

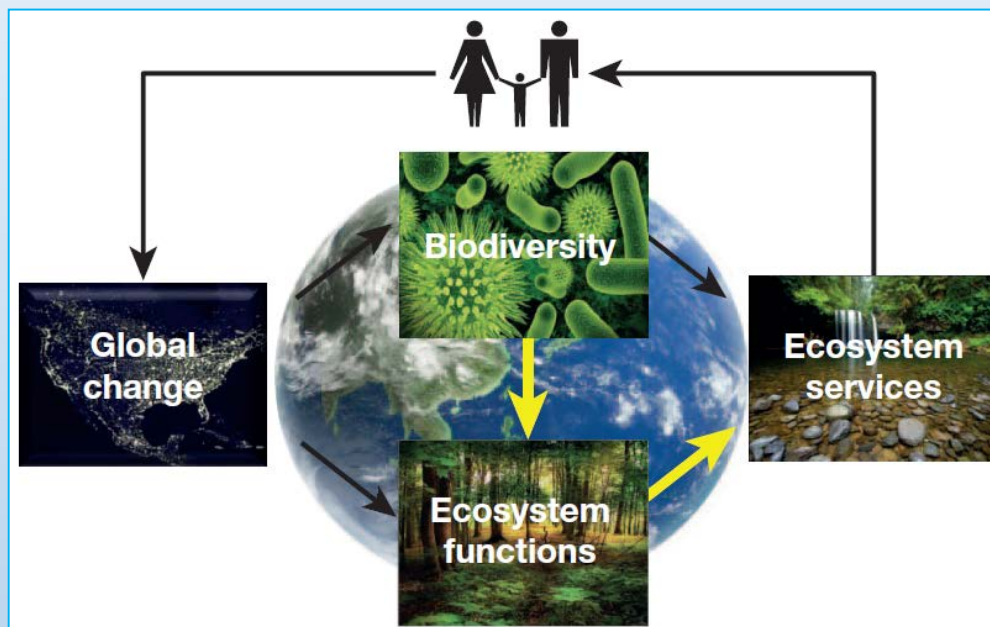
Closing workshop: “Sustainable land use and resilient livelihoods in the landslide-prone region of Mount Elgon, Uganda”

## Theme 3. Land degradation, biodiversity loss and payments for ecosystem services



Mbale, 2-10-2018

# Potential of Payments for Ecosystem Services (PES) in the Mt. Elgon area



Mbale, 2-10-2018

Bruno Verbist

With inputs from Stefano Pagiola, Leimona Beria, Meine van Noordwijk, Katrien Geussens, Sanne Baeten, Koen Vanderhaegen, Miet Maertens, Goedele Vandenbroeck, Zerubabel Naturinda, John Sekajugo, Moses Isabirye

# What? Ecosystems products and services

## Products

- Food
- Fuel wood
- Non-timber forest products
- Fisheries products
- Marine products
- Wetlands products
- Medicinal and biomedical products
- Forage and agricultural products
- Water
- Reeds
- Building material

## Services

### Watershed services

- Purification of water
- Capture, storage and release of surface and groundwater
- Mitigation of floods and droughts

### Biodiversity

- Maintenance of biodiversity (plants and animals)

### Climate – Carbon sequestration

- Partial stabilization of climate through carbon sequestration
- Moderation of temperature extremes and the force of winds and waves

### Landscape beauty

- Eco-tourism

# Identifying environmental services

## **Demand:**

- What specific services?
- Who benefits from these services?
- How much benefit do they receive?

## **Supply:**

- How are these services generated?
- How much more or less of these services would we receive, if land use changed?
- Who generates these services?

# Why PES?

Past responses have largely failed ...

- Direct government intervention
- Regulatory approaches
- Subsidies (in cash or in kind)
- 'Demonstration' approaches
- Low adoption rates
- Adoption followed by abandonment = Pseudo-adoption



# What makes payments for environmental services attractive?

- Efficient:
  - Conserves what is worth conserving
  - Does not conserve what is not worth conserving
- Potentially very sustainable:
  - Not based on whims of donors, NGOs, but self-interest of service users and providers
  - Need for services like water won't go away, so can generate indefinite payment stream
- For this to work, need:
  - Base payments to providers on payments by users
  - To actually deliver services: getting the science right is critical
  - Tailor mechanism to specific local conditions



**Natural  
Capital**

**Ecosystem  
Functions**

**Ecosystem/  
Environmental Services**

- Biodiversity conservation
- Beauty of landscape
- Watershed functions
- Carbon sequestration

*Stewards  
Managing  
landscape*

*Guardians  
Protecting  
landscape*

**Land practices**

**Direct/provisioning benefit**



**Ecosystem  
Service  
Providers**

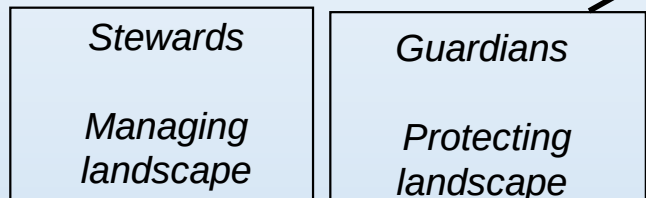


**Ecosystem  
Services  
Beneficiaries**

**Payments  
Recognition  
Reward**

**Brokers for Enabling  
Policies and Regulations**

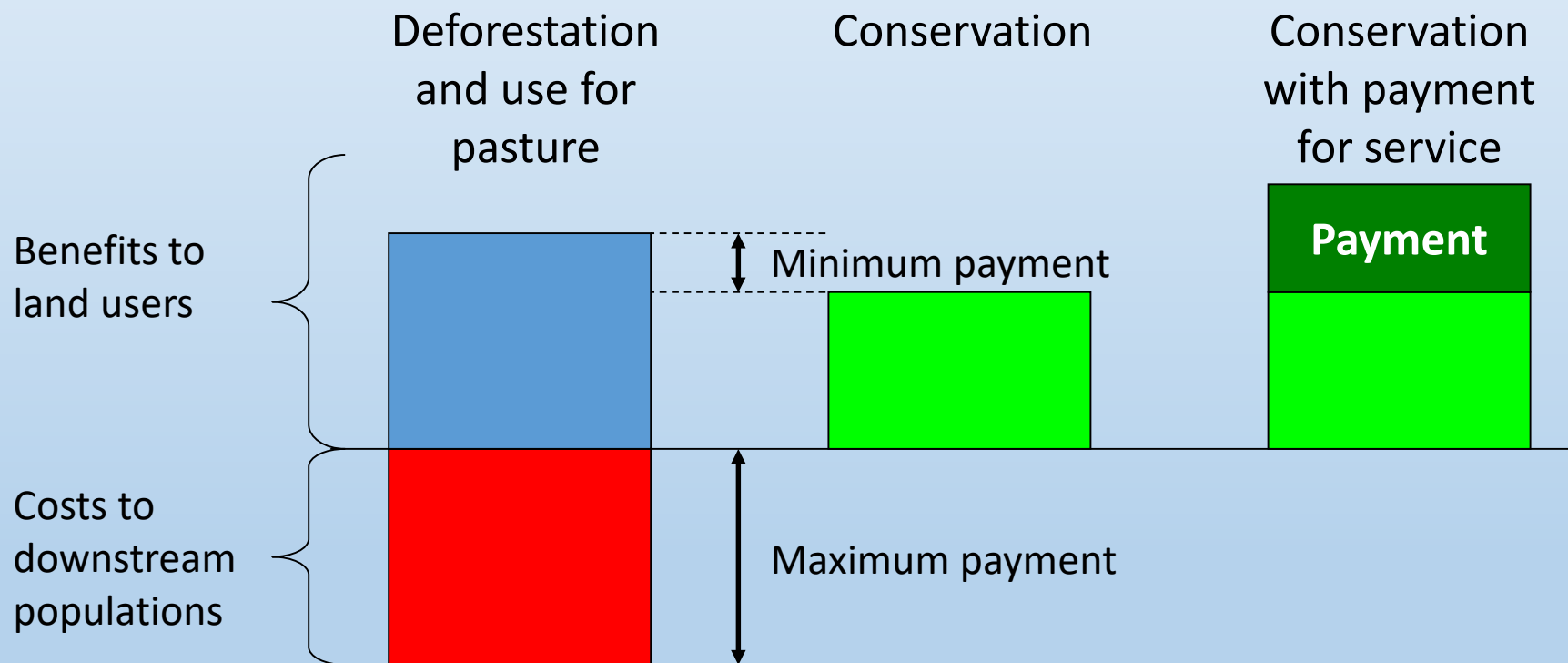
- Opportunity cost
- Control of land



# Valuing services

Why value?

