

# Participatory Methods and Tools for Water Governance at the Joint Research Unit Water Management, Actors, Uses (G-EAU)

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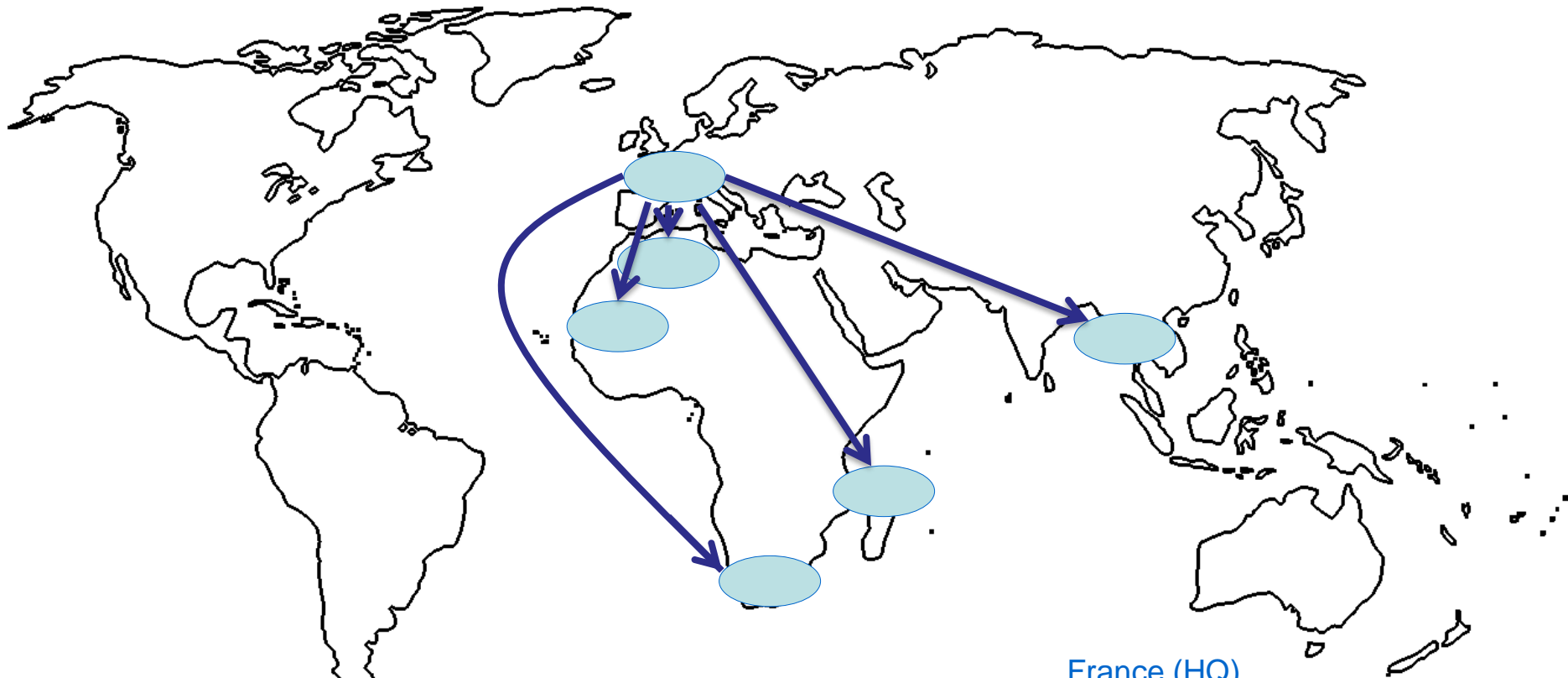
- G-eau JRU
- Participatory methods and tools
  - ComMod
  - CooPIAage
- Applications
  - KatAware
  - Various examples of CooPIAage
- Discussion and Perspectives

- From IWRM in irrigation systems (2005) to IWRM in hydrological territories
- Interdisciplinarity
- Applied research to support policy decision and action, in the North and in the South
- Co-construction with stakeholders

Sous-groupe disciplinaire et disciplines	Effectif		
	Chercheurs	Dont DR/HDR	ITA
<b>ST3 - Hydrologie, hydrogéologie</b>	6	4	4
ST5 - Mécanique des milieux fluides	4	2	7
ST6 - Informatique, automatique	5	2	2
SVE2-LS8 Ecologie	1		1
<b>SVE2-LS9 Agronomie</b>	9	4	8
<b>SHS1-1 Economie</b>	12	4	2
SHS1-2 Gestion	3		
SHS2-2 Science Politique	4	1	
SHS2-3 Anthropologie	1		1
SHS2-4 Sociologie,	1		1
SHS2-5 Sciences de l'infoet de la com			1
SHS3-1 Géographie	3	1	
	47	18	27
Administratif			4,5

- 47 thèses en cours (2/3 au Sud) – 12 HDR soutenues
- 1/3 des chercheurs + 3 ITA expatriés au Sud

# Where we are



France (HQ)  
Morocco and Tunisia (4)  
Senegal and BKF (4)  
South Africa and Mozambique (3)  
Mayotte (1-long missions)  
Thailand and Cambodia (2)



- Characterize co-evolutions water and societies
  - Different viewpoints
  - Technical evolution of water uses
- Regulation modes
  - Infrastructures for the physical control of flows
  - Public policies for social and economic control of uses
- Methods for analysis and assessment
  - Indicators to allow decision making
  - Participatory processes for water management and governance
  - Forecast of changes



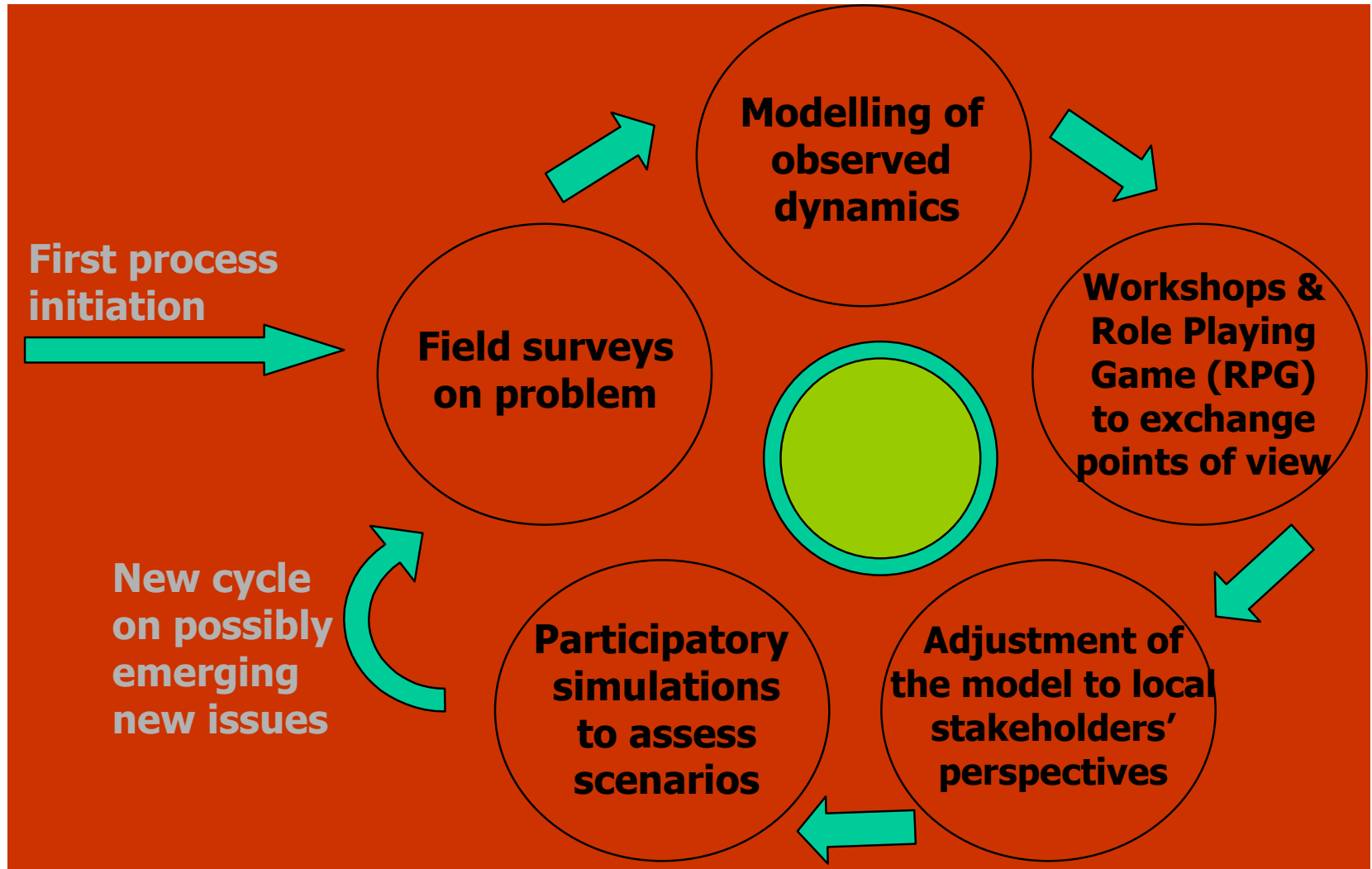
- Rules, practices, institutions, arrangements to allow water management
- Local water governance (community)
  - Decentralization
  - Devolution
- Need for tools, processes, approaches, methods to accompany water governance at various levels, particularly at the local one (catchment)



- An approach using jointly Models and Role Playing Games to tackle issues regarding decision processes, common property, co-ordination among actors, etc. (Barreteau et al., 2003)
- **First Objective: Understanding Complex Environments**
- **Second Objective: To Support Collective Decision-making Processes in Complex Situations**

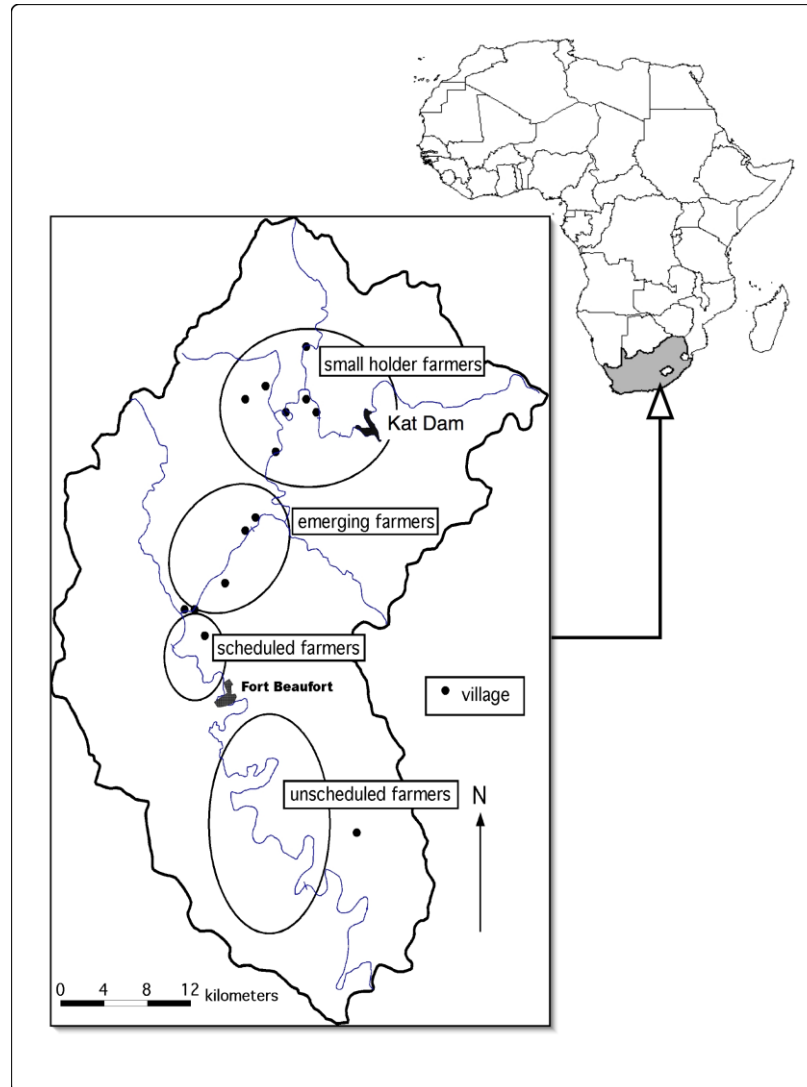


# The approach: Companion Modelling





# The Experience of the Kat River WUA (South Africa)



- NWA (1998) and the NWRS (2002)
  - Criteria
    - Resource protection (env. Sustainability)
    - Economic efficiency
    - Social Equity
  - Contradictions and dilemmas
    - Criteria unlikely to combine
    - Particularly in SA, where:
      - Widespread and severe rural poverty
      - Water scarcity
      - Very different sectors
      - Institutional and organizational deficit

