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VegSyst-DSS for managing irrigation and N fertilization in outdoor vegetable crops

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New features of VegSyst-DSS for outdoor veg crops

1. Rainfall as a water input
2. Includes surface irrigation

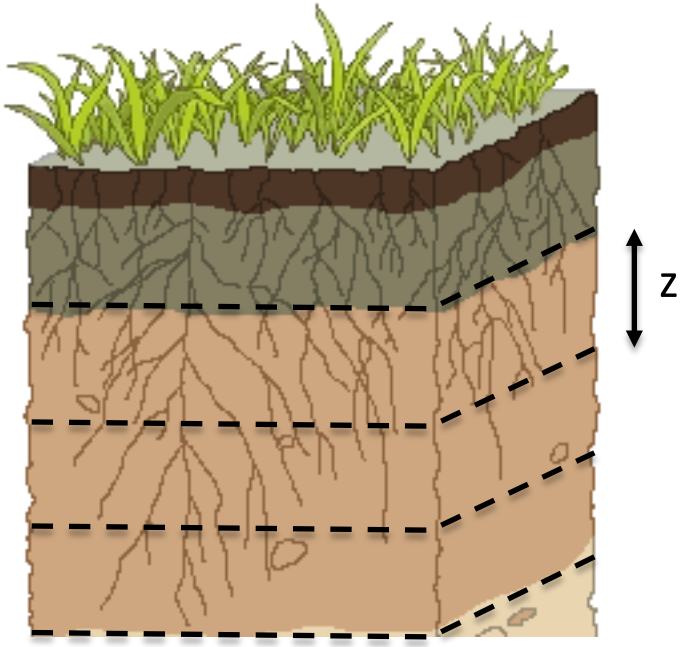
3. Double approach for calculating DMP
4. Root growth is calculated
5. Crop N demand (named as 'Crop N uptake' in previous presentation) includes aerial and roots demand

6. Soil temperature and moisture functions to calculate mineralization and nitrification
7. Downwards movement of water and N-NO_3

2. Surface irrigation

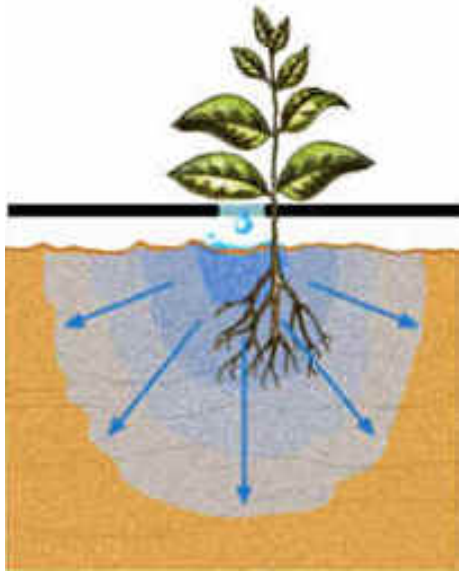
Surface Irrigation

N layers of thickness ‘z’