- Value of benefits for users (maximum payment)
- Opportunity cost for suppliers (minimum payment)





# Costa Rica: Payments by water users

| <i>Firm</i>        | <i>Year</i>         | <i>Watershed</i>                | <i>Contract area (ha)</i> | <i>Payment (US\$/ha/yr)</i>                                      |
|--------------------|---------------------|---------------------------------|---------------------------|------------------------------------------------------------------|
| Energía Global     | 1997                | Río Volcán                      | 2,493                     | 12                                                               |
|                    | <i>Renewed 2002</i> | Río San Fernando                | 1,818                     | 12                                                               |
| Platanar SA        | 1999                | Río Platanar                    | 1,800                     | 15/30 <sup>a</sup>                                               |
|                    | <i>Renewed 2004</i> |                                 |                           |                                                                  |
| CNFL               | 2000                | Río Aranjuez                    | 5,000                     | 42                                                               |
|                    |                     | Río Balsa                       | 6,000                     | 42                                                               |
|                    |                     | Río Laguna Cote                 | 900                       | 42                                                               |
|                    |                     | <i>Coordination among users</i> |                           |                                                                  |
| Florida Ice & Farm | 2001                | Río Segundo                     | 1,000                     | <div> <i>Higher payment in high opportunity cost area</i> </div> |
| Heredia ESPH       | 2002                |                                 |                           |                                                                  |
|                    |                     |                                 |                           | <div> 45<br/>+<br/>22<br/><hr/>67 </div>                         |
| Azucarera El Viejo | 2004                | Acuífero El Tempisque           | 550                       | 42                                                               |
| La Costeña SA      | 2004                | Acuífero de Guanacaste          | 100                       | 42                                                               |

Source : FONAFIFO

Note : <sup>a</sup>. Payment to land users without title

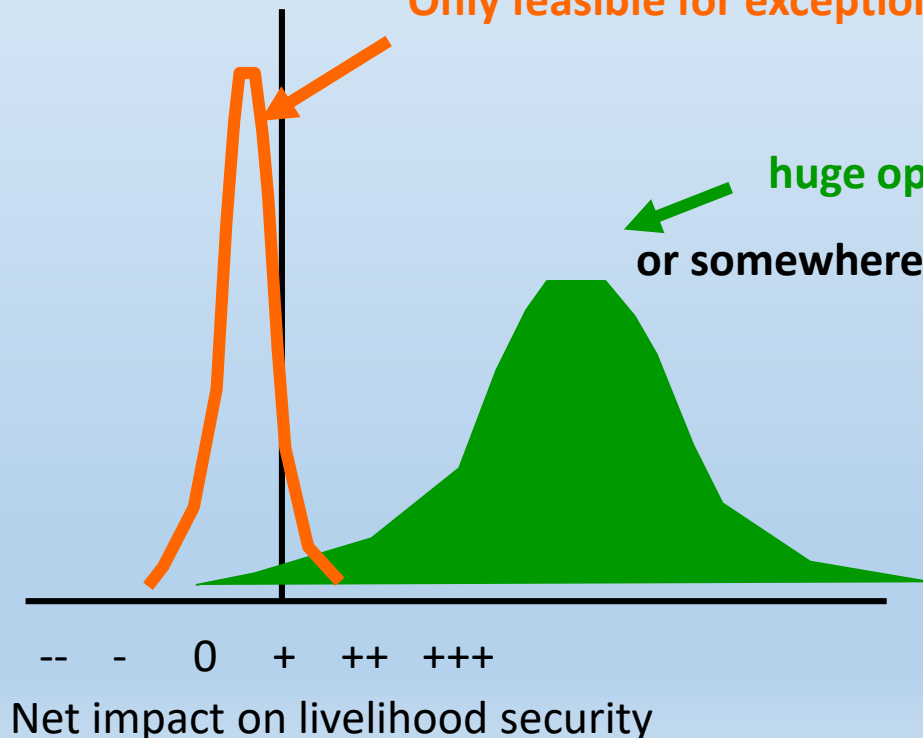
# Asia: Rewarding the Upland Poor for the Services they provide (RUPES) 2002-2012

1. What about the upland poor?
2. How big is the application domain?

Fraction of poor that can potentially be reached

Only feasible for exceptional cases, a niche

huge opportunities for nearly all  
or somewhere in between?



How can we increase the likelihood of ++ impacts for many of the upland poor?

Where should we start -- with the most likely 'winners'?

[rupes.worldagroforestry.org/](http://rupes.worldagroforestry.org/)  
ICRAF-Southeast Asia, World Agroforestry  
Centre [www.worldagroforestry.org/](http://www.worldagroforestry.org/)

# RUPES SITES IN ASIA

covering **12** contrasting sites in **8** countries



# Africa: Potential of PES in Mt. Elgon?

- *“Payments for **soil and water** related ecosystem services. Potential of reward mechanisms around Mount Elgon National park, Uganda”* KULeuven MSc Thesis Katrien Geussens 2017-2018
- *“Payments for **Carbon** Sequestration and Biodiversity Services A Case Study on Mt. Elgon, Uganda”* KULeuven MSc Thesis Sanne Baeten 2017-2018
- *“**Perceptions on PES by local stakeholders**”* Busitema MSc thesis Zerubali Naturalinda 2017-2018

# EVAMAB project



**Title:** “Economic valuation of ecosystem services in Man and Biosphere reserves: testing effective rapid assessment methods in selected African MABs”

**Duration:** 30 months (2017-mid 2019)

## Partners:



(Capacities for Biodiversity and Sustainable Development  
Royal Belgian Institute for Natural Sciences)

Fieldwork in collaboration with local partners through existing projects:



Abomey-Calavi  
University



Bahir Dar  
University

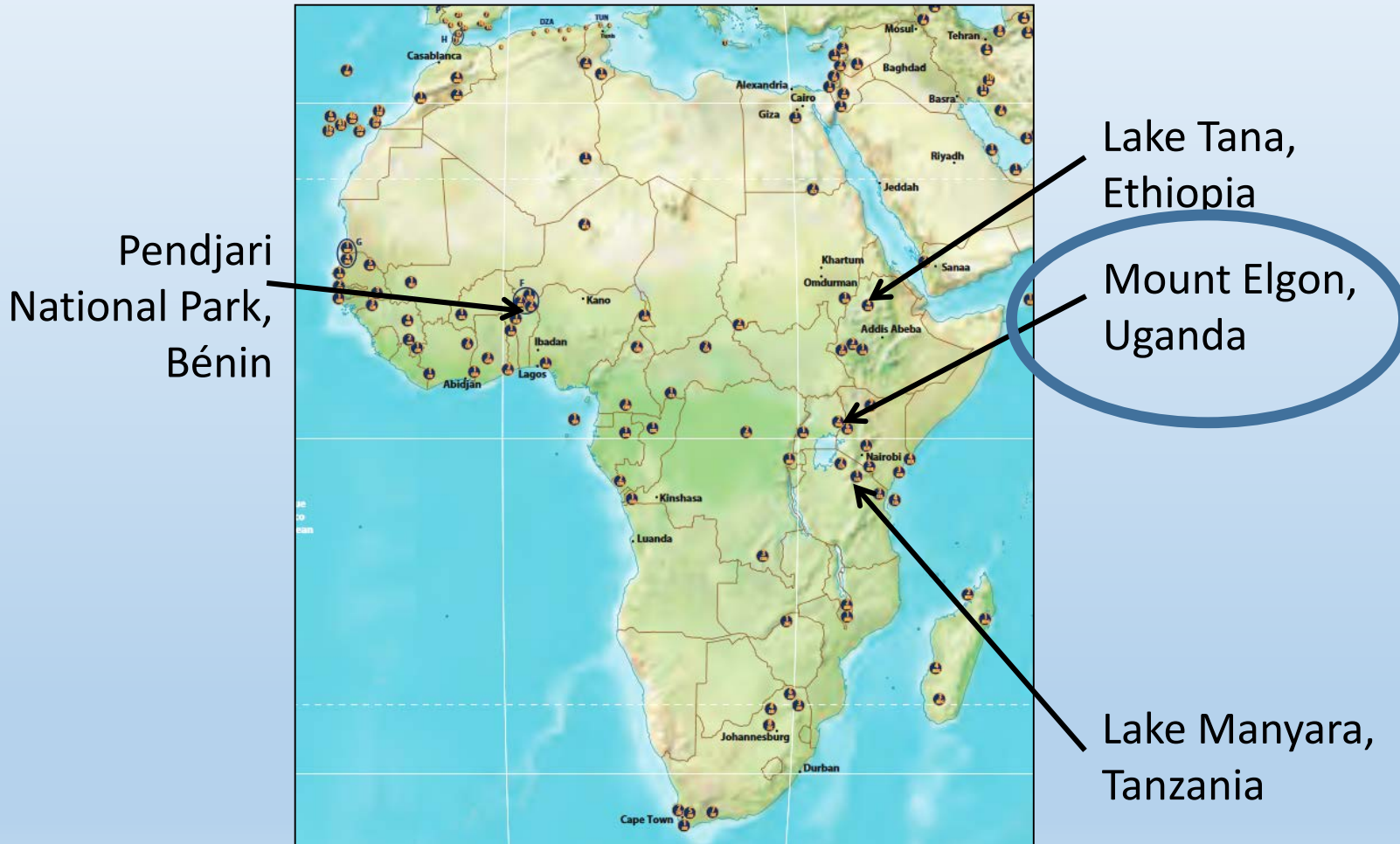


Nelson Mandela  
African Institute of  
Science and  
Technology



# EVAMAB project

Focus on 4 Biosphere Reserves (buffer + transition areas):





# Principles and criteria - Pro-poor rewards for environmental services



## EFFICIENCY principle

- **Realistic:**
  - causal pathways to enhance ES;
  - real *opportunity, transaction, & implementation* costs
  - benefits and co-benefit (financial and non-financial)
- **Conditional:** performance-based contracts in broad understanding (see levels of conditionality), agreed MRV (monitoring, reporting and verification) among all stakeholders

## FAIRNESS principle

- **Voluntary:** meets the Free and Prior Informed Consent standards; willingness to accept responsibilities
- **Pro-poor:** access, process, decision making and outcomes of the schemes are differentiated by wealth or gender and support a positive bias towards poor stakeholders

