QUANTIFYING AND DEMONSTRATING BENEFITS OF USE OF MET. PRODUCTS AND SERVICES

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- **Why demonstrate benefits?**
- **Review of case studies** evaluating & demonstrating benefits
- **Setting up a system** for demonstrating the socio-economic benefits
  - **Setting measurable metrics for assessing impact of information.**
  - **Quantify** the corresponding socio-economic benefits

Why demonstrate benefits?

- Improve understanding leading to enhanced funding
- Trigger up-scaling:
  - Help in steering diversity of product/ services development
  - Provide the stimulus for further work/influence
- Useful in representing a decision process in a simplified manner in order to develop tractable models

Case studies

- Value to the US **agricultural sector** of improved ENSO forecasts in the south eastern United States;
- Value of improved ENSO prediction to all US **agriculture**;
- Economic benefits of the public weather forecasts in Sydney **metropolitan area** in Australia;

Case studies……cont

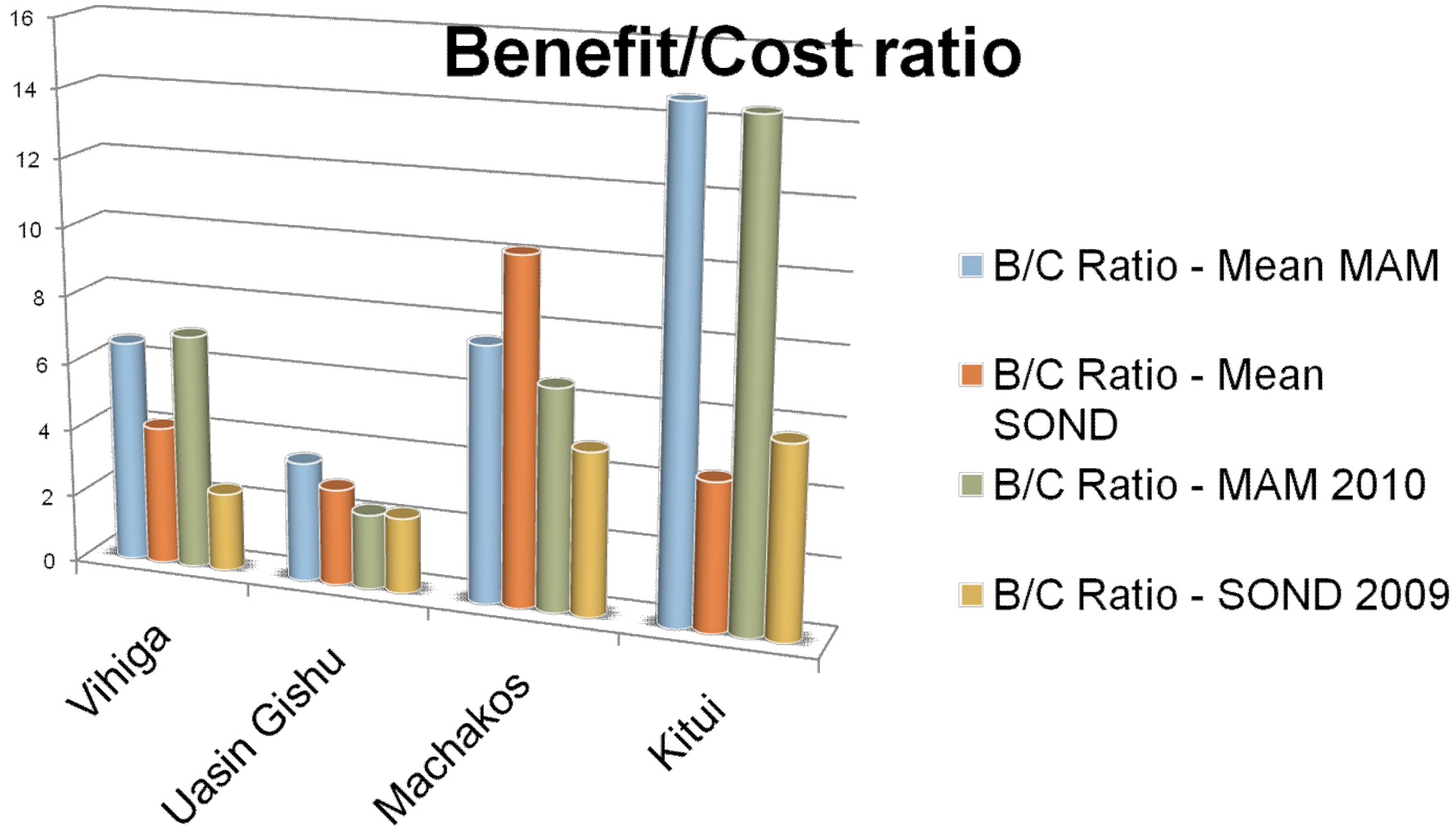
- Value of public weather forecast services to **households** in the province of Ontario in Canada
- Economic value of current and improved weather forecasts in the **US household sector**
- Economic and social benefits of meteorology and climatology in Switzerland
- Socio-economic benefits of meteorological information in the Agricultural sector in Kenya

