

AgPractices & Domains

**An Integrative System of Information and Modelling for
Recommendations Domains of
Agricultural Best Management Practices and Technologies**



**Workshop on Modeling Management of Climatic Stress in Rice-based Cropping Systems:
Application of the AgPractices&Domains Platform**

7-8 October 2021 | SEARCA SOLVE Platform

General principles and application of crop model for climate adaptation

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7-October



**Workshop on Modeling Management of Climatic Stress in Rice-based Cropping Systems:
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Outline

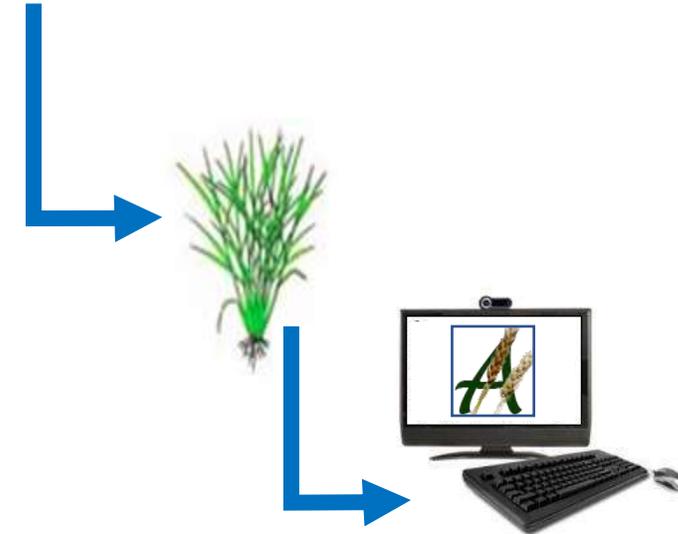
- General principles
 - Crop model and crop modelling
 - Data required for evaluation and application
- AgPractices&Domains : modelling application
 - Objectives
 - Approach

Crop model and crop modelling

A Model is a simplified representation of a system which is composed of elements that are interrelated.

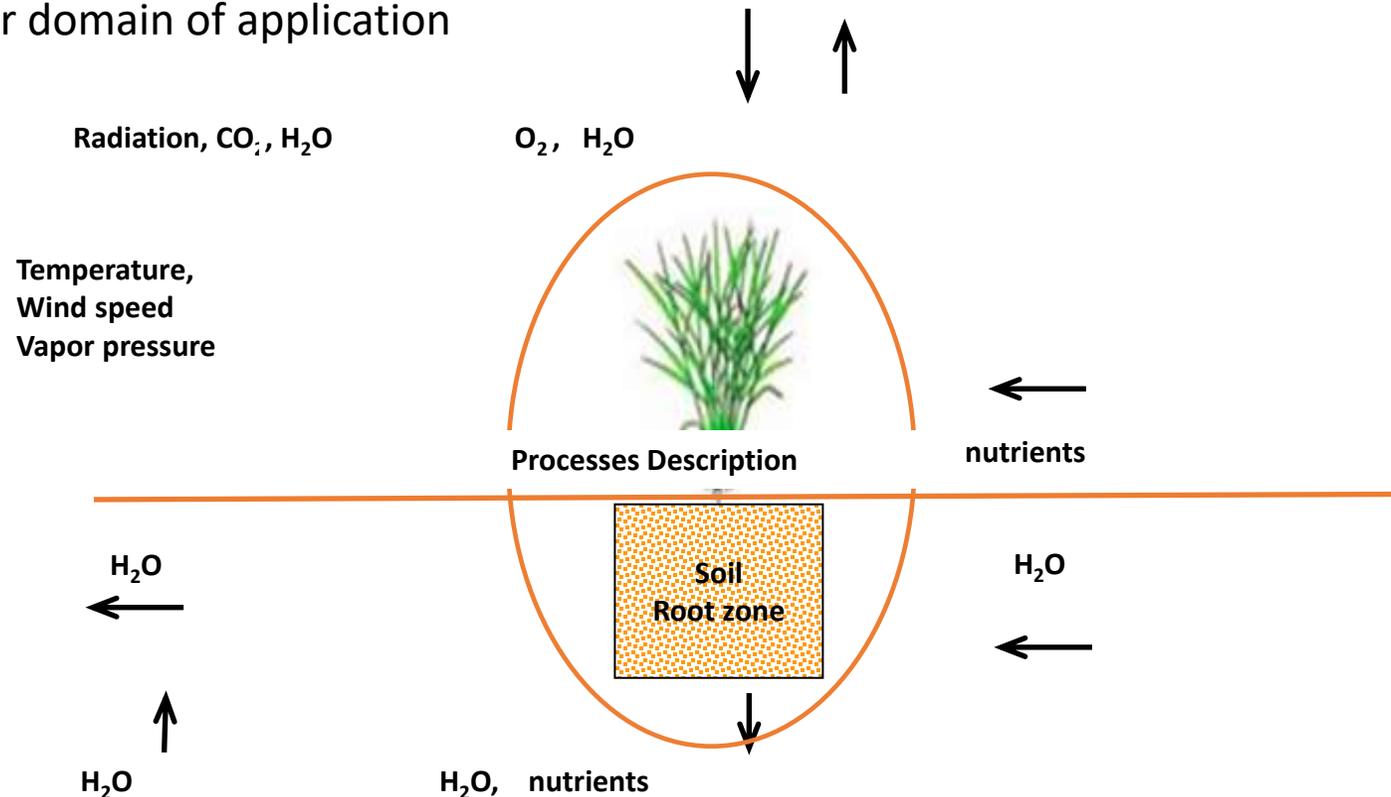
Modelling is the science of the representation of a system.

