



biogeografie  
uni bayreuth

# Monitoring and Experimental Methods and Approaches in Ecosystems Research



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# *Monitoring and Experiments*

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This course (2 credits) includes lectures and excursions (2 days).

Lectures will be held at the begin of the semester (approx. 4 - 5 weeks) on Mondays between 12:15 and 13:45 in S 25.

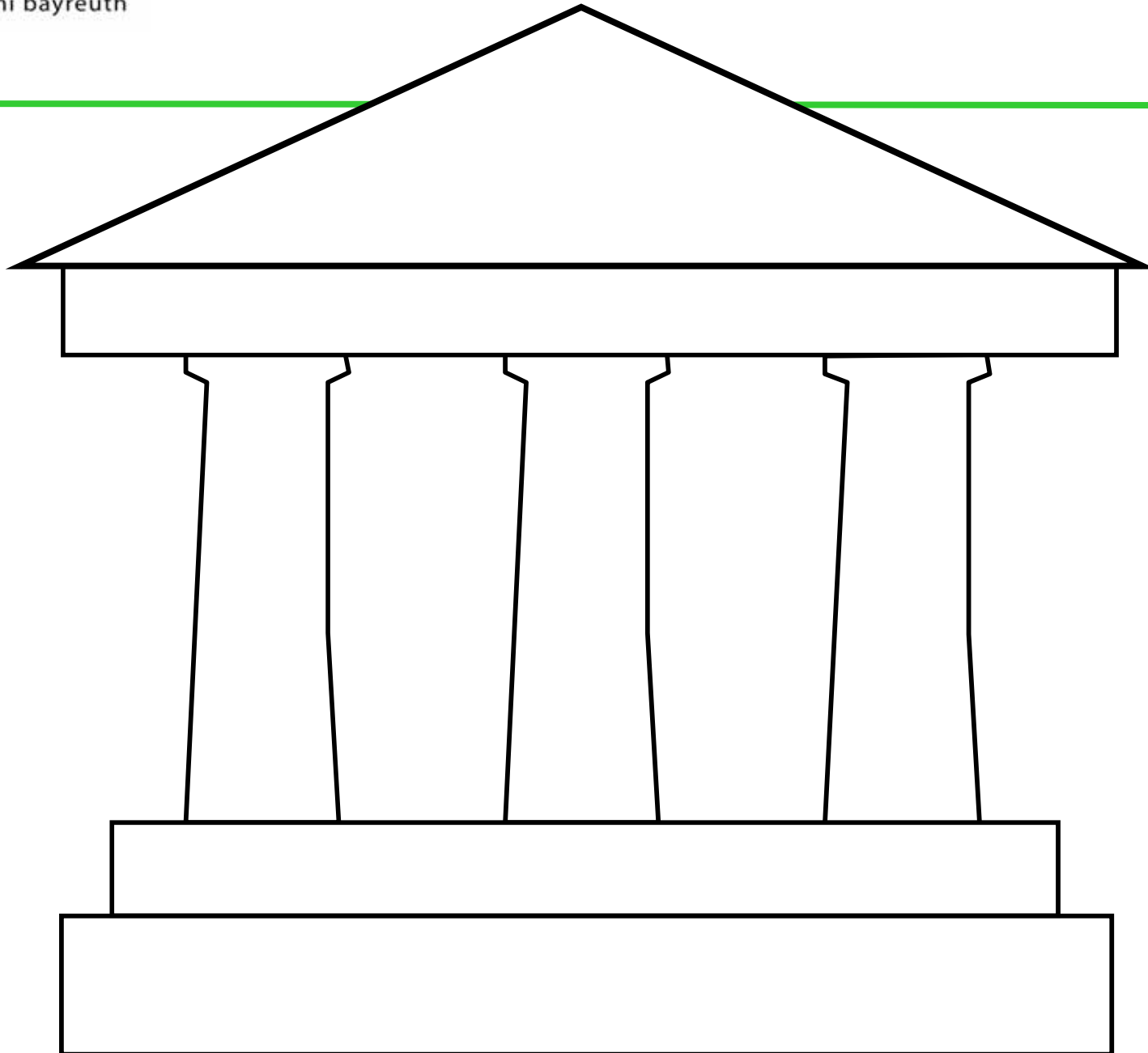
Excursions will lead to the JENA Experiment and to additional experiments and monitoring sites in Frankenwald and Fichtelgebirge.