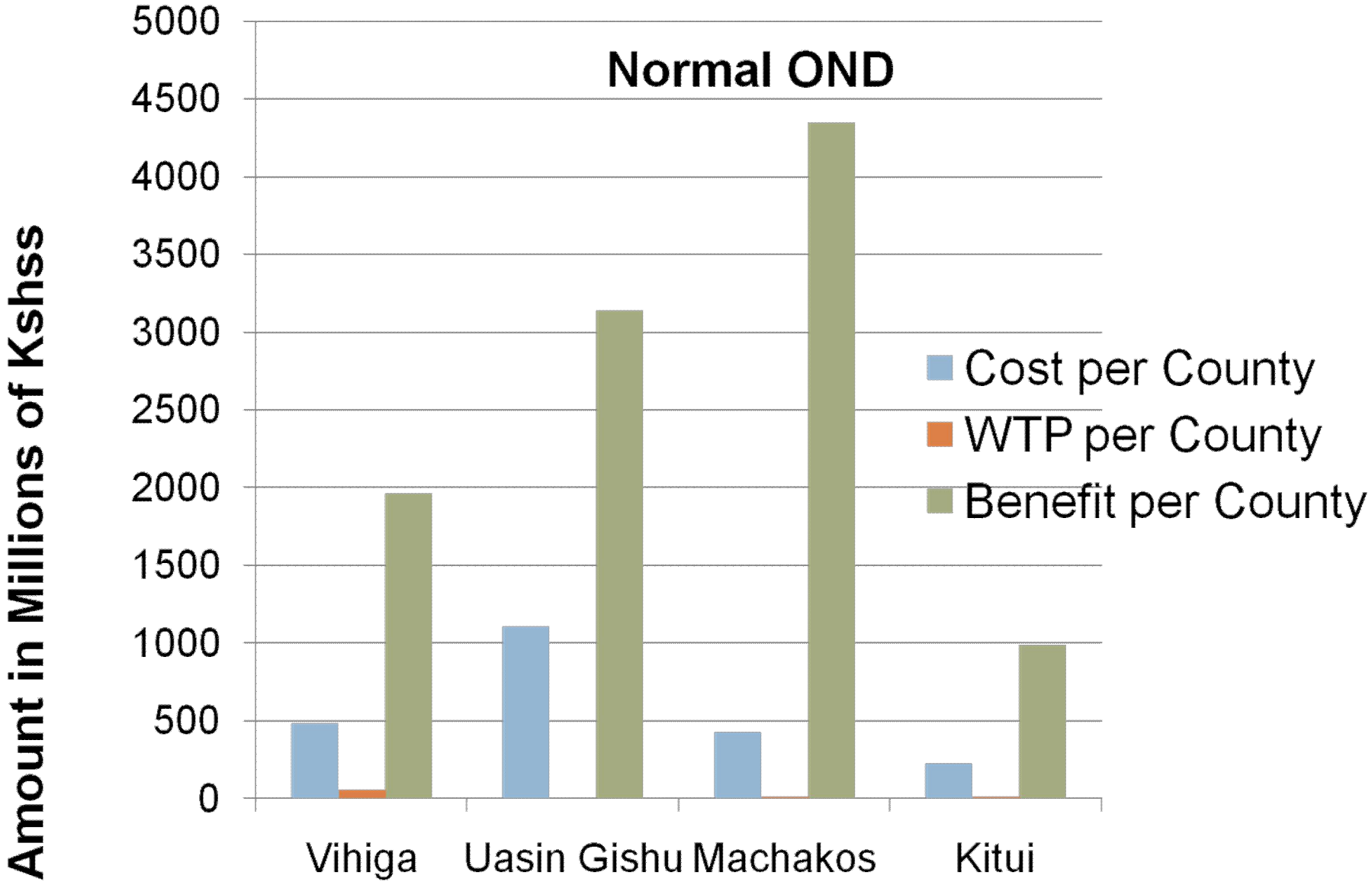
Coverage & Author	Method	Finding
Value to the Agricultural sector in South Eastern US of improved ENSO forecast [Adams et al 1995]	Normative method	
Value of improved ENSO prediction to all US agriculture [Solow et al (1999)]	Normative method	