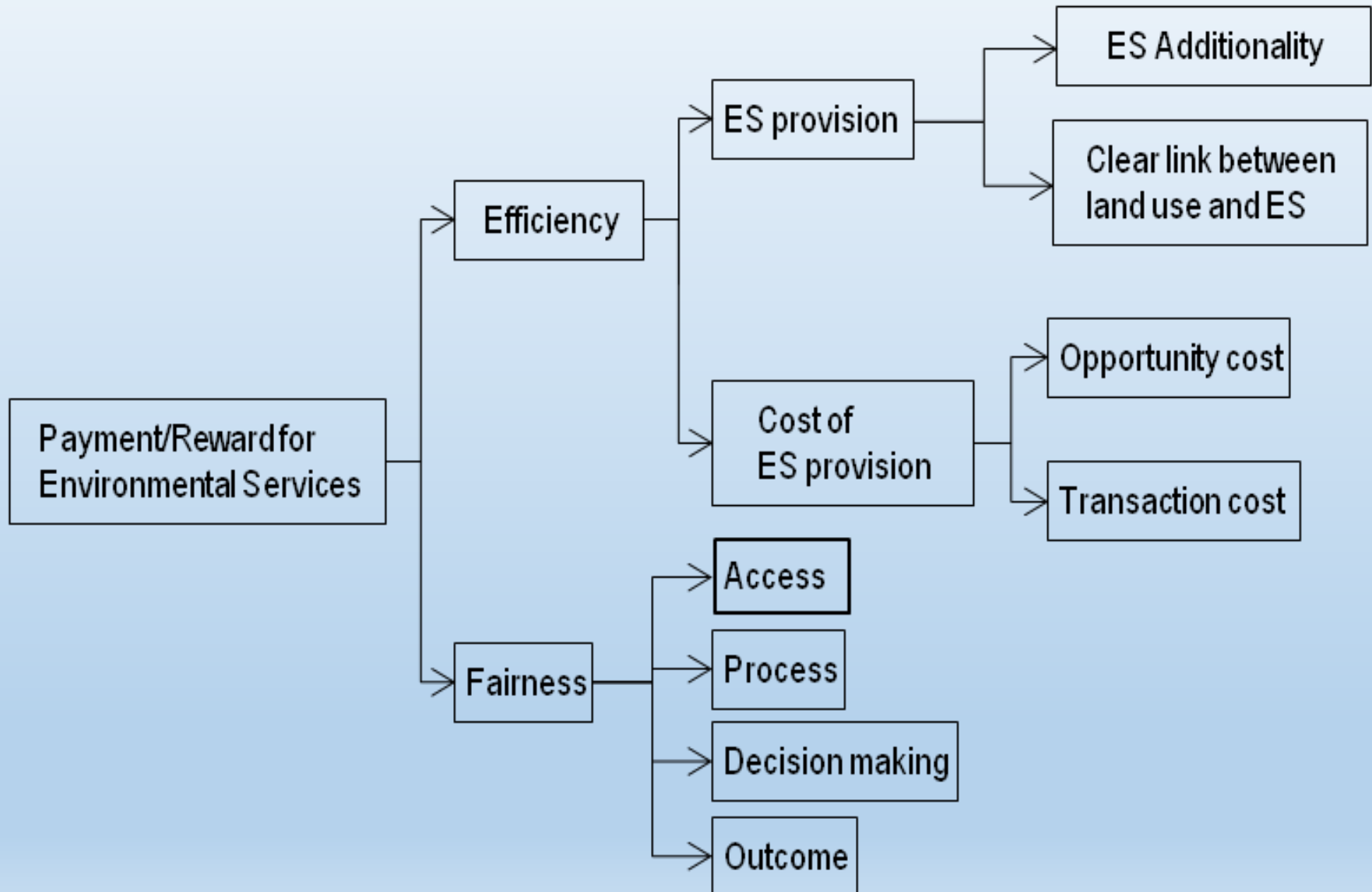
# Balance between fairness and efficiency?



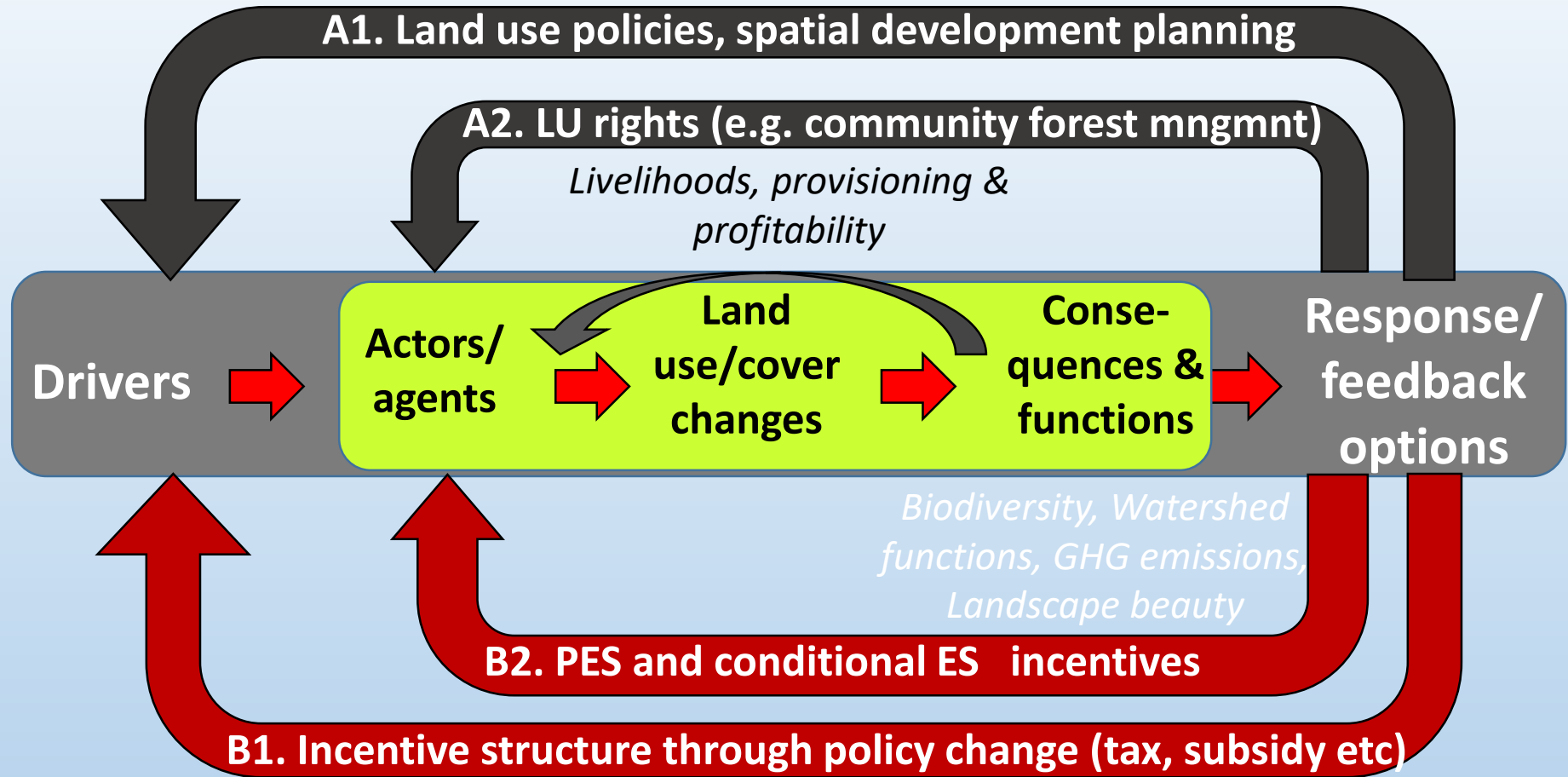
- Poverty is a major issue – enhancement of ES cannot be disentangled from development needs
- Communities depend greatly on social contacts in managing their landscapes
- Strict conditionality generally cannot work in developing countries
  - Lack of data in connecting land use change and ES provisions
  - Lack of monitoring tools, capacities and institutions
- Human interactions within a social capital follow different rationality when involving money

Even subtle reminder of money elicits big changes in human behaviour (Vohs et al., 2006)

# Elements of efficiency and fairness within a reward for environmental service scheme



# Rights-based approaches



## Economic incentives

# Case 1 Watershed services Mt. Elgon: Soil & Water

- **Mount Elgon region:**

- High population pressure
- Unsustainable agricultural practices



Land degradation, erosion, landslides ...  
Lot of sediment in rivers

➤ Can economic incentives help farmers to conserve the soil?





# Information gathering

- Group discussions
  - Individual interviews
    - Stakeholders
    - Project participants
  - Project documents
  - Other research
- Background
- Analysis



# Research objectives

- **Identify beneficiaries** of water related ES that could and want to pay for this ES
- Assess **preferences** of land users for
  - different soil conservation measures
  - different types of positive incentives/rewards
- Calculate the **willingness to accept** of farmers for implementing soil conservation measures
- Conclude on overall PES feasibility

# Existing Projects and Potential Buyers

- Two PES projects in the past five years using international funding:

- Community Ecosystem Conservation Fund
- Ecosystem Based Adaptation



Funding stopped and projects were terminated in 2016  
-> Project dependence: **Lack of permanence!**

- Future PES project with local, user-based funding:

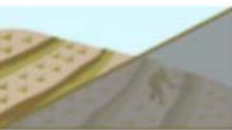
- National Water and Sewerage Corporation (NWSC)
- (Doho Rice Scheme)

