Introduction

• Assessing the feasibility of an irrigation dam investment and optimizing expected returns require detailed ex-ante appraisal.

• Due to the inherently complex and uncertain consequences of irrigation dam investments and often severe data scarcity, traditional cost-benefit assessment methods face limitations.

• Stochastic Impact Evaluation (SIE; Luedeling and Shepherd 2016) attempts to overcome the particular challenges of evaluating investments in such contexts.

Research questions

• What are the costs, benefits and risks of an irrigation dam in the study area?

• What uncertain variables affect the intervention decisions of the dam?

• How will the dam affect local stakeholders and the environment?

Methodology

• Expert knowledge from 10 subject matter experts was elicited and used to develop a causal impact model.

• We applied the SIE approach, which allows assessing complex decision problems and considering uncertainty and variability in input variables (Luedeling et al. 2015).

Results

• Several interest groups were identified:

  Stakeholders:   
  • Upstream villagers  • Farmers further downstream  
  • People displaced  • Implementers  
  • Downstream irrigators

• These groups’ net benefits are determined by:

  Costs:  
  • Production  • Watershed management  
  • Dam construction  • Health impacts  
  • Compensation  • Socio-cultural  
  • Repair and maintenance  • Environmental impact

• Several risk factors were identified:

  Benefits:  
  • Irrigation (also to support rainfed prod.)  • Compensation  
  • Employment  • Reduced flooding effect  
  • Time saving  • Erosion control  
  • Other environ. benefits

  Risks:  
  • Weather risk  • Water diversion  
  • Dam failure  • Increase in cost  
  • Use of dam water for urban supply  • Decrease in output price  
  • Delay in construction

Outlook

• Modeling of plausible ranges of decision outcomes for various stakeholders is in progress.

• Critical uncertainties will be identified by Value of Information analysis.