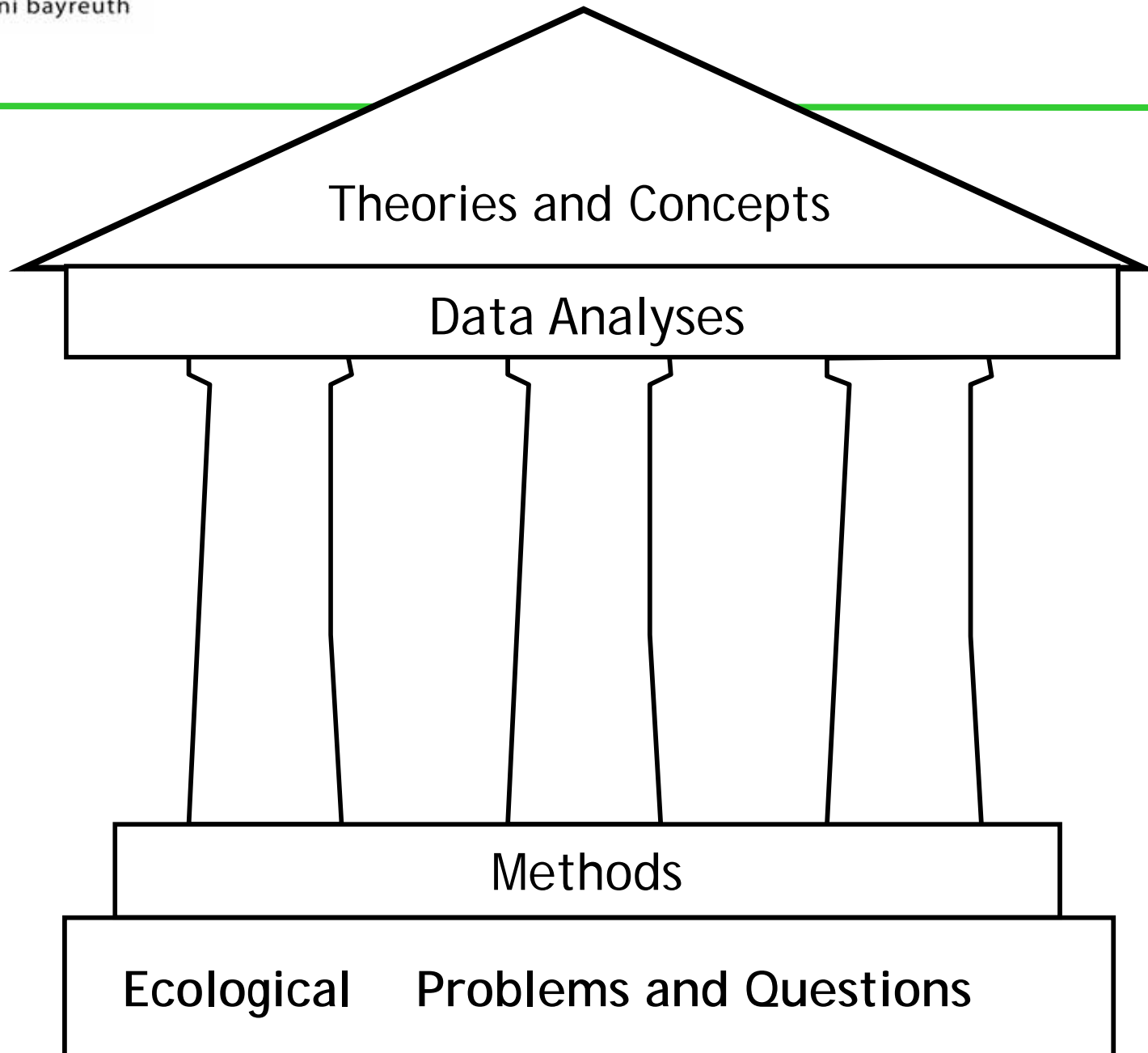
Introduction will address basic principles of ecological research.