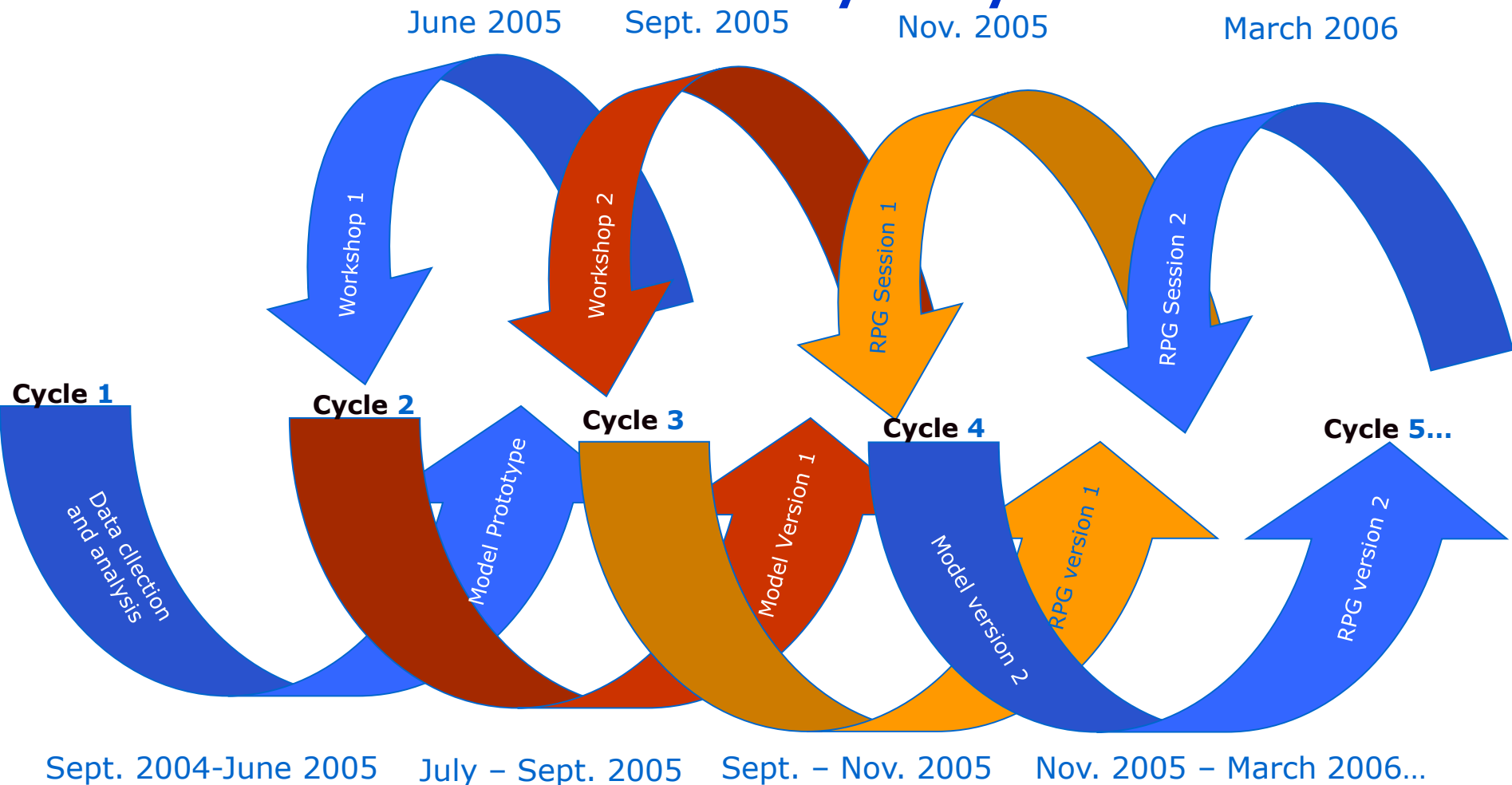


# The problem

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- In 2002, the existing Irrigation Board was converted into a **Water User Association** representing all main groups of water users in the Kat. **OBJECTIVE:** to produce a Water Business Plan for the next 5 years.
- Need for methods, approaches, tools that support the negotiation and collective decision-making process within WUA (WRC of SA research).

# Companion Modelling in the Kat Valley: Cycles





# Sequence of ComMod Workshops in the Kat Valley

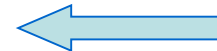
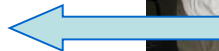
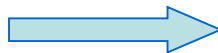
Date	October 2004	May 2005	June 2005	September 2005	November 2005	March 2006	October 2006	February 2007	March 2007
Event	Introductory workshop	Preparatory workshops with different WUA groups	KatAWARE Prototype Model Workshop	KatAWARE Version 1 Model Workshop	RPG Session 1	RPG Session 2	Scenarios Workshop 1	Vision Workshops	Scenarios Workshop 2
Participants	ST, WUA, MT	ST, WUA	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT

ST = Social Team (Rhodes University); WUA=Water Users Association; MT=Modelling Team (Cirad)

