p4ges

can paying 4 global ecosystem services reduce poverty?

les paiements pour les services écosystèmiques globaux peuvent-ils réduire la pauvreté?

www.p4ges.org

Can paying for global ecosystem services reduce poverty?

Welcome and introduction to the project

University of Zurich[UZH]

Queen's University Belfast

ITC UNIVERSITY OF TWENTE.

MADAGASIKARA VOAKAJY

Laboratoire des Radioisotopes Université d'Antananarivo

UNIVERSITY OF Southampton

Université d'Antananarivo ECOLE SUPERIEURE DES SCIENCES AGRONOMIQUES 50e ANNIVERSAIRE 1963-2013

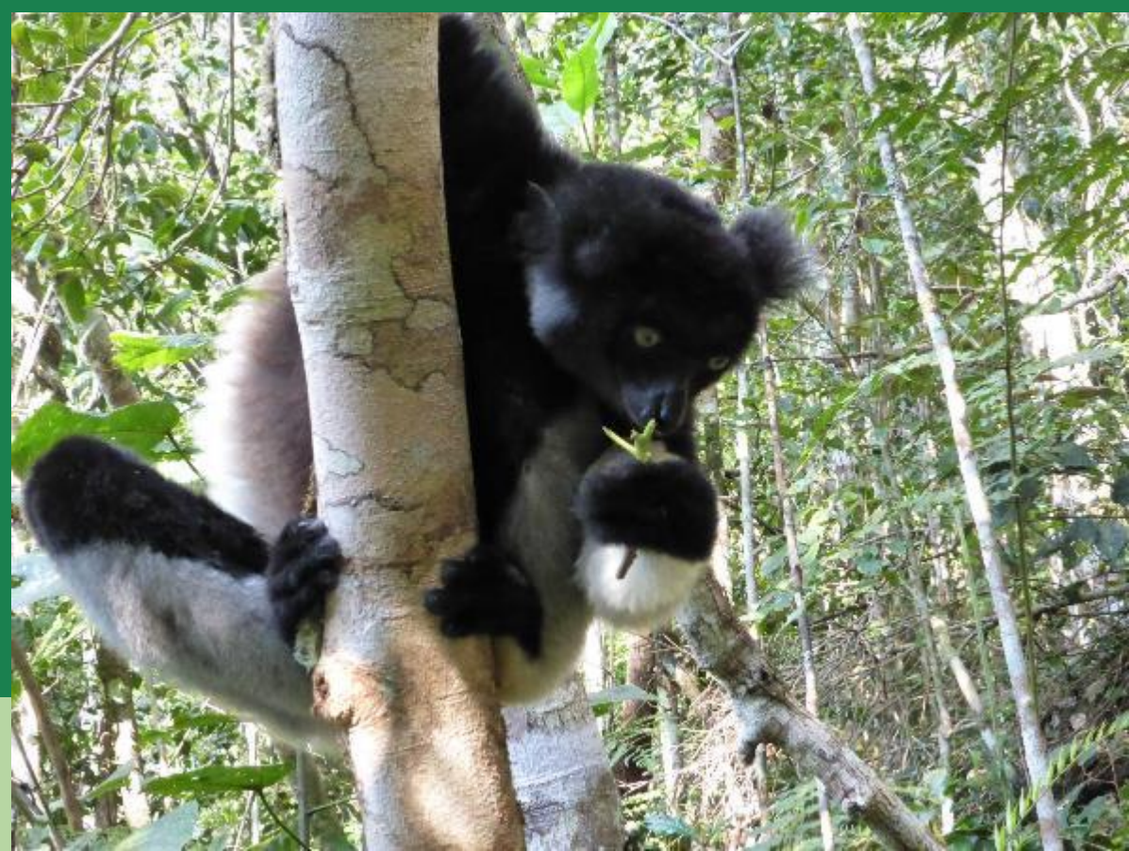
PRIFYSGOL BANGOR UNIVERSITY

KING'S College LONDON

CONSERVATION INTERNATIONAL

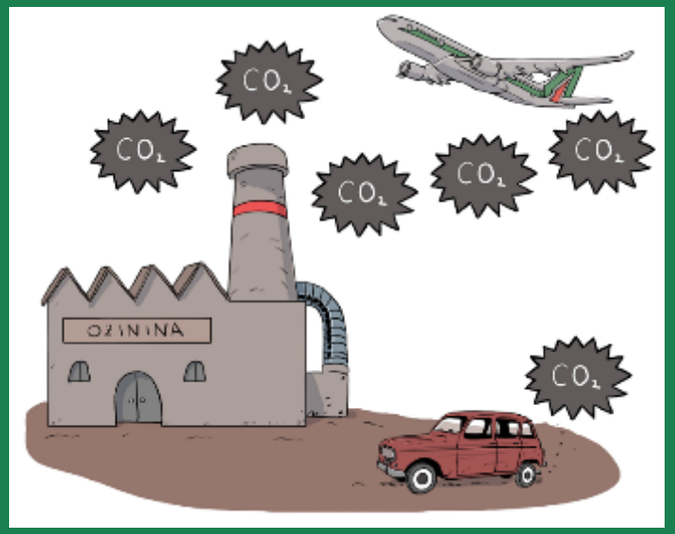
PRIFYSGOL ABERYSTWYTH UNIVERSITY

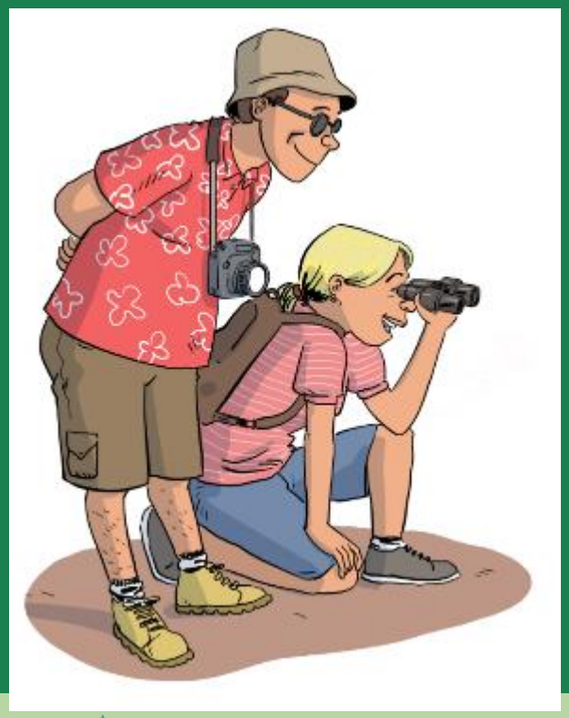

FON'NY ALA
FARITRA AROVANA TANTERAKA
TSY AZO ATAO ATO NY :
MANDORO MAGNORO
MANDRIPAKA ALA MITEVY
MITRANDRAKA VOLAMENA NA VATO
MIHAZA MAMANDRIKA
MAHAVOASAZY NY MANDIKA IREO