The section on monitoring gives an overview on sampling design and monitoring concepts.

The section on experiments will give information on additional aspects to the courses given by Dr. V. Temperton and by Prof. A. Jentsch, Dr. J. Kreyling and D. Harter.

TODAY just one hour lecture until 13:00!







# *Perspectives*

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## Scientific Demands

- *Reproducibility*
- *Objectivity*
- *Representativeness*

## Societal Demands

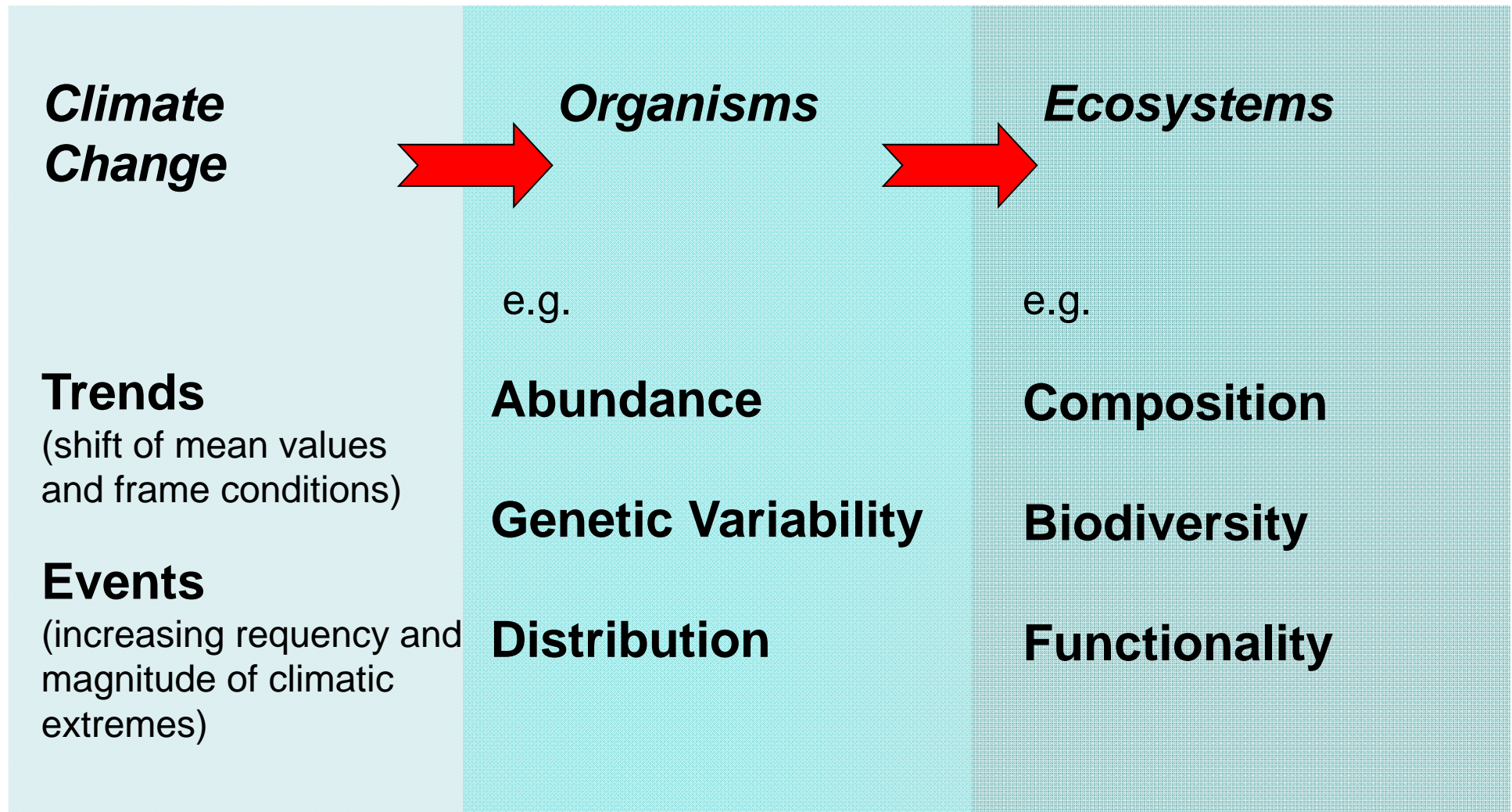
- *Social Relevance*
- *Economic Importance*
- *Ethic Constraints*

