Integrated crop management strategy developed in Guadeloupe and Martinique to reduce pesticide use

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Export dessert banana cropping system

An intensive mono-culture (mono-varietal) **in space and time** (up to 40 years) **…**

Dessert banana in Guadeloupe & Martinique

- 700 producers (UGPBAN)

- 270 000 tons /year

- 7000 ha

- important anthropisation

BANANE DE GUADELOUPE ET MARTINIQUE

UNION DES GROUPEMENTS DE PRODUCTEURS DE BANANE DE GUADELOUPE ET MARTINIQUE

Integrated crop management in Guadeloupe and Martinique to reduce pesticide use

- methods already developed or in progress
- interest of the “model approach”
- futur research prospect

Integrated Crop management strategy developed in the FWI

Target / Management	Nematodes	Weevils	Leaf spot Diseases	Weeds
Decision making tool	**Biotest**	**Biotest (trapping)**	**Forecasting strategy**	
Cultural practices	**- fallow - rotation - vitroplantlet**		**set of practices**	**« Cover » and associated crops**
Biological		**Pheormone trapping Enthomopathogen nematodes**	**biopesticide mixture « lixiviado»**	
Varietal	**- Clonal selection -New hybrids**		**New hybrids**	

Methods widely adopted by producers

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Adoption in progress

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Development stage

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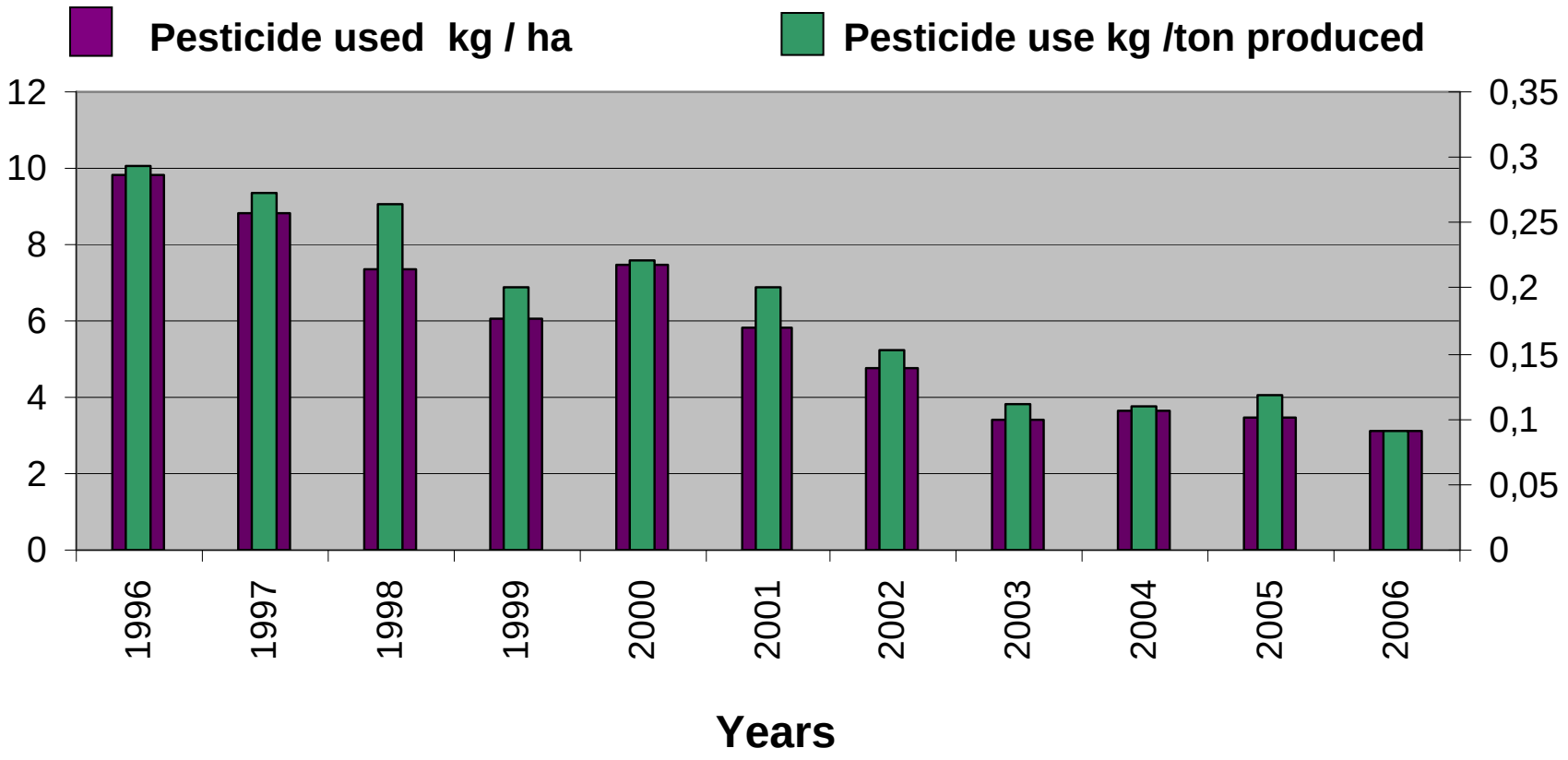
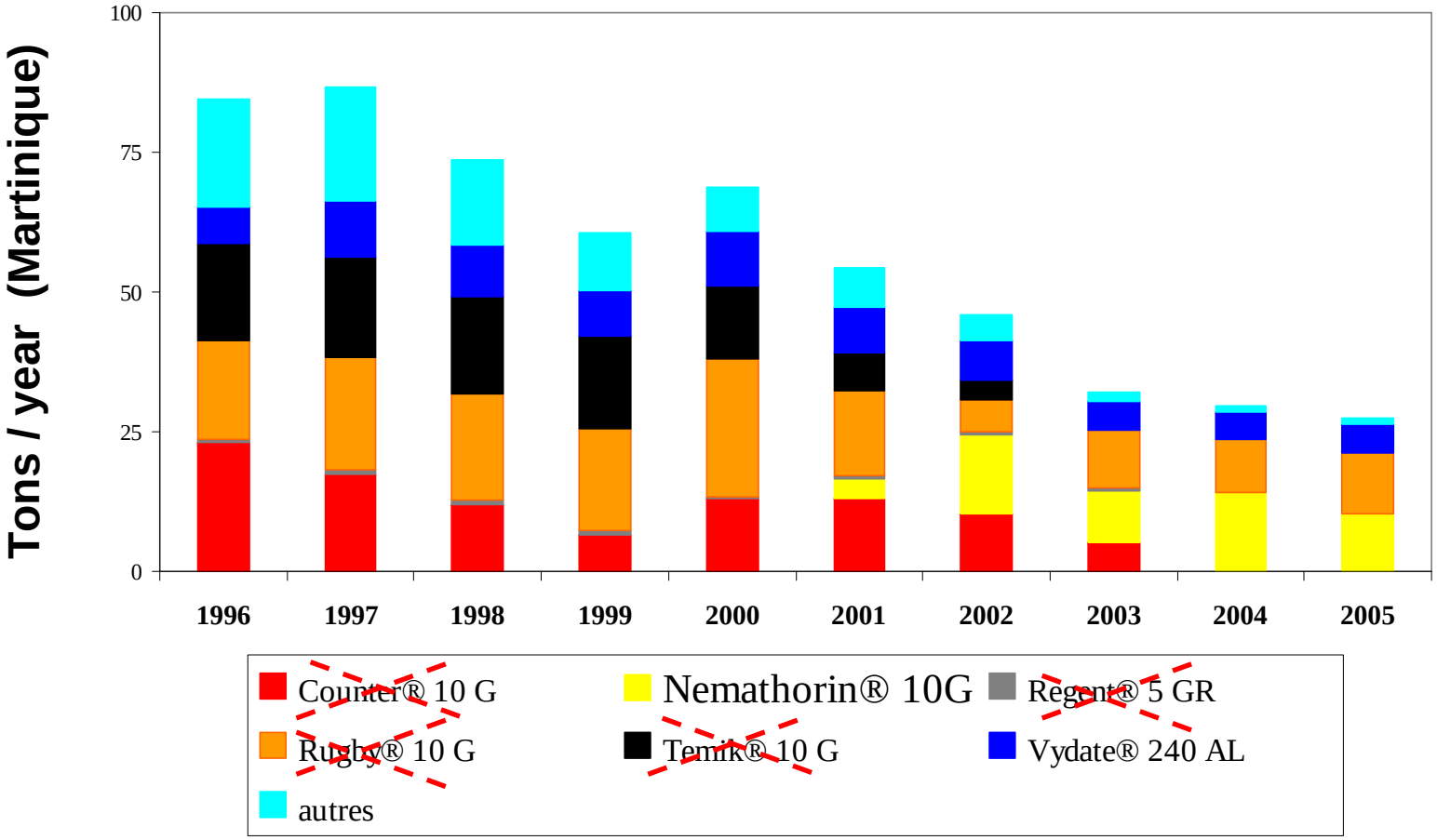
Impacts in term of pesticide use reduction

Nematicides & insecticides use (active ingredient) for banana production in the FWI



Reglementation also contributed to pestide use reduction !



- methods already developed or in progress
- **interest of the “modelling approach”**
- future research prospect

How to manage complexity ?

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How to manage complexity ?