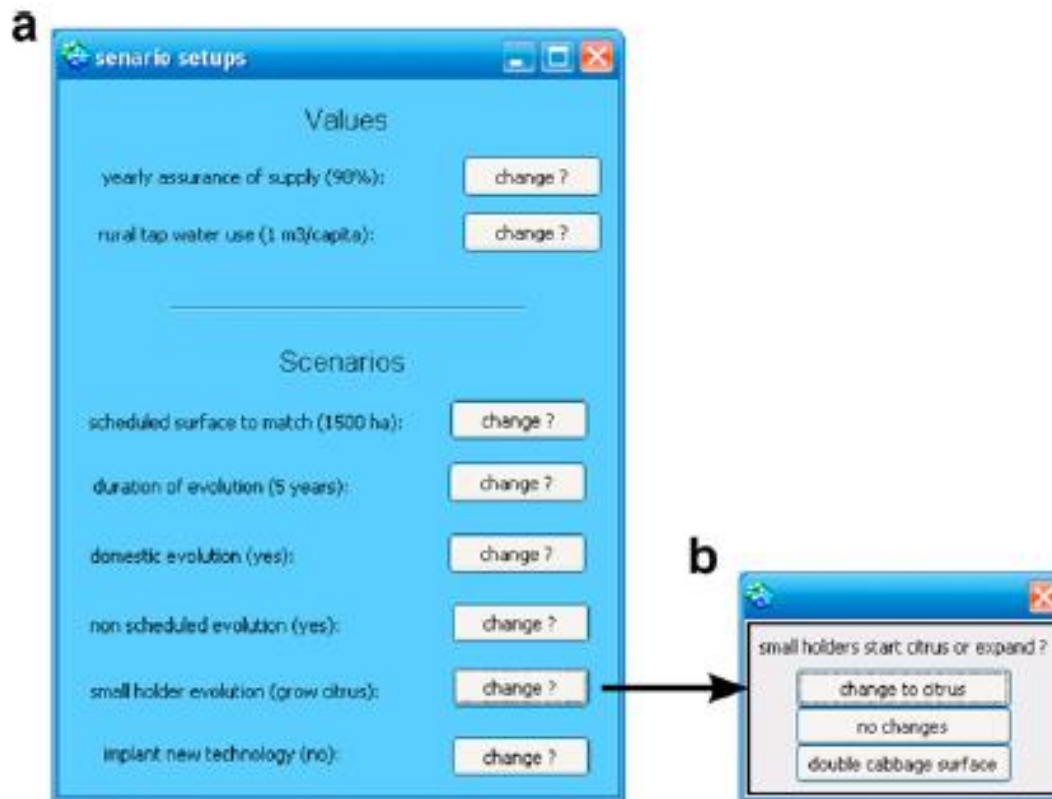




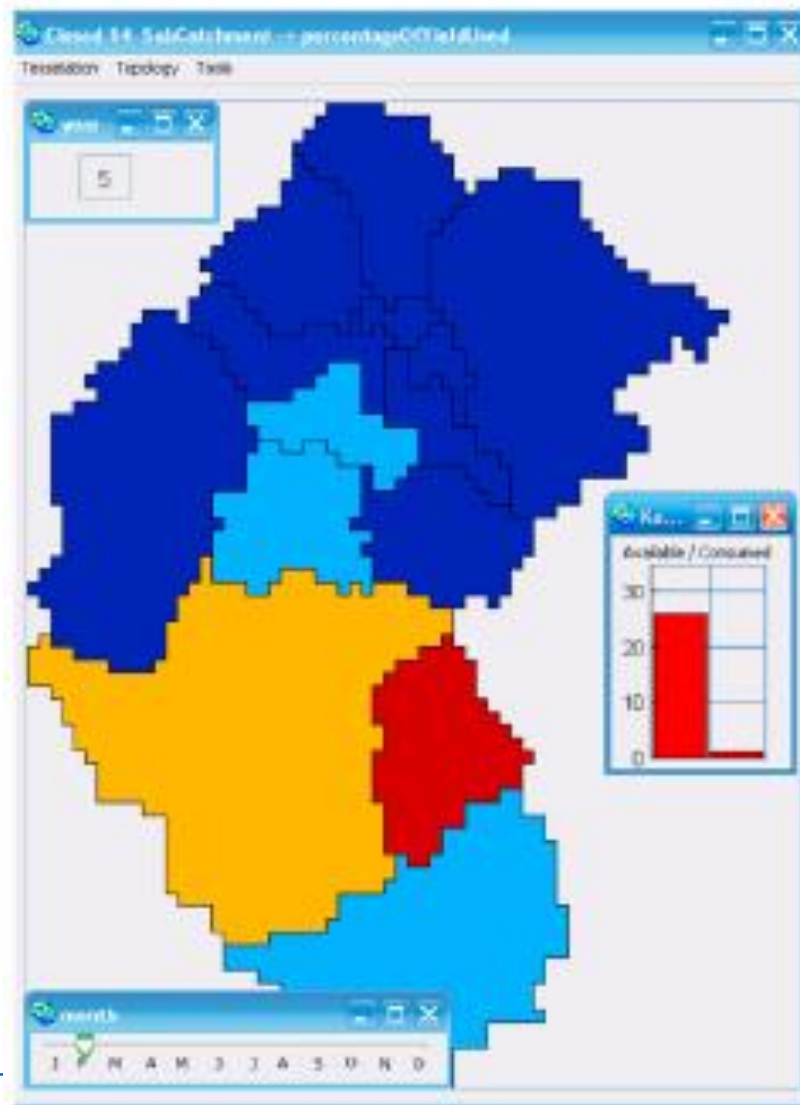
## The process with local stakeholders



# Changing parameters for simulations in the model

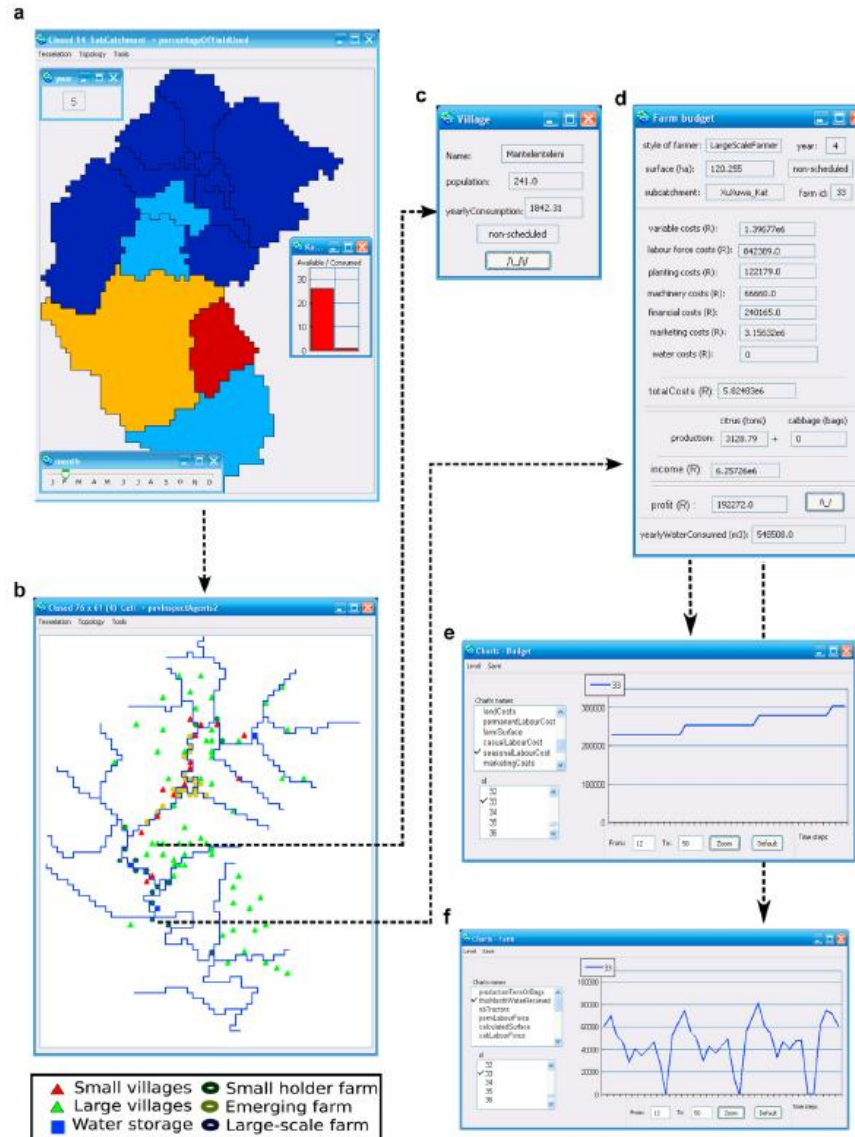


# Model's outcomes: water balance in the subcatchments

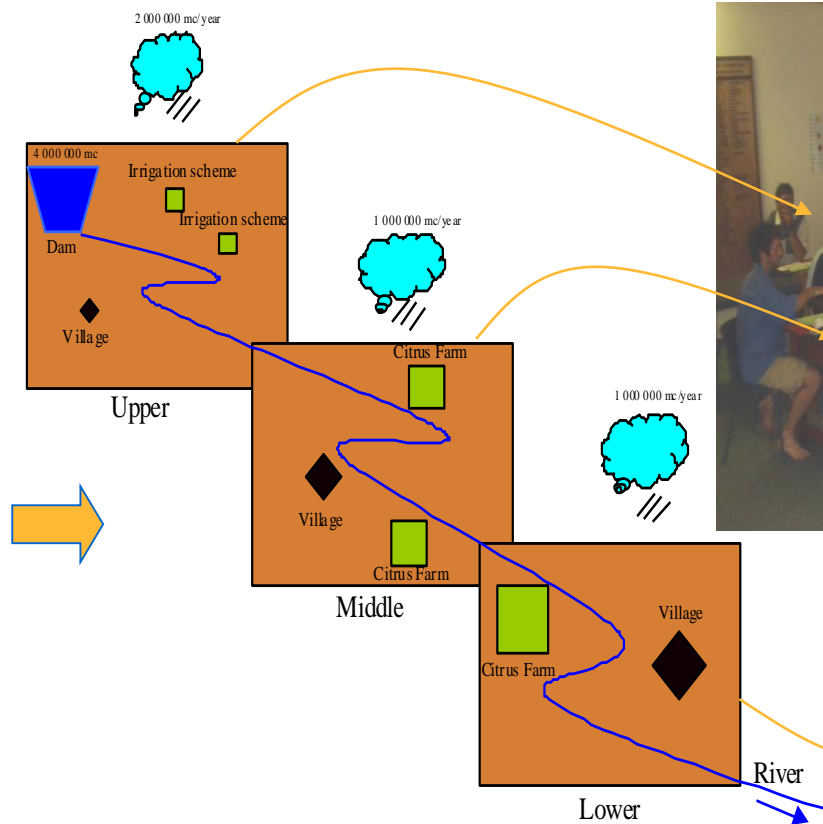
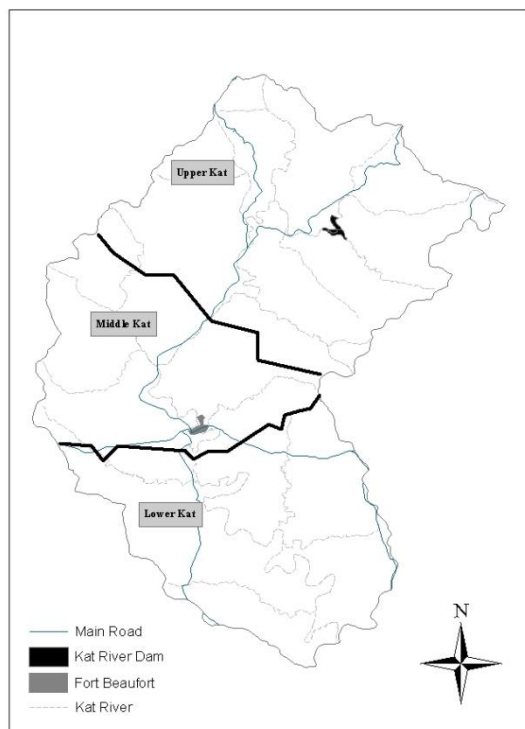




# Model's outcomes: dynamics of agents



# The Game





## Actual and transformed values for use in RPG of main variables in the Kat catchment

Variable <sup>a</sup>	Actual values	Values in role-playing game
Dam capacity (m <sup>3</sup> )	24,000,000	4,000,000
Natural runoff (m <sup>3</sup> )	13,500,000	3,300,000
Domestic consumption (m <sup>3</sup> )	1,500,000	580,000
Irrigation consumption (m <sup>3</sup> )	11,000,000	1,064,000
Cabbage area (ha)	180	40
Citrus area (ha)	1,300	100
Inhabitants in basin	49,000	23,000
Annual outflow	1,600,000	550,000

a. m<sup>3</sup> = cubic meters; ha = hectares.