Value of public weather forecasts to households in Sydney [Anaman and Lellyett, 1996]	Contingent Valuation	
[Brown,2002]	Contingent Valuation	

	Value to the Agriculture and Energy sectors in Switzerland Frei, 2009	CVM Normative method “ “	WTP for free information US$54-362 million Benefit of Seasonal forecast US$ 1 million Benefit in Energy (water) sector US$ 98 million Benefit in Energy (Electricity) sector US$ 4 million Estimated Benefit cost ratio 5:1
	Value to the Agriculture sector in Kenya [ICPAC, 2010]	CVM	Benefit of Seasonal forecast US$ 16-102 million Estimated Benefit cost ratio 4:1

Benefit/Cost ratio




Normal OND
Amount in Millions of Kshss
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Vihiga
Uasin Gishu
Machakos
Kitui
Cost per County
WTP per County
Benefit per County

SYSTEM SETUP: measurable metrics

- Baseline survey of the chosen sector:
  - E.g. Agriculture, Marine, Transport, etc
  - Establish existing level of usage of MPSs

- Design and elaboration of tools to
  - monitor,
  - assess and
  - report

  the value of met information and products.

Metrics … cont

- Integrated Participatory involvement:
  - Inception workshop to discuss the project implementation with users for their input and involvement
  - training workshop for key and other users involved in the demonstration project (e.g. farmers, fishermen, etc)
  - Project monitoring, evaluation and assessment.
  - National Stakeholders meeting for discussion of results

DESIGN AND ADOPTION OF METHODS

Quantification

Basis of methodologies

- Decision theory
  - Prescriptive (Contingency Valuation Method)
  - Willingness to Pay
  - Behaviour response (BRM)
- Game theory

Behavior response model

- Step 1: define the decision alternatives and determine that the particular decision
- Step 2: identify the goals and objectives of the user.
- Step3: identify all the decision-relevant info available to the user.
- Step 4: develop a model describing the relationship between available info & the decision of the user.
- Step 5: evaluate the model and ensure that it adequately describes the behaviour of the user.
- Step 6 : use of the model to determine the effect of using the meteorological information.