- global knowledge management of the « interactions » at the agrosystem level

- evaluation of environmental impact of cropping system

- evaluation of economic performance of cropping system

SIMBA Model

Input

Soil & climat conditions

Practices / decision rules

Model

Biophysic Model

- Plant
- Parasitism
- Soil
- Hydric content

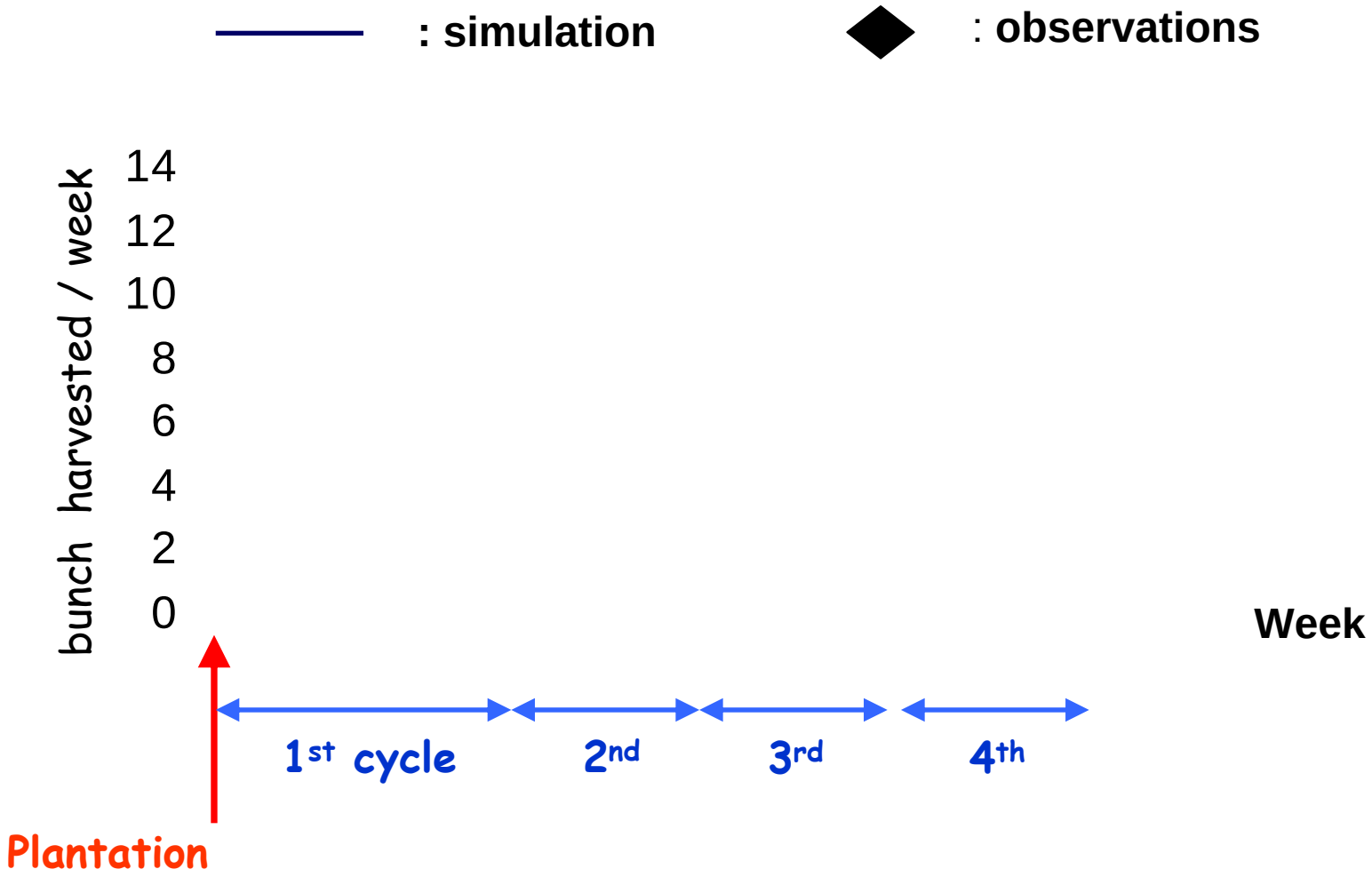
Indicators

Phytosanitary risks
