Development of an erosion and transfer particulate phase pesticides model at the watershed scale

Tulio Soares-Lima, Nadia Carluer, Michaël Rabotin, Roger Moussa, Claire Lauvernet

RiverLy Unit
Diffuse Pollution Team

Session HS9.2 – Transfer of sediments and contaminants in catchments, rivers systems and lakes

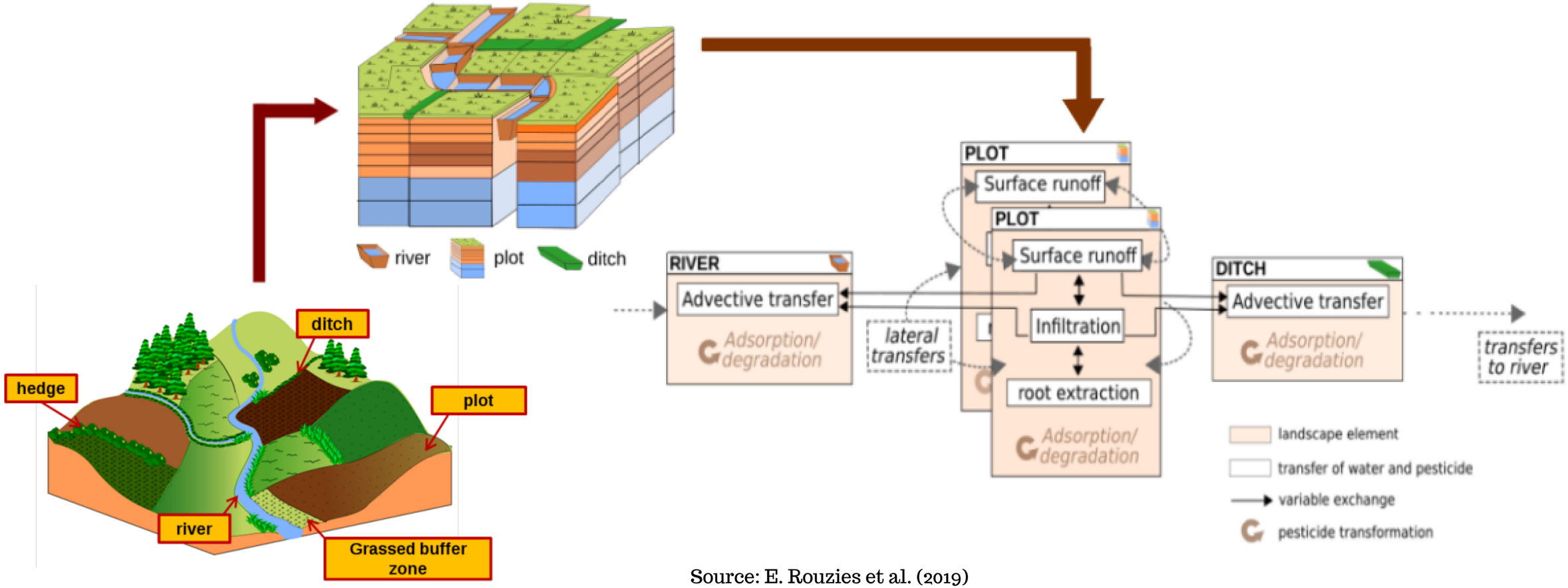
Development of an erosion and transfer particulate phase pesticides model at the watershed scale

