Providing a Science-Practice Interface to Decision Makers through Global Environmental Change And Food Systems (GECAFS) Decision Support Systems Research

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GLOBAL CHANGE
IGBP

IHDP

WCRP Climate

GECAFS
Global Environmental Change and Food Systems

FAO

CGIAR

WMO

GECAFS Vision

A food-secure future for those most vulnerable to environmental stress.

GECAFS Goal

To determine strategies to cope with the impacts of GEC on food systems and to assess the environmental and socioeconomic consequences of adaptive responses aimed at improving food security.

Global Environmental Change

Anthropogenic Causes

Examples of human activities leading to GEC:

- Deforestation
- Fossil fuel consumption
- Urbanisation
- Land reclamation
- Agricultural intensification
- Freshwater extraction
- Fisheries overexploitation
- Waste production

Global Environmental Change
Manifestations

Changes in the biophysical environment caused or strongly influenced by human activities

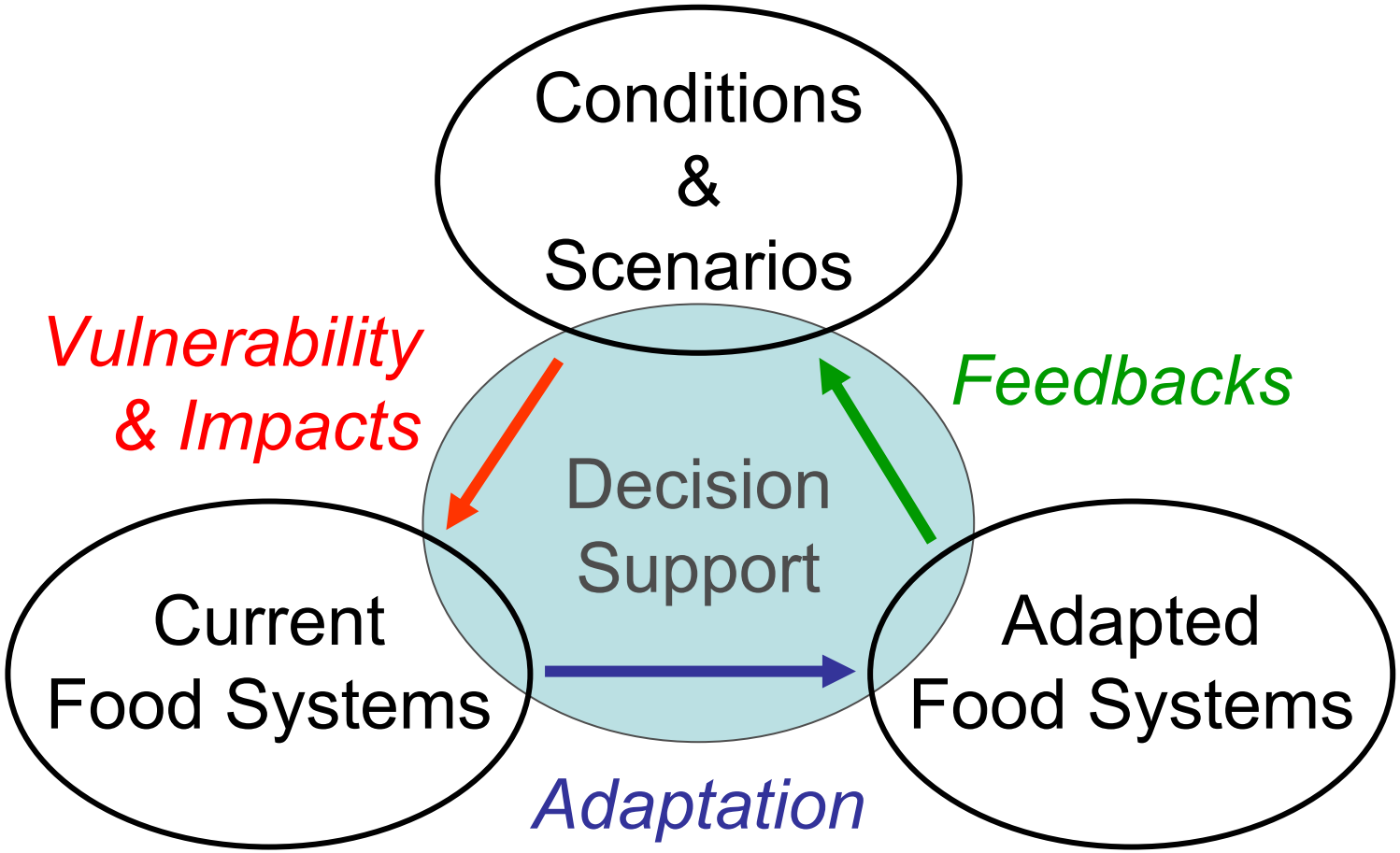
For example changes in:

- Land cover & soils
- Atmospheric composition
- Climate variability & means
- Water availability & quality
- Nitrogen availability & cycling
- Biodiversity
- Sea currents & salinity
- Sea level

GECAFS Fundamental Questions

- How will Global Environmental Change affect the **vulnerability of food systems** in different regions?
- How might food systems be **adapted to cope with GEC** so as to enhance food security?
- What would be the **consequences of adaptation options** for environmental and socioeconomic conditions?

Global Environmental Change and Food Systems Research



GECAFS
Global Environmental Change and Food Systems

Research Approaches

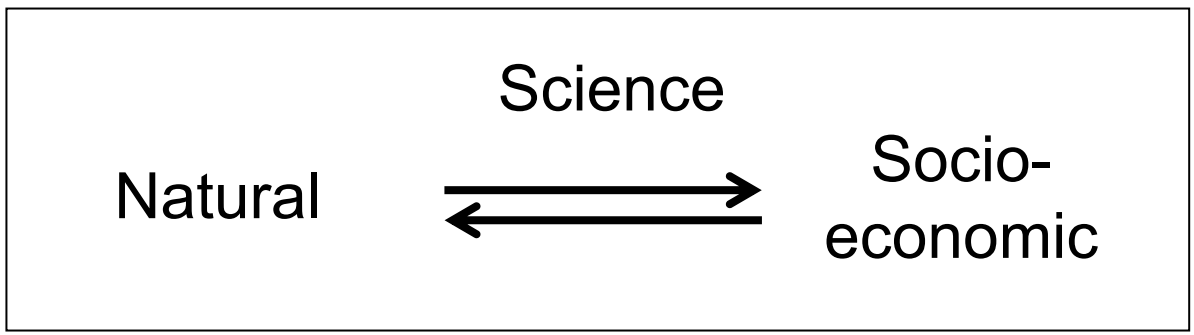
1. Conceptual & Methodological Research

i. Food Systems Concepts
ii. Vulnerability Concepts
iii. Scenario Construction
iv. Decision Support Systems

