

# Crop Production Intensification as a user of environmental statistics

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(\*) with assistance of many colleagues at FAO, but notably Bill Settle

# outline

- the challenge of crop intensification
- sustainability of resource use by farmers
- monitoring
  - role of farmers
  - role of policy makers
- DPSIR
- conclusions

# 1. the challenge:

- crop intensification is needed to feed 9bn
- intensification comes from farmers as custodians of natural environment
- the resource base is degraded; competition for resources (water, land)
- farming has a role in mitigating and adapting to climate change
- national policy makers have an enabling role



Farming may be less sustainable...





...or more sustainable



# ...farmer decisions include

- choice of varieties
- how to grow them
- irrigation (how, when, how much...)
- how and when to harvest, store and process



# Monitoring by farmers

AAES N°3  
Date: 19/08/08  
Heure: 8h30  
FIN 10h58

Kandi  
Site: PP  
PE: Lapin  
INFO-GENERALES  
Cult: coton  
Variété: H-379-1  
Date semis: 25/06/08  
Durée après semis: 56 jrs  
Devlpt: Végétation début floraison

**B. DONNÉES AGRO**  
 Hauteur moy: 39  
 Nbre moy araignées: 24  
 Nbre moy de chenilles: 7  
 Nbre moy de pucerons: 2  
 Nbre moy de carabes: 1

**C. Condition sol**  
Humidité: bonne

**ENNEMIS NATURELS**  
 Araignées: 3  
 Fourmis: 3

**RAVAGEURS**  
 pucerons: 2  
 criquet: 2  
 Syllépte derragna: 1  
 mouche blanche: 1

**TOTAL** 3+2 = 5

**CAUSES POSSIBLES**  
 - Pucerons trop nombreux des tiges  
 - absence de prédateurs des pucerons  
 - absence de prédateurs des chenilles

**RECOMMANDATIONS**  
 Eviter dans les plus  
 arrosage mettre l'engrais  
 ou collect des pucerons

Observation: 48 plants montés  
 Commandation: ne plus faire sans humidité suffisante  
 - Continuer dans ce sens  
 - continuer l'entretien



# Monitoring: policy makers review at aggregate level

Point based observations are often not representative.

To make policy needs meaningful proxies which “sample” health of both agro-ecosystems, and neighbouring unmanaged ecosystems - examples:

- water quality
- diversity, and quantity of pollinators and other species (predatory insects, soil organisms...)
- other proxies?



An example - water quality can indicate:

- over-use of fertiliser (nitrate and/or phosphate levels)
- use of pesticides (residues)
- soil erosion (sedimentation)
- other area characteristics (pH, salinity)

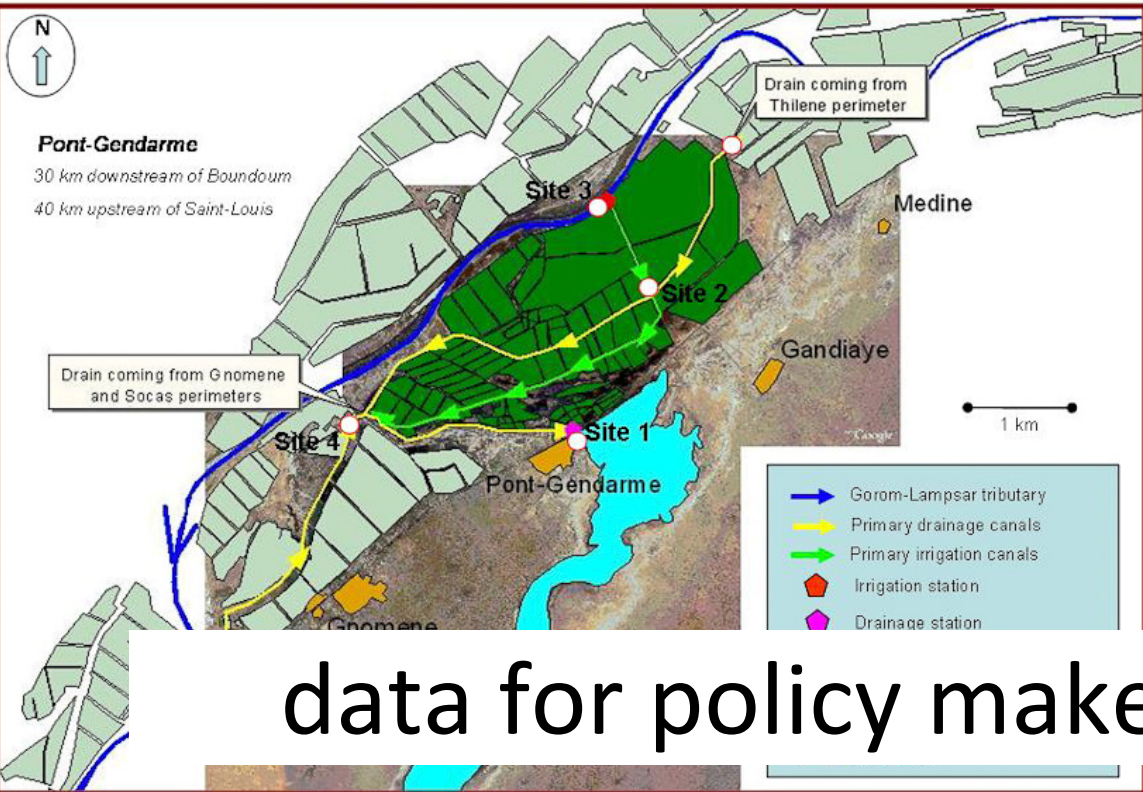
But water quality may change daily – need tools for cumulative sampling



**Pont-Gendarme**  
30 km downstream of Boundoum  
40 km upstream of Saint-Louis

Drain coming from Gnomene and Socas perimeters

Drain coming from Thilene perimeter



# data for policy makers - Senegal



# policy makers can use such information...

- Zoning – where agriculture is practised and how
- Regulate and monitor
- Appropriate input levels (transition subsidies)
- Investments in knowledge generation
- Investments in rural infrastructure

# DPSIR can be a tool (for analysis? for communication?)

Drivers	Pressures	States	Impacts	Responses
<p><b>Need to grow more, for:</b></p> <ul style="list-style-type: none"><li>- more people</li><li>- changing diets</li><li>- biofuel</li><li>- fibre</li></ul> <p><i>In the light of competition for water and land resources</i></p>				

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	Over/mis-use of inputs	Groundwater levels	<b>Human health due to farmer poisoning, groundwater</b>	
	Excess tillage	Reduced water quality	<b>Loss of biodiversity in non-managed ecosystems</b>	
	Too frequent slash and burn at same location	Amount of top soil		
	Using non-specific insecticides	Beneficial insect populations		
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# conclusion

- to farm sustainably, farmers need:
  - real time simple robust monitoring tools
  - adapted knowledge
- policy makers need:
  - proxies for state of agro-ecosystem health
  - and an understanding of impact of agriculture on neighbouring ecosystems

Thank you