Erosion
Soil fertility

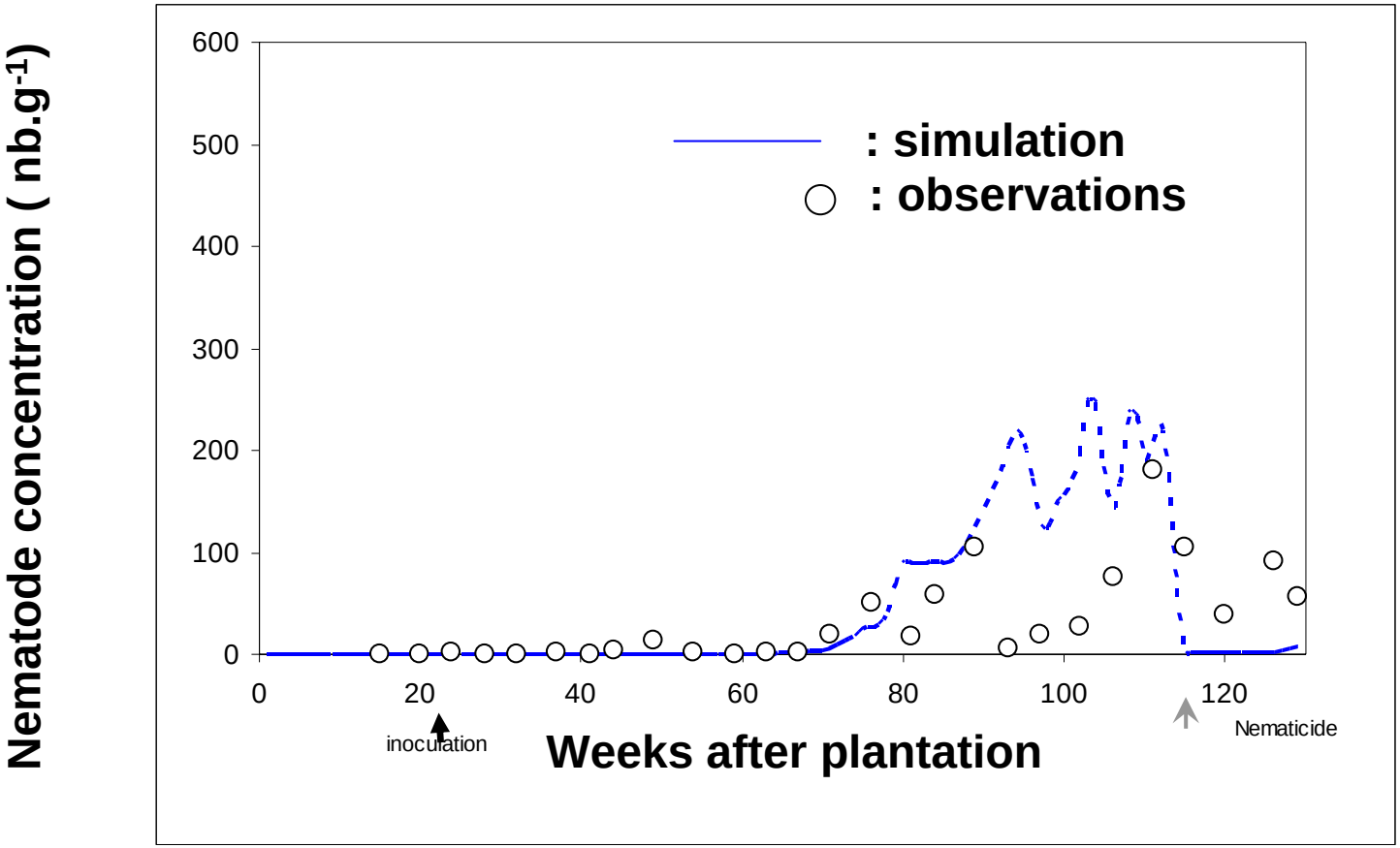
Ouput

Multi-criteria evaluation : Agronomic, Economic, Environmental

Example of simulation : number of bunch harvested



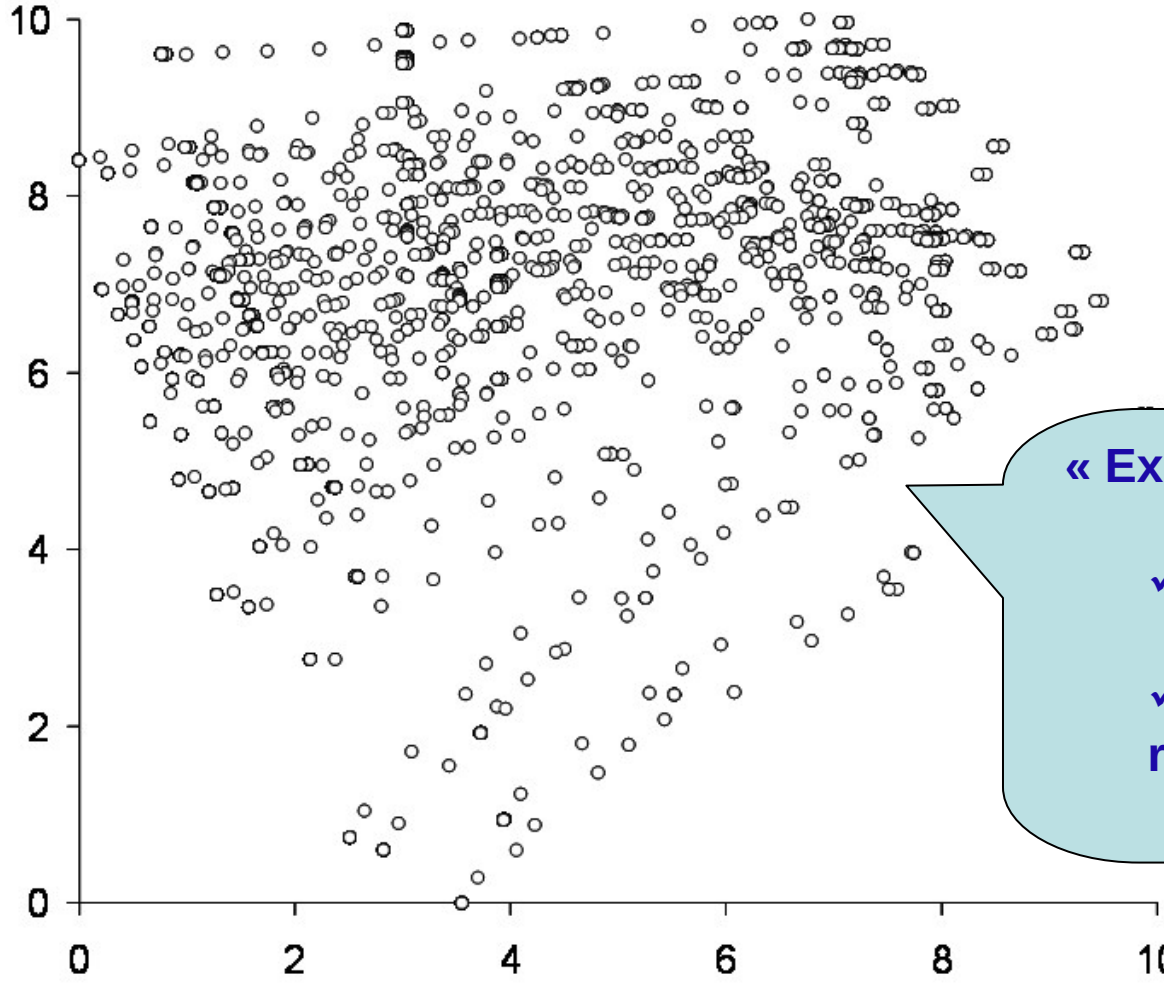
Example of simulation : nematode (Rs) population development



Tixier et al. 2004 European Journal of Agronomy, 26 : 71-81.
Tixier et al. 2006. Ecological Modelling, 198: 321-331.