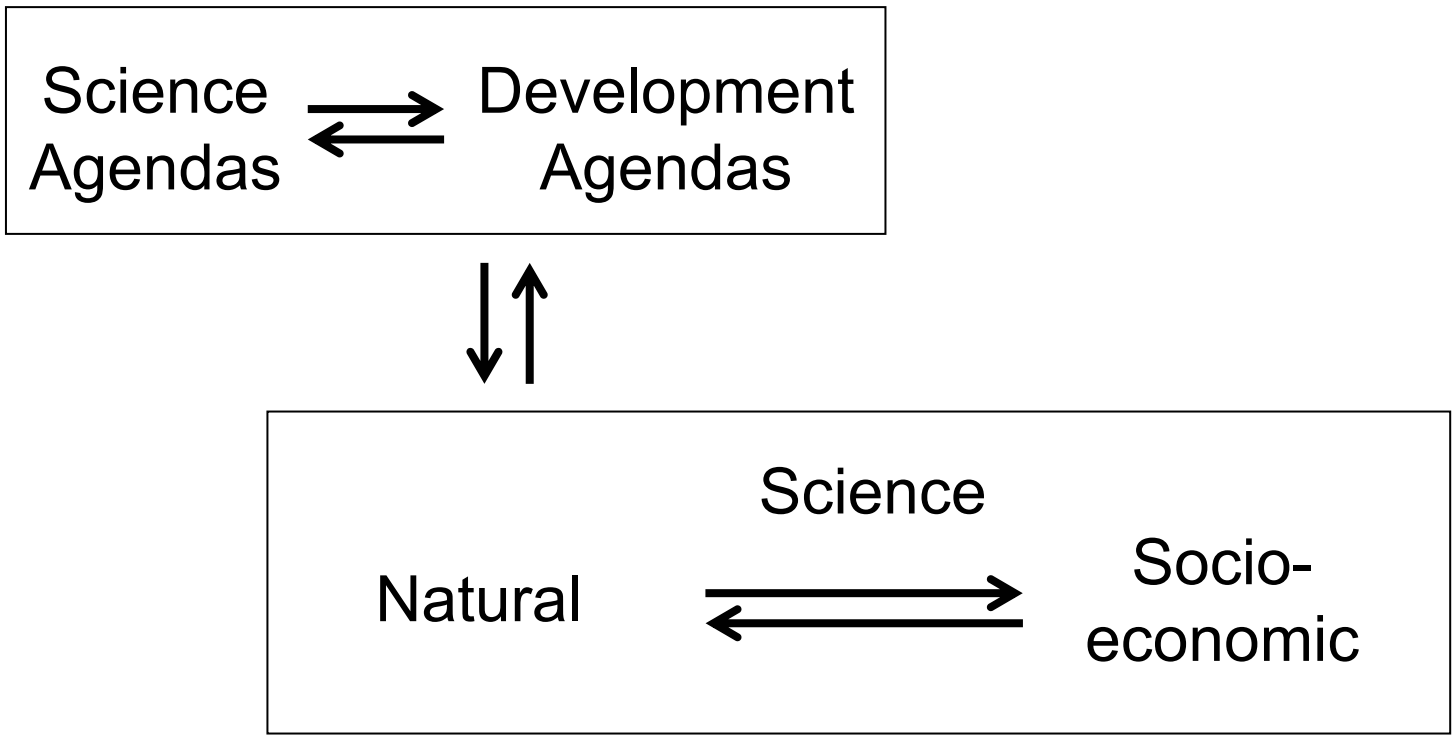
2. Regional Food Systems Research

i. Indo-Gangetic Plain
ii. Caribbean
iii. Southern Africa

Research Relevance and Partnerships



Research Relevance and Partnerships