Crop modelling is the discipline of development and use of **model** in Crop/Ag science.



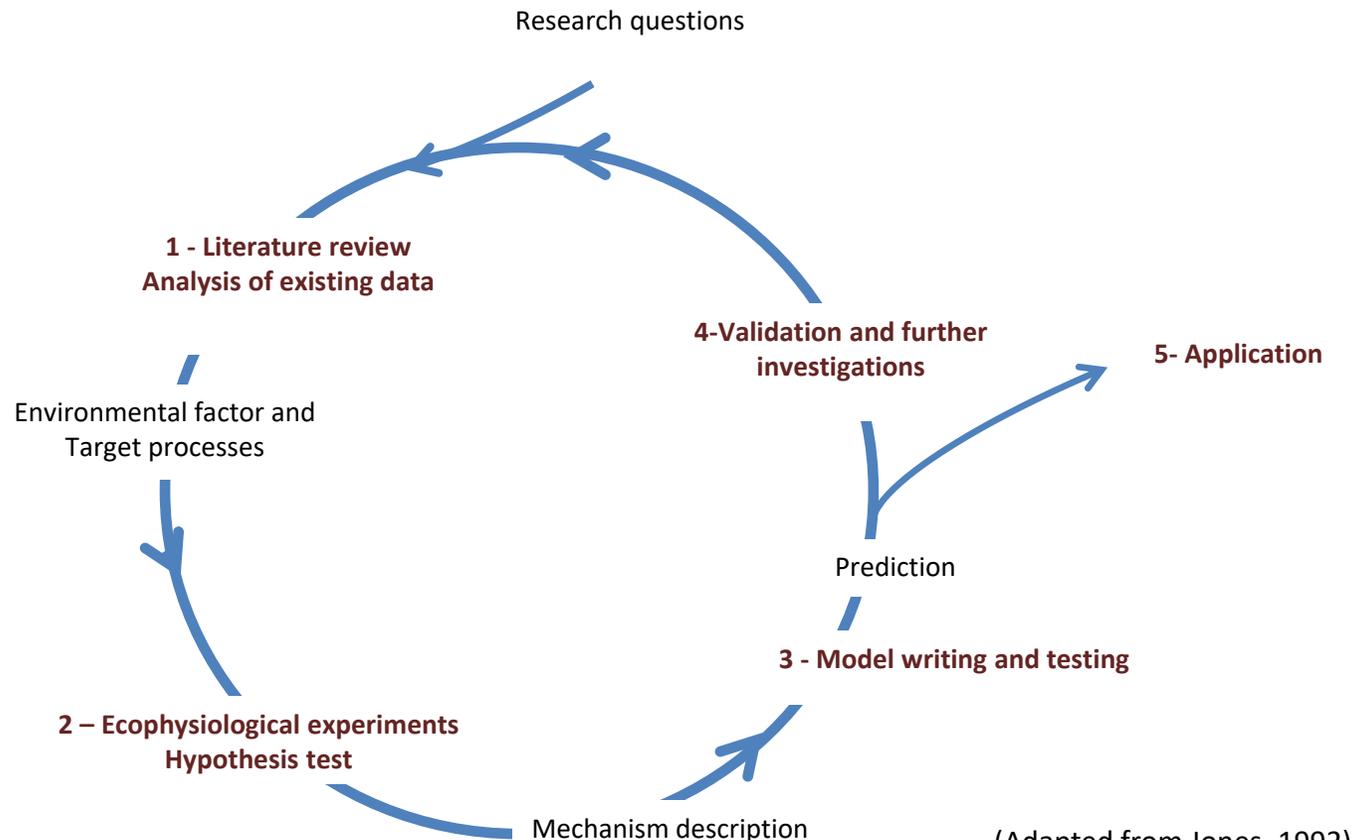
Crop Model is an application, a computer program or software compiling mathematical equations describing processes and interaction of different elements of a cropping system.

