Uncovering ecosystem services of expropriated land: The case of urban expansion in Bahir Dar, Northwest Ethiopia

UKNEE - envecon 2020: Applied Environmental Economics Conference, 13 March 2020, London, UK.

Wubante Fetene Admasu

WubanteFetene.Admasu@uantwerpen.be

Promotors

Prof. Steven Van Passel

Dr. Amare Sewnet

Research problem

- Direct effects of ecosystem services (ES) are usually considered in land expropriations and compensated for.
- But not the indirect uses such as the contribution of this land for water provision, water quality regulation, and other indirect uses.
- This has been causing tenure insecurity and unintended environmental problems:
    - urban expansion is an ecosystem change process that converts agricultural lands and others in to urban land (Bai et al., 2012; He et al., 2016; López et al., 2001).

Research gap:

In developing countries, very few studies have been conducted in the areas of ES assessments due to lack of appropriate data, methods, tools, and management frameworks (Bhandari et al., 2016; Paudyal et al., 2015).

It is even worse in terms of ES assessment studies in relation to land expropriations for urban expansion.

Likewise, in Ethiopia, there are few ES assessments (Krause et al., 2017; Temesgen & Wu, 2018), but their focus were on a particular land use such as forest, wetlands, etc.

In addition, there are researches conducted on land expropriation, compensation, etc., but not in relation to ES.

Research objectives

The general objective of the study is to assess ES of three most important land uses that are threatened by urban expansion.

Specifically, we analysed the following questions:

- Which of the ES are mostly used by the local communities? And from which land use do local communities get the ES? Is it different in the different villages?
- What is the potential of each land use to deliver ES? Is it different in different villages?
- Which ES are considered most important to the different stakeholders?
- How is the change of ES over the years?

Why Bahir Dar?

Fast population growth

Rapid urban expansion

Lake Tana is being affected

Methods (I)

The study applied a participatory approach using local community perception and expert judgements (N=108).

Interviews and FGDs were used to collect data.

Interviews were conducted in two rounds between May 2018 and August 2018 in four *kebeles* (Addis Alem, Weramit, Wereb and Zebzelima).

Data analysis*:*

Based on the mean points, the matrix of the different land use capacities and use of ES were prepared.

Results and discussion(I)

Uses of ES:

In agroforestry about 29% of all considered ES are perceived as very high to high use, but in cropland and grassland this is only 15-17%.

Individual ES that are perceived as very high usage at a land use level include:

- In crop land: *Food and fodder*.
- In agroforestry: *Timber production, firewood production and climate regulations*.
- In grass land: *Erosion prevention, water purification and treatment, and nutrient recycling*.

Results and discussion (II)

ES categories	Total average mean points		
Provisioning	23.2	31	12.5
Supporting	3.1	12.2	8.7

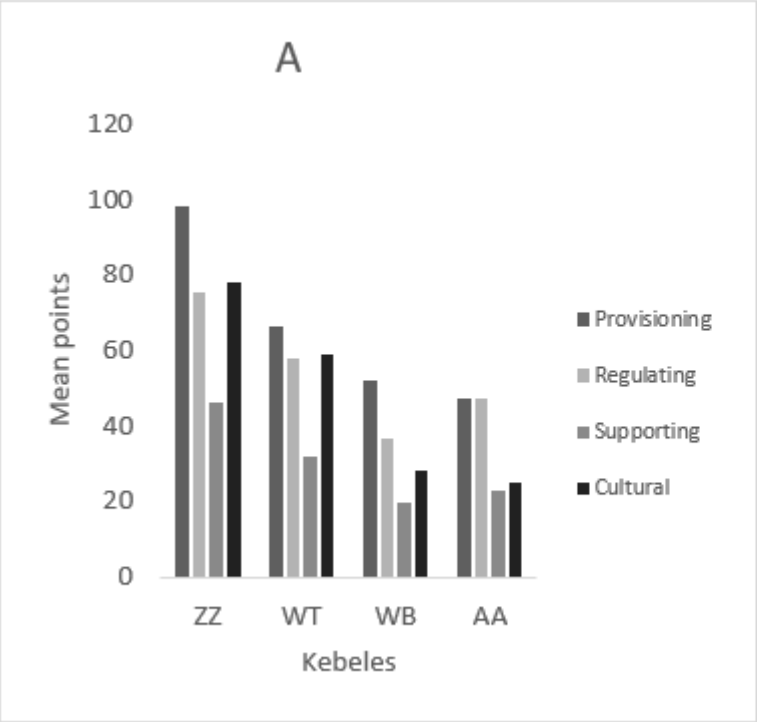
*_Zenzelima kebele_ is perceived as the one which has the highest perceived values in all ES categories.