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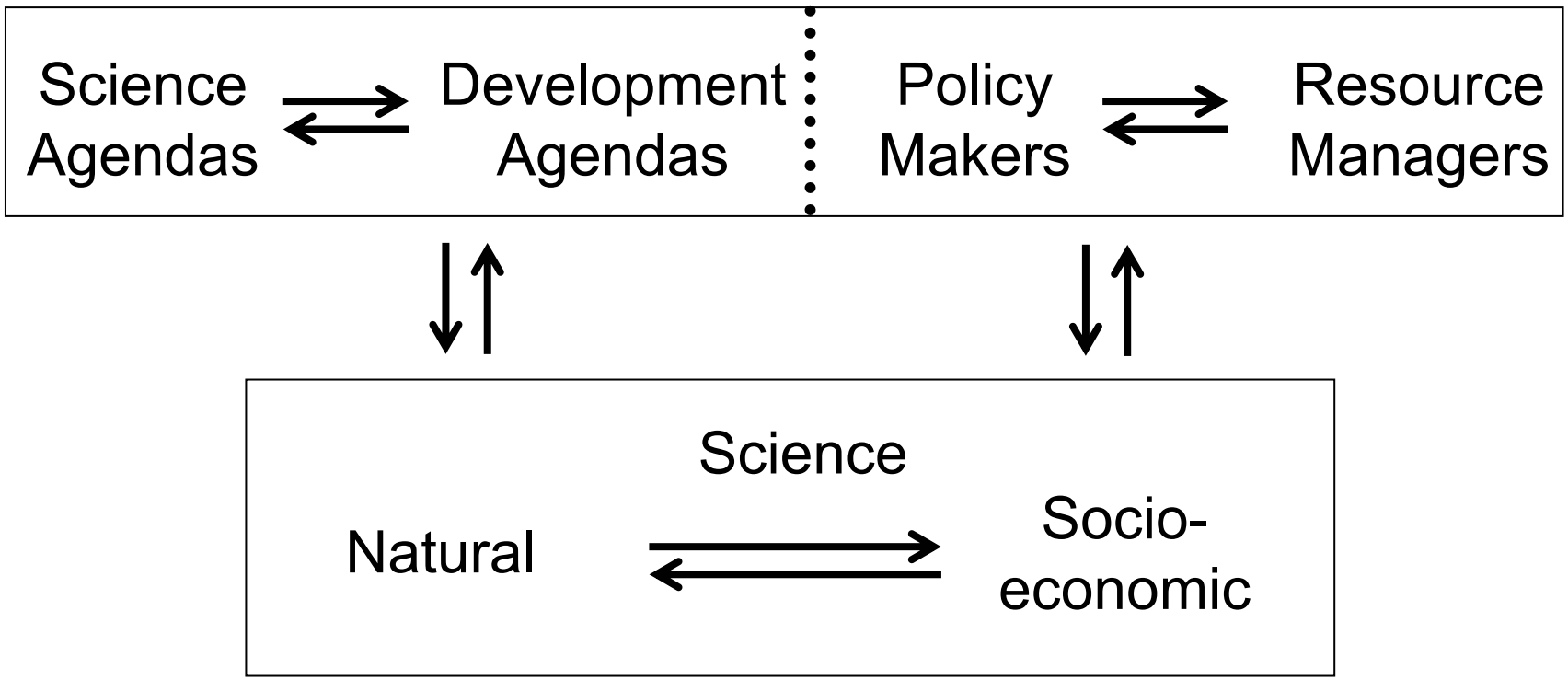
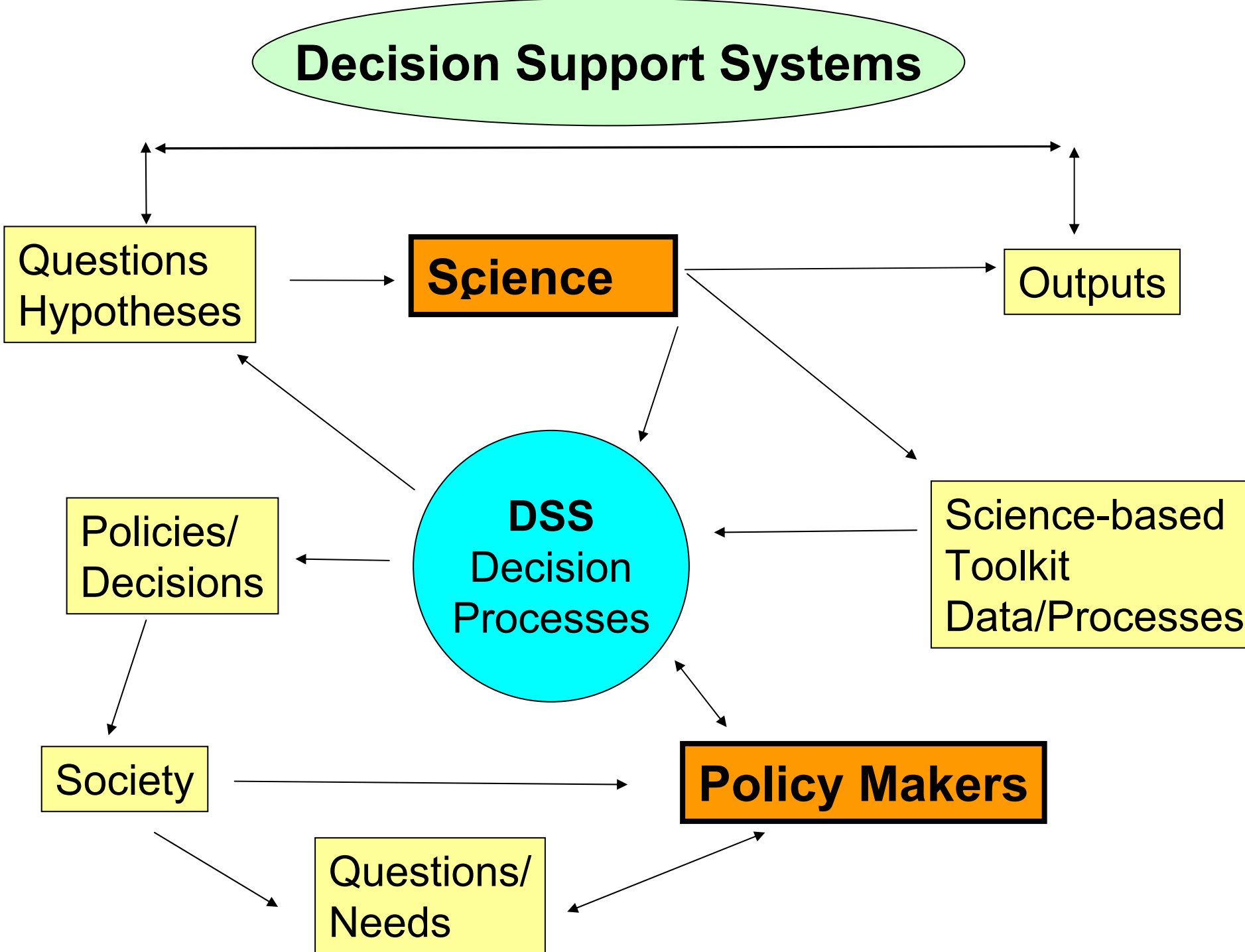
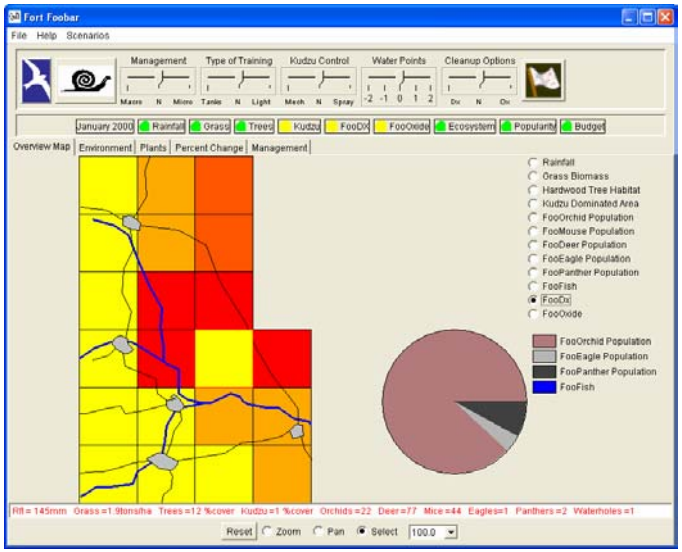
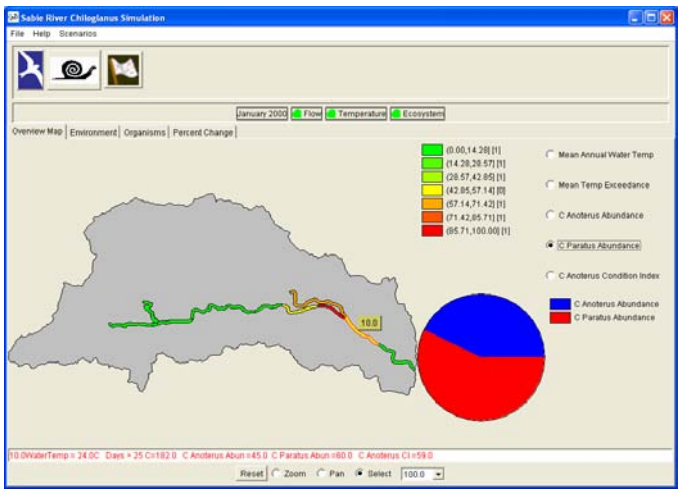