Tulio Lima, Nadia Carluer, Michael Rabotin, Roger Moussa, and Claire Lauvernet

April 2023

PESHMELBA

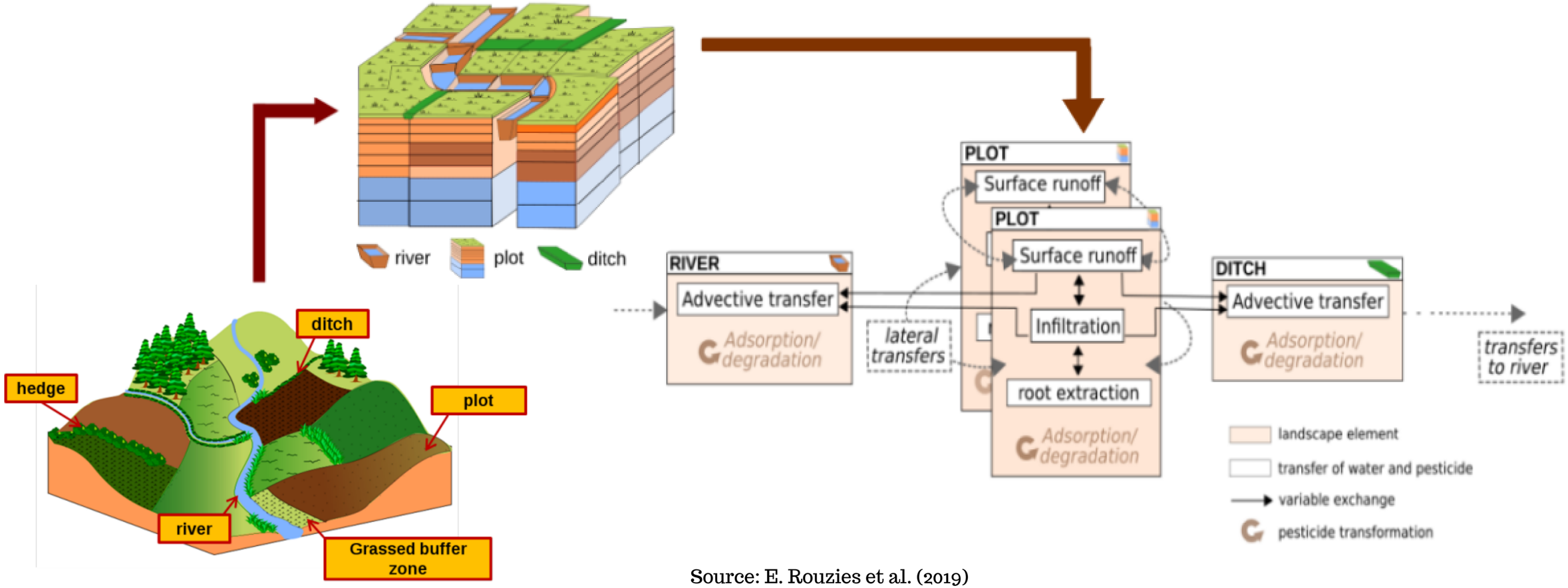
- Simulate pesticide transfers (in solution) and fate on small agricultural catchments
- Simulations of heterogenous landscapes
- Continuous dynamic simulations
- Modular structure to explore landscape management scenarios



Source: E. Rouzies et al. (2019)

PESHMELBA

- Simulate pesticide transfers (in solution) and fate on small agricultural catchments
- Simulations of heterogenous landscapes
- Continuous dynamic simulations
- Modular structure to explore landscape management scenarios



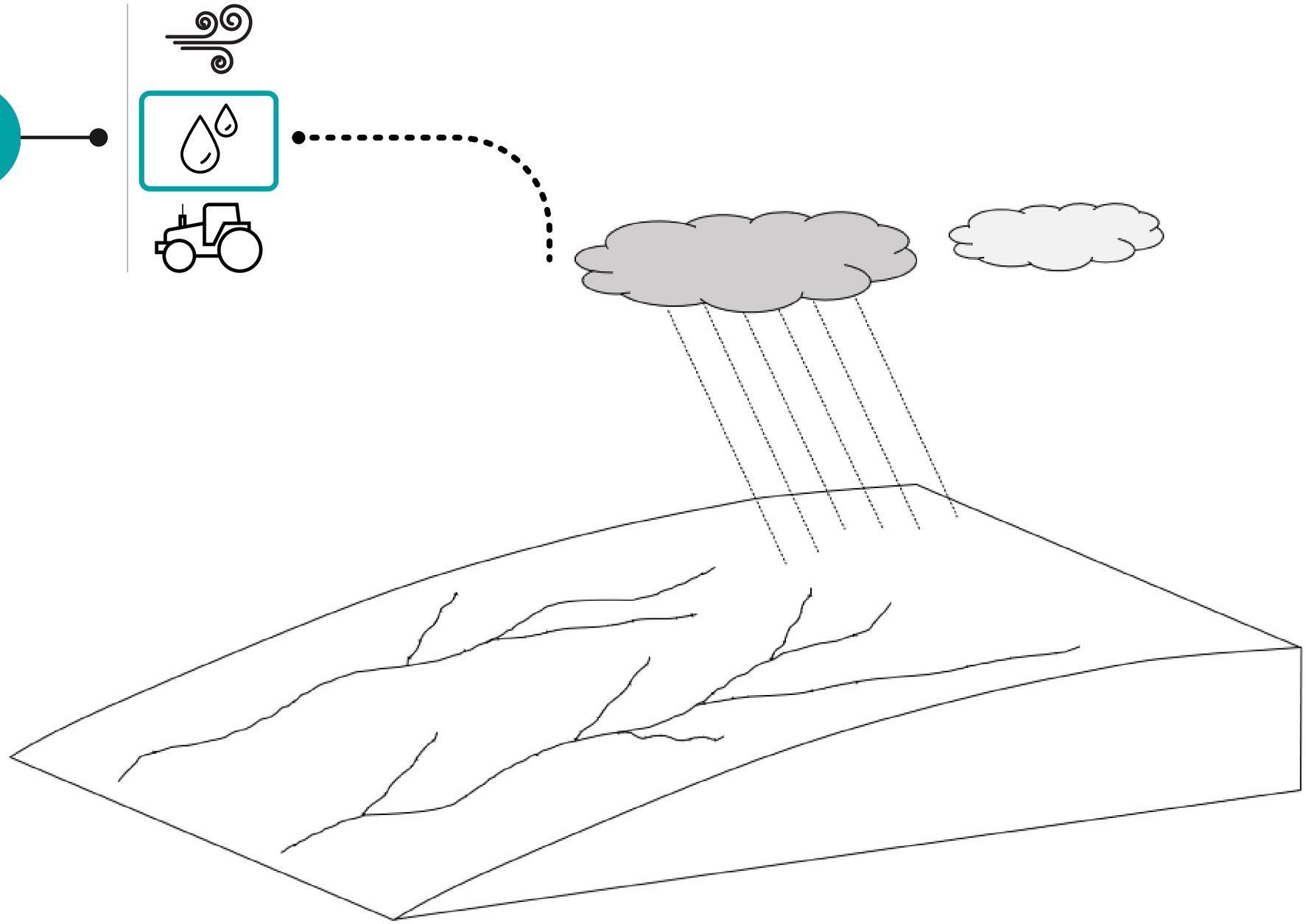
Source: E. Rouzies et al. (2019)