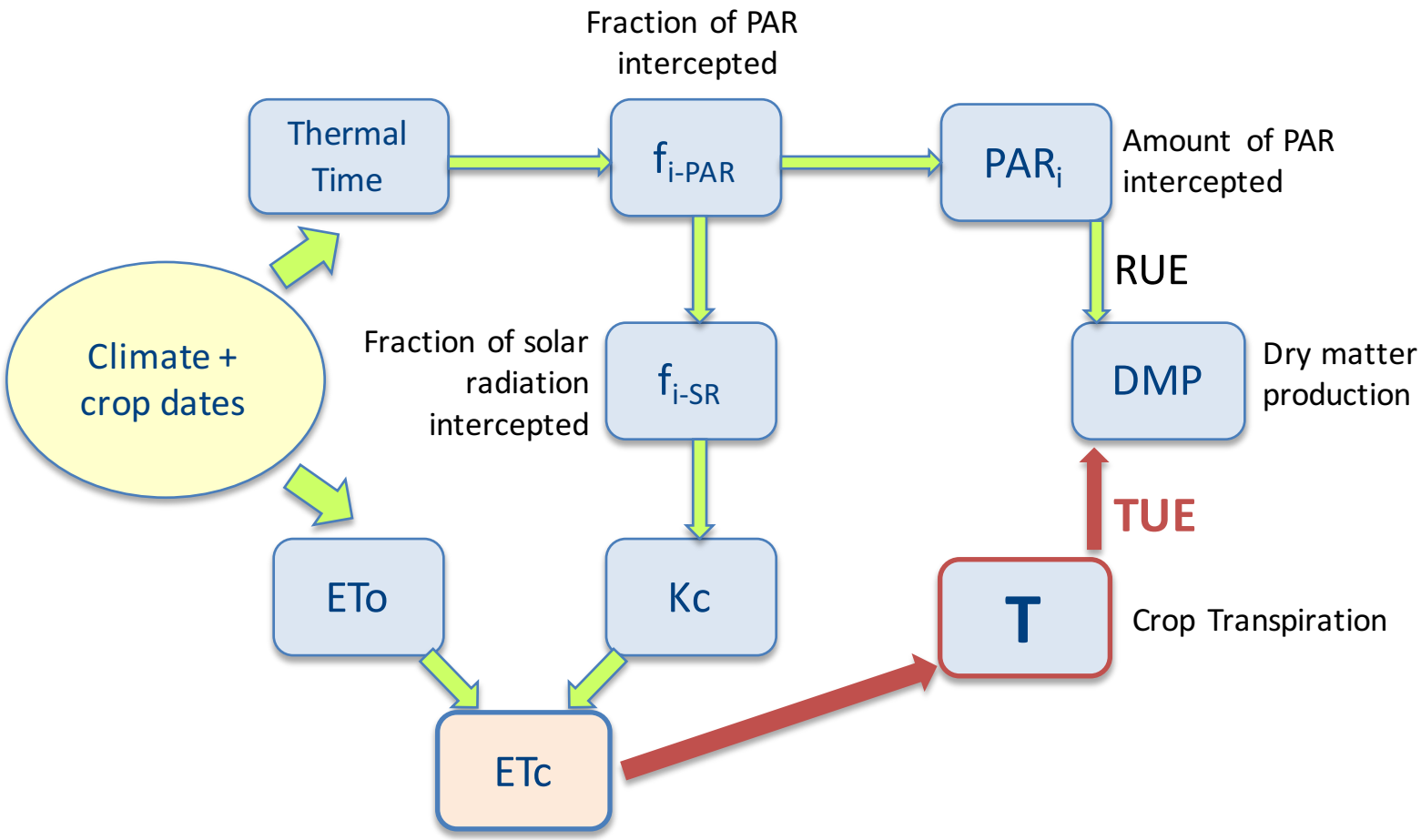


Drip Irrigation

Wet bulb dimensions

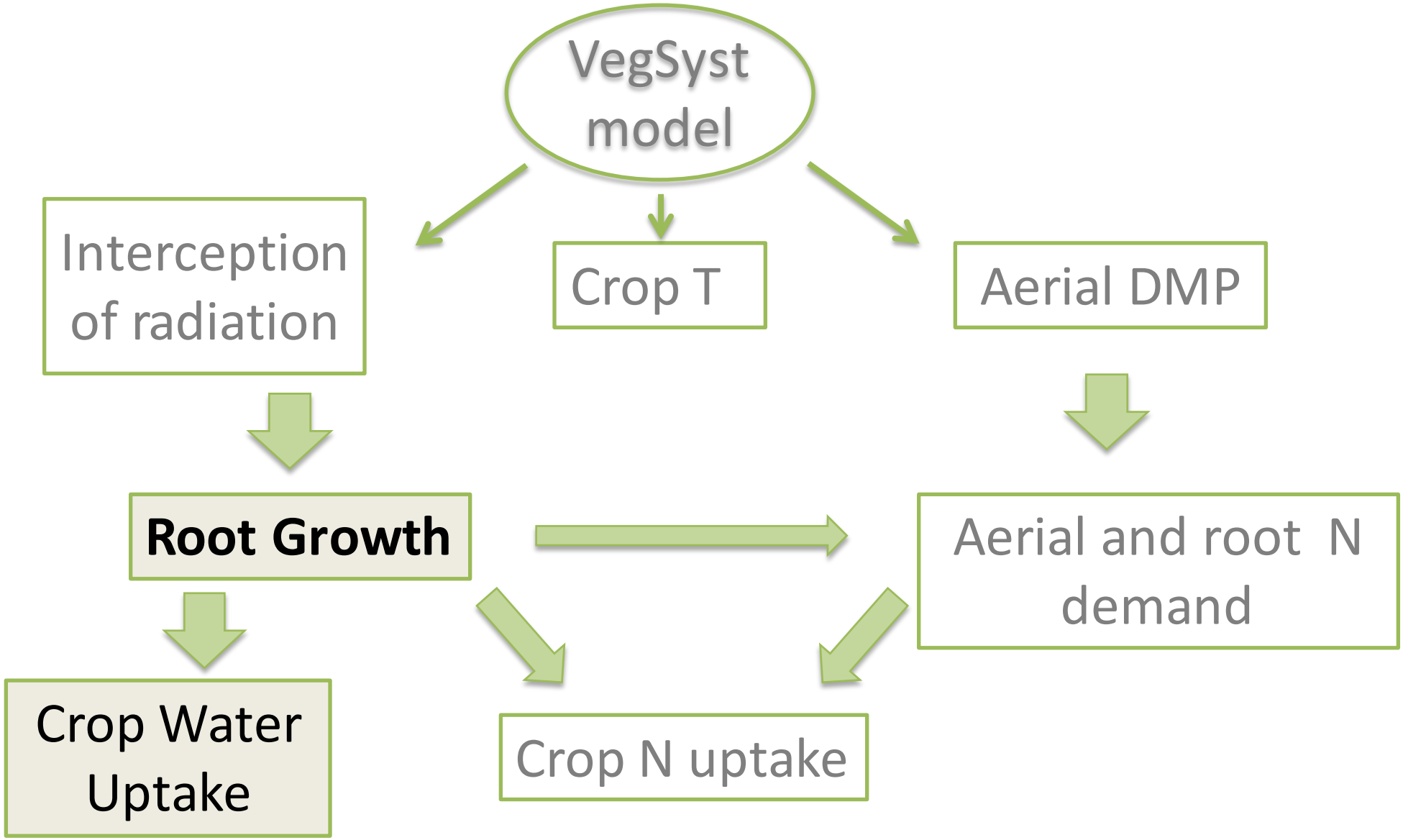


3. Double approach for calculating DMP



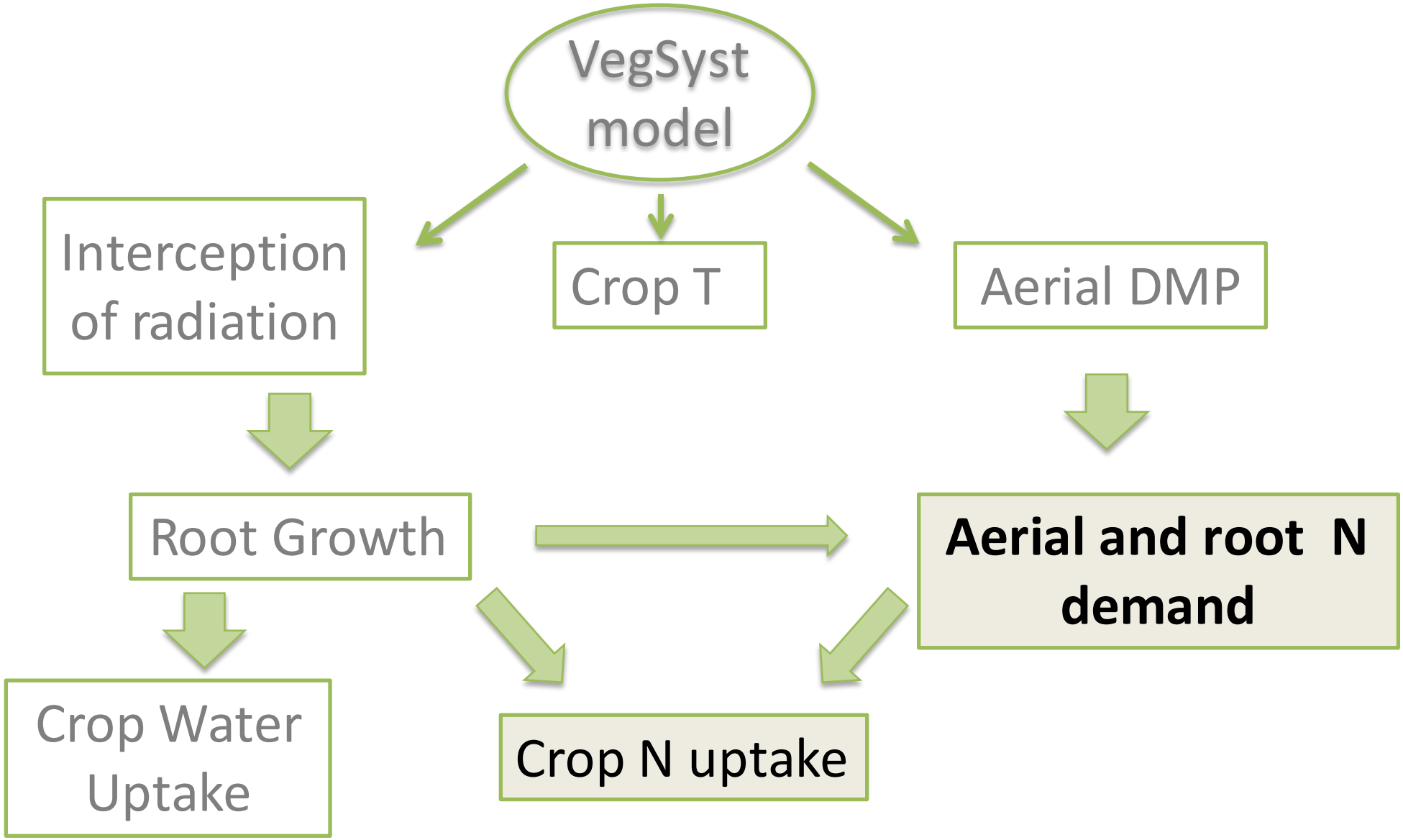
4. Root growth is calculated

Crop Processes



5. Aerial and root N demand

Crop Processes



7. Downward movement of water and solutes

Soil Processes

Rainfall and/or Irrigation

Soil N content updated

Water and N transport

SWC updated

Other N cycle processes (N gas losses) are not considered

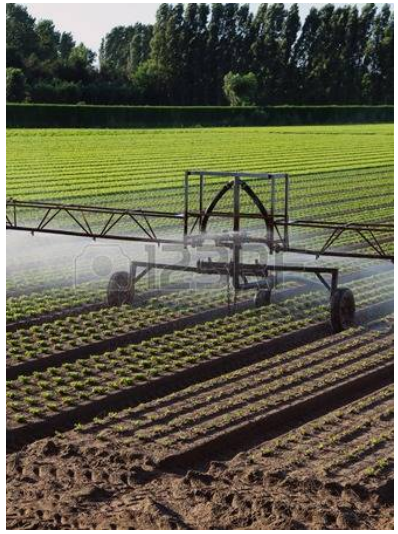
Management: Surface irrigation and fertilization