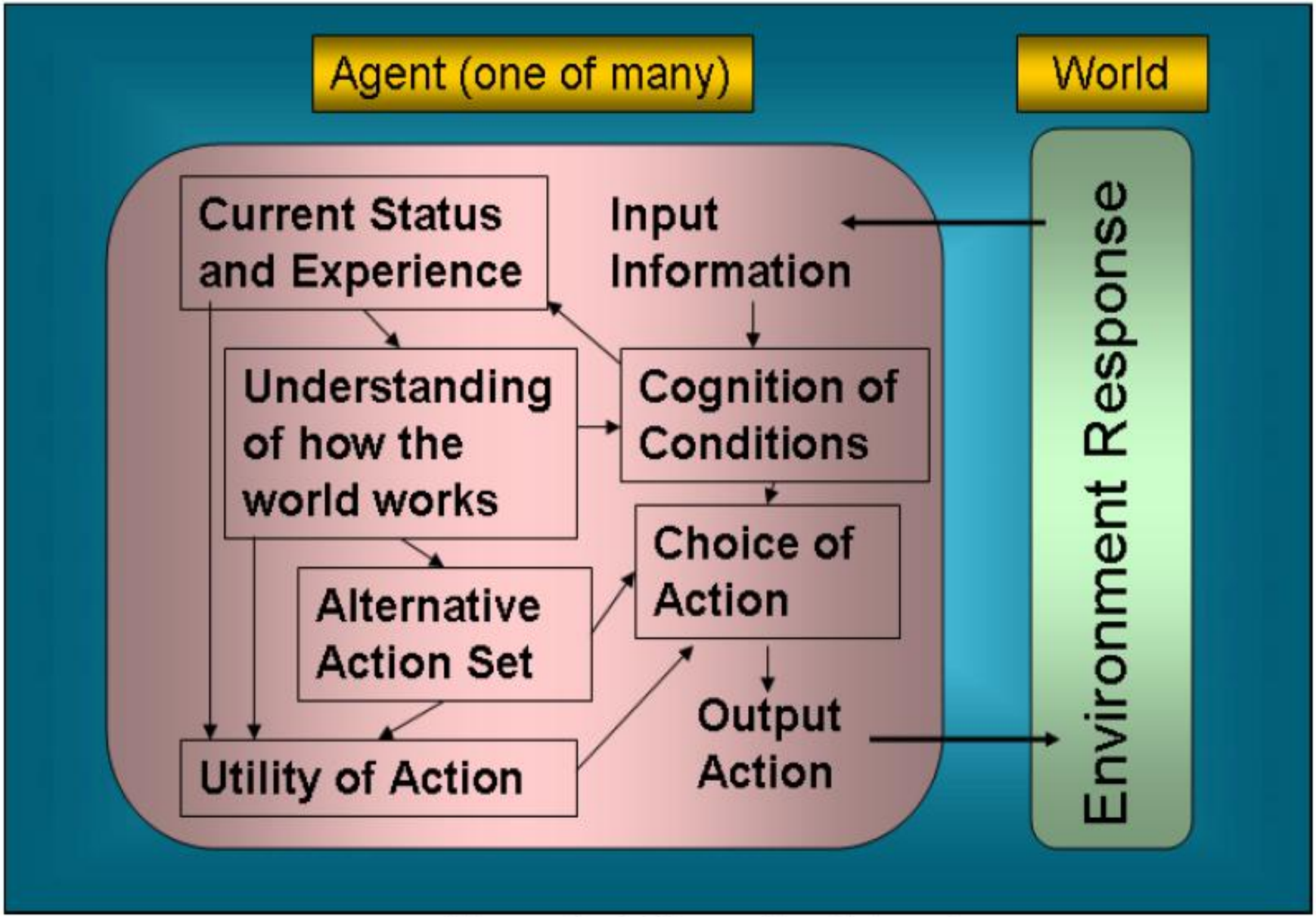


Figure 1: A Generalized Agent

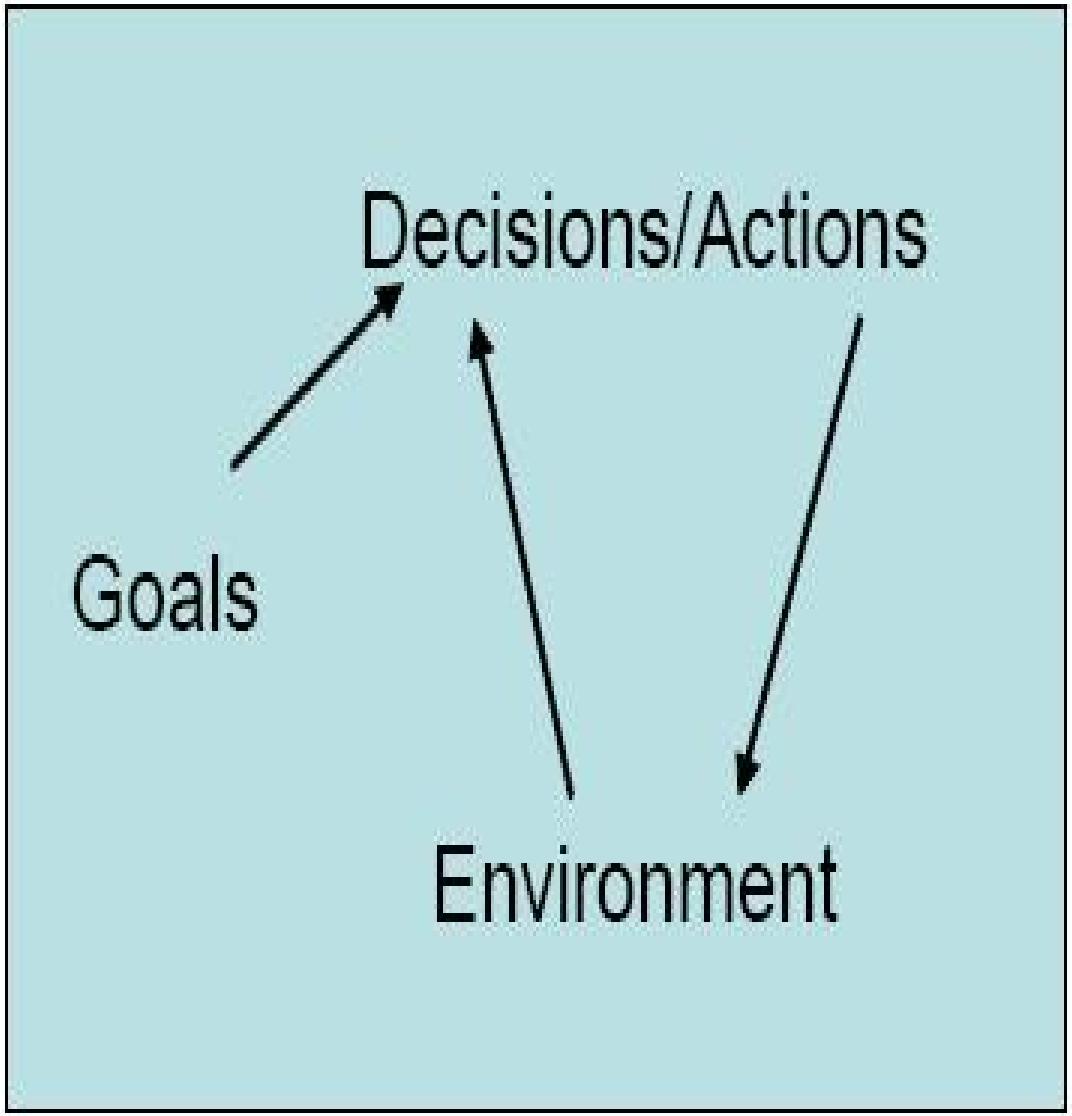


Figure 2: The basic