PESHMELBA

EROSION MODEL

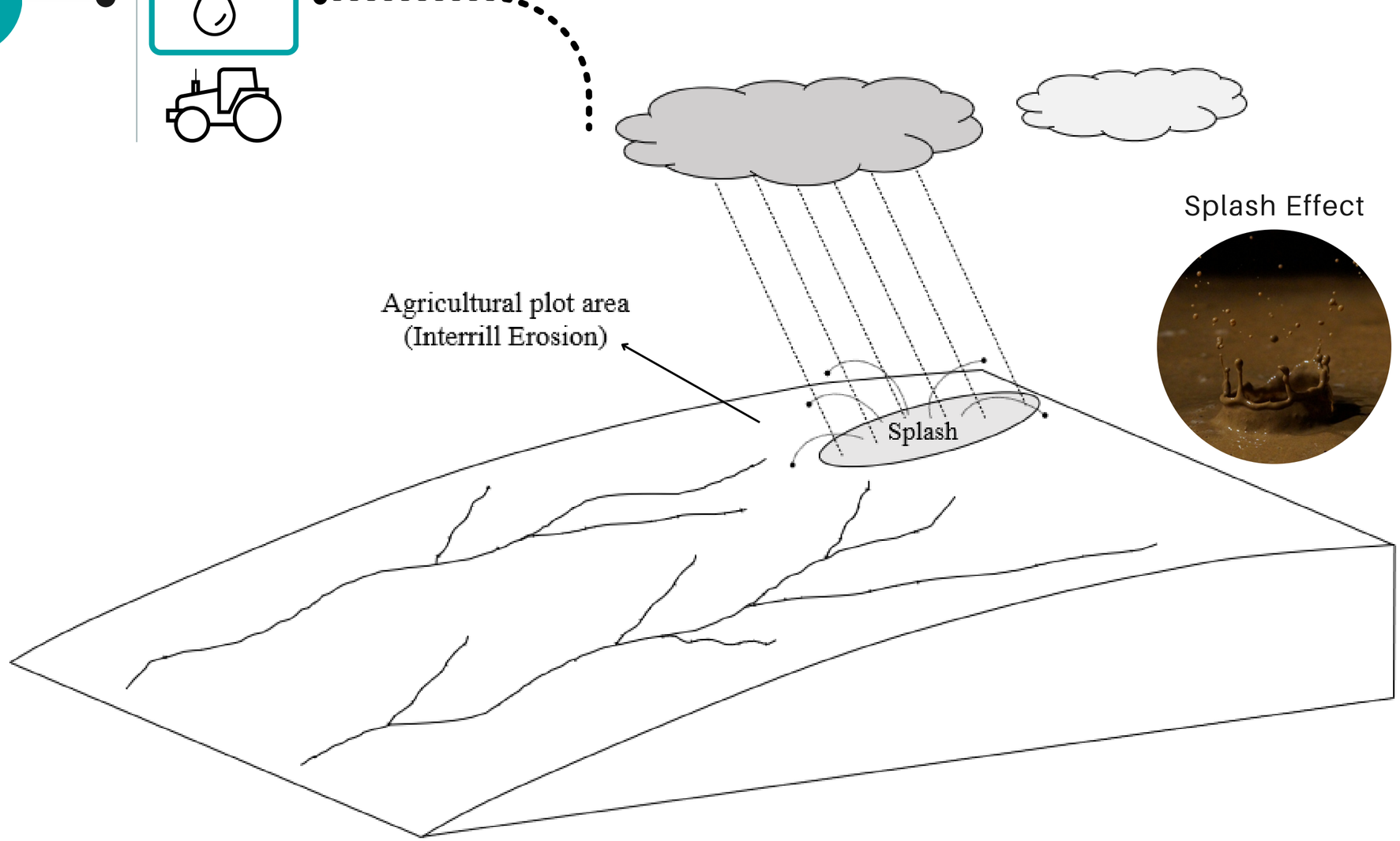
PESHMELBA

EROSION MODEL



PESHMELBA

EROSION MODEL



Splash Effect

PESHMELBA

EROSION MODEL