# What is the farmer interested in?

## Choice Experiment

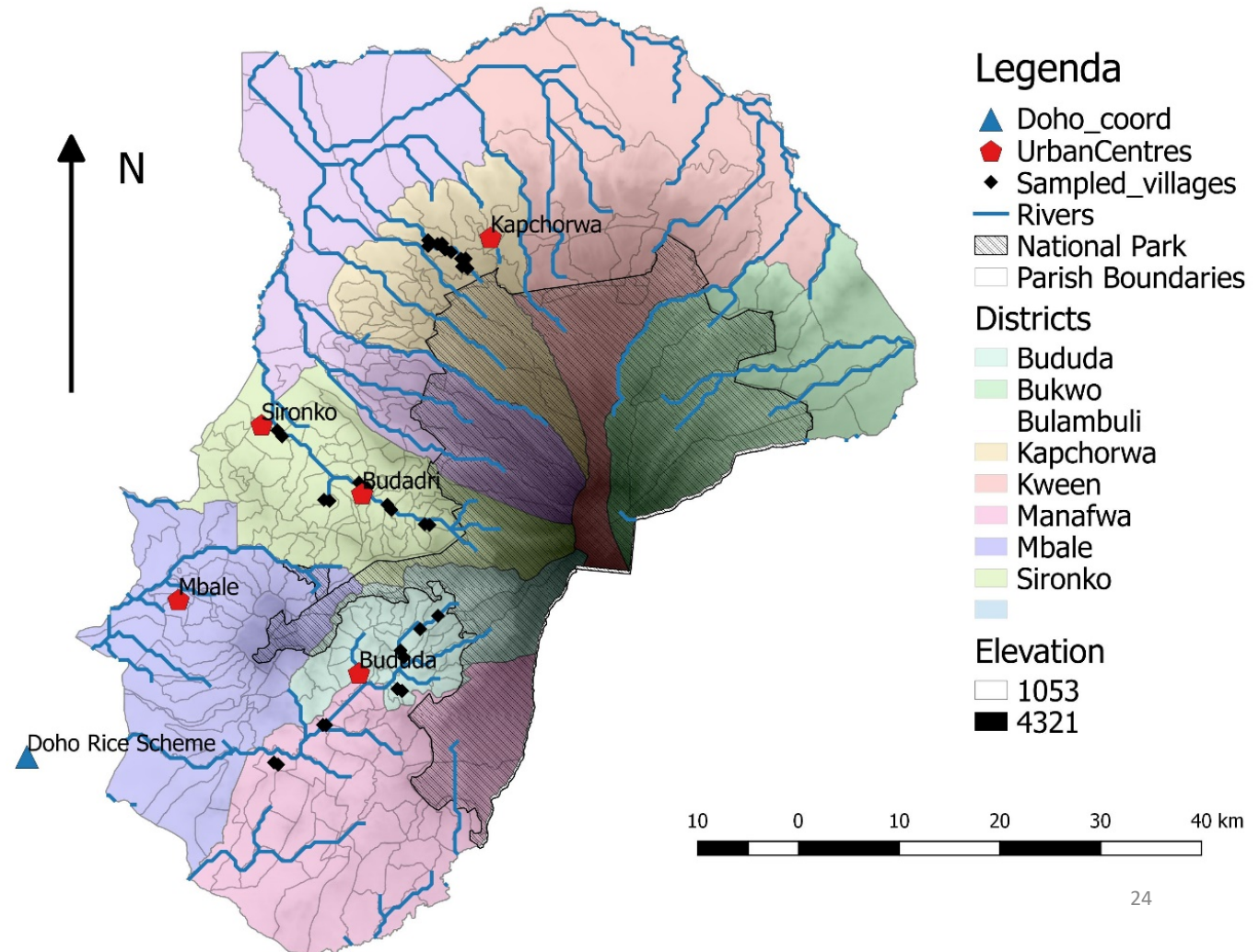
Twelve choice cards for representation

1. Width of to be protected river banks?
2. What soil conservation measures?
3. What agricultural practices?
4. Compensation amounts?
5. Private vs. Communal compensation?
6. Assistance needed?

| CARD 1                                                                    | Contract A                                                                                                | Contract B                                                                                                   | No Contract                                                               |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| 1. Distance to river banks to be protected                                | <br>0 M                | <br>20 M                  | I choose not to enter any contract and to keep my current farming methods |
| 2. Contour trenches and grass bunds                                       | <br>ALL FIELDS         | <br>HALF OF FIELDS        |                                                                           |
| 3. Soil conserving agricultural practices (minimal tillage, mulching ...) | <br>HALF OF FIELDS     | <br>ALL FIELDS            |                                                                           |
| 4. Yearly compensation                                                    | <br>360.000 UGX        | <br>90.000 UGX            |                                                                           |
| 5. Mode of compensation                                                   | <br>COMMUNAL          | <br>50/50                |                                                                           |
| 6. Assistance in implementation                                           | <br>LABOUR AND TOOLS | <br>TOOLS BUT NO LABOUR |                                                                           |

## Location of sampling sites

- Farmers with land at the river
- Important water sources
- Degraded rivers





# Results: Latent Class analysis

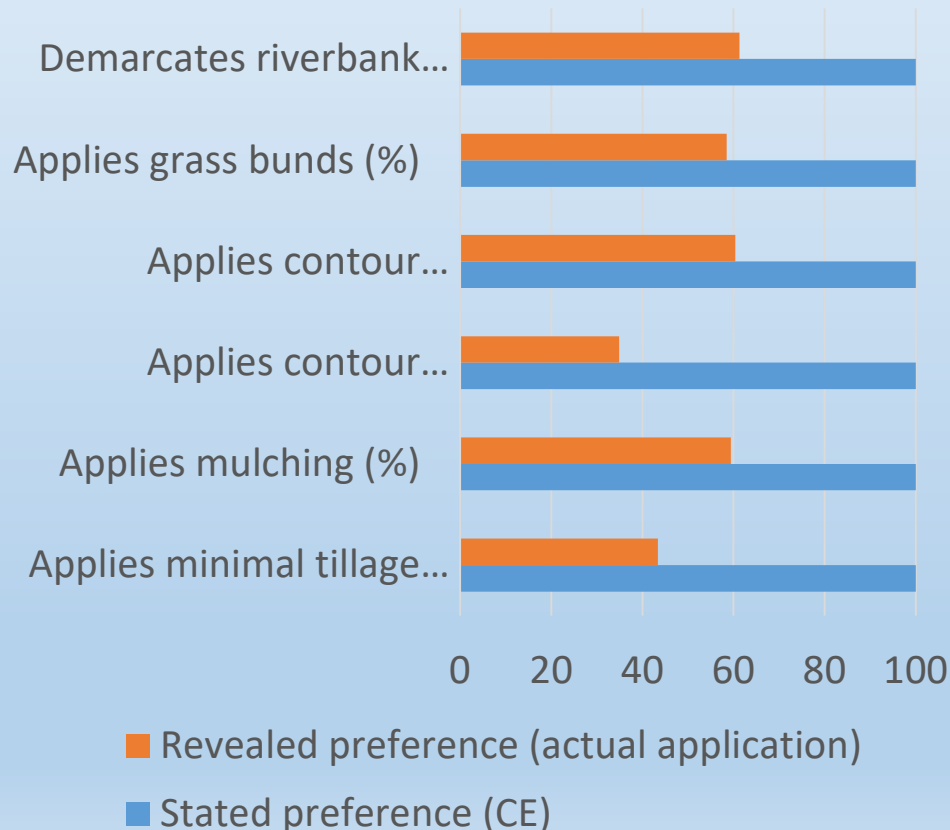
- Two classes
- Negative ASC (indicates interest to change current situation) and positive payment effect
- Distance to river  $\neq$  sign in both classes
- Difference in preference for trenches and SCM
- Negative preference for communal payments
- **Mostly positive preferences for assistance**

|                         | Latent Class 1              |         | Latent Class 2             |         |
|-------------------------|-----------------------------|---------|----------------------------|---------|
|                         | <i>Class share = 70.2 %</i> |         | <i>Class share = 29.8%</i> |         |
| ASC                     | - 0.871 ***                 | (0.227) | - 1.357 ***                | (0.347) |
| Payment                 | 0.002 ***                   | (0.000) | 0.002 *                    | (0.000) |
| Distance to river       | 0.033 ***                   | (0.004) | - 0.147 ***                | (0.013) |
| Trenches, half          | 0.526 ***                   | (0.108) | - 0.074                    | (0.267) |
| Trenches, all           | 0.492 ***                   | (0.092) | - 0.029                    | (0.236) |
| Soil conservation, half | 0.350 ***                   | (0.096) | 0.266                      | (0.241) |
| Soil conservation, all  | 0.447 ***                   | (0.447) | 0.077                      | (0.218) |
| Divided payment         | - 0.385 ***                 | (0.092) | - 0.965 ***                | (0.207) |
| Communal payment        | - 0.718 ***                 | (0.101) | - 1.074 ***                | (0.238) |
| Labour                  | 0.462 ***                   | (0.117) | 0.459 *                    | (0.269) |
| Tools                   | 0.443 ***                   | (0.113) | 0.050                      | (0.259) |
| Tools and labour        | 0.689 ***                   | (0.120) | 0.485 *                    | (0.271) |

- $p < 0.1$ ,  $p < 0.05$ ,  $p < 0.01$
- Categorical variables use dummy coding

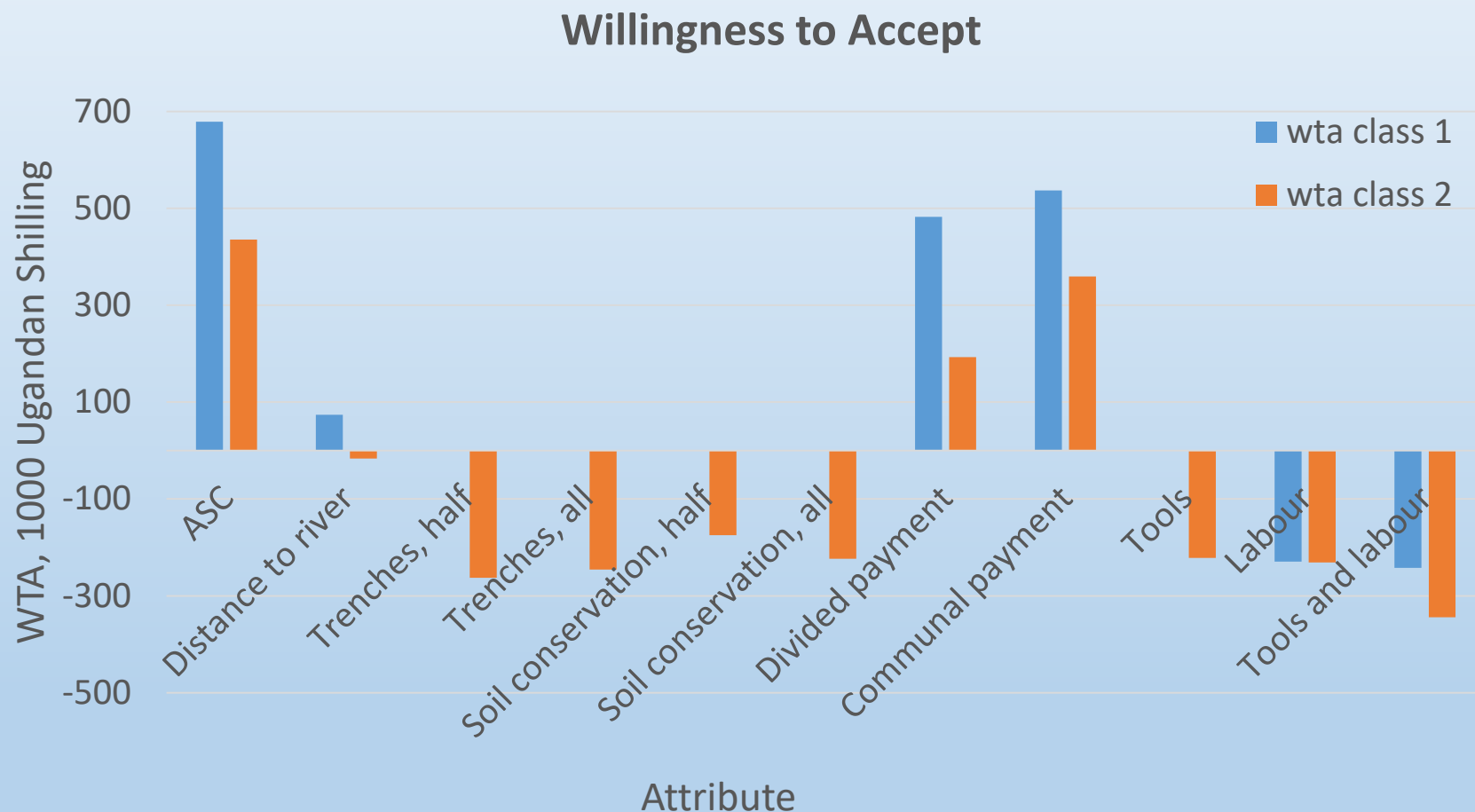
# Results: Stated vs. Revealed Preferences