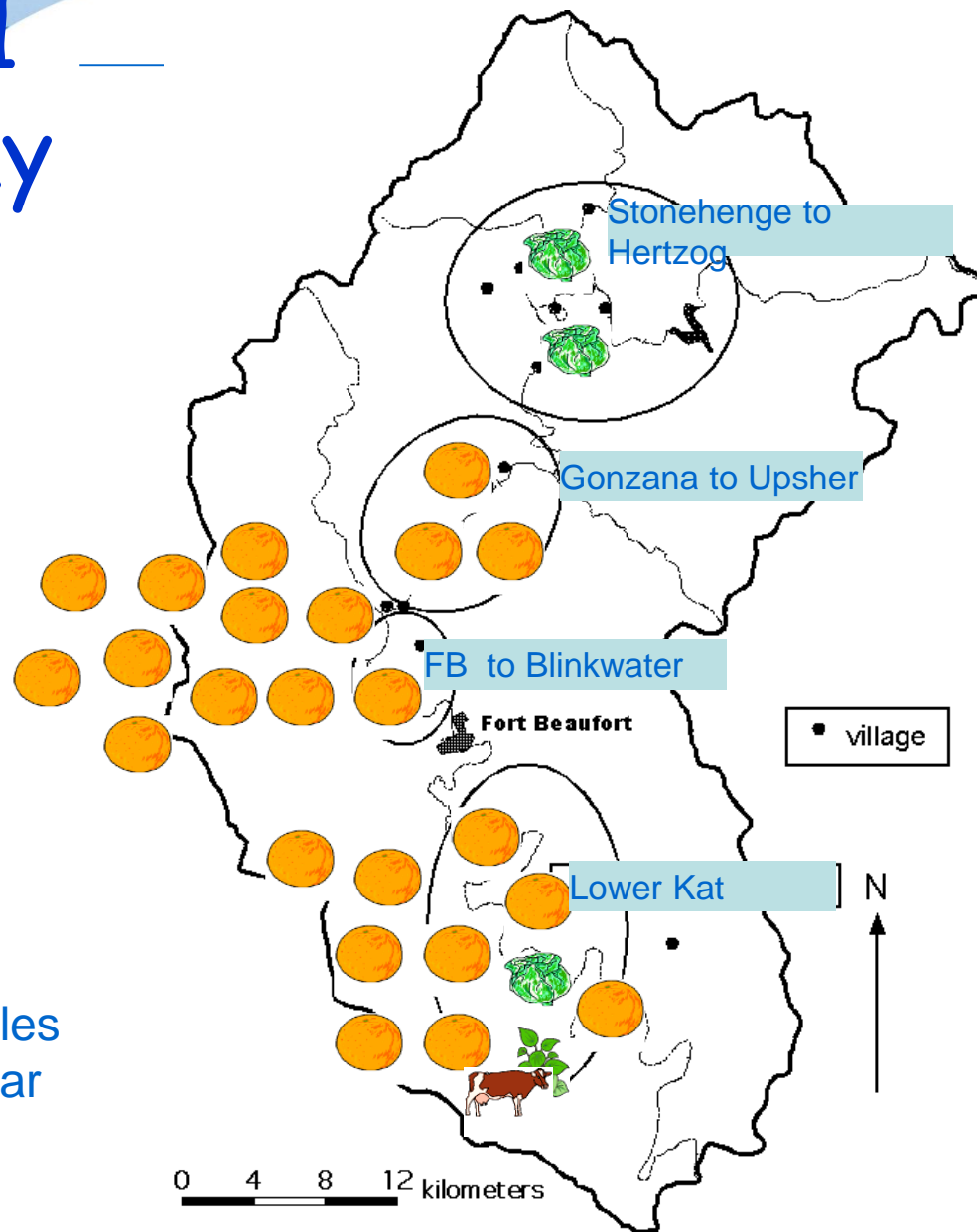
# RPG Artefacts



# RPG indicators during the session



# Scenario 1 present day use



50 ha oranges

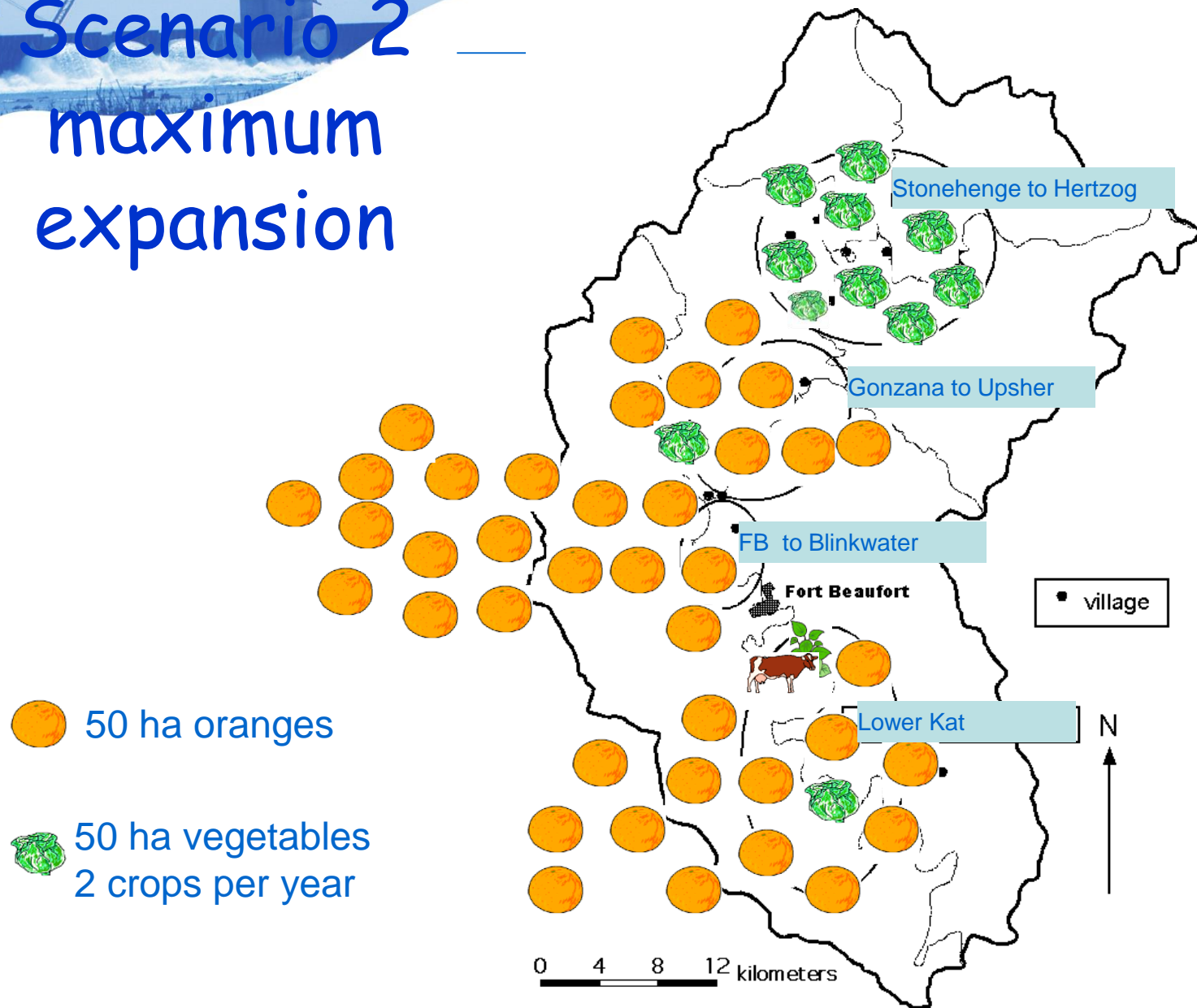


50 ha vegetables  
2 crops per year



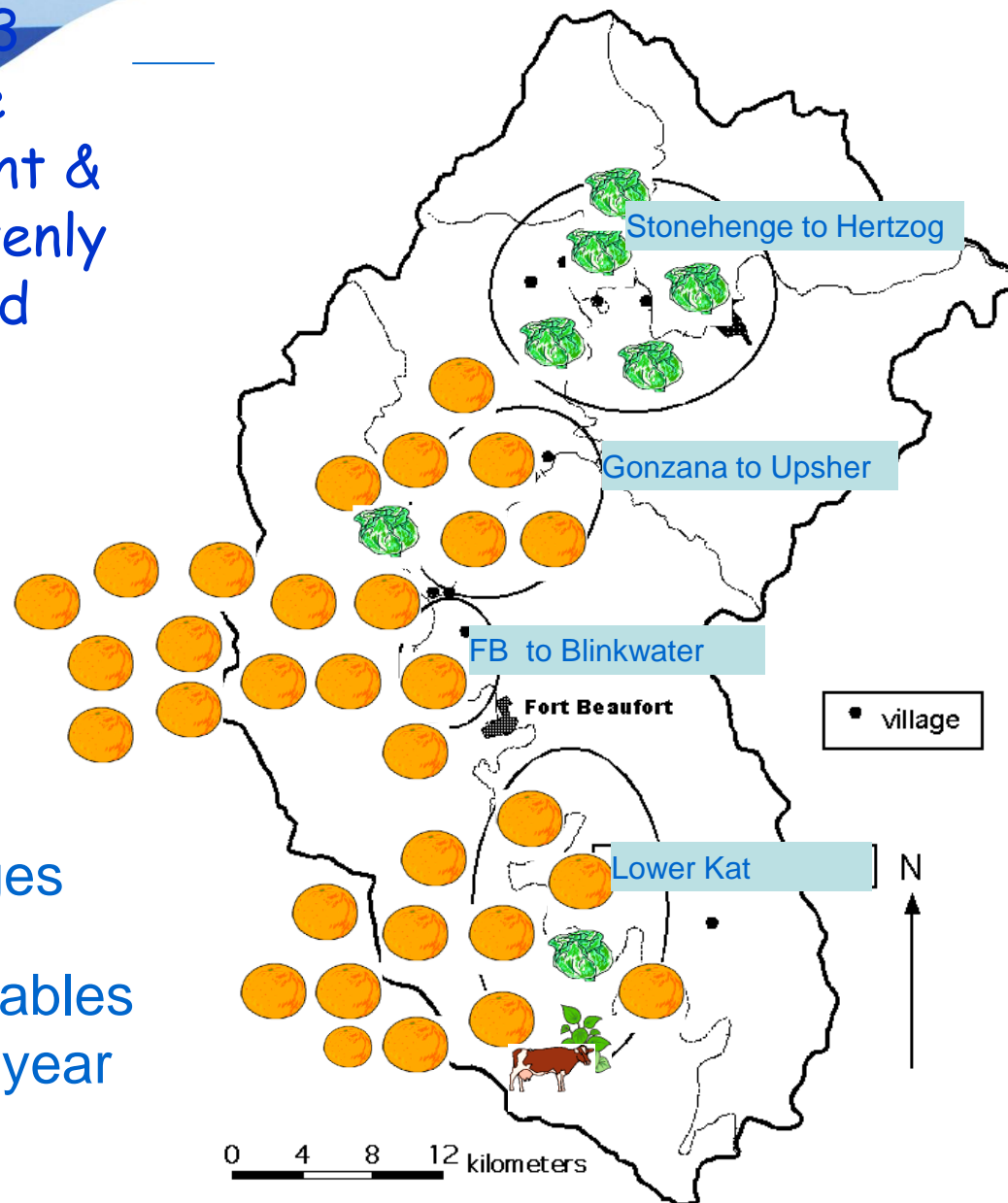
pasture

# Scenario 2 maximum expansion



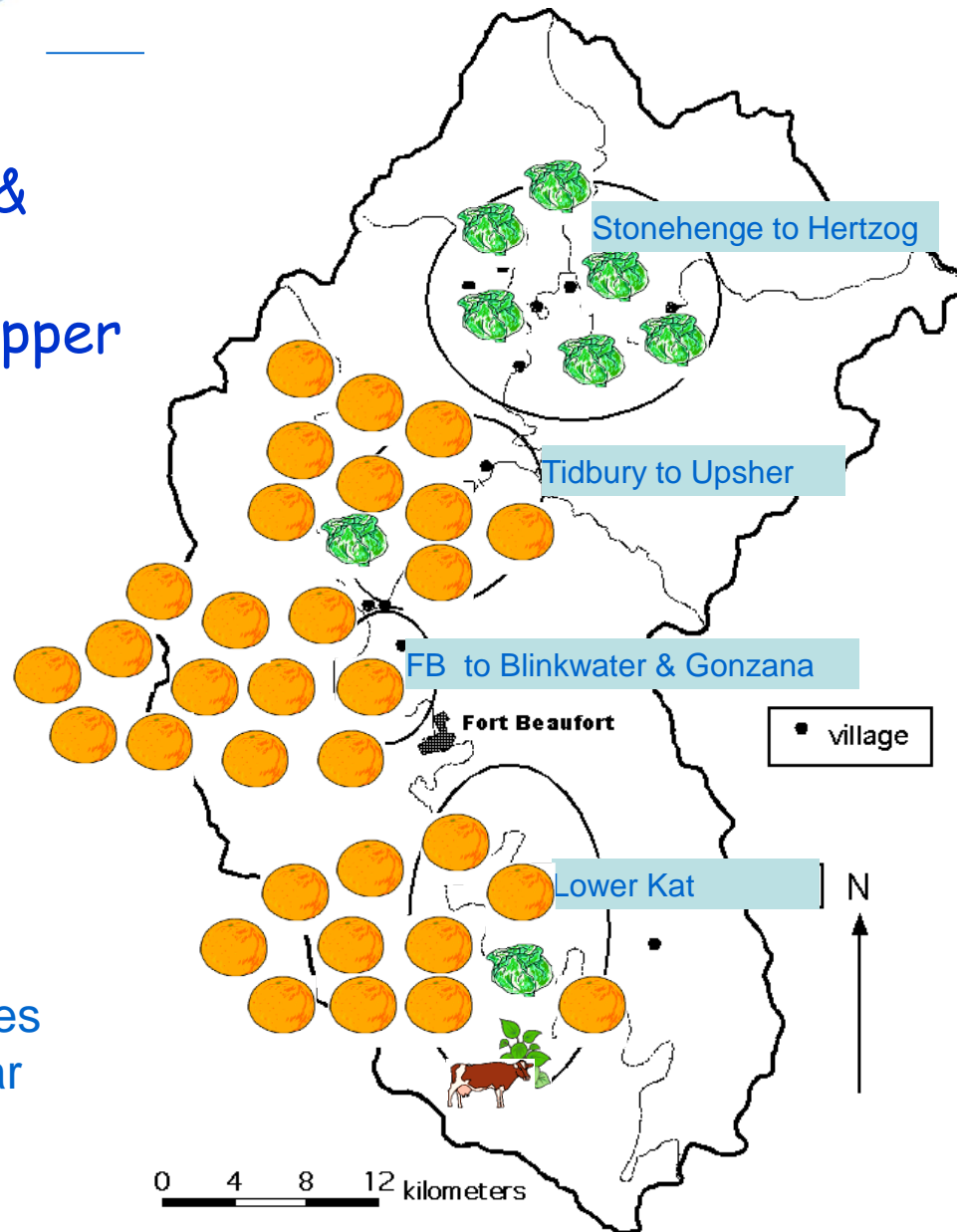


Scenario 3  
moderate  
redevelopment &  
expansion, evenly  
distributed



- 50 ha oranges
- 50 ha vegetables  
2 crops per year

Scenario 4  
moderate  
redevelopment &  
expansion  
partly addressing upper  
Kat issues