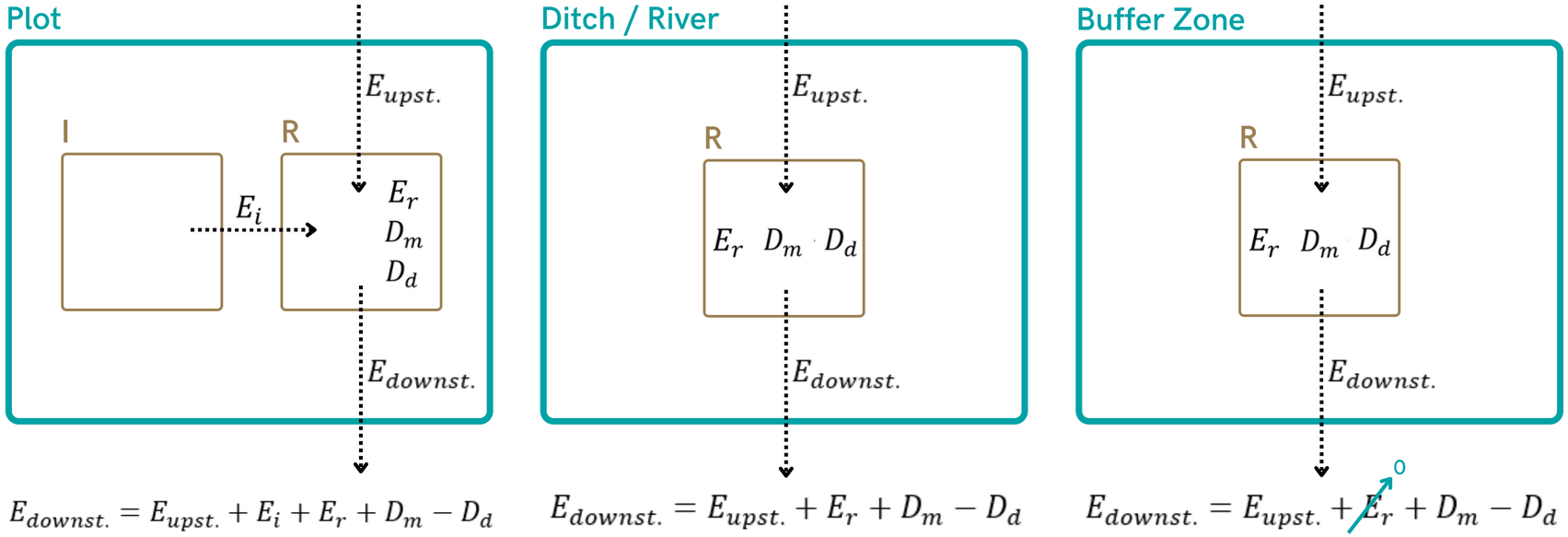
Rill Channels

Splash Effect

PESHMELBA

EROSION MODEL

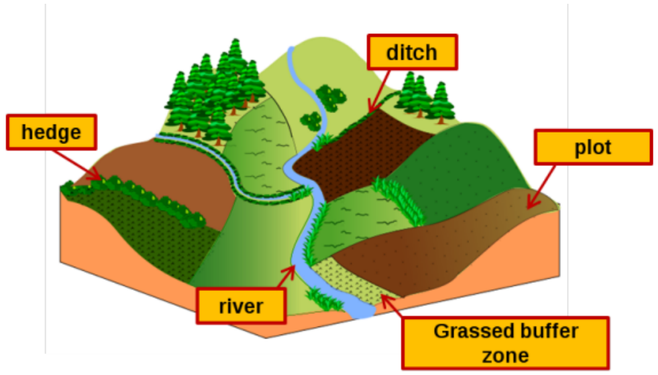
Processes representation for each landscape element:

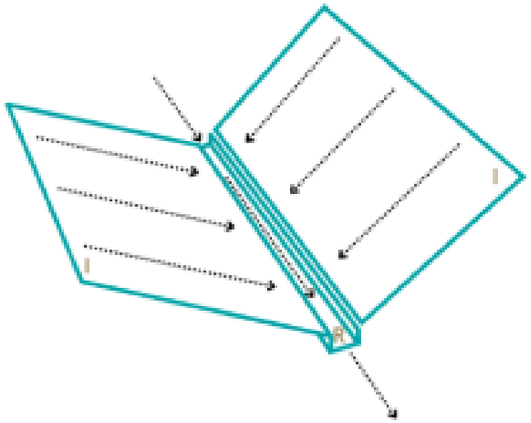


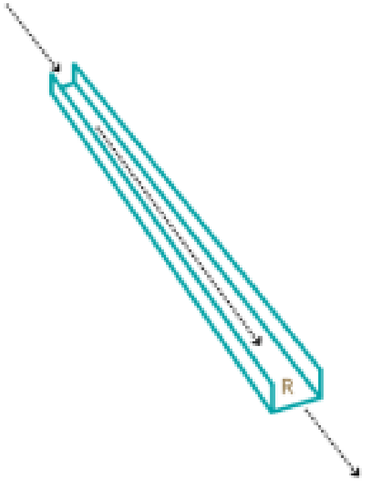
$$E_{downst.} = E_{upst.} + E_i + E_r + D_m - D_d$$

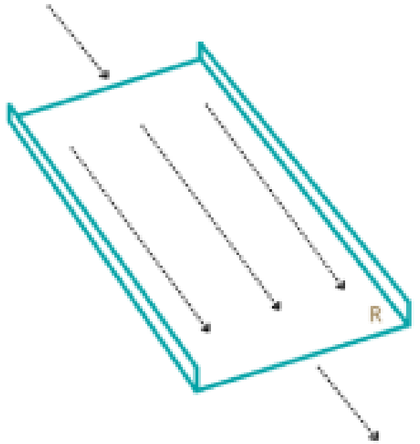
$$E_{downst.} = E_{upst.} + E_r + D_m - D_d$$

$$E_{downst.} = E_{upst.} + \overset{0}{E_r} + D_m - D_d$$









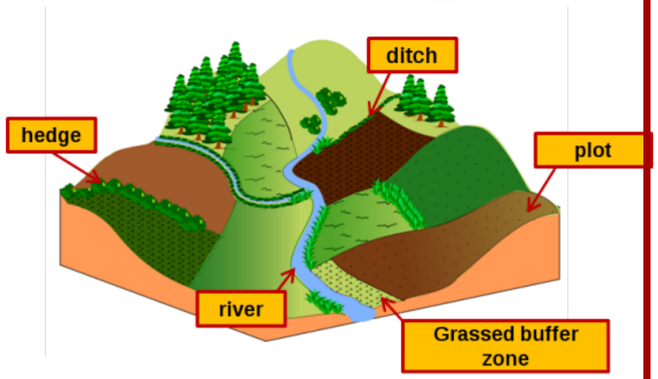
I = Interrill Process ; R = Rill Process

PESHMELBA

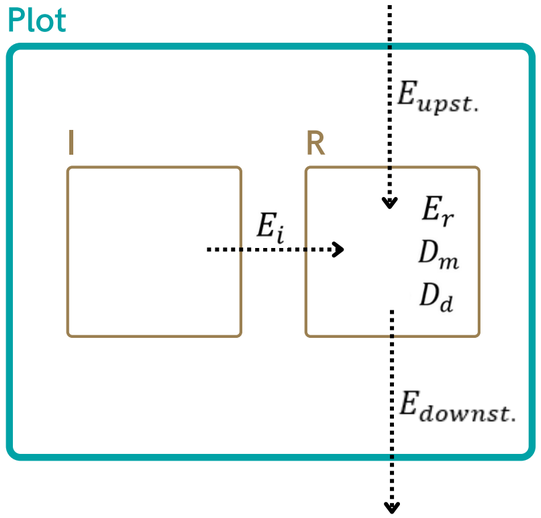
EROSION MODEL

Processes representation for each landscape element:

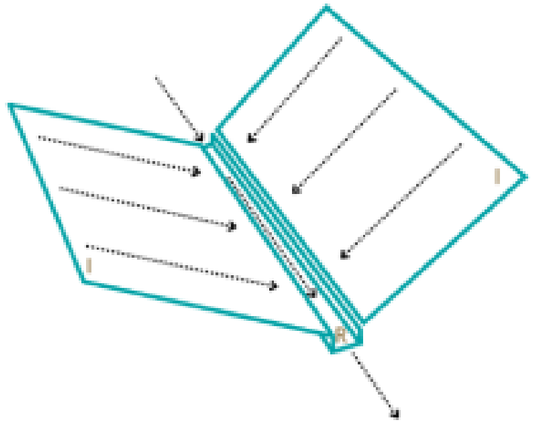
Interrill Erosion, Rill Erosion and Deposition



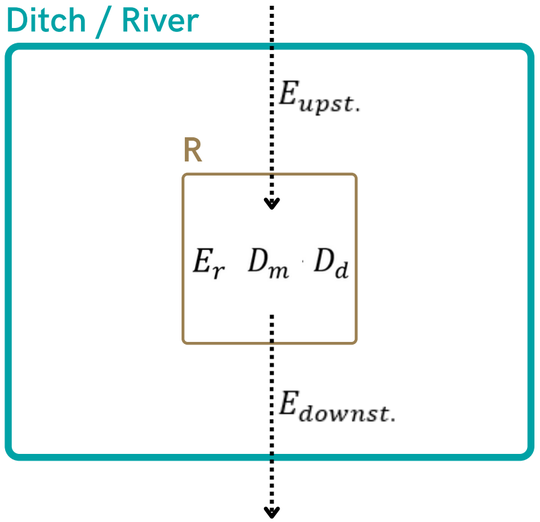
Plot



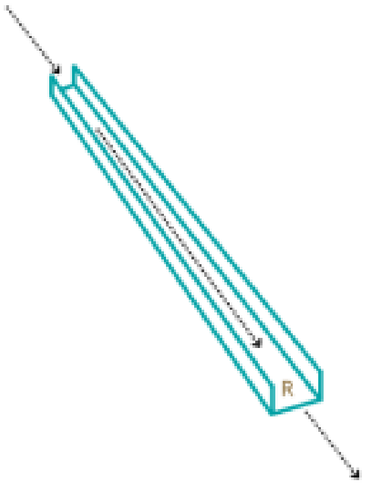
$$E_{downst.} = E_{upst.} + E_i + E_r + D_m - D_d$$



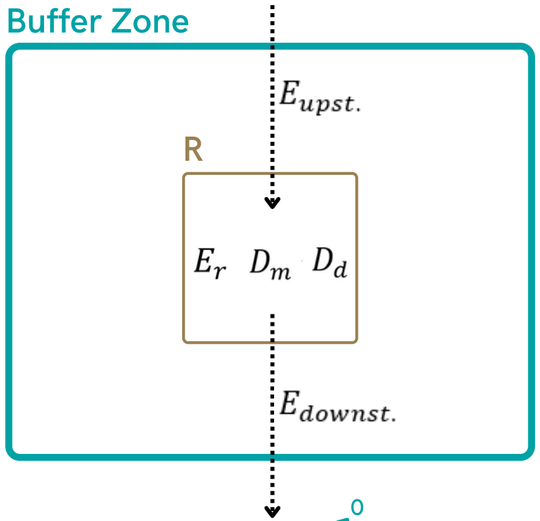
Ditch / River



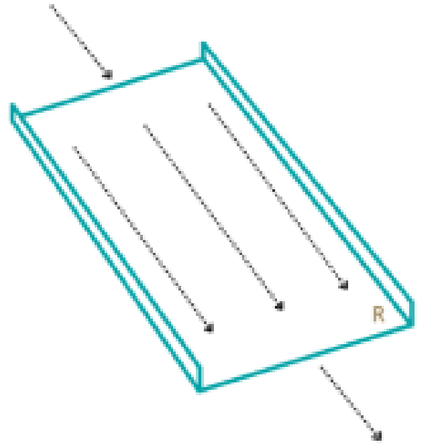
$$E_{downst.} = E_{upst.} + E_r + D_m - D_d$$