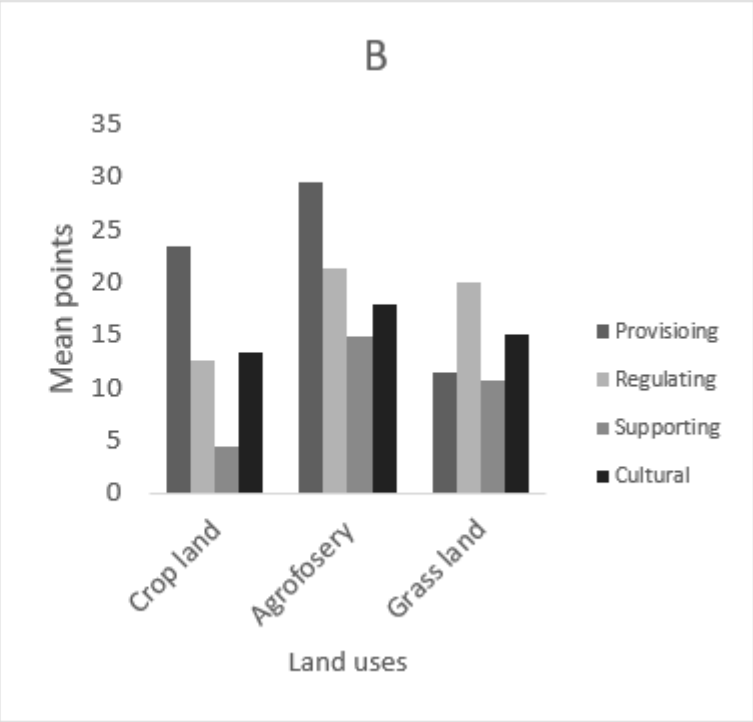
Results and discussion (III)

- **Highest relevant potential:**
  - In crop land: *food and fodder*
  - In agroforestry: *climate regulation and erosion prevention.*
  - In grass land: *water regulation, erosion prevention, water purification and treatment and nutrient recycling* were ranked highest.
- There was no service from the cultural category, for which any land use has a high capacity.

Results and discussion (IV)

- Comparisons of relative potentials (mean points) of ecosystem service categories by A) kebeles B) land uses





Results and discussion(V)

Ranking and changes of ES:

- Households gave more priority for provisioning services than other ES categories; however, experts showed better priority for regulating services.
- Food, fodder, timber, firewood, fresh water, energy, compost, climate regulation, erosion prevention, and water purification and treatment were identified as the ten most important services.
- In general, many of the respondents agreed that there is a decreasing trend in the supply of ecosystem goods and services

Result and discussion (I)

- In general, farmers were be able to differentiate ES in terms of their use, and ecosystems in terms of their potential to deliver services.
- Provisioning services were obvious for the farmers
- Their assessments were highly related with their interaction with the land uses.

Implications

- We believe that the research process by itself and the findings of this study may have the following implications:
    i. Consideration of the importance of all ES categories and compensate the lost ES, and hence sustainably manage the land uses.
    ii. awareness creation among the stakeholders about the benefits that nature is providing to the society.
    iii. can serve as an incentive to conduct similar studies and help to initiate an additional environmental policy in Ethiopia related to land expropriations due to urban expansions.
    iv. an additional case study to the literature on the use of long-time experiences of the community, and the knowledge and skill of experts to assess the values of ES in data poor regions.

Conclusion and recommendations

The land uses are providing various ecosystem goods and services, which are basic for the wellbeing of the societies and the sustainability of the environment.

They are also perceived to have significant potential to provide ecosystem goods and services in the future.

It is not only provisioning service that is contributing to the wellbeing of the community, but also other ecosystem service categories (such as regulating, supporting and cultural services).

Sustainable development could be assured by realising the real (total) loses caused by the decision to convert agricultural ecosystems to urbanisation.


Thank you for your attention!!!