## Comparison of stated and revealed preferences of class 1 farmers



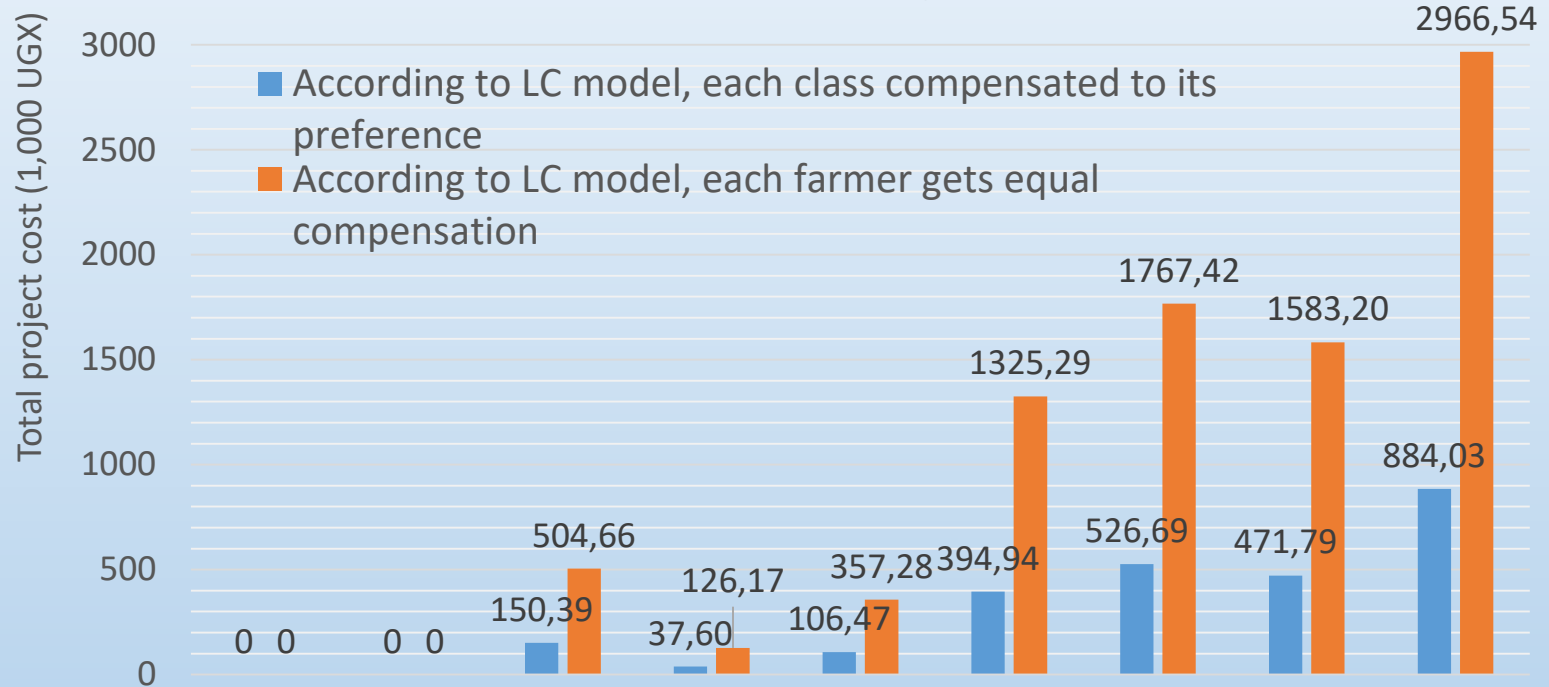
- Gap between stated and revealed preference
- Hypothetical bias
- Barriers to implementation:
  - Land
  - Labour
  - Resources

# Results: Willingness to Accept (WTA)



# Results: Project Costs

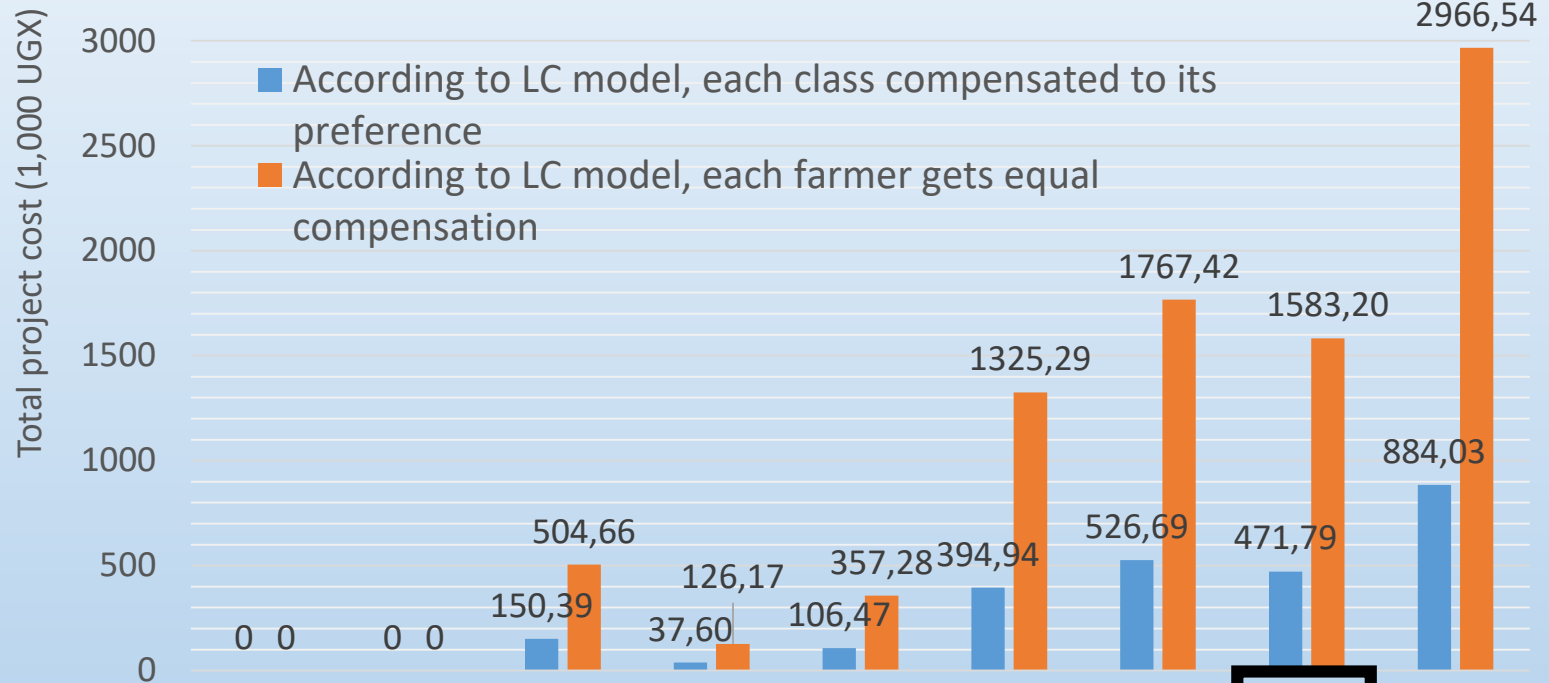
Estimation of total project costs



| Buffer width  | 5 m | 5 m     | 5 m | 10 m | 10 m    | 10 m | 20 m | 20 m    | 20 m |
|---------------|-----|---------|-----|------|---------|------|------|---------|------|
| Trenches + SC | Yes | Yes     | Yes | Yes  | Yes     | Yes  | Yes  | Yes     | Yes  |
| Communal?     | No  | No      | Yes | No   | No      | Yes  | No   | No      | Yes  |
| Labour        | No  | 20 days | No  | No   | 20 days | No   | No   | 20 days | No   |

# Results: Project Costs

## Estimation of total project costs



|               |     |         |     |      |         |      |      |         |      |
|---------------|-----|---------|-----|------|---------|------|------|---------|------|
| Buffer width  | 5 m | 5 m     | 5 m | 10 m | 10 m    | 10 m | 20 m | 20 m    | 20 m |
| Trenches + SC | Yes | Yes     | Yes | Yes  | Yes     | Yes  | Yes  | Yes     | Yes  |
| Communal?     | No  | No      | Yes | No   | No      | Yes  | No   | No      | Yes  |
| Labour        | No  | 20 days | No  | No   | 20 days | No   | No   | 20 days | No   |



# Policy Implications

- Awareness on benefits of SC is present -> focus on overcoming barriers
- Use individual payments
- Not all farmers require compensations: Efficiency vs. Equity
- Three solutions with increasing cost and increasing ecological benefit
  1. Equity with 5 m buffers: **only transaction costs**
  2. Equity with 10 m buffers and individual compensation: **UGX 126,170/yr**
  3. Spatial targetting with 20 m buffers, individual compensation + 20 labour days: **UGX 471,790/yr**

What is the affordability for the buyer (NWSC) for scenario's 2 & 3 ?