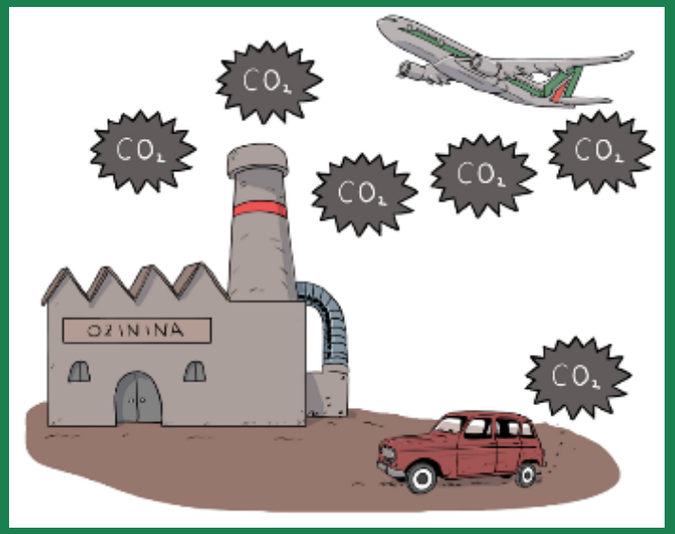
Madagascar's forests have global value

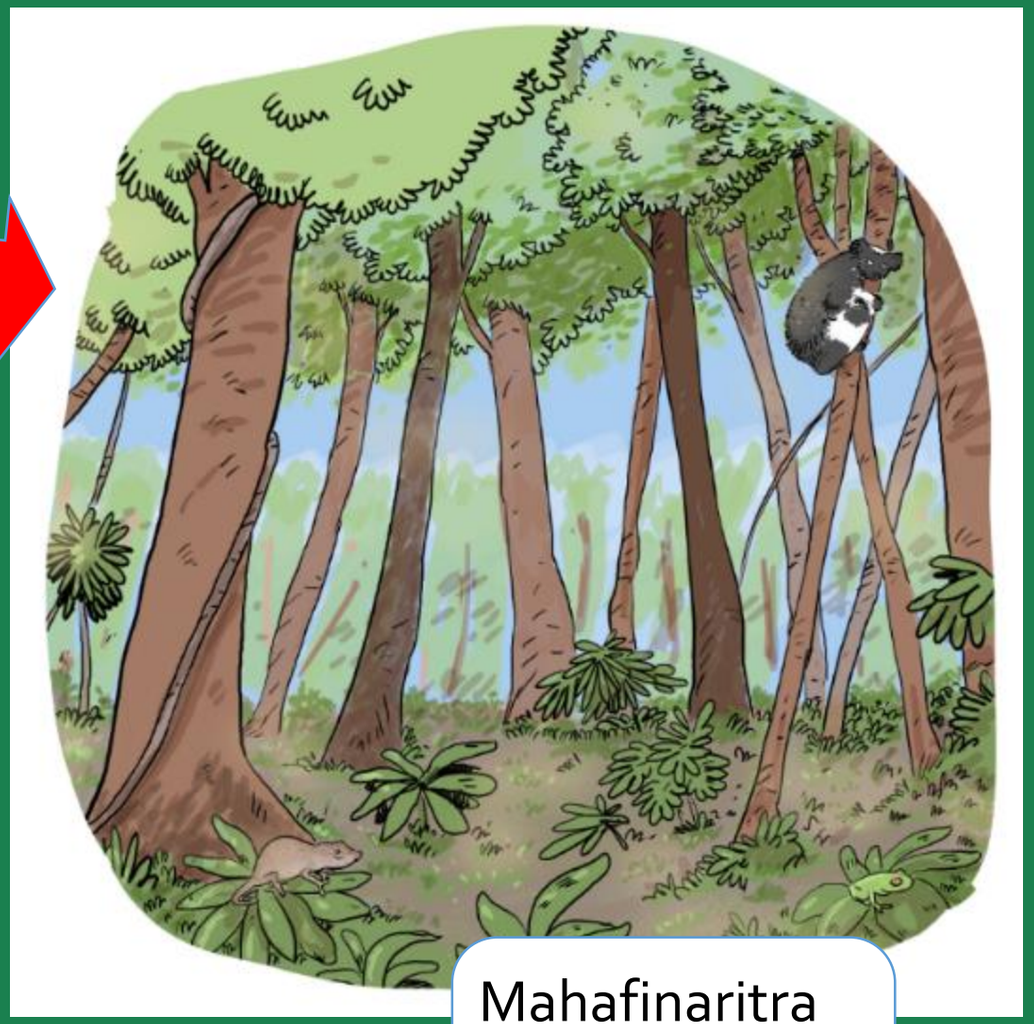
Madagascar's forests have global value

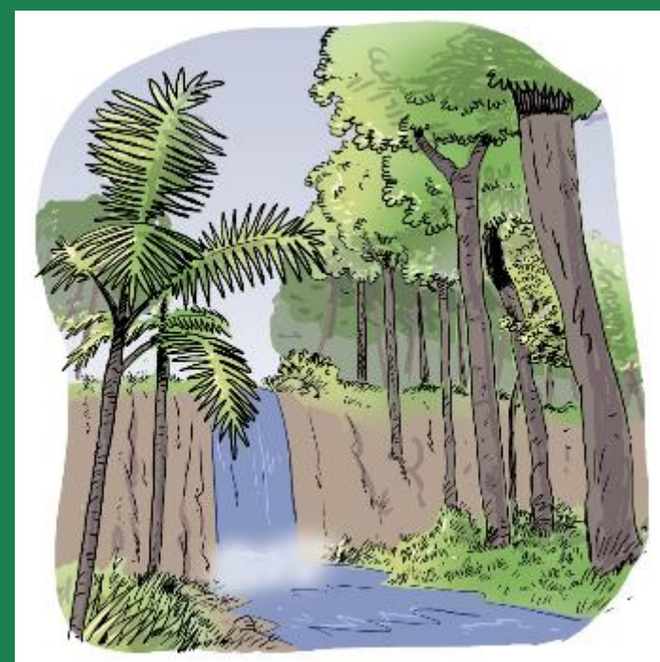


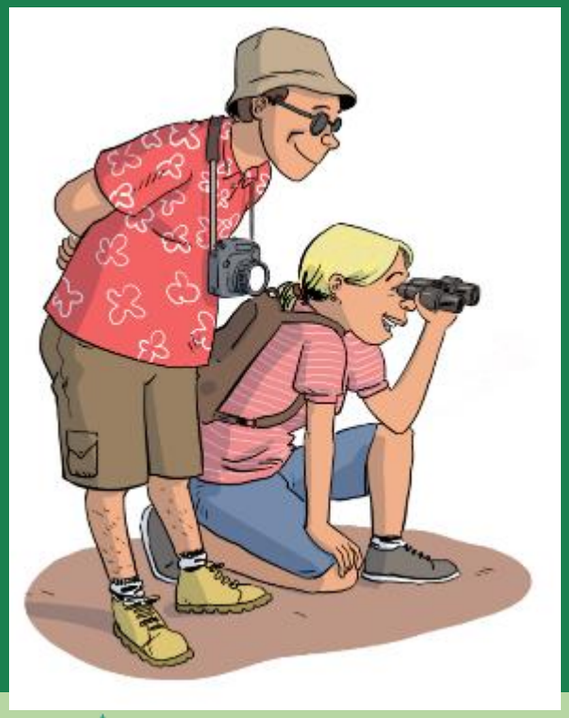


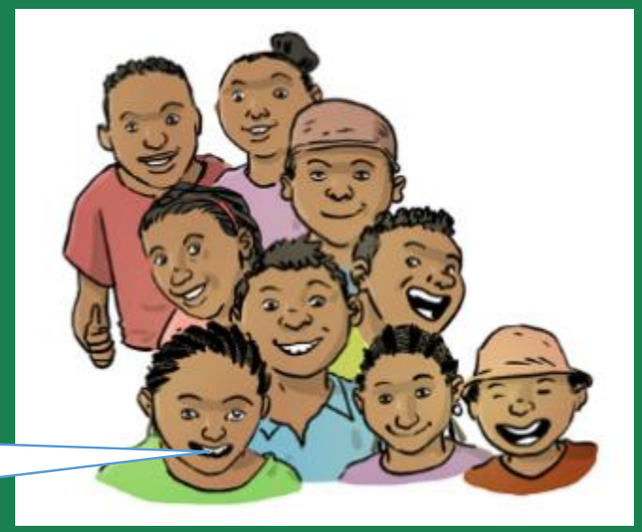
They also have local values











Mahafinaritra ny biby sy ny zava maniry!

But conservation restrictions to conserve local and global values can have individual costs which may be born by very poor, forest-dependent farmers

Aim: Can forest conservation (especially funded by REDD+) effectively contribute to reducing poverty in Madagascar, given bio-physical, economic and political realities?

Ekipa rano

Ekipa tombon-tsoan'ny mponina

Ekipa rafi-pitantanana

Ekipa sosialy sy ekonomika

Ekipa karbônina

Ekipa biby sy zava-maniry

espa
ecosystem services for poverty alleviation

A research programme co-funded by DFID, ESRC & NERC and accredited by LWEC

DFID Department for International Development

E·S·R·C Economic & Social Research Council

Natural Environment Research Council

University of Zurich

University of Southampton

Prifysgol Aberystwyth University

King's College London

Prifysgol Bangor University

Madagasikara Voakajy

ITC University of Twente

Conservation International

Université d'Antananarivo – École Supérieure des Sciences Agronomiques – 50e Anniversaire 1963 2013

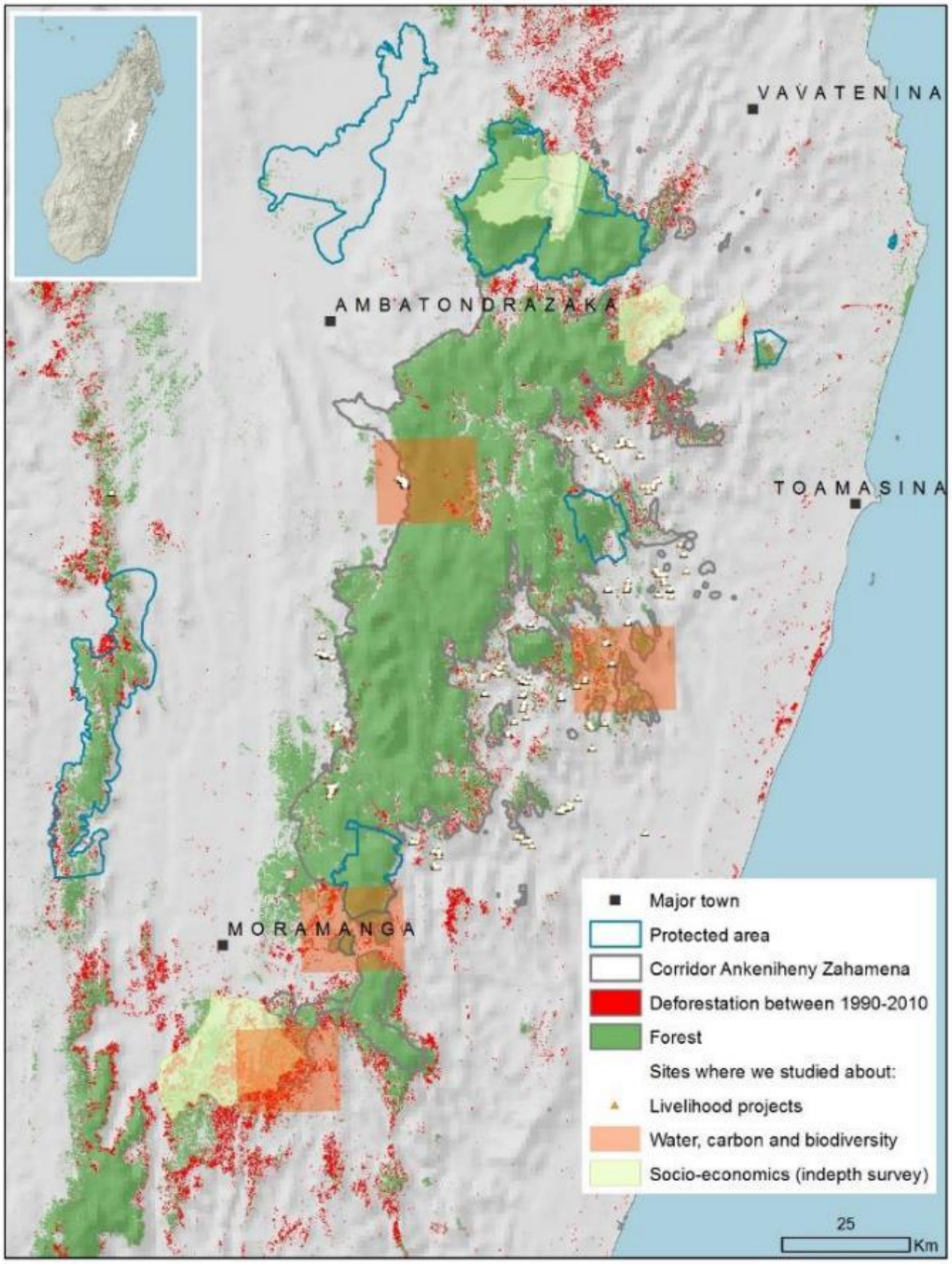
Association Mitsinjo

Madagascar National Parks

GERP

Ministère de l'Environnement, de l'Ecologie, de la Mer et des Forêts

Corridor Ankeniheny Zahamena (CAZ) REDD+ project



Sharing our results…

We have also held regional events and invited stakeholders to visit our hydrological research sites

We have run 2 national trainings for technical experts in Madagascar to be able to use WaterWorld and Co$ting Nature (Ecosystem Services mapping tools which we have improved for use in Madagascar during this project)

We also presented these results internationally (e.g. CBD and UNFCCC COP)

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Can paying for global ecosystem services reduce poverty?

Results of the p4ges project, Jan 2017

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Structure

Introduction

1. What data did we collect and where?
2. What are the past and likely future changes in forest cover in CAZ?
3. What are the carbon benefits of preventing forest loss?
4. What are the hydrological benefits of preventing forest loss?
5. What are the biodiversity benefits of preventing forest loss?
6. What are the importance of different land uses for the supply of wild harvested products?

   BRIEF QUESTIONS

7. What are the local costs of conservation and have they been compensated?
8. What have we learnt about the use of micro-development projects to share benefits and slow deforestation?