Ecological Problems and Questions





# *Impact of Global Climate Change in Ecological Systems*



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## ***Ecosystem Change***



will modify

## ***Ecological Services***

**Composition**

**Biodiversity**

**Functionality**

### **Benefits**

(e.g. food, drinking water,  
raw materials)

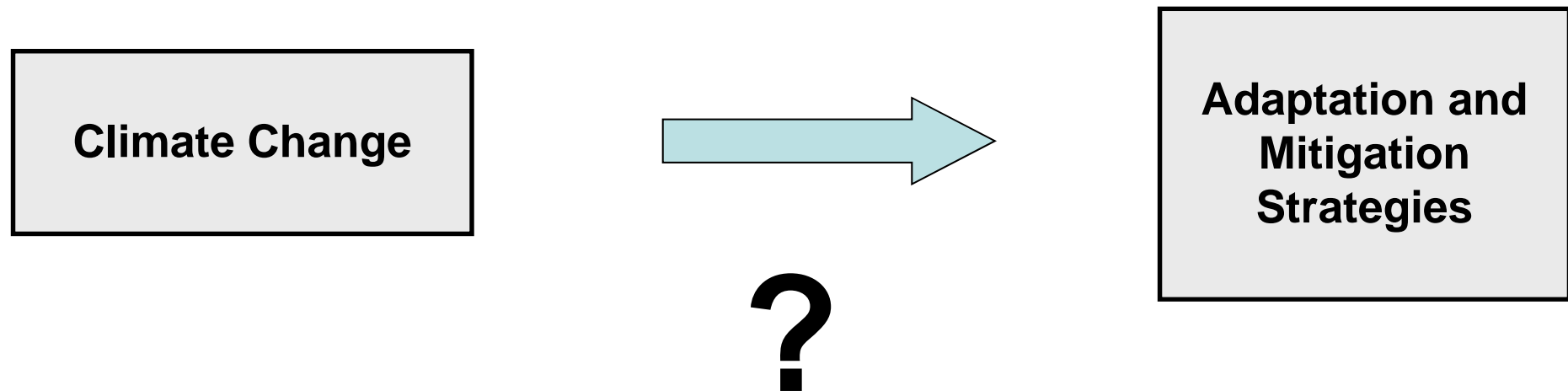
### **Protection against Threats**

(e.g. land slides,  
floods, diseases)