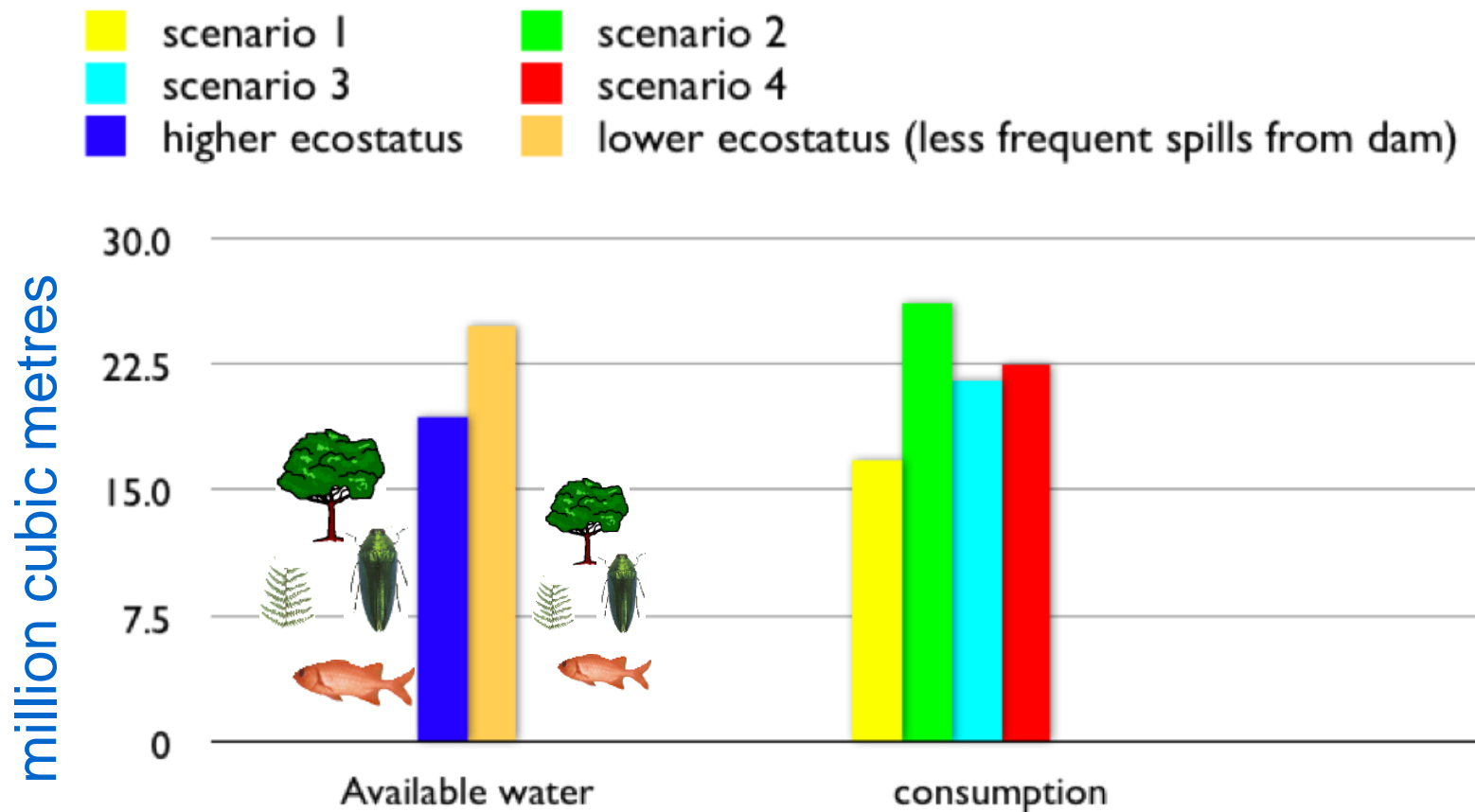
50 ha oranges



50 ha vegetables  
2 crops per year

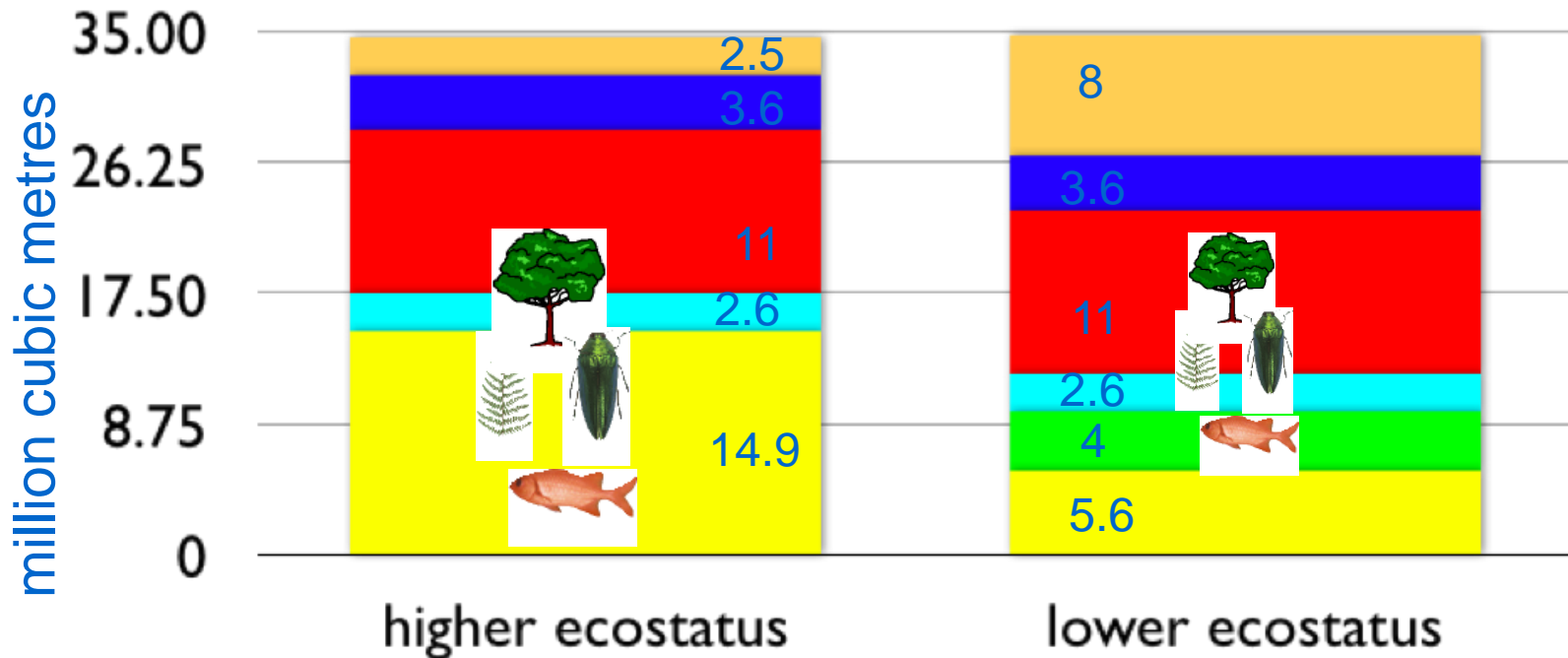
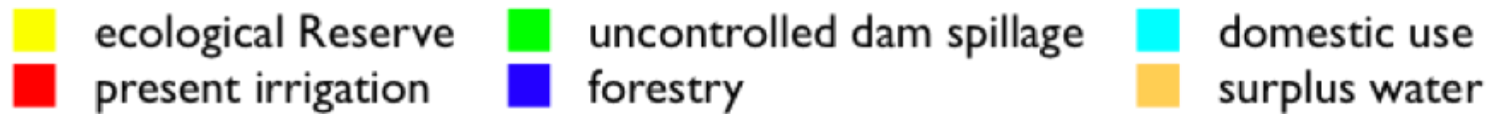


# Water consumption year 10



Available water is water available for allocation after ecological Reserve requirements have been met. Includes water for domestic use and forestry.

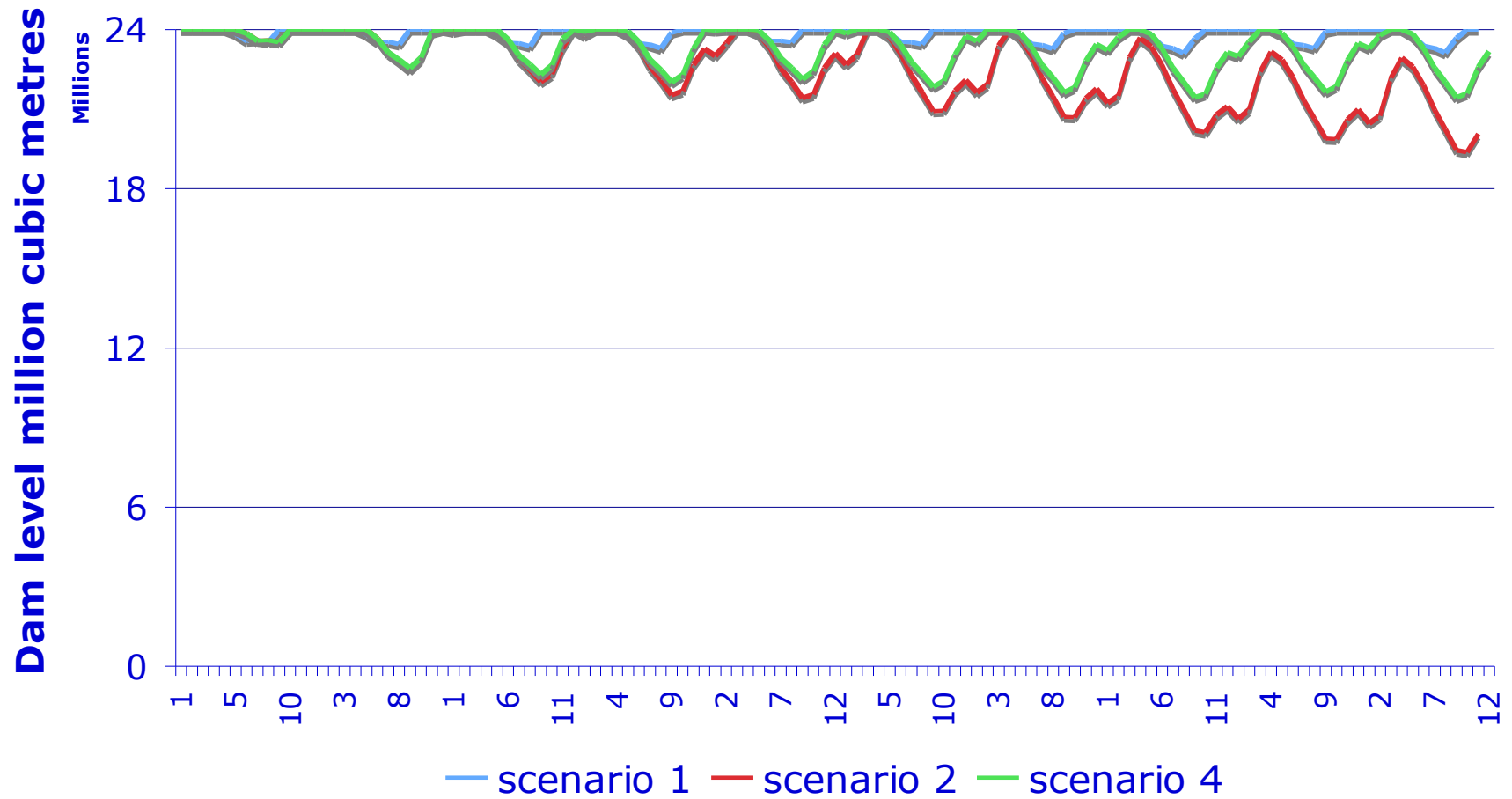
# Present water consumption



Surplus water is additional water available for allocation after ecological Reserve requirements have been met.