   BRIEF QUESTIONS

Conclusions and discussion

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BRIEF QUESTIONS

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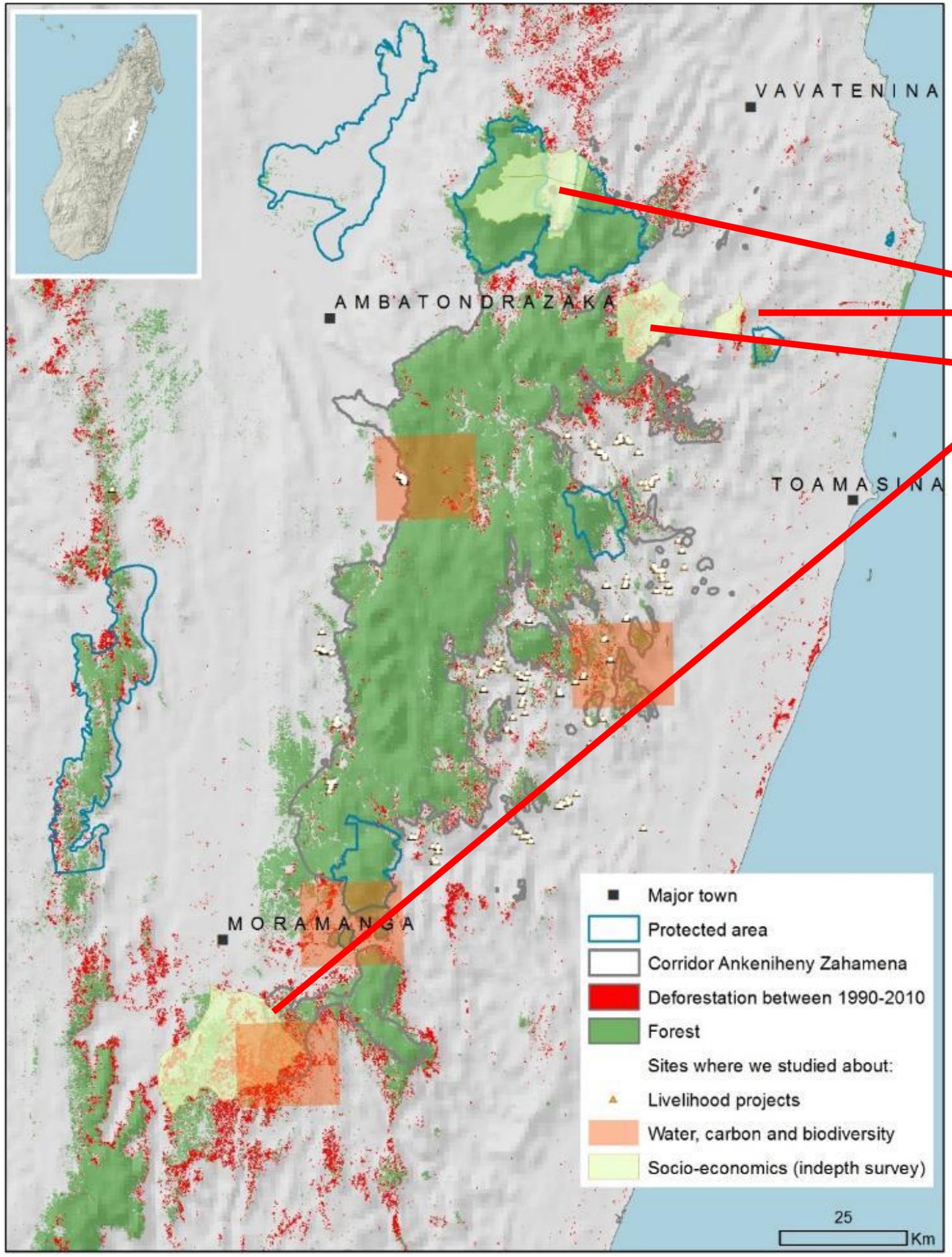
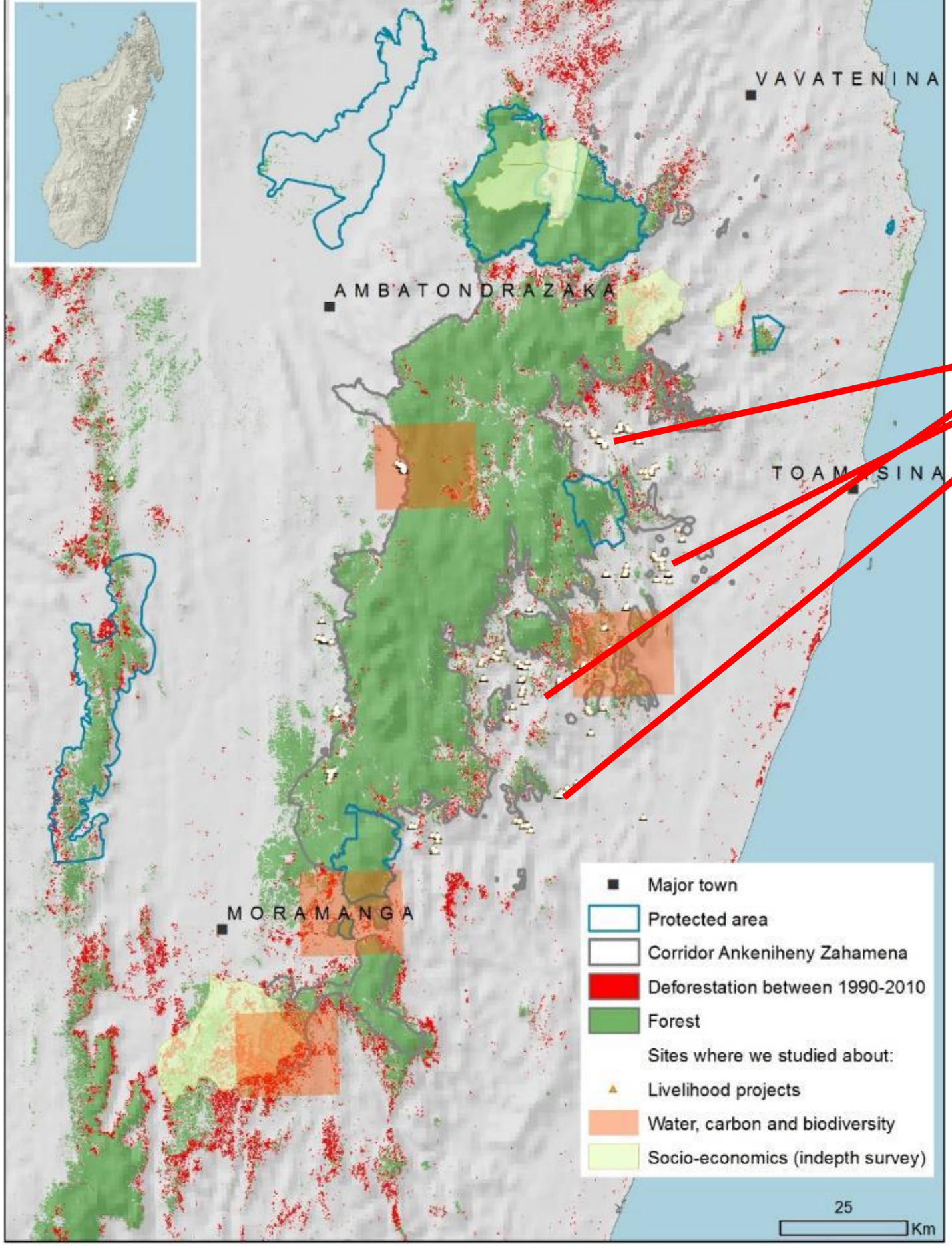
1) What data did we collect and where?



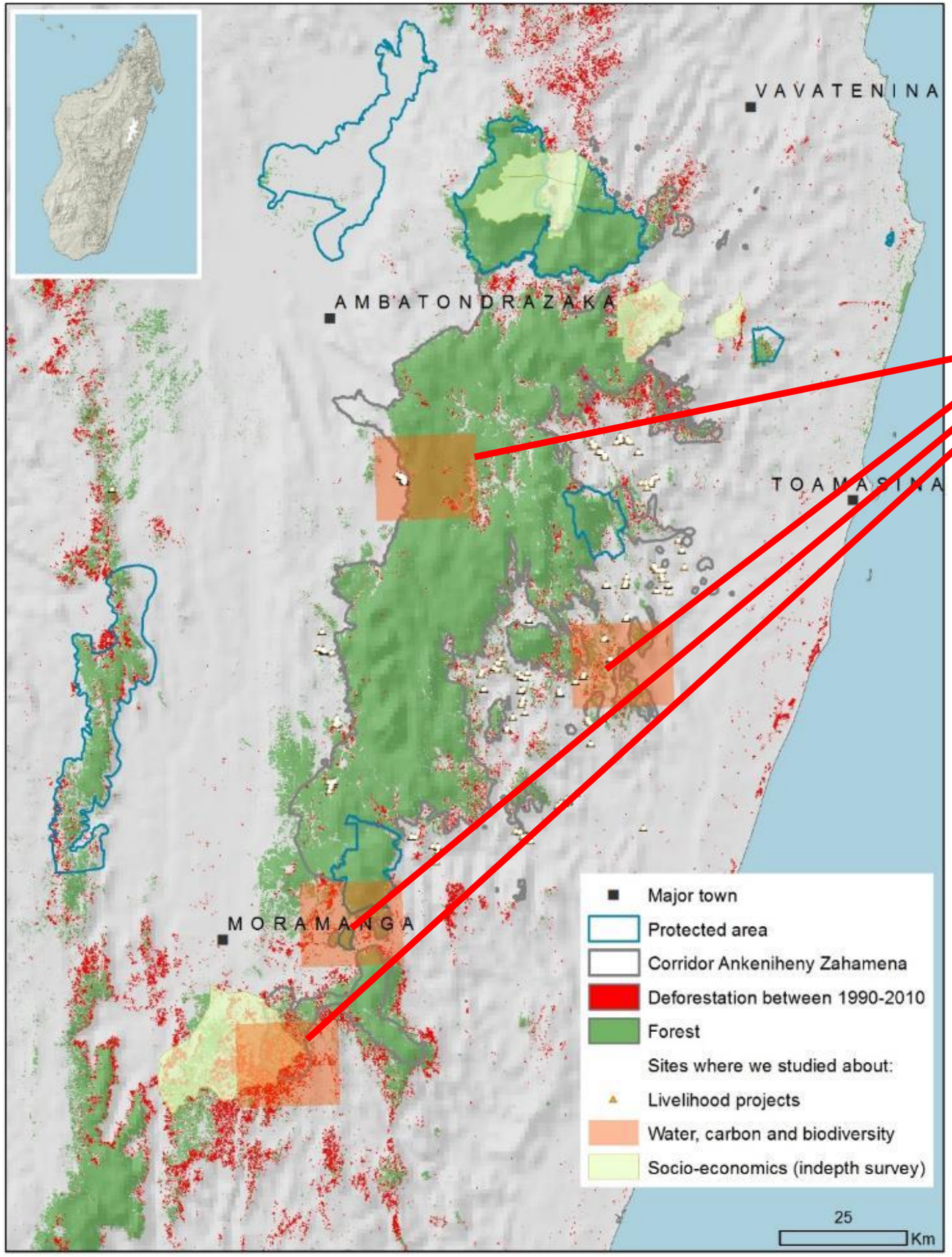




Social-economic indepth sites:
>650 household surveys, 170 detailed agricultural mapping and wild product use survey
>60 focus groups & Key Informant Interviews



Micro-development project sites:
611 interviews with participants in 61 micro projects & qualitative research in subset of 8 sites.



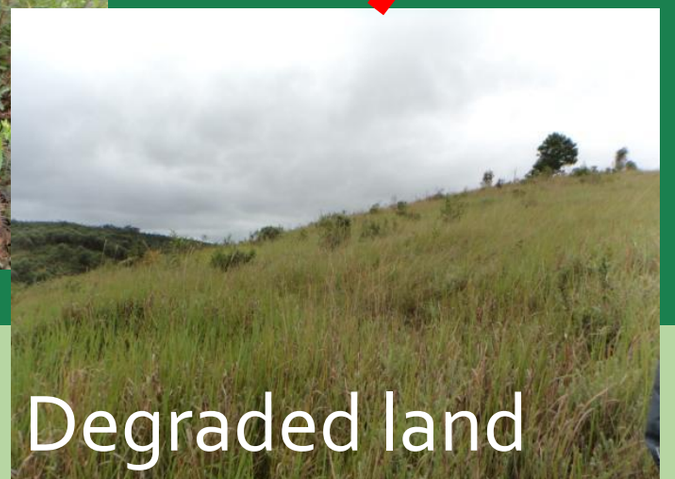
Biophysical sites:
Hydro, biodiversity, carbon and wild harvested product measurements at 54 sites in 4 land uses