# *Effects, Strategies and Responses*

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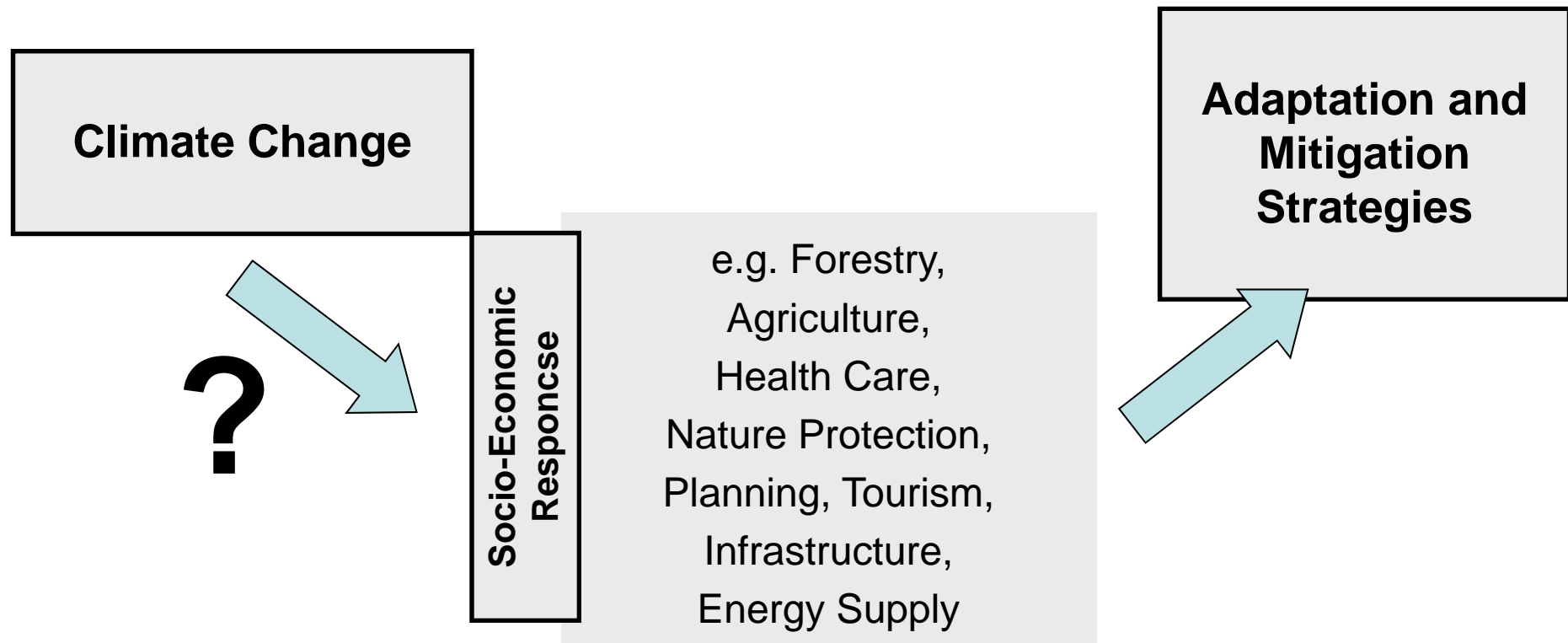