- ✓ Integration of available knowledge of the system: scientific theories that can be empirical and mechanistic
- ✓ Robust assumptions on the elements of the system considered : simple, accurate and useful
- ✓ Boundaries defined for domain of application



- *Model application:*

- “ All models are wrong but some are useful” George E. P. Box
- A Model has to be only used within its domain of validity and not beyond its foundation
- Best practices in modelling require to carry out proper and adequate Calibration and Validation protocol before the use of scenarios analysis and extrapolation.



(Adapted from Jones ,1992)

- **Decision making in management:**

e.g what to grow, when to sow, what to apply when to apply ...

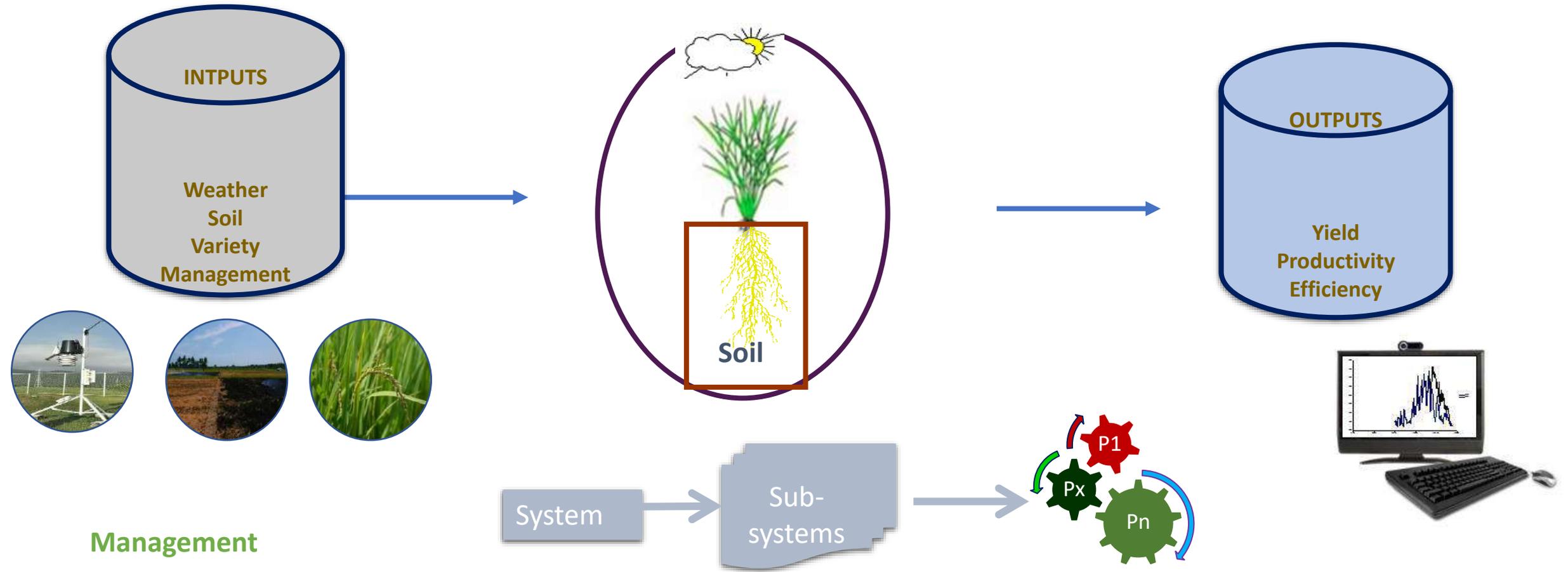
- **Understanding the system**

e.g Variability in the Environments, Varieties performance, Drivers of Yield variability