environment-goal-decision relationship

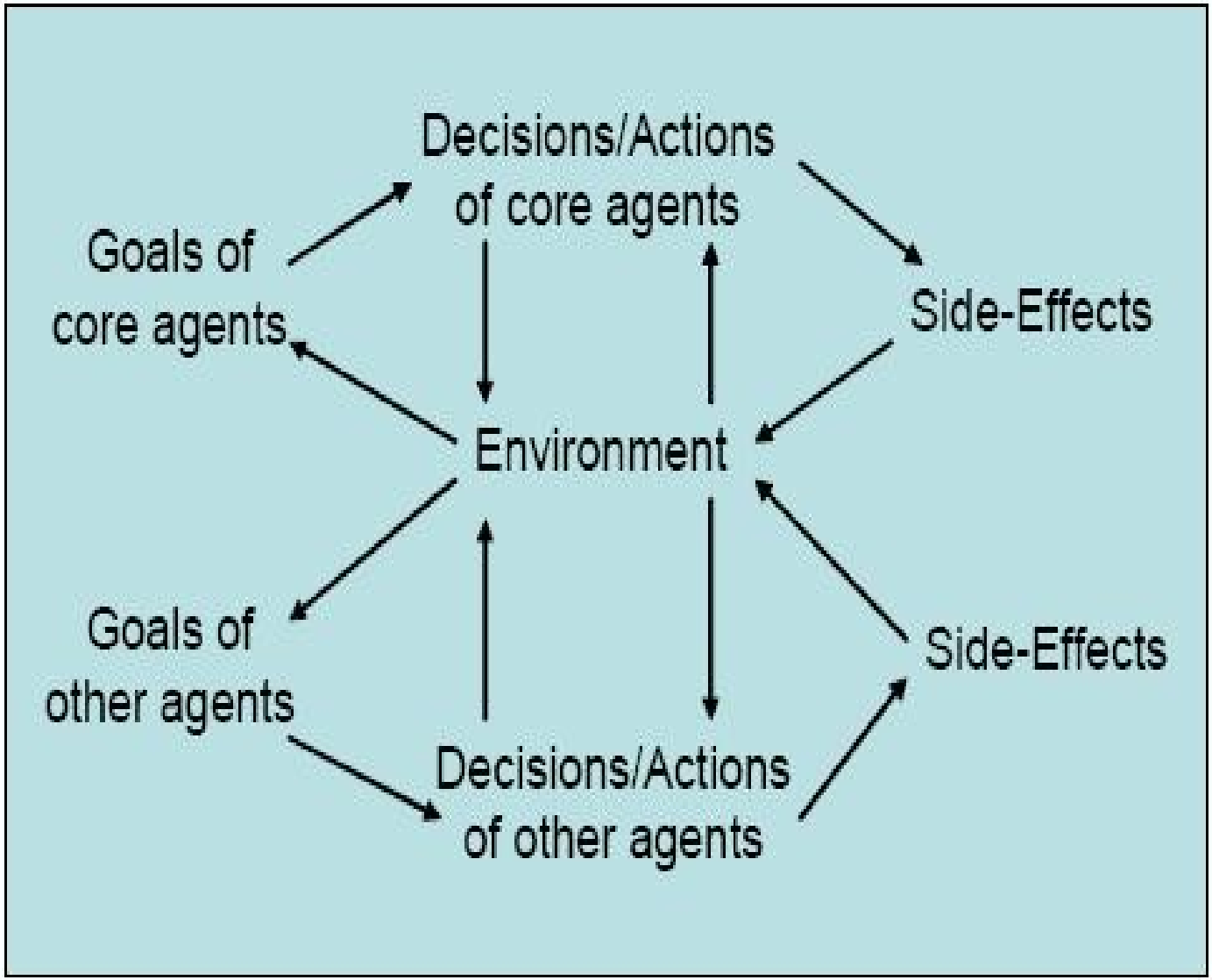


Figure 3: The agent-environment-agent relationship