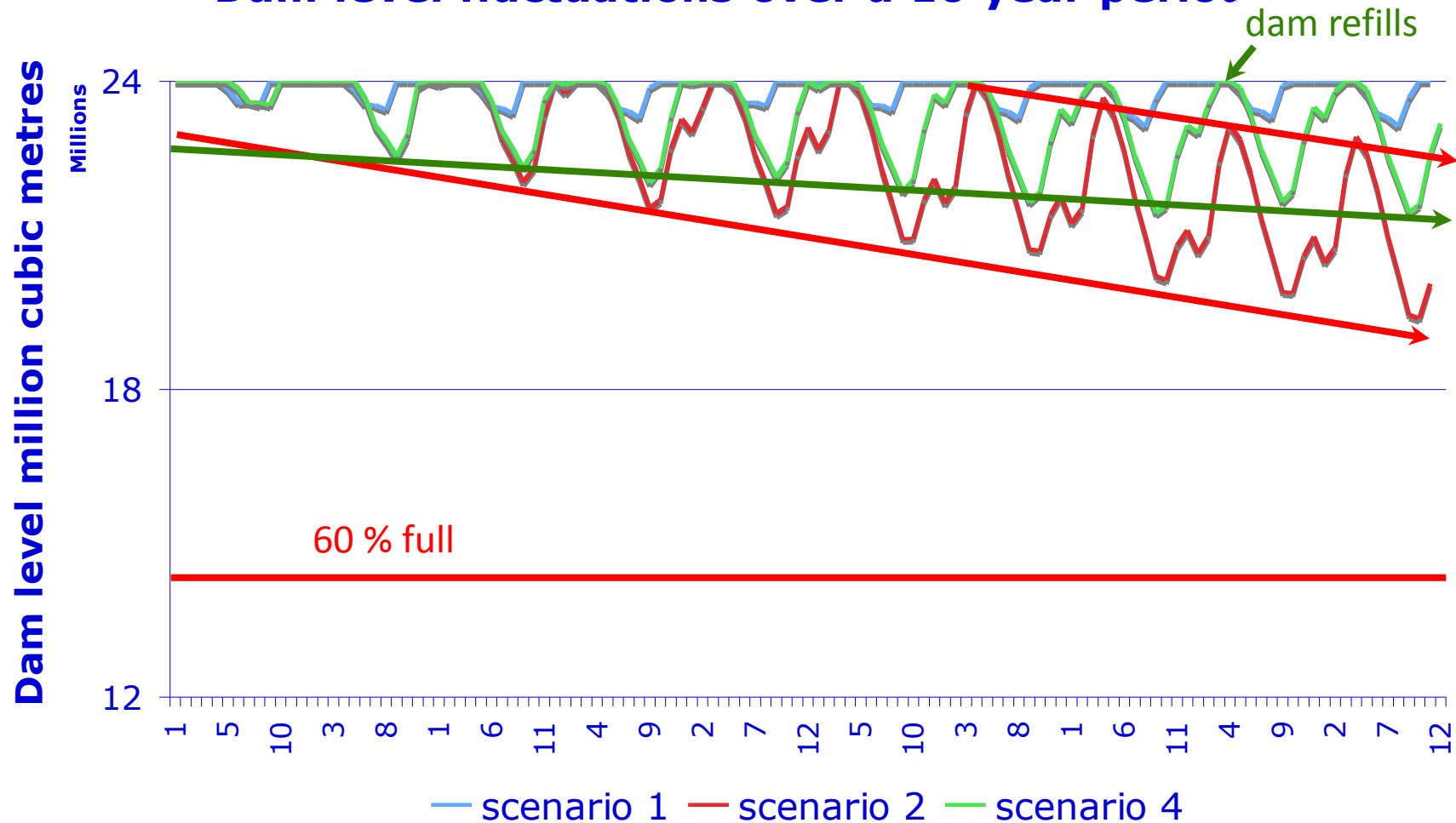


## Dam level fluctuations over a 10 year period

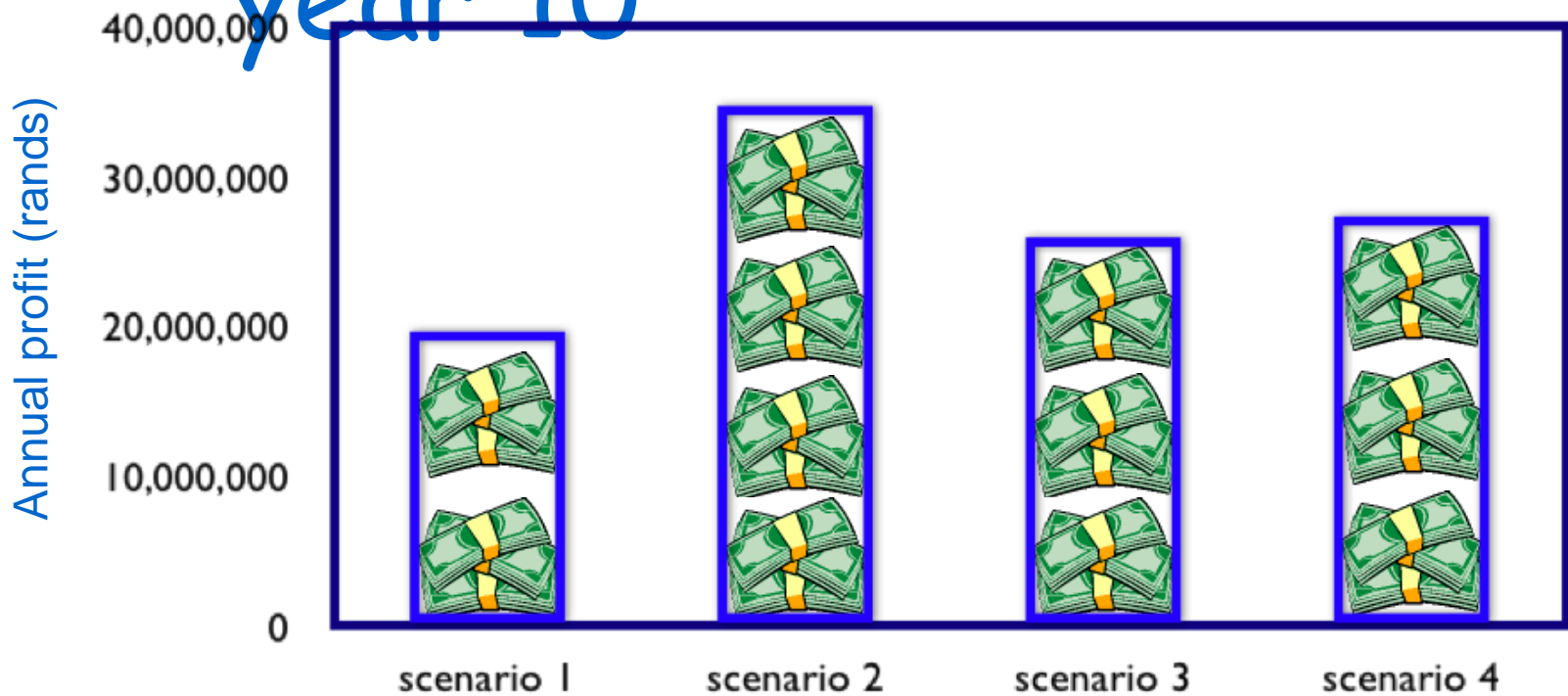




## Dam level fluctuations over a 10 year period



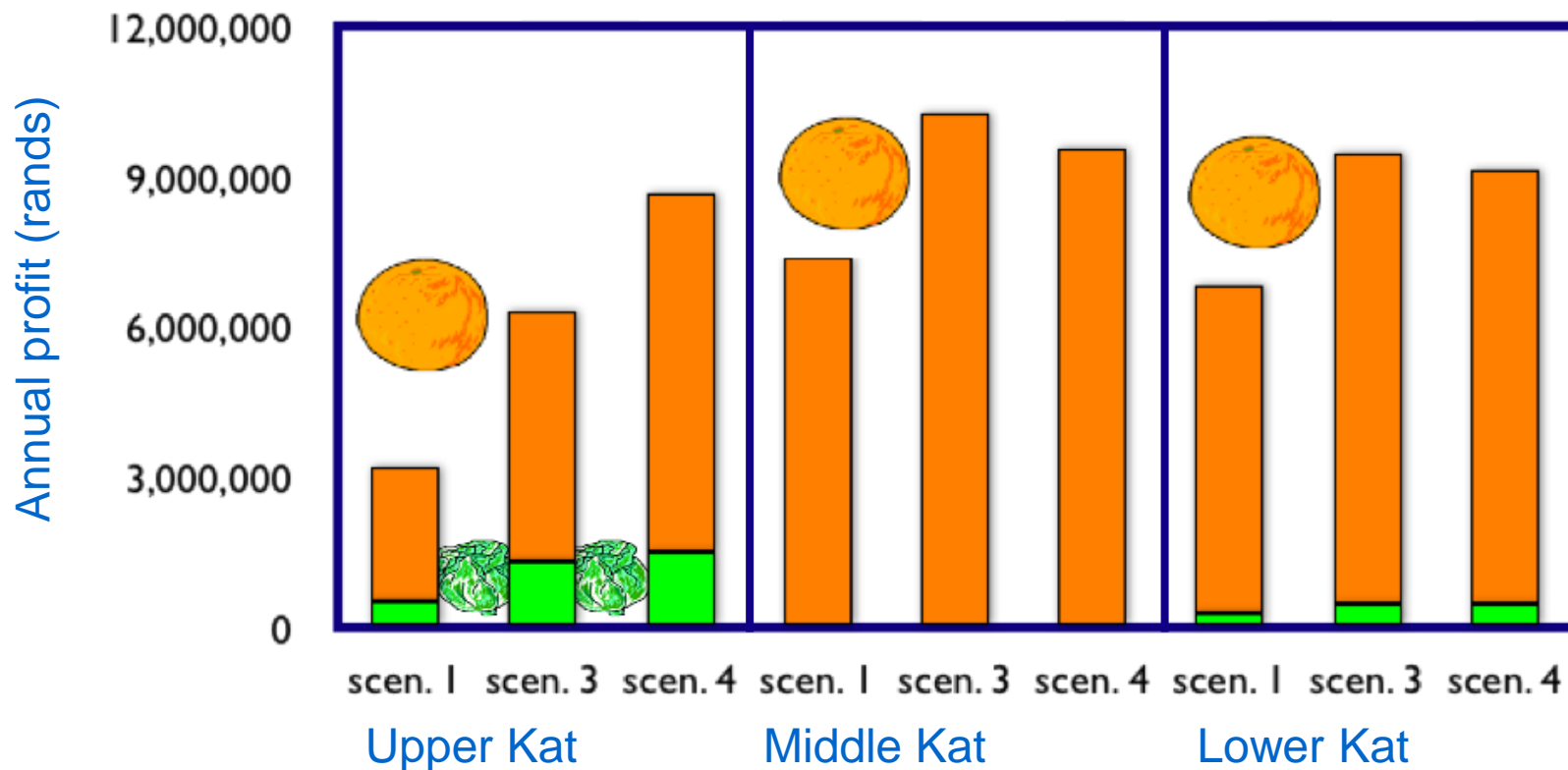
- Catchment profit at year 10





# Subcatchment profit at

year 10



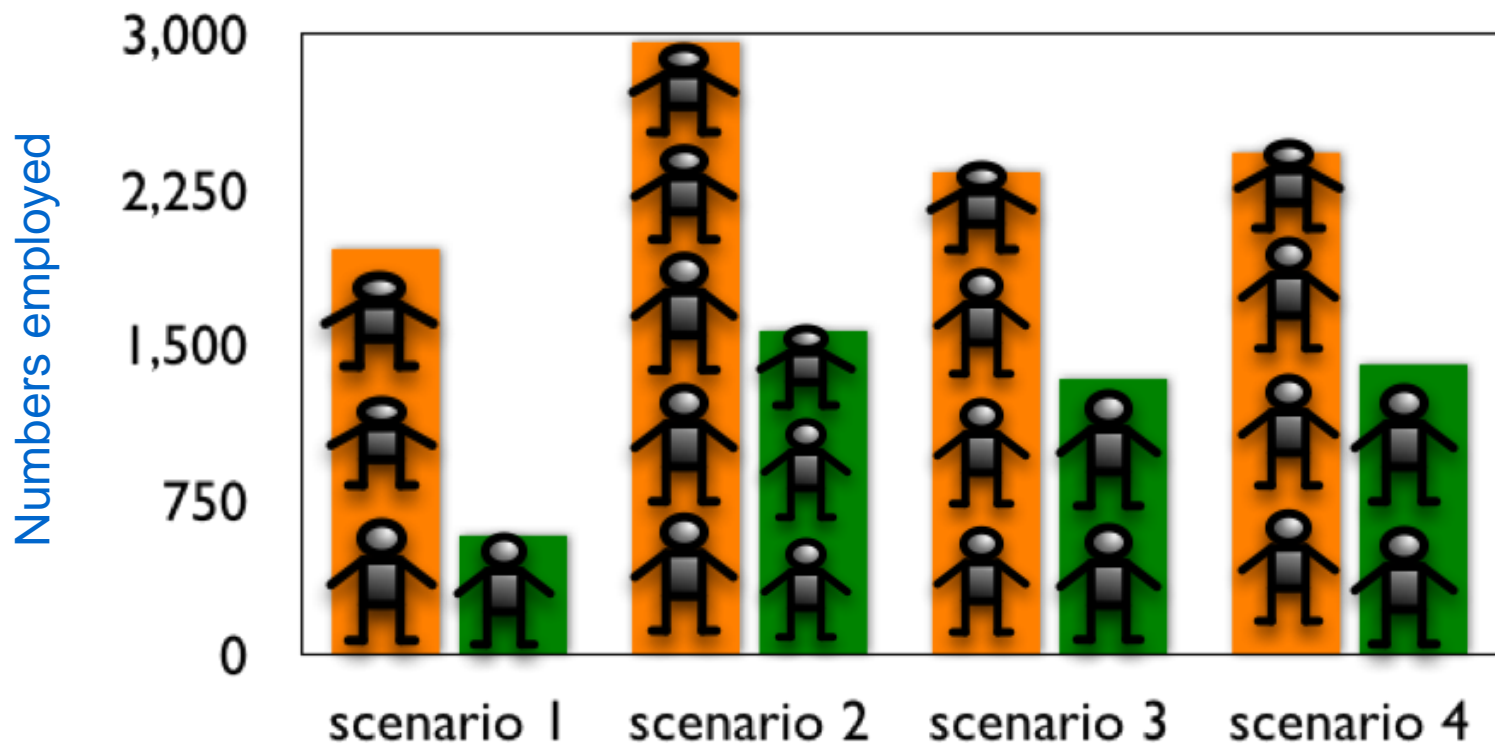
# Catchment employment at year 10

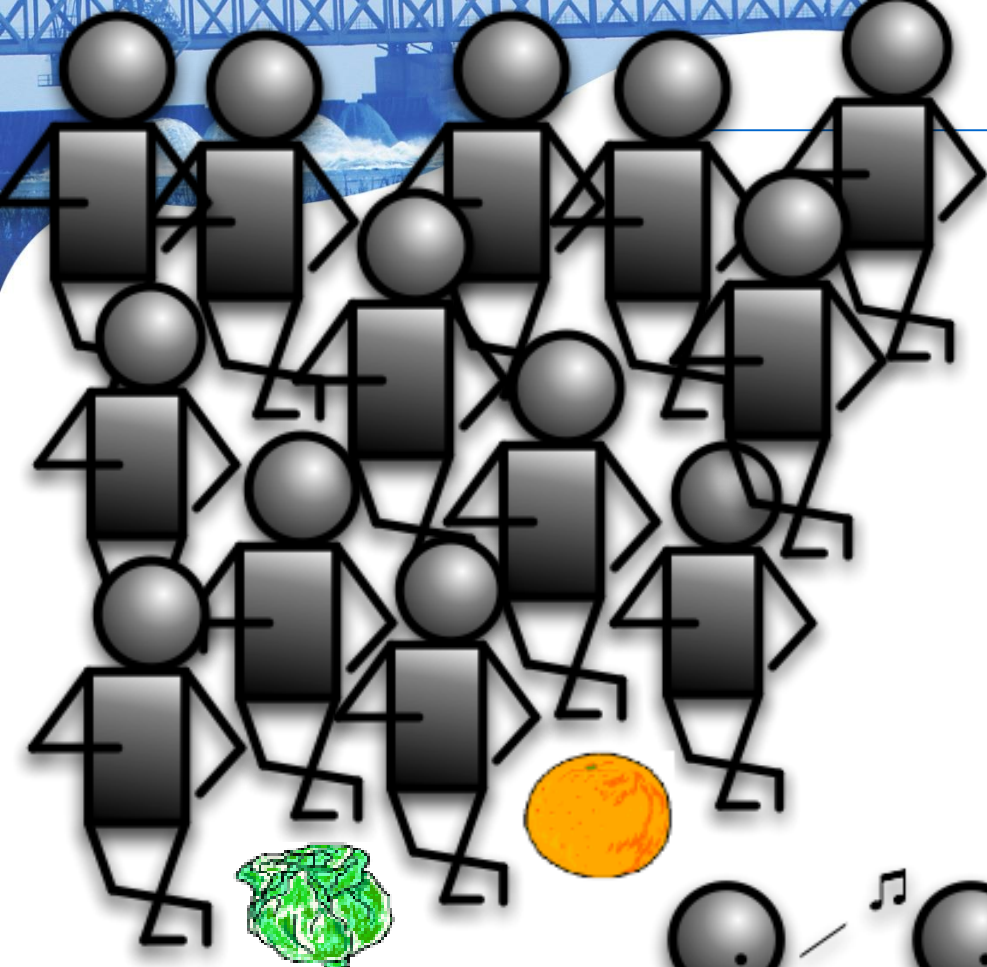


citrus



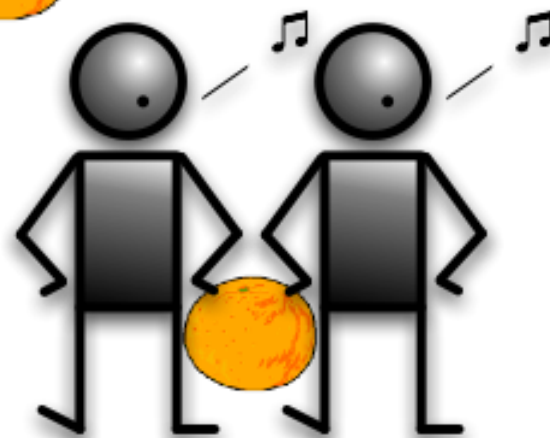
vegetables





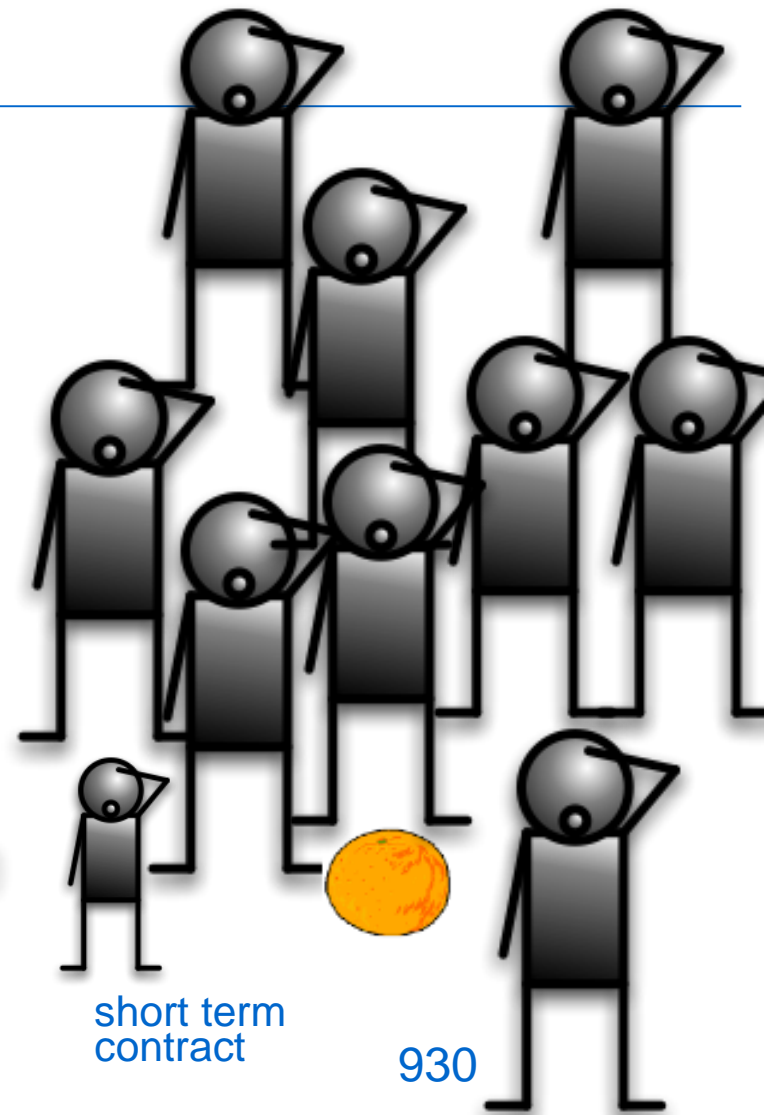
seasonal

1300



permanent

200



short term  
contract

930

Scenario 4



- Producing Knowledge
- Accompanying a common decision-making process



+


- Providing elements of a complex system
- Sharing different perceptions of the system

-

- Uneven understanding among the stakeholders of the system's complexity



# Accompanying a common decision-making process

- Facilitating communication among stakeholders
- Interpretation/discussion of scenarios (Conflicts )
- Selection (preliminary) of scenarios



- **Drafting a Catchment Management Plan to be submitted to DWAF**

+