Grassed Buffer Zone



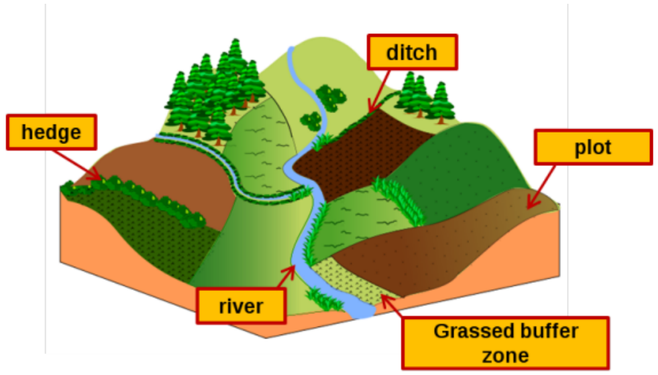
$$E_{downst.} = E_{upst.} + \overset{0}{E_r} + D_m - D_d$$



I = Interrill Process ; R = Rill Process

PESHMELBA

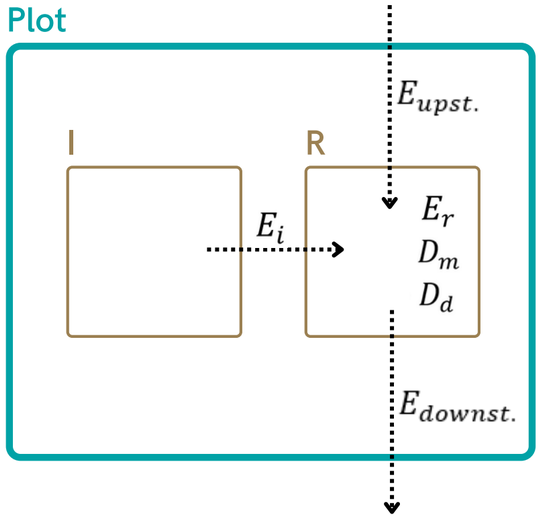
EROSION MODEL



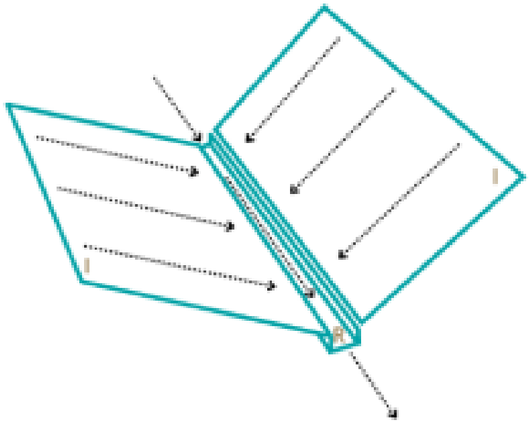
Processes representation for each landscape element:

Rill Erosion and Deposition

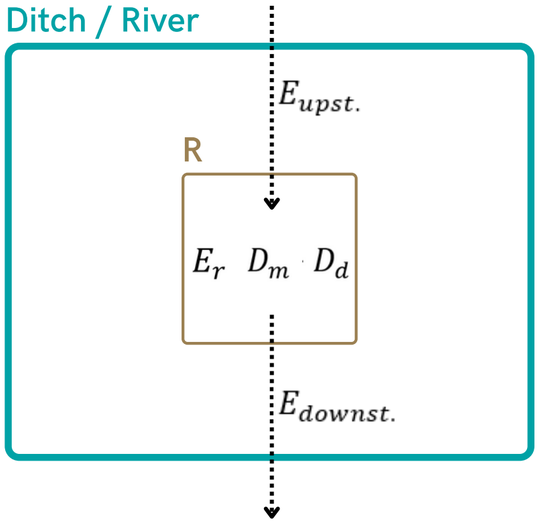
Plot



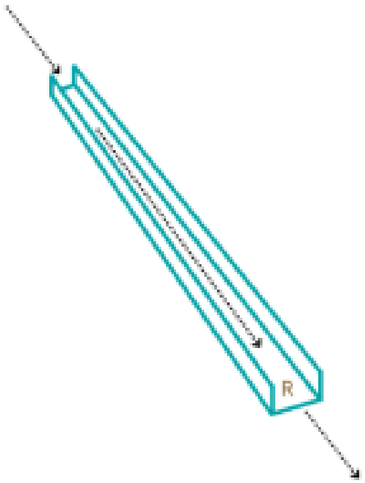
$$E_{downst.} = E_{upst.} + E_i + E_r + D_m - D_d$$