Focal land uses in the biophysical sites


Forest


Tree fallow

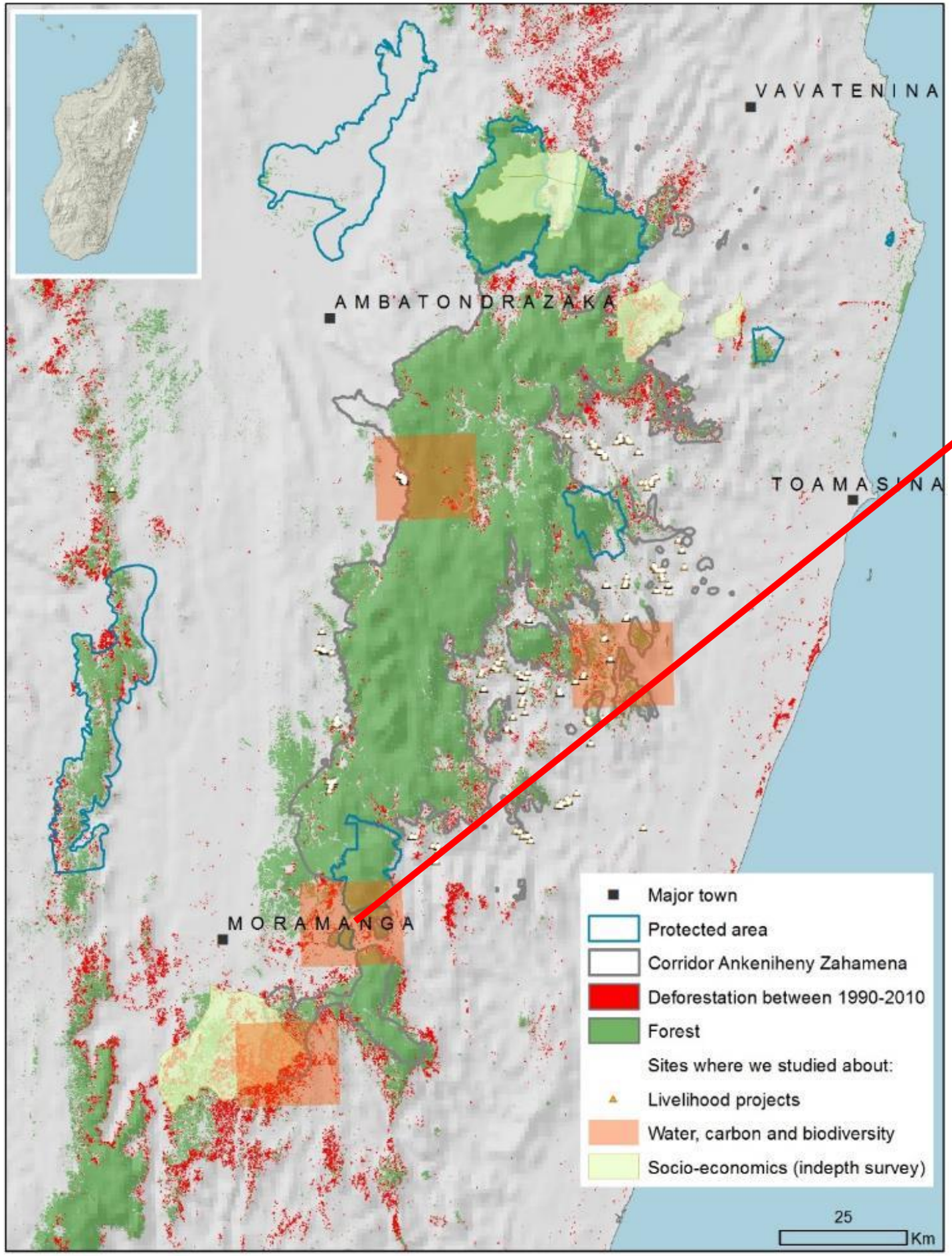

Shrub fallow


Degraded land


Reforestation

degradation

restoration



Intensive plot-scale hydrological work in Andasibe commune

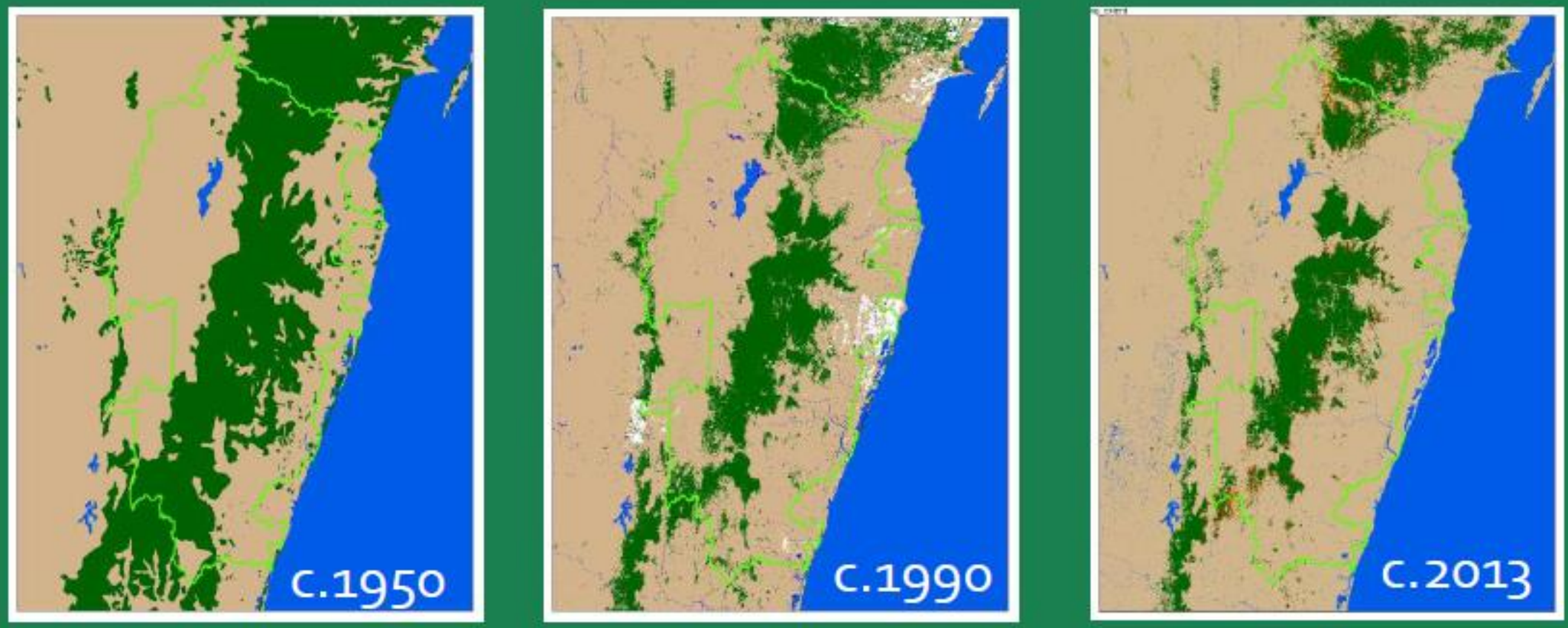



2) Past and likely future changes in forest cover in the CAZ





CAZ has experienced historically high levels of deforestation



1.08% average rate of deforestation over last decade

Hewson et al (in prep), Panfil et al (in prep)

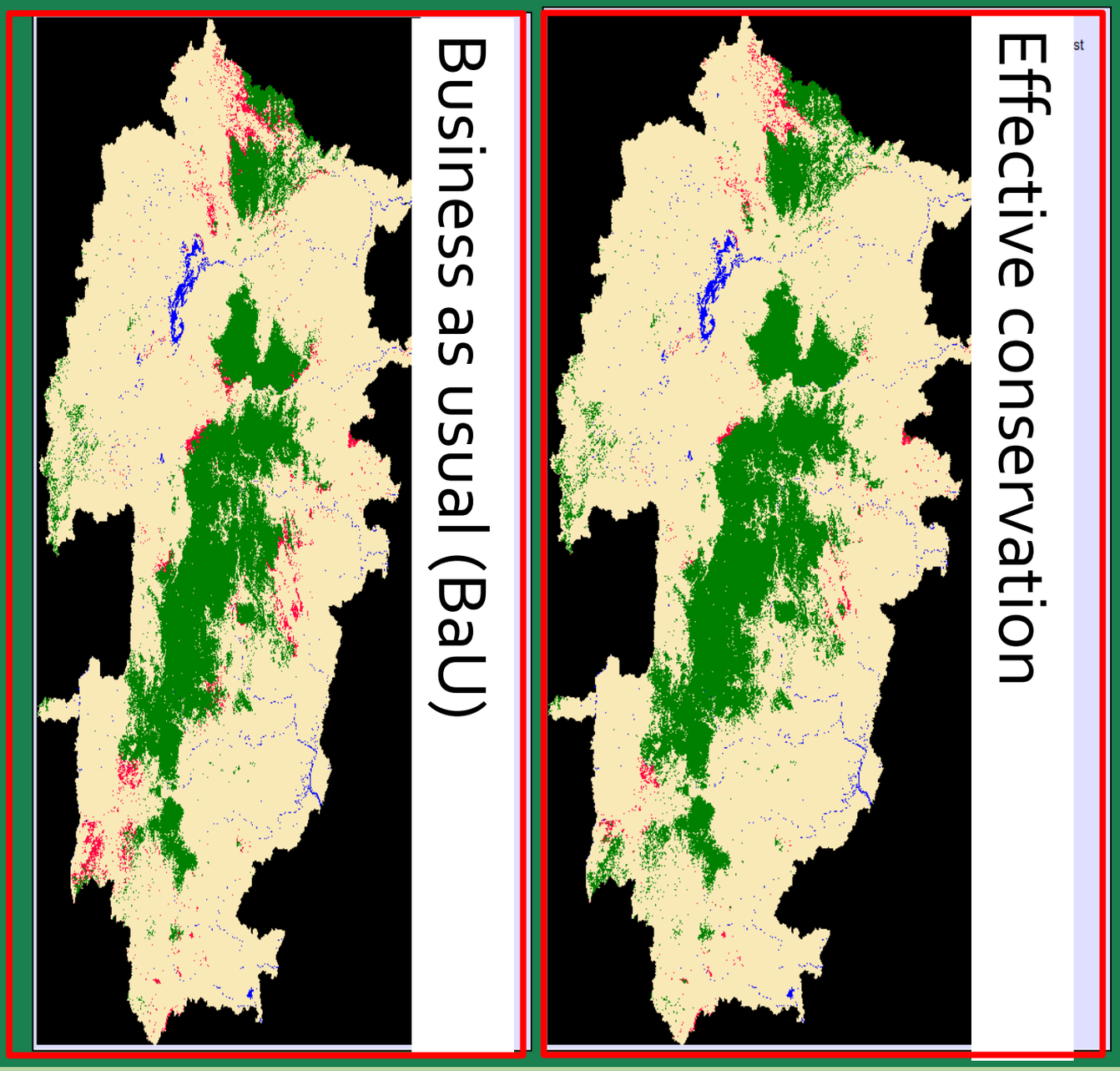
Madagascar is actively engaged with REDD+ process

CAZ has been managed in early stages as a REDD+ pilot project

Madagascar has been using these pilot projects to learn lessons for the wider implementation of REDD+

Panfil et al (in prep)

We estimate that 39,000 ha of deforestation could be avoided over the next 10 years if the proposed conservation and REDD+ project is successful



Hewson et al (in prep)

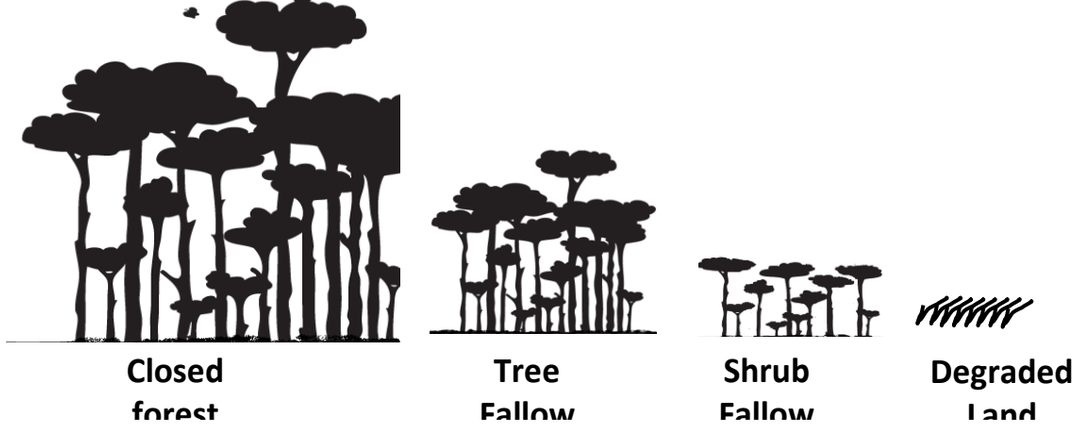


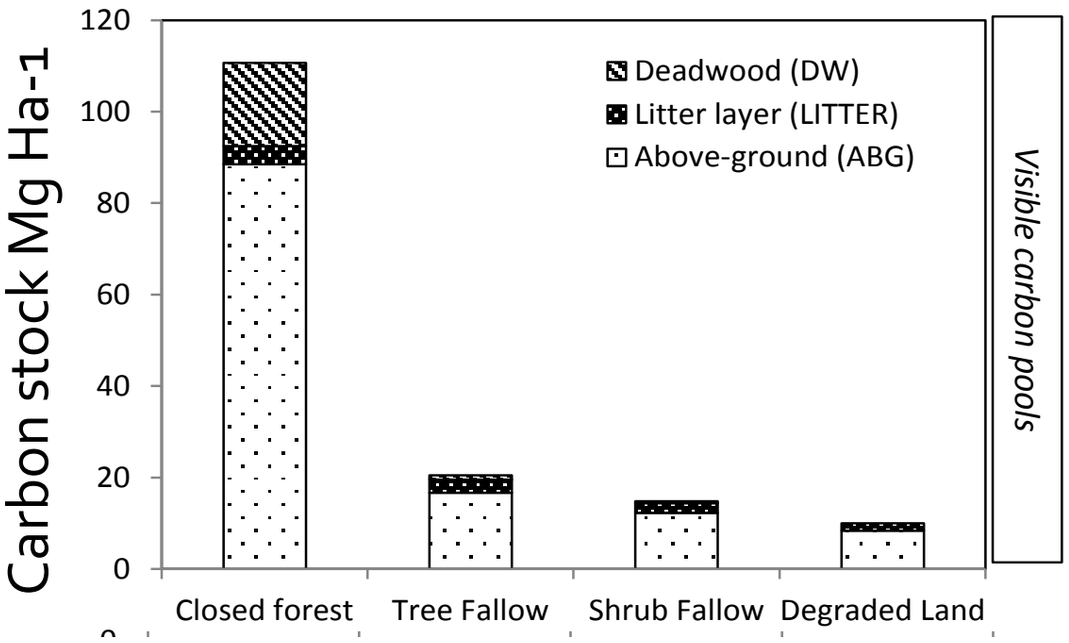

3) What are the carbon benefits of preventing forest loss?