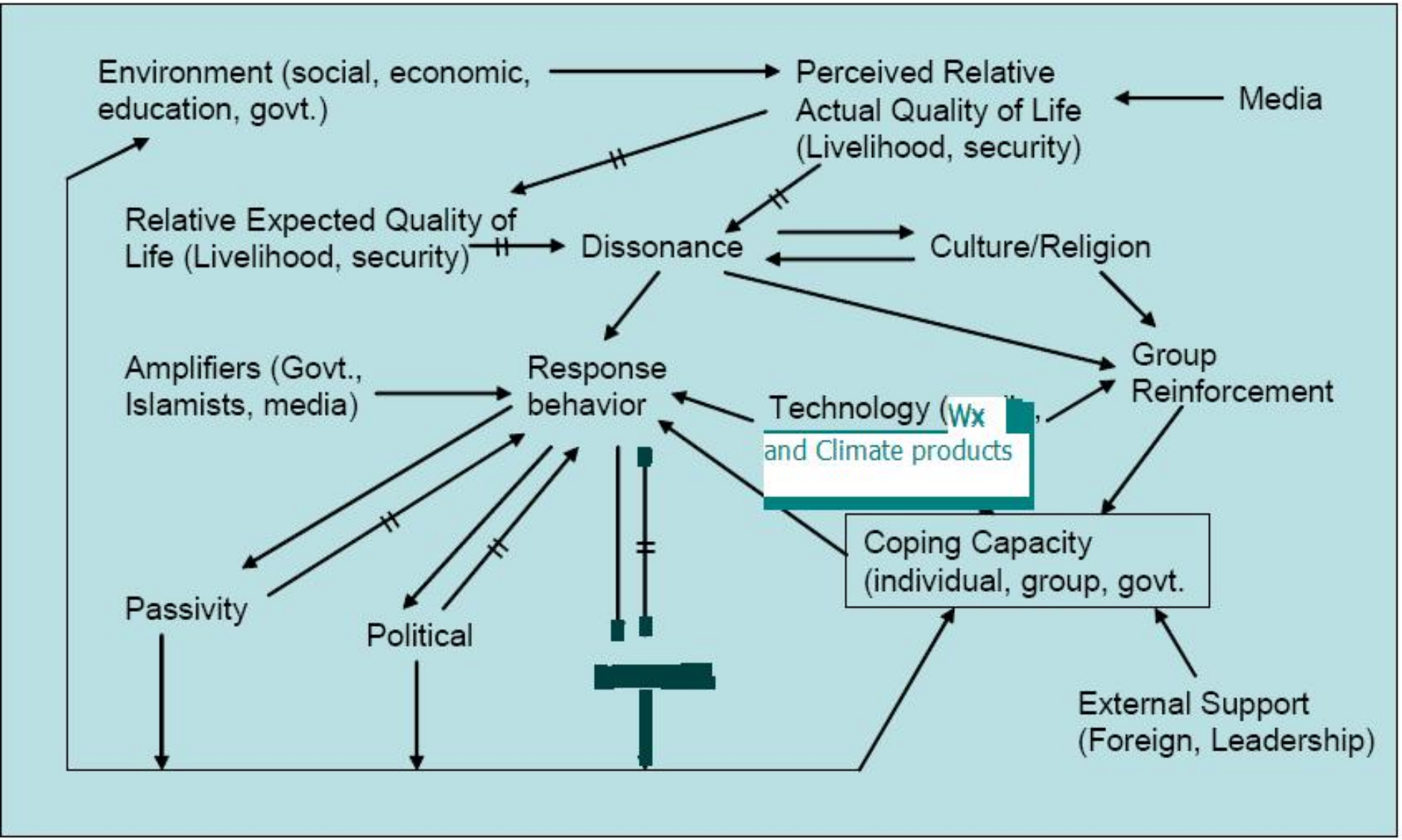
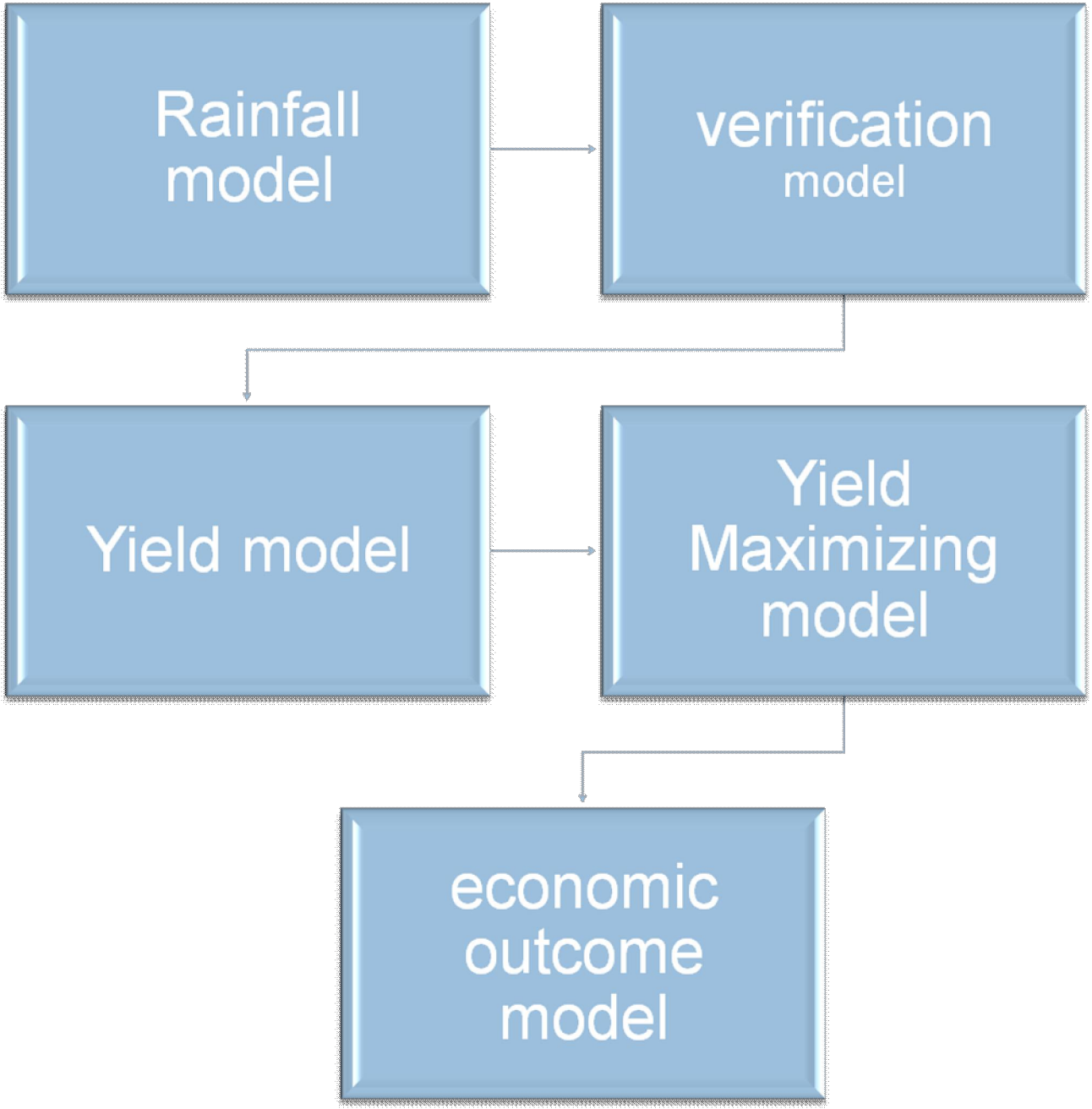


Figure 4: Model Components.


Rainfall model
verification model
Yield model
Yield Maximizing model
economic outcome model

Conclusion

- Contribution to the alleviation of extreme poverty possible through demonstration of the benefits of using MPSs
- Both micro and Macro levels are involved
- Public private partnerships established and nurtured