suelo a profundidades de 1 metro de la superficie del suelo y al fondo de la columna de suelo

*.hyd = resumen anual de hidrología (precipitación total, escorrentía, erosión y evapotranspiración)

*.msb = balance anual de masa química a profundidades de 1 metro de la superficie del suelo y al fondo de la columna de suelo (aplicación total, flujo de escorrentía, flujo de descomposición, flujo de erosión, masa que permanece en la columna de suelo, etc.)

*.zts = winPRZM cronometra las salidas de series para un análisis más profundo (usando otro software)

Salidas de RICEWQ

*.zp0 = RICEWQ serie de datos diarios de salida de masa del arroz inundado (agua, sedimento, follaje)

*.zp1 = serie de datos diarios de balance de masa y concentración en el arroz inundado. Si se simulan metabolitos se crean archivos *.zp* adicionales.

*.zzh = serie de datos diarios del resumen de hidrología (precipitación, evaporación, tasa de infiltración, irrigación, profundidad, humedad, volumen saliendo del arroz inundado)

*.zzt = serie de datos diarios de volumen de agua y masa que sale del arroz inundado debido a drenaje o es desbordado

*.zzz = resumen de los datos de entrada en RICEWQ

Salidas de EXAMS

*.xms = EXAMS archivo de reporte tabular estándar

*.yms = EXAMS *EcoRisk* archivo de salida que contiene las concentraciones acuáticas promedio "instantáneas" y la media de 24 horas, 96 horas, 21 días, 60 días, 90 días y las anuales de la matriz y de los productos químicos de transformación

*.zms = archivos de salida EXAMS EcoTox (concentraciones diarias de la matriz y de los productos químicos)

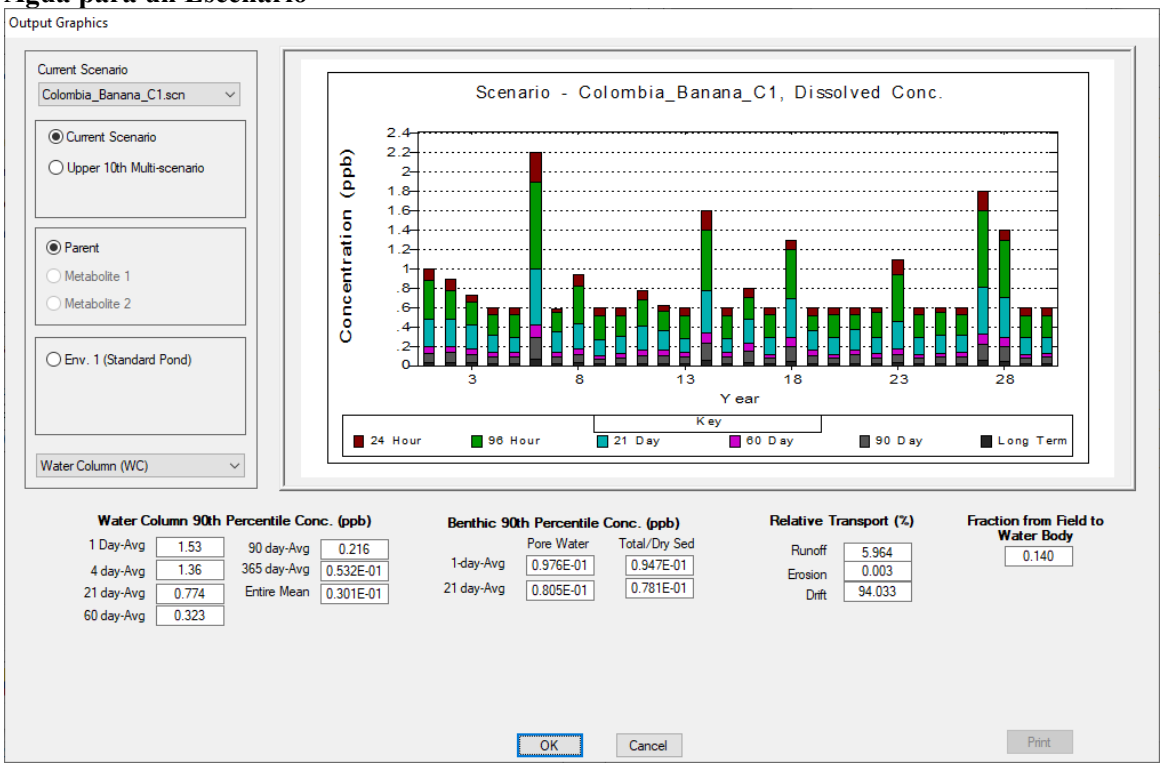
Generador de Salidas (Output)

Inicie el generador de *output* al seleccionar el ícono "histogram graph" en la ventana de apertura (esquina superior izquierda).

Esto resulta en la aparición de la ventana que se muestra en la Figura 41. La salida gráfica de los EECs máximos anuales en orden cronológico se muestran en la pantalla para el escenario seleccionado con los botones en la parte superior izquierda de la pantalla. La información más crítica usualmente serán los EECs del 10mo en la fase de agua. La pantalla también muestra los EECs de 1-en-10-años (10mo percentil superior) para los promedios calculados en el tiempo de duración de exposición en la parte inferior de la pantalla para el escenario actual seleccionado. Los EECs máximos anuales del 10mo percentil para 1-día, 4-días, 21-días, 60-días, 90-días, 365-días, y de todos los años se muestra para para la fase de agua. También se proporcionan los EECs máximos anuales del 10mo percentil para agua intersticial y sedimento para el promedio calculado sobre el tiempo para 1-día y 21-días. Se muestra el porcentaje relativo de escorrentía, erosión y deriva durante todo el periodo.

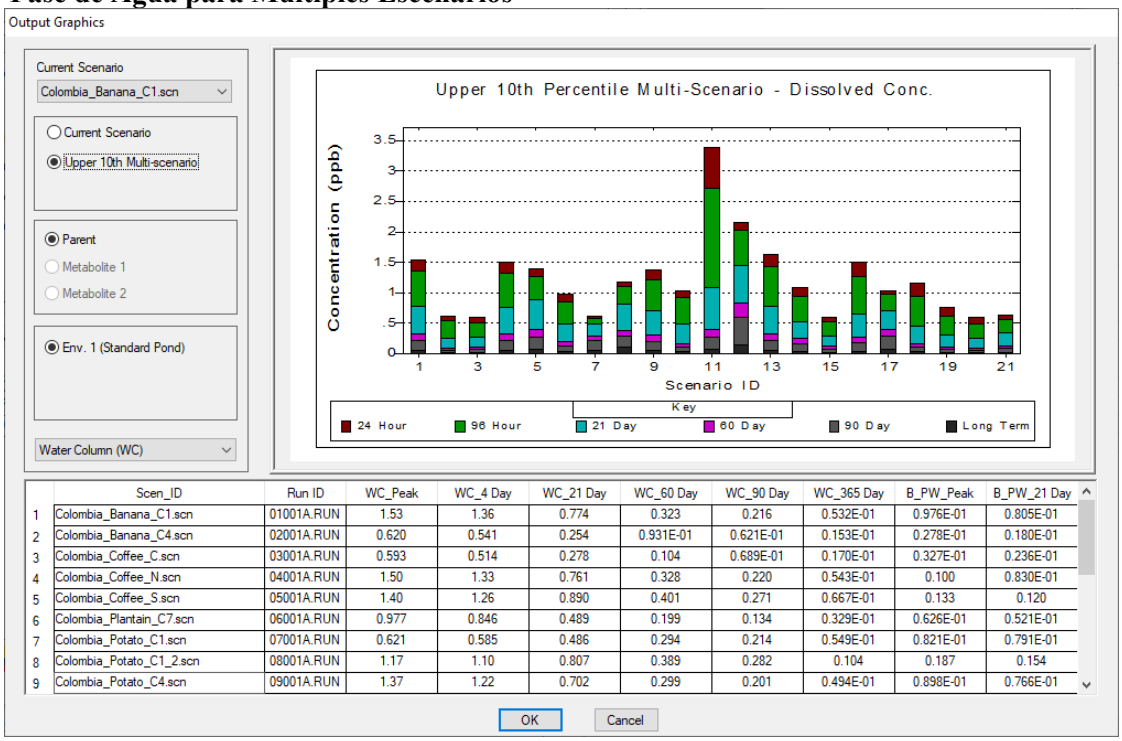
Adicionalmente, el usuario puede observar el "Transporte Relativo (%)" en la ventana de salida. Esta provee al modelador con la información de la contribución de la carga que es transportada al cuerpo de agua ya sea por escorrentía, erosión o deriva.

Figura 41. Ventana que Muestra un Gráfico de las *EECs* Máximas Anuales en la Fase de Agua para un Escenario



Al seleccionar el botón “Upper 10th multi-scenario” en la parte superior izquierda de la pantalla (bajo el escenario actual), tiene como resultado la aparición de la pantalla que se muestra en la Figura 42 y un archivo “Eec10.txt” generado en la carpeta del proyecto. Se muestran las salidas gráficas de los EECs del 10mo percentil máximo anual de agua en el orden de ejecución del escenario. El orden de ejecución se muestra a continuación con el escenario listado con los EECs máximos anuales del 10mo percentil para agua y agua intersticial en ppb para cada duración de exposición.

Figura 42. Pantalla Muestra una Tabla y un Gráfico de las EECs del 10mo Percentil en la Fase de Agua para Múltiples Escenarios



	Scen_ID	Run ID	WC_Peak	WC_4 Day	WC_21 Day	WC_60 Day	WC_90 Day	WC_365 Day	B_PW_Peak	B_PW_21 Day
1	Colombia_Banana_C1.scn	01001A.RUN	1.53	1.36	0.774	0.323	0.216	0.532E-01	0.976E-01	0.805E-01
2	Colombia_Banana_C4.scn	02001A.RUN	0.620	0.541	0.254	0.931E-01	0.621E-01	0.153E-01	0.278E-01	0.180E-01
3	Colombia_Coffee_C.scn	03001A.RUN	0.593	0.514	0.278	0.104	0.689E-01	0.170E-01	0.327E-01	0.236E-01
4	Colombia_Coffee_N.scn	04001A.RUN	1.50	1.33	0.761	0.328	0.220	0.543E-01	0.100	0.830E-01
5	Colombia_Coffee_S.scn	05001A.RUN	1.40	1.26	0.890	0.401	0.271	0.667E-01	0.133	0.120
6	Colombia_Plantain_C7.scn	06001A.RUN	0.977	0.846	0.489	0.199	0.134	0.329E-01	0.626E-01	0.521E-01
7	Colombia_Potato_C1.scn	07001A.RUN	0.621	0.585	0.486	0.294	0.214	0.549E-01	0.821E-01	0.791E-01
8	Colombia_Potato_C1_2.scn	08001A.RUN	1.17	1.10	0.807	0.389	0.282	0.104	0.187	0.154
9	Colombia_Potato_C4.scn	09001A.RUN	1.37	1.22	0.702	0.299	0.201	0.494E-01	0.898E-01	0.766E-01

El usuario tiene la opción de ver los gráficos de agua intersticial. La Figura 43 muestra gráficamente los EECs máximos anuales en el agua intersticial para el escenario actual en orden cronológico. La Figura 44 muestra un gráfico de los EECs del 10mo percentil para todos los escenarios.

Figura 43. Ventana que Muestra un Gráfico de las EECs Máximas Anuales en la Fase de Agua Intersticial para un Escenario

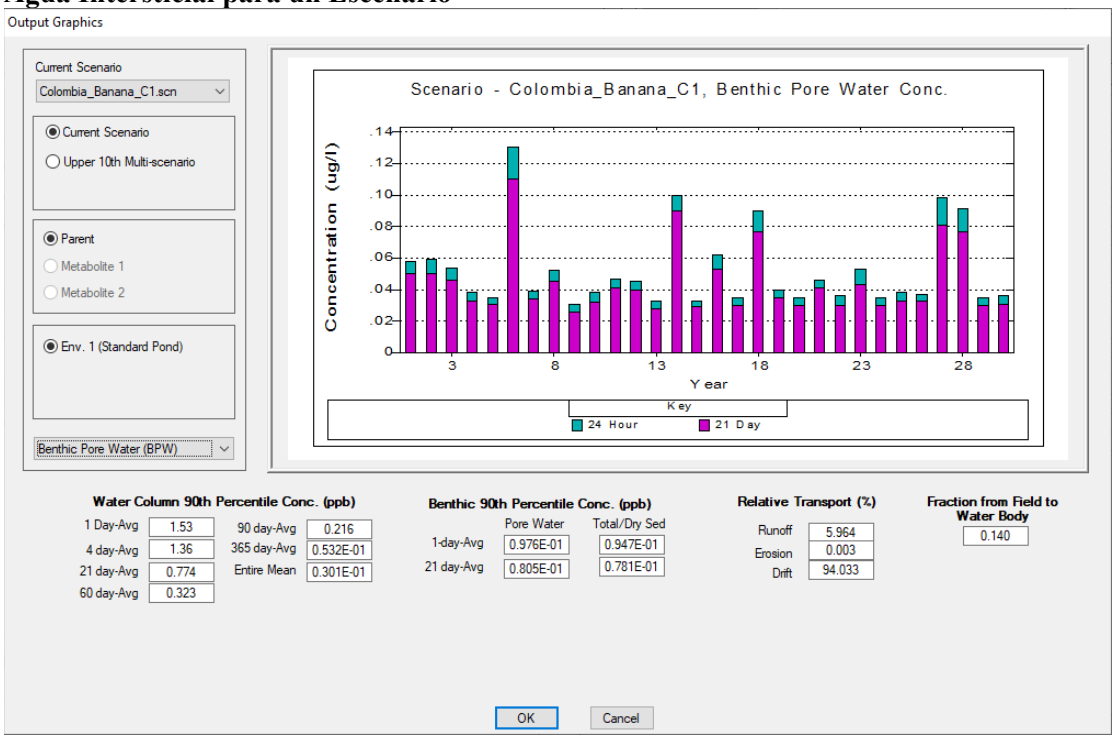
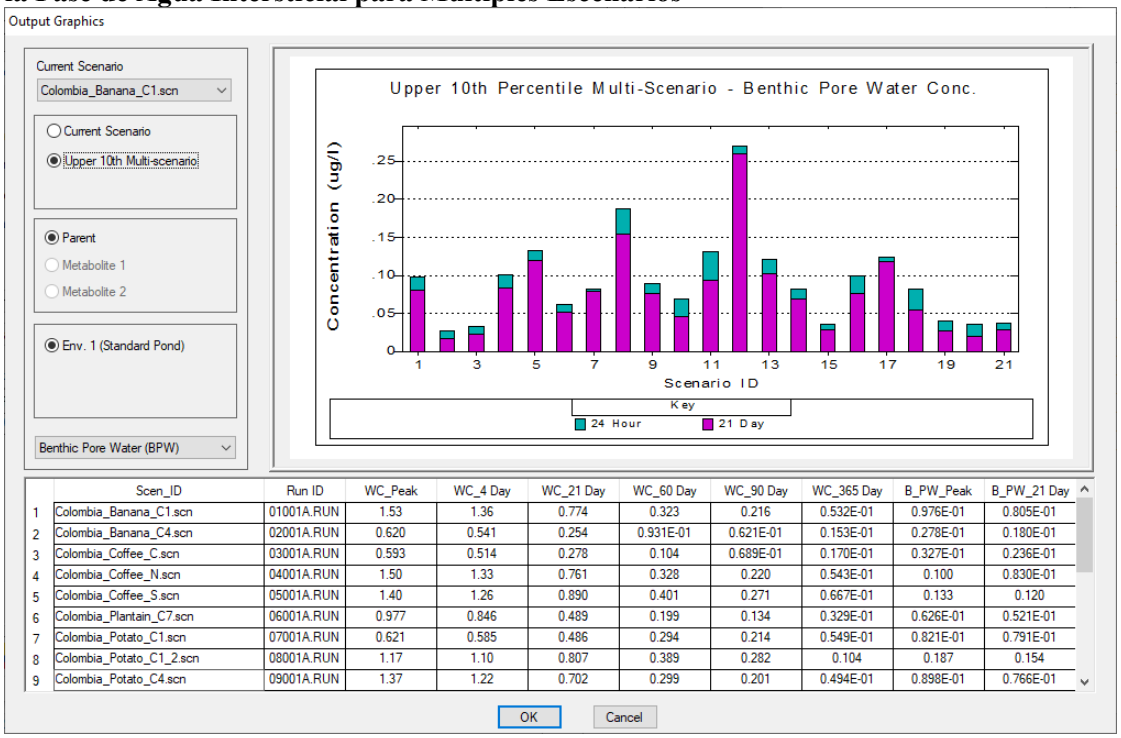


Figura 44. Ventana que Muestra una Tabla y un Gráfico de las EECs del 10mo Percentil en la Fase de Agua Intersticial para Múltiples Escenarios



	Scen_ID	Run ID	WC_Peak	WC_4 Day	WC_21 Day	WC_60 Day	WC_90 Day	WC_365 Day	B_PW_Peak	B_PW_21 Day
1	Colombia_Banana_C1.scn	01001A.RUN	1.53	1.36	0.774	0.323	0.216	0.532E-01	0.976E-01	0.805E-01
2	Colombia_Banana_C4.scn	02001A.RUN	0.620	0.541	0.254	0.931E-01	0.621E-01	0.153E-01	0.278E-01	0.180E-01
3	Colombia_Coffee_C.scn	03001A.RUN	0.593	0.514	0.278	0.104	0.689E-01	0.170E-01	0.327E-01	0.236E-01
4	Colombia_Coffee_N.scn	04001A.RUN	1.50	1.33	0.761	0.328	0.220	0.543E-01	0.100	0.830E-01
5	Colombia_Coffee_S.scn	05001A.RUN	1.40	1.26	0.890	0.401	0.271	0.667E-01	0.133	0.120
6	Colombia_Plantain_C7.scn	06001A.RUN	0.977	0.846	0.489	0.199	0.134	0.329E-01	0.626E-01	0.521E-01
7	Colombia_Potato_C1.scn	07001A.RUN	0.621	0.585	0.486	0.294	0.214	0.549E-01	0.821E-01	0.791E-01
8	Colombia_Potato_C1_2.scn	08001A.RUN	1.17	1.10	0.807	0.389	0.282	0.104	0.187	0.154
9	Colombia_Potato_C4.scn	09001A.RUN	1.37	1.22	0.702	0.299	0.201	0.494E-01	0.898E-01	0.766E-01

La carpeta del proyecto contiene la salida de cada simulación. Se crea un archivo de texto (*.txt) para cada escenario que contiene los EECs máximos anuales y los EECs del 10mo percentil para

agua y agua intersticial. Como se mencionó anteriormente, se crea un archivo "Eec10.txt" que contiene el resumen de los EECs del 10mo percentil para cada escenario. Para salir de los Gráficos de Salida, el usuario debe presionar el botón "OK".

Para salir completamente del modelo ANDES, el usuario debe presionar el botón "Exit" en la parte superior izquierda de la pantalla (Figura 45). El botón de ayuda "Help" está a la derecha del botón de salida "Exit". Al presionar "Help" se despliegan los manuales del usuario (Figura 46).

Figura 45. Pantalla Principal con las Opciones de "Exit" y "Help"

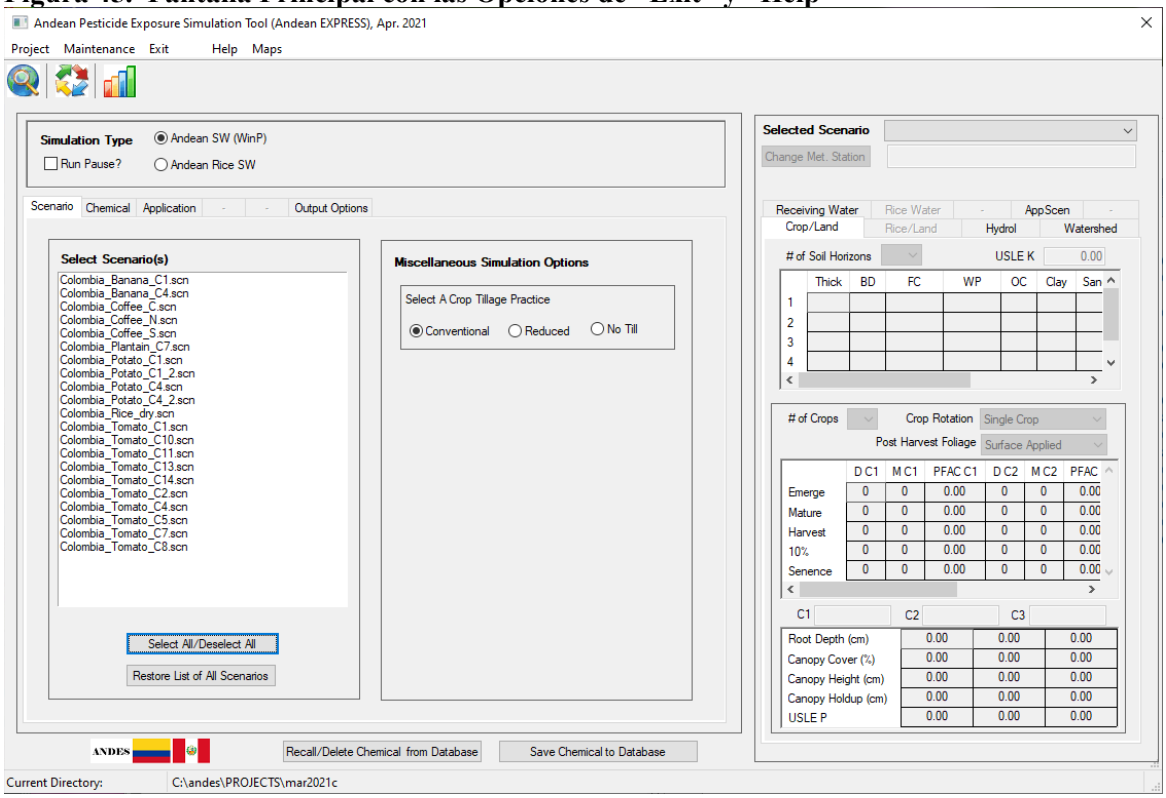
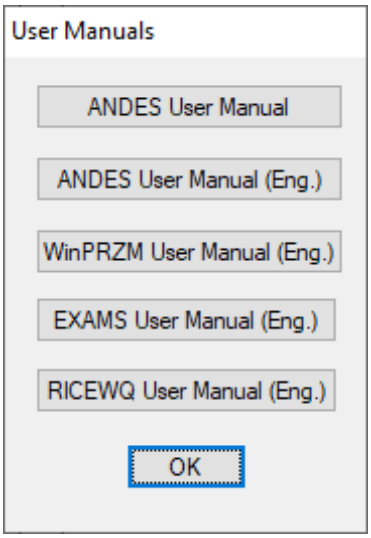


Figura 46. Manuales del Usuario Disponibles al Presionar el Botón "Help"



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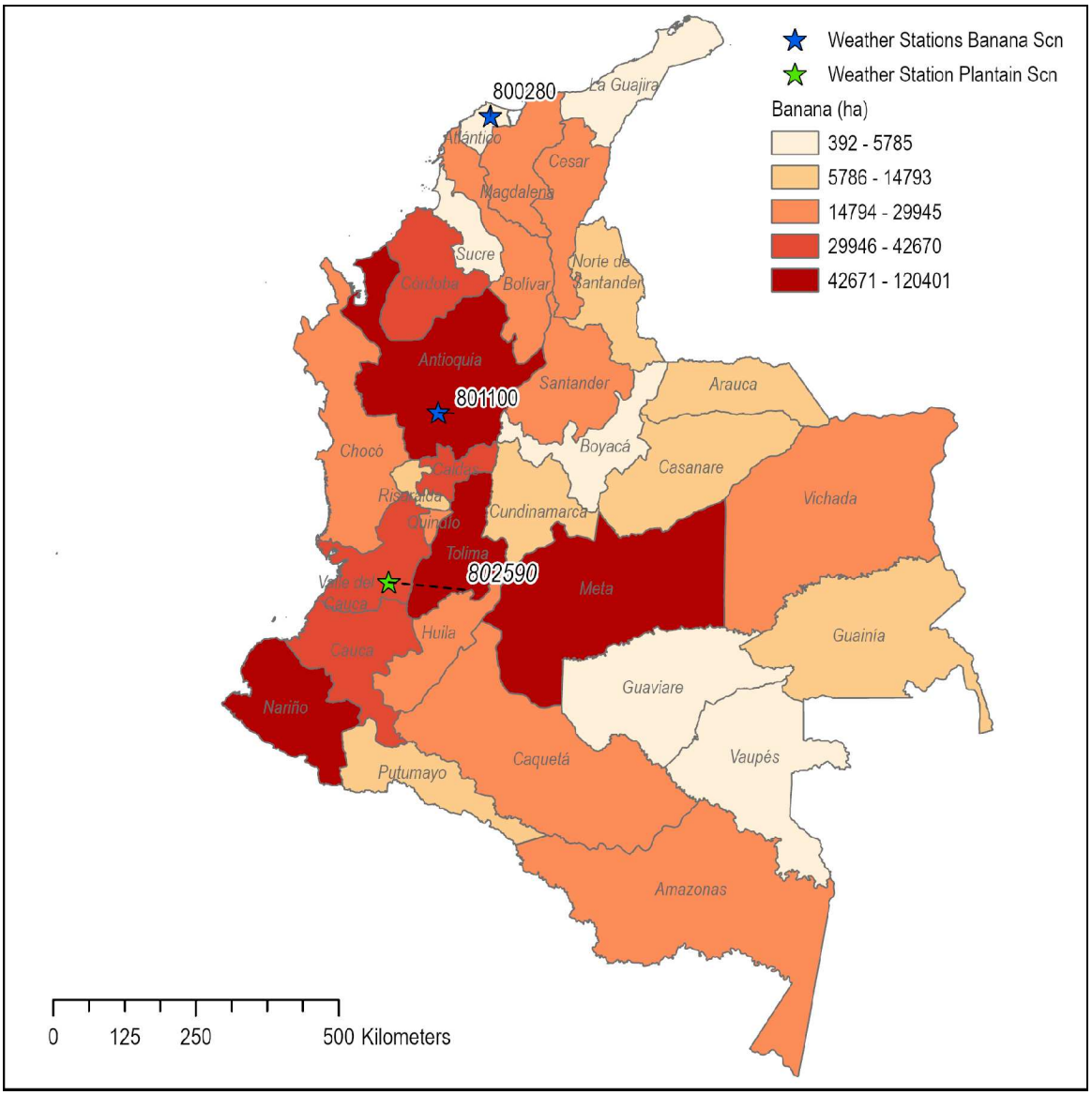
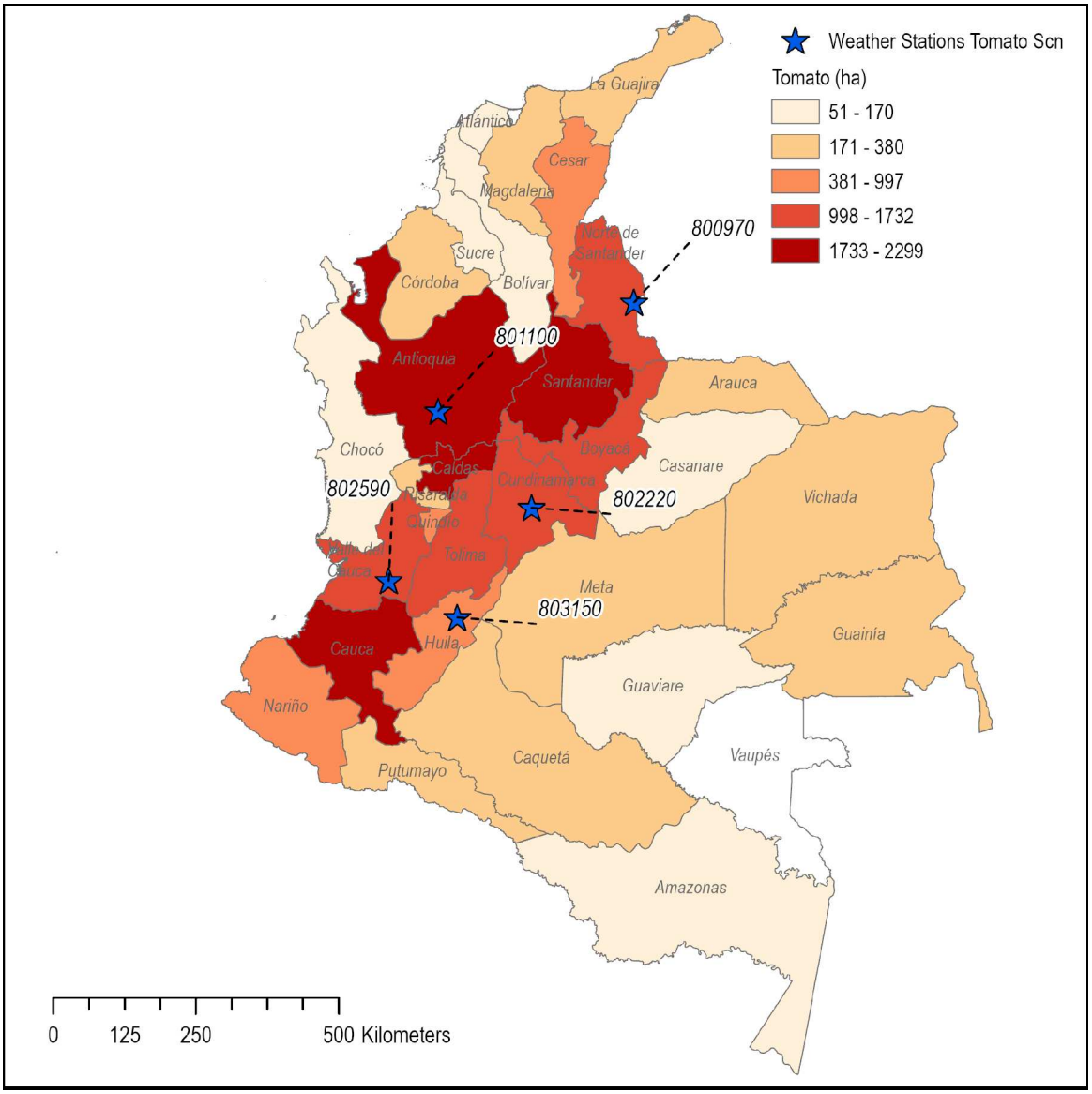
Apéndice C: Figuras, Mapas, y Análisis Climáticos para los Escenarios de Colombia

Figura C - 1. Localización de los escenarios de banana y plátano en Colombia



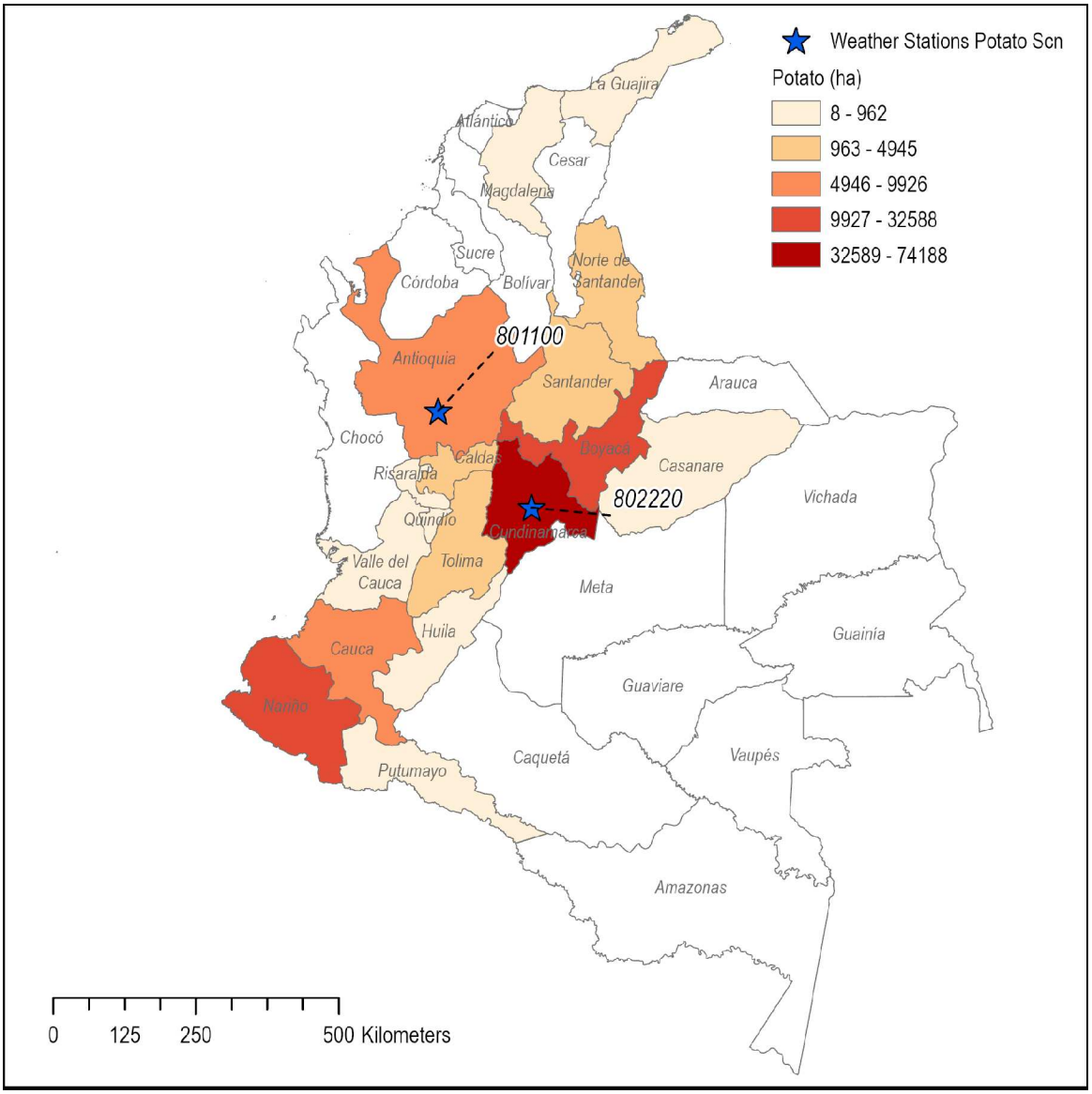
2013 Crop Production (DANE, 2016)

Figura C - 2. Localización de los escenarios de tomate en Colombia



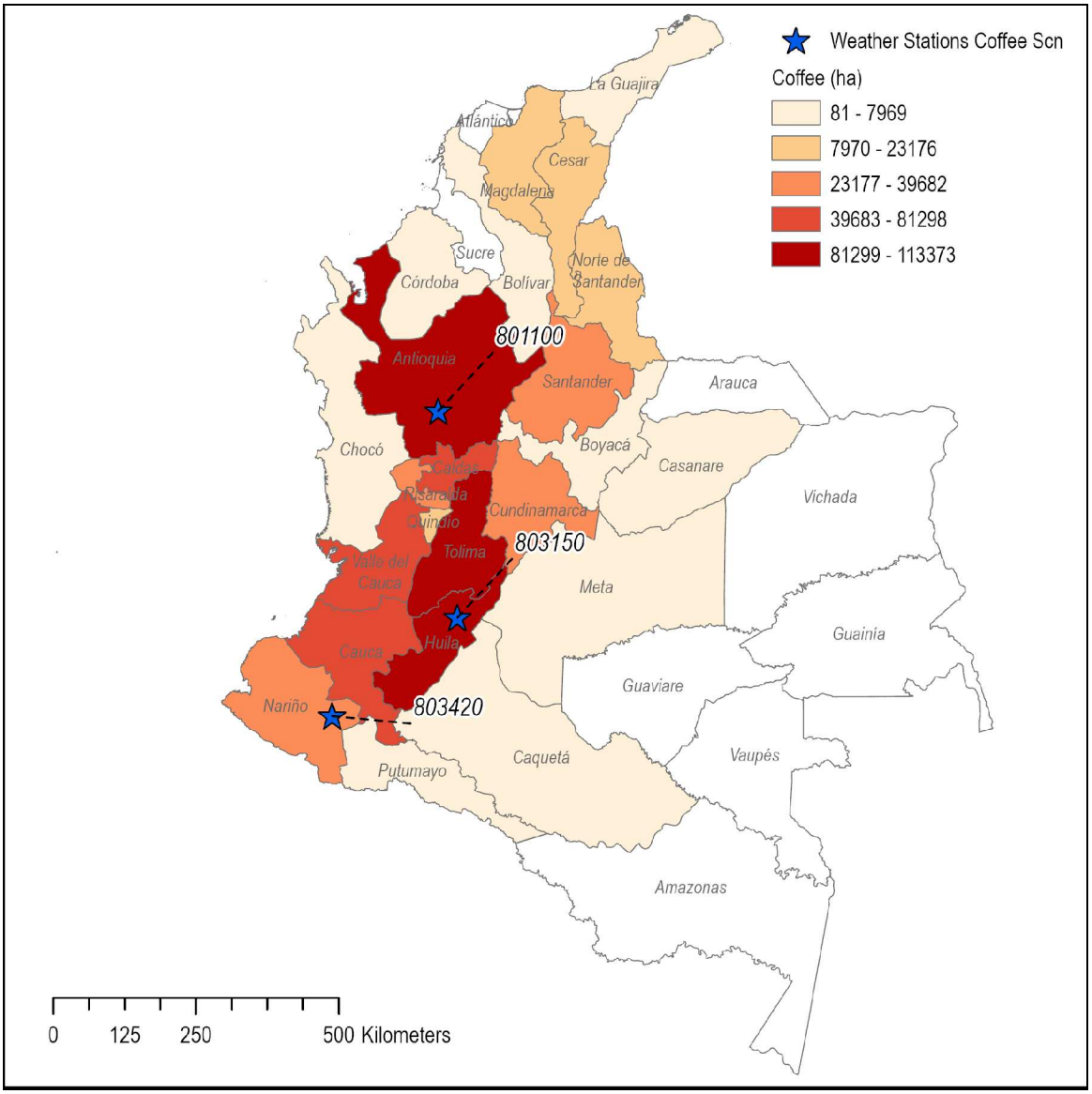
2013 Crop Production (DANE, 2016). Zero production not shaded.