- Going beyond the phase of « visioning » and « mental models », by providing quantitative scenarios and concrete basis for decision-making

-

- Limited space for refutation and challenge to the models: KatAWARE seen as a « tool to tell » rather than a « tool to test »
- (almost) Absence of some crucial stakeholders (DWAF)
- Long and expensive process
- Other catchments? Upscaling?

# Coupling actors, methods and issues for socio-environmental change and governance:

## *The* **CoOPLAaGE** *Approach*

*Nils Ferrand, Géraldine Abrami, Raphaele Ducrot, Sylvie Morardet, Emeline Hassenforder, Benjamin Noury, Patrice Garin, Bruno Bonté, Wanda Aquae-Gaudi*

UMR/JRU G-EAU Managing Water, Stakeholders & Uses



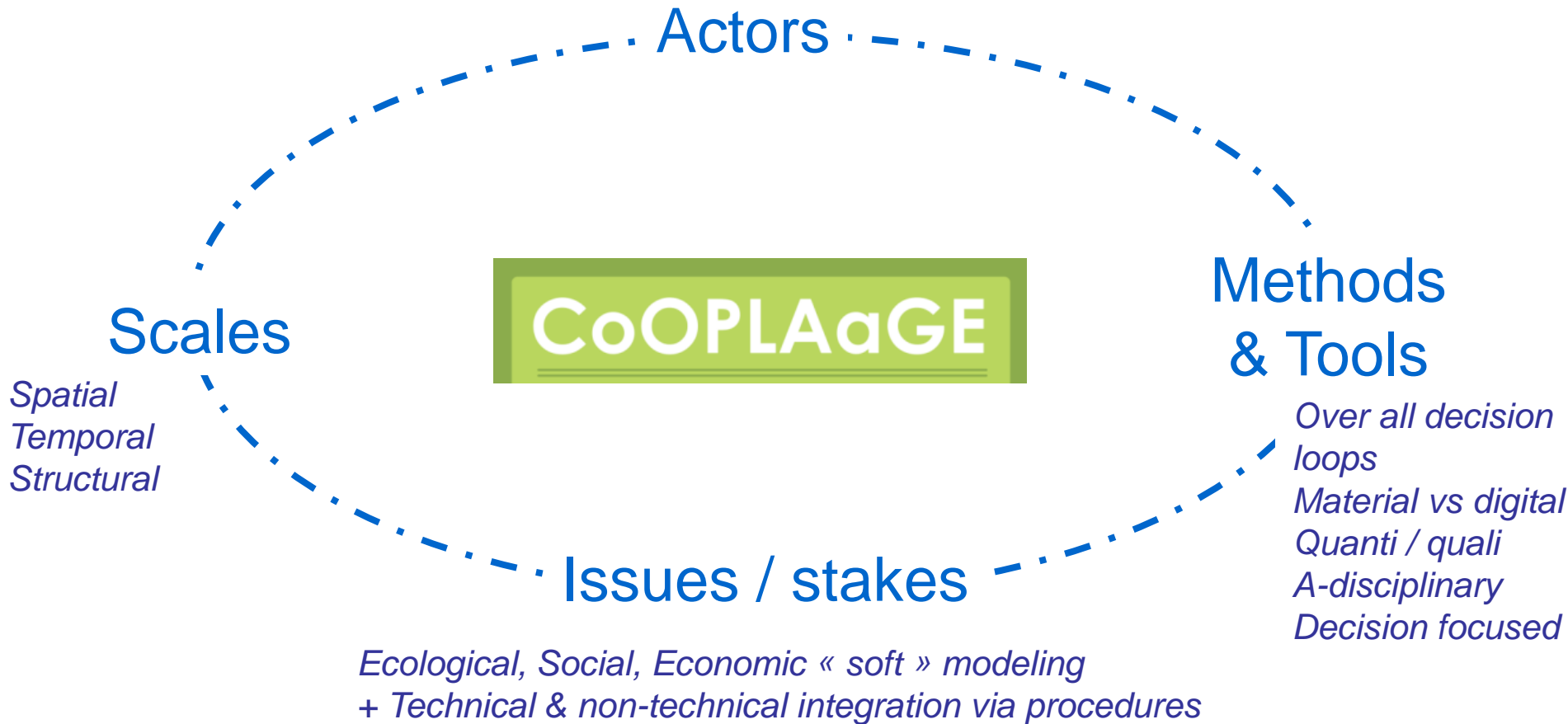
1. A robust apparatus coupling participatory methods, designed and used in various countries (110 listed cases) to support Socio Environmental change
2. (Multi-) Integration to cope with complexity: actors, stakes, scales, methods, disciplines...
3. « Let them » manage their own process (via transfer, a pro-autonomy posture and minimal intervention)
4. A grounding participatory modeling paradigm:  
*« Yes, they can model » to explore and change their own pathway in a complex environment*