- **Prediction of near and far future change**

e.g Yield forecasting, Climate change

Principles in crop modelling : Data process



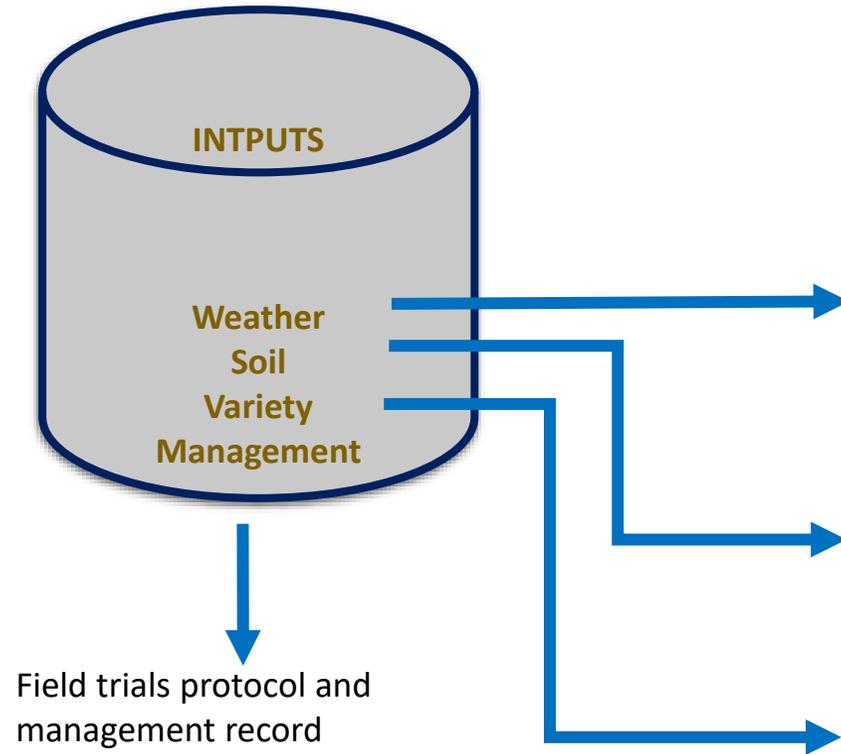


Crop modelling a data intensive research tool

#	Data	Ideal data (High)	Adequate data (Acceptable)	Usable data (Uncertain)
1	Nursery density	√	√	√
2	Field density	√	√	√
3	Sowing date	√	√	√
4	Planting date	√	√	√
5	Daily radiation/sunshine	√ on-site	√	√
6	Maximum temperature	√ on-site	√ on-site	√
7	Minimum temperature	√ on-site	√ on-site	√
8	Rainfall	√ on-site	√ on-site	√
9	Wind speed	√ on-site	√	
10	Vapor pressure	√ on-site	√	
11	Phenology	PI, FL, PM	FL, PM	PM
12	Biomass accumulation	>3 measurements, component	1 measurement, component	Final, total
13	N uptake	>3 measurements, component		
