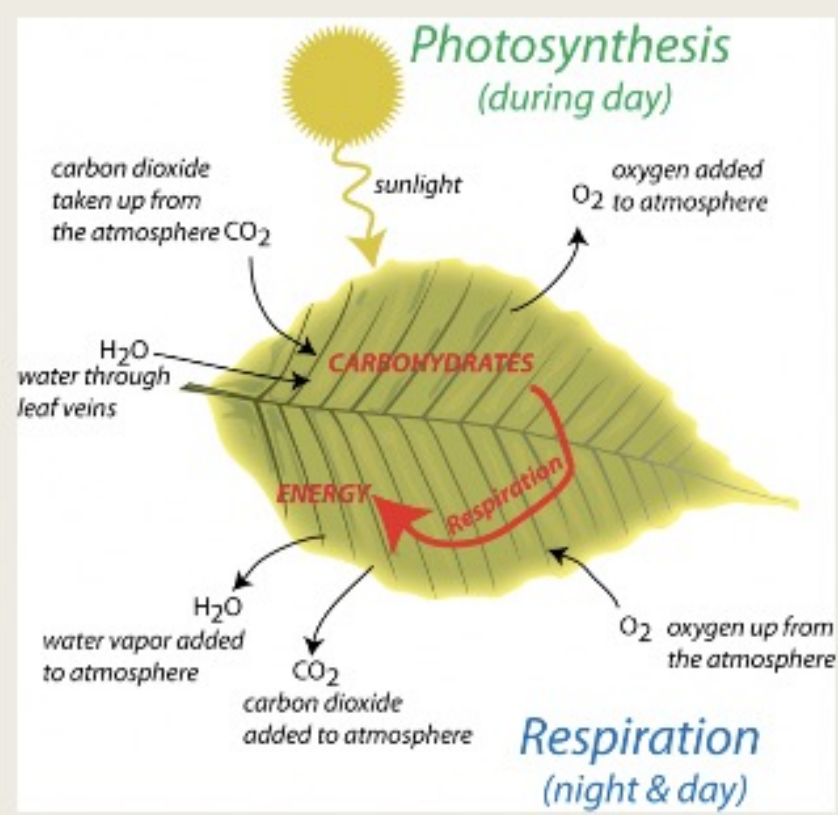


## Photosynthesis

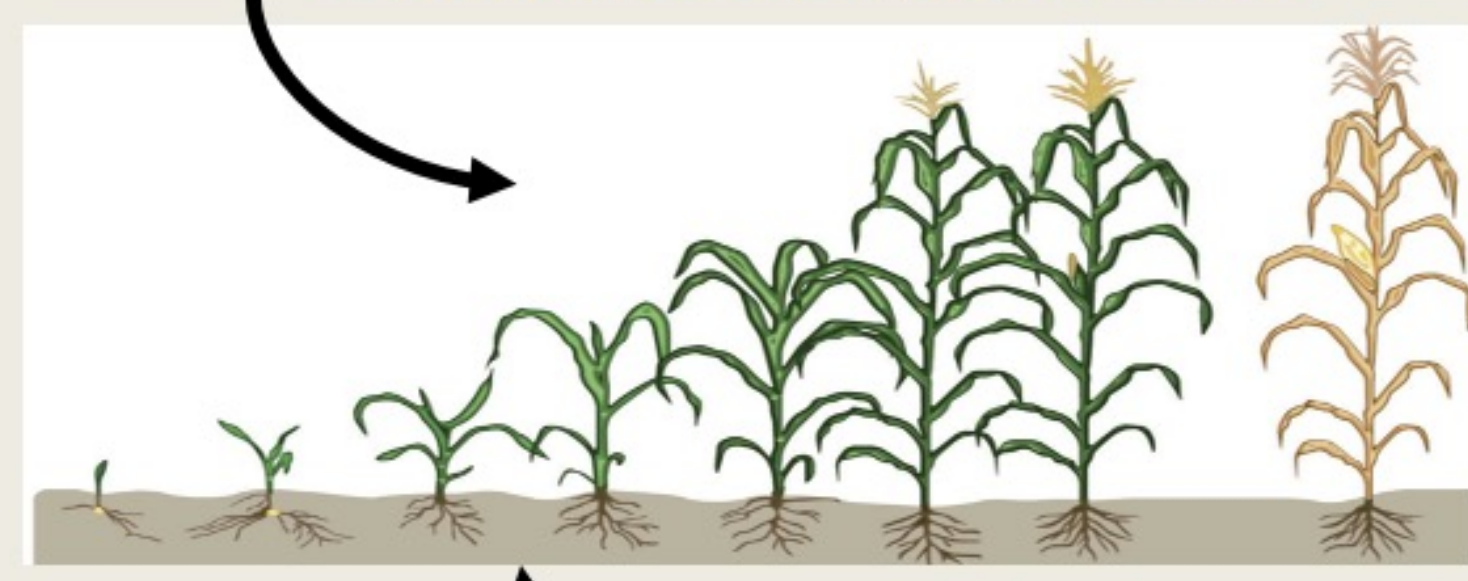


## Weather and Climate