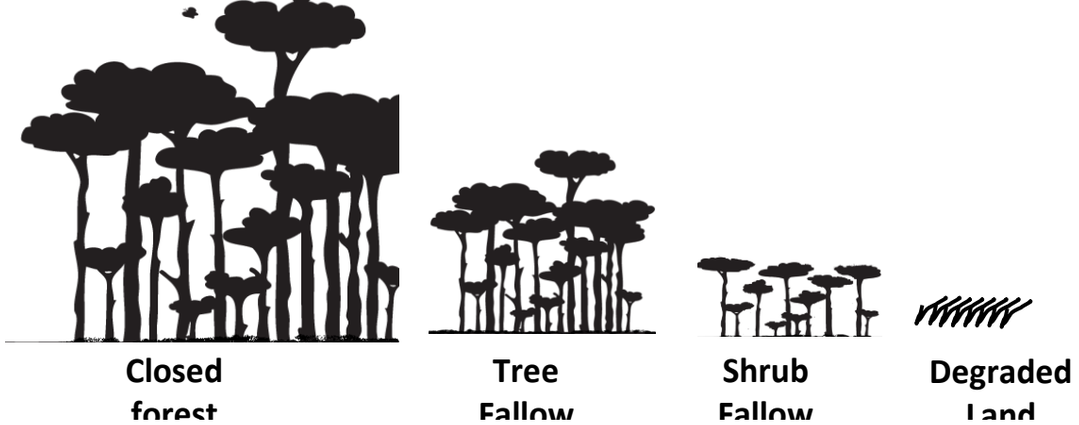
We quantified the effects of changing land use on carbon storage (including below ground pools which are challenging and unusual to study)

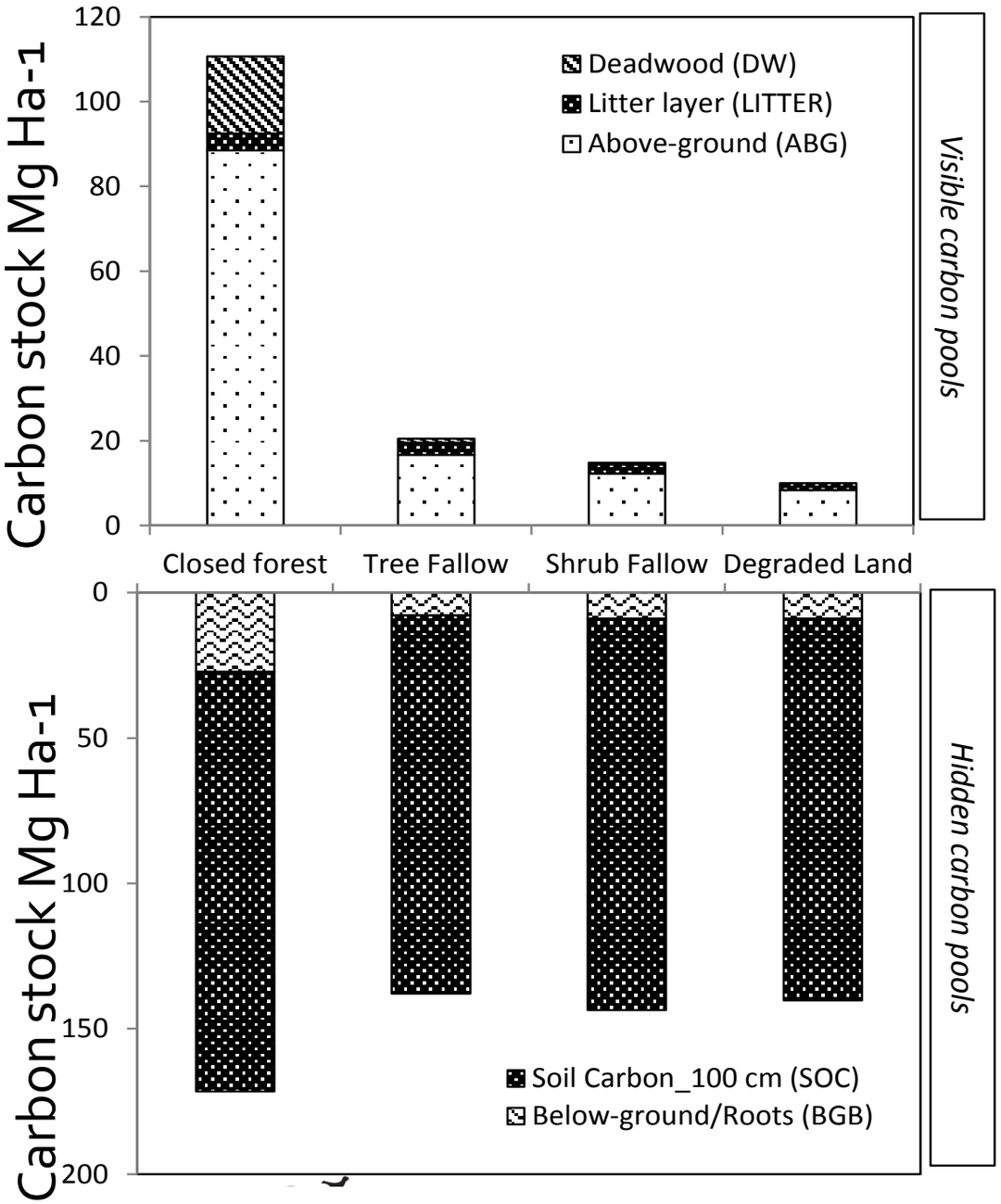




There is MUCH more carbon above ground stored in forest than other land uses(>5x)

Andriamananjara et al (2016), Ramboanantenaina et al (2015)





There is MUCH more carbon above ground stored in forest than other land uses (>5X)

BUT the difference is less when hidden pools (soil and roots) are taken into account

This represents a challenge for monitoring emissions reductions in REDD+

Source: Andriamananjara et al (2016), Ramboatiana et al (2015)




4) What are the hydrological benefits of preventing forest loss?





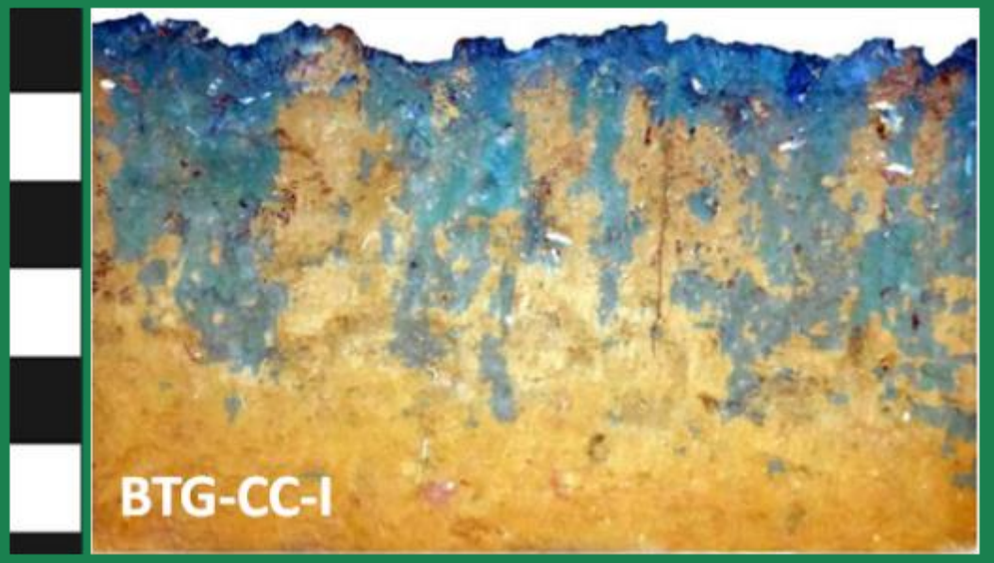
We quantified the empirical effects of changing land use on hydrology at both the plot and landscape scale

Overland flow matters to people as it can influence flood risk, water quality, erosion and availability of water in the dry season

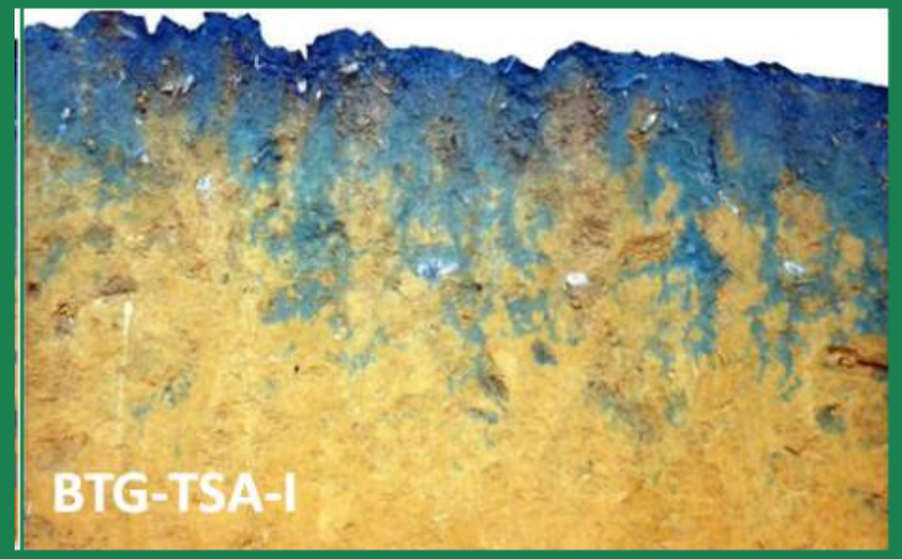
We studied overland flow using blue dye experiments to map infiltration and ‘run off plots’

Zwartendijk et al (in press), Ghimire et al (2016)

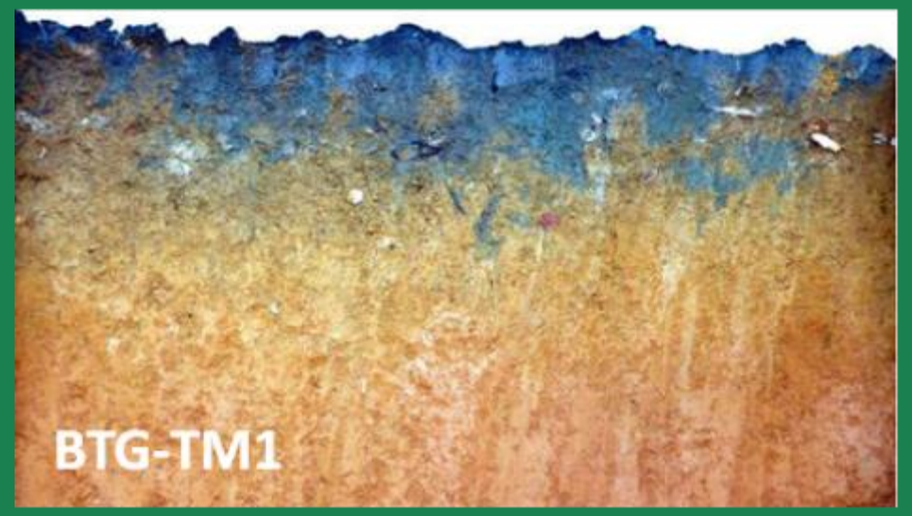
Forest: infiltration (eg along roots) is high