Figura C - 3. Localización de los escenarios de papa en Colombia



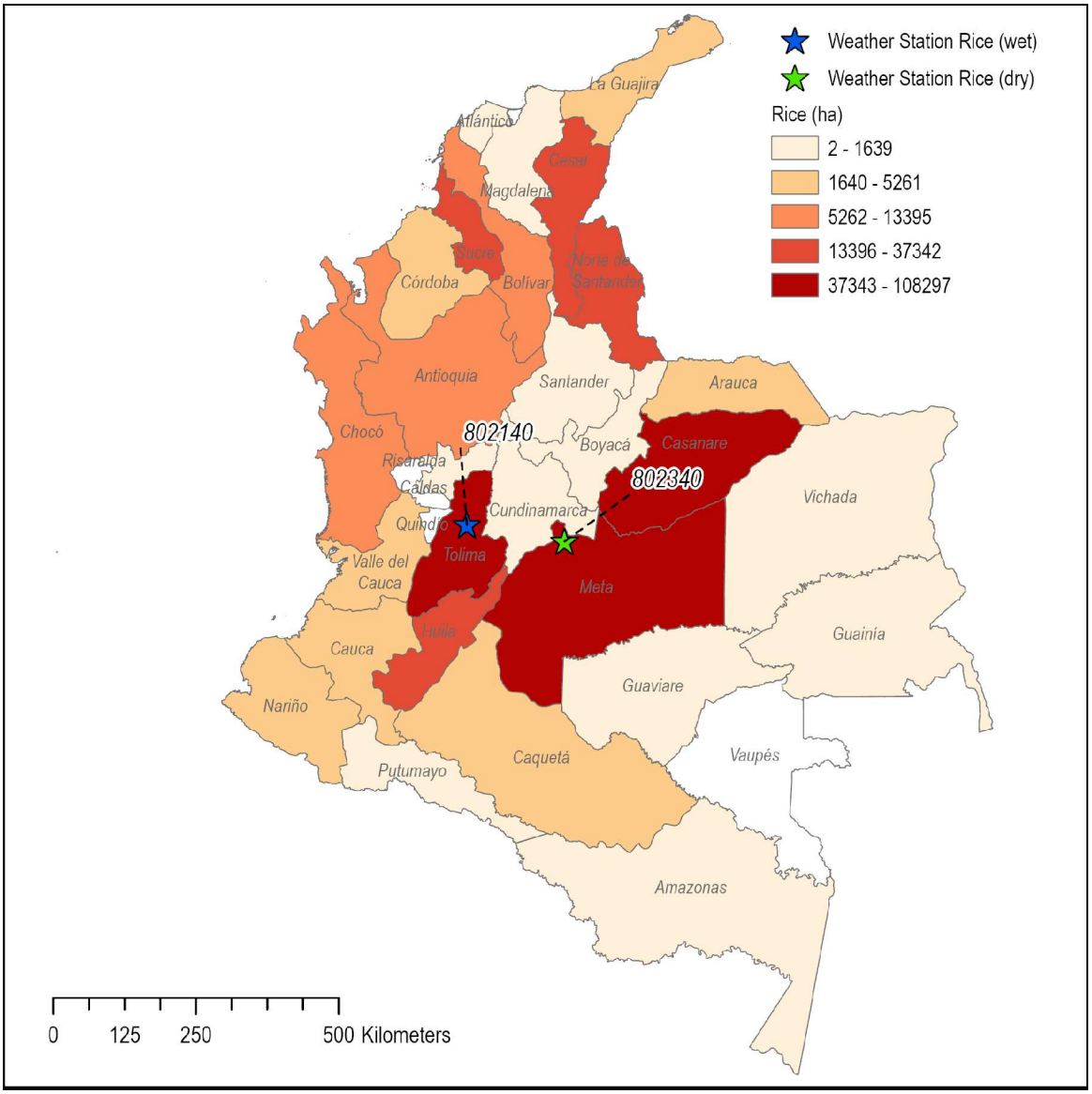
2013 Crop Production (DANE, 2016). Zero production not shaded.

Figura C - 4. Localización de los escenarios de café en Colombia



2013 Crop Production (DANE, 2016). Zero production not shaded.

Figura C - 5. Ubicación de los escenarios de arroz en Colombia



Producción de cultivos 2013 (DANE, 2016). No sombreada es cero producción.

Evaluación meteorológica de Colombia para escenarios de banano

Como se discutió en la Sección 7.1, se crearon archivos meteorológicos de 30 años con registros de precipitación, temperatura y evaporación de bandeja para los escenarios de banano utilizando el Generador Climático (ClimGen). El clima de ClimGen se basó en las estaciones GSOD (801100 Medellín y 800280 Barranquilla) registros diarios de temperatura y precipitación reportados durante un período de tiempo (es decir, 1941-2006). Para ver una comparación de los datos meteorológicos existentes con datos más recientes, se obtuvieron

datos de NOAA NCDC[5] para el período de 1958-2018 para la estación GSOD 801100 Medellín, de la Región del Valle de Aburrá con una latitud de -6.2395 y longitud de -75.5878. Además, se consultaron datos del NCDC durante el período 1941-2018 para la estación GSOD 800280 Barranquilla, de la Región Caribe con una latitud de -10.8830 y una longitud de -74.7830. Estos datos se originaron en el Resumen Global del Día (GSOD). Los campos incluidos fueron número de estación, fecha de la muestra, temperatura promedio (F), punto de rocío (F), velocidad del viento (nudos), precipitación (pulgadas) y profundidad de nieve (pulgadas).

Se evaluaron los datos meteorológicos de 2007 a 2017 de las estaciones meteorológicas. Ambas estaciones tenían muy pocos datos meteorológicos de 2007, 2008 y 2009. Por lo tanto, sólo se comparó el clima de 2010 a 2017 con los archivos meteorológicos de 30 años para los escenarios de banano en ANDES. Tabla C - 1 muestra la comparación de los datos actuales de las estaciones meteorológicas (temperatura y precipitaciones) de las estaciones bananeras con los datos de 2010 a 2017 sobre una base anual. La temperatura media anual es muy similar para ambas estaciones y la precipitación media anual total para Medellín es muy similar. El promedio de precipitaciones anuales totales para Barranquilla es mayor de 2010 a 2017. También es mayor para el año de precipitaciones totales mínimas y máximas. La actual estación meteorológica de Medellín tuvo una precipitación anual mínima más alta pero una precipitación anual máxima más baja.

Tabla C - 1 . Estaciones meteorológicas para bananos – Comparaciones anuales de temperatura y precipitaciones

Estación meteorológica	ANDES actuales (Colombia express original) o datos nuevos (más recientes)	Temperatura media anual (ºC)	Precipitación media total anual (cm)	min. Precipitación anual total (cm)	Máx. Precipitación anual total (cm)
Barranquilla (800280)	Archivo meteorológico actual de ANDES (30 años)	28.30	50.8	30.1	75.5
	Clima más reciente (2010 a 2017)	28.02	71.3	39.0	117.6
Medellín (801100)	Archivo meteorológico actual de ANDES (30 años)	22.19	111.6	88.2	138.8
	Clima continuo más reciente (2010 a 2017)	23.62	113.1	46.1	209.3

Con el fin de obtener una mejor comprensión de las diferencias en el clima, la precipitación y la temperatura se analizaron mensualmente. **Error! Reference source not found.** muestra mensualmente los datos de precipitación. Presenta los totales mensuales promedio, mínimo y máximo durante 30 años para el clima actual y más de ocho años para los nuevos datos. El clima actual de Barranquilla tiene siete meses con totales mensuales máximos más altos que el nuevo clima. La precipitación actual de Medellín tuvo seis meses con totales mensuales máximos superiores al nuevo clima y los promedios mensuales son muy similares.

Figura C – 6 muestra los datos de precipitación diaria en diagramas de caja para cada año. Los diagramas de caja muestran el promedio como una "x" con valores atípicos circulares.

[5] NOAA, 2018, NNDC Data Online --Global Summary of the Day (GSOD). Disponible en https://www7.ncdc.noaa.gov/CDO/cdoselect.cmd?datasetabbv=GSOD&resolution=40 (búsqueda por IDs de estación 800280, 801100). Último acceso: 8 de octubre de 2018 (rango de datos del 1 de enero de 1958 al 1 de julio de 2018).

Al observar los datos presentados de esta manera se muestra que los datos actuales y los nuevos son muy similares.

Error! Reference source not found. muestra los datos mensuales de cada estación meteorológica. La temperatura mínima es la temperatura mínima diaria en el mes durante el período (30 años u 8 años). El máximo es la temperatura máxima diaria en el mes durante el período de datos (actual y nuevo). Los diagramas de caja anuales de la temperatura diaria se muestran en la Figura C -7. La temperatura de Barranquilla es muy similar entre los datos actuales y los nuevos. La nueva temperatura de Medellín aumenta en 2010 y luego tiende a la baja en 2017 con temperaturas menos atípicas que el clima actual.
.

Apéndice D: Lista de los parámetros en winPRZM, RICEWQ, y EXAMS de los escenarios de Colombia

The following provide the input values used for ANDES Colombia PRZM and RICEWQ scenario inputs and EXAMS pond parameters for Colombia and Peru. An input file for each PRZM crop or RICEWQ rice crop scenario is provided. The weather data and cropping associated with each scenario is provided elsewhere in this document. These PRZM and RICEWQ input summary files are distributed with the software and can be found in the SCENARIOS subdirectory. A database conversion program is used to read these files into a password protected database which the software uses to create the PRZM and RICEWQ input files. This ensures that the user cannot modify soil/dates/environmental properties and that all users will be creating the same input files. The EXAMS summary is provided as a table since no equivalent summary file exists. Again, the same database protection exists for the EXAMS pond environment ensuring that all users will be using the same data.

Colombia winPRZM Scenarios (.scn files)

Banana – C1 (Antioquia)

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\801100.dvf

PRZM      Variable
Record #  Name
         1TITLE                Colombia Banana, Antioquia
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD            25.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             2  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.34                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.29                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Banana
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR            120  Maximum rooting depth of crop (cm)
          COVMAX            90  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           85  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            300  Maximum canopy height (cm) at maturation date (Record 11) Based on Colombian experts
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
```

```
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Banana
          EMD                1  Integer day of crop emergence
          EMM                1  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               10  Integer day of crop maturation
          MAM                1  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM               12  Integer month of crop harvest
          IYRHAR            12  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          P10D              10  Integer day of crop maturation
          P10M               1  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M              12  Integer month of crop harvest-25
          IYRP60            12  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            200  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.204  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)          SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content        SOTERLAC soils
          CLAY            20.00  Clay Content        SOTERLAC soils

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor
```

```
        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.401  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.204  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              3.1  Organic carbon in horizon (%)         SOTERLAC soils

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          40.00  Sand Content     SOTERLAC soils
          CLAY          20.00  Clay Content     SOTERLAC soils

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            3  Horizon number
          THKNS            20  Thickness of horizon (cm)
          BD             1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.380  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"             see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.380  Field capacity in horizon (cm3/cm3) Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.217  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC             0.86  Organic carbon in horizon (%)         SOTERLAC soils

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          19.00  Sand Content     SOTERLAC soils
          CLAY          33.00  Clay Content     SOTERLAC soils

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            4  Horizon number
          THKNS            20  Thickness of horizon (cm)
          BD             1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.349  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"             see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.349  Field capacity in horizon (cm3/cm3)   Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.222  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC             0.40  Organic carbon in horizon (%)         SOTERLAC

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          32.00  Sand Content        SOTERLAC
          CLAY          38.00  Clay Content        SOTERLAC

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            5  Horizon number
          THKNS           140  Thickness of horizon (cm)
          BD             1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.439  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"             see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.439  Field capacity in horizon (cm3/cm3)   Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.299  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC             0.20  Organic carbon in horizon (%)            SOTERLAC soils

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          14.00  Sand Content                        SOTERLAC soils
          CLAY          55.00  Clay Content                        SOTERLAC soils

        40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6      Watershed Data
!  1000.0 100000.     0.0      Waterbody Area (by Env)
!     2.0     2.0     0.0      Waterbody Depth (by Env)
!     2.0     2.0     0.0      Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0      Crop Area Fraction
!       4       4       4      Flow/Volume Option
!      0.      0.      0.      Flow/Volume value
!       0       0       0      Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                      burial
!   3.e-5                      user mass transfer coefficient
!     0.5                      prben
```

```
!    0.05                    benthic depth
!    0.50                    benthic porosity
!    1.85                    benthic bulk density
!    0.04                    benthic foc
!     5.0                    benthic doc
!   0.006                    benthic biomass
!    1.19                    wc dfac
!    30.0                    wc ss
!   0.005                    wc chlorophyll
!    0.04                    wc foc
!     5.0                    wc doc
!     0.4                    wc biomass
```

Banana – C4 (Magdelena)

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\800280.dvf

PRZM      Variable
Record #  Name
         1TITLE                Colombia Banana, Magdelena
         2HITITLE              Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             25.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             2  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.34                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.29                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Banana
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR            120  Maximum rooting depth of crop (cm)
          COVMAX            90  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           85  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            300  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Banana
          EMD                1  Integer day of crop emergence
          EMM                1  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        Perennial crop
          MAD               10  Integer day of crop maturation
          MAM                1  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation        Perennial crop
          HAD               31  Integer day of crop harvest
          HAM               12  Integer month of crop harvest
          IYRHAR            12  Integer year of crop harvest           Perennial crop
          P10D              10  Integer day of crop maturation
          P10M               1  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M              12  Integer month of crop harvest-25
          IYRP60            12  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED           200  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
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          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)      Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.204  Wilting point in horizon (cm3/cm3)       Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)            SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content         SOTERLAC soil
          CLAY            20.00  Clay Content         SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)
          THEWP          0.204  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.380  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.380  Field capacity in horizon (cm3/cm3)   NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)
          THEWP          0.217  Wilting point in horizon (cm3/cm3)    NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)
          OC              0.86  Organic carbon in horizon (%)         NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content
          CLAY            33.00  Clay Content
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Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            4  Horizon number
          THKNS            20  Thickness of horizon (cm)
          BD             1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.349  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.349  Field capacity in horizon (cm3/cm3)
          THEWP         0.222  Wilting point in horizon (cm3/cm3)
          OC             0.40  Organic carbon in horizon (%)         N

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          32.00  Sand Content
          CLAY          38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            5  Horizon number
          THKNS           140  Thickness of horizon (cm)
          BD             1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.439  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.439  Field capacity in horizon (cm3/cm3)
          THEWP         0.299  Wilting point in horizon (cm3/cm3)
          OC             0.20  Organic carbon in horizon (%)

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          14.00  Sand Content
          CLAY          55.00  Clay Content

        40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!   1000.0 100000.     0.0      Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Plantains - C7 (Valle De Cauca)

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\802590.dvf

PRZM      Variable
Record #  Name
         1TITLE                Colombia Plantain, Valle De Cauca
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             25.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             2  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.35                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Plantain
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR            150  Maximum rooting depth of crop (cm)
          COVMAX            90  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           85  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            250  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
          RECORD9D  .011 .011 .011
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
          RECORD9D  .011 .011 .011
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .075 .075 .075
          RECORD9D  .011 .011 .011
          RECORD9E    85   85   85

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Plantain
          EMD                1  Integer day of crop emergence
          EMM                1  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               10  Integer day of crop maturation
          MAM                1  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM               12  Integer month of crop harvest
          IYRHAR            12  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          P10D              10  Integer day of crop maturation
          P10M               1  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M              12  Integer month of crop harvest-25
          IYRP60            12  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties
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        20CORED            200  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE               0  Irrigation type, under canopy=4
         RATEAP            0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL            0.00  fraction of water capacity at which irrigation is applied
         FLEACH             0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)      Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)      SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content        SOTERLAC soil
          CLAY            20.00  Clay Content        SOTERLAC soil

Horizon 2:
              34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO        0.38096  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3809  Field capacity in horizon (cm3/cm3)
          THEWP         0.2174  Wilting point in horizon (cm3/cm3)
          OC              0.86  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content
          CLAY            33.00  Clay Content

Horizon 4:
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        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            4  Horizon number
          THKNS            20  Thickness of horizon (cm)
          BD             1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO        0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC        0.3493  Field capacity in horizon (cm3/cm3)
          THEWP        0.2221  Wilting point in horizon (cm3/cm3)
          OC             0.40  Organic carbon in horizon (%)

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          32.00  Sand Content
          CLAY          38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            5  Horizon number
          THKNS           140  Thickness of horizon (cm)
          BD             1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO        0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC        0.4394  Field capacity in horizon (cm3/cm3)
          THEWP        0.2999  Wilting point in horizon (cm3/cm3)
          OC             0.20  Organic carbon in horizon (%)

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          14.00  Sand Content
          CLAY          55.00  Clay Content

        40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Potatoes – C1 (1st cycle)

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\802220.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Potato, Cundinamarca, Crop 1st cycle
         2HTITLE               Developed 06/01/2007, Revised 07/30/2019

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           12.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             3  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Potato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             60  Maximum rooting depth of crop (cm), Fedepapa
          COVMAX            95  Maximum areal coverage of canopy (%), Fedepapa
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           89  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            86  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             90  Maximum canopy height (cm) at maturation date (Record 11), Fedepapa
Conventional Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  0105 0505 1505 1605 2005 0106 1606 0107 1607 0108 1608 0109 1609 0110 0510 1610
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    86   86   86   86   86   86   86   86   86   86   87   87   87   87   87
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  0105 0505 1505 1605 2005 0106 1606 0107 1607 0108 1608 0109 1609 0110 0510 1610
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    82   82   82   82   82   82   82   82   82   82   83   83   83   83   83
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  0105 0505 1505 1605 2005 0106 1606 0107 1607 0108 1608 0109 1609 0110 0510 1610
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    78   78   78   78   78   78   78   78   78   78   79   79   79   79   79
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79   79

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Potato
          EMD                1  Integer day of crop emergence
          EMM                5  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence;       Fedepapa
          MAD               15  Integer day of crop maturation
          MAM                8  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation; Fedepapa
          HAD                1  Integer day of crop harvest
          HAM                9  Integer month of crop harvest
          IYRHAR            12  Integer year of crop harvest;         Fedepapa
          P10D              15  Integer day of crop maturation
          P10M               8  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               1  Integer day of crop harvest
```

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          P60M               9  Integer month of crop harvest
          IYRP60            12  Integer year of crop harvest
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE               6  Irrigation type, under canopy=6
         RATEAP            .009  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.20  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)        SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content       SOTERLAC soil
          CLAY            20.00  Clay Content       SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor
```

```
       37DPN              1  Thickness of compartments in horizon (cm)
         THEFC       0.3809  Field capacity in horizon (cm3/cm3)
         THEWP       0.2174  Wilting point in horizon (cm3/cm3)
         OC            0.86  Organic carbon in horizon (%)

       38SPT          10.00  Initial Soil Temperature (C)
         SAND         19.00  Sand Content
         CLAY         33.00  Clay Content

Horizon 4:
       34"(Repeat Records 34, 36, and 37 for each horizon)"
         HORIZN           4  Horizon number
         THKNS           20  Thickness of horizon (cm)
         BD            1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
         see below
         THETO       0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"             see below
         AD               0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
         DISP             0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
         ADL              0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
         DEGF         1.000  Degradation Factor

       37DPN              1  Thickness of compartments in horizon (cm)
         THEFC       0.3493  Field capacity in horizon (cm3/cm3)
         THEWP       0.2221  Wilting point in horizon (cm3/cm3)
         OC            0.40  Organic carbon in horizon (%)

       38SPT          10.00  Initial Soil Temperature (C)
         SAND         32.00  Sand Content
         CLAY         38.00  Clay Content

Horizon 5:
       34"(Repeat Records 34, 36, and 37 for each horizon)"
         HORIZN           5  Horizon number
         THKNS           40  Thickness of horizon (cm)
         BD            1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
         see below
         THETO       0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"             see below
         AD               0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
         DISP             0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
         ADL              0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
         DEGF         1.000  Degradation Factor

       37DPN              1  Thickness of compartments in horizon (cm)
         THEFC       0.4394  Field capacity in horizon (cm3/cm3)
         THEWP       0.2999  Wilting point in horizon (cm3/cm3)
         OC            0.20  Organic carbon in horizon (%)

       38SPT          10.00  Initial Soil Temperature (C)
         SAND         14.00  Sand Content
         CLAY         55.00  Clay Content

       40ILP              0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
         CFLAG            0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!      1       5       6       Watershed Data
!  1000.0 100000.     0.0      Waterbody Area (by Env)
!     2.0     2.0     0.0      Waterbody Depth (by Env)
!     2.0     2.0     0.0      Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0      Crop Area Fraction
!      4       4       4       Flow/Volume Option
!     0.      0.      0.       Flow/Volume value
!      0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!      0                       burial
!   3.e-5                      user mass transfer coefficient
!     0.5                      prben
!    0.05                      benthic depth
!    0.50                      benthic porosity
!    1.85                      benthic bulk density
!    0.04                      benthic foc
!     5.0                      benthic doc
!   0.006                      benthic biomass
!    1.19                      wc dfac
!    30.0                      wc ss
!   0.005                      wc chlorophyll
!    0.04                      wc foc
!     5.0                      wc doc
!     0.4                      wc biomass
```

Potatoes – C1 2 (2nd cycle)

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\802220.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Potato, Cundinamarca, Crop 2nd cycle
         2HTITLE               Developed 07/30/2019

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           12.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             3  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Potato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             60  Maximum rooting depth of crop (cm), Fedepapa
          COVMAX            95  Maximum areal coverage of canopy (%), Fedepapa
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           89  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            86  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             90  Maximum canopy height (cm) at maturation date (Record 11), Fedepapa
Conventional Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  1511 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 0105 0505 1505 1605 2005
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    86   86   86   86   86   86   86   86   86   87   87   87   87   87   87   87
          RECORD9B  0106 1606 0107 1607 0108 2008 0109 1609 0110 0510 1610 0111
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  1511 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 0105 0505 1505 1605 2005
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    82   82   82   82   82   82   82   82   82   83   83   83   83   83   83   83
          RECORD9B  0106 1606 0107 1607 0108 2008 0109 1609 0110 0510 1610 0111
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  1511 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 0105 0505 1505 1605 2005
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    78   78   78   78   78   78   78   78   78   79   79   79   79   79   79   79
          RECORD9B  0106 1606 0107 1607 0108 2008 0109 1609 0110 0510 1610 0111
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79   79

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Potato
          EMD               15  Integer day of crop emergence
          EMM               11  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        Fedepapa
          MAD                1  Integer day of crop maturation
          MAM                3  Integer month of crop maturation
          IYRMAT            13  Integer year of crop maturation       Fedepapa
          HAD               20  Integer day of crop harvest
          HAM                3  Integer month of crop harvest
          IYRHAR            13  Integer year of crop harvest          Fedepapa
          P10D               1  Integer day of crop maturation
          P10M               3  Integer month of crop maturation
          IYP10             13  Integer year of crop maturation
          P60D              20  Integer day of crop harvest
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          P60M              3  Integer month of crop harvest
          IYRP60           13  Integer year of crop harvest
          KCINIT          1.0  Initial Crop growth stage
          KCMID          1.05  Crop development stage
          KCLATE         0.83  Late season growth stage
          KCMAX          1.10  Maximum growth stage
          REW             1.0  Stage 1 Evapotranspiration (mm)
          INCROP            1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED           100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG            0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG            0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG            0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT             0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC               0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG            2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG            0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG            0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG            0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG            1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+        0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT            10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              6  Irrigation type, under canopy=6
         RATEAP           .009  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.20  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ            5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            1  Horizon number
          THKNS            10  Thickness of horizon (cm)
          BD             1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO        0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC        0.4019  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP        0.2042  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              3.1  Organic carbon in horizon (%)        SOTERLAC soil

        38SPT             0.1  Initial Soil Temperature (C)
          SAND            0.1  Sand Content       SOTERLAC soil
          CLAY            0.1  Clay Content       SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            2  Horizon number
          THKNS            10  Thickness of horizon (cm)
          BD             1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO        0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC        0.4019  Field capacity in horizon (cm3/cm3)
          THEWP        0.2042  Wilting point in horizon (cm3/cm3)
          OC              3.1  Organic carbon in horizon (%)

        38SPT             0.1  Initial Soil Temperature (C)
          SAND            0.1  Sand Content
          CLAY            0.1  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            3  Horizon number
          THKNS            20  Thickness of horizon (cm)
          BD             1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO        0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor
```

```
        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.3809  Field capacity in horizon (cm3/cm3)
          THEWP         0.2174  Wilting point in horizon (cm3/cm3)
          OC              0.86  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           19.00  Sand Content
          CLAY           33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             4  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.3493  Field capacity in horizon (cm3/cm3)
          THEWP         0.2221  Wilting point in horizon (cm3/cm3)
          OC              0.40  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           32.00  Sand Content
          CLAY           38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             5  Horizon number
          THKNS             40  Thickness of horizon (cm)
          BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.4394  Field capacity in horizon (cm3/cm3)
          THEWP         0.2999  Wilting point in horizon (cm3/cm3)
          OC              0.20  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           14.00  Sand Content
          CLAY           55.00  Clay Content

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!    3.e-5                      user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Potatoes – C4 (1st cycle)

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\801100.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Potato, Antioquia, Crop 1st cycle
         2HTITLE               Developed 06/01/2007, Revised 07/30/2019

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           12.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             3  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.30                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Potato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             60  Maximum rooting depth of crop (cm), Fedepapa
          COVMAX            95  Maximum areal coverage of canopy (%), Fedepapa
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           89  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            86  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             90  Maximum canopy height (cm) at maturation date (Record 11), Fedepapa
Conventional Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  0105 0505 1505 1605 2005 0106 1606 0107 1607 0108 1608 0109 1609 0110 0510 1610
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    86   86   86   86   86   86   86   86   86   86   87   87   87   87   87
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  0105 0505 1505 1605 2005 0106 1606 0107 1607 0108 1608 0109 1609 0110 0510 1610
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    82   82   82   82   82   82   82   82   82   82   83   83   83   83   83
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  0105 0505 1505 1605 2005 0106 1606 0107 1607 0108 1608 0109 1609 0110 0510 1610
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    78   78   78   78   78   78   78   78   78   78   79   79   79   79   79
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79   79

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Potato
          EMD                1  Integer day of crop emergence
          EMM                5  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence;       Fedepapa
          MAD               15  Integer day of crop maturation
          MAM                8  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation; Fedepapa
          HAD                1  Integer day of crop harvest
          HAM                9  Integer month of crop harvest
          IYRHAR            12  Integer year of crop harvest;         Fedepapa
          P10D              15  Integer day of crop maturation
          P10M               8  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               1  Integer day of crop harvest
```

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          P60M               9  Integer month of crop harvest
          IYRP60            12  Integer year of crop harvest
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE               6  Irrigation type, under canopy=6
         RATEAP            .009  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.20  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)        SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content       SOTERLAC soil
          CLAY            20.00  Clay Content       SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor
```

```
       37DPN              1  Thickness of compartments in horizon (cm)
         THEFC         0.3809  Field capacity in horizon (cm3/cm3)
         THEWP         0.2174  Wilting point in horizon (cm3/cm3)
         OC              0.86  Organic carbon in horizon (%)

       38SPT            10.00  Initial Soil Temperature (C)
         SAND           19.00  Sand Content
         CLAY           33.00  Clay Content

Horizon 4:
       34"(Repeat Records 34, 36, and 37 for each horizon)"
         HORIZN             4  Horizon number
         THKNS             20  Thickness of horizon (cm)
         BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
         see below
         THETO         0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
         AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
         DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
         ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
         DEGF           1.000  Degradation Factor

       37DPN                1  Thickness of compartments in horizon (cm)
         THEFC         0.3493  Field capacity in horizon (cm3/cm3)
         THEWP         0.2221  Wilting point in horizon (cm3/cm3)
         OC              0.40  Organic carbon in horizon (%)

       38SPT            10.00  Initial Soil Temperature (C)
         SAND           32.00  Sand Content
         CLAY           38.00  Clay Content

Horizon 5:
       34"(Repeat Records 34, 36, and 37 for each horizon)"
         HORIZN             5  Horizon number
         THKNS             40  Thickness of horizon (cm)
         BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
         see below
         THETO         0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
         AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
         DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
         ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
         DEGF           1.000  Degradation Factor

       37DPN                1  Thickness of compartments in horizon (cm)
         THEFC         0.4394  Field capacity in horizon (cm3/cm3)
         THEWP         0.2999  Wilting point in horizon (cm3/cm3)
         OC              0.20  Organic carbon in horizon (%)

       38SPT            10.00  Initial Soil Temperature (C)
         SAND           14.00  Sand Content
         CLAY           55.00  Clay Content

       40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
         CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Potatoes – C4 2 (2nd cycle)

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\801100.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Potato, Antioquia, Crop 2nd cycle
         2HTITLE               Developed 07/30/2019

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           12.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             3  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.30                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Potato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             60  Maximum rooting depth of crop (cm), Fedepapa
          COVMAX            95  Maximum areal coverage of canopy (%), Fedepapa
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           89  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            86  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             90  Maximum canopy height (cm) at maturation date (Record 11), Fedepapa
Conventional Tillage
          RECORD9A           1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  1511 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 0105 0505 1505 1605 2005
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    86   86   86   86   86   86   86   86   86   87   87   87   87   87   87   87
          RECORD9B  0106 1606 0107 1607 0108 2008 0109 1609 0110 0510 1610 0111
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A           1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  1511 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 0105 0505 1505 1605 2005
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    82   82   82   82   82   82   82   82   82   83   83   83   83   83   83   83
          RECORD9B  0106 1606 0107 1607 0108 2008 0109 1609 0110 0510 1610 0111
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A           1      28    "RUSLE ""C"" and ""N"" Factors; Rb3PIPIC Potato, Iris, Conventional tillage,
Monpelier, VT"
          RECORD9B  1511 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 0105 0505 1505 1605 2005
          RECORD9C  .788 .645 .400 .310 .173 .056 .053 .135 .267 .511 .544 .570 .586 .591 .593 .593
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    78   78   78   78   78   78   78   78   78   79   79   79   79   79   79   79
          RECORD9B  0106 1606 0107 1607 0108 2008 0109 1609 0110 0510 1610 0111
          RECORD9C  .592 .591 .590 .589 .594 .604 .623 .640 .631 .758 .762 .801
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    79   79   79   79   79   79   79   79   78   79   79   79

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Potato
          EMD               15  Integer day of crop emergence
          EMM               11  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        Fedepapa
          MAD                1  Integer day of crop maturation
          MAM                3  Integer month of crop maturation
          IYRMAT            13  Integer year of crop maturation       Fedepapa
          HAD               20  Integer day of crop harvest
          HAM                3  Integer month of crop harvest
          IYRHAR            13  Integer year of crop harvest          Fedepapa
          P10D               1  Integer day of crop maturation
          P10M               3  Integer month of crop maturation
          IYP10             13  Integer year of crop maturation
```

```
          P60D              20  Integer day of crop harvest
          P60M               3  Integer month of crop harvest
          IYRP60            13  Integer year of crop harvest
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              6  Irrigation type, under canopy=6
         RATEAP           .009  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.20  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)        SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content       SOTERLAC soil
          CLAY            20.00  Clay Content       SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
```

```
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3809  Field capacity in horizon (cm3/cm3)
          THEWP         0.2174  Wilting point in horizon (cm3/cm3)
          OC              0.86  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           19.00  Sand Content
          CLAY           33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             4  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3493  Field capacity in horizon (cm3/cm3)
          THEWP         0.2221  Wilting point in horizon (cm3/cm3)
          OC              0.40  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           32.00  Sand Content
          CLAY           38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             5  Horizon number
          THKNS             40  Thickness of horizon (cm)
          BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4394  Field capacity in horizon (cm3/cm3)
          THEWP         0.2999  Wilting point in horizon (cm3/cm3)
          OC              0.20  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           14.00  Sand Content
          CLAY           55.00  Clay Content

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Tomato – C1

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\802220.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Cundinamarca - Sept. Emergence
         2HITITLE              Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             90  Maximum rooting depth of crop (cm)
          COVMAX            80  Maximum areal coverage of canopy (%)
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   87   87   87   87   87   87
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   83   83   83   83   83   83
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   79   79   79   79   79   79
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                9  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM               11  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                1  Integer month of crop harvest
          IYRHAR            13  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
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          P10D              15  Integer day of crop maturation
          P10M              11  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest - 25 days
          P60M               1  Integer month of crop harvest -25 days
          IYRP60            13  Integer year of crop harvest - 25 days
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)      Computed Rawls & Brakensiek with SOTERLAC soil
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)       Computed Rawls & Brakensiek with SOTERLAC soil
          OC               3.1  Organic carbon in horizon (%)          SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content                    SOTERLAC soil
          CLAY            20.00  Clay Content                    SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
```

```
          DISP                 0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                  0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF             1.000  Degradation Factor

        37DPN                  1  Thickness of compartments in horizon (cm)
          THEFC           0.3809  Field capacity in horizon (cm3/cm3)
          THEWP           0.2174  Wilting point in horizon (cm3/cm3)
          OC                0.86  Organic carbon in horizon (%)

        38SPT              10.00  Initial Soil Temperature (C)
          SAND             19.00  Sand Content
          CLAY             33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN               4  Horizon number
          THKNS               20  Thickness of horizon (cm)
          BD                1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO           0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"                see below
          AD                   0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                 0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                  0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF             1.000  Degradation Factor

        37DPN                  1  Thickness of compartments in horizon (cm)
          THEFC           0.3493  Field capacity in horizon (cm3/cm3)
          THEWP           0.2221  Wilting point in horizon (cm3/cm3)
          OC                0.40  Organic carbon in horizon (%)

        38SPT              10.00  Initial Soil Temperature (C)
          SAND             32.00  Sand Content
          CLAY             38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN               5  Horizon number
          THKNS               40  Thickness of horizon (cm)
          BD                1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO           0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"                see below
          AD                   0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                 0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                  0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF             1.000  Degradation Factor