Precip, Temp, Humidity, Radiation, Wind, Pressure



## Dynamic crop growth



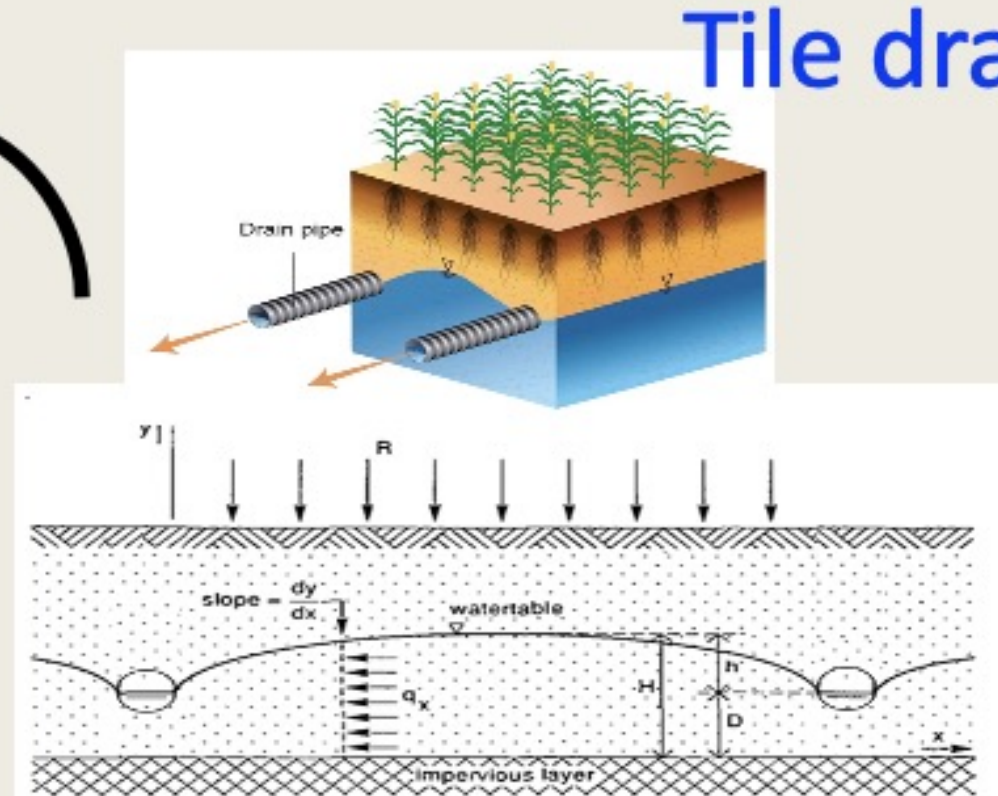