Cropping system design using model simulation

Environnemental notation



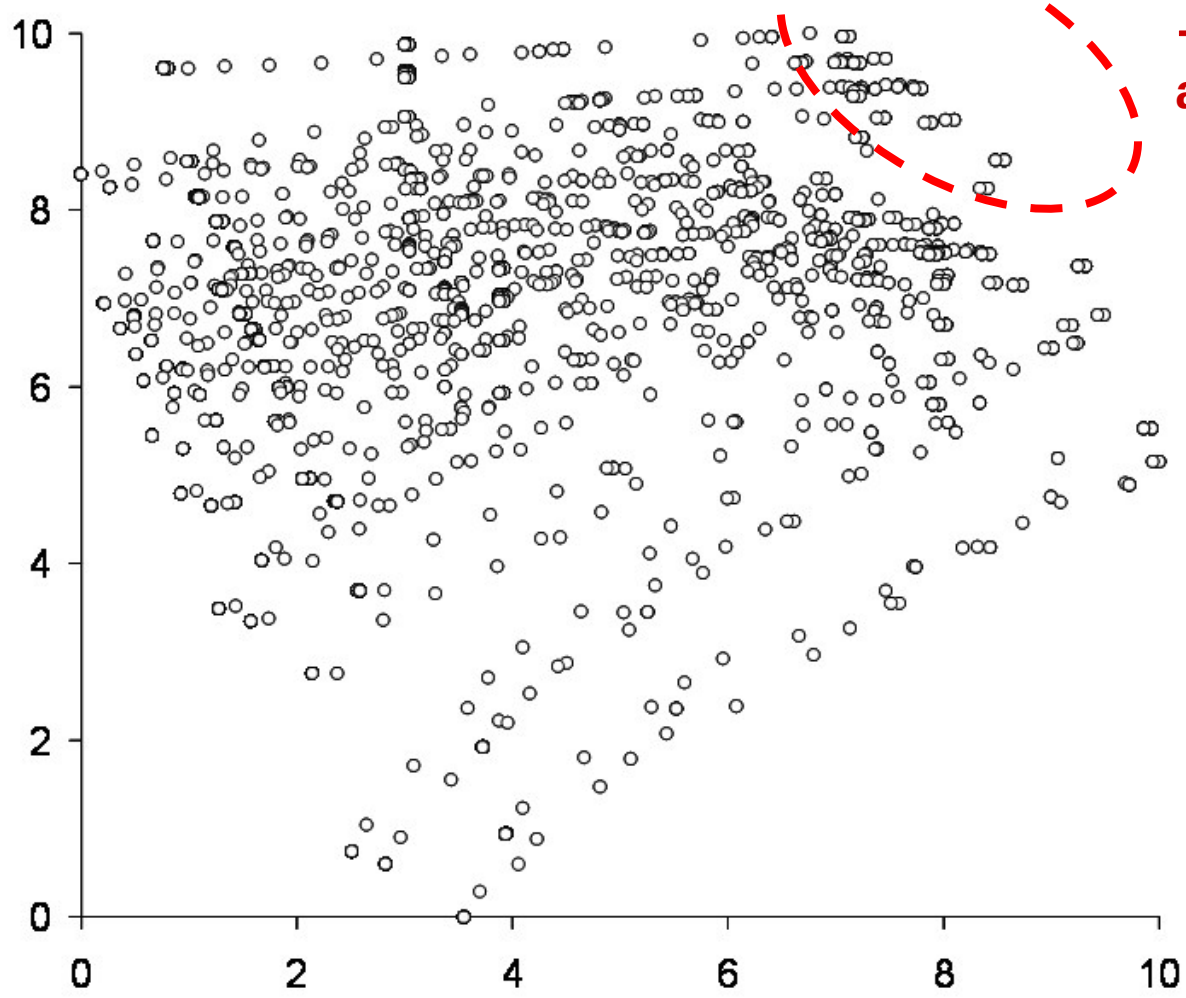
Economic notation

« Exhaustive » simulations of :

- ✓**cultural practices**
- ✓**combination of decision rules**

Cropping system design using model simulation