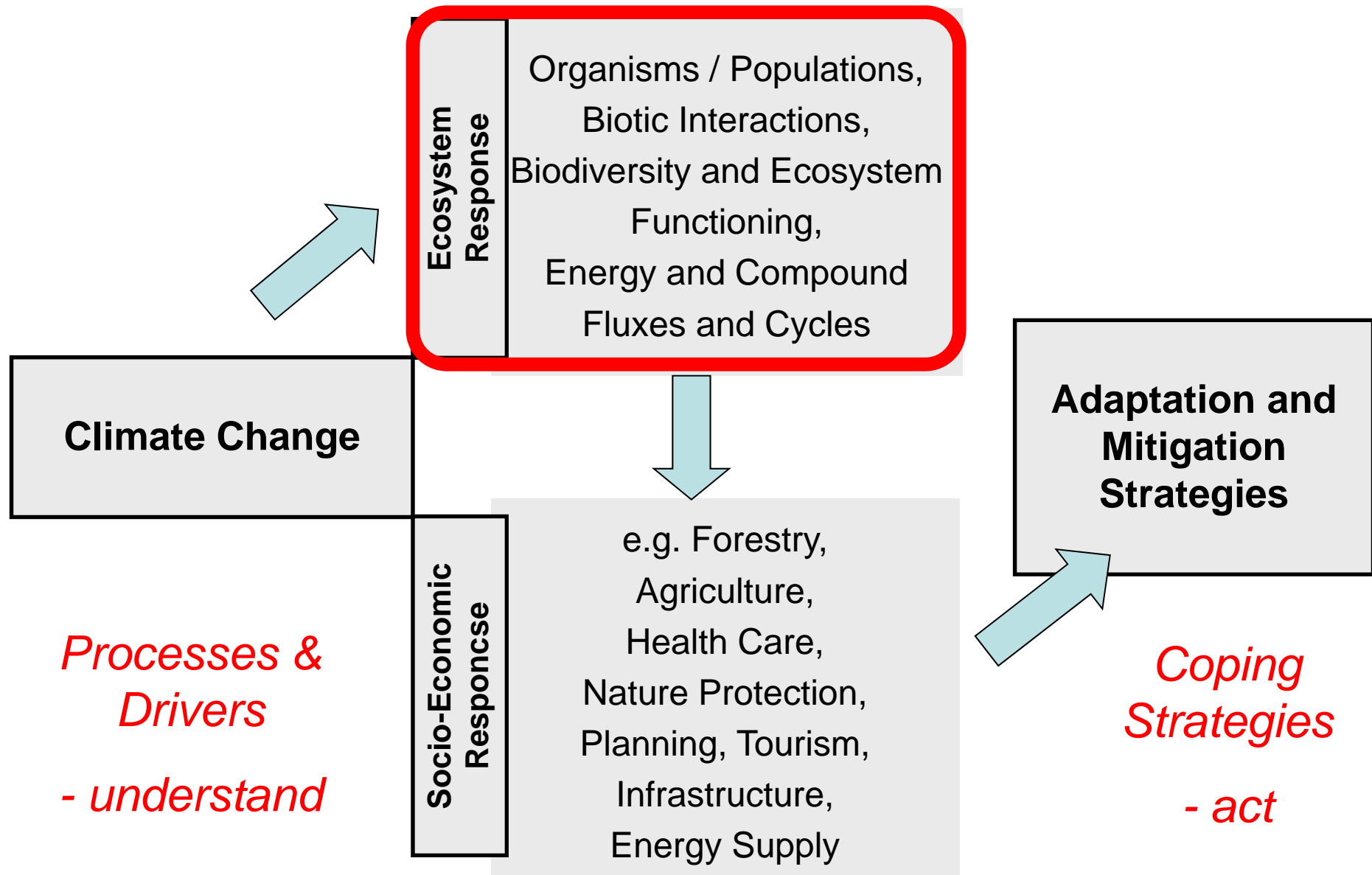
# *Effects, Strategies and Responses*

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# *Effects, Strategies and Responses*

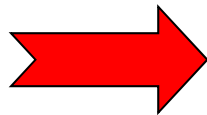




# Research Questions

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*Effects of  
seasonal and  
short term **shifts***

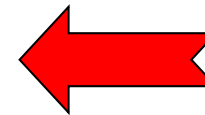


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Ecosystem  
Response

Organisms / Populations,  
Biotic Interactions,  
Biodiversity and Ecosystem  
Functioning,  
Energy and Compound  
Fluxes and Cycles

*Effects of novel  
or more intense  
and frequent  
**disturbances***



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# Research Questions

*Effects of  
seasonal and  
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**Ecosystem  
Response**

Organisms / Populations,  
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*Effects of novel  
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Population dynamics

Migration

Speed of dispersal

Vectors

Invasion of exotic species

Introduction of diseases



Species composition

Biodiversity and stability and inertia

Loss of species

Spatial heterogeneity

Decoupling of biotic interactions

Sensitivity of ecosystems

(high mountains, semiarid, subarctic, boreal)