## Crop yield



## Irrigation

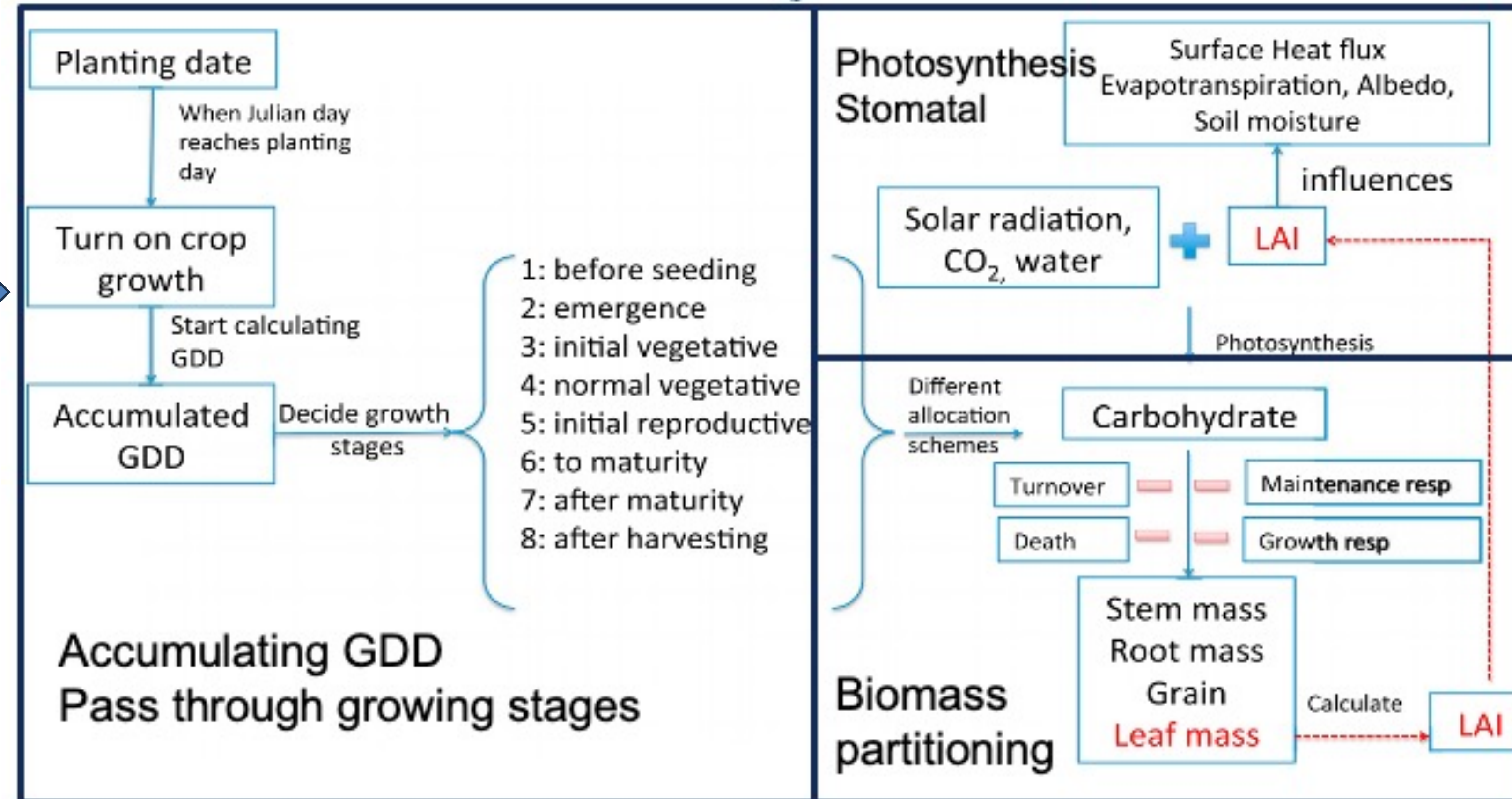


## Tile drainage

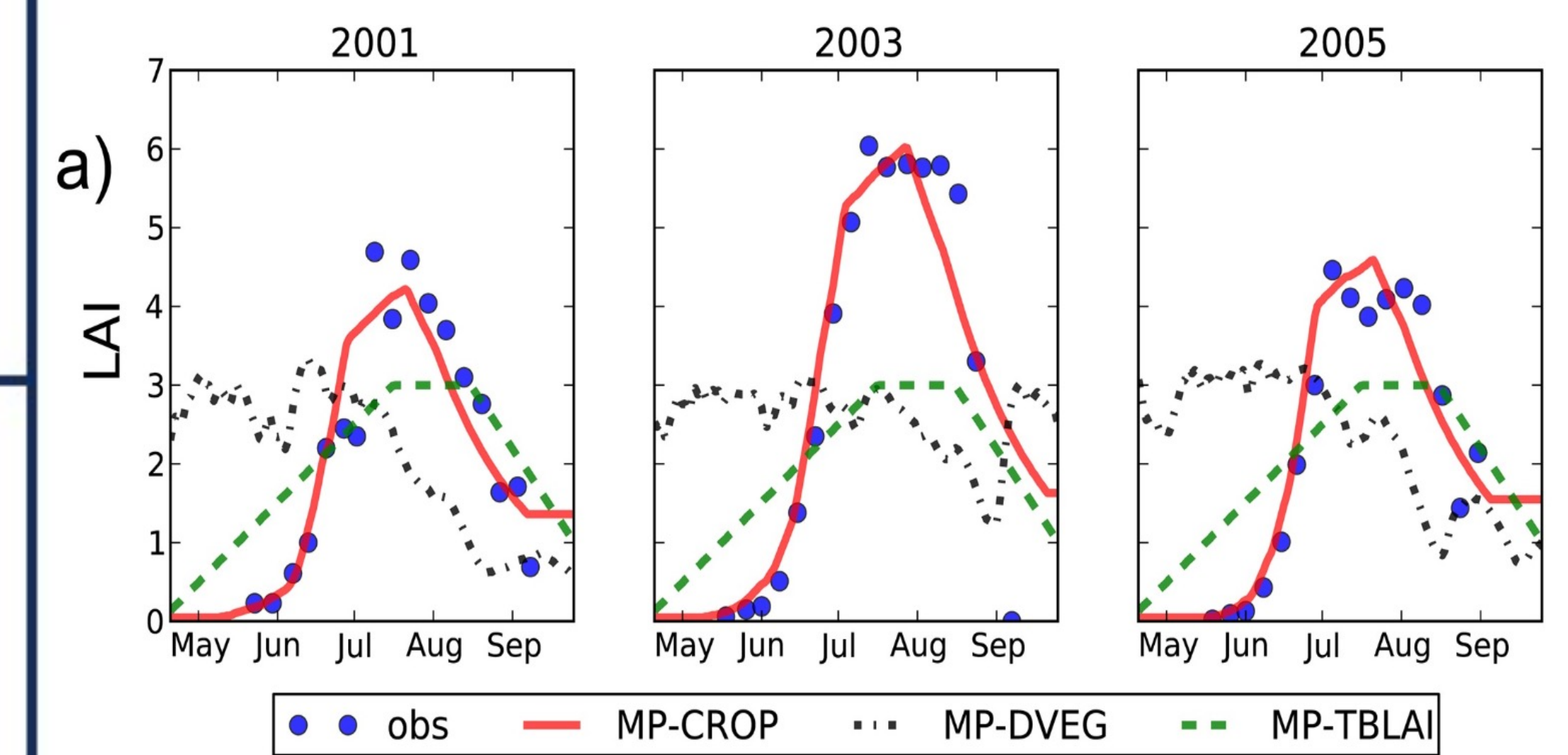


Climate/weather forcing

## Dynamic Crop Model



Dynamic LAI feedback to photosynthesis & Evapotranspiration, modifying Surface energy & water balance