        37DPN                  1  Thickness of compartments in horizon (cm)
          THEFC           0.4394  Field capacity in horizon (cm3/cm3)
          THEWP           0.2999  Wilting point in horizon (cm3/cm3)
          OC                0.20  Organic carbon in horizon (%)

        38SPT              10.00  Initial Soil Temperature (C)
          SAND             14.00  Sand Content
          CLAY             55.00  Clay Content

        40ILP                  0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG                0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6        Watershed Data
!   1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0        Waterbody Depth (by Env)
!     2.0     2.0     0.0        Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0        Crop Area Fraction
!       4       4       4        Flow/Volume Option
!      0.      0.      0.        Flow/Volume value
!       0       0       0        Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                        burial
!    3.e-5                       user mass transfer coefficient
!     0.5                        prben
!    0.05                        benthic depth
!    0.50                        benthic porosity
!    1.85                        benthic bulk density
!    0.04                        benthic foc
!     5.0                        benthic doc
!   0.006                        benthic biomass
!    1.19                        wc dfac
!    30.0                        wc ss
!   0.005                        wc chlorophyll
!    0.04                        wc foc
!     5.0                        wc doc
!     0.4                        wc biomass
```

Tomato – C2

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
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PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Cundinamarca - March Emergence
         2HITITLE              Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR              90  Maximum rooting depth of crop (cm)
          COVMAX             80  Maximum areal coverage of canopy (%)
          ICNAH               3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)            91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                             85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                             87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX               0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   85   85   87   87   87   87
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   81   81   83   83   83   83
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   77   77   79   79   79   79
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                3  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM                5  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                7  Integer month of crop harvest
          IYRHAR            12  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
```

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          P10D              15  Integer day of crop maturation
          P10M               5  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               7  Integer month of crop harvest-25
          IYRP60            12  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)                Computed with Rawls &Brakensiek from
SOTERLAC soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)                 Computed with Rawls &Brakensiek from
SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)                      SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content          SOTERLAC soil
          CLAY            20.00  Clay Content          SOTERLAC soil

Horizon 2:
              34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
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          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3809  Field capacity in horizon (cm3/cm3)
          THEWP          0.2174  Wilting point in horizon (cm3/cm3)
          OC               0.86  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content
          CLAY            33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              4  Horizon number
          THKNS              20  Thickness of horizon (cm)
          BD               1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3493  Field capacity in horizon (cm3/cm3)
          THEWP          0.2221  Wilting point in horizon (cm3/cm3)
          OC               0.40  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            32.00  Sand Content
          CLAY            38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              5  Horizon number
          THKNS              40  Thickness of horizon (cm)
          BD               1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.4394  Field capacity in horizon (cm3/cm3)
          THEWP          0.2999  Wilting point in horizon (cm3/cm3)
          OC               0.20  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            14.00  Sand Content
          CLAY            55.00  Clay Content

        40ILP                 0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG               0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6        Watershed Data
!  1000.0 100000.     0.0        Waterbody Area (by Env)
!     2.0     2.0     0.0        Waterbody Depth (by Env)
!     2.0     2.0     0.0        Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0        Crop Area Fraction
!       4       4       4        Flow/Volume Option
!      0.      0.      0.        Flow/Volume value
!       0       0       0        Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                        burial
!   3.e-5                        user mass transfer coefficient
!     0.5                        prben
!    0.05                        benthic depth
!    0.50                        benthic porosity
!    1.85                        benthic bulk density
!    0.04                        benthic foc
!     5.0                        benthic doc
!   0.006                        benthic biomass
!    1.19                        wc dfac
!    30.0                        wc ss
!   0.005                        wc chlorophyll
!    0.04                        wc foc
!     5.0                        wc doc
!     0.4                        wc biomass
```

Tomato – C4

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\803150.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Huila - Sept Emergence
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR              90  Maximum rooting depth of crop (cm)
          COVMAX             80  Maximum areal coverage of canopy (%)
          ICNAH               3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)            91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                             85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                             87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX               0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   87   87   87   87   87   87
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   83   83   83   83   83   83
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   79   79   79   79   79   79
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                9  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM               11  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                1  Integer month of crop harvest
          IYRHAR            13  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
```

```
          P10D              15  Integer day of crop maturation
          P10M              11  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               1  Integer month of crop harvest-25
          IYRP60            13  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)               Computed with Rawls &Brakensiek from
SOTERLAC soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)                Computed with Rawls &Brakensiek from
SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)                     SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content          SOTERLAC soil
          CLAY            20.00  Clay Content          SOTERLAC soil

Horizon 2:
              34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
```

```
          AD                   0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                 0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                  0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF             1.000  Degradation Factor

        37DPN                  1  Thickness of compartments in horizon (cm)
          THEFC           0.3809  Field capacity in horizon (cm3/cm3)
          THEWP           0.2174  Wilting point in horizon (cm3/cm3)
          OC                0.86  Organic carbon in horizon (%)

        38SPT              10.00  Initial Soil Temperature (C)
          SAND             19.00  Sand Content
          CLAY             33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN               4  Horizon number
          THKNS               20  Thickness of horizon (cm)
          BD                1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO           0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                   0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                 0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                  0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF             1.000  Degradation Factor

        37DPN                  1  Thickness of compartments in horizon (cm)
          THEFC           0.3493  Field capacity in horizon (cm3/cm3)
          THEWP           0.2221  Wilting point in horizon (cm3/cm3)
          OC                0.40  Organic carbon in horizon (%)

        38SPT              10.00  Initial Soil Temperature (C)
          SAND             32.00  Sand Content
          CLAY             38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN               5  Horizon number
          THKNS               40  Thickness of horizon (cm)
          BD                1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO           0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                   0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                 0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                  0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF             1.000  Degradation Factor

        37DPN                  1  Thickness of compartments in horizon (cm)
          THEFC           0.4394  Field capacity in horizon (cm3/cm3)
          THEWP           0.2999  Wilting point in horizon (cm3/cm3)
          OC                0.20  Organic carbon in horizon (%)

        38SPT              10.00  Initial Soil Temperature (C)
          SAND             14.00  Sand Content
          CLAY             55.00  Clay Content

        40ILP                  0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG                0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!   1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Tomato – C5

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\803150.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Huila - March Emergence
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR              90  Maximum rooting depth of crop (cm)
          COVMAX             80  Maximum areal coverage of canopy (%)
          ICNAH               3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)            91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                             85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                             87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX               0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   85   85   87   87   87   87
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   81   81   83   83   83   83
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   77   77   79   79   79   79
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                3  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM                5  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                7  Integer month of crop harvest
          IYRHAR            12  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
```

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          P10D              15  Integer day of crop maturation
          P10M               5  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               7  Integer month of crop harvest-25
          IYRP60            12  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)            Computed with Rawls &Brakensiek from SOTERLAC
soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)             Computed with Rawls &Brakensiek from SOTERLAC
soils
          OC               3.1  Organic carbon in horizon (%)                  SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content        SOTERLAC soil
          CLAY            20.00  Clay Content        SOTERLAC soil

Horizon 2:
              34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
```

```
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3809  Field capacity in horizon (cm3/cm3)
          THEWP         0.2174  Wilting point in horizon (cm3/cm3)
          OC              0.86  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           19.00  Sand Content
          CLAY           33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             4  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3493  Field capacity in horizon (cm3/cm3)
          THEWP         0.2221  Wilting point in horizon (cm3/cm3)
          OC              0.40  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           32.00  Sand Content
          CLAY           38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             5  Horizon number
          THKNS             40  Thickness of horizon (cm)
          BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4394  Field capacity in horizon (cm3/cm3)
          THEWP         0.2999  Wilting point in horizon (cm3/cm3)
          OC              0.20  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           14.00  Sand Content
          CLAY           55.00  Clay Content

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Tomato – C7

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\800970.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Norte De Santander - Sept Emergence
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR              90  Maximum rooting depth of crop (cm)
          COVMAX             80  Maximum areal coverage of canopy (%)
          ICNAH               3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)            91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                             85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                             87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX               0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   87   87   87   87   87   87
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   83   83   83   83   83   83
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   79   79   79   79   79   79
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                9  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM               11  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                1  Integer month of crop harvest
          IYRHAR            13  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
```

```
          P10D              15  Integer day of crop maturation
          P10M              11  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               1  Integer month of crop harvest-25
          IYRP60            13  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)            Computed with Rawls &Brakensiek from SOTERLAC
soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)             Computed with Rawls &Brakensiek from SOTERLAC
soils
          OC               3.1  Organic carbon in horizon (%)                  SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content            SOTERLAC soil
          CLAY            20.00  Clay Content            SOTERLAC soil

Horizon 2:
              34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
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          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3809  Field capacity in horizon (cm3/cm3)
          THEWP          0.2174  Wilting point in horizon (cm3/cm3)
          OC               0.86  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content
          CLAY            33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              4  Horizon number
          THKNS              20  Thickness of horizon (cm)
          BD               1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3493  Field capacity in horizon (cm3/cm3)
          THEWP          0.2221  Wilting point in horizon (cm3/cm3)
          OC               0.40  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            32.00  Sand Content
          CLAY            38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              5  Horizon number
          THKNS              40  Thickness of horizon (cm)
          BD               1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.4394  Field capacity in horizon (cm3/cm3)
          THEWP          0.2999  Wilting point in horizon (cm3/cm3)
          OC               0.20  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            14.00  Sand Content
          CLAY            55.00  Clay Content

        40ILP                 0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG               0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!   1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Tomato – C8

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\800970.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Norte De Santander - March Emergence
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             90  Maximum rooting depth of crop (cm)
          COVMAX            80  Maximum areal coverage of canopy (%)
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   85   87   87   87   87
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   81   83   83   83   83
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   77   77   79   79   79   79
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                3  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM                5  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                7  Integer month of crop harvest
```

```
          IYRHAR            12  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          P10D              15  Integer day of crop maturation
          P10M               5  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               7  Integer month of crop harvest-25
          IYRP60            12  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED           100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)          Computed with Rawls &Brakensiek from SOTERLAC
soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)           Computed with Rawls &Brakensiek from SOTERLAC
soils
          OC               3.1  Organic carbon in horizon (%)               SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content              SOTERLAC soil
          CLAY            20.00  Clay Content              SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
```

```
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3809  Field capacity in horizon (cm3/cm3)
          THEWP         0.2174  Wilting point in horizon (cm3/cm3)
          OC              0.86  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           19.00  Sand Content
          CLAY           33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             4  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3493  Field capacity in horizon (cm3/cm3)
          THEWP         0.2221  Wilting point in horizon (cm3/cm3)
          OC              0.40  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           32.00  Sand Content
          CLAY           38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             5  Horizon number
          THKNS             40  Thickness of horizon (cm)
          BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4394  Field capacity in horizon (cm3/cm3)
          THEWP         0.2999  Wilting point in horizon (cm3/cm3)
          OC              0.20  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           14.00  Sand Content
          CLAY           55.00  Clay Content

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Tomato – C10

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\801100.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Antioquia - Sept. Emergence
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             90  Maximum rooting depth of crop (cm)
          COVMAX            80  Maximum areal coverage of canopy (%)
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   87   87   87   87   87   87
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   83   83   83   83   83   83
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   79   79   79   79   79   79
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                9  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM               11  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                1  Integer month of crop harvest
          IYRHAR            13  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
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          P10D              15  Integer day of crop maturation
          P10M              11  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               1  Integer month of crop harvest-25
          IYRP60            13  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)         Computed with Rawls &Brakensiek from SOTERLAC
soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)          Computed with Rawls &Brakensiek from SOTERLAC
soils
          OC               3.1  Organic carbon in horizon (%)               SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content              SOTERLAC soil
          CLAY            20.00  Clay Content              SOTERLAC soil

Horizon 2:
              34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
```

```
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3809  Field capacity in horizon (cm3/cm3)
          THEWP          0.2174  Wilting point in horizon (cm3/cm3)
          OC               0.86  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content
          CLAY            33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              4  Horizon number
          THKNS              20  Thickness of horizon (cm)
          BD               1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3493  Field capacity in horizon (cm3/cm3)
          THEWP          0.2221  Wilting point in horizon (cm3/cm3)
          OC               0.40  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            32.00  Sand Content
          CLAY            38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              5  Horizon number
          THKNS              40  Thickness of horizon (cm)
          BD               1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.4394  Field capacity in horizon (cm3/cm3)
          THEWP          0.2999  Wilting point in horizon (cm3/cm3)
          OC               0.20  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            14.00  Sand Content
          CLAY            55.00  Clay Content

        40ILP                 0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG               0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6        Watershed Data
!  1000.0 100000.     0.0        Waterbody Area (by Env)
!     2.0     2.0     0.0        Waterbody Depth (by Env)
!     2.0     2.0     0.0        Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0        Crop Area Fraction
!       4       4       4        Flow/Volume Option
!      0.      0.      0.        Flow/Volume value
!       0       0       0        Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                        burial
!   3.e-5                        user mass transfer coefficient
!     0.5                        prben
!    0.05                        benthic depth
!    0.50                        benthic porosity
!    1.85                        benthic bulk density
!    0.04                        benthic foc
!     5.0                        benthic doc
!   0.006                        benthic biomass
!    1.19                        wc dfac
!    30.0                        wc ss
!   0.005                        wc chlorophyll
!    0.04                        wc foc
!     5.0                        wc doc
!     0.4                        wc biomass
```

Tomato – C11

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\801100.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Antioquia - March Emergence
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             90  Maximum rooting depth of crop (cm)
          COVMAX            80  Maximum areal coverage of canopy (%)
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   85   87   87   87   87
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   81   83   83   83   83
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   77   77   79   79   79   79
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                3  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM                5  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                7  Integer month of crop harvest
```

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          IYRHAR            12  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          P10D              15  Integer day of crop maturation
          P10M               5  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               7  Integer month of crop harvest-25
          IYRP60            12  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE               0  Irrigation type, under canopy=4
         RATEAP            0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL            0.00  fraction of water capacity at which irrigation is applied
         FLEACH             0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field dataPare available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)          SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content          SOTERLAC soil
          CLAY            20.00  Clay Content          SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)   NRCS S85-019-004 Pedon 85P 988 (weighted ave 13 to 63
cm)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)    NRCS S85-019-004 Pedon 85P 988 (weighted ave 13 to 63
cm)
          OC               3.1  Organic carbon in horizon (%)         NRCS S85-019-004 Pedon 85P 988 (weighted ave 13 to 63
cm)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
```

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          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3809  Field capacity in horizon (cm3/cm3)   NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)
          THEWP         0.2174  Wilting point in horizon (cm3/cm3)    NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)
          OC              0.86  Organic carbon in horizon (%)         NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           19.00  Sand Content
          CLAY           33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             4  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.3493  Field capacity in horizon (cm3/cm3)   NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)
          THEWP         0.2221  Wilting point in horizon (cm3/cm3)    NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)
          OC              0.40  Organic carbon in horizon (%)         NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)

        38SPT            32.00  Initial Soil Temperature (C)
          SAND           38.00  Sand Content
          CLAY           21.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             5  Horizon number
          THKNS             40  Thickness of horizon (cm)
          BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4394  Field capacity in horizon (cm3/cm3)   NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)
          THEWP         0.2999  Wilting point in horizon (cm3/cm3)    NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)
          OC              0.20  Organic carbon in horizon (%)         NRCS S85CA-019-004 Pedon 85P 988 (weighted ave. 63 to
150 cm)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           14.00  Sand Content
          CLAY           55.00  Clay Content

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
```

```
!     5.0                     benthic doc
!   0.006                     benthic biomass
!    1.19                     wc dfac
!    30.0                     wc ss
!   0.005                     wc chlorophyll
!    0.04                     wc foc
!     5.0                     wc doc
!     0.4                     wc biomass
```

Tomato – C13

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\802590.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Valle De Cauca - Sept. Emergence
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             90  Maximum rooting depth of crop (cm)
          COVMAX            80  Maximum areal coverage of canopy (%)
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   87   87   87   87   87   87
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   83   83   83   83   83   83
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A         1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1604
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   79   79   79   79   79   79
          RECORD9B  0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                9  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM               11  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                1  Integer month of crop harvest
          IYRHAR            13  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
```

```
          P10D              15  Integer day of crop maturation
          P10M              11  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               1  Integer month of crop harvest-25
          IYRP60            13  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)            Computed with Rawls &Brakensiek from SOTERLAC
soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)             Computed with Rawls &Brakensiek from SOTERLAC
soils
          OC               3.1  Organic carbon in horizon (%)                  SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content            SOTERLAC soil
          CLAY            20.00  Clay Content            SOTERLAC soil

Horizon 2:
              34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
```

```
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3809  Field capacity in horizon (cm3/cm3)
          THEWP          0.2174  Wilting point in horizon (cm3/cm3)
          OC               0.86  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content
          CLAY            33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              4  Horizon number
          THKNS              20  Thickness of horizon (cm)
          BD               1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3493  Field capacity in horizon (cm3/cm3)
          THEWP          0.2221  Wilting point in horizon (cm3/cm3)
          OC               0.40  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            32.00  Sand Content
          CLAY            38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              5  Horizon number
          THKNS              40  Thickness of horizon (cm)
          BD               1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.4394  Field capacity in horizon (cm3/cm3)
          THEWP          0.2999  Wilting point in horizon (cm3/cm3)
          OC               0.20  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            14.00  Sand Content
          CLAY            55.00  Clay Content

        40ILP                 0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG               0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6        Watershed Data
!  1000.0 100000.     0.0        Waterbody Area (by Env)
!     2.0     2.0     0.0        Waterbody Depth (by Env)
!     2.0     2.0     0.0        Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0        Crop Area Fraction
!       4       4       4        Flow/Volume Option
!      0.      0.      0.        Flow/Volume value
!       0       0       0        Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                        burial
!   3.e-5                        user mass transfer coefficient
!     0.5                        prben
!    0.05                        benthic depth
!    0.50                        benthic porosity
!    1.85                        benthic bulk density
!    0.04                        benthic foc
!     5.0                        benthic doc
!   0.006                        benthic biomass
!    1.19                        wc dfac
!    30.0                        wc ss
!   0.005                        wc chlorophyll
!    0.04                        wc foc
!     5.0                        wc doc
!     0.4                        wc biomass
```

Tomato – C14

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\802590.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Tomato, Valle De Cauca - March Emergence
         2HTITLE               Developed 06/01/2007

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             33.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.50                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP                2                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR              90  Maximum rooting depth of crop (cm)
          COVMAX             80  Maximum areal coverage of canopy (%)
          ICNAH               3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)            91  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                             85  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                             87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX               0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    85   85   85   85   85   85   85   85   85   85   85   85   87   87   87   87
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    81   81   81   81   81   81   81   81   81   81   81   81   83   83   83   83
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      27    "RUSLE EPA Pesticide Project: UC0BGBGC; Green Beans, conventional tillage; Tampa, FL
"
          RECORD9B  0103 1603 0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1008 1608 0109
          RECORD9C  .846 .859 .870 .878 .881 .881 .880 .836 .849 .938 .840 .572 .285 .177 .162 .210
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    77   77   77   77   77   77   77   77   77   77   77   77   79   79   79   79
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 1602
          RECORD9C  .291 .422 .547 .636 .683 .715 .743 .768 .793 .813 .830
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                1  Integer day of crop emergence
          EMM                3  Integer month of crop emergence
          IYREM             12  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               15  Integer day of crop maturation
          MAM                5  Integer month of crop maturation
          IYRMAT            12  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM                7  Integer month of crop harvest
          IYRHAR            12  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
```

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          P10D              15  Integer day of crop maturation
          P10M               5  Integer month of crop maturation
          IYP10             12  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M               7  Integer month of crop harvest-25
          IYRP60            12  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)         Computed with Rawls &Brakensiek from SOTERLAC
soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)          Computed with Rawls &Brakensiek from SOTERLAC
soils
          OC               3.1  Organic carbon in horizon (%)               SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content        SOTERLAC soil
          CLAY            20.00  Clay Content        SOTERLAC soil

Horizon 2:
              34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
```

```
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3809  Field capacity in horizon (cm3/cm3)
          THEWP          0.2174  Wilting point in horizon (cm3/cm3)
          OC               0.86  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content
          CLAY            33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              4  Horizon number
          THKNS              20  Thickness of horizon (cm)
          BD               1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.3493  Field capacity in horizon (cm3/cm3)
          THEWP          0.2221  Wilting point in horizon (cm3/cm3)
          OC               0.40  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            32.00  Sand Content
          CLAY            38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN              5  Horizon number
          THKNS              40  Thickness of horizon (cm)
          BD               1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                  0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP                0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                 0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF            1.000  Degradation Factor

        37DPN                 1  Thickness of compartments in horizon (cm)
          THEFC          0.4394  Field capacity in horizon (cm3/cm3)
          THEWP          0.2999  Wilting point in horizon (cm3/cm3)
          OC               0.20  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            14.00  Sand Content
          CLAY            55.00  Clay Content

        40ILP                 0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG               0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6        Watershed Data
!   1000.0 100000.    0.0        Waterbody Area (by Env)
!     2.0     2.0     0.0        Waterbody Depth (by Env)
!     2.0     2.0     0.0        Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0        Crop Area Fraction
!       4       4       4        Flow/Volume Option
!      0.      0.      0.        Flow/Volume value
!       0       0       0        Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                        burial
!    3.e-5                       user mass transfer coefficient
!      0.5                       prben
!     0.05                       benthic depth
!     0.50                       benthic porosity
!     1.85                       benthic bulk density
!     0.04                       benthic foc
!      5.0                       benthic doc
!    0.006                       benthic biomass
!     1.19                       wc dfac
!     30.0                       wc ss
!    0.005                       wc chlorophyll
!     0.04                       wc foc
!      5.0                       wc doc
!      0.4                       wc biomass
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Coffee – N

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
12 41 C:\ANDES\METFILES\ANDES\801100.dvf

PRZM      Variable
Record #  Name
         1TITLE                Colombia Coffee, Antioquia
         2HTITLE               Developed 10/24/2019

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             25.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             2  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          1.40                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            0.9                       Universal soil loss equation (P) practice factor (contour)
          SLP               16                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Coffee
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR            100  Maximum rooting depth of crop (cm), FNC-CENICAFE
          COVMAX           100  Maximum areal coverage of canopy (%), FNC-CENICAFE
          ICNAH              2  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           85  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table H-4; Rotation meadow CNT good
                            85  "GLEAMS Manual Table H-4; Rotation meadow CNT good
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            250  Maximum canopy height (cm) at maturation date (Record 11), FNC-CENICAFE
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Coffee
          EMD                1  Integer day of crop emergence (tree crop doesn't lose leaves, bud emerge 01-December)
          EMM                1  Integer month of crop emergence
          IYREM             89  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               10  Integer day of crop maturation
          MAM                1  Integer month of crop maturation (tree crop doesn't lose leaves, mature 01-October)
          IYRMAT            89  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM               12  Integer month of crop harvest (tree crop doesn't lose leaves, harvest October/November,
April/May)
          IYRHAR            89  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          P10D              10  Integer day of crop maturation
          P10M               1  Integer month of crop maturation
          IYP10             89  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M              12  Integer month of crop harvest-25
          IYRP60            89  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            200  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
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          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.204  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)          SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content        SOTERLAC soils
          CLAY            20.00  Clay Content        SOTERLAC soils

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.204  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)         SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content     SOTERLAC soils
          CLAY            20.00  Clay Content     SOTERLAC soils

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.380  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.380  Field capacity in horizon (cm3/cm3) Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.217  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.86  Organic carbon in horizon (%)         SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content     SOTERLAC soils
          CLAY            33.00  Clay Content     SOTERLAC soils

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             4  Horizon number
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          THKNS             20  Thickness of horizon (cm)
          BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.349  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.349  Field capacity in horizon (cm3/cm3)   Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.222  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.40  Organic carbon in horizon (%)         SOTERLAC

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           32.00  Sand Content        SOTERLAC
          CLAY           38.00  Clay Content        SOTERLAC

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             5  Horizon number
          THKNS            140  Thickness of horizon (cm)
          BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.439  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.439  Field capacity in horizon (cm3/cm3)   Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.299  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.20  Organic carbon in horizon (%)            SOTERLAC soils

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           14.00  Sand Content                        SOTERLAC soils
          CLAY           55.00  Clay Content                        SOTERLAC soils

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
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Coffee - C

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
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PRZM      Variable
Record #  Name
         1TITLE                Colombia Coffee, Huila
         2HTITLE               Developed 10/24/2019

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             25.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             2  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          5.84                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            0.9                       Universal soil loss equation (P) practice factor (contour)
          SLP               38                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Coffee
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR            100  Maximum rooting depth of crop (cm), FNC-CENICAFE
          COVMAX           100  Maximum areal coverage of canopy (%), FNC-CENICAFE
          ICNAH              2  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           85  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table H-4; Rotation meadow CNT good
                            85  "GLEAMS Manual Table H-4; Rotation meadow CNT good
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            250  Maximum canopy height (cm) at maturation date (Record 11), FNC-CENICAFE
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Coffee
          EMD                1  Integer day of crop emergence (tree crop doesn't lose leaves, bud emerge 01-March)
          EMM                1  Integer month of crop emergence
          IYREM             89  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               10  Integer day of crop maturation
          MAM                1  Integer month of crop maturation (tree crop doesn't lose leaves, mature 30-April)
          IYRMAT            89  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM               12  Integer month of crop harvest (tree crop doesn't lose leaves, harvest April-May/November)
          IYRHAR            89  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          P10D              10  Integer day of crop maturation
          P10M               1  Integer month of crop maturation
          IYP10             89  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M              12  Integer month of crop harvest-25
          IYRP60            89  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED           200  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
```

```
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.204  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)          SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content        SOTERLAC soils
          CLAY            20.00  Clay Content        SOTERLAC soils

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.204  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)         SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content     SOTERLAC soils
          CLAY            20.00  Clay Content     SOTERLAC soils

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.380  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.380  Field capacity in horizon (cm3/cm3) Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.217  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.86  Organic carbon in horizon (%)         SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content     SOTERLAC soils
          CLAY            33.00  Clay Content     SOTERLAC soils

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             4  Horizon number
```

```
          THKNS             20  Thickness of horizon (cm)
          BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.349  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.349  Field capacity in horizon (cm3/cm3)   Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.222  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.40  Organic carbon in horizon (%)         SOTERLAC

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           32.00  Sand Content        SOTERLAC
          CLAY           38.00  Clay Content        SOTERLAC

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             5  Horizon number
          THKNS            140  Thickness of horizon (cm)
          BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.439  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.439  Field capacity in horizon (cm3/cm3)   Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.299  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.20  Organic carbon in horizon (%)            SOTERLAC soils

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           14.00  Sand Content                        SOTERLAC soils
          CLAY           55.00  Clay Content                        SOTERLAC soils

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
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Coffee – S

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
10 19 C:\ANDES\METFILES\ANDES\803420.dvf

PRZM      Variable
Record #  Name
         1TITLE                Colombia Coffee, Narino
         2HTITLE               Developed 10/24/2019

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD             25.  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             2  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          4.00                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            0.9                       Universal soil loss equation (P) practice factor (contour)
          SLP               30                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Coffee
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR            100  Maximum rooting depth of crop (cm), FNC-CENICAFE
          COVMAX           100  Maximum areal coverage of canopy (%), FNC-CENICAFE
          ICNAH              2  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           85  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            85  "GLEAMS Manual Table H-4; Rotation meadow CNT good
                            85  "GLEAMS Manual Table H-4; Rotation meadow CNT good
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            250  Maximum canopy height (cm) at maturation date (Record 11), FNC-CENICAFE
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85
Conventional Tillage
          RECORD9A         1       3
          RECORD9B  0101 1001 3112
          RECORD9C  .025 .025 .025
          RECORD9D  .014 .014 .014
          RECORD9E    85   85   85

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Coffee
          EMD                1  Integer day of crop emergence (tree crop that doesn't lose leaves, buds emerge 01-March)
          EMM                1  Integer month of crop emergence
          IYREM             10  Integer year of crop emergence        PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          MAD               10  Integer day of crop maturation (tree crop that doesn't lose leaves, mature 01-April)
          MAM                1  Integer month of crop maturation
          IYRMAT            10  Integer year of crop maturation       PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          HAD               31  Integer day of crop harvest
          HAM               12  Integer month of crop harvest (tree crop that doesn't lose leaves, harvest April/December-
January)
          IYRHAR            10  Integer year of crop harvest          PIC Recommended dates adjusted according to RUSLE
Project planting dates.
          P10D              10  Integer day of crop maturation
          P10M               1  Integer month of crop maturation
          IYP10             10  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
          P60M              12  Integer month of crop harvest-25
          IYRP60            10  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M   Brief description of soil properties

        20CORED            200  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
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          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.204  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)          SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content        SOTERLAC soils
          CLAY            20.00  Clay Content        SOTERLAC soils

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.401  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.401  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.204  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)         SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content     SOTERLAC soils
          CLAY            20.00  Clay Content     SOTERLAC soils

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.380  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.380  Field capacity in horizon (cm3/cm3) Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.217  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.86  Organic carbon in horizon (%)         SOTERLAC soils

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            19.00  Sand Content     SOTERLAC soils
          CLAY            33.00  Clay Content     SOTERLAC soils

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             4  Horizon number
```

```
          THKNS             20  Thickness of horizon (cm)
          BD              1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.349  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.349  Field capacity in horizon (cm3/cm3)   Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.222  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.40  Organic carbon in horizon (%)         SOTERLAC

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           32.00  Sand Content        SOTERLAC
          CLAY           38.00  Clay Content        SOTERLAC

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             5  Horizon number
          THKNS            140  Thickness of horizon (cm)
          BD              1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.439  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.439  Field capacity in horizon (cm3/cm3)   Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP          0.299  Wilting point in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          OC              0.20  Organic carbon in horizon (%)            SOTERLAC soils

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           14.00  Sand Content                        SOTERLAC soils
          CLAY           55.00  Clay Content                        SOTERLAC soils

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
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Dry Rice

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
10 19 C:\ANDES\METFILES\ANDES\802340.DVF

PRZM      Variable
Record #  Name
         1TITLE                Colombia Rice (dry), Meta
         2HTITLE               Developed 09/11/2020

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           12.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             3  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.30                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP              1.7                       Land slope (%)
          USLEK           0.28                       Universal soil loss equation (K) of soil erodibility
          IREG               4                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Dry Rice
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             60  Maximum rooting depth of crop (cm), Roberts et al (2018)
          COVMAX            80  Maximum areal coverage of canopy (%), FEDARROZ
          ICNAH              3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           89  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/good, Cropping and Residue =
Small Grain SR/good"
                            88  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/good, Cropping and Residue =
Small Grain SR/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            100  Maximum canopy height (cm) at maturation date (Record 11), Alvarez-Herrera, et al (2017),
Moldenhauer et al (2018)
Conventional Tillage
          RECORD9A         1      27    "RUSLE ""C"" and ""N"" Factors; B09BWWWC Barley, Conventional tillage, Pullman REQ,
WA"
          RECORD9B  1604 0105 1605 0106 1606 0107 1507 1607 0108 1608 0109 1009 1509 1609 0110 1610
          RECORD9C  .043 .040 .030 .028 .030 .031 .032 .005 .005 .005 .006 .006 .006 .007 .007 .008
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87   87   88   88   88   88
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104
          RECORD9C  .008 .009 .010 .011 .004 .004 .004 .004 .010 .032 .042
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    88   88   88   88   88   88   88   88   88   88   88
Reduced Tillage
          RECORD9A         1      27    "RUSLE ""C"" and ""N"" Factors; B09BWWWC Reduced tillage, Pullman,WA"
          RECORD9B  1604 0105 1605 0106 1606 0107 1507 1607 0108 1608 0109 1009 1509 1609 0110 1610
          RECORD9C  .013 .013 .010 .011 .011 .011 .012 .002 .002 .002 .002 .002 .002 .003 .003 .003
          RECORD9D  .040 .040 .040 .040 .040 .040 .040 .040 .040 .040 .040 .040 .040 .040 .040 .040
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83   84   84   84   84
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104
          RECORD9C  .004 .004 .005 .005 .004 .004 .004 .004 .006 .010 .013
          RECORD9D  .040 .040 .040 .040 .040 .040 .040 .040 .040 .040 .040
          RECORD9E    84   84   84   84   84   84   84   84   84   84   84
No Tillage
          RECORD9A         1      27    "RUSLE ""C"" and ""N"" Factors; B09BWWWC Barley, No tillage, Pullman, WA"
          RECORD9B  1604 0105 1605 0106 1606 0107 1507 1607 0108 1608 0109 1009 1609 0110 1610 0111
          RECORD9C  .001 .001 .001 .001 .001 .001 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    78   78   78   78   78   78   78   78   78   78   78   78   79   79   79   79
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104
          RECORD9C  .000 .000 .000 .000 .001 .001 .001 .001 .001 .001 .001
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    79   79   79   79   79   79   79   79   79   79   79

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Dry Rice
          EMD               16  Integer day of crop emergence
          EMM                4  Integer month of crop emergence
          IYREM             10  Integer year of crop emergence;FEDEARROZ, Fondo Latinoamericano para Arroz de Riego FLAR
          MAD               30  Integer day of crop maturation
          MAM                6  Integer month of crop maturation
          IYRMAT            10  Integer year of crop maturation;FEDEARROZ, Fondo Latinoamericano para Arroz de Riego FLAR
          HAD               15  Integer day of crop harvest
          HAM                9  Integer month of crop harvest
          IYRHAR            10  Integer year of crop harvest;FEDEARROZ, Fondo Latinoamericano para Arroz de Riego FLAR
          P10D              30  Integer day of crop maturation
          P10M               6  Integer month of crop maturation
          IYP10             10  Integer year of crop maturation
```

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          P60D              21  Integer day of crop harvest-25
          P60M               8  Integer month of crop harvest-25
          IYRP60            10  Integer year of crop harvest
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "CO47M"Brief description of soil properties

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, none
         RATEAP           .000  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             5  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)    Computed with Rawls &Brakensiek from SOTERLAC soils
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)     Computed with Rawls &Brakensiek from SOTERLAC soils
          OC               3.1  Organic carbon in horizon (%)        SOTERLAC soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content       SOTERLAC soil
          CLAY            20.00  Clay Content       SOTERLAC soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.01  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.4019  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.4019  Field capacity in horizon (cm3/cm3)
          THEWP         0.2042  Wilting point in horizon (cm3/cm3)
          OC               3.1  Organic carbon in horizon (%)

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            40.00  Sand Content
          CLAY            20.00  Clay Content

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.3809  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
```

```
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC        0.3809  Field capacity in horizon (cm3/cm3)
          THEWP        0.2174  Wilting point in horizon (cm3/cm3)
          OC             0.86  Organic carbon in horizon (%)

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          19.00  Sand Content
          CLAY          33.00  Clay Content

Horizon 4:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            4  Horizon number
          THKNS            20  Thickness of horizon (cm)
          BD             1.43  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO        0.3493  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC        0.3493  Field capacity in horizon (cm3/cm3)
          THEWP        0.2221  Wilting point in horizon (cm3/cm3)
          OC             0.40  Organic carbon in horizon (%)

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          32.00  Sand Content
          CLAY          38.00  Clay Content

Horizon 5:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            5  Horizon number
          THKNS            40  Thickness of horizon (cm)
          BD             1.44  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO        0.4394  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC        0.4394  Field capacity in horizon (cm3/cm3)
          THEWP        0.2999  Wilting point in horizon (cm3/cm3)
          OC             0.20  Organic carbon in horizon (%)

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          14.00  Sand Content
          CLAY          55.00  Clay Content

        40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Wet Rice – C1 (1st cycle)