# Coupling...

*Engineered inclusion in participation*

+ « *The Shared Room Principle* » ([\*Ferrand' keynote @ Resilience 2011\*](#))

+ « *2-levels processes* »





# COOPLAAGE



PrePar



Preparing design of  
the decision process



Wat-A-Game



Modeling &  
role-playing-games



Just-A-Grid



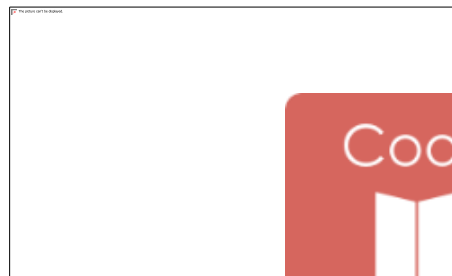
Discussing justice  
principles



Encore-Me



Evaluating  
impacts



Cooplan



Building action  
plans



Scoolplaage



Learning by doing

# A typical process



1

PrePar

## Preparing a governance protocol

Decide the principles and rules of the emerging participation process.

2

Just-A-Grid



## Exploring Justice

Discuss the social justice principles for sharing land and water.

6



## Monitoring and evaluation

Learn about the changes in knowledge, preferences, actions and relations

CoOPLAaGE

3

Wat-A-Game



## Creating a playable model

Prepare a local model for participatory simulations of local situation and new options.

5



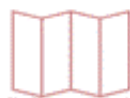
Wat-A-Game

## Testing and discussing plans

Experiment the plan with the role playing game and validate a joint adaptation strategy.

4

Cooplan



## Elaborating an integrated action plan

Propose and structure actions, and then assess their coherency, feasibility and efficiency



# e.g. Natural Resource Management in Africa (FP7 Afromaison 2011-2014)

## Fogera (Ethiopia)

*Agriculture intensification and soil degradation in uncertain land tenure context*



Procedural  
agreement



Focal issue



Actions  
identification



Planning



Role-playing-  
game



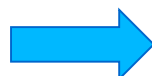
Implementation  
plan



## Rwenzori (Uganda)

*Proposal and validation of INRM plan in context of overexploitation of land and resources*

Co-design the  
process itself  
Share equity  
preferences



Propose actions  
Build and assess  
integrated strategies



Build own model  
Simulate new  
actions and norms

<http://cooplaage-intro.Watagame.info>

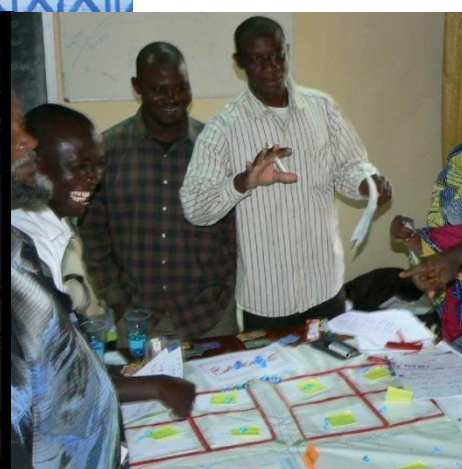
Source: E. Hassenforder, 2015



- Europe: Several European projects on Water Framework implementation, climate change adaptation, IWRM
  - Africa : Moz (irrigation), SA (Catchment strat. Inkomati), Mali (IND, ODN), Niger (ABN) BF (training), Eth (mng land Degrad. Tana), Ug (Rwenzori INRM), Ke (East-Mt Kenya NRM), Sn (training, strat recess. Agri), Tn (Ichkeul, training), Ma (training)
  - America : USA (training), Ca (training), CR & Nic (ES policy adaptation)
  - Pacifics : Au (social justice, training), NC (IWRM), KI
- 3000 users worldwide, 350 trainees in 2015



# COOPLAAGE







# Wat-A-Game (WAG)

## A toolkit for participatory modeling & role-playing games

- « Let-them » model their own catchment on the table
- Include their own roles, resources, activities, events
- !!! Get a shared model (playable) of their hydrosocial system
- INIWAG : introduction / discovery kit-bag
- CREA-WAG : creative process, step by step
- WAG-LIB : a library of past case studies (> 80)
- INFO-WAG : knowledge management
- INTER-WAG : computer support for edition













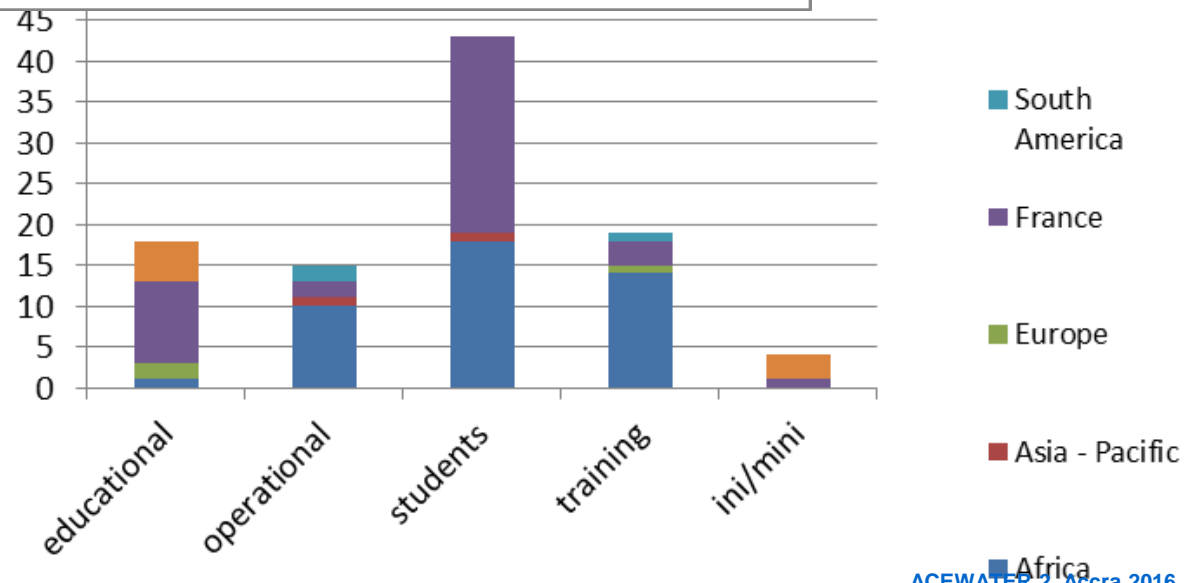
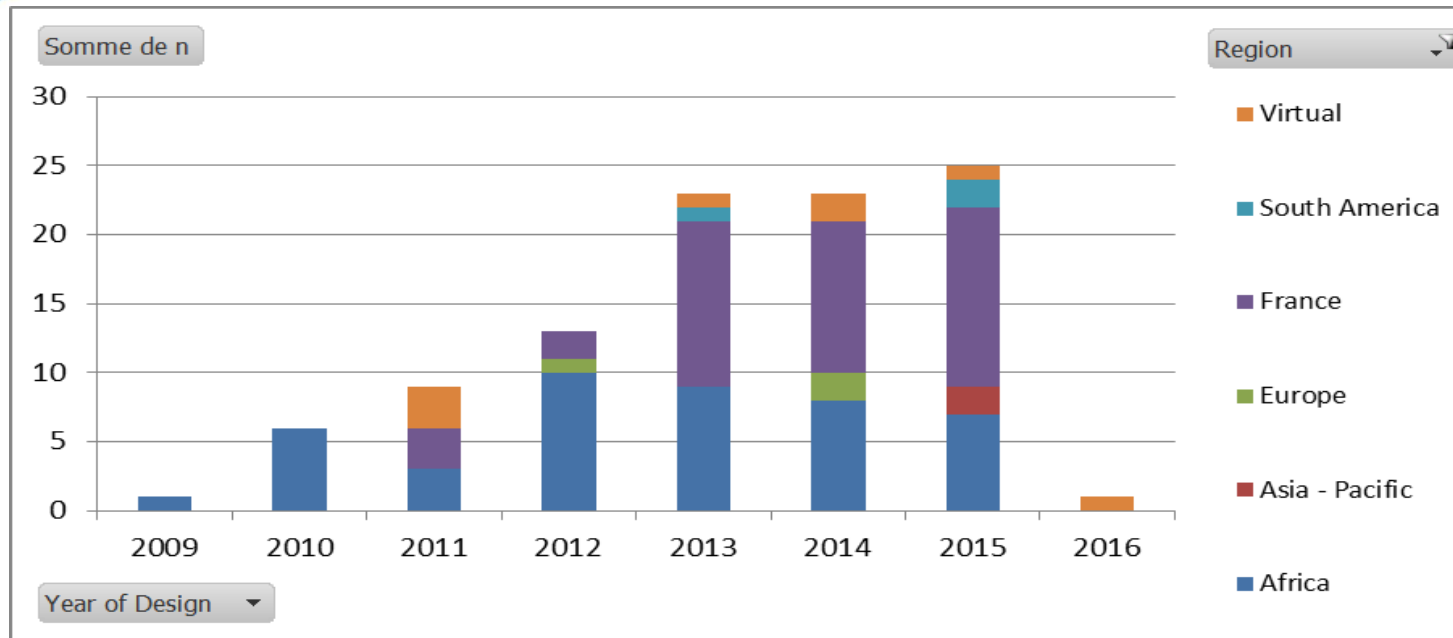








# 110 WAG case studies



# Issues addressed

61/111 models informed

~ activities

~ ES dynamics

~social dynamics


Water allocation / sharing	36	Policy implementation / reform	18
Water pollution	28	Poverty	13
Irrigation management	27	Land access / grabbing	8
Ecosystem preservation	20	Equity & fairness	8
Floods	17	Economic instruments	8
Groundwater management	16	Salinity	5
Sedimentation / erosion / siltation	13	Migrations	3
Wetlands management	10	War / civil conflicts	0
Landscape	7		
Demography	6		
Pests & epidemic	1		

:

Other

10

- activities : infrastructures management & maintenance
- ES : sand invasion, ecosystem services
- social : water pricing , corruption, risk, public health

- Water governance to regulate the development and management of water resources and provision of water services at different levels of society (GWP)
  - African countries' water governance => radical changes in the last fifteen years or so.
  - Participation of stakeholders at various geographic and institutional levels, especially at the local level is a crucial factor to improve water management and increase people's empowering
  - Action research can be of determinant help by providing tools and approaches.
  - To facilitate participation in water management and governance, several tools and processes have been proposed and developed
  - Companion Modelling
- 
- CoopIAage (no computer, quicker process, fast autonomy of local communities through training)
  - => a support for improved water governance
  - => is this applicable to existing situations in your countries?
  - => which participants?



Thank you for your attention

<http://www.cirad.fr/en/research-operations/research-units/g-eau>

<https://sites.google.com/site/waghhistory/>

<http://www.commod.org/en>