Tree fallow: infiltration is still quite high

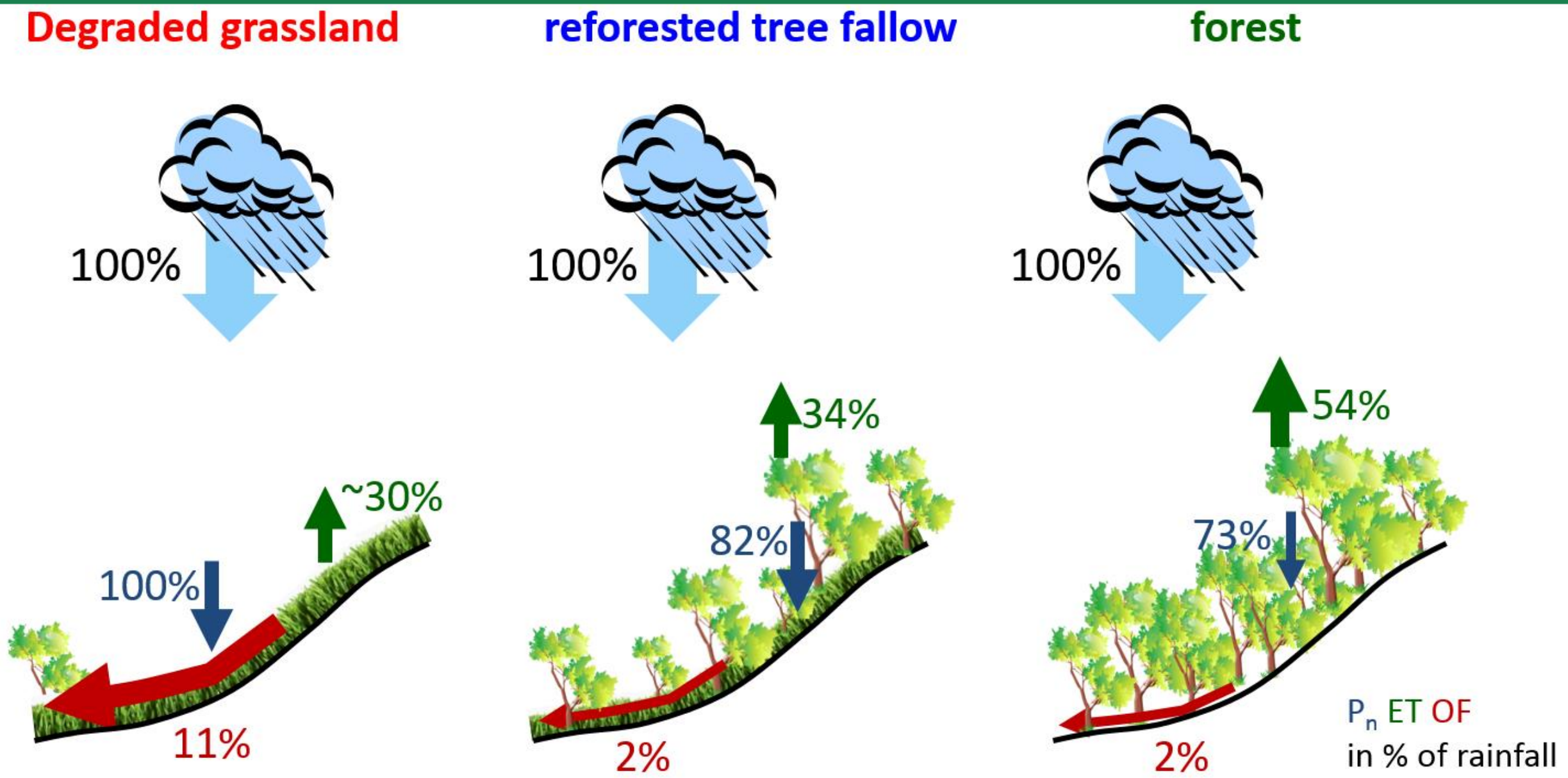


Degraded land: infiltration is very low



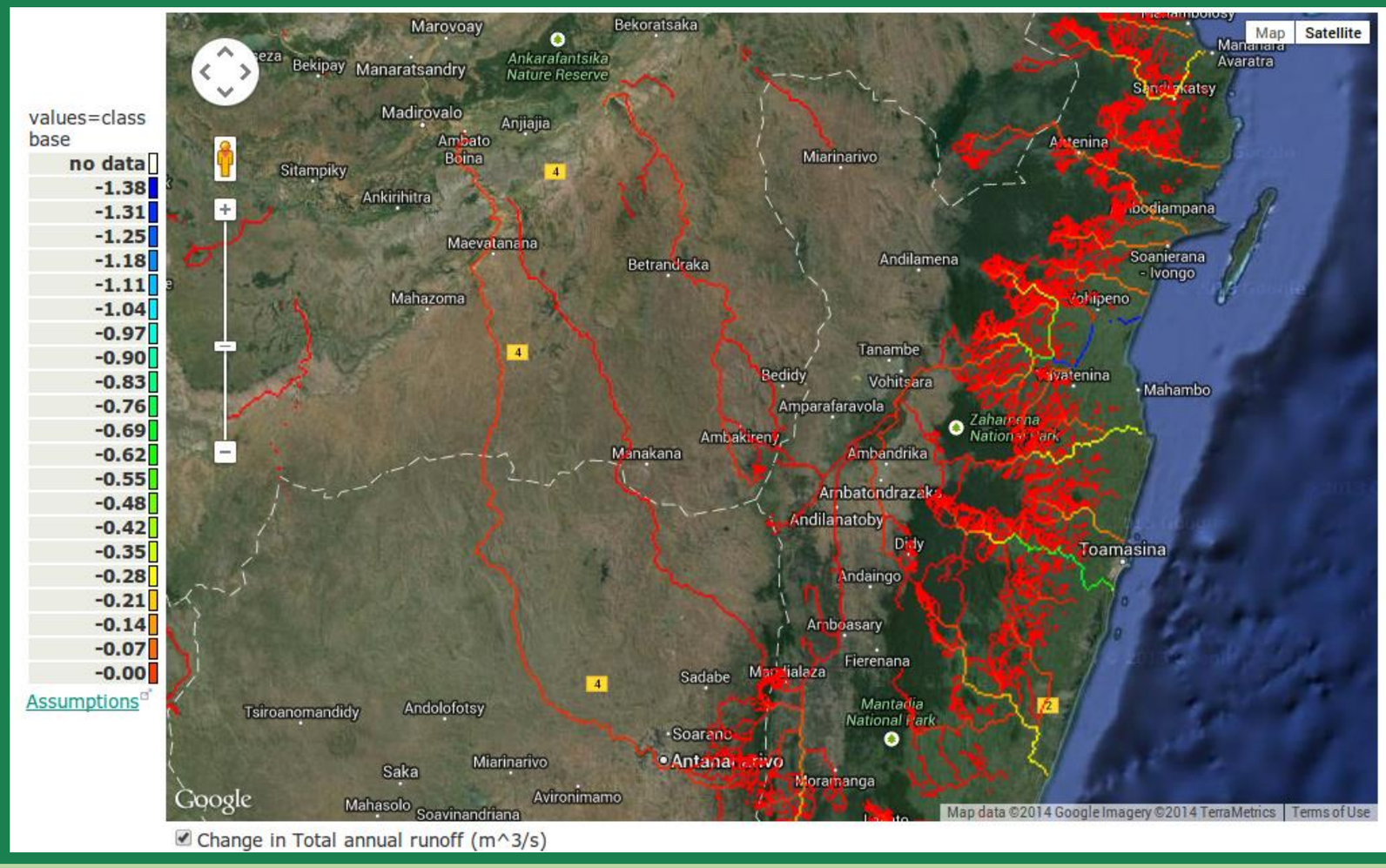
Zwartendijk et al (in press), Ghimire et al (2016)

Overland flow is greater on degraded land



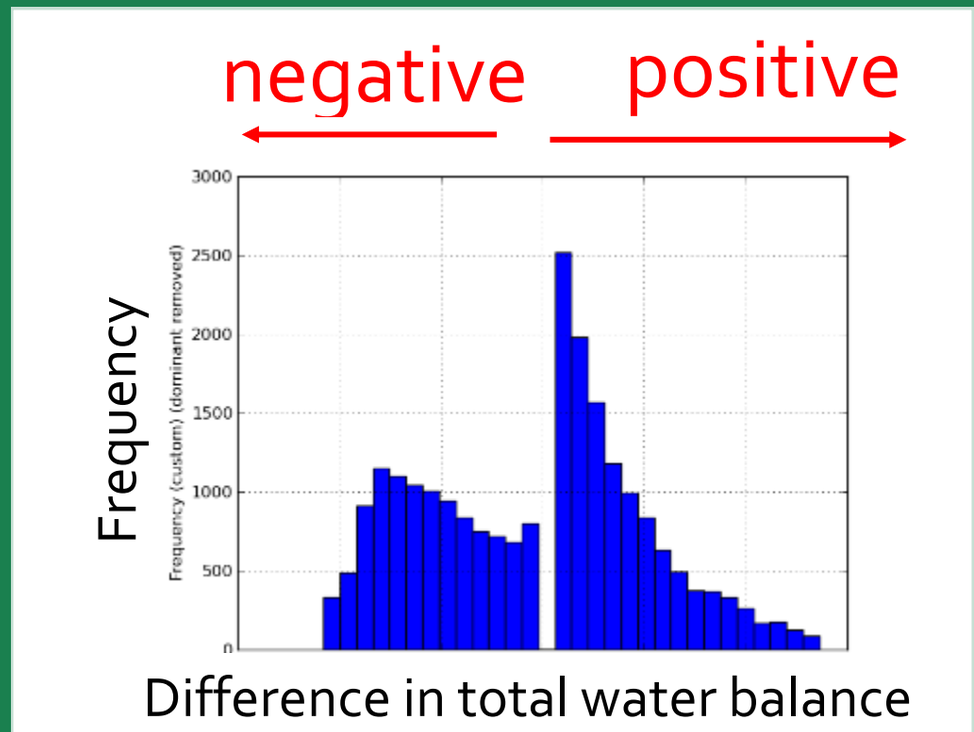
Zwartendijk et al (in press), Ghimire et al (2016)

We used this data (and other datasets) to develop and improve the global ecosystem service policy support tools waterworld and co$ting nature. We used these models to scale up the empirical findings to the landscape scale.



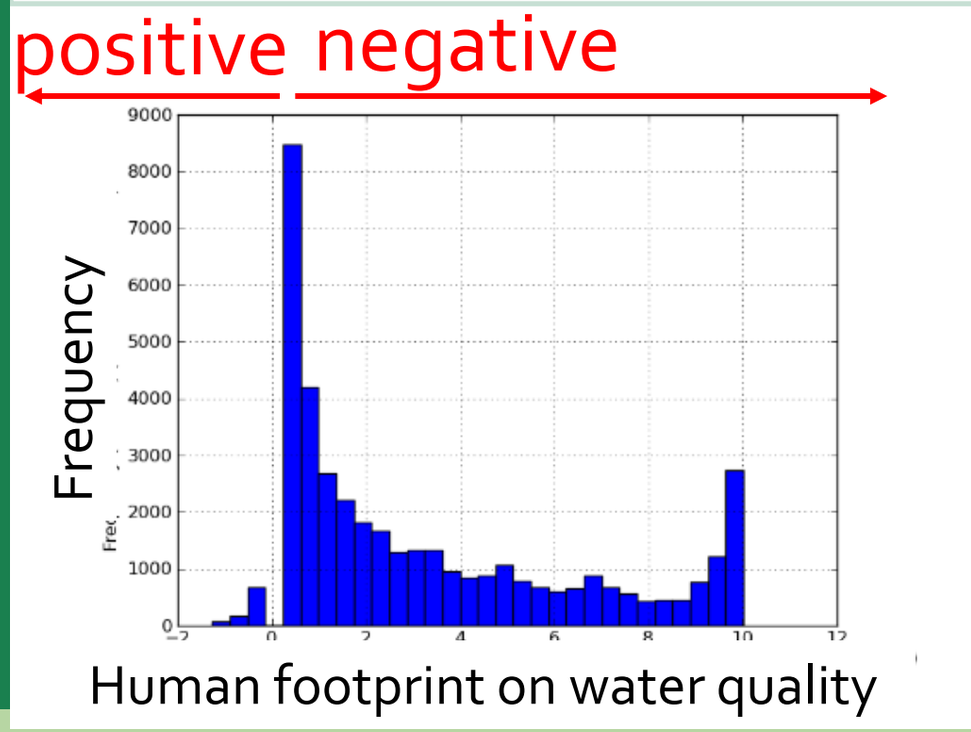
How would effective conservation influence hydrological impacts relative to business as usual?