14	Final grain yield	√	√	√
15	Harvest index	√	√	√
16	Grain weight	√	√	
17	Transpiration	√		
18	Soil texture	√	√	
19	Soil organic carbon	√	√	
20	Soil organic N	√		
21	Soil mineral N	√		
22	Irrigation	√	√	√
23	Soil water	√	√	
24	Fertilizer application	√	√	√
25	Pest & disease control	√	√	
26	Nutrient deficiency	√		

(Adapted from Li et al., 2015)

AgPractices&Domains a platform for researcher to access inputs/ outputs for modelling as researcher tool



Management

Weather station located at the field station
Silo data base



Soil sampling at the field trial
Literature and expert consultation



Crop monitoring and plant sampling at the field trial

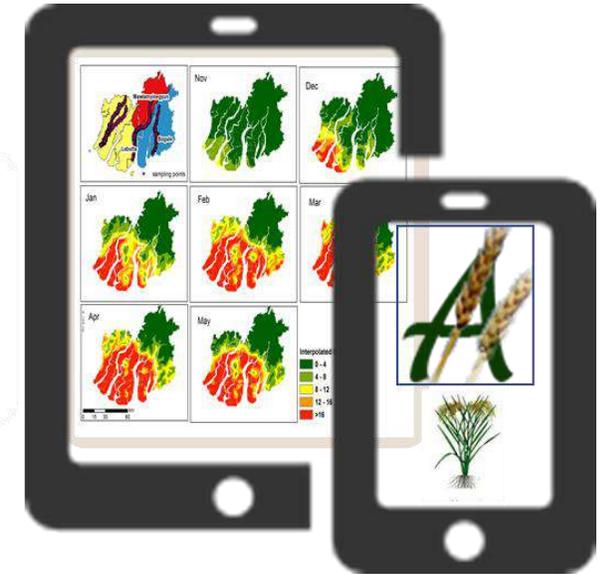
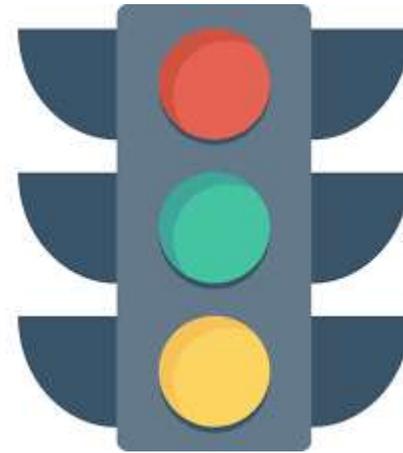
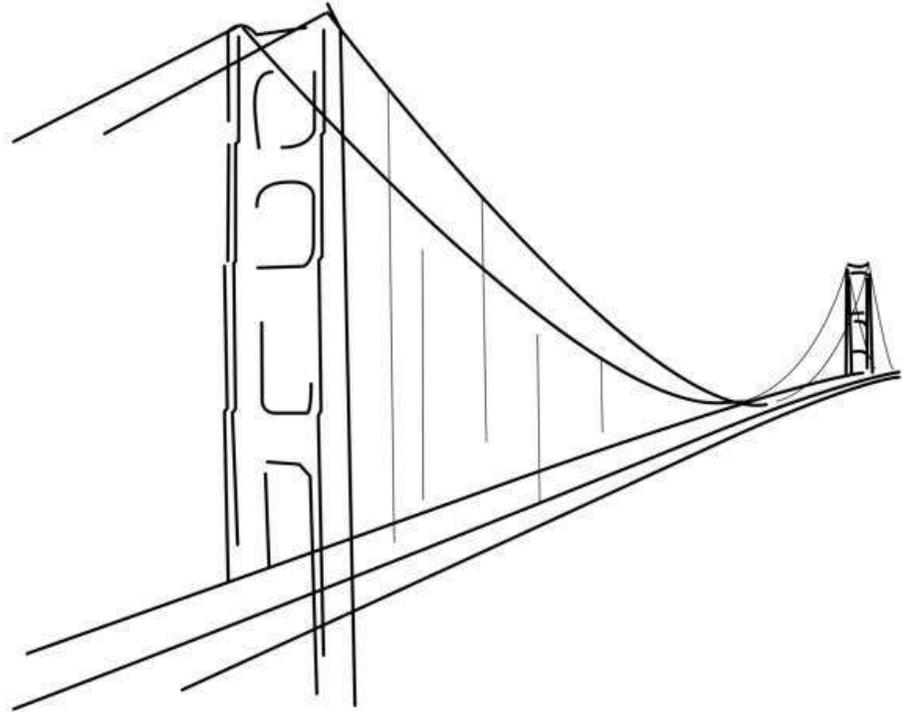




