Probabilistic Causal Models for Nutrition Outcomes of Agricultural Actions

Eike Luedeling

Center for Development Research
Zentrum für Entwicklungsforschung
University of Bonn

Addis Ababa, 22nd June 2016

Funded by:
The ANH decision support challenge

• Food systems are complex
• Uncertainties abound
• Complete ‘precise’ understanding would take a huge research effort
• Decision-makers don’t have the time or money for such research
• Need pragmatic approach for supporting such decisions

http://agrobiodiversityplatform.org/
Luedeling et al., 2015. Frontiers in Environmental Science 3, 16; Luedeling and Shepherd, under review.
Bayesian approach

• Initial model based on subjective beliefs of experts and stakeholders (‘prior knowledge’)
• Critical to honestly assess own state of uncertainty
• Model is iteratively updated as new information comes in
• At each stage: is information sufficient for decision support?
Bayesian Networks for Decision Analysis

- Explicit quantitative representations of causal impact pathways
- Combine quantitative and qualitative information, data and expert knowledge
- Account for uncertainty
- Results initially ‘fuzzy’ but rapidly available
- Following decision, model can be continually updated and used for project planning, monitoring and evaluation

IMMANA grant:

Probabilistic Causal Models for Nutrition Outcomes of Agricultural Actions

Bayesian Network analysis of nutritional impact pathways of two agricultural actions

Fruit trees on smallholder farms in Kenya

Homegardens vs. large-scale staple crop production in Uganda
Progress to date

Kenya fruit tree workshop in Nairobi (April 2016)

Part of the ‘emerging’ model
Conclusions so far

• Bayesian networks are a useful tool for gaining a causal understanding of prospective decision impacts
• Transdisciplinary framework for analyzing and supporting ANH decisions
• Potential for decision support, project planning, M&E