People affected by change in water quantity: More=1821, less=1270, No change=1.26M



Difference in total water balance

People affected by change in water quality: More=2500, Less=19,300, No change=1.24M,



Human footprint on water quality

Source: Mulligan (in prep)

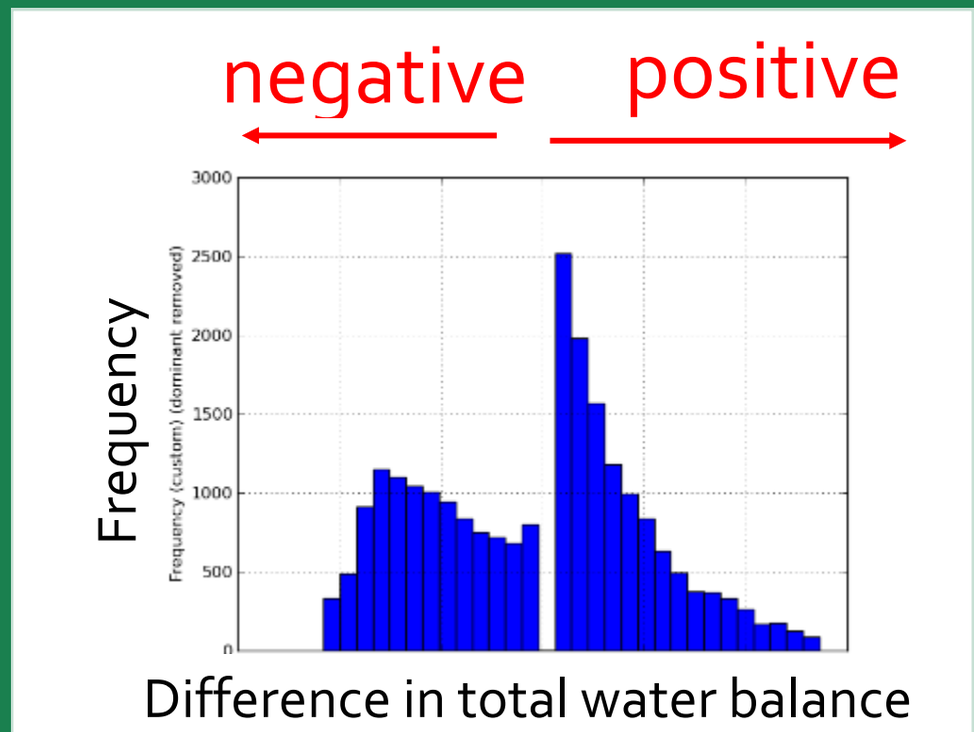
How would effective conservation influence hydrological impacts relative to business as usual?

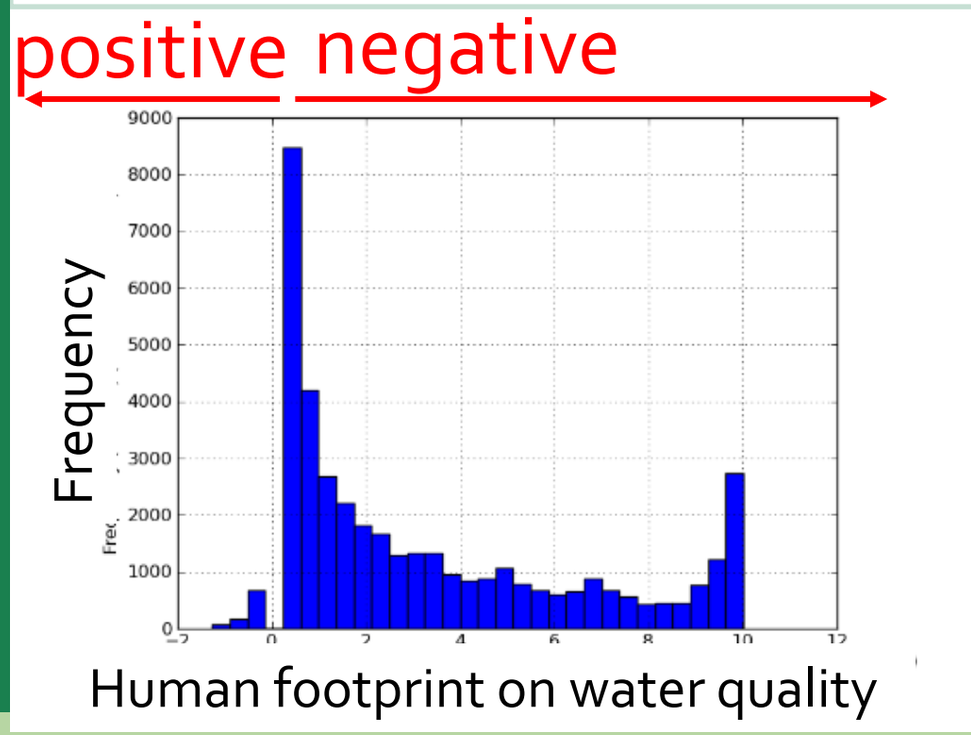
People affe… water
q… 2/0, No
c…

limited influence on water quantity available to people

Effective conservation results in 12000 fewer people with poor water quality

…vater
…000, No





Source: Mulligan (in prep)




5) What are the biodiversity impacts of forest loss?



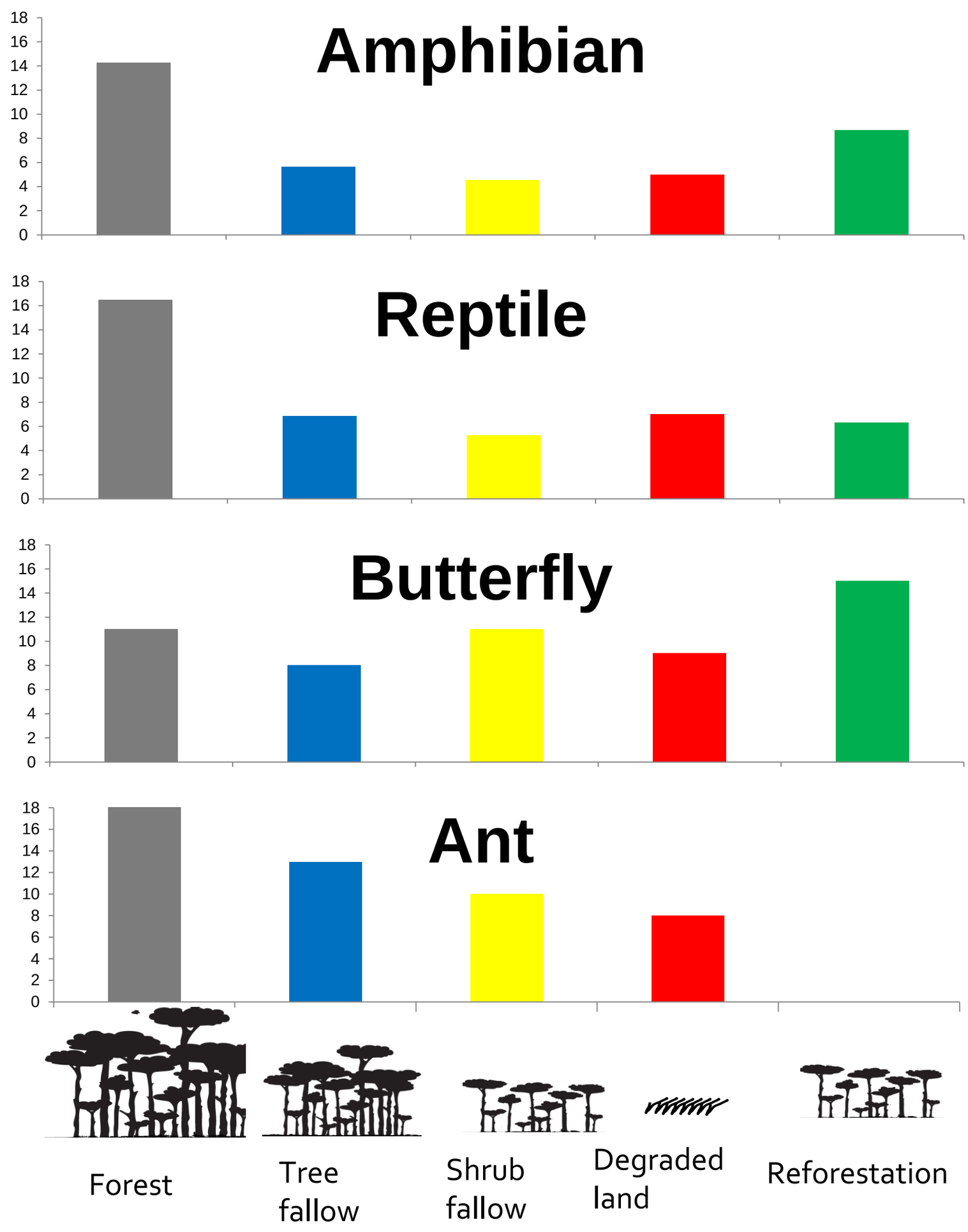


We quantified the effects of changing land use on biodiversity-identification of amphibians particularly challenging

Species richness for all groups was highest in forest

This effect was most marked for reptiles and amphibians (where many species are forest specialists)

Other land uses also retain significant species richness






6) What are the importance of different land uses for the supply of wild harvested products?

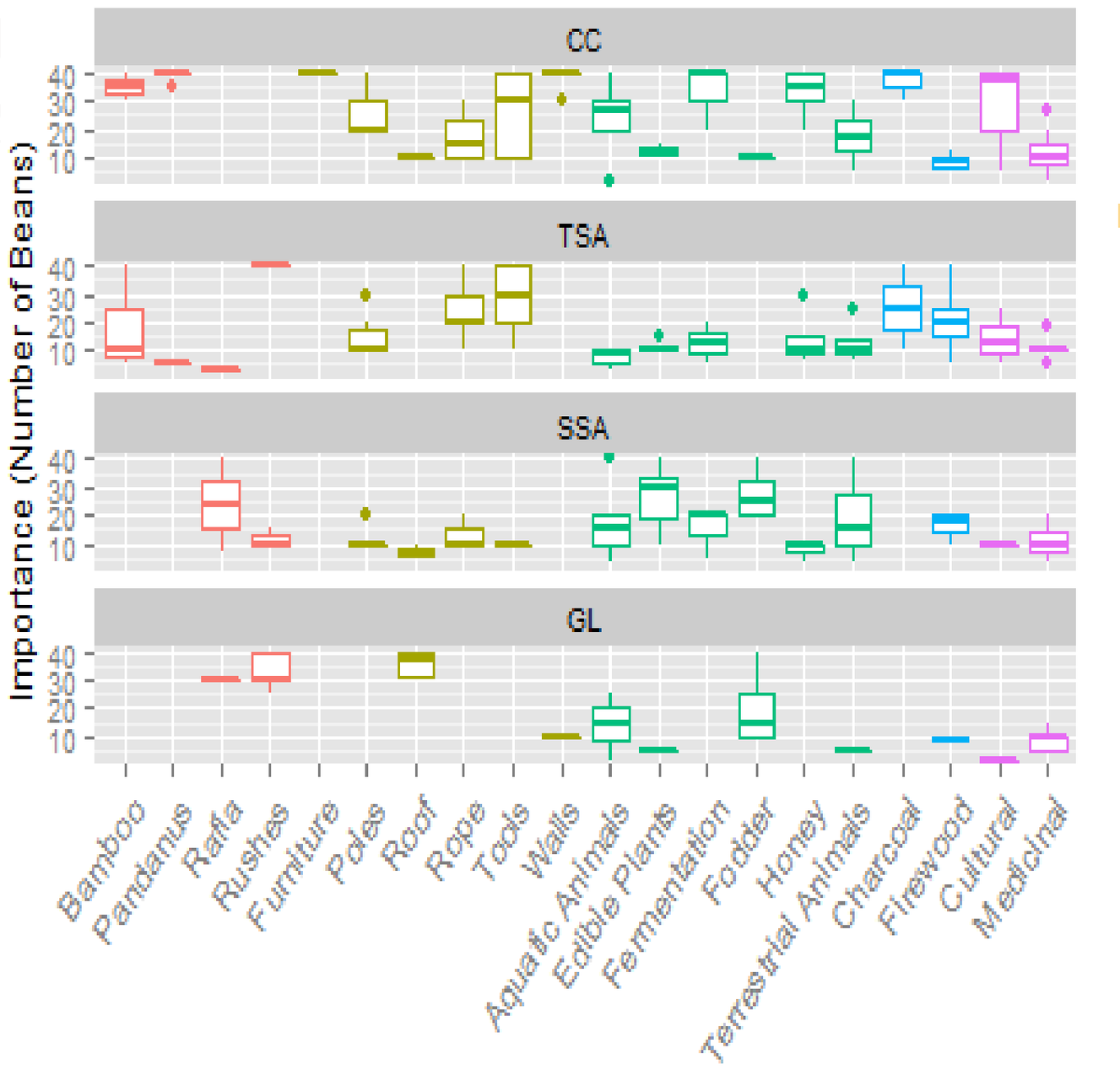




We quantified importance of the different land uses in the tavy cycle for the supply of wild-harvested products important for local livelihoods

Source: Howard et al (in prep)

- Though the majority of products come from closed canopy forest, shrub & other land uses in the fallow cycle provide important products



Source: Razafimanahaka et al (in prep), Howard et al (in prep)




7) What are the local costs of conservation and have they been compensated?