```
PARAMETER                                        VALUE USED       SOURCE/RATIONALE
10 19 C:\ANDES\METFILES\ANDES\802140.DVF
DOUBLE CROP FLAG:   OFFSET DAYS:                       0    000   FLAG:0=no double crop, 1=on  OFFSET DAYS: days added to
cropping and drainage dates
HYDROLOGIC PARAMETERS
Surface area of paddy (ha)                         10.00 10.0  10.00  10.00  10.00          ANDES
Initial depth of paddy (cm)                      0.00           Condition of rice paddy on January 1
Number of Irrigation/Drain Events                4
Date to irrigate paddy (initial flood) (IDM/IDD) 04/17          ANDI, Camara Procultivos (irrigate after sowing)
Irrigation Event or Drain Event                  2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   2.00           Takeda et.al, 2019, average
Irrigation rate (cm/day)                         5.00           ANDI, Camara Procultivos
Depth of paddy outlet (cm)                       30.00          Takeda et al., 2019
Depth at which irrigation will begin (cm)        2.00           Typical practice for the region
Depth at which irrigation will cease (cm)        5.00           Typical practice for the region
Date to raise flood paddy                        04/21          Typical practice for the region
Irrigation Event or Drain Event                  2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   2.00           Takeda et.al, 2019, average
Irrigation rate (cm/day)                         5.00           ANDI, Camara Procultivos
Depth of paddy outlet (cm)                       30.00          Takeda et al., 2019
Depth at which irrigation will begin (cm)        5.00           ANDI, Camara Procultivos (water does not exceed 8 - 10 cm)
Depth at which irrigation will cease (cm)        10.00          ANDI, Camara Procultivos (water does not exceed 8 - 10 cm)
Date to irrigate paddy (second flood)            08/01          1 week before drain for harvest, no irrigation
Irrigation Event or Drain Event                  1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   2.00           Takeda et.al, 2019, average
Irrigation rate (cm/day)                         5.00           ANDI, Camara Procultivos
Depth of paddy outlet (cm)                       30.00          Takeda et al., 2019
Depth at which irrigation will begin (cm)        0.00           Typical practice for the region
Depth at which irrigation will cease (cm)        0.00           Typical practice for the region
Date to cease irrigating paddy                   08/08          7 days before harvest
Irrigation Event or Drain Event                  1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   2.00           Takeda et.al, 2019, average
Irrigation rate (cm/day)                         5.00           ANDI, Camara Procultivos
Depth of paddy outlet (cm)                       0.00           Typical practice for the region,
Depth at which irrigation will begin (cm)        0.00           Typical practice for the region
Depth at which irrigation will cease (cm)        0.00           Typical practice for the region

CROP PARAMETERS
Crop emergence date (JEM/JED)                    04/16              FLAR and FEDEARROZ
Crop maturity date (KMM/KMD)                     06/30          FEDEARROZ (flowering - 75 days after emergence)
Crop harvest date (KHM/KHD)                      08/15              FLAR and FEDEARROZ
Maximum crop coverage (fraction)                 0.80           FEDEARROZ
Paddy EVAP                                        -8.00  8.00  8.00 10.00 12.00 13.00 13.00 12.00 11.00 10.00  8.00  8.00

AQUATIC CONCENTRATION PARAMETERS
Settling velocity (m/day)                        2.00           Calculated for fine particles (Guy,1977)
Mixing velocity (diffusion) (m/day)              0.001          Typical range of 0.0 - 0.1 m/day (Arnold et al., 1991)
Seepage Rate                                     0.23           Minimum Farm C - Takeda, et al, 2019
DMAX                                             40.000         Avella, 1974
DLAKE                                            0.000          Condition on January 1

SEDIMENT CONCENTRATION PARAMETERS
Concentration of suspended sediment (ppm)        30.00          Typical default (Young, 2014)
Depth of active sediment layer (cm)              5.00           Guidelines (Young, 2014; Med-Rice,2003)
Bulk density of bed sediment (g/cc)              1.42           Farm B - (Takeda, et al, 2019)
Field capacity (cm3/cm3)                         0.32           Farm B - (Takeda, et al, 2019)
Wilting point (cm3/cm3)                          0.26           Farm B - (Takeda, et al, 2019)
Mixing depth to allow direct partitioning to bed 0.10           Professional judgment and Capri and Miao (2002)
Organic Carbon Content                           1.48           Farm B - (Takeda, et al, 2019)

FLAGS
Harvest Flag                                     -1            -1 = all residues left alone,-2 = foliar residues removed
(set to 0), still has sediment residues 0 = all foliar and sediment residues removed (set to 0)
EXAMS Flag                                       1              0=no EXAMS transfer files, 1= EXAMS transfer files
!
!       1       2       6       Watershed Data
! 10000.0     0.0     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Wet Rice – C2 (2nd cycle)

```
PARAMETER                                         VALUE USED       SOURCE/RATIONALE
10 19 C:\ANDES\METFILES\ANDES\802140.DVF
DOUBLE CROP FLAG:   OFFSET DAYS:                       0    000   FLAG:0=no double crop, 1=on  OFFSET DAYS: days added to
cropping and drainage dates
HYDROLOGIC PARAMETERS
Surface area of paddy (ha)                           10.00 10.0  10.00  10.00  10.00           ANDES
Initial depth of paddy (cm)                       0.00           Condition of rice paddy on January 1
Number of Irrigation/Drain Events                 4
Date to irrigate paddy (initial flood) (IDM/IDD)  09/02          ANDI, Camara Procultivos (irrigate after sowing)
Irrigation Event or Drain Event                   2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    2.00           Takeda et.al, 2019, average
Irrigation rate (cm/day)                          5.00           ANDI, Camara Procultivos
Depth of paddy outlet (cm)                        30.00          Takeda et al., 2019
Depth at which irrigation will begin (cm)         2.00           Typical practice for the region
Depth at which irrigation will cease (cm)         5.00           Typical practice for the region
Date to raise flood paddy                         09/06          Typical practice for the region
Irrigation Event or Drain Event                   2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    2.00           Takeda et.al, 2019, average
Irrigation rate (cm/day)                          5.00           ANDI, Camara Procultivos
Depth of paddy outlet (cm)                        30.00          Takeda et al., 2019
Depth at which irrigation will begin (cm)         5.00           ANDI, Camara Procultivos (water does not exceed 8 - 10 cm)
Depth at which irrigation will cease (cm)         10.00          ANDI, Camara Procultivos (water does not exceed 8 - 10 cm)
Date to irrigate paddy (second flood)             12/17          1 week before drain for harvest, no irrigation
Irrigation Event or Drain Event                   1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    2.00           Takeda et.al, 2019, average
Irrigation rate (cm/day)                          5.00           ANDI, Camara Procultivos
Depth of paddy outlet (cm)                        30.00          Takeda et al., 2019
Depth at which irrigation will begin (cm)         0.00           Typical practice for the region
Depth at which irrigation will cease (cm)         0.00           Typical practice for the region
Date to cease irrigating paddy                    12/24          7 days before harvest
Irrigation Event or Drain Event                   1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    2.00           Takeda et.al, 2019, average
Irrigation rate (cm/day)                          5.00           ANDI, Camara Procultivos
Depth of paddy outlet (cm)                        0.00           Typical practice for the region,
Depth at which irrigation will begin (cm)         0.00           Typical practice for the region
Depth at which irrigation will cease (cm)         0.00           Typical practice for the region

CROP PARAMETERS
Crop emergence date (JEM/JED)                     09/01              FLAR and FEDEARROZ
Crop maturity date (KMM/KMD)                      11/15          FEDEARROZ (flowering - 75 days after emergence)
Crop harvest date (KHM/KHD)                       12/31              FLAR and FEDEARROZ
Maximum crop coverage (fraction)                  0.80           FEDEARROZ
Paddy EVAP                                         -8.00  8.00  8.00 10.00 12.00 13.00 13.00 12.00 11.00 10.00  8.00  8.00

AQUATIC CONCENTRATION PARAMETERS
Settling velocity (m/day)                         2.00           Calculated for fine particles (Guy,1977)
Mixing velocity (diffusion) (m/day)               0.001          Typical range of 0.0 - 0.1 m/day (Arnold et al., 1991)
Seepage Rate                                      0.23           Minimum Farm C - Takeda, et al, 2019
DMAX                                              40.000         Avella, 1974
DLAKE                                             0.000          Condition on January 1

SEDIMENT CONCENTRATION PARAMETERS
Concentration of suspended sediment (ppm)         30.00          Typical default (Young, 2014)
Depth of active sediment layer (cm)               5.00           Guidelines (Young, 2014; Med-Rice, 2003)
Bulk density of bed sediment (g/cc)               1.42           Farm B - (Takeda, et al, 2019)
Field capacity (cm3/cm3)                          0.32           Farm B - (Takeda, et al, 2019)
Wilting point (cm3/cm3)                           0.26           Farm B - (Takeda, et al, 2019)
Mixing depth to allow direct partitioning to bed  0.10           Professional judgment and Capri and Miao (2002)
Organic Carbon Content                            1.48           Farm B - (Takeda, et al, 2019)

FLAGS
Harvest Flag                                      -1            -1 = all residues left alone,-2 = foliar residues removed
(set to 0), still has sediment residues 0 = all foliar and sediment residues removed (set to 0)
EXAMS Flag                                        1              0=no EXAMS transfer files, 1= EXAMS transfer files
!
!       1       2       6       Watershed Data
! 10000.0     0.0     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
     !     0.4                       wc biomass
```

EXAMS Pond Inputs for Colombia and Peru

	Environmental Variables			
AEC	Anion exchange cap	1.0e-2	meq/100 gr	Standard Pond
ATURB	Atmospheric turb	2.0	kilometer	Standard Pond
BACPL	Plankton Population	1.0	cfu/mL	Standard Pond
BNBAC	Benthic bacteria	37	cfu/100 gr	Standard Pond
BNMAS	Benthic biomass	6.0e-3	g/m^2	Standard Pond
BULKD	Bulk density	1.85	g/cm^3	Standard Pond
CEC	Cation exchange cap	1.0e-2	meq/100 gr	Standard Pond
CLOUD	Mean monthly clouds		tenths of sky	Standard Pond
DFAC	Distribution factor	1.19	dimensionless	Standard Pond
DISO2	Disolved oxygen	5.0	mg/liter	Standard Pond
DOC	Dissolved org carb	5.0	mg/liter	Standard Pond
DSP	Dispersion coef.	3.0e-5	m^2/hour	Standard Pond
FROC	Frac. organic carbon	0.04	dimensionless	Standard Pond
OZONE	Mean monthly ozone	0.3	cm NTP	Standard Pond
PH	Log hydrogen ion con	7.0	pH units	Standard Pond
POH	Log hydroxid ion con	7.0	pOH units	Standard Pond
RAIN	Ave monthly rainfall	N/A	mm/month	Standard Pond
RHUM	Relative Humidity	N/A	% saturation	Standard Pond
SUSED	Suspended sediment	30	mg/liter	Standard Pond
TCEL	Temperature celsius	variable	C^o Max=30 C°	Read from weather file

Apéndice E : Pasos de procesamiento GIS y evaluación de área para la selección de suelos en Perú

Pasos de procesamiento GIS

En este apéndice se detallan los pasos de procesamiento GIS para desarrollar la base de datos de suelo que se considerará para su uso en los escenarios de modelización. Los pasos que se enumeran a continuación son el archivo de notas registrado durante la evaluación real.

Los conjuntos de datos de entrada relevantes se muestran en el cuerpo principal de este informe.

1. Límites administrativos de Perú
    a. Extraer Perú de Gadmin- V2 en Peru_gadmin2
2. Determinar la resolución más alta a la que están disponibles los datos del cultivo
    a. Nombre0 = Nivel de país (posible) – 1 valor
    b. Nombre1 = Provincia (posible) – 25 valores
    c. Nombre2 = Distrito () – 194 valores
    d. Name3 = Condado (no posible) – 1668 valores

Verificar con la información de estadísticas de cultivos
URL de origen: http://siea.minag.gob.pe/siea/?q=publicaciones/boletin-estadistico-de-produccion-agricola-pecuaria-y-avicola-0

Acumular datos mensuales de las 4 hojas de cálculo trimestrales en un solo número anual.

- Espárragos: tabla C.21 en todas las hojas de cálculo – copiar / pegar > acumulado.
    - Al nivel distrital
- Aguacate: Al nivel provincial:
- Uvas: Al nivel provincial:
- Maíz: Al nivel provincial
- Arroz: Al nivel provincial
- Tomate: Al nivel provincial

Dividir el polígono de la provincia del Callo ya que tiene una parte que debería haber sido lima metropolitana y costera, no montañas. – Utilice crear polígono de una sola parte para eliminar el polígono multi parte

Unir los datos de los cultivos (tomate y maíz) con la capa de administración provincial (NOMBRE1)
Unir los datos del cultivo (espárragos) con la capa de administración distrital (NOMBRE2)

Exportar los datos a un archivo nuevo Peru_Crops2016_MultipartToSi2

3. Agregar campo de zona climática
    a. Agregar nombre de campo ClimZone (text (10))
4. Asignar valores de climZone
    a. Costa
    b. Montaña
    c. Trópico

5. Extraer datos de Ag 30m de <data source>.
    a. Usar Clases
6. HWSD re muestreado de 1 km a 30 m
7. Sujetar HWSD a capa ag 30m
8. Normalizar la producción distribuyendo la producción total (t) por distrito o provincia al área ag total (o píxeles) por unidades de administración
    a. Estadísticas zonales (todas) para la capa de la cuadrícula ag-hwsd en distritos >> Peru_AgPixels_by_District
    b. Estadísticas zonales (todas) para la capa ráster ag-hwsd en la provincia >> Peru_AgPixels_by_Province
    c. Para los espárragos, una la Peru_AgPixels_by_District al Peru_Crops2016_MultipartToSi2 y divida el producto total por el recuento de píxeles para una densidad semi normalizada píxel por píxel
        i. ! GISAspar.txt.tons2016! / ! Peru_AgPixels_by_District.COUNT!
    d. Para los tomate y maíz, una la Peru_AgPixels_by_Province al Peru_Crops2016_MultipartToSi2 y divida el producto total por el recuento de píxeles para una densidad semi-normalizada píxel por píxel
        i. ! Peru_Crops2016_MultipartToSi2.Data2Map__Tomato! / ! Peru_AgPixels_by_Province.COUNT!
        ii. ! Peru_Crops2016_MultipartToSi2.Data2Map__Corn! / ! Peru_AgPixels_by_Province.COUNT!
    e. Cocientes más altos, significan densidad más alta
    f. Quitar las uniones a las tablas de recuento de píxeles
9. Intersecte ag_hwsd con Peru_Crops2016_MultipartToSi2 a Peru_AdminWeatherCropSoil. Da como resultado todos los píxeles ag con toda la información para la selección del sitio
10. Extraiga la grilla de World Hydrgrp a Peru Ag >> capa resultante Peru_Hydgrp_Ag (a 250m). Utilice la resolución mínima de cuadrícula de celda.
    a. 0,002083333 grados dentro
    b. 0,000269494585 grados fuera
11. Convertir en polígono >> peru_hydgrp_ag_poly. Ahora la capa se puede combinar con Peru_AdminWeatherCropSoil. No simplifique los polígonos.
12. Intersecte con Peru_AdminWeatherCropSoilHydgrp
13. Proyecte a albers área igual siembra tienen unidades métricas para trabajar.
14. Elimine los polígonos de astillas. Utilice criterios de 30x30=900m2 como mínimo y combine con el polígono vecino adyacente. Alrededor de 608,000+ son polígonos de astillas.
15. Agregue la estación meteorológica con GT 20 años de datos diarios al mapa
    a. WeatherStations.txt agregar al mapa
    b. Convertir en tema de evento (prj wgs1984)
    c. Exportar a capa de accidentes geográficos
    d. Proyectar a Albers área igual para amortiguamiento (no funciona tan bien en proyección geográfica)
    e. Distancias de amortiguador
        i. 10 km
        ii. 25km
        iii. 50 km
        iv. 75km
    f. Una distancia de amortiguador de 50 km elimina la agricultura abundante y todavía contiene las principales regiones de cultivo de
        i. Espárragos
        ii. Maíz

iii. Tomate – Las provincias de mayor producción en Ica y Tacna no están cubiertas por estaciones meteorológicas
iv. Revisar _http://minagri.gob.pe/portal/ _Revisar
v. https://web2.senamhi.gob.pe/ (Servicio meteorológico actual en Perú)
1. ICA > Prov. Chincha >Dist. San José de los Molinos > Estación Huamani
2. Ica > Prov. Chincha > Dist Chincha Baja > estación Fonagro (Chincha)

g. Extraiga todas las tierras ag dentro del amortiguador de 50 km >> Peru_AdminSoilCropHydgrpWeather
h. Resumen de cada cultivo basado en los mejores datos disponibles
i. Espárragos >> Peru_Asparagus_Assessment
1. Distrito
2. Climzone
3. GSOD (estación meteorológica)
4. Suelo
5. Hydrgrp
6. DdensidadAspa
ii. Maíz>> Peru_Corn_Assessment
1. Provincia
2. Climzone
3. Estación meteorológica
4. Suelo
5. Hydrgrp
6. DensidadMaiz
iii. Tomate>> Peru_Tomato_Assessment
1. Provincia
2. Climzone
3. Estación meteorológica
4. Suelo
5. Hydrgrp
6. DensidadToma

i. Copiar y pegar datos de ArcGIS Pro en una hoja de cálculo
i. Remover registro con HWSD 0(sin datos)

Valoración del área del suelo

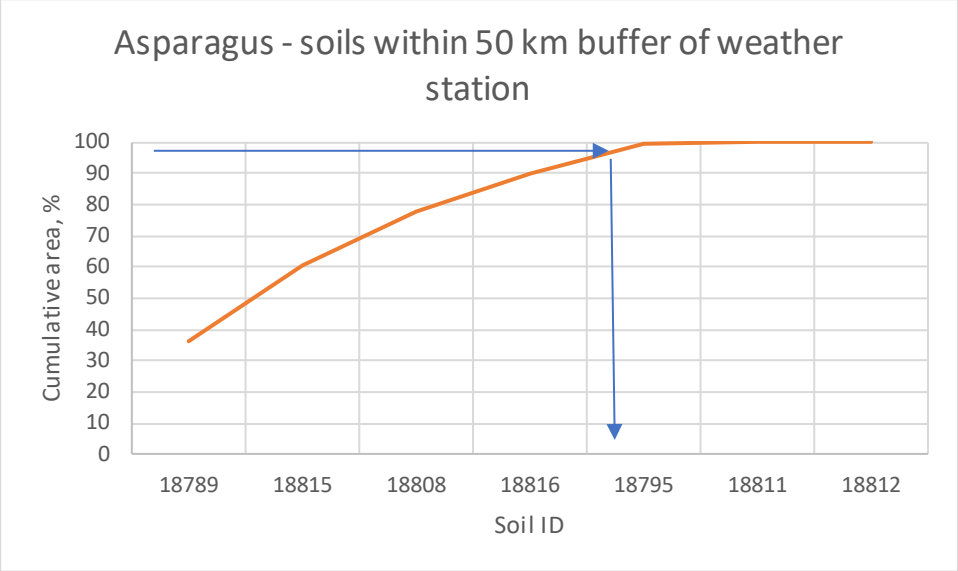
para los suelos dentro de los 50km de una estación meteorológica para el espárrago, el tomate, el maíz, el aguacate, la uva, y el arroz

Tabla A - 1. espárrago - Suelos dentro del amortiguador de 50km

Identificación del suelo	Fracción del área	Área acum	Capacidad del campo	Textura
18789	0.3646	36.4636	0.0687	Arena fina
18815	0.2385	60.3102	0.0774	Arena fina margosa
18808	0.1768	77.9950	0.2163	Marga arenosa
18816	0.1178	89.7757	0.1247	Arena fina margosa
18795	0.0972	99.4963	0.2675	Marga
18811	0.0047	99.9673	0.3065	Marga
18812	0.0003	100.0000	0.1645	Marga arenosa

*Suelo resaltado con >5% de área

Figura E - 1. Suelos del espárrago- área acumulativa



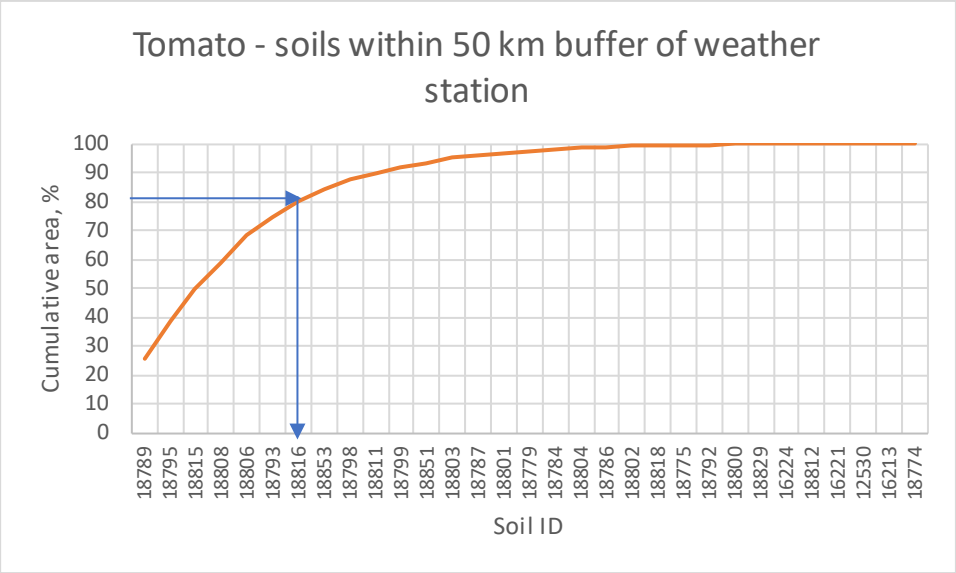
Las áreas a la izquierda de las flechas muestran el suelo con área >5%

Tabla E - 2. Tomates - suelos dentro del amortiguador de los 50km

Identificación del suelo	Fracción del área	Área acum	Capacidad del campo	Textura
18789	0.258722142	25.8722	0.0687	Arena fina
18795	0.131621134	39.0343	0.2675	Franco
18815	0.107429395	49.7773	0.0774	Arena fina margosa
18808	0.092752793	59.0525	0.2163	Franco arenoso
18806	0.091549036	68.2075	0.2156	Franco arenoso
18793	0.064768013	74.6843	0.2467	Franco
18816	0.055038125	80.1881	0.1247	Arena fina margosa
18853	0.039524077	84.1405	0.3688	Franco limosa
18798	0.034671414	87.6076	0.3420	Franco-arcilloso
18811	0.022540903	89.8617	0.3065	Franco
18799	0.018462509	91.7080	0.2675	Franco
18851	0.017923081	93.5003	0.3928	Franco arcilloso
18803	0.016941407	95.1944	0.2591	Franco arenoso
18787	0.01044818	96.2392	0.3469	Franco arcilloso
18801	0.008094286	97.0486	0.3009	Franco arenoso
18779	0.006965839	97.7452	0.3551	Franco
18784	0.004383074	98.1835	0.2391	Franco
18804	0.003560057	98.5395	0.3176	Franco limosa
18786	0.003370907	98.8766	0.3154	Franco arcillo arenoso
18802	0.003070414	99.1837	0.3873	Franco arcilloso
18818	0.001935912	99.3773	0.3042	Franco arcillo arenoso
18775	0.001841029	99.5614	0.3688	Franco limosa
18792	0.001500778	99.7115	0.3420	Franco arcilloso
18800	0.001208049	99.8323	0.3420	Franco arcilloso
18829	0.000908243	99.9231	0.2879	Franco arcillo arenoso
16224	0.000326335	99.9557	0.1772	Franco arenoso
18812	0.000319449	99.9877	0.1645	Franco arenoso
16221	7.7901E-05	99.9954	0.2412	Franco arenoso
12530	2.2856E-05	99.9977	0.1912	Franco arenoso
16213	1.99096E-05	99.9997	0.4027	Franco arcilloso
18774	2.75241E-06	100.0000	0.3042	Franco arcillo arenoso

*Suelo resaltado con área >5%

Figura E - 2. Suelos del tomate- área acumulativa



Las áreas a la izquierda de las flechas muestran el suelo con área >5%

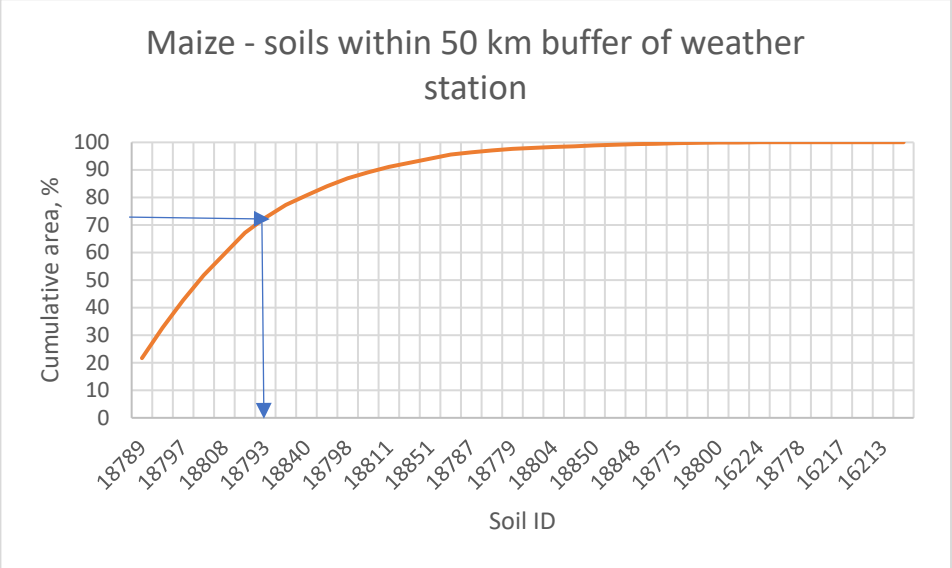
Tabla E - 3. Maíz - suelos dentro del amortiguador de 50km

Identificación del suelo	Fracción del área	Área acum	Capacidad del campo	Textura
18789	0.2171	21.7087	0.0687	Arena fina
18795	0.1104	32.7526	0.2675	Franco
18797	0.0996	42.7155	0.4574	Arcilla
18815	0.0901	51.7297	0.0774	Arena fina margosa
18808	0.0778	59.5123	0.2163	Franco arenoso
18806	0.0768	67.1939	0.2156	Franco arenoso
18793	0.0543	72.6284	0.2467	Franco
18816	0.0462	77.2465	0.1247	Arena fina margosa
18840	0.0343	80.6774	0.4924	Arcilla
18853	0.0332	83.9938	0.3688	Franco limosa
18798	0.0291	86.9030	0.3420	Franco arcilloso
18852	0.0220	89.0990	0.4574	Arcilla
18811	0.0189	90.9904	0.3065	Franco
18799	0.0155	92.5395	0.2675	Franco
18851	0.0150	94.0434	0.3928	Franco arcilloso
18803	0.0142	95.4649	0.2591	Franco arenoso
18787	0.0088	96.3416	0.3469	Franco arcilloso
18801	0.0068	97.0208	0.3009	Franco arenoso
18779	0.0058	97.6052	0.3551	Franco
18784	0.0037	97.9730	0.2391	Franco
18804	0.0030	98.2717	0.3176	Franco limosa

18786	0.0028	98.5546	0.3154	Franco arcillo arenoso
18850	0.0026	98.8153	0.4791	Arcilla
18802	0.0026	99.0729	0.3873	Franco arcilloso
18848	0.0023	99.3053	0.4791	Arcilla
18818	0.0016	99.4678	0.3042	Franco arcillo arenoso
18775	0.0015	99.6222	0.3688	Franco limosa
18792	0.0013	99.7482	0.3420	Franco arcilloso
18800	0.0010	99.8495	0.3420	Franco arcilloso
18829	0.0008	99.9257	0.2879	Franco arcillo arenoso
16224	0.0003	99.9531	0.1772	Franco arenoso
18812	0.0003	99.9799	0.1645	Franco arenoso
18778	0.0001	99.9871	0.3797	Arcilla
16221	0.0001	99.9937	0.2412	Franco arenoso
16217	0.00003	99.99618	0.4457	Arcilla
12530	0.00002	99.99810	0.1912	Franco arenoso
16213	0.00002	99.99977	0.4027	Franco arcilloso
18774	0.000002	100.000000	0.3042	Franco arcillo arenoso

*Suelo resaltado con área >5%

Figura E - 3. Suelos del maíz- área acumulativa



Las áreas a la izquierda de las flechas muestran el suelo con área >5%

Tabla E - 4. Aguacate - suelos dentro del amortiguador de 50km en La Libertad

Identificación del suelo	Fracción del área	Área acum	Capacidad del campo	Textura
18815	0.6013	60.1335	0.0774	Arena fina margosa
18808	0.2123	81.3587	0.2163	Franco arenoso
18795	0.1426	95.6155	0.2675	Franco
18811	0.0430	99.9158	0.3065	Franco
18812	0.0008	100.0000	0.1645	Franco arenoso

Figura E - 4. Suelos del aguacate- área acumulativa

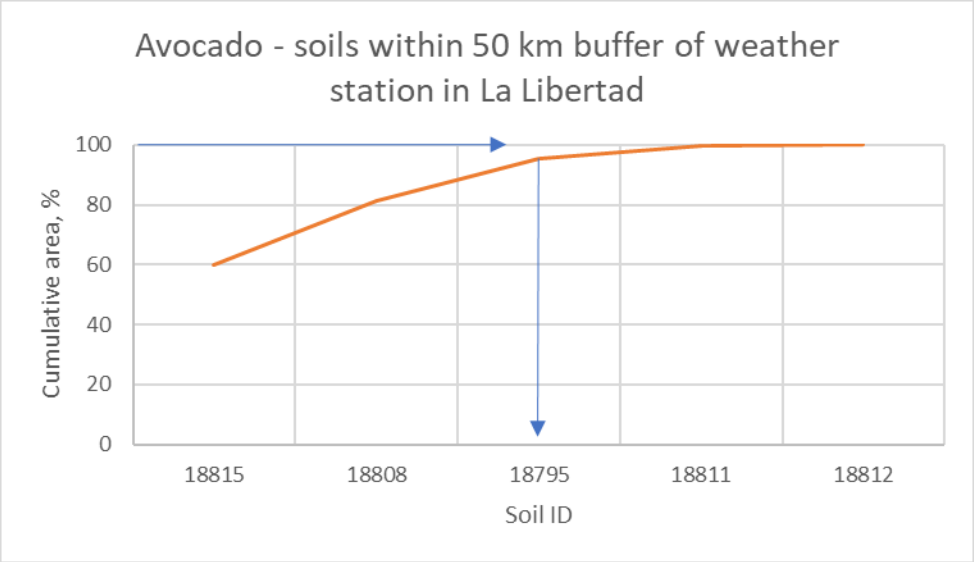


Tabla E - 5. Uvas - suelos dentro del amortiguador de 50km en Piura e Ica

Identificación del suelo	Fracción del área	Área acum	Capacidad del campo	Textura
18789	0.3382	33.8235	0.0687	Arena fina
18795	0.2494	58.7668	0.2675	Franco
18793	0.1551	74.2731	0.2467	Franco
18816	0.1516	89.4352	0.1247	Arena fina margosa
18798	0.0993	99.3603	0.3420	Franco arcilloso
18808	0.0064	99.9993	0.2163	Franco arenoso
18792	0.0000	100.0000	0.3420	Franco arcilloso

Figura E - 5. Suelos de las uvas- área acumulativa

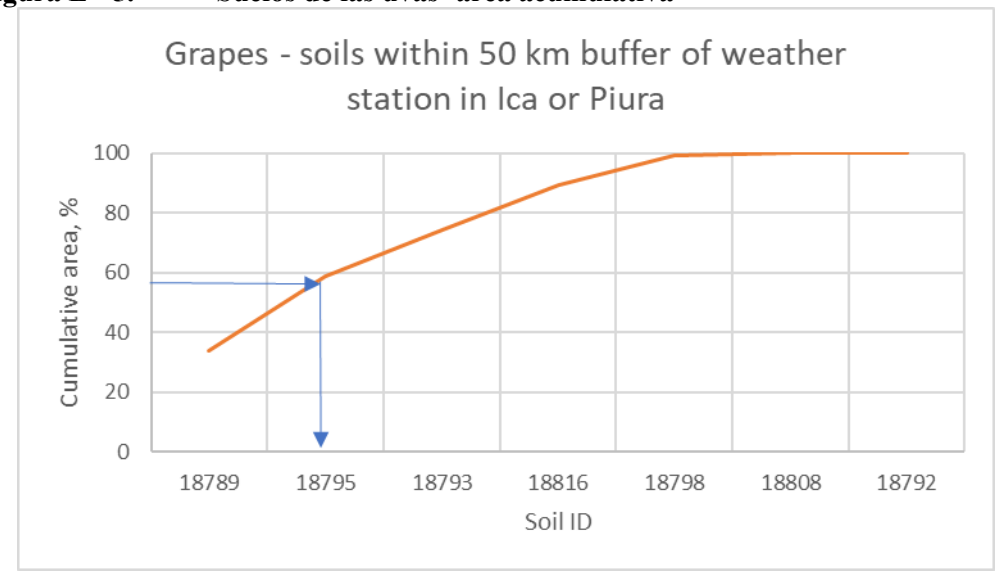
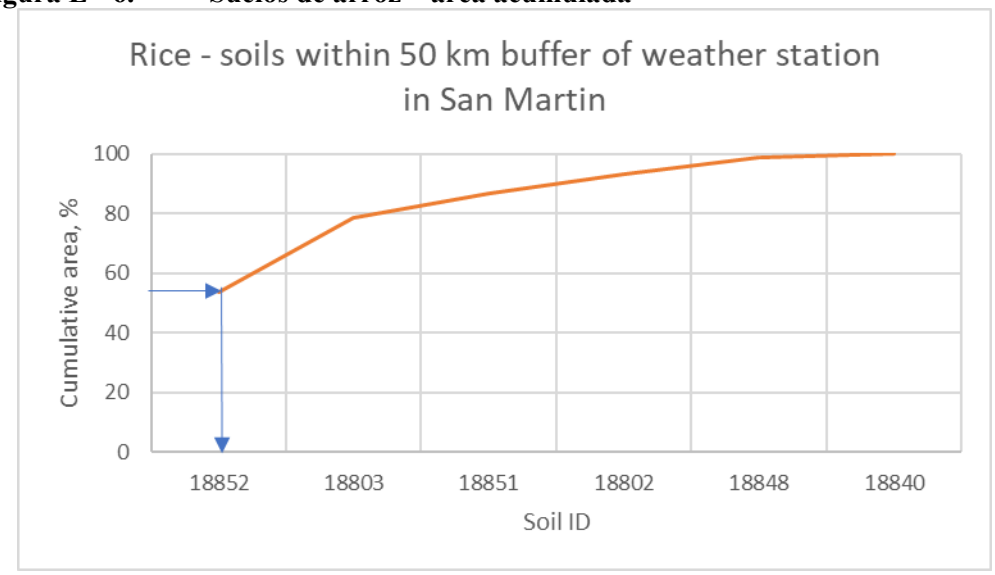


Tabla E - 6. Arroz - suelos dentro del amortiguador de los 50km en San Martin

Identificación del suelo	Fracción del área	Área acum	Capacidad del campo	Textura
18852	0.5352	53.5154	0.4574	Arcilla
18803	0.2517	78.6903	0.2591	Franco arenoso
18851	0.0831	87.0025	0.3928	Franco arcilloso
18802	0.0628	93.2805	0.3873	Franco arcilloso
18848	0.0566	98.9435	0.4791	Arcilla
18840	0.0106	100.0000	0.4924	Arcilla

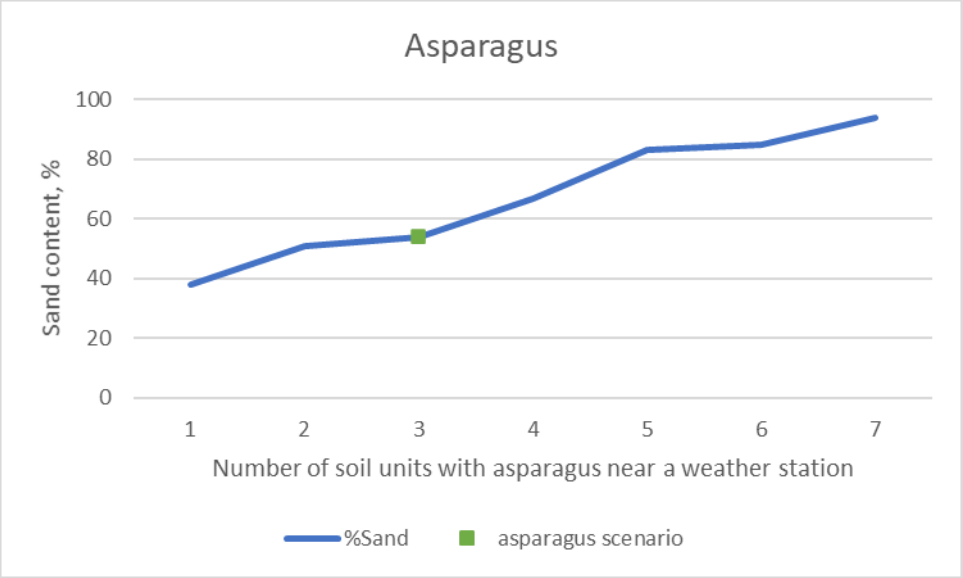
Figura E - 6. Suelos de arroz – área acumulada



Escenario de suelo seleccionado – propiedades del suelo en contexto con otros suelos dentro del amortiguador de 50 km de estaciones meteorológicas

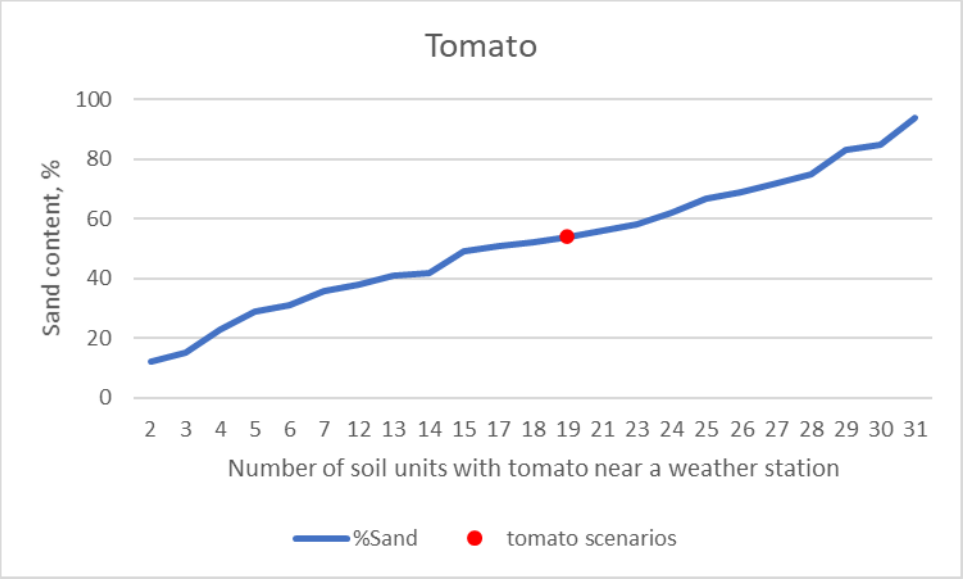
Arena - Cuanto menor sea el contenido de arena, mayor será el caso de escorrentía. Los suelos seleccionados de espárragos, maíz, aguacate, uva y arroz tienen % de arena menos que el promedio. El suelo del tomate tiene % de arena más alto que los suelos promedio del tomate.