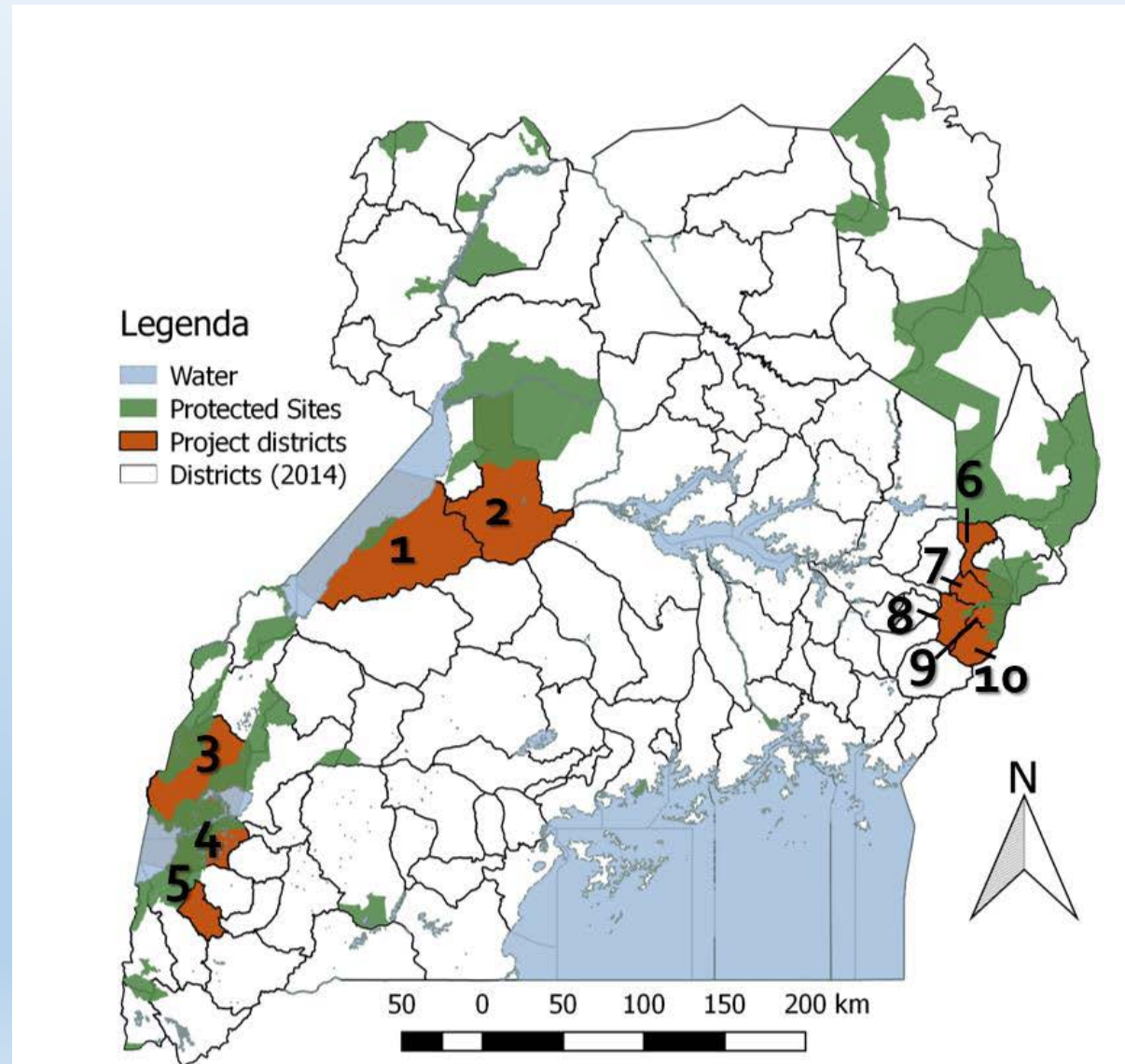
# Potential of carbon payments

## Case 2: Trees for Global Benefits

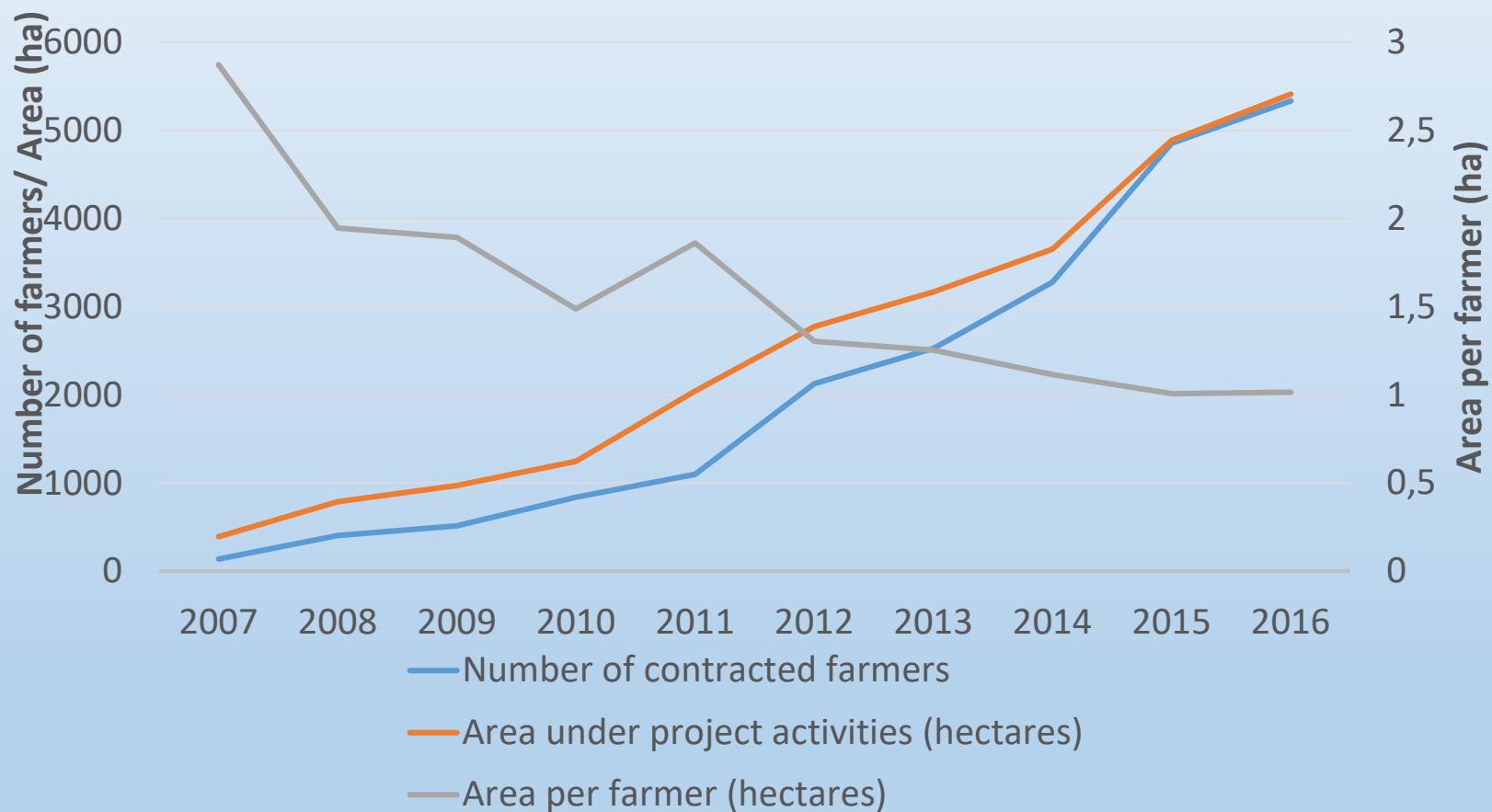
- Agroforestry PES project by Ecotrust (Ugandan NGO)
- Ex-ante purchases with Plan Vivo Standard
- °2003 → 2013 in Elgon
- Farmers → responsible for management trees for 25 years
- Conditional payments: first 10 years
- Monitoring, reporting and verifying
- Woodlots → agroforestry