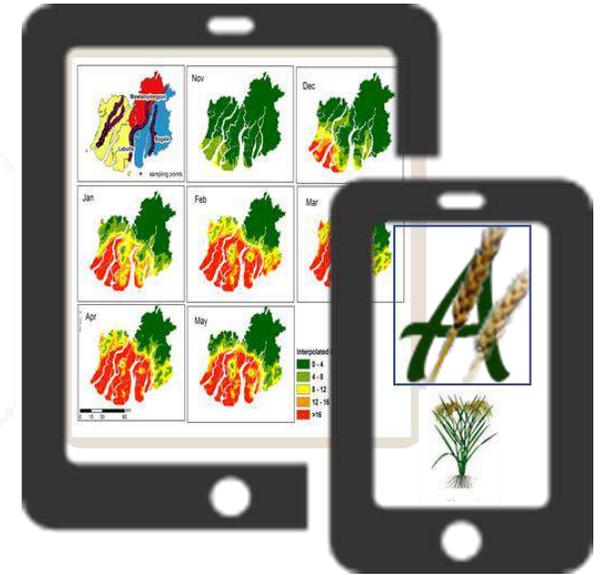
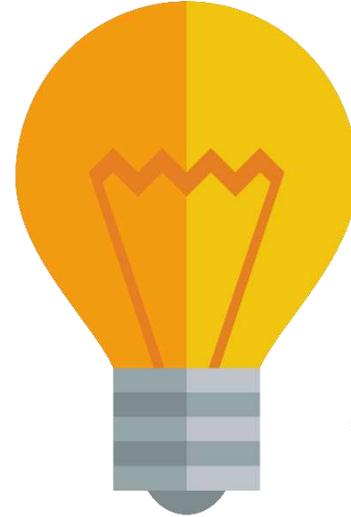
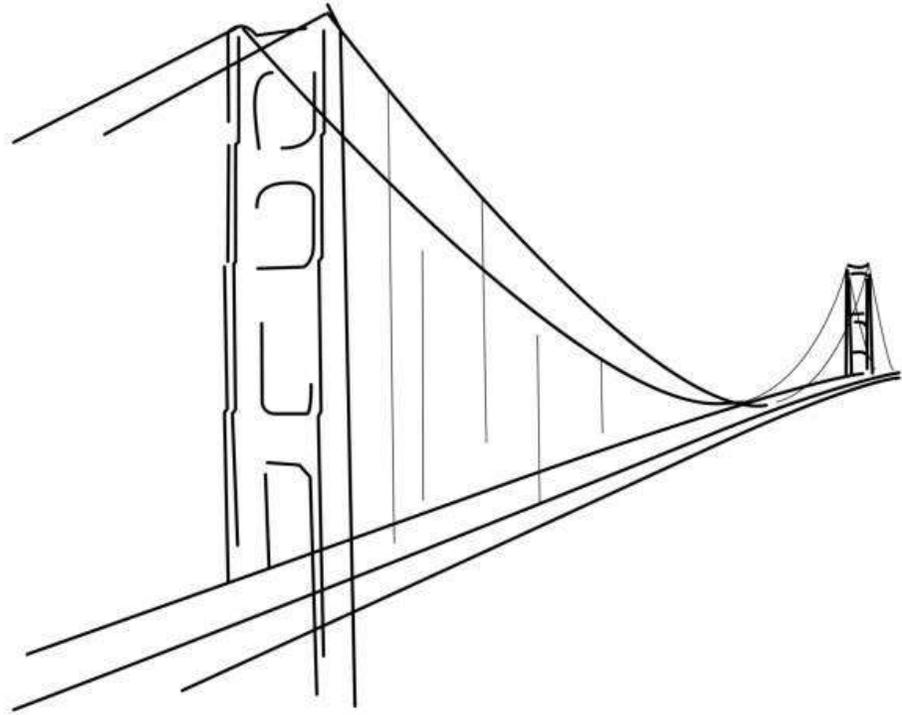
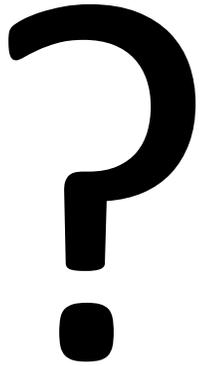
AgPractices & Domains Objectives