Environnemental notation



Economic notation

Most promising Cropping system simulated → to be further evaluated at the field level

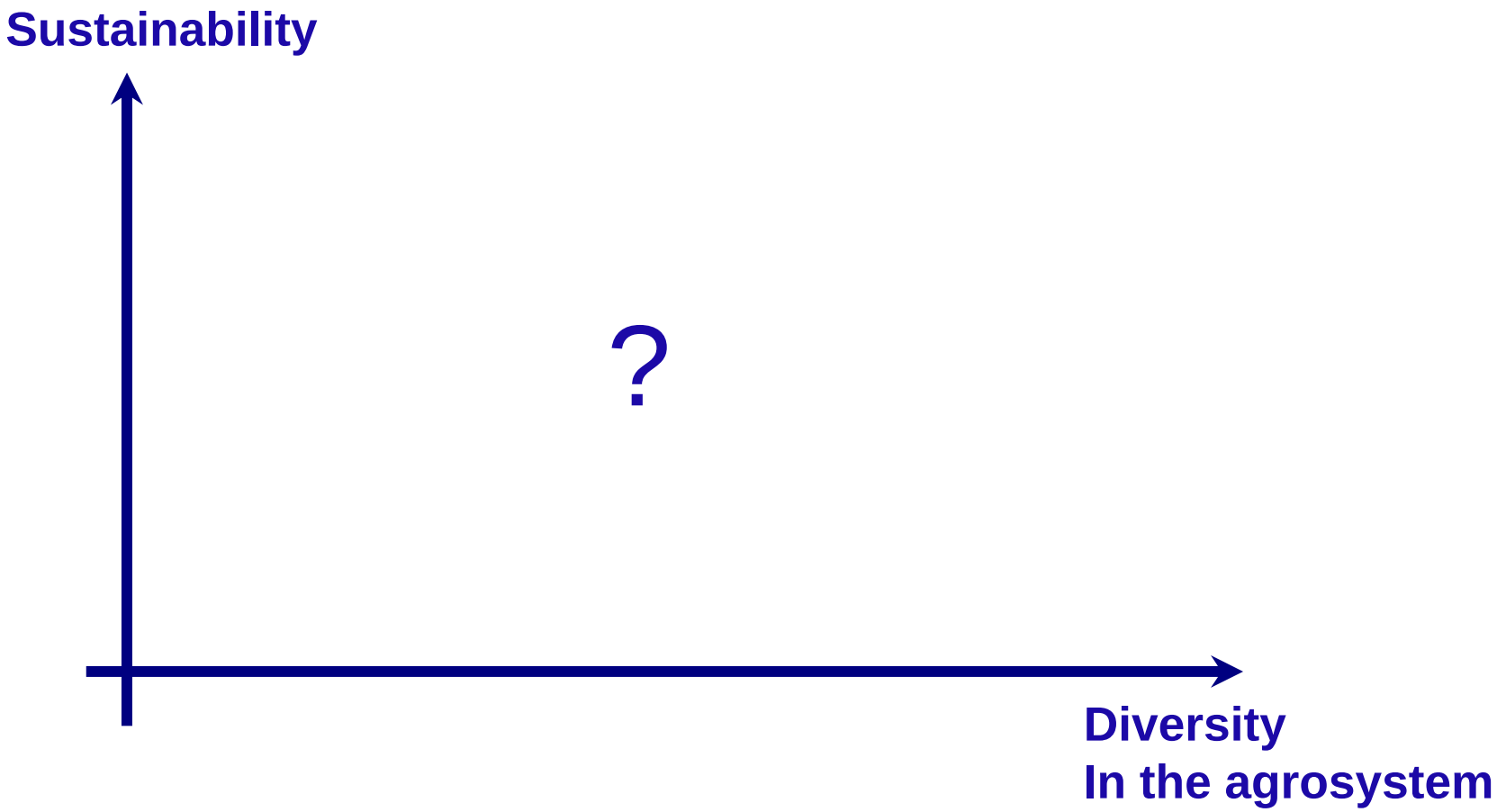
- methods already developed or in progress
- interest of the “modelling approach”
- **Ongoing & futur research prospect**