Figura E -7 . Espárragos – Contenido de arena del suelo seleccionado en comparación con todos los suelos de espárragos dentro a menos de 50 km de una estación meteorológica



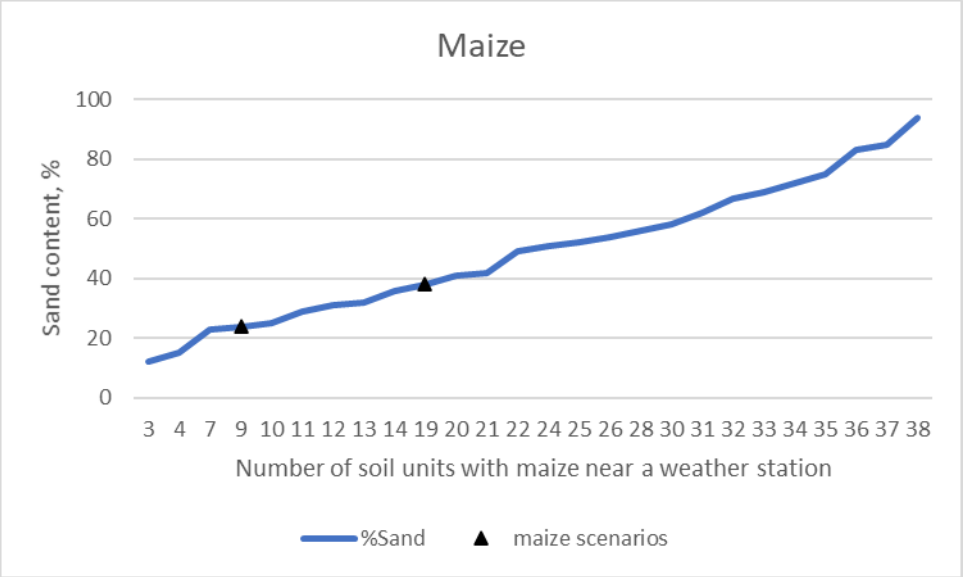
% promedio de arena para suelos de espárragos = 67,4%, suelo seleccionado = 54% de arena

Figura E -8 . Tomate – Contenido de arena del suelo seleccionado en comparación con todos los suelos de tomate a menos de 50 km de una estación meteorológica



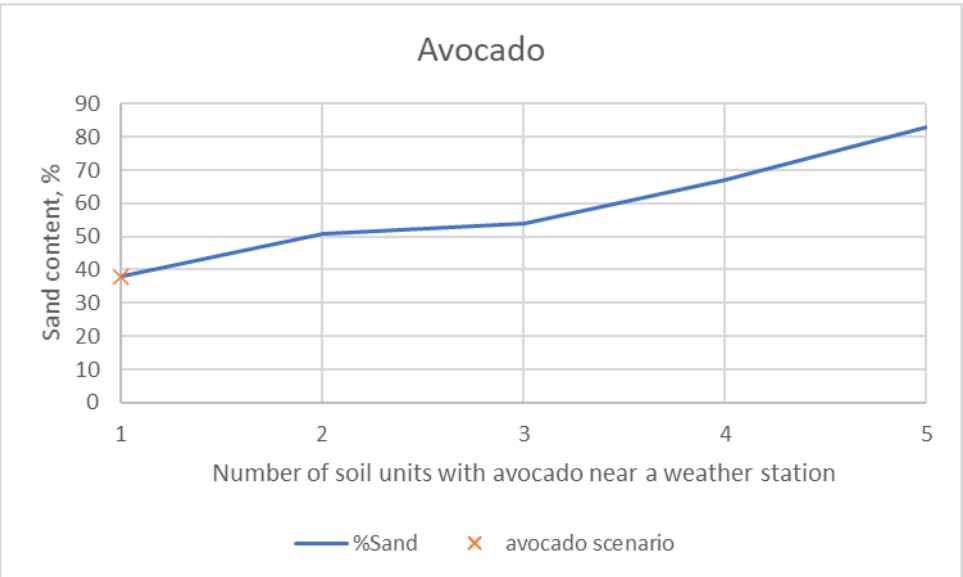
% promedio de arena para suelos de tomate = 49,1%, suelo seleccionado = 54% de arena

Figura E -9 . Maíz – Contenido de arena del suelo seleccionado en comparación con todos los suelos de maíz a menos de 50 km de una estación meteorológica



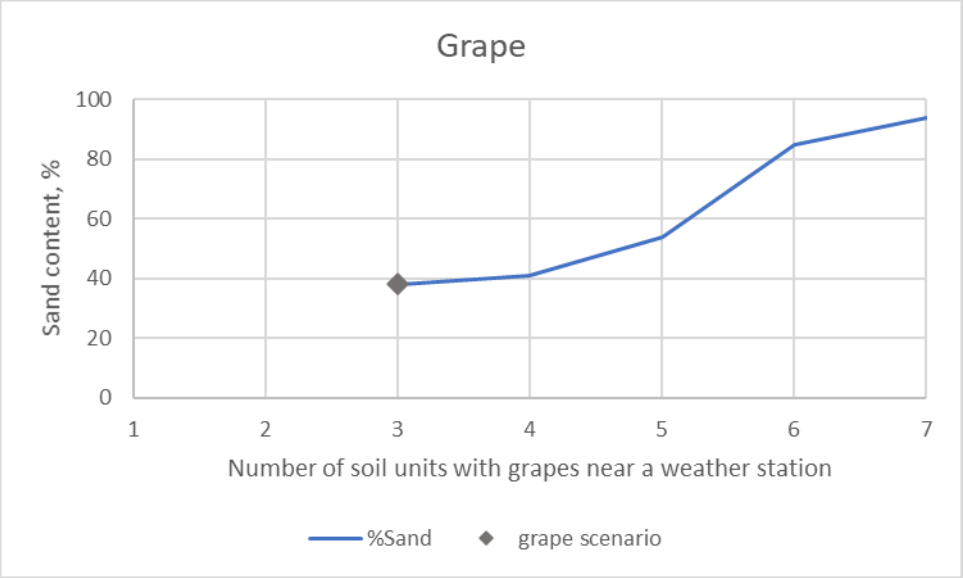
% promedio de arena para suelos de maíz = 43,0%, suelos seleccionados = 24% y 38% de arena

Figura E -10 . Aguacate – Contenido de arena del suelo seleccionado en comparación con todos los suelos de aguacate a menos de 50 km de una estación meteorológica en La Libertad



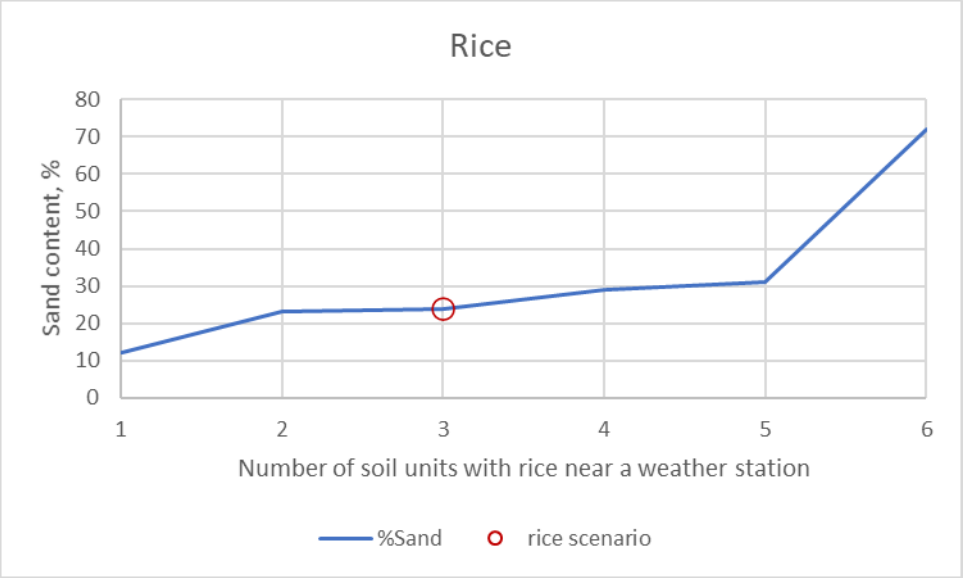
%promedio de arena para suelos de aguacate = 58,6%, suelo seleccionado = 38% de arena

Figura E -11 . Uva – Contenido de arena del suelo seleccionado en comparación con todos los suelos de uva dentro de los 50 km de una estación meteorológica en Piura e Ica



% promedio de arena para suelos de uva = 55,0%, suelo seleccionado = 38% de arena

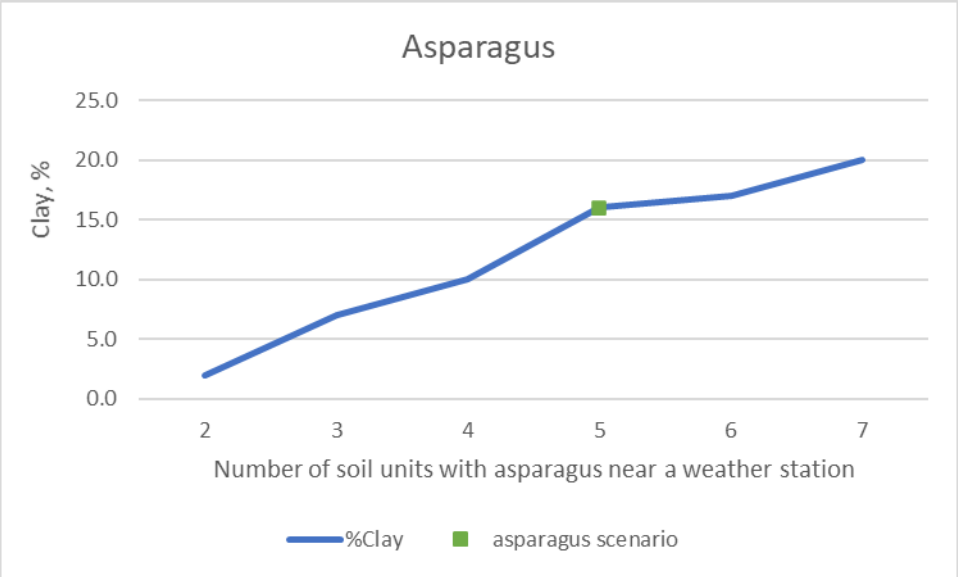
Figura E -12 . Arroz – Contenido de arena del suelo seleccionado en comparación con todos los suelos de arroz a menos de 50 km de una estación meteorológica en San Martín



% promedio de arena para suelos de arroz = 31,8%, suelo seleccionado = 24% de arena

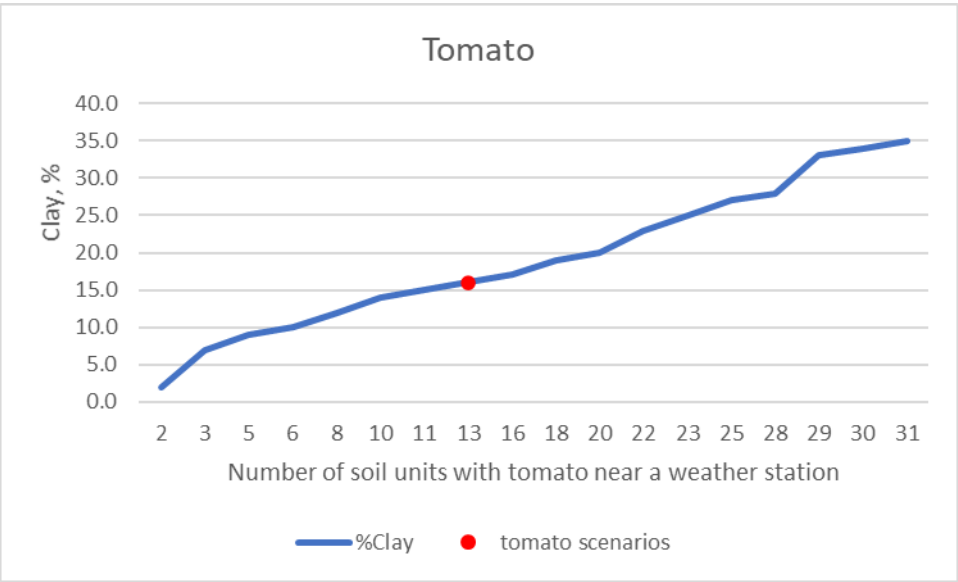
Arcilla - Cuanto mayor sea el contenido de arcilla, mayor el caso de escorrentía. Los suelos de espárragos, aguacates, uvas y arroz tienen un % de arcilla más alto que el promedio de los suelos de espárragos. El % de arcilla del suelo de tomate es ligeramente inferior al promedio de los suelos de tomate. Uno de los escenarios de maíz tiene un % de arcilla superior a la media y el otro está ligeramente por debajo de la media.

Figura E -13 . Espárragos – Contenido de arcilla del suelo seleccionado en comparación con todos los suelos de espárragos a menos de 50 km de una estación meteorológica



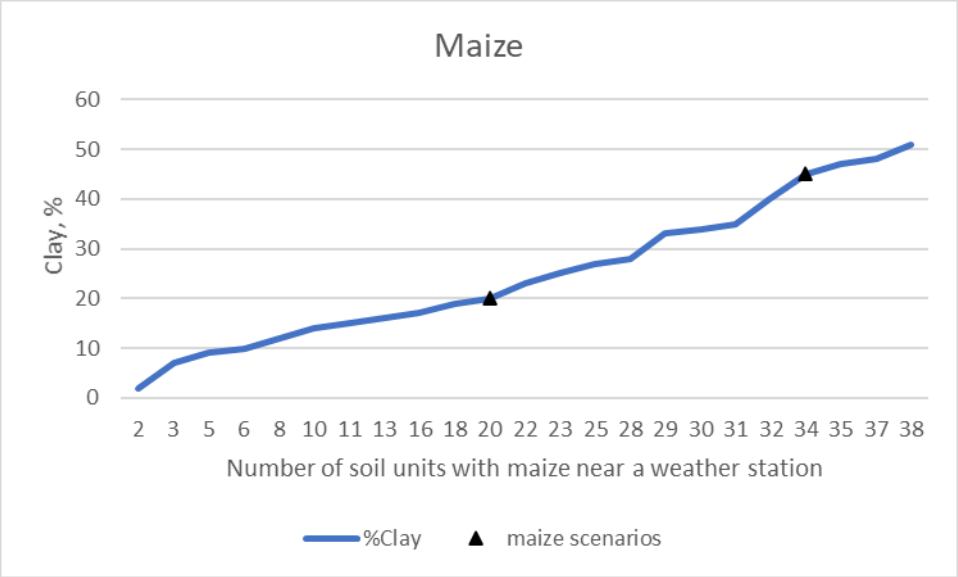
% promedio de arcilla para suelos de espárragos = 10,6%, suelo seleccionado = 16% de arcilla

Figura E -14 . Tomate – Contenido de arcilla del suelo seleccionado en comparación con todos los suelos de tomate a menos de 50 km de una estación meteorológica



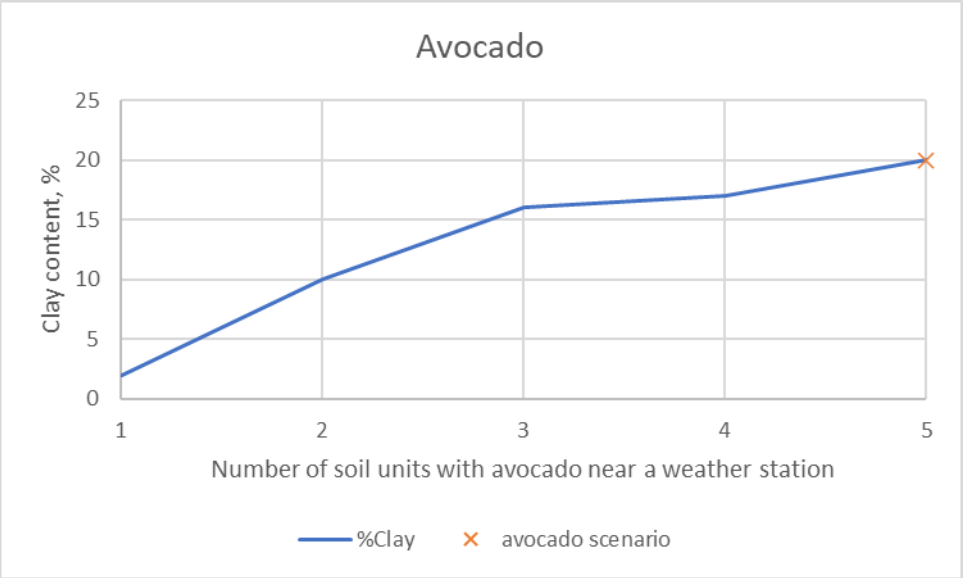
% promedio de arcilla para suelos de tomate = 18,6%, suelo seleccionado = 16% de arcilla

Figura E -15 . Maíz – Contenido de arcilla del suelo seleccionado en comparación con todos los suelos de maíz a menos de 50 km de una estación meteorológica



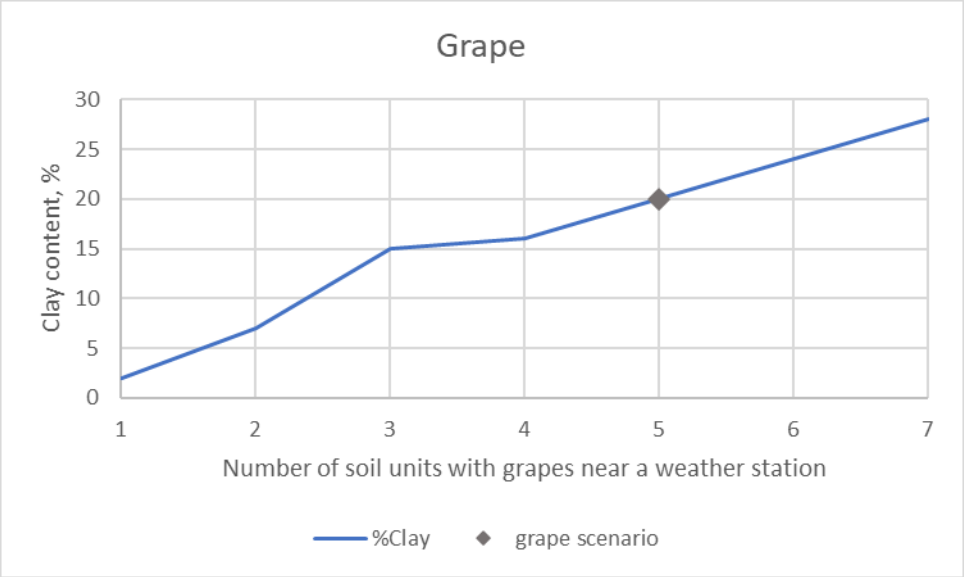
% promedio de arcilla para suelos de maíz = 23,7%, suelos seleccionados = 45% y 20% de arcilla

Figura E -16 . Aguacate – Contenido de arcilla del suelo seleccionado en comparación con todos los suelos de aguacate a menos de 50 km de una estación meteorológica en La Libertad



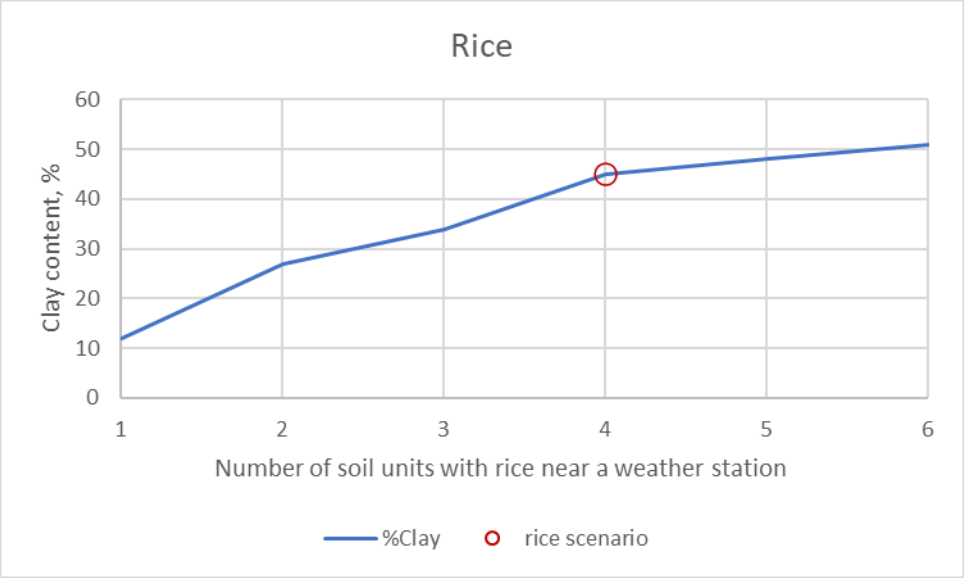
% promedio de arcilla para suelos de aguacate = 13%, suelo seleccionado = 20% de arcilla

Figura E -17 . Uva – Contenido de arcilla del suelo seleccionado en comparación con todos los suelos de uva a menos de 50 km de una estación meteorológica en Piura e Ica



% promedio de arcilla para suelos de uva = 16,6%, suelo seleccionado = 20% de arcilla

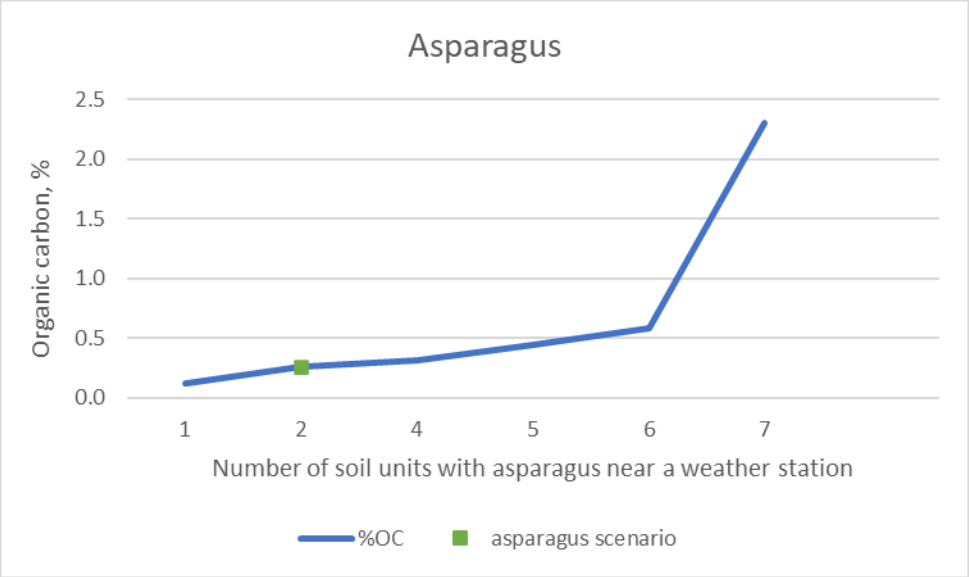
Figura E -18 . Arroz – Contenido de arcilla del suelo seleccionado en comparación con todos los suelos de arroz a menos de 50 km de una estación meteorológica en San Martín



% promedio de arcilla para suelos de arroz = 36.2%, suelo seleccionado = 45% de arcilla

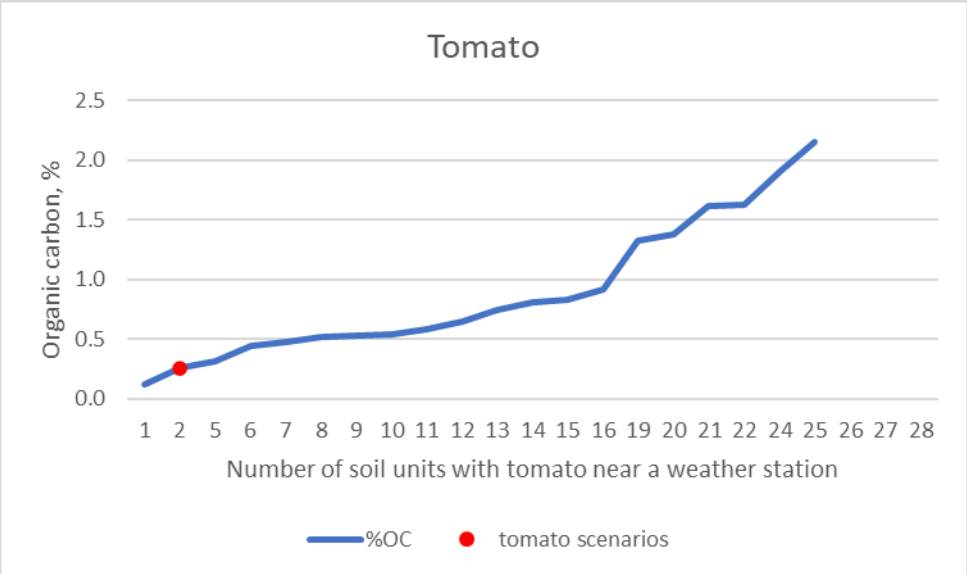
Carbono orgánico - Cuanto menor sea el contenido de carbono orgánico (OC), mayor el caso de escorrentía. Los suelos de espárragos, tomate, aguacate, uva y arroz tienen un % de OC más bajo que el promedio. Uno de los escenarios de maíz tiene un % de OC inferior a la media y el otro está ligeramente por encima de la media.

Figura E -19 . Espárragos – Carbono orgánico del suelo seleccionado en comparación con todos los suelos de espárragos a menos de 50 km de una estación meteorológica



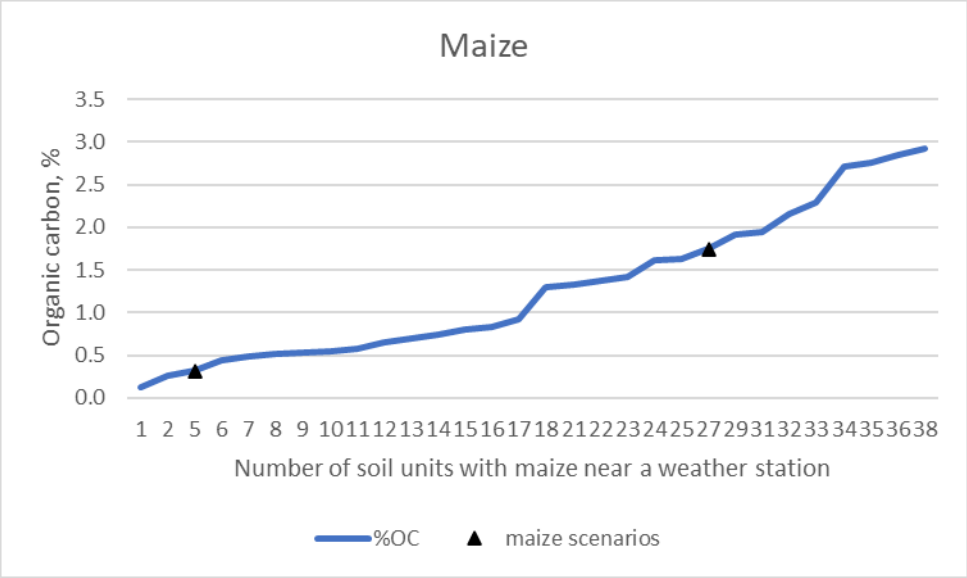
% promedio de carbono orgánico para suelos de espárragos = 0,62%, suelo seleccionado = 0,26%

Figura E -20 . Tomate – Carbono orgánico del suelo seleccionado en comparación con todos los suelos de tomate a menos de 50 km de una estación meteorológica



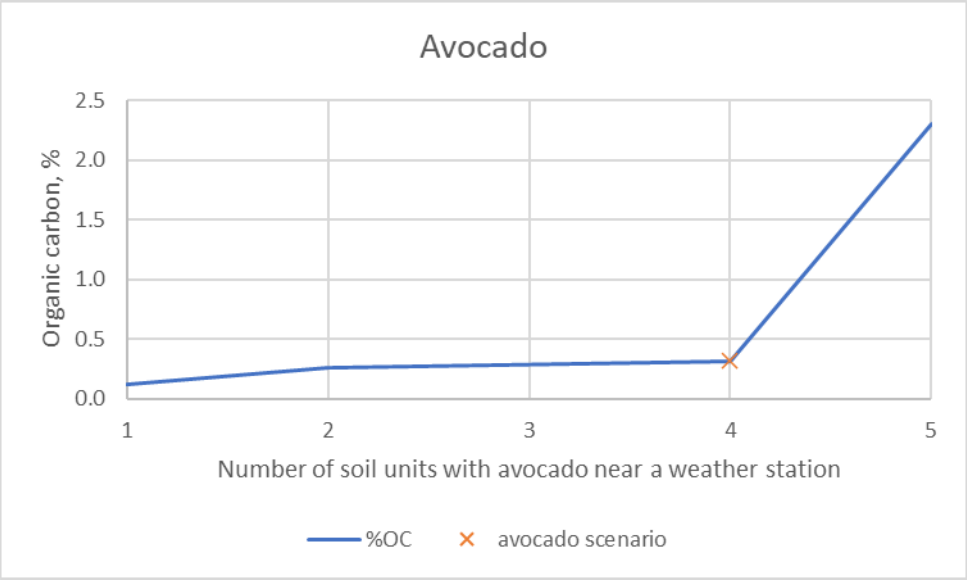
% promedio de carbono orgánico para suelos de tomate = 1,27%, suelo seleccionado = 0,26% OC

Figura E -21 . Maíz – Carbono orgánico del suelo seleccionado en comparación con todos los suelos de maíz a menos de 50 km de una estación meteorológica



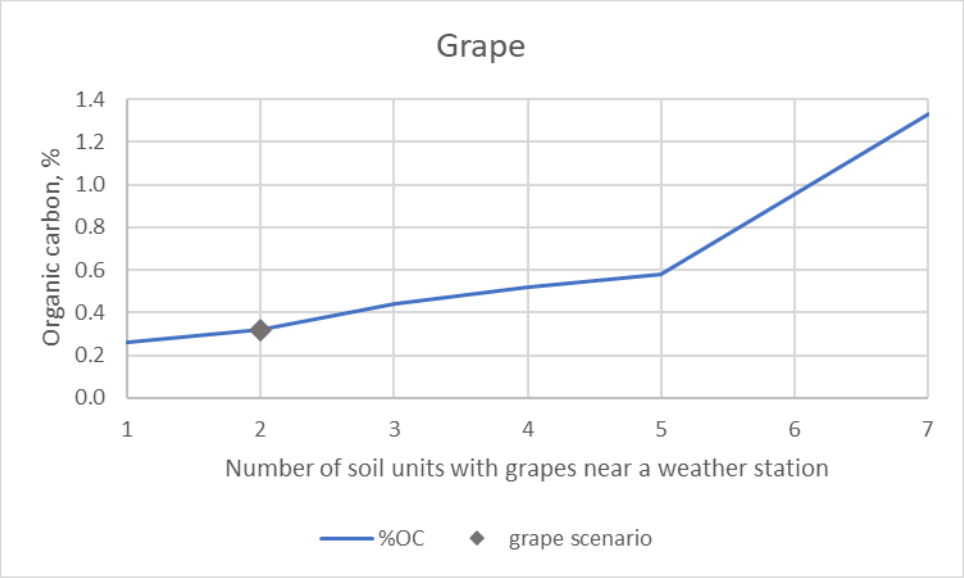
% promedio de carbono orgánico para suelos de maíz = 1,28%, suelo seleccionado = 0,32% y 1,75% OC

Figura E -22 . Aguacate – Carbono orgánico del suelo seleccionado en comparación con todos los suelos de aguacate a menos de 50 km de una estación meteorológica en La Libertad



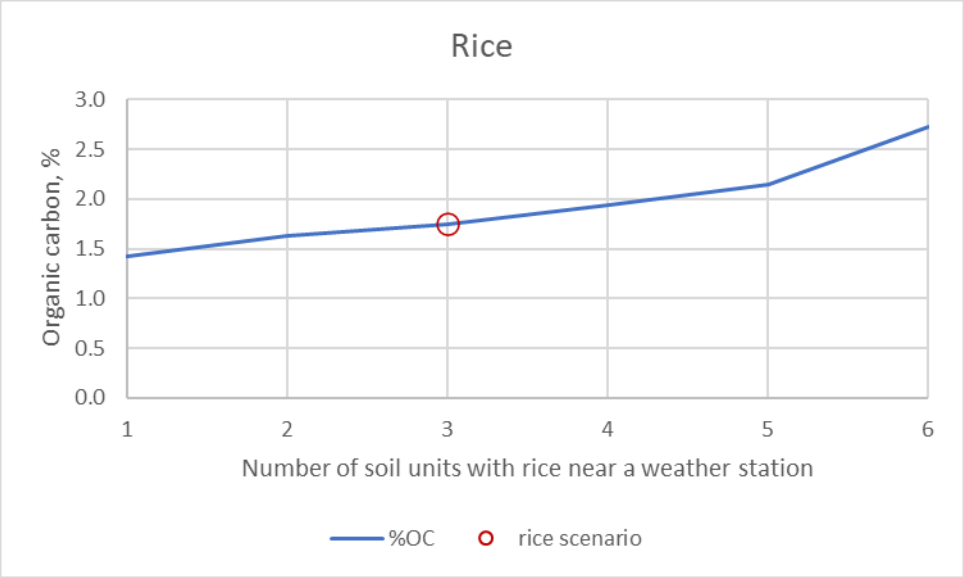
% promedio de carbono orgánico para suelos de aguacate = 0,66%, suelo seleccionado = 0,32% OC