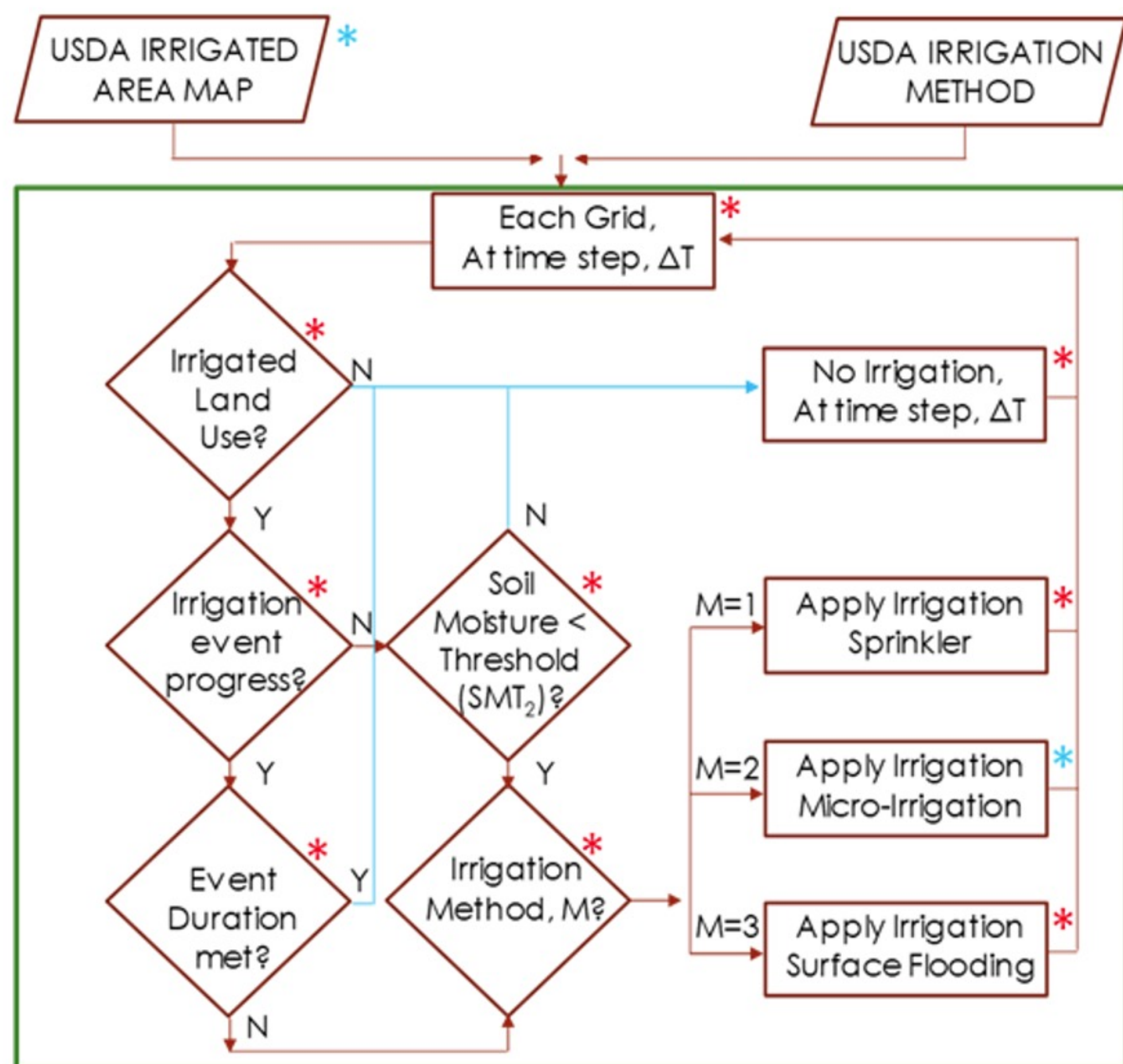


Mead, NE

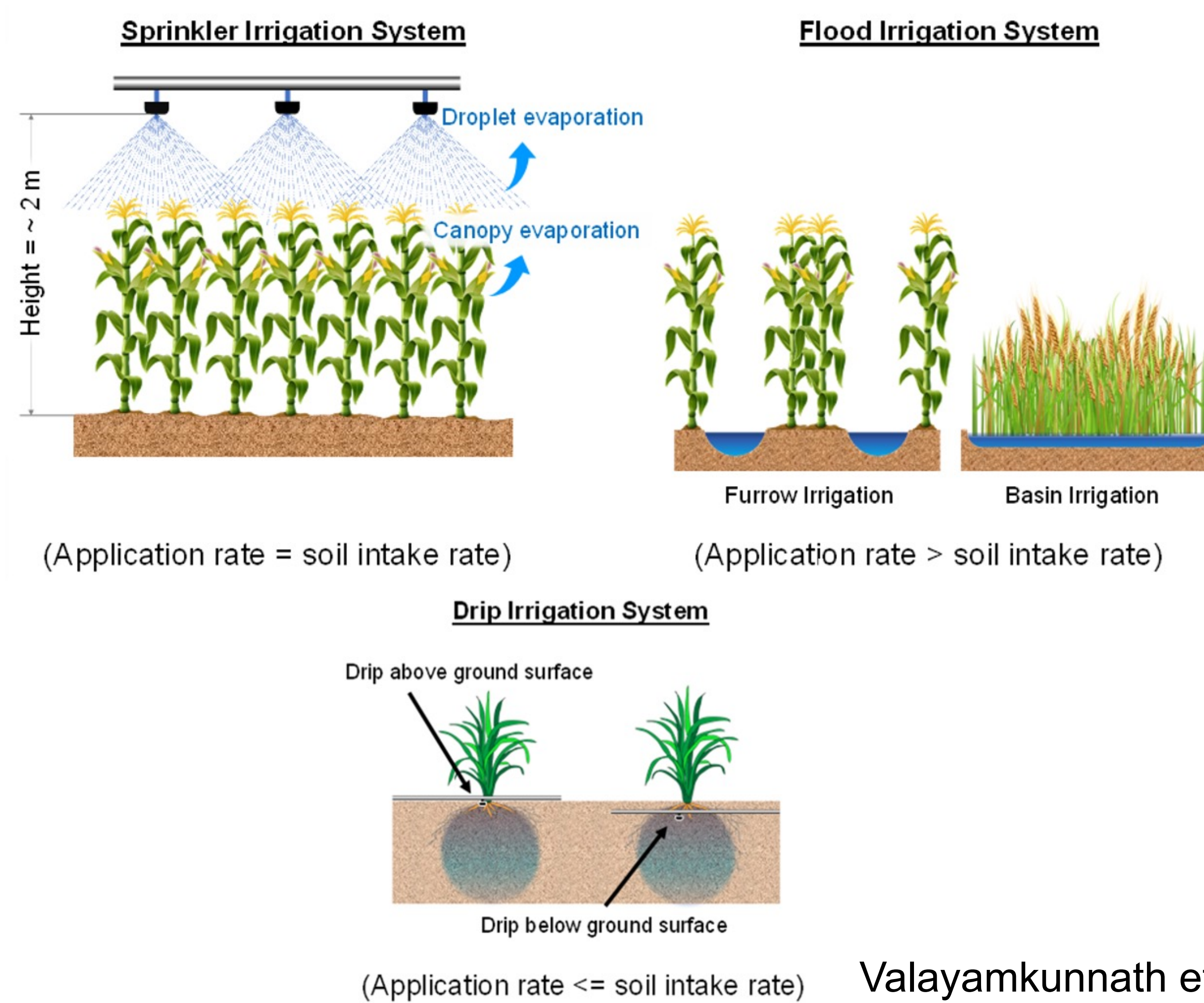
Liu et al., 2016; Zhang et al., 2020, 2022

## Dynamic Irrigation Model

### Noah-MP Dynamic Irrigation Scheme



- 1) where to irrigate?
- 2) when to irrigate?
- 3) what amount of water to irrigate?
- 4) how to irrigate?