Ongoing & futur research prospect

New resistant varieties

Sustainable cropping System

Future research : objectives & concepts



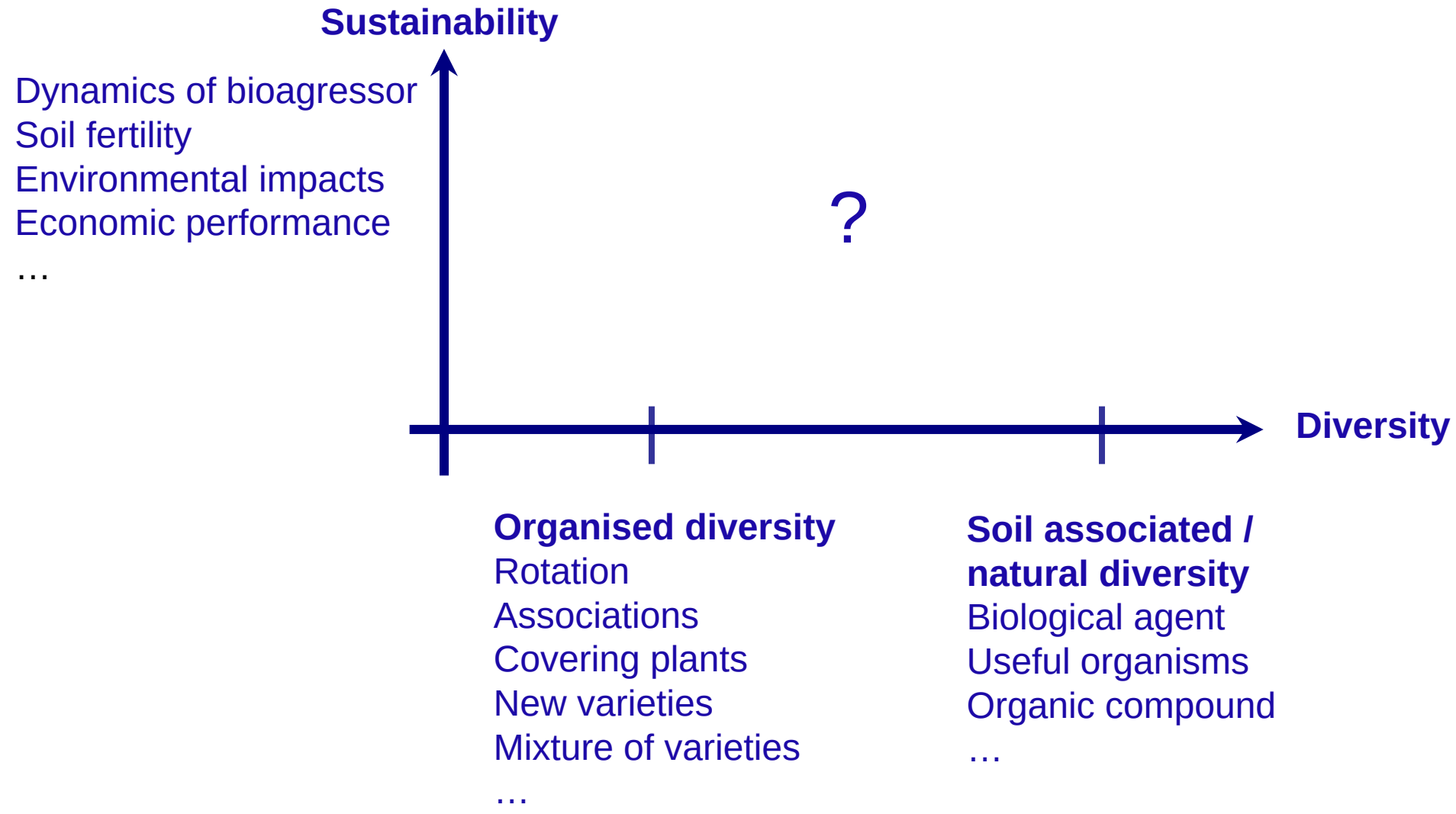
Future research : objectives & concepts

Hypothesis :

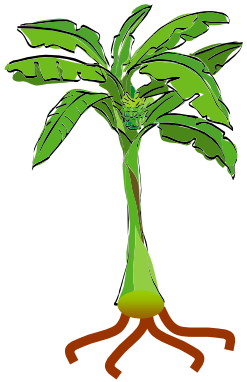
- **To stop/decrease the dynamics of development of bioagressors using diversity of non-host species**

- **To enhance the 'feedbacks' of (re) introduced organisms on bio-agressors or on physico-chemical caracteristic of the agrosystem**

Future research : objectives & concepts



Study of the trophic relations in the agrosystem

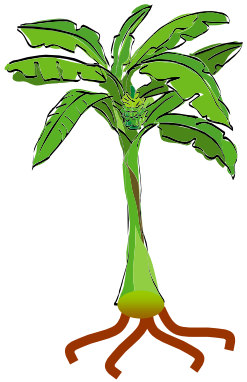


Organised biodiversity

Associated/natural biodiversity

Bioagressors

Study of the trophic relations in the agrosystem



Organised biodiversity

Associated/natural biodiversity

Bioagressors

Practices

Conclusions

