Anticipating economic consequences of rainwater management in the Blue Nile basin

Kindie Getnet

International Water Management Institute

Nile BDC Symposium on Modeling in the Blue Nile Basin
Addis Ababa, 12 November 2012

Three phase research activities to achieve output 2.3 of N4 (anticipating economic impacts of RWM)

1. **Characterizing the baseline** situation at a HRU (*the business as usual scenario*)

2. **Assessing consequences** at HRU level using different RWM strategies and scenarios

3. **Extrapolating** HRU level consequences of the new RWM strategies to a basin scale

Characterizing the baseline situation

- Modeling approach - ECOSAUT

  Economic, social and environmental assessment of land use types and management practices (**the three dimensions of sustainability**)

- Relevant biophysical and socioeconomic data gathered for the three NBDC sites (Jeldu, Diga, Fogera)

  Spatial and temporal scales

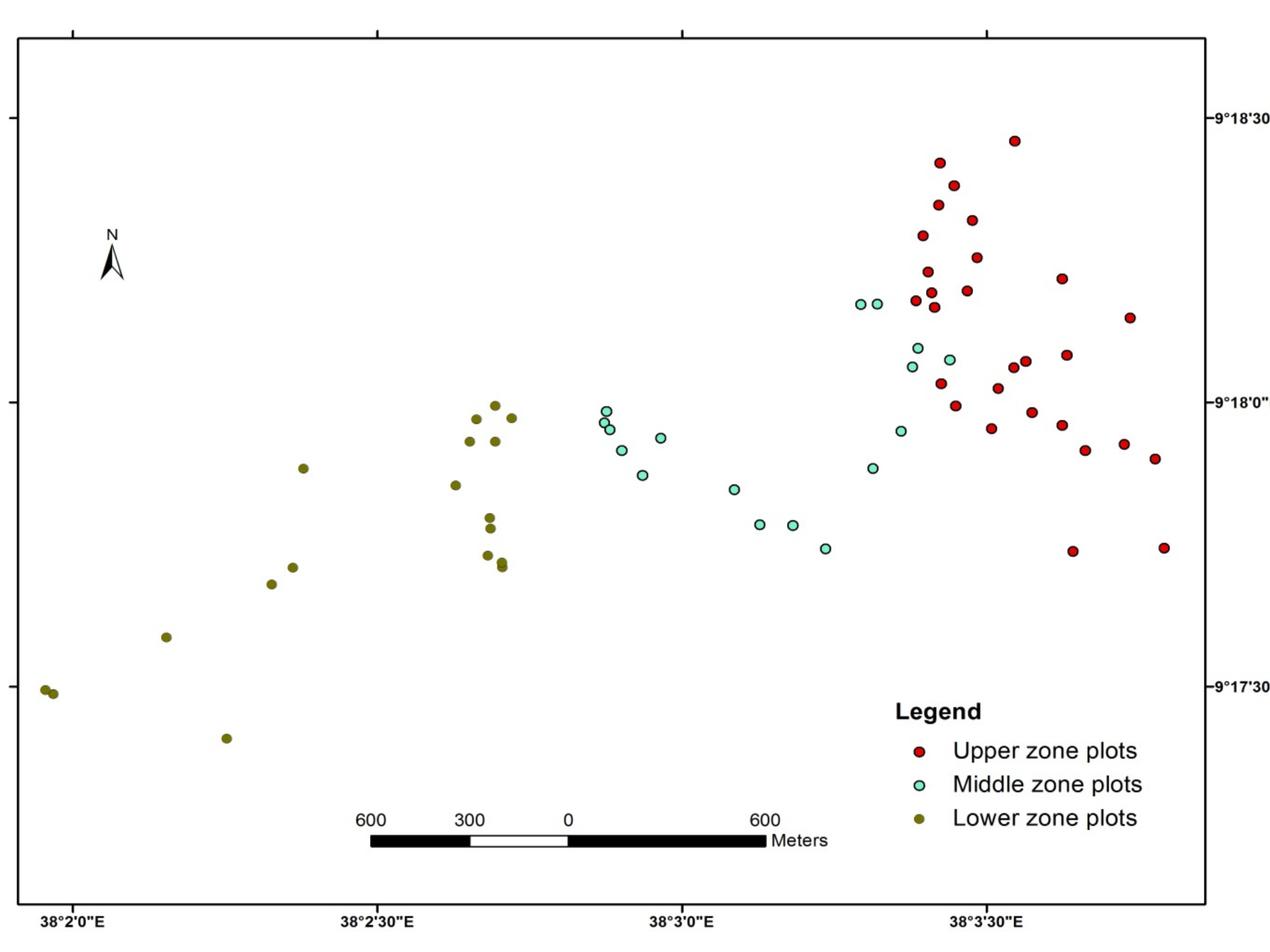
  Crop, livestock (and interactions) and employment