Invasibility of ecosystems





# *Perspectives*

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## Scientific Demands

- *Reproducibility*
- *Objectivity*
- *Representativeness*

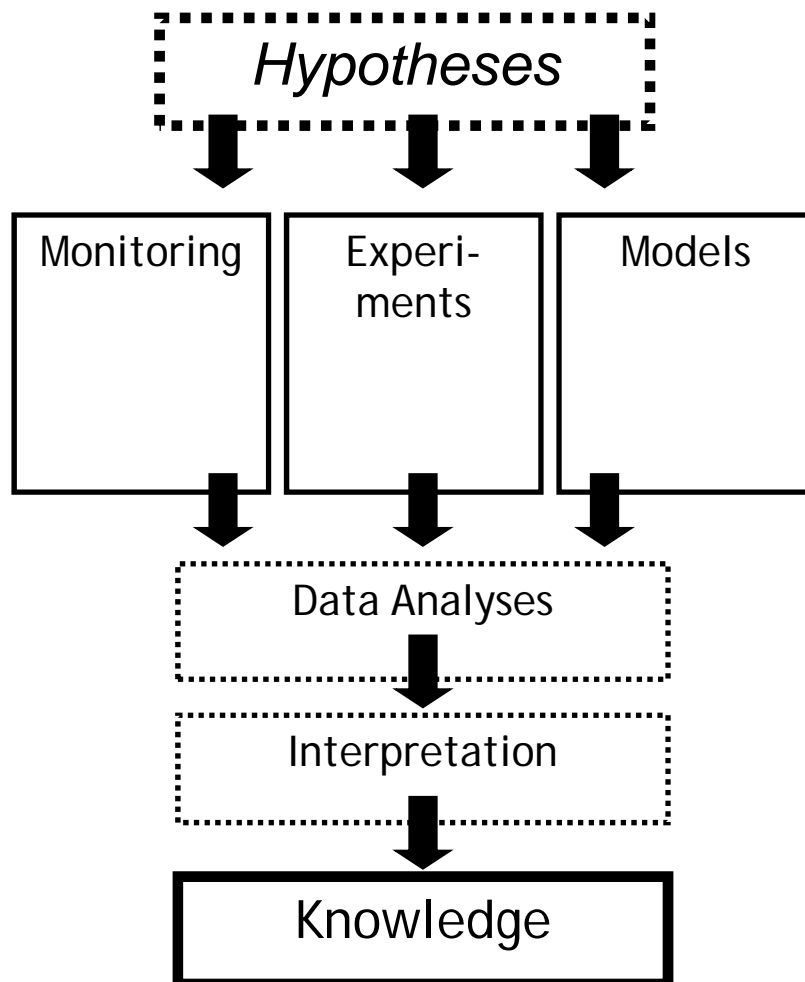
## Societal Demands

- *Social Relevance*
- *Economic Importance*
- *Ethic Constraints*

Ecological      Problems and Questions