Figura E -23 . Uva – Carbono orgánico del suelo seleccionado en comparación con todos los suelos de uva a menos de 50 km de una estación meteorológica en Piura e Ica



% promedio de carbono orgánico para suelos de uva = 0,68%, suelo seleccionado = 0,32% OC

Figura E -24 . Arroz – Carbono orgánico del suelo seleccionado en comparación con todos los suelos de arroz a menos de 50 km de una estación meteorológica en San Martín



% promedio de carbono orgánico para suelos de arroz = 1,94%, suelo seleccionado = 1,75% OC

Apéndice F: Figuras y Mapas de Perú

Figura F - 1. Densidad del cultivo (normalizada) para esparrago

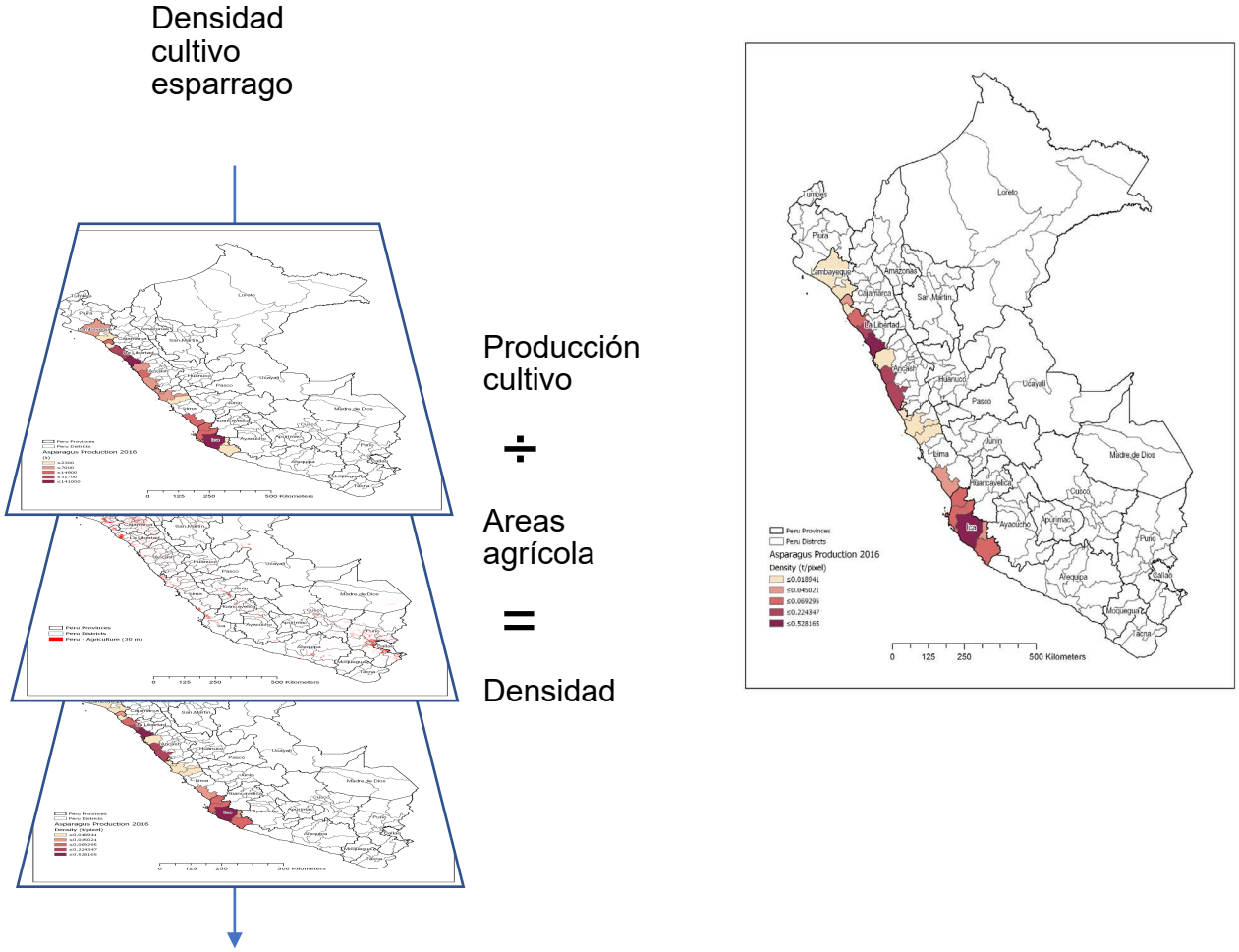
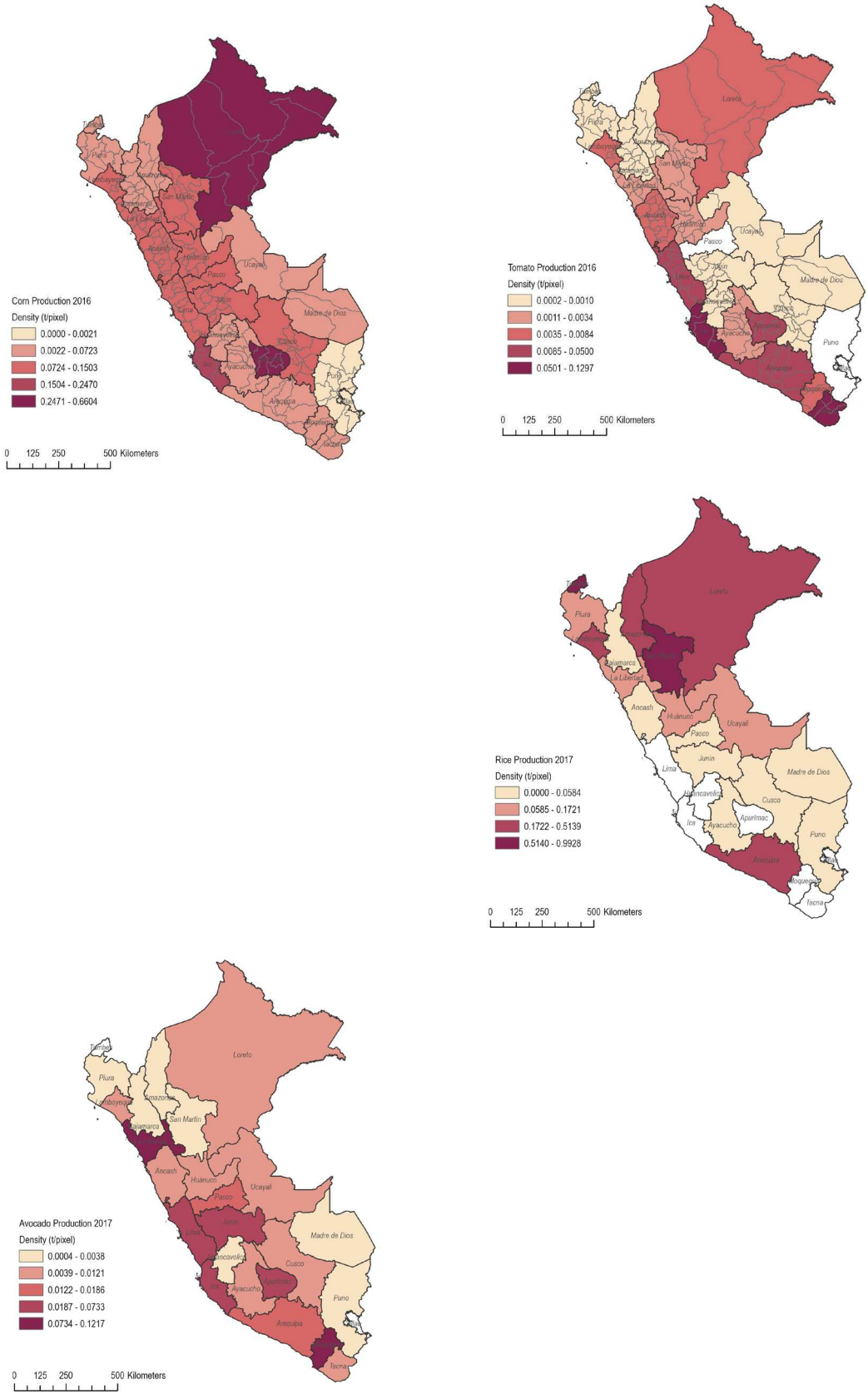


Figura F - 2. Densidad cultivo (normalizado) del maiz, tomate, arroz, aguacate y uva



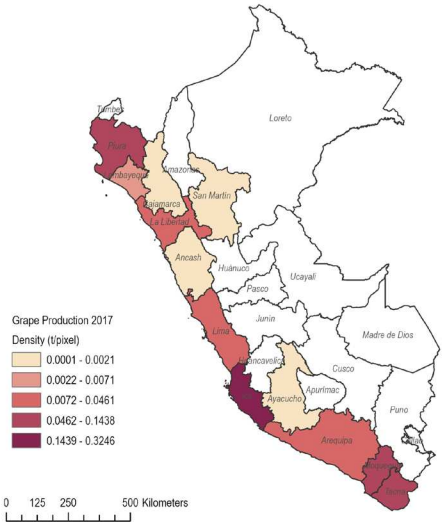

Loreto
Piura
Amazonas
San Martin
Cajamarca
La Libertad
Ancash
Huánuco
Ucayali
Pasco
Junin
Lima
Madre de Dios
Huancavelica
Cusco
Apurimac
Ayacucho
Puno
Arequipa
Grape Production 2017
Density (t/pixel)
0.0001 - 0.0021
0.0022 - 0.0071
0.0072 - 0.0461
0.0462 - 0.1438
0.1439 - 0.3246
0 125 250 500 Kilometers