Decision Support Systems
Questions
Hypotheses
Science
Outputs
DSS
Decision
Processes
Policies/
Decisions
Science-based
Toolkit
Data/Processes
Society
Policy Makers
Questions/
Needs

QnD Model



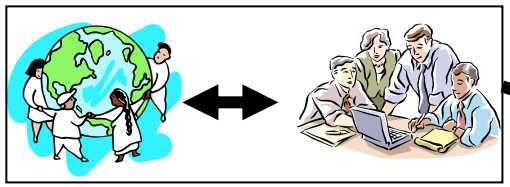


- QnD™ – *"Questions and Decisions™"*
- A fully integrated Graphic User Interface (GUI) with a flexible model engine
- One model - Many ecosystems
  - Java code / XML inputs
  - Dynamically instantiated objects
- Java-based deployment in web browsers
- "Fast Deployment" (weeks/months)
- Spatial simulation with GIS linkage
- Multiple time steps
- Multiple maps/graphs/files for output variables

- Kiker et al. (2005)

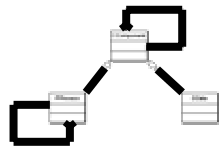
QnD: Development Methodology

Genesis Session



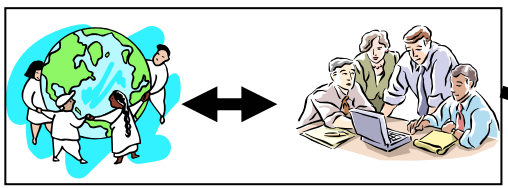
- Talk about the system, goals, desires
- Explore current management options
- Gather initial maps/data
- Brainstorm about desired management options, relevant information and socio-economic realities

Prototype QnD Game View and Simulation Engine



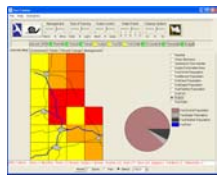
- Rough estimate of components, processes and data
- Simple information
- Deployed in limited circulation for calibration/reality checks