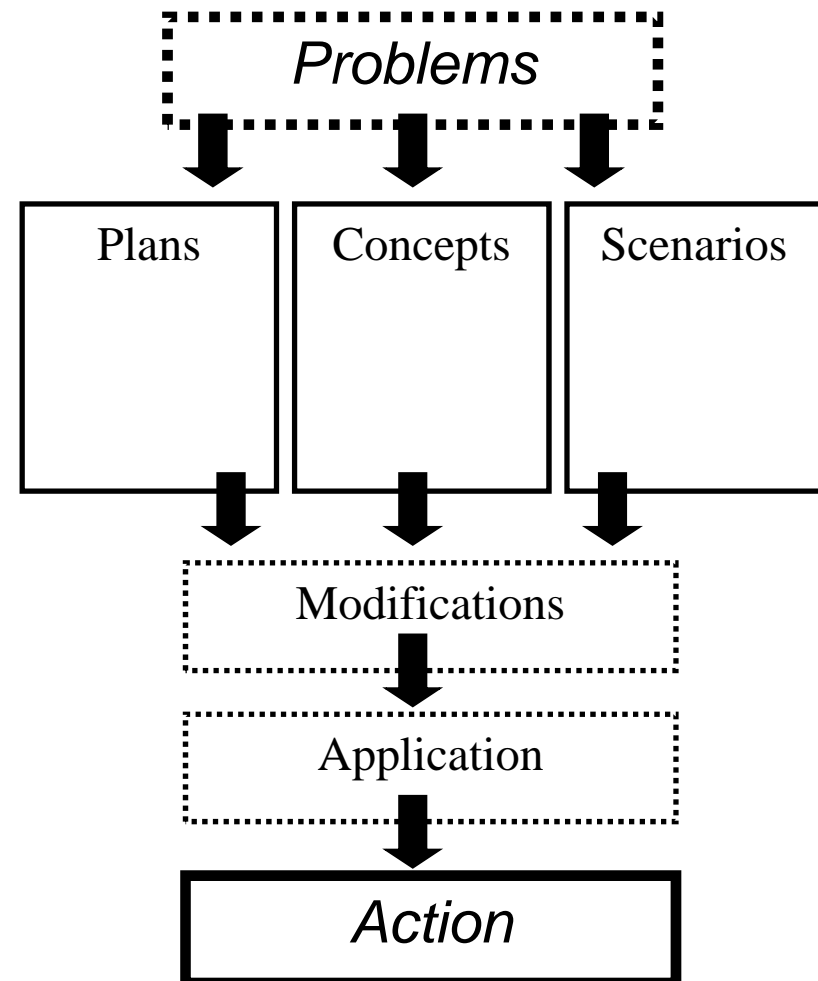
# *Perspectives*

## *Heuristic Approach*



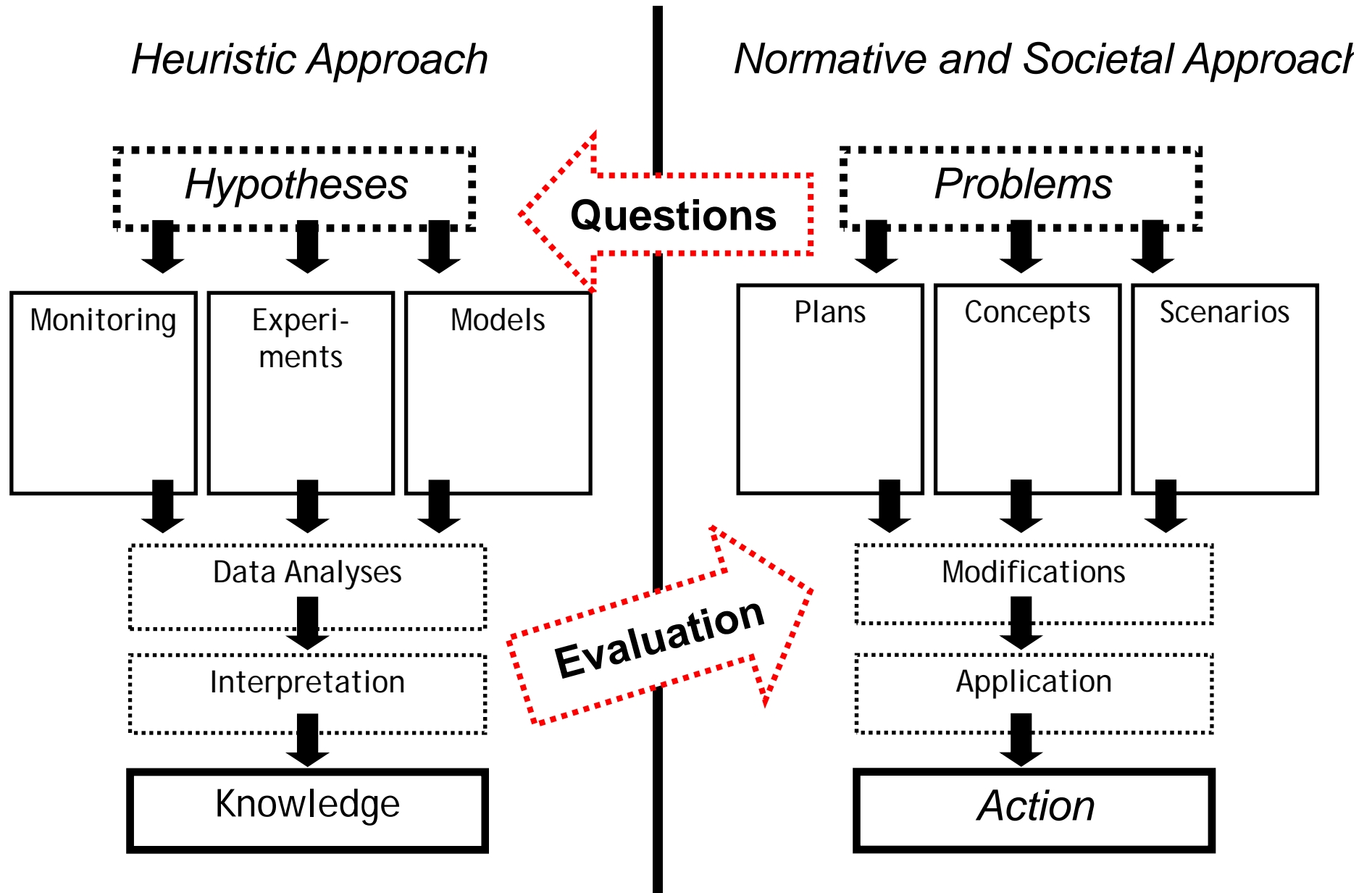
# *Perspectives*

## *Normative and Societal Approach*





# Perspectives







## Theories and Concepts

Without a sound theoretical and conceptual background, the solution of problems will fail!

Ecological Problems and Questions