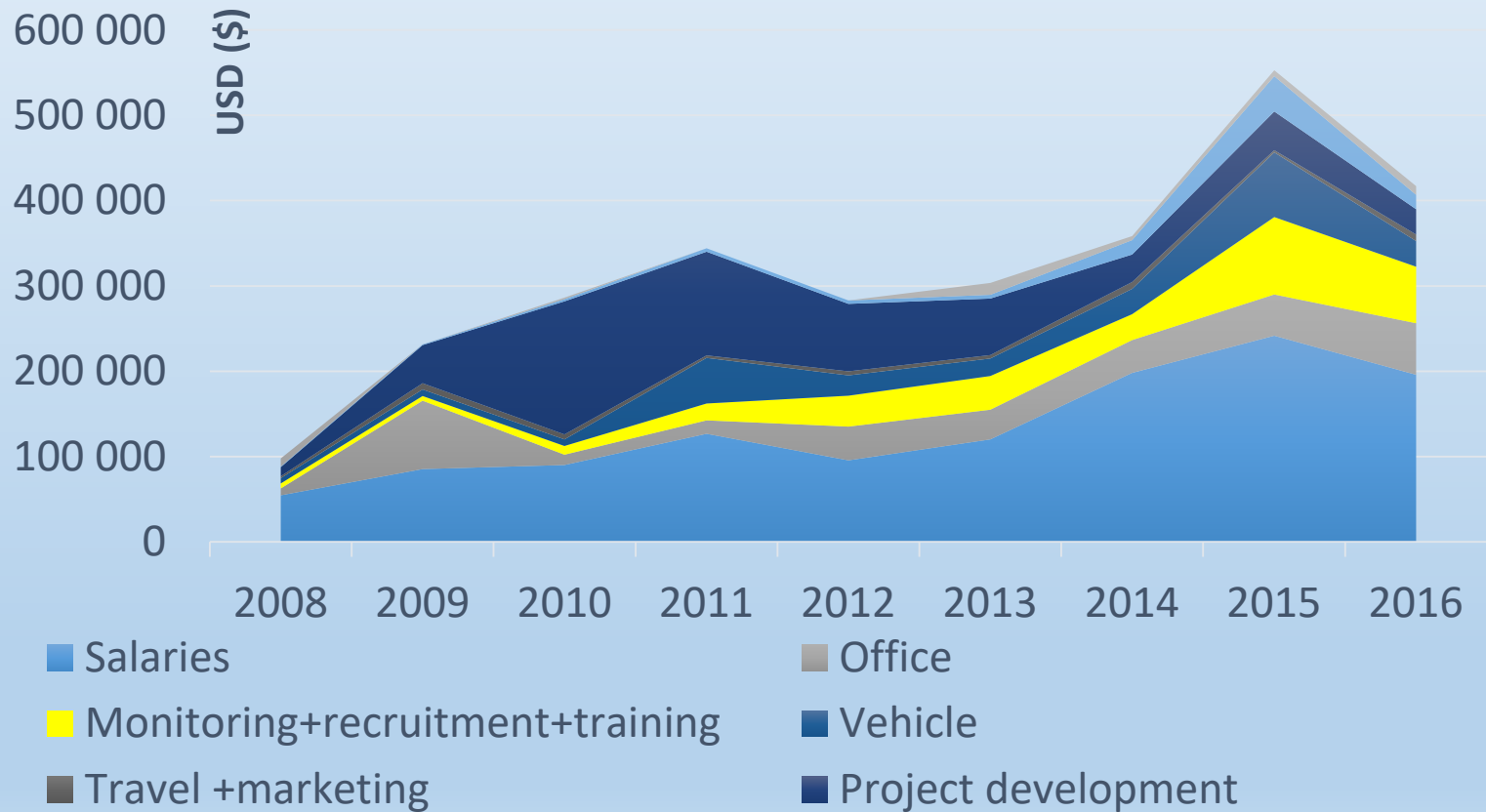
# Where is Trees for Global Benefits operating?



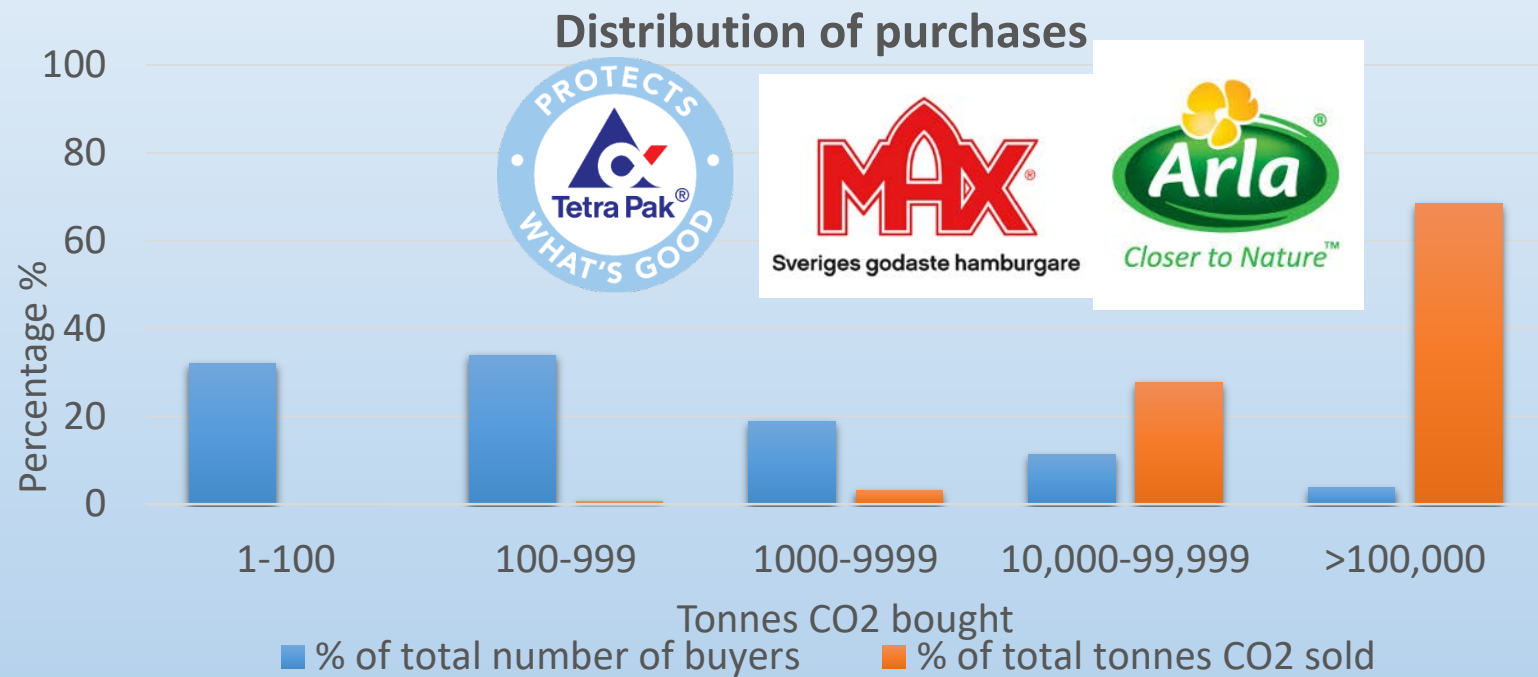
# Evolution of farmers and area



# Increasing monitoring costs

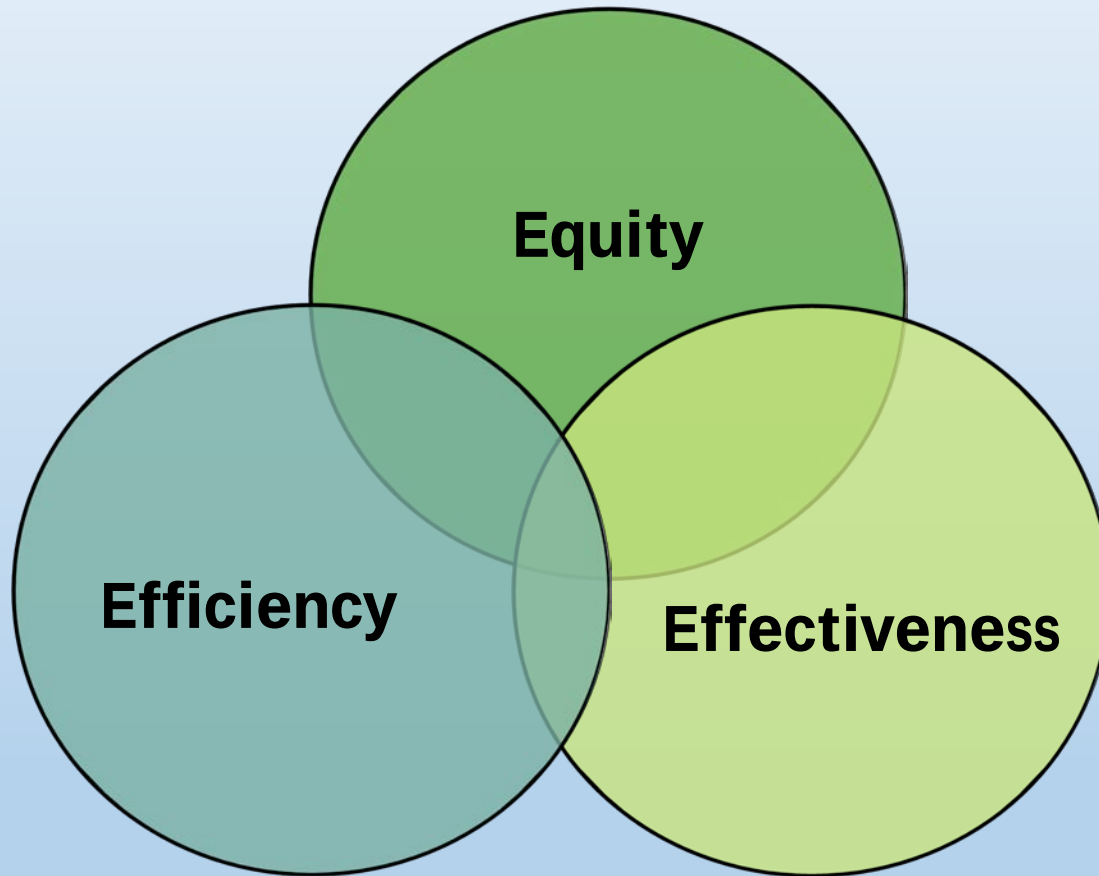


# Dependency on few buyers

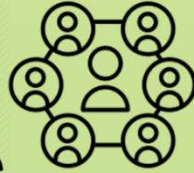


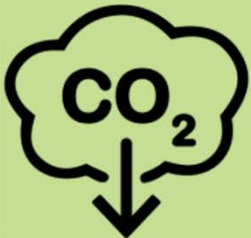


# Methodology: 3-E approach



# Effectiveness

| <u>Impact on livelihoods</u> |                                                                                                                                                                      |                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                              | Non-monetary                                                                                                                                                         | Financial                                                                                  |
| Intrinsic                    | ↑ Ecosystem services                                                                                                                                                 | <ul style="list-style-type: none"><li>• Income diversification</li><li>• Pension</li></ul> |
| Added value TGB              |   |         |

| <u>Impact on the environment</u>                                                    |                                                                                                                                                                        |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"><li>• 1,2 million tonnes CO<sub>2</sub></li><li>• Avoided deforestation</li><li>• Promotes biodiversity</li><li>• Leakage?</li></ul> |