- **Capacity building of Agricultural researchers in the country targets in data management and use for crop modelling**
- **Facilitating the access of modelling data for Ag researchers**
- **Improving the adoption of adaptative technologies to climate variability**

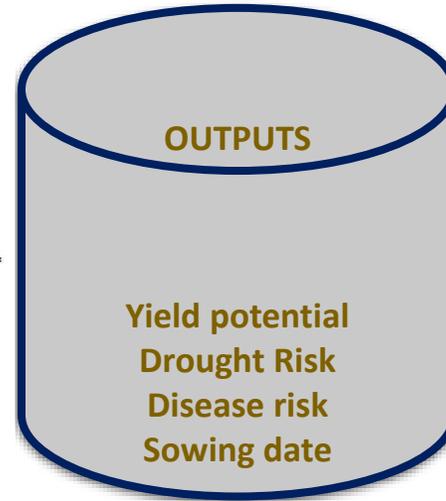
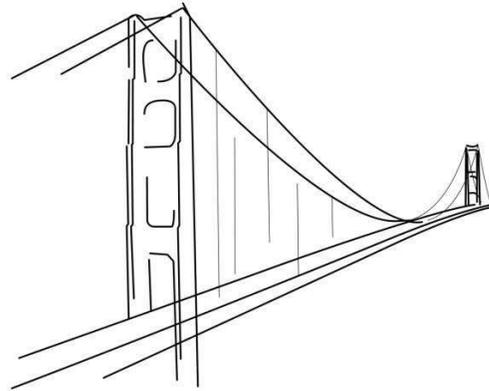
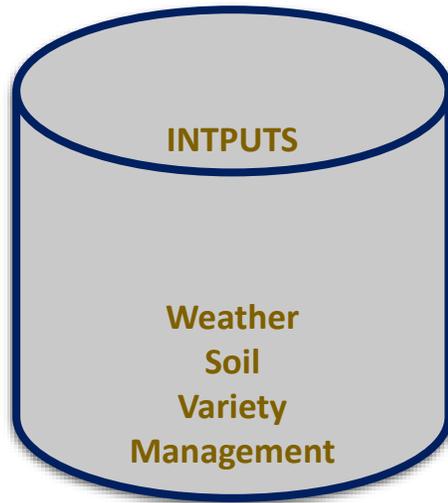
AgPractices&Domains a platform for researcher to access inputs/
outputs for modelling as researcher tool



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AgPractices&Domains highlights

- **Platform facilitating the use of crop modelling for agricultural research.**
- **Platform allowing access to outputs from crop model set within its domain of validation.**
- **Platform bridging practical research questions for cropping system management**
 - For risk associated to climate variability including biotic and abiotic stresses
 - For site specific adaptation options with spatially explicit system evaluation



Questions?

Find out more:

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