Figura F - 3. Porcentaje de arena de la capa superior en Peru

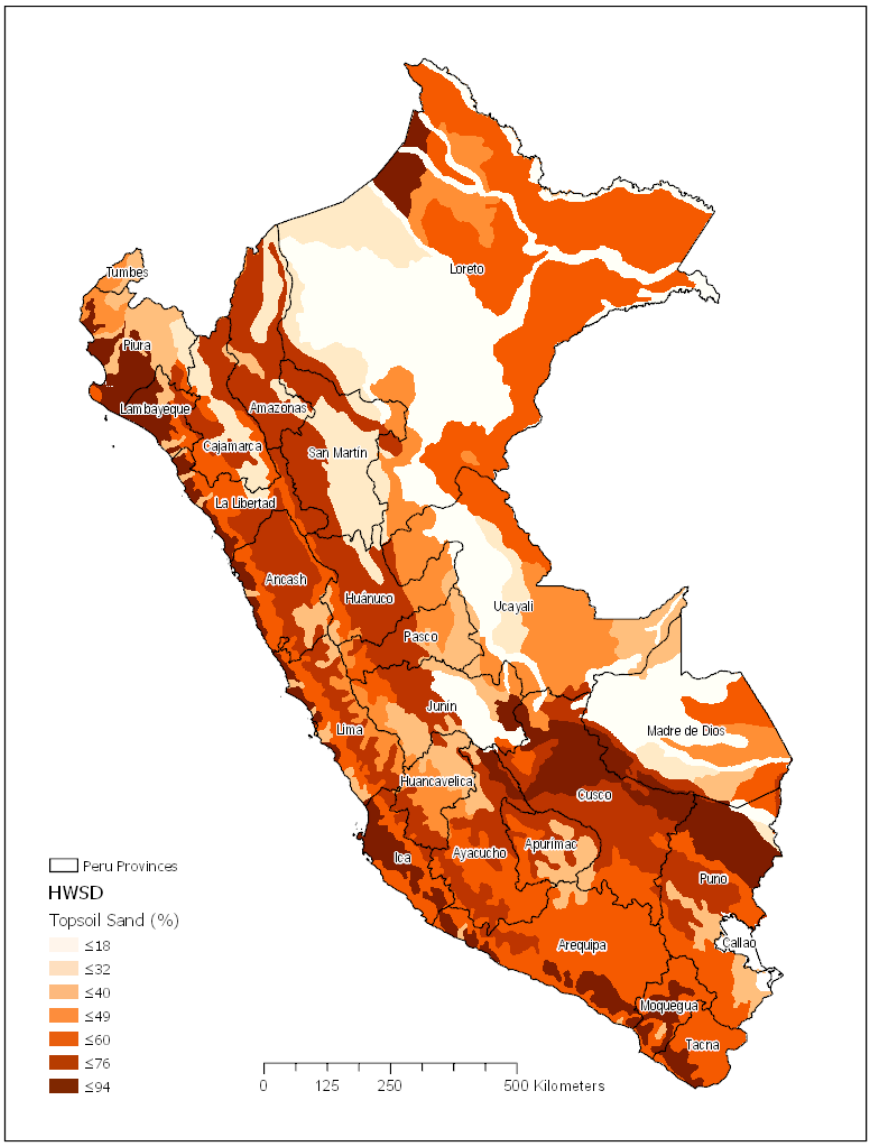


Figura F - 4. Porcentaje de arcilla en la capa superior en Peru

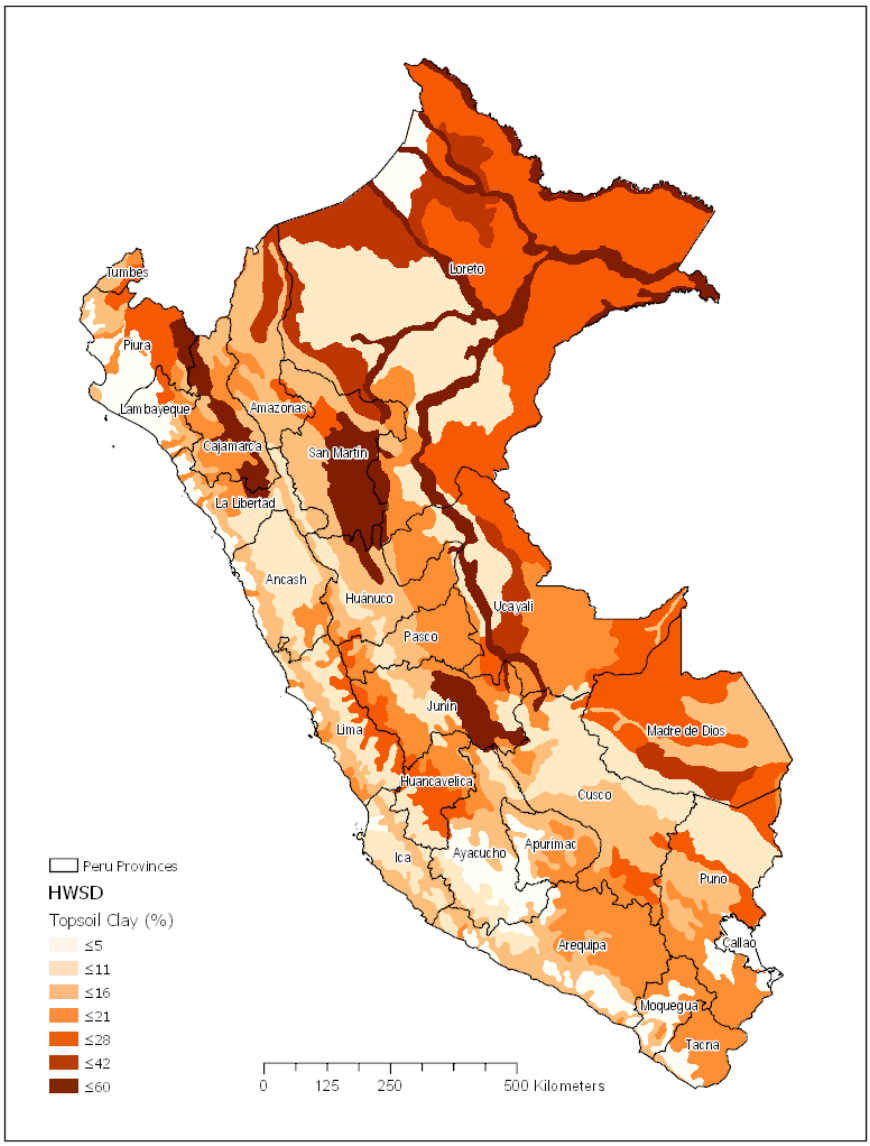


Figura F - 5. Porcentaje de carbono orgánico en la capa superior en Peru

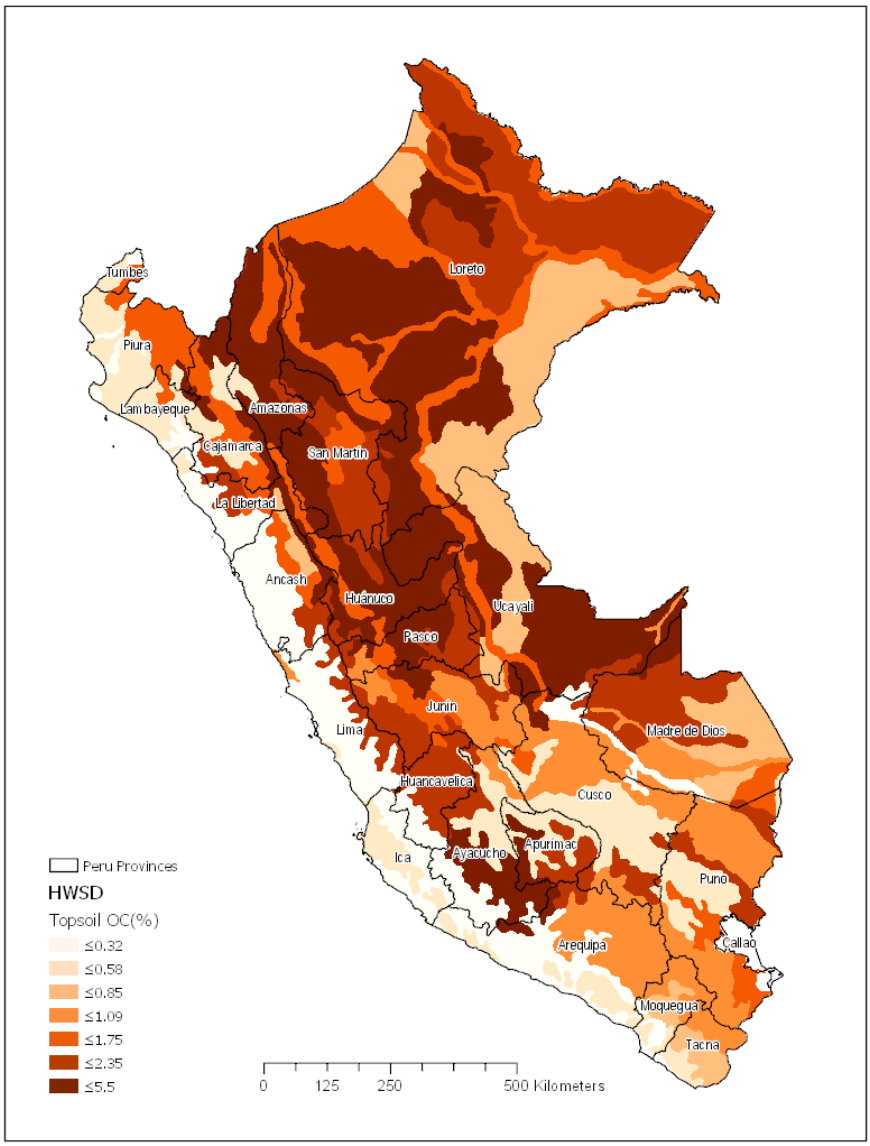


Figura F - 6. Localización de los escenarios de esparragos en Peru

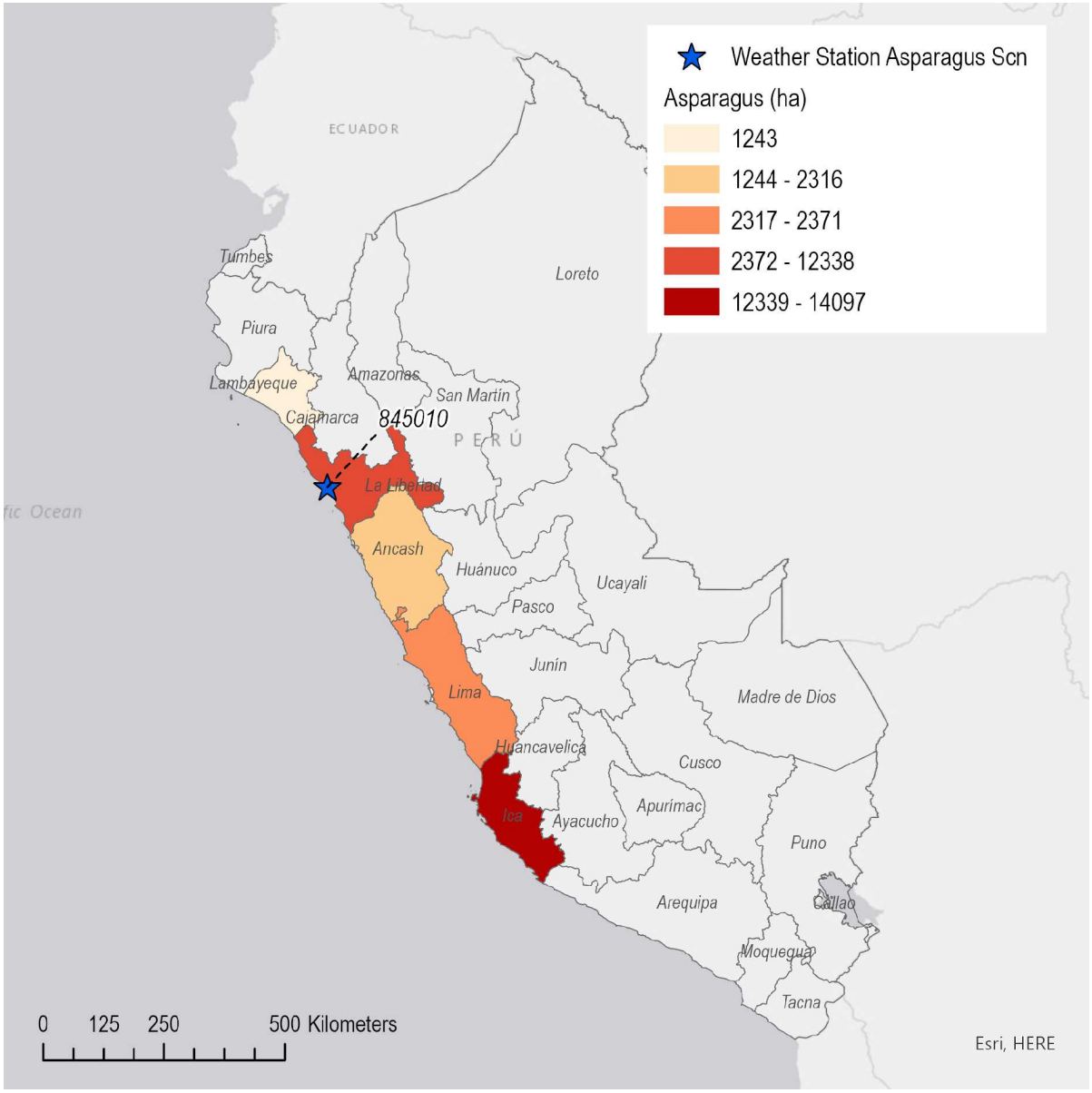


Figura F - 7. Localización de los escenarios de tomate en Peru

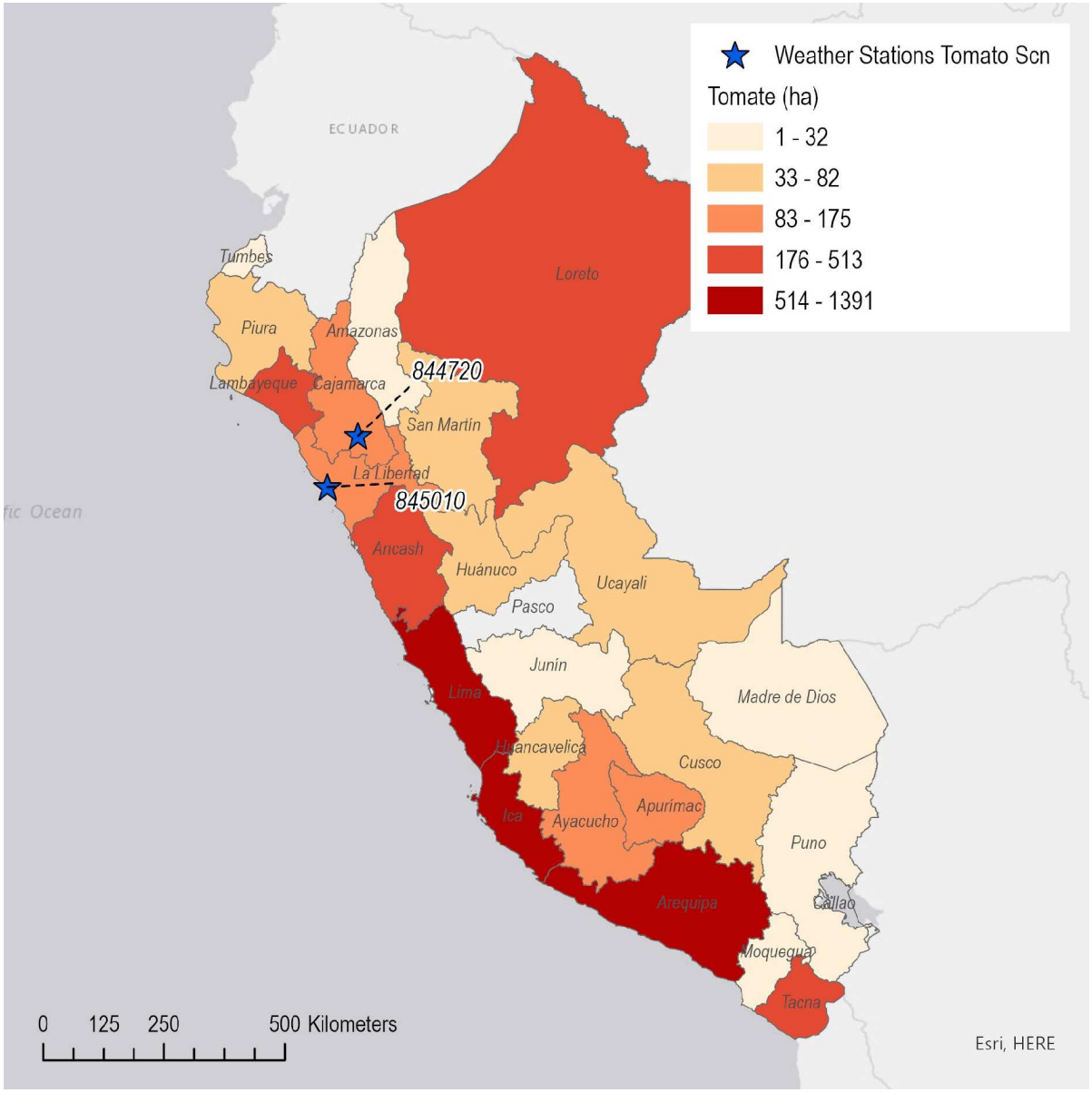


Figura F - 8. Localización de los escenarios de maize en Peru

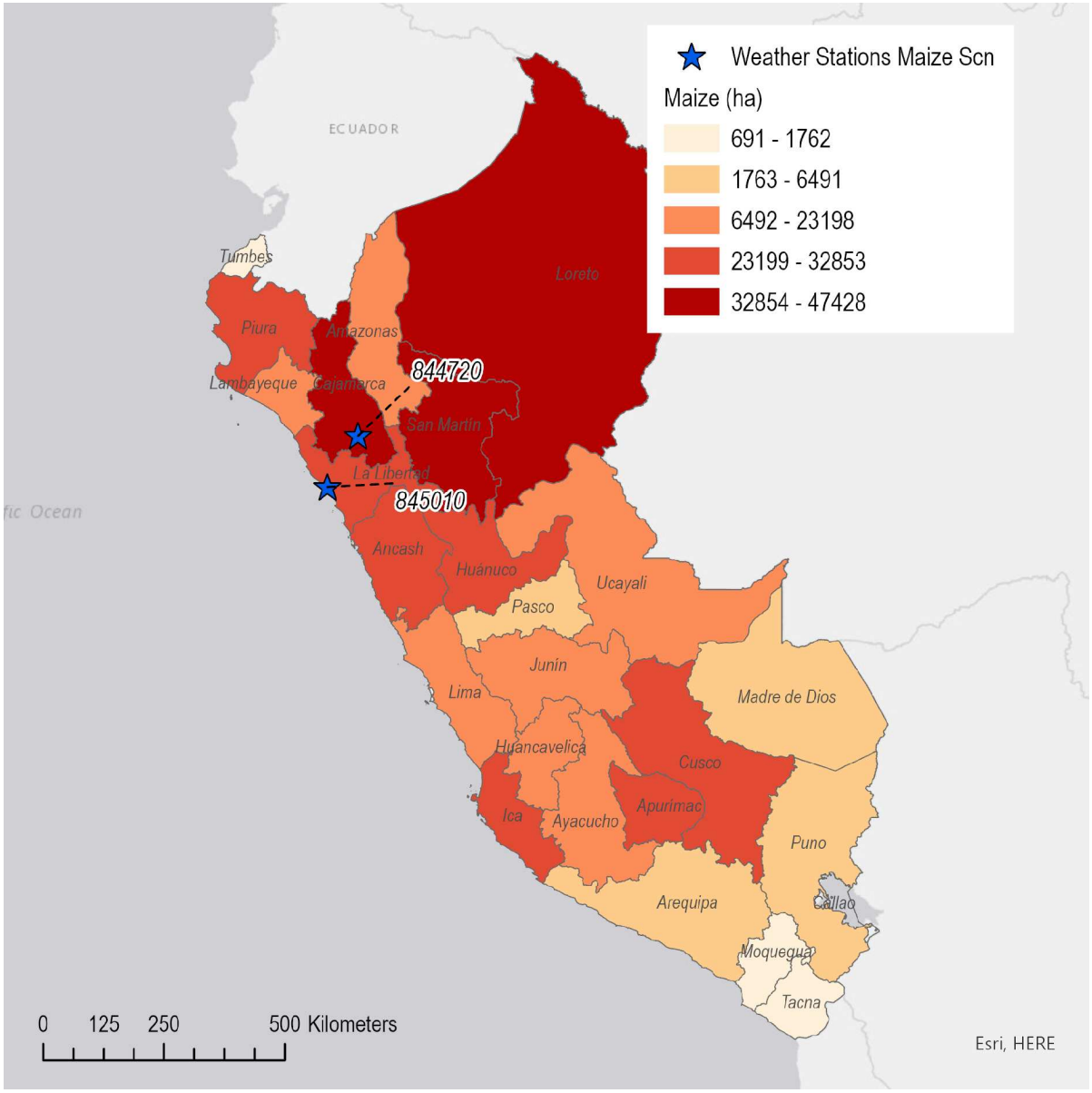


Figura F - 9. Localización de los escenarios de aguacate en Peru

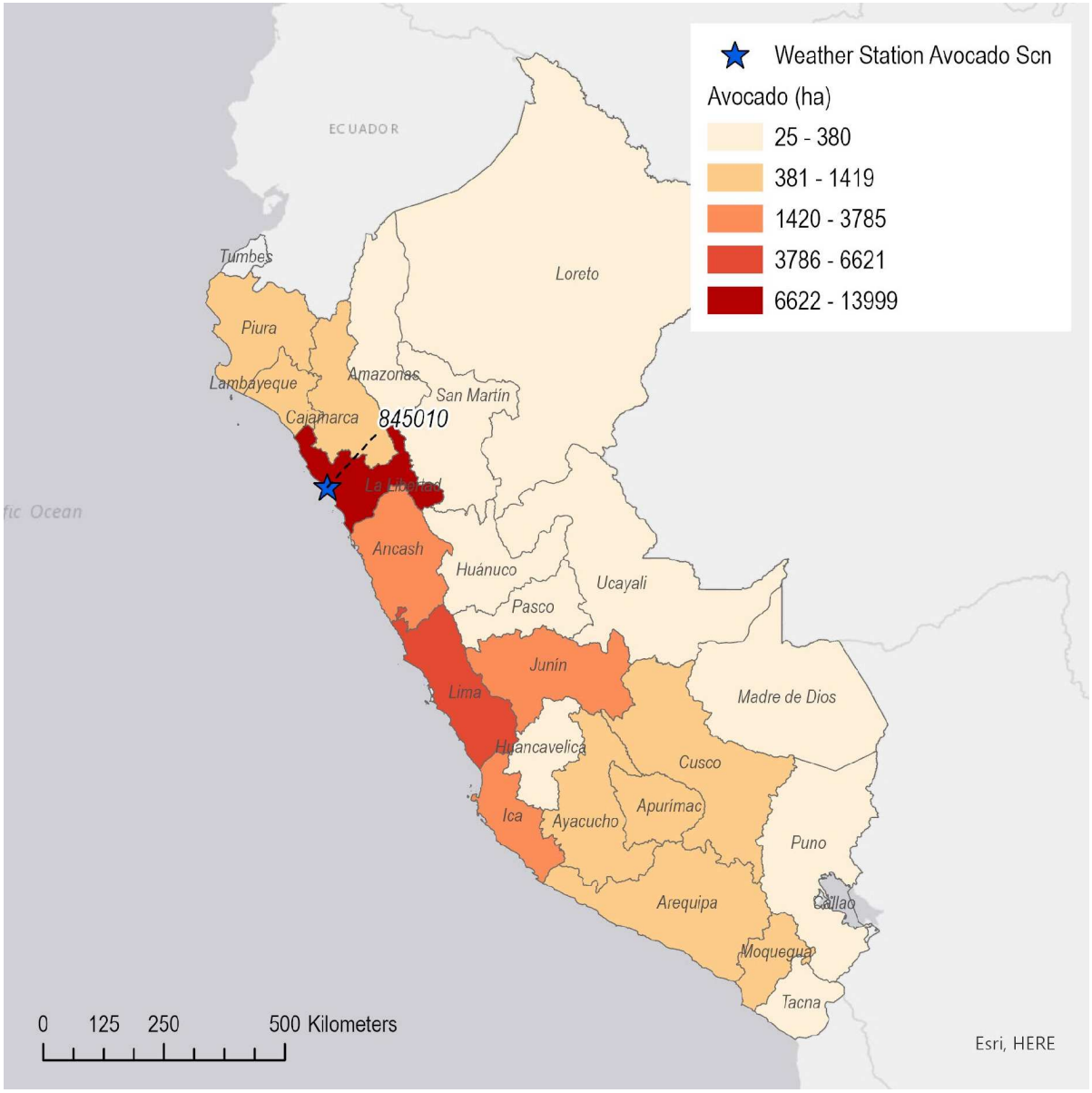


Figura F - 10. Localización de los escenarios de uva en Peru

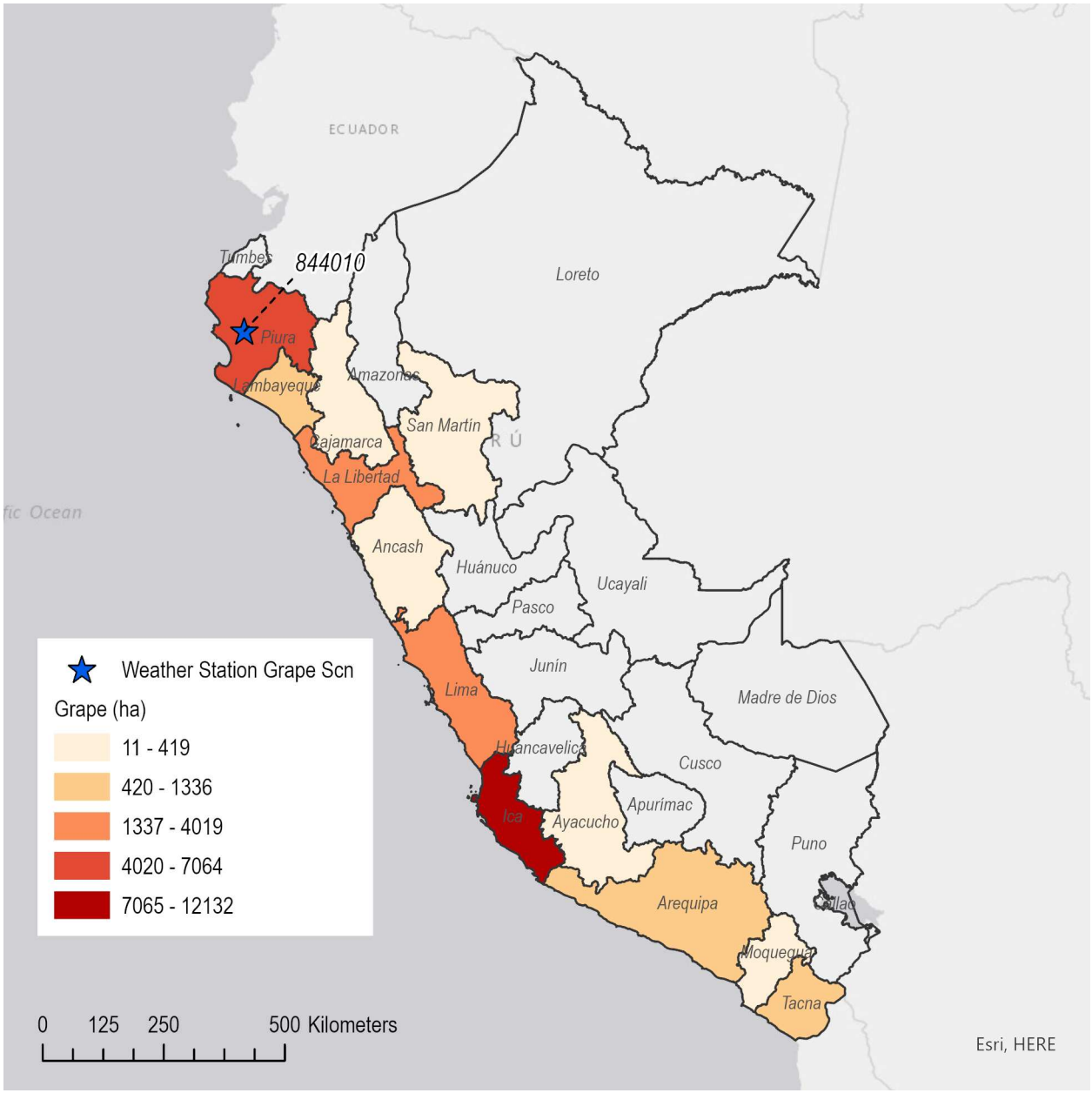
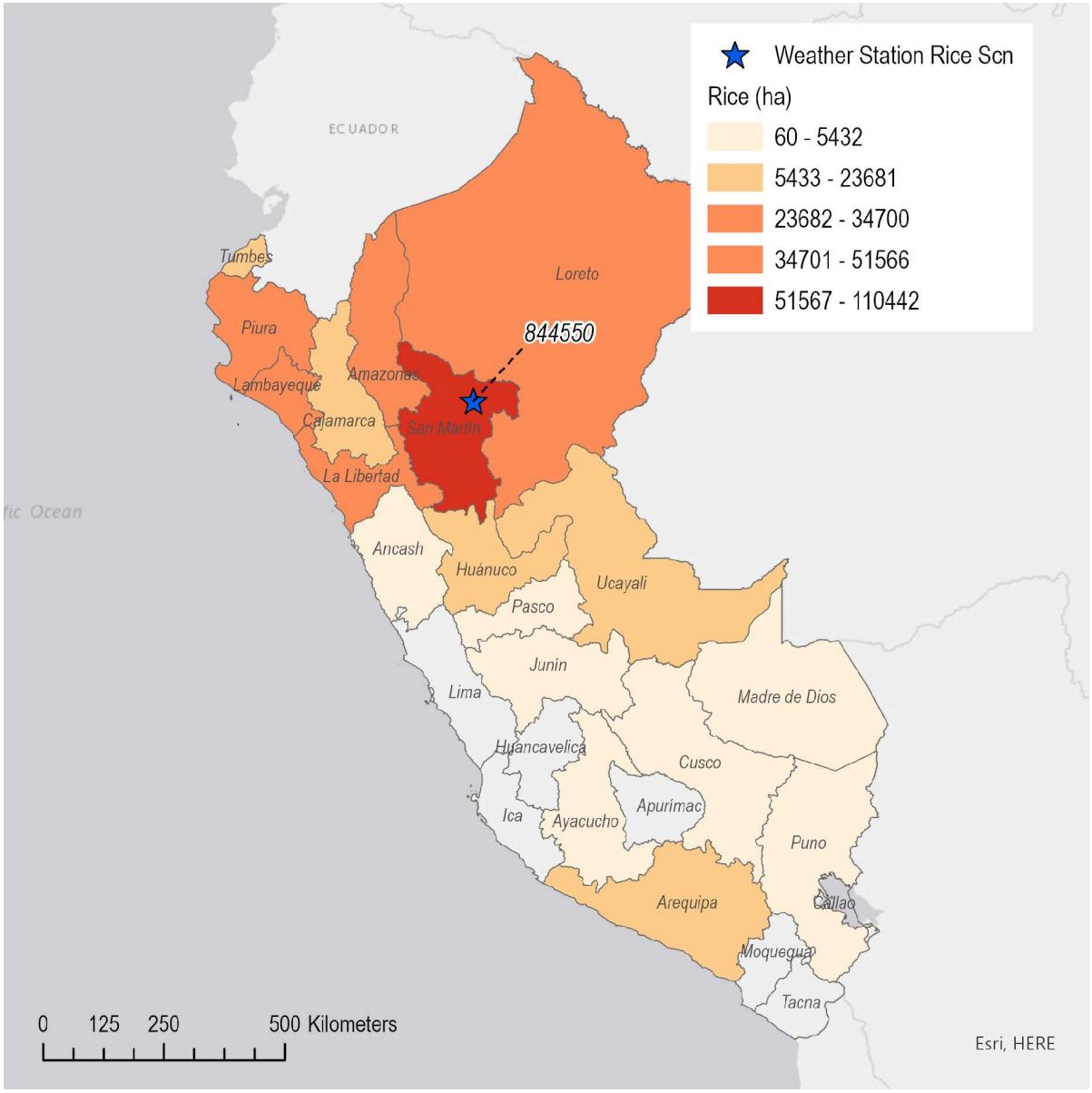


Figura F - 11. Localización de los escenarios de arroz en Peru



Apéndice G: Lista de los parámetros en winPRZM y RICEWQ en los escenarios de Peru

Los siguientes son los parámetros de entrada de los escenarios creados en winPRZM y RICEWQ de ANDES. Los parámetros de la laguna de EXAMS están incluidos en el Apéndice D. Se incluye un archive para cada escenario de cultivo de winPRZM y el escenario de arroz en RICEWQ. Los datos de clima y prácticas de cultivo asociadas con cada escenario han sido descritas en otras partes de este reporte. Estos archivos de winPRZM y RICEWQ se pueden encontrar dentro del software y se encuentran en el subdirectorio de SCENARIOS. Un programa de conversión usa estos archivos y ha generado una base de datos protegida con un password. Esto asegura que el usuario no pueda modificar las propiedades de suelo/fechas/ambiente y que todos los usuarios puedan usar los mismos parámetros de entrada.

Peru winPRZM Scenarios (.scn files)

Asparagus

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
68 97 C:\ANDES\METFILES\ANDES\W845010.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Asparagus Title of input file
         2HTITLE               "La Libertad, Peru; Metfile: W845010.dvf

         3PFAC            1.0  Pan factor (dimensionless)  ET in weather file
          SFAC              0  Snowmelt factor (cm/C)
          IPEIND            7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD          17.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP            1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND            1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG            4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD           10                      Area of field or plot (ha); EPA default is 10
          HL            356.8                      "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS         0.26                      Universal soil loss equation (LS) length-slope topographic factor
          USLEP           1.0                      Universal soil loss equation (P) practice factor
          SLP             1.8                      Land slope (%)
          USLEK          0.27                      Universal soil loss equation (K) of soil erodibility
          IREG              2                      Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC               1                      Number of different crops in simulation (1 to 5)
Asparagus
         9(repeat this record NDC times)
          ICNCN             1  Crop number
          CINTCP         0.05  Maximum interception storage of crop (cm)
          AMXDR            50  Maximum rooting depth of crop (cm)
          COVMAX           80  Maximum areal coverage of canopy (%)
          ICNAH             3  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)          87  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                           82  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                           87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX             0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX           120  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      25              "RUSLE EPA Pesticide Project:  C23ONONC; Onions, Fresno CA Conventional
Tillage"
          RECORD9B  0112 1612 2612 0101 1601 0102 1602 0103 1603 0104 1604 0105 1605 0106 1606 0107
          RECORD9C  .708 .683 .654 .627 0.62 .648 .655 .664 .663 .660 .525 .525 .524 .523 .522 .521
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    82   82   82   82   82   82   82   82   82   82   82   87   87   87   87
          RECORD9B  1607 0108 1608 0109 1609 0110 1610 0111 1611
          RECORD9C  .523 .527 .536 .551 .576 .605 .592 .732 0.73
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87
Conventional Tillage
          RECORD9A          1      25              "RUSLE EPA Pesticide Project:  C23ONONC; Onions, Fresno CA Conventional
Tillage"
          RECORD9B  0112 1612 2612 0101 1601 0102 1602 0103 1603 0104 1604 0105 1605 0106 1606 0107
          RECORD9C  .708 .683 .654 .627 0.62 .648 .655 .664 .663 .660 .525 .525 .524 .523 .522 .521
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    82   82   82   82   82   82   82   82   82   82   82   87   87   87   87
          RECORD9B  1607 0108 1608 0109 1609 0110 1610 0111 1611
```

```
          RECORD9C  .523 .527 .536 .551 .576 .605 .592 .732 0.73
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87
Conventional Tillage
          RECORD9A         1      25              "RUSLE EPA Pesticide Project:  C23ONONC; Onions, Fresno CA Conventional
Tillage"
          RECORD9B  0112 1612 2612 0101 1601 0102 1602 0103 1603 0104 1604 0105 1605 0106 1606 0107
          RECORD9C  .708 .683 .654 .627 0.62 .648 .655 .664 .663 .660 .525 .525 .524 .523 .522 .521
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    82   82   82   82   82   82   82   82   82   82   82   82   87   87   87   87
          RECORD9B  1607 0108 1608 0109 1609 0110 1610 0111 1611
          RECORD9C  .523 .527 .536 .551 .576 .605 .592 .732 0.73
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Asparagus
          EMD               01  Integer day of crop emergence
          EMM               12  Integer month of crop emergence
          IYREM             68  Integer year of crop emergence        Dates from Peruvian expert
          MAD               15  Integer day of crop maturation
          MAM                4  Integer month of crop maturation
          IYRMAT            69  Integer year of crop maturation         Dates from Peruvian expert
          HAD               31  Integer day of crop harvest
          HAM                5  Integer month of crop harvest
          IYRHAR            69  Integer year of crop harvest           Dates from Peruvian expert
          P10D              10  Integer day of crop emergence
          P10M               4  Integer month of crop emergence
          IYP10             69  Integer year of crop emergence
          P60D              17  Integer day of crop maturation
          P60M               5  Integer month of crop maturation
          IYRP60            69  Integer year of crop maturation
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "Sandy Loam, Hydrologic Group C, HWSD soil 18808

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              6  Irrigation type, under canopy=3
         RATEAP           0.25  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.35  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.216  Field capacity in horizon (cm3/cm3) Calculated from Rawls &Brakensiek from HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)  Calculated from Rawls &Brakensiek from HWSD soil
          OC              0.26  Organic carbon in horizon (%)         HWSD

        38SPT             15.00  Initial Soil Temperature (C)
          SAND            59.00  Sand Content                          HWSD
          CLAY             3.00  Clay Content                          HWSD

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
```

```
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.216  Field capacity in horizon (cm3/cm3)   Calculated from Rawls &Brakensiek from HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)    Calculated from Rawls &Brakensiek from HWSD soil
          OC              0.26  Organic carbon in horizon (%)         HWSD

        38SPT            15.00  Initial Soil Temperature (C)
          SAND           59.00  Sand Content                        HWSD
          CLAY            3.00  Clay Content                        HWSD

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             70  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"              see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.216  Field capacity in horizon (cm3/cm3)   Calculated from Rawls &Brakensiek from HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)    Calculated from Rawls &Brakensiek from HWSD soil
          OC              0.26  Organic carbon in horizon (%)         HWSD

        38SPT            15.00  Initial Soil Temperature (C)
          SAND           59.00  Sand Content                     HWSD
          CLAY            3.00  Clay Content                     HWSD

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Maize C2 – Coastal, Crop Cycle 1 (February)

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
68 97 C:\ANDES\METFILES\ANDES\W845010.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Maize Coastal February Title of input file
         2HTITLE               "La Libertad, Peru; Metfile: W845010.dvf

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           17.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.18                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP              1.1                       Land slope (%)
          USLEK           0.34                       Universal soil loss equation (K) of soil erodibility
          IREG               2                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Maize
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR              90  Maximum rooting depth of crop (cm)
          COVMAX             80  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)            92  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                             90  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                             92  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1      25              "RUSLE EPA Pesticide Project:  C21CGBDC; Corn, Sacramento CA Conventional
Tillage"
          RECORD9B  0102 0502 1602 0103 1603 0104 1604 0105 1605 0106 1606 0107 1607 0108 1608 0109
          RECORD9C  .418 .235 .133 .107 .109 .109 .108 .127 .176 .018 .018 .018 .019 .051 .064 .080
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    90   90   90   90   90   90   90   90   90   90   90   90   90   92   92   92
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601
          RECORD9C  .097 .113 .316 .352 .376 .537 .565 .611 .575
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    92   92   92   92   92   92   92   92   92
Reduced Tillage
          RECORD9A         1      25              "RUSLE EPA Pesticide Project:  C21CGBDM; Corn, Sacramento CA Reduced
Tillage"
          RECORD9B  0102 0502 1602 0103 1603 0104 1604 0105 1605 0106 1606 0107 1607 0108 1608 0109
          RECORD9C  .339 .193 .110 .089 .090 .090 .090 .106 .146 .017 .017 .017 .018 .019 .021 .024
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    86   86   86   86   86   86   86   86   86   86   86   86   88   88   88
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601
          RECORD9C  .027 .030 .102 .116 .128 .338 .370 .426 .418
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    88   88   88   88   88   88   88   88   88
No Tillage
          RECORD9A         1      25              "RUSLE EPA Pesticide Project:  C21CGBDN; Corn, Sacramento CA No Tillage"
          RECORD9B  0102 0502 1602 0103 1603 0104 1604 0105 1605 0106 1606 0107 1607 0108 1608 0109
          RECORD9C  .097 .056 .045 .046 .046 .046 .054 .075 .014 .014 .014 .015 .016 .018 .020 .022
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    81   81   81   81   81   81   81   81   81   81   81   81   83   83   83
          RECORD9B  1609 0110 1610 0111 1611 0112 1612 0101 1601
          RECORD9C  .025 .070 .053 .060 .070 .082 .116 .122 .165
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    83   83   83   83   83   83   83   83   83

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Maize
          EMD               01  Integer day of crop emergence
          EMM                2  Integer month of crop emergence
          IYREM             68  Integer year of crop emergence        Dates from Peruvian expert
          MAD               15  Integer day of crop maturation
          MAM                5  Integer month of crop maturation
          IYRMAT            68  Integer year of crop maturation         Dates from Peruvian expert
          HAD               31  Integer day of crop harvest
          HAM                7  Integer month of crop harvest
          IYRHAR            68  Integer year of crop harvest           Dates from Peruvian expert
          P10D              15  Integer day of crop maturation
          P10M               5  Integer month of crop maturation
          IYP10             68  Integer year of crop maturation
          P60D               6  Integer day of crop harvest-25
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          P60M               7  Integer month of crop harvest-25
          IYRP60            68  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "Loam, Hydrologic Group D, HWSD soil 18795

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE               7  Irrigation type, under canopy=7  fixed
         RATEAP            0.15  Max rate at which irrigation is applied (cm/hr)
         PCDEPL            0.70  fraction of water capacity at which irrigation is applied
         FLEACH             0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.40  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.267  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.267  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.140  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.32  Organic carbon in horizon (%)        HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content         HWSD soil
          CLAY            20.00  Clay Content         HWSD soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.40  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.267  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.267  Field capacity in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.140  Wilting point in horizon (cm3/cm3)      Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.32  Organic carbon in horizon (%) HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content            HWSD soil
          CLAY            20.00  Clay Content            HWSD soil

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             70  Thickness of horizon (cm)
          BD              1.41  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.244  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor
```

```
        37DPN              1  Thickness of compartments in horizon (cm)
          THEFC          0.244  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.135  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.14  Organic carbon in horizon (%)

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           49.00  Sand Content                    HWSD soil
          CLAY           21.00  Clay Content                    HWSD soil

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Maize C9 – Coastal, Crop Cycle 2 (September)

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
68 97 C:\ANDES\METFILES\ANDES\W845010.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Maize Coastal Sept     Title of input file
         2HTITLE               "La Libertad, Peru; Metfile: W845010.dvf

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           17.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.18                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP              1.1                       Land slope (%)
          USLEK           0.34                       Universal soil loss equation (K) of soil erodibility
          IREG               2                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Maize
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR              90  Maximum rooting depth of crop (cm)
          COVMAX             80  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)            92  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                             90  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                             92  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            150  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1      25              "RUSLE EPA Pesticide Project:  C21CGBDC; Corn, Sacramento CA Conventional
Tillage"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 0502 1602 0103 1603 0109
          RECORD9C  .418 .235 .133 .107 .109 .109 .108 .127 .176 .018 .018 .018 .019 .051 .064 .080
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    90   90   90   90   90   90   90   90   90   90   92   92   92   92   92   92
          RECORD9B  1604 0105 1605 0106 1606 0107 1607 0108 1608
          RECORD9C  .097 .113 .316 .352 .376 .537 .565 .611 .575
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    92   92   92   92   92   92   92   92   92
Reduced Tillage
          RECORD9A         1      25              "RUSLE EPA Pesticide Project:  C21CGBDC; Corn, Sacramento CA Conventional
Tillage"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 0502 1602 0103 1603 0109
          RECORD9C  .339 .193 .110 .089 .090 .090 .090 .106 .146 .017 .017 .017 .018 .019 .021 .024
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    86   86   86   86   86   86   86   86   86   86   86   86   88   88   88
          RECORD9B  1604 0105 1605 0106 1606 0107 1607 0108 1608
          RECORD9C  .027 .030 .102 .116 .128 .338 .370 .426 .418
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    88   88   88   88   88   88   88   88   88
No Tillage
          RECORD9A         1      25              "RUSLE EPA Pesticide Project:  C21CGBDC; Corn, Sacramento CA Conventional
Tillage"
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102 0502 1602 0103 1603 0109
          RECORD9C  .097 .056 .045 .046 .046 .046 .054 .075 .014 .014 .014 .015 .016 .018 .020 .022
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    81   81   81   81   81   81   81   81   81   81   81   81   83   83   83
          RECORD9B  1604 0105 1605 0106 1606 0107 1607 0108 1608
          RECORD9C  .025 .070 .053 .060 .070 .082 .116 .122 .165
          RECORD9D  .070 .070 .070 .070 .070 .070 .070 .070 .070
          RECORD9E    83   83   83   83   83   83   83   83   83

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Maize
          EMD                01  Integer day of crop emergence
          EMM                 9  Integer month of crop emergence
          IYREM              68  Integer year of crop emergence         Dates from Peruvian expert
          MAD                15  Integer day of crop maturation
          MAM                11  Integer month of crop maturation
          IYRMAT             68  Integer year of crop maturation          Dates from Peruvian expert
          HAD                31  Integer day of crop harvest
          HAM                 1  Integer month of crop harvest
          IYRHAR             69  Integer year of crop harvest           Dates from Peruvian expert
          P10D               15  Integer day of crop maturation
          P10M               11  Integer month of crop maturation
          IYP10              61  Integer year of crop maturation
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          P60D               6  Integer day of crop harvest-25
          P60M               1  Integer month of crop harvest-25
          IYRP60            65  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "Loam, Hydrologic Group D, HWSD soil 18795

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              7  Irrigation type, under canopy=7  fixed
         RATEAP           0.15  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.70  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.40  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.267  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.267  Field capacity in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.140  Wilting point in horizon (cm3/cm3)      Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.32  Organic carbon in horizon (%)    HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content           HWSD soil
          CLAY            20.00  Clay Content           HWSD soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.40  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.267  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.267  Field capacity in horizon (cm3/cm3)  Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.140  Wilting point in horizon (cm3/cm3)   Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.32  Organic carbon in horizon (%)    HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content     HWSD soil
          CLAY            20.00  Clay Content     HWSD soil

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             70  Thickness of horizon (cm)
          BD              1.41  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.244  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
```

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          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.244  Field capacity in horizon (cm3/cm3) Calculated from Rawls & Brakensiek with HWSD soil
          THEWP         0.135  Wilting point in horizon (cm3/cm3)  Calculated from Rawls & Brakensiek with HWSD soil
          OC             0.14  Organic carbon in horizon (%)   HWSD soil

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          49.00  Sand Content        HWSD soil
          CLAY          21.00  Clay Content        HWSD soil

        40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6      Watershed Data
!  1000.0 100000.     0.0      Waterbody Area (by Env)
!     2.0     2.0     0.0      Waterbody Depth (by Env)
!     2.0     2.0     0.0      Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0      Crop Area Fraction
!       4       4       4      Flow/Volume Option
!      0.      0.      0.      Flow/Volume value
!       0       0       0      Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                      burial
!   3.e-5                      user mass transfer coefficient
!     0.5                      prben
!    0.05                      benthic depth
!    0.50                      benthic porosity
!    1.85                      benthic bulk density
!    0.04                      benthic foc
!     5.0                      benthic doc
!   0.006                      benthic biomass
!    1.19                      wc dfac
!    30.0                      wc ss
!   0.005                      wc chlorophyll
!    0.04                      wc foc
!     5.0                      wc doc
!     0.4                      wc biomass
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Maize Mtn – Mountain

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PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
73 84 C:\ANDES\METFILES\ANDES\W844720.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Maize Mountain Title of input file
         2HTITLE               "Cajamarca, Peru; Metfile: W844720.dvf

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC            0.36  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           12.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          1.52                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP             16.8                       Land slope (%)
          USLEK           0.25                       Universal soil loss equation (K) of soil erodibility
          IREG               3                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Maize
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR             50  Maximum rooting depth of crop (cm)
          COVMAX            70  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           92  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            90  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            92  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            180  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A         1      26              "RUSLE EPA Pesticide Project:  G83CGWWC; Corn, Yuma, CO Conventional
Tillage"
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 1604 2504 0105 1605
          RECORD9C  .527 .438 .319 .245 .223 .228 .231 .234 .249 .212 .210 .200 .187 .176 .175 .197
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 0.23 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    90   90   90   90   90   90   90   90   90   90   90   90   90   90   90   90
          RECORD9B  0106 1606 0107 1607 0108 1608 0109 1609 0110 1610
          RECORD9C  .199 .202 .204 .210 .221 .235 .444 .452 .514 .536
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    92   92   92   92   92   92   92   92   92   92
Reduced Tillage
          RECORD9A         1      26              "RUSLE EPA Pesticide Project:  G83CGWWM; Corn, Yuma, CO Reduced Tillage"
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 1604 2504 0105 1605
          RECORD9C  .298 .267 .205 .167 .159 .168 .174 .179 .194 .114 .114 .110 .104 .098 .098 .065
          RECORD9D  .040 .040 .040 .040 .040 .040 .040 0.40 .040 .040 .040 .040 .040 .040 .040 .040
          RECORD9E    86   86   86   86   86   86   86   86   86   86   86   86   86   86   86   86
          RECORD9B  0106 1606 0107 1607 0108 1608 0109 1609 0110 1610
          RECORD9C  .066 .067 .068 .070 .074 .080 .146 .152 .246 .283
          RECORD9D  .040 .040 .040 .040 .040 .040 .040 .040 .040 .040
          RECORD9E    88   88   88   88   88   88   88   88   88   88
No Tillage
          RECORD9A         1      26              "RUSLE EPA Pesticide Project:  G83CGWWN; Corn, Yuma, CO No Tillage"
          RECORD9B  0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104 1504 1604 2504 0105 1605
          RECORD9C  .061 .052 .052 .057 .061 .065 .072 .032 .033 .031 .030 .028 .028 .028 .028 .036
          RECORD9D  .040 .040 .040 .040 .040 .040 .040 0.40 .040 .040 .040 .040 .040 .040 .040 .040
          RECORD9E    81   81   81   81   81   81   81   81   81   81   81   81   81   81   81   81
          RECORD9B  0106 1606 0107 1607 0108 1608 0109 1609 0110 1610
          RECORD9C  .036 .037 .037 .039 .041 .045 .049 .070 .079 .075
          RECORD9D  .040 .040 .040 .040 .040 .040 .040 .040 .040 .040
          RECORD9E    83   83   83   83   83   83   83   83   83   83

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Maize
          EMD                01  Integer day of crop emergence
          EMM                11  Integer month of crop emergence
          IYREM              73  Integer year of crop emergence        Dates from Peruvian expert
          MAD                15  Integer day of crop maturation
          MAM                 2  Integer month of crop maturation
          IYRMAT             74  Integer year of crop maturation        Dates from Peruvian expert
          HAD                31  Integer day of crop harvest
          HAM                 5  Integer month of crop harvest
          IYRHAR             74  Integer year of crop harvest          Dates from Peruvian expert
          P10D               15  Integer day of crop maturation
          P10M                2  Integer month of crop maturation
          IYP10              74  Integer year of crop maturation
          P60D                6  Integer day of crop harvest-25
          P60M                5  Integer month of crop harvest-25
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          IYRP60            74  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "Clay, Hydrologic Group D, HWSD soil 18797

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ            3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            1  Horizon number
          THKNS            10  Thickness of horizon (cm)
          BD             1.25  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO         0.457  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC         0.457  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP         0.288  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC             1.75  Organic carbon in horizon (%)      HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            24.00  Sand Content     HWSD soil
          CLAY            45.00  Clay Content     HWSD soil

Horizon 2:
            34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.25  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO         0.457  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC         0.457  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP         0.288  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC             1.75  Organic carbon in horizon (%)       HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content    HWSD soil
          CLAY            20.00  Clay Content     HWSD soil

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             70  Thickness of horizon (cm)
          BD              1.30  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO         0.359  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor
```

```
       37DPN               1  Thickness of compartments in horizon (cm)
         THEFC           0.359  Field capacity in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
         THEWP           0.223  Wilting point in horizon (cm3/cm3)      Calculated from Rawls & Brakensiek with HWSD soil
         OC               0.58  Organic carbon in horizon (%)   HWSD soil

       38SPT             10.00  Initial Soil Temperature (C)
         SAND            34.00  Sand Content              HWSD soil
         CLAY            37.00  Clay Content              HWSD soil

       40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
         CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Tomato C4 – Coastal, Crop cycle 1 (April)

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
68 97 C:\ANDES\METFILES\ANDES\W845010.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Tomato Coastal April    Title of input fileile
         2HTITLE               "La Libertad, Peru; Metfile: W845010.dvf

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC            0.00  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           17.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.26                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP              1.8                       Land slope (%)
          USLEK           0.27                       Universal soil loss equation (K) of soil erodibility
          IREG               2                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             70  Maximum rooting depth of crop (cm)
          COVMAX            80  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           87  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            83  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             50  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      25        "RUSLE EPA Pesticide Project:  CA tomato -C23BDCGC; Beans, Fresno CA
Conventional Tillage"
          RECORD9B  0104 1604 0105 1605 0106 1606 0107 1607 0108 1608 0109 1609 0110 1010 1610 0111
          RECORD9C  .255 .218 .138 .077 .065 .054 .043 .057 .035 .035 .035 .035 .035 .035 .036 .099
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    83   83   83   83   83   83   83   83   83   83   87   87   87   87   87   87
          RECORD9B  1611 0112 1612 0101 1601 0102 1602 0103 1603
          RECORD9C  .103 .112 .127 .147 .168 .069 .082 .195 .252
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      25        "RUSLE EPA Pesticide Project:  CA tomato -C23BDCGC; Beans, Fresno CA
Conventional Tillage"
          RECORD9B  0104 1604 0105 1605 0106 1606 0107 1607 0108 1608 0109 1609 0110 1010 1610 0111
          RECORD9C  .255 .218 .138 .077 .065 .054 .043 .057 .035 .035 .035 .035 .035 .035 .036 .099
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    79   79   79   79   79   79   79   79   79   79   83   83   83   83   83   83
          RECORD9B  1611 0112 1612 0101 1601 0102 1602 0103 1603
          RECORD9C  .103 .112 .127 .147 .168 .069 .082 .195 .252
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      25        "RUSLE EPA Pesticide Project:  CA tomato -C23BDCGC; Beans, Fresno CA
Conventional Tillage"
          RECORD9B  0104 1604 0105 1605 0106 1606 0107 1607 0108 1608 0109 1609 0110 1010 1610 0111
          RECORD9C  .255 .218 .138 .077 .065 .054 .043 .057 .035 .035 .035 .035 .035 .035 .036 .099
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    75   75   75   75   75   75   75   75   75   75   79   79   79   79   79   79
          RECORD9B  1611 0112 1612 0101 1601 0102 1602 0103 1603
          RECORD9C  .103 .112 .127 .147 .168 .069 .082 .195 .252
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                01  Integer day of crop emergence
          EMM                 4  Integer month of crop emergence
          IYREM              68  Integer year of crop emergence        Dates from Peruvian expert
          MAD                15  Integer day of crop maturation
          MAM                 7  Integer month of crop maturation
          IYRMAT             68  Integer year of crop maturation         Dates from Peruvian expert
          HAD                31  Integer day of crop harvest
          HAM                 8  Integer month of crop harvest
          IYRHAR             68  Integer year of crop harvest            Dates from Peruvian expert
          P10D               15  Integer day of crop maturation
          P10M                7  Integer month of crop maturation
          IYP10              68  Integer year of crop maturation
```

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          P60D               6  Integer day of crop harvest-25
          P60M               8  Integer month of crop harvest-25
          IYRP60            68  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "Sandy Loam, Hydrologic Group C, HWSD soil 18808

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              6  Irrigation type, under canopy=6
         RATEAP           0.17  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.20  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.216  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.26  Organic carbon in horizon (%)          HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            54.00  Sand Content               HWSD soil
          CLAY            16.00  Clay Content               HWSD soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.216  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.26  Organic carbon in horizon (%)  HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            54.00  Sand Content     HWSD soil
          CLAY            16.00  Clay Content     HWSD soil

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             70  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
```

```
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC         0.216  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP         0.113  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC             0.26  Organic carbon in horizon (%)       HWSD soil

        38SPT           10.00  Initial Soil Temperature (C)
          SAND          54.00  Sand Content        HWSD soil
          CLAY          16.00  Clay Content        HWSD soil