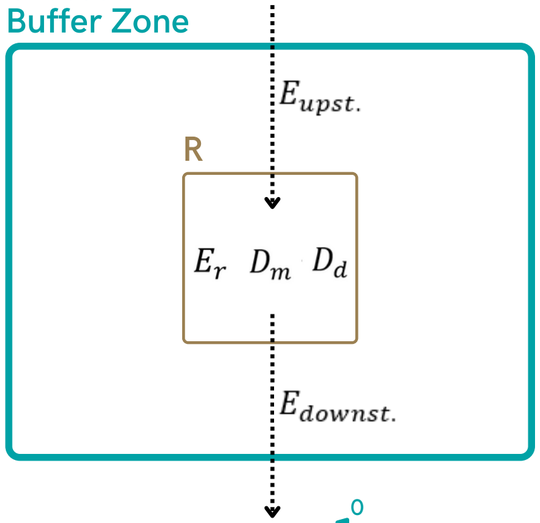
Ditch / River



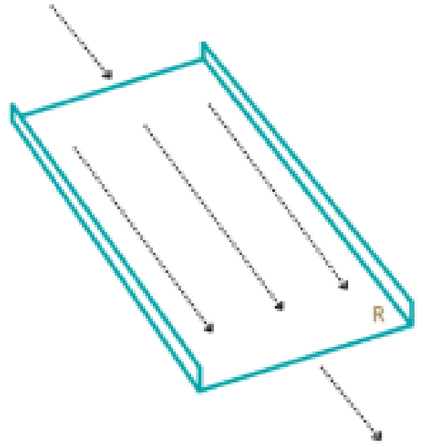
$$E_{downst.} = E_{upst.} + E_r + D_m - D_d$$



Grassed Buffer Zone



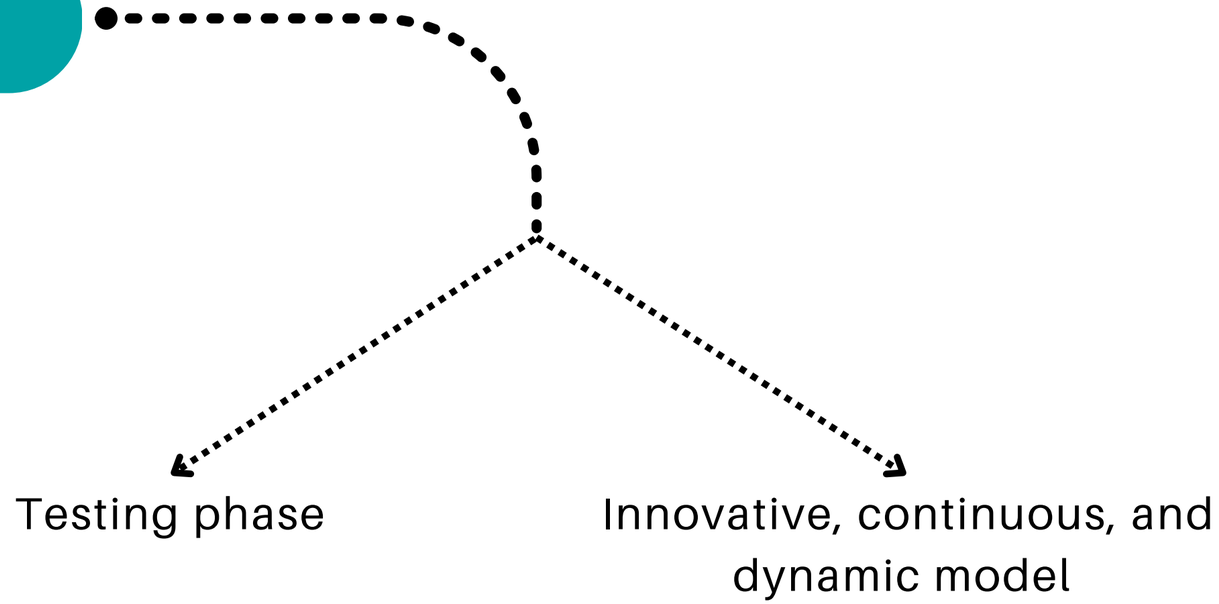
$$E_{downst.} = E_{upst.} + \cancel{E_r}^{0} + D_m - D_d$$



I = Interrill Process ; R = Rill Process

PESHMELBA

EROSION MODEL



Strong potential to represent erosive processes in a more realistic way !

Questions?

Thank you very much!