How can pesticide use be reduced in banana culture ? Experience in Guadeloupe & Martinique

- **several solutions based on Integrated Crop Management approaches are already available**

several other solutions are in development (ICM & new resistant varieties)

Conclusions (continued)

- How to speed up the process from research to innovation ?

Conclusions (continued)

- How to speed up the process from research to innovation ?

✓ multidisciplinary approaches

✓ **direct producer involment in Research & Developement agenda**

Thank You

Banana
new varieties

Impatiens

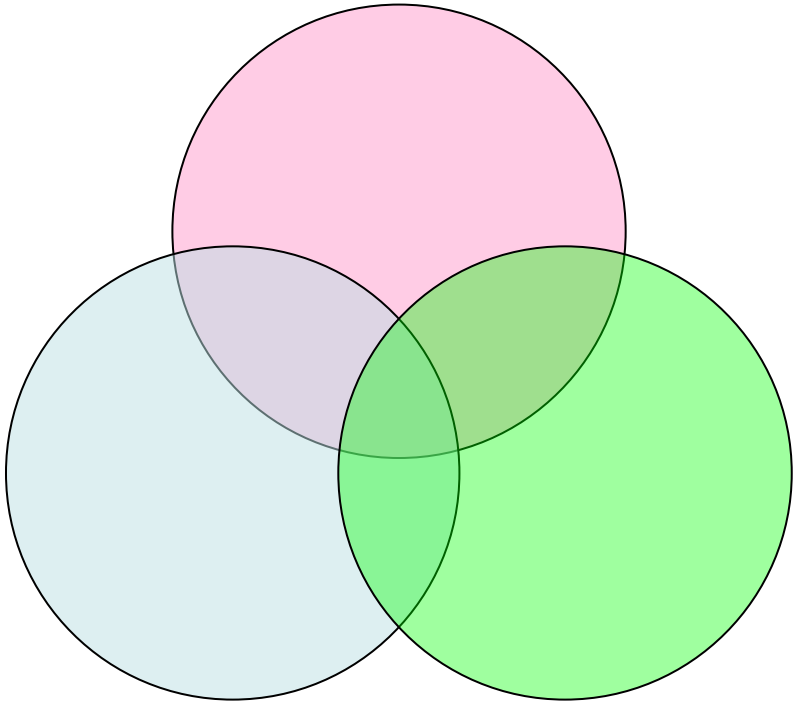
Bracaria

Crotalaria

Siratro

Banana & Plantain research at Cirad

Development of sustainable banana & plantain Croping system



Banana & Plantain genetic improvement

Thematic research support

(virology, plant pathology genomic, …)