        40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6      Watershed Data
!  1000.0 100000.     0.0      Waterbody Area (by Env)
!     2.0     2.0     0.0      Waterbody Depth (by Env)
!     2.0     2.0     0.0      Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0      Crop Area Fraction
!       4       4       4      Flow/Volume Option
!      0.      0.      0.      Flow/Volume value
!       0       0       0      Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                      burial
!   3.e-5                      user mass transfer coefficient
!     0.5                      prben
!    0.05                      benthic depth
!    0.50                      benthic porosity
!    1.85                      benthic bulk density
!    0.04                      benthic foc
!     5.0                      benthic doc
!   0.006                      benthic biomass
!    1.19                      wc dfac
!    30.0                      wc ss
!   0.005                      wc chlorophyll
!    0.04                      wc foc
!     5.0                      wc doc
!     0.4                      wc biomass
```

Tomato C9 – Coastal, Crop cycle 2 (September)

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
68 97 C:\ANDES\METFILES\ANDES\W845010.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Tomato Coastal Sept    Title of input fileile
         2HTITLE               "La Libertad, Peru; Metfile: W845010.dvf

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC            0.00  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           17.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.26                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP              1.8                       Land slope (%)
          USLEK           0.27                       Universal soil loss equation (K) of soil erodibility
          IREG               2                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             70  Maximum rooting depth of crop (cm)
          COVMAX            80  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           87  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            83  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             50  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      25        "RUSLE EPA Pesticide Project:  CA tomato -C23BDCGC; Beans, Fresno CA
Conventional Tillage"
          RECORD9B  0109 1609 0110 1010 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104
          RECORD9C  .255 .218 .138 .077 .065 .054 .043 .057 .035 .035 .035 .035 .035 .035 .036 .099
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    83   83   83   83   83   83   83   83   83   83   87   87   87   87   87   87
          RECORD9B  604 0105 1605 0106 1606 0107 1607 0108  1608
          RECORD9C  .103 .112 .127 .147 .168 .069 .082 .195 .252
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      25        "RUSLE EPA Pesticide Project:  CA tomato -C23BDCGC; Beans, Fresno CA
Conventional Tillage"
          RECORD9B  0109 1609 0110 1010 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104
          RECORD9C  .255 .218 .138 .077 .065 .054 .043 .057 .035 .035 .035 .035 .035 .035 .036 .099
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    79   79   79   79   79   79   79   79   79   79   83   83   83   83   83   83
          RECORD9B  604 0105 1605 0106 1606 0107 1607 0108  1608
          RECORD9C  .103 .112 .127 .147 .168 .069 .082 .195 .252
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      25        "RUSLE EPA Pesticide Project:  CA tomato -C23BDCGC; Beans, Fresno CA
Conventional Tillage"
          RECORD9B  0109 1609 0110 1010 1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603 0104
          RECORD9C  .255 .218 .138 .077 .065 .054 .043 .057 .035 .035 .035 .035 .035 .035 .036 .099
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    75   75   75   75   75   75   75   75   75   75   79   79   79   79   79   79
          RECORD9B  604 0105 1605 0106 1606 0107 1607 0108  1608
          RECORD9C  .103 .112 .127 .147 .168 .069 .082 .195 .252
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                01  Integer day of crop emergence
          EMM                 9  Integer month of crop emergence
          IYREM              68  Integer year of crop emergence        Dates from Peruvian expert
          MAD                15  Integer day of crop maturation
          MAM                11  Integer month of crop maturation
          IYRMAT             68  Integer year of crop maturation        Dates from Peruvian expert
          HAD                31  Integer day of crop harvest
          HAM                12  Integer month of crop harvest
          IYRHAR             68  Integer year of crop harvest          Dates from Peruvian expert
          P10D               15  Integer day of crop maturation
          P10M               11  Integer month of crop maturation
          IYP10              68  Integer year of crop maturation
```

```
          P60D              6  Integer day of crop harvest-25
          P60M             12  Integer month of crop harvest-25
          IYRP60           68  Integer year of crop harvest-25
          KCINIT          1.0  Initial Crop growth stage
          KCMID          1.05  Crop development stage
          KCLATE         0.83  Late season growth stage
          KCMAX          1.10  Maximum growth stage
          REW             1.0  Stage 1 Evapotranspiration (mm)
          INCROP            1  Crop number associated with NDC (Record 8)

        19STITLE     "Sandy Loam, Hydrologic Group C, HWSD soil 18808

        20CORED           100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG            0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG            0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG            0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT             0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC               0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG            2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG            0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG            0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG            0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG            1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+      0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT          10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE           6  Irrigation type, under canopy=3
         RATEAP        0.17  Max rate at which irrigation is applied (cm/hr)
         PCDEPL        0.20  fraction of water capacity at which irrigation is applied
         FLEACH         0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ          3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN          1  Horizon number
          THKNS          10  Thickness of horizon (cm)
          BD           1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO       0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN             0.1  Thickness of compartments in horizon (cm)
          THEFC       0.216  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP       0.113  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC           0.26  Organic carbon in horizon (%)    HWSD soil

        38SPT         10.00  Initial Soil Temperature (C)
          SAND        54.00  Sand Content       HWSD soil
          CLAY        16.00  Clay Content       HWSD soil

Horizon 2:
            34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            2  Horizon number
          THKNS            20  Thickness of horizon (cm)
          BD             1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO       0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF          1.000  Degradation Factor

        37DPN               1  Thickness of compartments in horizon (cm)
          THEFC       0.216  Field capacity in horizon (cm3/cm3) Calculated from Rawls & Brakensiek with HWSD soil
          THEWP       0.113  Wilting point in horizon (cm3/cm3)  Calculated from Rawls & Brakensiek with HWSD soil
          OC           0.26  Organic carbon in horizon (%)      HWSD soil

        38SPT         10.00  Initial Soil Temperature (C)
          SAND        54.00  Sand Content        HWSD soil
          CLAY        16.00  Clay Content         HWSD soil

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN            3  Horizon number
          THKNS            70  Thickness of horizon (cm)
          BD             1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO       0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP              0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL               0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
```

```
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.216  Field capacity in horizon (cm3/cm3)   Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.26  Organic carbon in horizon (%)     HWSD soil

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           54.00  Sand Content      HWSD soil
          CLAY           16.00  Clay Content      HWSD soil

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Tomato – Mountain

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
73 84 C:\ANDES\METFILES\ANDES\W844720.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Tomato Mountain Title of input file
         2HTITLE               "Cajamarca, Peru; Metfile: W844720.dvf

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC            0.36  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           12.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS           3.5                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP           0.45                       Universal soil loss equation (P) practice factor
          SLP               28                       Land slope (%)
          USLEK           0.27                       Universal soil loss equation (K) of soil erodibility
          IREG               3                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region

         8NDC                1                       Number of different crops in simulation (1 to 5)
Tomato
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.10  Maximum interception storage of crop (cm)
          AMXDR             40  Maximum rooting depth of crop (cm)
          COVMAX            80  Maximum areal coverage of canopy (%)
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           87  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values); note that runoff and leach
                            83  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
                            87  "GLEAMS Manual Table A-3; Fallow = SR Conservation Tillage/poor, Cropping and Residue = Row
Crop Contour/good"
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX             50  Maximum canopy height (cm) at maturation date (Record 11) Based on visual interpretation of
ground level photography
Conventional Tillage
          RECORD9A          1      27        "RUSLE EPA Pesticide Project:  G83BGBGC; Beans, Yuma, CO Conventional Tillage"
          RECORD9B  0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1508 1608 0109 1609 0110
          RECORD9C  .750 .520 .262 .164 .151 .184 .200 .233 .262 .286 .304 .318 .329 .335 .339 .342
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   87   87   87   87   87   87   87
          RECORD9B  1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603
          RECORD9C  .346 .350 .355 .365 .387 .414 .444 .488 .627 .646 .790
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    87   87   87   87   87   87   87   87   87   87   87
Reduced Tillage
          RECORD9A          1      27        "RUSLE EPA Pesticide Project:  G83BGBGC; Beans, Yuma, CO Conventional Tillage"
          RECORD9B  0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1508 1608 0109 1609 0110
          RECORD9C  .750 .520 .262 .164 .151 .184 .200 .233 .262 .286 .304 .318 .329 .335 .339 .342
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79   79   83   83   83   83   83   83
          RECORD9B  1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603
          RECORD9C  .346 .350 .355 .365 .387 .414 .444 .488 .627 .646 .790
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    83   83   83   83   83   83   83   83   83   83
No Tillage
          RECORD9A          1      27        "RUSLE EPA Pesticide Project:  G83BGBGC; Beans, Yuma, CO Conventional Tillage"
          RECORD9B  0104 1604 0105 1505 1605 2505 0106 1606 0107 1607 0108 1508 1608 0109 1609 0110
          RECORD9C  .750 .520 .262 .164 .151 .184 .200 .233 .262 .286 .304 .318 .329 .335 .339 .342
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    75   75   75   75   75   75   75   75   75   75   79   79   79   79   79   79
          RECORD9B  1610 0111 1611 0112 1612 0101 1601 0102 1602 0103 1603
          RECORD9C  .346 .350 .355 .365 .387 .414 .444 .488 .627 .646 .790
          RECORD9D  .011 .011 .011 .011 .011 .011 .011 .011 .011 .011 .011
          RECORD9E    79   79   79   79   79   79   79   79   79

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Tomato
          EMD                01  Integer day of crop emergence
          EMM                 4  Integer month of crop emergence
          IYREM              73  Integer year of crop emergence        Dates from Peruvian expert
          MAD                15  Integer day of crop maturation
          MAM                 7  Integer month of crop maturation
          IYRMAT             73  Integer year of crop maturation       Dates from Peruvian expert
          HAD                31  Integer day of crop harvest
          HAM                 8  Integer month of crop harvest
          IYRHAR             73  Integer year of crop harvest          Dates from Peruvian expert
          P10D               10  Integer day of crop maturation
          P10M                9  Integer month of crop maturation
          IYP10              73  Integer year of crop maturation
          P60D               17  Integer day of crop harvest-25
          P60M                9  Integer month of crop harvest-25
          IYRP60             73  Integer year of crop harvest-25
```

```
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "Sandy Loam, Hydrologic Group C, HWSD soil 18808

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             0  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              0  Irrigation type, under canopy=4
         RATEAP           0.00  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.00  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.216  Field capacity in horizon (cm3/cm3)  Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)   Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.26  Organic carbon in horizon (%)  HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            54.00  Sand Content     HWSD soil
          CLAY            16.00  Clay Content     HWSD soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.216  Field capacity in horizon (cm3/cm3)   Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.26  Organic carbon in horizon (%)          HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            54.00  Sand Content  HWSD soil
          CLAY            16.00  Clay Content  HWSD soil

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             70  Thickness of horizon (cm)
          BD              1.46  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.216  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see below
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
```

```
          THEFC          0.216  Field capacity in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.113  Wilting point in horizon (cm3/cm3)       Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.26  Organic carbon in horizon (%)         HWSD soil

        38SPT            10.00  Initial Soil Temperature (C)
          SAND           54.00  Sand Content      HWSD soil
          CLAY           16.00  Clay Content       HWSD soil

        40ILP                0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
          CFLAG              0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Avocado

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
68 97 C:\ANDES\METFILES\ANDES\W845010.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Avocado Title of input file
         2HTITLE               "La Libertad, Peru; Metfile: W845010.dvf

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           17.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.28                       Universal soil loss equation (LS) length-slope topographic factor
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP              2.0                       Land slope (%)
          USLEK           0.34                       Universal soil loss equation (K) of soil erodibility, loam with >0.5%
OM
          IREG               2                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region, Type IA

         8NDC                1                       Number of different crops in simulation (1 to 5)
Avocado
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR             35  Maximum rooting depth of crop (cm), Ismael Rivas
          COVMAX           100  Maximum areal coverage of canopy (%), Ismael Rivas
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           90  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values);
                            90  "GLEAMS Manual Table H-4; bare ground, conditions good for Hydrologic Soil D
                            90  "GLEAMS Manual Table H-4; bare ground, conditions good for Hydrologic Soil D
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            300  Maximum canopy height (cm) at maturation date (Record 11), Ismael Rivas
Conventional Tillage, bare soil
          RECORD9A           1      26              "RUSLE EPA Pesticide Project:  C25CBCBC; Citrus bare soil, San Diego CA
Conventional Tillage"
          RECORD9B  0101 1601 0102 1602 0103 1603 0104 1504 1604 0105 1605 0106 1606 0107 1507 1607
          RECORD9C  .305 .313 .320 .325 .320 .330 .337 .342 .343 .344 .344 .350 .350 .358 .368 .368
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    90   90   90   90   90   90   90   90   90   90   90   90   90   90   90   90
          RECORD9B  0108 1608 0109 1609 0110 1610 0111 1611 0112 1612
          RECORD9C  .367 .335 .328 .329 .329 .330 .252 .261 .270 .279
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    90   90   90   90   90   90   90   90   90   90
Alleys covered      woods
          RECORD9A           1      24              "RUSLE EPA Pesticide Project:  C25CCCM; Citrus cover in alley, San Diego
CA
          RECORD9B  0101 1601 0102 1602 0103 1603 0104 1604 0105 1605 0106 1606 0107 1607 0108 1608
          RECORD9C  .164 .171 .177 .181 .135 .144 .150 .145 .137 .135 .135 .134 .139 .141 .141 .140
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    83   83   83   83   83   83   83   83   83   83   83   83   83   83   83   83
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612
          RECORD9C  .014 .014 .014 .014 .115 .122 .129 .136
          RECORD9D  .014 .014 .014 .014 .014 .014 .014 .014
          RECORD9E    83   83   83   83   83   83   83   83
Full coverage meadow
          RECORD9A           1      24              "RUSLE EPA Pesticide Project:  C25CFCFN; Citrus full cover, San Diego CA
          RECORD9B  0101 1601 0102 1602 0103 1603 0104 1604 0105 1605 0106 1606 0107 1607 0108 1608
          RECORD9C  .049 .050 .051 .052 .059 .061 .062 .056 .051 .051 .052 .052 .055 .056 .056 .057
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    78   78   78   78   78   78   78   78   78   78   78   78   78   78   78   78
          RECORD9B  0109 1609 0110 1610 0111 1611 0112 1612
          RECORD9C  .057 .057 .057 .057 .040 .042 .043 .044
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    78   78   78   78   78   78   78   78

        10NCPDS              30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Peru Avocado
          EMD                01  Integer day of crop emergence
          EMM                 1  Integer month of crop emergence
          IYREM              68  Integer year of crop emergence        Dates from Peruvian expert (bloom from October to
November)
          MAD                10  Integer day of crop maturation
          MAM                 1  Integer month of crop maturation
          IYRMAT             68  Integer year of crop maturation         Dates from Peruvian expert (avocados mature in
April)
          HAD                31  Integer day of crop harvest
          HAM                12  Integer month of crop harvest
          IYRHAR             68  Integer year of crop harvest            Dates from Peruvian expert (avocados harvest in May
or June)
          P10D               10  Integer day of crop maturation
          P10M                1  Integer month of crop maturation
          IYP10              68  Integer year of crop maturation
```

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          P60D              06  Integer day of crop harvest-25
          P60M              12  Integer month of crop harvest-25
          IYRP60            68  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "Loam, Hydrologic Group D, HWSD soil 18795

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              6  Irrigation type, under canopy=6  no runoff
         RATEAP           .125  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.20  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.40  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.267  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.267  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.140  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.32  Organic carbon in horizon (%)        HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content         HWSD soil
          CLAY            20.00  Clay Content         HWSD soil

Horizon 2:
             34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.40  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.267  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.267  Field capacity in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.140  Wilting point in horizon (cm3/cm3)      Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.32  Organic carbon in horizon (%) HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content            HWSD soil
          CLAY            20.00  Clay Content            HWSD soil

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             70  Thickness of horizon (cm)
          BD              1.41  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.244  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see be
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
```

```
         DEGF          1.000  Degradation Factor

       37DPN               1  Thickness of compartments in horizon (cm)
         THEFC         0.244  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
         THEWP         0.135  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
         OC             0.14  Organic carbon in horizon (%)

       38SPT           10.00  Initial Soil Temperature (C)
         SAND          49.00  Sand Content                    HWSD soil
         CLAY          21.00  Clay Content                    HWSD soil

       40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
         CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6       Watershed Data
!  1000.0 100000.     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       user mass transfer coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
!    0.04                       benthic foc
!     5.0                       benthic doc
!   0.006                       benthic biomass
!    1.19                       wc dfac
!    30.0                       wc ss
!   0.005                       wc chlorophyll
!    0.04                       wc foc
!     5.0                       wc doc
!     0.4                       wc biomass
```

Grape

```
PRZM INPUTS - PRZM Data Inputs for Various Crop Scenarios
69 98 C:\ANDES\METFILES\ANDES\W844010.dvf

PRZM      Variable
Record #  Name
         1TITLE                Peru Grapes Title of input file
         2HTITLE               "Piura, Peru; Metfile: W844010.dvf

         3PFAC             1.0  Pan factor (dimensionless)  ET in weather file
          SFAC               0  Snowmelt factor (cm/C)
          IPEIND             7  Pan factor flag - 0 = pan data read from meteorology file
          ANETD           17.5  Min. depth from which evaporation is extracted during fallow period (cm); 10 cm = soil with
limited drainage
          INICRP             1  "Flag for initial crop if simulation date is before emergence date (see Record 10); 1 = yes,
2 = no"
          ISCOND             1  "Surface condition of initial crop if INICRP = 1; 1 = fallow, 2 = cropping, 3 = residue"

         6ERFLAG             4  "Flag to calculate erosion; 0 = none, 2 = MUSLE, 3 = MUST, 4 = MUSS; note that a value of 1
is meaningless; MUSS selected by EPA and industry as most appropriate."

         7"Only needed if ERFLAG = 2,3, or 4 (Record 6)"
          AFIELD            10                       Area of field or plot (ha); EPA default is 10
          HL             356.8                       "Hydraulic length (m); for a circular 10 ha field emptying into a 1 ha
pond (when linked
          USLELS          0.28                       Universal soil loss equation (LS) length-slope topographic factor,
slope and 91 m
          USLEP            1.0                       Universal soil loss equation (P) practice factor
          SLP             1.94                       Land slope (%)
          USLEK           0.34                       Universal soil loss equation (K) of soil erodibility, loam with >0.5%
OM
          IREG               2                       Location of NRCS 24-hour hyetograph/Soil Conservation Service rainfall
distribution region, Type IA

         8NDC                1                       Number of different crops in simulation (1 to 5)
Grapes
         9(repeat this record NDC times)
          ICNCN              1  Crop number
          CINTCP          0.25  Maximum interception storage of crop (cm)
          AMXDR             60  Maximum rooting depth of crop (cm), Fundo GESSEX
          COVMAX           100  Maximum areal coverage of canopy (%), Fundo GESSEX
          ICNAH              1  "Surface condition of crop after harvest date (see Record 11); 1 = fallow, 2 = cropping, 3 =
residue"
          CN (x3)           90  "Runoff curve numbers of antecedent moisture condition for fallow, cropping, and residue
(three values);
                            90  "GLEAMS Manual Table H-4; bare ground, conditions good for Hydrologic Soil D
                            90  "GLEAMS Manual Table H-4; bare ground, conditions good for Hydrologic Soil D
          WFMAX              0  "Maximum dry weight of crop at full canopy (kg/m2), required if CAM = 3 (Record 16) else set
to 0.0"
          HTMAX            200  Maximum canopy height (cm) at maturation date (Record 11), Fundo GESSEX
Conventional Tillage, bare soil
          RECORD9A         1      26              "RUSLE EPA Pesticide Project:  C25GBGBC; Grapes bare soil, San Diego CA
Conventional Tillage"
          RECORD9B  1006 0107 1507 1607 0108 1608 0109 1609 0110 1610 0111 1611 0112 1612 0101 1601
          RECORD9C  .345 .396 .413 .425 .448 .464 .475 .495 .496 .498 .472 .455 .446 .445 .454 .453
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    90   90   90   90   90   90   90   90   90   90   90   90   90   90   90   90
          RECORD9B  0102 1602 0103 1603 0104 1504 1604 0105 1605 0106
          RECORD9C  .454 .453 .464 .465 .465 .466 .258 .271 .286 .300
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    90   90   90   90   90   90   90   90   90   90
Alleys covered, pasture (fair)
          RECORD9A         1      24              "RUSLE EPA Pesticide Project:  C25GCGCM;Grapes cover in alley, San Diego
CA
          RECORD9B  1006 0107 1607 0108 1608 0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102
          RECORD9C  .333 .382 .400 .412 .441 .458 .469 .475 .477 .451 .421 .411 .410 .408 .406 .405
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    84   84   84   84   84   84   84   84   84   84   84   84   84   84   84   84
          RECORD9B  1602 0103 1603 0104 1604 0105 1605 0106
          RECORD9C  .404 .403 .403 .404 .244 .257 .272 .286
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    84   84   84   84   84   84   84   84
Full coverage meadow
          RECORD9A         1      24              "RUSLE EPA Pesticide Project:  C25GFGFN; Grapes full cover, San Diego CA
          RECORD9B  1006 0107 1607 0108 1608 0109 1609 0110 1610 0111 1611 0112 1612 0101 1601 0102
          RECORD9C  .065 .068 .068 .073 .098 .092 .083 .085 .066 .061 .066 .074 .065 .055 .044 .028
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    78   78   78   78   78   78   78   78   78   78   78   78   78   78   78   78
          RECORD9B  1602 0103 1603 0104 1604 0105 1605 0106
          RECORD9C  .025 .034 .036 .033 .025 .032 .035 .045
          RECORD9D  .023 .023 .023 .023 .023 .023 .023 .023
          RECORD9E    78   78   78   78   78   78   78   78

        10NCPDS             30  Number of cropping periods (sum of NDC for all cropping dates in Record 11)

        11(Repeat this record NCPDS times)
Peru Grape
          EMD               10  Integer day of crop emergence
          EMM                6  Integer month of crop emergence
          IYREM             69  Integer year of crop emergence        Dates from Peruvian expert - Fundo GESSEX pruning date
          MAD               20  Integer day of crop maturation,
          MAM                9  Integer month of crop maturation
          IYRMAT            69  Integer year of crop maturation         Dates from Peruvian expert - Fundo GESSEX
          HAD               30  Integer day of crop harvest
          HAM               10  Integer month of crop harvest
          IYRHAR            69  Integer year of crop harvest           Dates from Peruvian expert - Fundo GESSEX
          P10D              20  Integer day of crop maturation
          P10M               9  Integer month of crop maturation
          IYP10             69  Integer year of crop maturation
          P60D              05  Integer day of crop harvest-25
          P60M              10  Integer month of crop harvest-25
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          IYRP60            69  Integer year of crop harvest-25
          KCINIT           1.0  Initial Crop growth stage
          KCMID           1.05  Crop development stage
          KCLATE          0.83  Late season growth stage
          KCMAX           1.10  Maximum growth stage
          REW              1.0  Stage 1 Evapotranspiration (mm)
          INCROP             1  Crop number associated with NDC (Record 8)

        19STITLE     "Loam, Hydrologic Group D, HWSD soil 18795

        20CORED            100  Total depth of soil core (cm); must be sum of all horizon thicknesses in Record 33 and at
least as deep as the root depth in Recor
          BDFLAG             0  "Bulk density flag; 0 = bulk density known and entered in Record 33, 1 = mineral value
entered"
          THFLAG             0  "Field capacity and wilting point flag; 0 = water contents are entered, 1 = calculated by
model."
          KDFLAG             0  "Soil adsorption coefficient; 0 = Kd entered in Record 37, 1 = calculated by model."
          Submission studies
          HSWZT              0  "Drainage flag; 0 = free draining, 1 = restricted (should be set to zero)"
          MOC                0  "Method of characteristics flag; 1 = yes, 0 = no; this flag is used for the leaching program
and PRZM is not recommended as a leaching model by the EPA at this time."
          IRFLAG             2  "Irrigation flag; 0 = no irrigation, 1 = year round, 2 = during cropping period only."
          ITFLAG             0  "Soil temperature simulation flag; 1 = yes, 0 = no (must = 1 if nitrogen is being
simulated)"
          IDFLAG             0  "Thermal conductivity and heat capacity flag; 1 = yes, 0 = no."
          BIOFLG             0  "Biodegradation flag; 1 = yes, 0 = no; this flag is used when transformation occurs only by
the microbial pathway and requires knowledge of microbe population characteristics"
          DSPFLG             1  Dispersion flag for FOCUS GW modeling

        31ALBEDO+         0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.96    2

        32BBT             10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0

         IRTYPE              6  Irrigation type, under canopy=6  no runoff
         RATEAP           0.25  Max rate at which irrigation is applied (cm/hr)
         PCDEPL           0.20  fraction of water capacity at which irrigation is applied
         FLEACH            0.0  Leaching factor as a fraction of irrigation water depth

        33NHORIZ             3  Number of horizons

Horizon 1:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             1  Horizon number
          THKNS             10  Thickness of horizon (cm)
          BD              1.40  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          THETO          0.267  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN              0.1  Thickness of compartments in horizon (cm)
          THEFC          0.267  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.140  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.32  Organic carbon in horizon (%)        HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content         HWSD soil
          CLAY            20.00  Clay Content         HWSD soil

Horizon 2:
            34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             2  Horizon number
          THKNS             20  Thickness of horizon (cm)
          BD              1.40  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see above
          THETO          0.267  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see above
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor

        37DPN                1  Thickness of compartments in horizon (cm)
          THEFC          0.267  Field capacity in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
          THEWP          0.140  Wilting point in horizon (cm3/cm3)      Calculated from Rawls & Brakensiek with HWSD soil
          OC              0.32  Organic carbon in horizon (%) HWSD soil

        38SPT             10.00  Initial Soil Temperature (C)
          SAND            38.00  Sand Content            HWSD soil
          CLAY            20.00  Clay Content            HWSD soil

Horizon 3:
        34"(Repeat Records 34, 36, and 37 for each horizon)"
          HORIZN             3  Horizon number
          THKNS             70  Thickness of horizon (cm)
          BD              1.41  Bulk density if BDFLAG = 0 or mineral density if BDFLAG = 1 (Record 20) (g/cm3)
          see below
          THETO          0.244  "Initial soil water content in horizon (cm3/cm3); if site-specific value not known, use
field capacity"               see be
          AD                 0  "Soil drainage parameter if HSWZT = 1 (Record 20), else set to 0.0 (day-1); note that the #
of compartments (= DPN/THKNS) is needed to determine AD"
          DISP               0  Pesticide(s) hydrodynamic solute dispersion coefficient for each NCHEM; should be set to
zero unless field data are available for calibration
          ADL                0  Lateral soil drainage parameter if HSWZT = 1 (Record 20) (should be set to zero)
          DEGF           1.000  Degradation Factor
```

```
       37DPN               1  Thickness of compartments in horizon (cm)
         THEFC         0.244  Field capacity in horizon (cm3/cm3)    Calculated from Rawls & Brakensiek with HWSD soil
         THEWP         0.135  Wilting point in horizon (cm3/cm3)     Calculated from Rawls & Brakensiek with HWSD soil
         OC             0.14  Organic carbon in horizon (%)

       38SPT           10.00  Initial Soil Temperature (C)
         SAND          49.00  Sand Content                    HWSD soil
         CLAY          21.00  Clay Content                    HWSD soil

       40ILP               0  "Flag for initial pesticide(s) levels before simulation start date; 1 = yes, 0 = no"
         CFLAG             0  "Conversion flag for initial pesticide(s) levels; 0 = mg/kg, 1 = kg/ha, blank if ILP = 0"
!
!       1       5       6     Watershed Data
!  1000.0 100000.     0.0     Waterbody Area (by Env)
!     2.0     2.0     0.0     Waterbody Depth (by Env)
!     2.0     2.0     0.0     Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0     Crop Area Fraction
!       4       4       4     Flow/Volume Option
!      0.      0.      0.     Flow/Volume value
!       0       0       0     Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                     burial
!   3.e-5                     user mass transfer coefficient
!     0.5                     prben
!    0.05                     benthic depth
!    0.50                     benthic porosity
!    1.85                     benthic bulk density
!    0.04                     benthic foc
!     5.0                     benthic doc
!   0.006                     benthic biomass
!    1.19                     wc dfac
!    30.0                     wc ss
!   0.005                     wc chlorophyll
!    0.04                     wc foc
!     5.0                     wc doc
!     0.4                     wc biomass
```

Wet Rice – Direct Seed (RICEWQ scenario)

```
PARAMETER                                        VALUE USED       SOURCE/RATIONALE
12 41 C:\ANDES\METFILES\ANDES\W844550.DVF
DOUBLE CROP FLAG:   OFFSET DAYS:                       0    000   FLAG:0=no double crop, 1=on  OFFSET DAYS: days added to
cropping and drainage dates
HYDROLOGIC PARAMETERS
Surface area of paddy (ha)                          10.00 10.0  10.00  10.00  10.00          ANDES
Initial depth of paddy (cm)                      0.00           Condition of rice paddy on January 1
Number of Irrigation/Drain Events                6
Date to irrigate paddy (initial flood) (IDM/IDD)  01/15         Information given by Cultivida
Irrigation Event or Drain Event                  2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   3.50           Information given by Cultivida
Irrigation rate (cm/day)                         5.00           Information given by Cultivida
Depth of paddy outlet (cm)                       50.00          Information given by Cultivida
Depth at which irrigation will begin (cm)        5.00           Information given by Cultivida
Depth at which irrigation will cease (cm)        10.00          Information given by Cultivida
Date to raise flood paddy                        01/20          Typical practice for the region
Irrigation Event or Drain Event                  2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   3.50           Information given by Cultivida
Irrigation rate (cm/day)                         5.00           Information given by Cultivida
Depth of paddy outlet (cm)                       50.00          Information given by Cultivida
Depth at which irrigation will begin (cm)        10.00          Information given by Cultivida
Depth at which irrigation will cease (cm)        15.00          Information given by Cultivida
Date to irrigate paddy (second flood)            01/22          Information given by Cultivida
Irrigation Event or Drain Event                  1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   3.50           Information given by Cultivida
Irrigation rate (cm/day)                         5.00           Information given by Cultivida
Depth of paddy outlet (cm)                       0.00           Information given by Cultivida
Depth at which irrigation will begin (cm)        0.00           Information given by Cultivida
Depth at which irrigation will cease (cm)        0.00           Information given by Cultivida
Date to irrigate paddy (second flood)            01/23          Refill for final flood
Irrigation Event or Drain Event                  2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   3.50           Information given by Cultivida
Irrigation rate (cm/day)                         5.00           Information given by Cultivida
Depth of paddy outlet (cm)                       50.00          Information given by Cultivida
Depth at which irrigation will begin (cm)        10.00          Information given by Cultivida
Depth at which irrigation will cease (cm)        15.00          Information given by Cultivida
Date to irrigate paddy (second flood)            05/03          2 days before drain for harvest, no irrigation
Irrigation Event or Drain Event                  1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   3.50           Information given by Cultivida
Irrigation rate (cm/day)                         5.00           Information given by Cultivida
Depth of paddy outlet (cm)                       50.00          Information given by Cultivida
Depth at which irrigation will begin (cm)        0.00           Information given by Cultivida
Depth at which irrigation will cease (cm)        0.00           Information given by Cultivida
Date to cease irrigating paddy                   05/05          Almost 2 weeks before harvest
Irrigation Event or Drain Event                  1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                   3.50           Information given by Cultivida
Irrigation rate (cm/day)                         5.00           Information given by Cultivida
Depth of paddy outlet (cm)                       0.00           Information given by Cultivida
Depth at which irrigation will begin (cm)        0.00           Information given by Cultivida
Depth at which irrigation will cease (cm)        0.00           Information given by Cultivida

CROP PARAMETERS
Crop emergence date (JEM/JED)                    01/25              Information given by Cultivida
Crop maturity date (KMM/KMD)                     04/09          Flowering - 75 days after emergence)
Crop harvest date (KHM/KHD)                      06/04              Information given by Cultivida
Maximum crop coverage (fraction)                 1.00           Information given by Cultivida
Paddy EVAP                                        -8.00  8.00  8.00 10.00 12.00 13.00 13.00 12.00 11.00 10.00  8.00  8.00

AQUATIC CONCENTRATION PARAMETERS
Settling velocity (m/day)                        2.00           Calculated for fine particles (Guy,1977)
Mixing velocity (diffusion) (m/day)              0.001          Typical range of 0.0 - 0.1 m/day (Arnold et al., 1991)
Seepage Rate                                     0.00           Information given by Cultivida
DMAX                                             75.000         Information given by Cultivida
DLAKE                                            0.000          Condition on January 1

SEDIMENT CONCENTRATION PARAMETERS
Concentration of suspended sediment (ppm)        30.00          Typical default (Young, 2014)
Depth of active sediment layer (cm)              5.00           Guidelines (Young, 2014; Med-Rice,2003)
Bulk density of bed sediment (g/cc)              1.25           Soil 18852 (FAO/IIASA/ISRIC/ISSCAS/JRC. 2012)
Field capacity (cm3/cm3)                         0.46           Rawls and Brackensiek (1982) equation using soil parameters
Wilting point (cm3/cm3)                          0.29           Rawls and Brackensiek (1982) equation using soil parameters
Mixing depth to allow direct partitioning to bed  0.10          Professional judgment and Capri and Miao (2002)
Organic Carbon Content                           1.75           Soil 18852 (FAO/IIASA/ISRIC/ISSCAS/JRC. 2012)

FLAGS
Harvest Flag                                     -2            -1 = all residues left alone,-2 = foliar residues removed
(set to 0), still has sediment residues 0 = all foliar and sediment residues removed (set to 0)
EXAMS Flag                                       1              0=no EXAMS transfer files, 1= EXAMS transfer files
!
!       1       4       4       Watershed Data
! 10000.0     0.0     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
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! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00
!
!       0                       burial
!   3.e-5                       dispersion coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
```

```
!    0.04                    benthic foc
!     5.0                    benthic doc
!   0.006                    benthic biomass
!    1.19                    wc dfac
!    30.0                    wc ss
!   0.005                    wc chlorophyll
!    0.04                    wc foc
!     5.0                    wc doc
!     0.4                    wc biomass
```

Wet Rice – Transplant (RICEWQ scenario)

```
PARAMETER                                         VALUE USED       SOURCE/RATIONALE
12 41 C:\ANDES\METFILES\ANDES\W844550.DVF
DOUBLE CROP FLAG:   OFFSET DAYS:                        0    000   FLAG:0=no double crop, 1=on  OFFSET DAYS: days added to
cropping and drainage dates
HYDROLOGIC PARAMETERS
Surface area of paddy (ha)                           10.00 10.0  10.00  10.00  10.00          ANDES
Initial depth of paddy (cm)                       0.00           Condition of rice paddy on January 1
Number of Irrigation/Drain Events                 6
Date to irrigate paddy (initial flood) (IDM/IDD)  01/15          Information given by Cultivida
Irrigation Event or Drain Event                   2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    3.50           Information given by Cultivida
Irrigation rate (cm/day)                          5.00           Information given by Cultivida
Depth of paddy outlet (cm)                        50.00          Information given by Cultivida
Depth at which irrigation will begin (cm)         5.00           Information given by Cultivida
Depth at which irrigation will cease (cm)         10.00          Information given by Cultivida
Date to raise flood paddy                         01/20          Typical practice for the region
Irrigation Event or Drain Event                   2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    3.50           Information given by Cultivida
Irrigation rate (cm/day)                          5.00           Information given by Cultivida
Depth of paddy outlet (cm)                        50.00          Information given by Cultivida
Depth at which irrigation will begin (cm)         10.00          Information given by Cultivida
Depth at which irrigation will cease (cm)         15.00          Information given by Cultivida
Date to irrigate paddy (second flood)             01/22          Information given by Cultivida
Irrigation Event or Drain Event                   1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    3.50           Information given by Cultivida
Irrigation rate (cm/day)                          5.00           Information given by Cultivida
Depth of paddy outlet (cm)                        0.00           Information given by Cultivida
Depth at which irrigation will begin (cm)         0.00           Information given by Cultivida
Depth at which irrigation will cease (cm)         0.00           Information given by Cultivida
Date to irrigate paddy (second flood)             01/23          Refill for final flood
Irrigation Event or Drain Event                   2              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    3.50           Information given by Cultivida
Irrigation rate (cm/day)                          5.00           Information given by Cultivida
Depth of paddy outlet (cm)                        50.00          Information given by Cultivida
Depth at which irrigation will begin (cm)         10.00          Information given by Cultivida
Depth at which irrigation will cease (cm)         15.00          Information given by Cultivida
Date to irrigate paddy (second flood)             05/03          2 days before drain for harvest, no irrigation
Irrigation Event or Drain Event                   1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    3.50           Information given by Cultivida
Irrigation rate (cm/day)                          5.00           Information given by Cultivida
Depth of paddy outlet (cm)                        50.00          Information given by Cultivida
Depth at which irrigation will begin (cm)         0.00           Information given by Cultivida
Depth at which irrigation will cease (cm)         0.00           Information given by Cultivida
Date to cease irrigating paddy                    05/05          Almost 2 weeks before harvest
Irrigation Event or Drain Event                   1              (1=drain, 2=Auto, 3=Fixed)
Maximum drainage rate (cm/day)                    3.50           Information given by Cultivida
Irrigation rate (cm/day)                          5.00           Information given by Cultivida
Depth of paddy outlet (cm)                        0.00           Information given by Cultivida
Depth at which irrigation will begin (cm)         0.00           Information given by Cultivida
Depth at which irrigation will cease (cm)         0.00           Information given by Cultivida

CROP PARAMETERS
Crop emergence date (JEM/JED)                     01/25              Information given by Cultivida
Crop maturity date (KMM/KMD)                      04/09          Flowering - 75 days after emergence)
Crop harvest date (KHM/KHD)                       06/04              Information given by Cultivida
Maximum crop coverage (fraction)                  1.00           Information given by Cultivida
Paddy EVAP                                         -8.00  8.00  8.00 10.00 12.00 13.00 13.00 12.00 11.00 10.00  8.00  8.00

AQUATIC CONCENTRATION PARAMETERS
Settling velocity (m/day)                         2.00           Calculated for fine particles (Guy,1977)
Mixing velocity (diffusion) (m/day)               0.001          Typical range of 0.0 - 0.1 m/day (Arnold et al., 1991)
Seepage Rate                                      0.00           Information given by Cultivida
DMAX                                              75.000         Information given by Cultivida
DLAKE                                             0.000          Condition on January 1

SEDIMENT CONCENTRATION PARAMETERS
Concentration of suspended sediment (ppm)         30.00          Typical default (Young, 2014)
Depth of active sediment layer (cm)               5.00           Guidelines (Young, 2014; Med-Rice,2003)
Bulk density of bed sediment (g/cc)               1.25           Soil 18852 (FAO/IIASA/ISRIC/ISSCAS/JRC. 2012)
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Wilting point (cm3/cm3)                           0.29           Rawls and Brackensiek (1982) equation using soil parameters
Mixing depth to allow direct partitioning to bed  0.10           Professional judgment and Capri and Miao (2002)
Organic Carbon Content                            1.75           Soil 18852 (FAO/IIASA/ISRIC/ISSCAS/JRC. 2012)

FLAGS
Harvest Flag                                      -2            -1 = all residues left alone,-2 = foliar residues removed
(set to 0), still has sediment residues 0 = all foliar and sediment residues removed (set to 0)
EXAMS Flag                                        1              0=no EXAMS transfer files, 1= EXAMS transfer files
!
!       1       4       4       Watershed Data
! 10000.0     0.0     0.0       Waterbody Area (by Env)
!     2.0     2.0     0.0       Waterbody Depth (by Env)
!     2.0     2.0     0.0       Waterbody Max. Depth (by Env)
!     1.0     0.2     0.0       Crop Area Fraction
!       4       4       4       Flow/Volume Option
!      0.      0.      0.       Flow/Volume value
!       0       0       0       Scen Specific Drift Option
! 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
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0.00 0.00
!
!       0                       burial
!   3.e-5                       dispersion coefficient
!     0.5                       prben
!    0.05                       benthic depth
!    0.50                       benthic porosity
!    1.85                       benthic bulk density
```

```
!    0.04                    benthic foc
!     5.0                    benthic doc
!   0.006                    benthic biomass
!    1.19                    wc dfac
!    30.0                    wc ss
!   0.005                    wc chlorophyll
!    0.04                    wc foc
!     5.0                    wc doc
!     0.4                    wc biomass
```

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