  Water and sediment

  Quantitative data for quantitative analysis

- ECOSAUT populated for Jeldu and Fogera

- Preliminary analysis made for Jeldu


N
9°18'30
9°18'0"
9°17'30
38°2'0"E
38°2'30"E
38°3'0"E
38°3'30"E
600
300
0
600
Meters
Legend
Upper zone plots
Middle zone plots
Lower zone plots

Preliminary results for Jeldu

- ✓ ECOSAUT findings mimic reality
- ✓ Optimization made possible over the entire sample micro-watershed (20ha)
- ✓ Baseline scenario generates a **net farm income** of USD$404,790 over 10 years
  - ✓ 70 plots (most plots crop production, some trees, and rest grazing land)

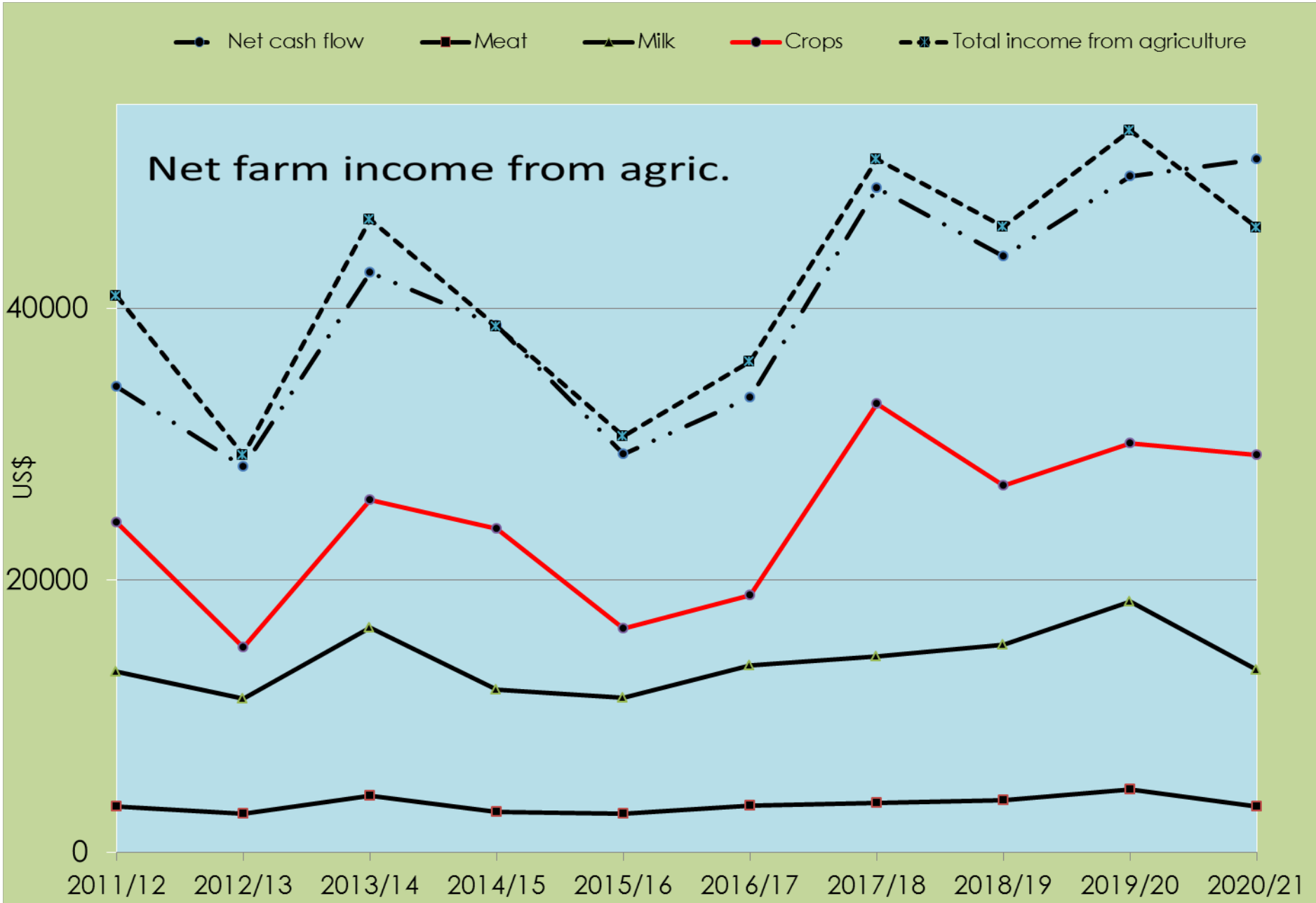
Main findings

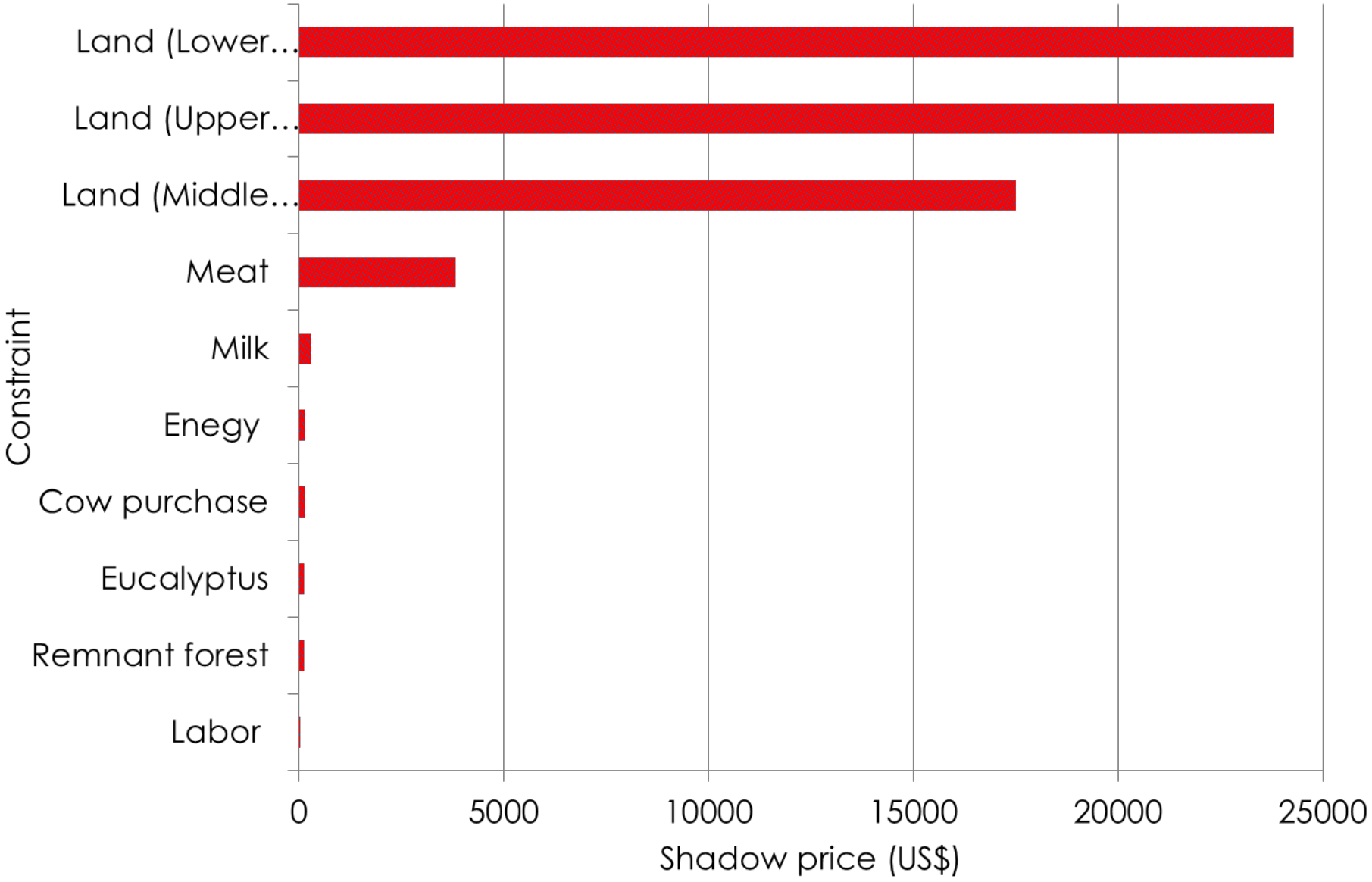
- Agriculture – Will remain main source of farm income and employment

- Farm income positively trending **but not significantly drifting** (sytem productivity stagnant, if not declining)
  - Given population growth, declining per capita farm income?
  - Poverty reduction role of agriculture not dependable?

- Apparent negative externalities associated with farm income growth (soil erosion)
  - Trade-off between farm income growth and land resource
  - Is the farming system sustainable?

- Land the most limiting resource for farm income growth


Net cash flow
Meat
Milk
Crops
Total income from agriculture
Net farm income from agric.
40000
20000
0
US$
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
2019/20
2020/21


Land (Lower…
Land (Upper…
Land (Middle…
Meat
Milk
Enegy
Cow purchase
Eucalyptus
Remnant forest
Labor
Constraint
0
5000
10000
15000
20000
25000
Shadow price (US$)

The remaining question

- Will a change in land use and resource management change the above indicators positively (farm income, poverty, and soil erosion) in the watershed?

Next activities

- Develop land use and resource management scenarios
- Assess their consequences at HRU scale
- Extrapolate basin-wide impact
- Inform policy and decision making

Challenges

- Lack of crop-specific sediment and run off data
- Scenarios and strategies not yet concretized and quantified
- Assessing hydrologic and yield impacts, then economic consequences, of strategies not well linked
- How to extrapolate impacts to a basin level

Thank you