# Efficiency

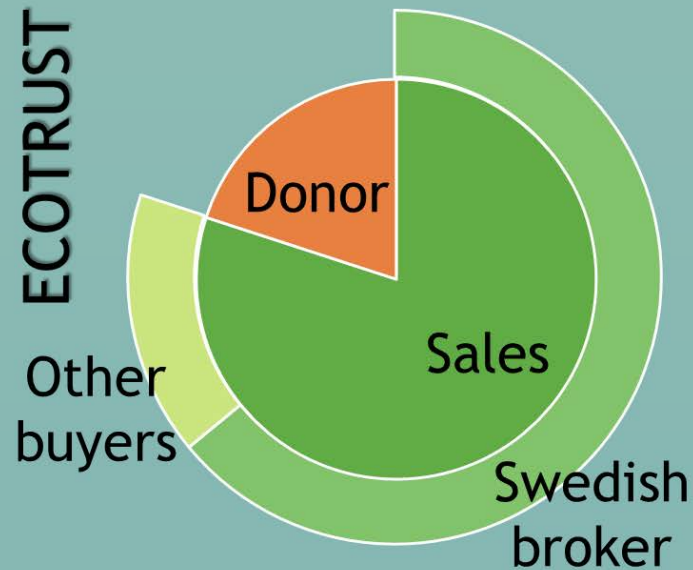
## BENEFITS

- Reward in 6 stages
  - ~ buyer
  - ~ exchange rate
- Sale timber, firewood

## COSTS

- Inputs
- Seedlings
- ↑ discount rate →
- ↑ opportunity cost

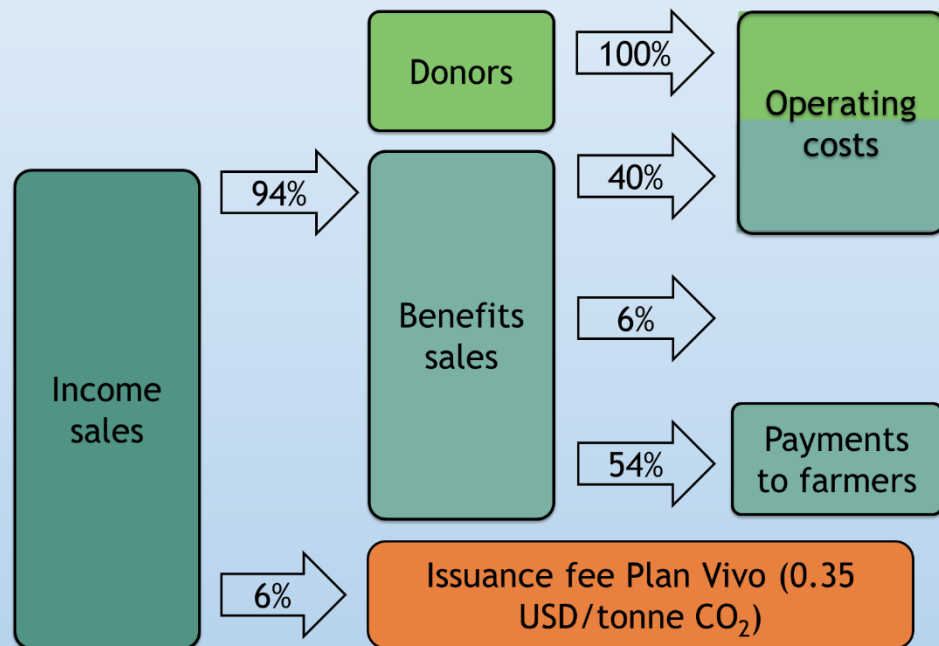
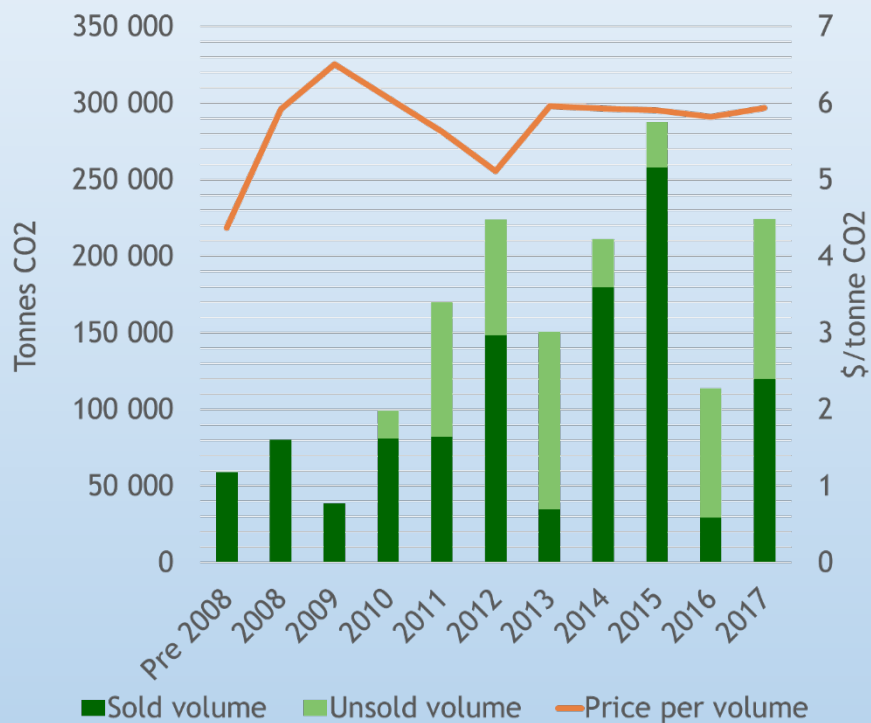
ECOTRUST



- ↑ monitoring costs
- ↑ issuance fee



# Efficiency



# Equity

## Barriers:

- Poverty
- Education
- Gender

## ≠ Outcome

- Farmer's reward
- Within household
- Communities



# Policy Implications

- TGB is successful program:
  - Waiting list of interested farmers!
  - Can carbon sales follow? Need for more marketing!
- From “Trees for Global Benefits” to “Trees for Local Benefits”
  - e.g. consider land slide risk maps to prioritise areas , impact on species choice, ....
  - Balance other ES (biodiversity, soil & water, ...)
  - Need for (fire)wood creates more interest in tree planting
  - ? Look at land and tree tenure

# Some considerations

- A strict interpretation of realistic, conditional and voluntary PES (paradigm CES or commoditized ES) not always obvious: Carbon is doable; Soil and water is more tricky
- Monetary incentives may be counterproductive for public pro-social activities
  - Large interest in labour and tools rather than money
  - undermine existing norms
  - not sufficient and/or durable enough to offset this loss of intrinsic motivation.
- Also consider a livelihoods approach e.g. the five capital types (human, social, physical, financial and natural) in their interactions across scales.
- Replacing the “payment” concept by “co-investment” language is an effort to appeal to both social and financial concepts.



# Co-investment and shared responsibility

## ❑ A language of CIS: “**co-investment**” and “**shared responsibility**”

- conducive to the type of respect,
- mutual accountability and commitment to sustainable development
- reference to social exchange rather than financial transactions
- opportunities for phased strategies.

## ❑ An evolutionary process ....

After creating a basis of **respect** and **relationships** through the paradigm of CIS there may be **more space** for **specific follow-ups** in the paradigm of CES for **actual delivery of ES** to meet **conservation objectives**.

# Conclusions

- High potential for - and ongoing - successful PES initiatives
  - e.g. Trees for Global Benefits (Carbon, biodiversity) ....
  - Soil & Water protection: focus on removing the bottlenecks
- Development context: Consider efficiency vs. fairness, from PES to Co-investment; need for a flexible approach; mix and match different mechanisms ...
- Trade-offs between ES: C vs. Biodiversity
  - Possible solutions by differentiating according to place in the landscape (landslide prevention) and ownership farmers or MENP
- Possible win-wins
  - with soil and water conservation efforts, ... links with other stakeholders (NARO, agricultural extension services, National and Water Sewerage Corporation, ....)
- Options for scaling up (Soils, National Park, ...)

# Further reading

Forest Trends, Katoomba Group & UNEP, 2008. Payments for Ecosystem Services: Getting Started. A Primer

Leimona, B., Van Noordwijk, M., de Groot, R., Leemans, R., 2015. Fairly efficient, efficiently fair: Lessons from designing and testing payment schemes for ecosystem services in Asia. Ecosystem Services 12, 16-28.

Bagstad, K.J., D. Semmens, S. Waage, and R. Winthrop. 2013. A comparative assessment of decision support tools for ecosystem services quantification and valuation. Ecosystem Services 5: 27-39

Peh, K.S.H., Balmford, A., Bradbury, R.B., Brown, C., Butchart, S.H.M., Hughes, F.M.R., Stattersfield, A., Thomas, D.H.L., Walpole, M., Bayliss, J., Gowing, D., Jones, J.P.G., Lewis, S.L., Mulligan, M., Pandeya, B., Stratford, C., Thompson, J.R., Turner, K., Vira, B., Willcock, S. and Birch, J.C., 2013. TESSA: A toolkit for rapid assessment of ecosystem services at sites of biodiversity conservation importance. Ecosystem Services, 5: 51-57.

Huong, T.T.T., Zeller, M., Suhardiman, D. (2016). Payments for ecosystem services in Hoa Binh province, Vietnam: An institutional analysis <http://publications.iwmi.org/pdf/H047763.pdf>

[www.worldagroforestry.org/](http://www.worldagroforestry.org/)

ICRAF at [www.worldagroforestry.org/](http://www.worldagroforestry.org/)

TEEBweb.org (The Economics of Ecosystems and Biodiversity)

Birdlife: TESSA toolkit: <http://www.birdlife.org/worldwide/science/assessing-ecosystem-services-tesa>



Thank you!  
Questions?