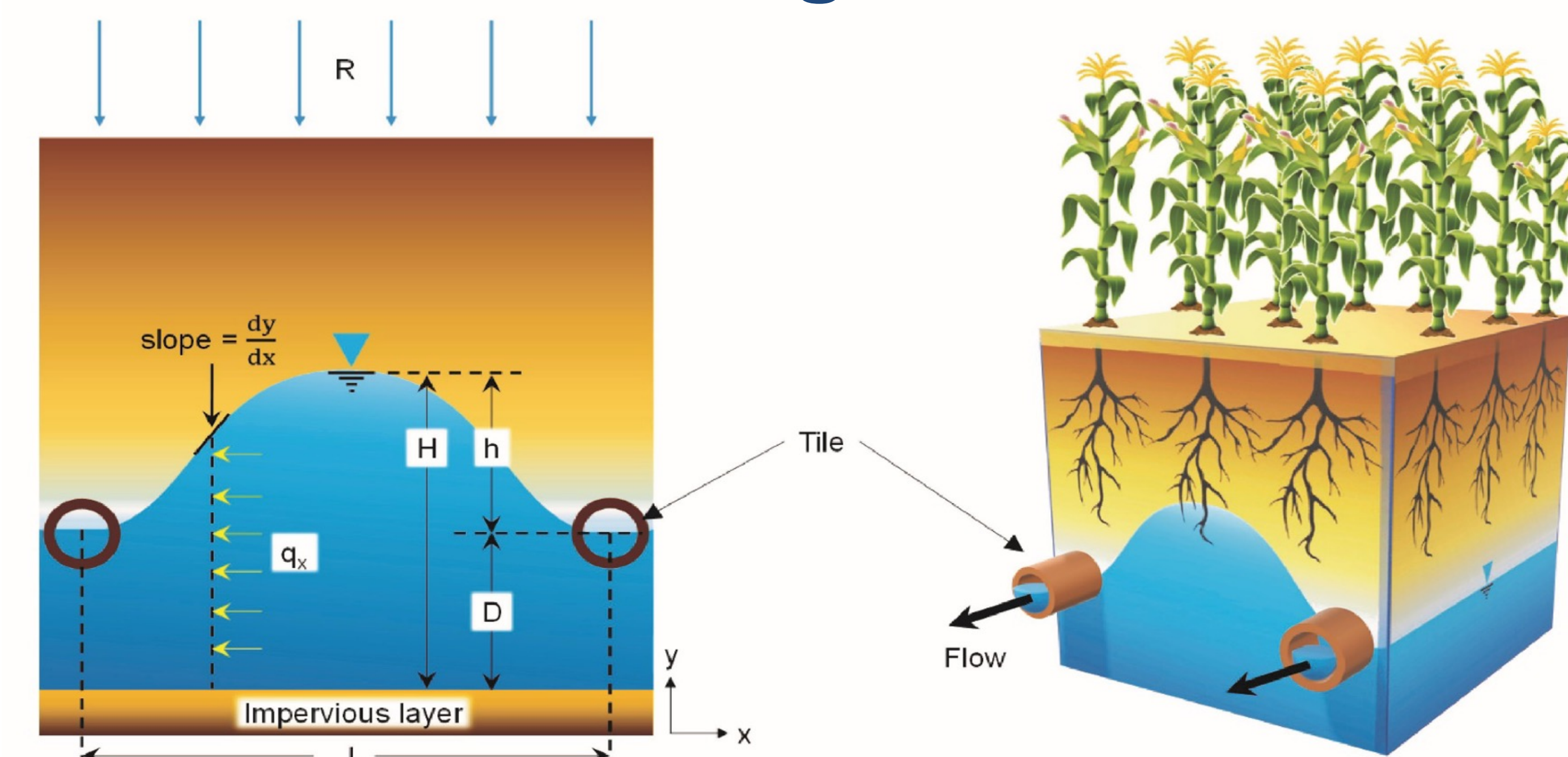


Three irrigation methods have different effects on surface energy & water balance