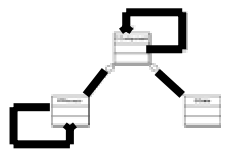
Iterative Sessions 1…n



- Refine goals, objectives
- Explore current and possible management options
- Calibrate/Validate engine performance
- Revise Game View for relevant management information
- Make changes concerning management options, relevant information and socio-economic factors

Deployed QnD Model

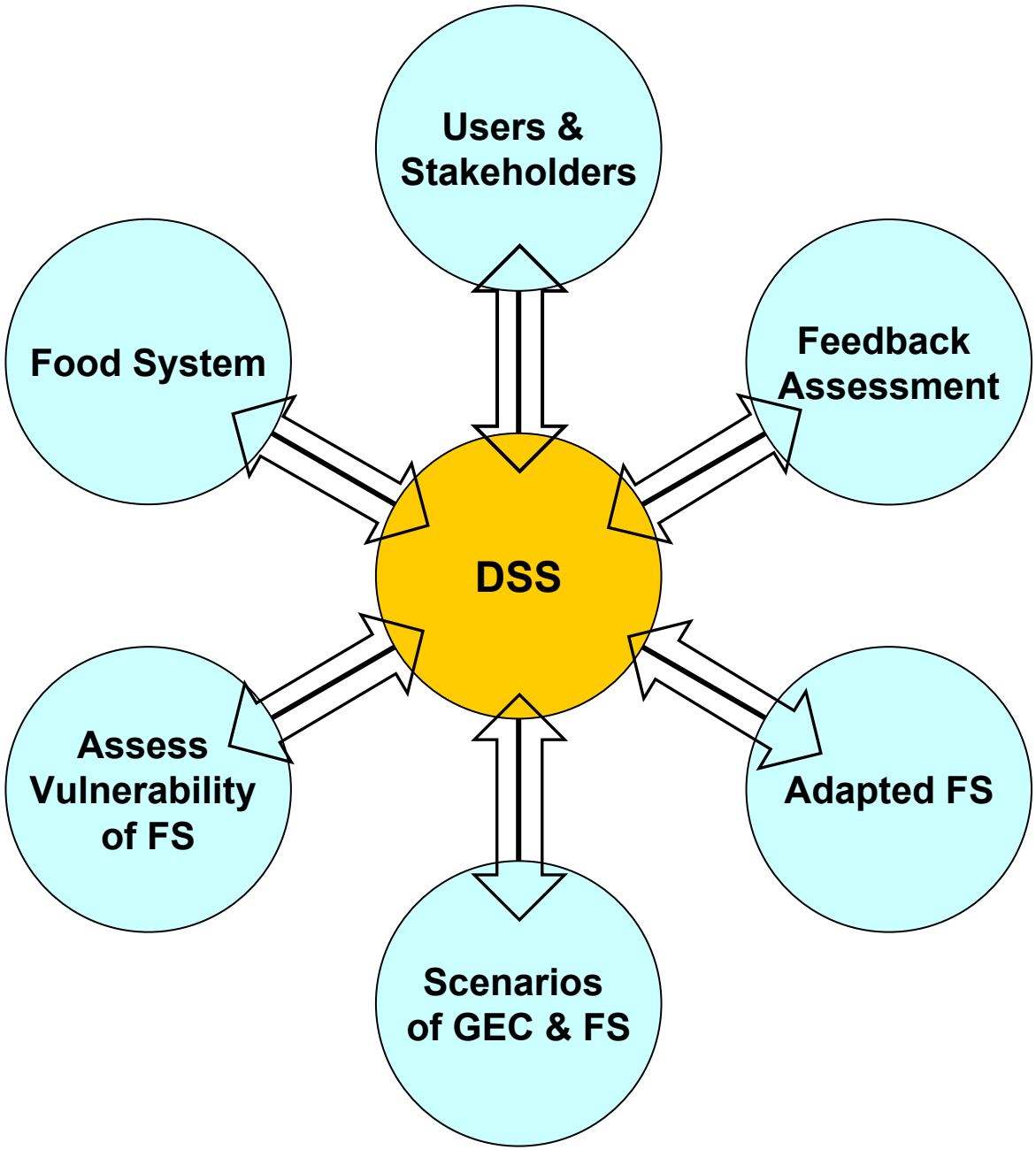




- Player/Developer reviewed components, processes and data
- More relevant information
- Brainstorm about desired management options, relevant information and socio-economic realities

GECAFS-DSS

Approach for region or country analysis of Food Systems and GEC



http://www.gecafs.org

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