Surface Irrigation

Net Irrigation = Max PAW - Current PAW

Efficiency Coeff.
Irrig. System

Gross Irrigation



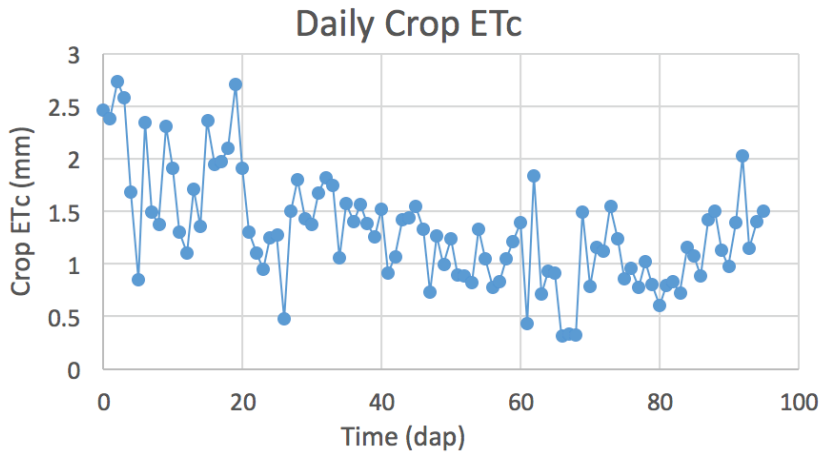
N fertilization

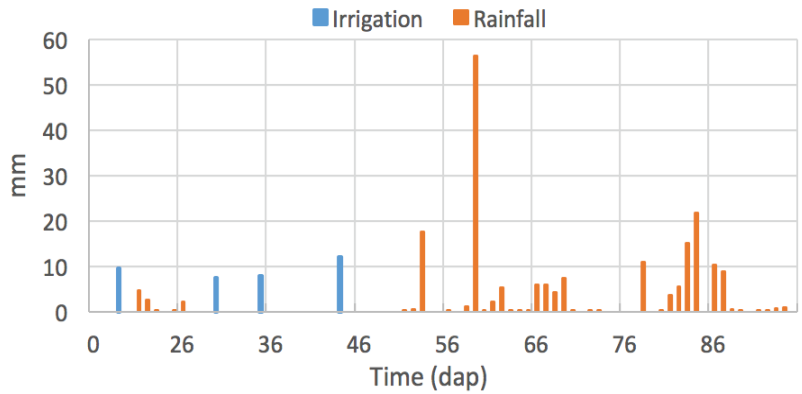
If Current soil N < Allowable residual soil N

Amount

(Allowable soil N max – Current soil N)

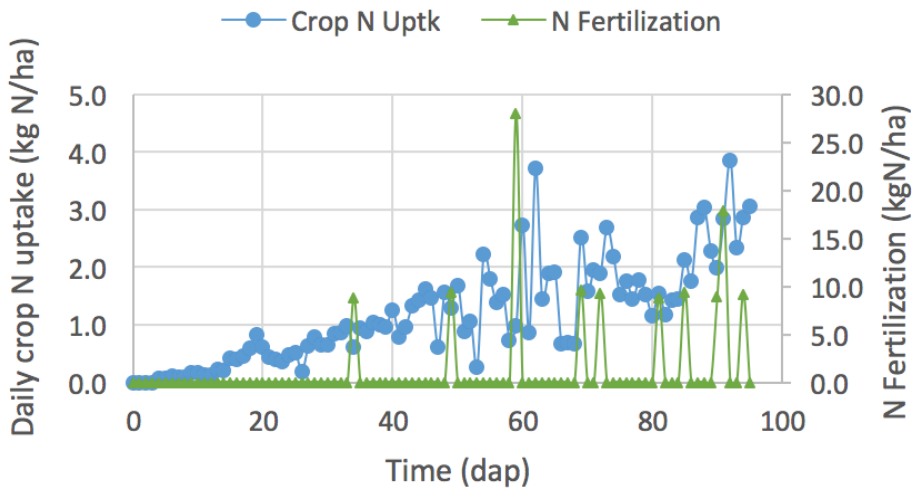
Example of Outputs





Crop ETc: 126 mm
Irrigation: 70 mm
Rainfall: 197 mm

Crop: spinach
Location: Córdoba, Spain
Cycle: Oct. 27, 2013 - Jan 30, 2014
Initial soil N: 40 kg/ha
Initial SWC: 0.20 cm^3/cm^3



N uptake: 114 kg/ha
N Fertilization: 119 kg/ha
N leaching: 36 kg/ha

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To be implemented

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Parameterize more crops

User interaction feature

Thanks for your attention!