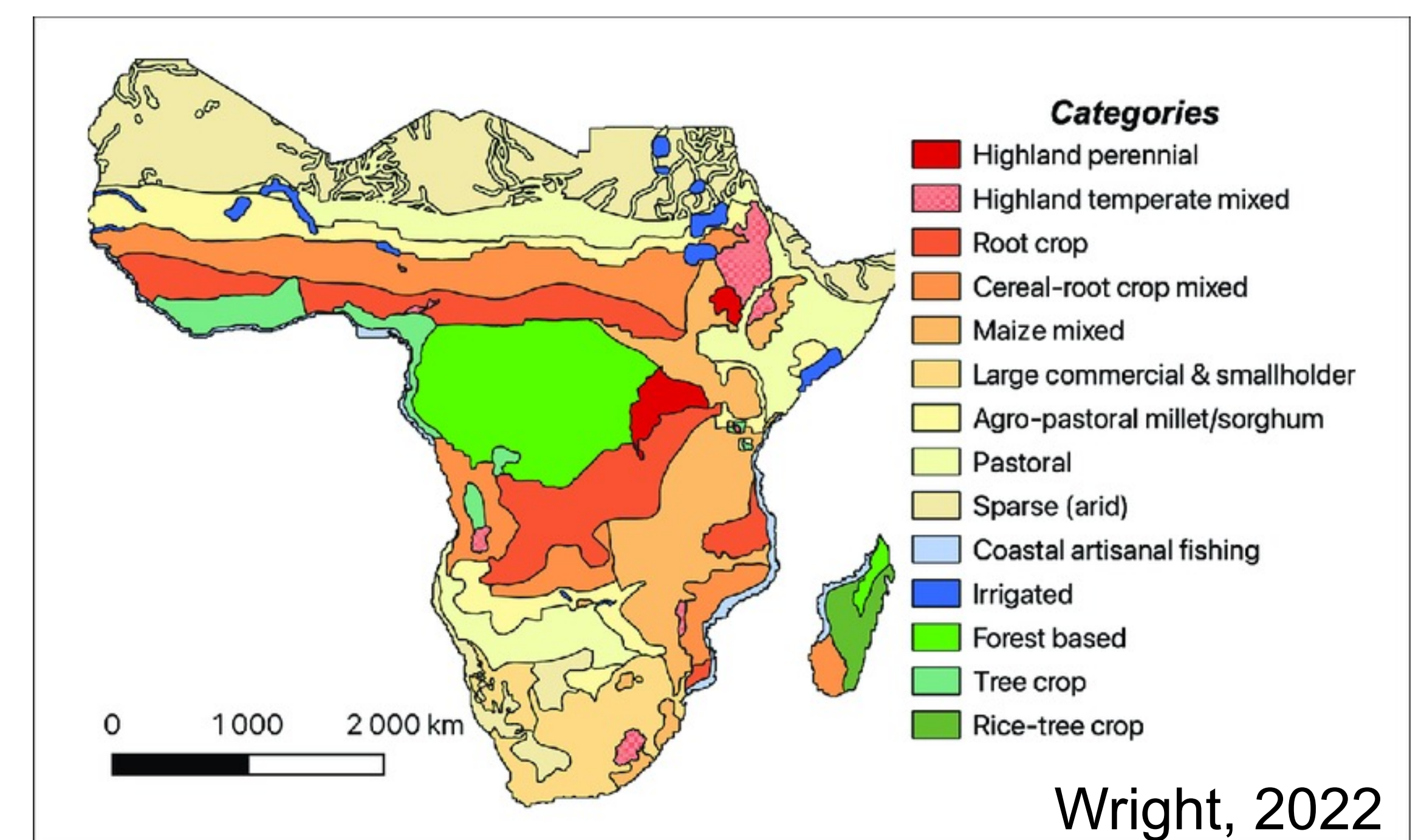
Valayamkunnath et al. 2021

## Tile Drainage Model

Valayamkunnath et al. 2022



## Farming impact on African landscape



Wright, 2022