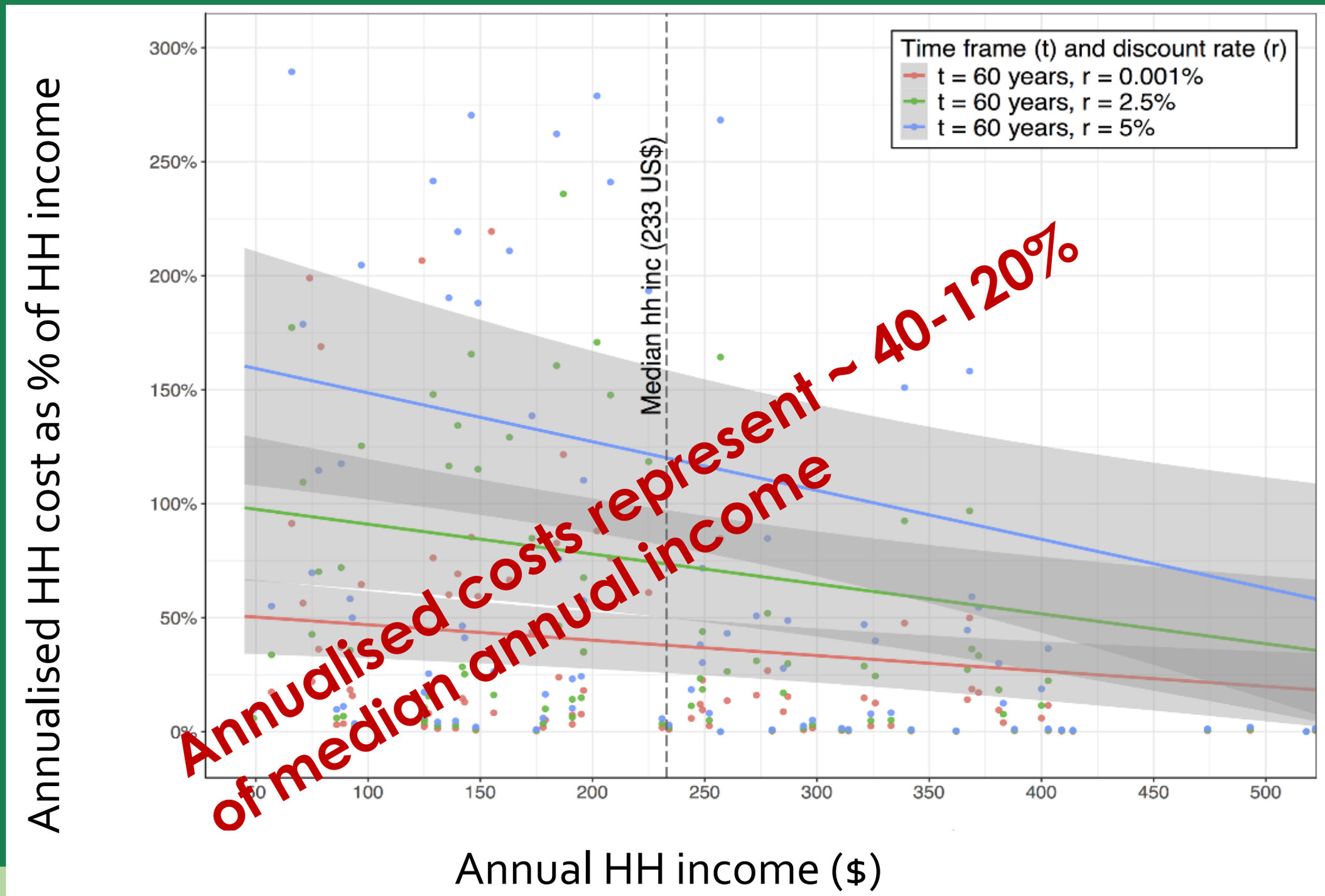


Conservation restrictions can have local costs

- Expanding agricultural land can provide sustained benefits to households over multiple generations
- Preventing agricultural expansion into forests therefore has costs
- There are increasing commitments to 'do no harm' in conservation and, where possible, ensure conservation delivers livelihood benefits

"where people are displaced, physically or economically, they must be compensated for any losses" (World Bank Performance Standard 5)

Median total cost per household ~ US $2500
Annual costs are very significant in terms of local incomes (higher for poorer households)



Poudyal et al (in prep)

Note: Our annual estimates of costs are very similar to the official pgess estimate of annual opportunity cost per household

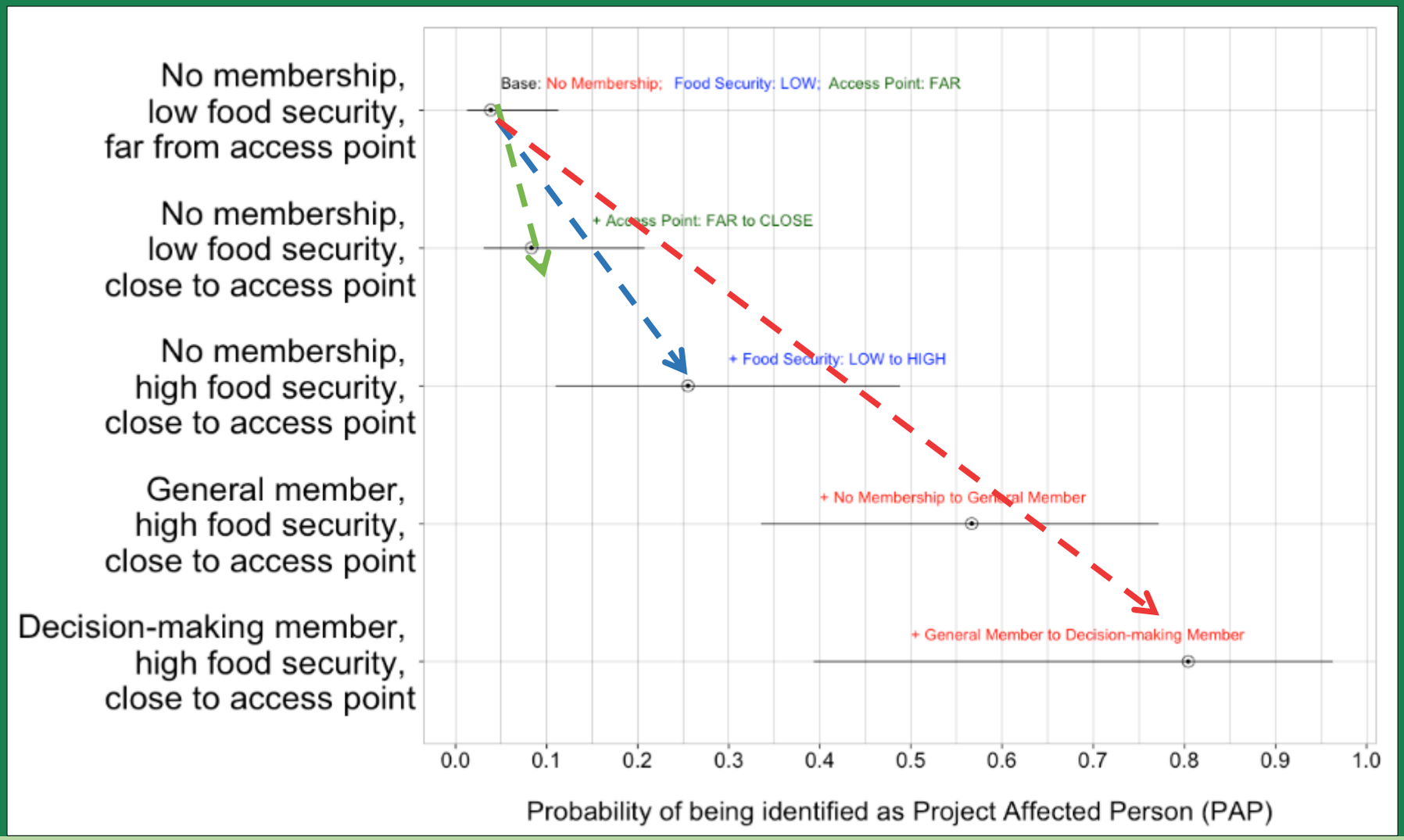
Estimate of annual cost	Source
$120	Plan de gestion environmental et de sauveguard sociale
$198 ($83 median)	Our estimate (annualised with 60 year time horizon and 5% discount rate)

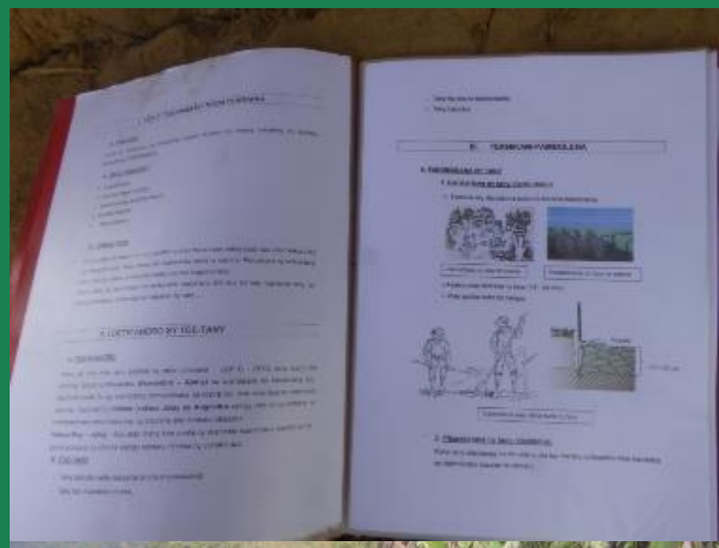
Compensation has tended to reach those who are more accessible and better connected

More accessible households are nearly 2x more likely to be compensated

More food secure households are 5X more likely to be compensated

Committee members 16x more likely to be compensated





Poudyal et al (2016)

Possible reasons why those most affected by conservation restrictions may not have been reached by compensation

Isolation and logistics

Farmer's unwillingness to self-identify as PAPs

Poor maps of location of communities (eg this village with an EPP, inside CAZ is not on any map)

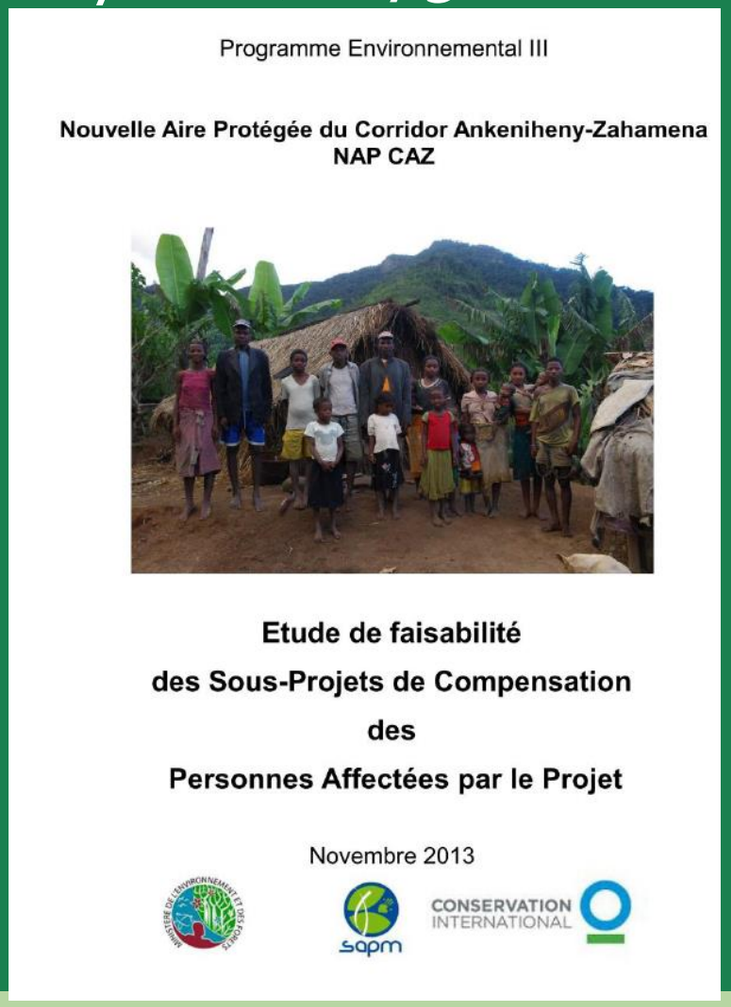
Poudyal et al (2016)

How does the size of the compensation compare with the opportunity cost?

Maximum spent per household: $173

Our estimate of value (after 2 years): $79

This is not surprising as compensation was equivalent value to estimated **annual** cost BUT is a one-off payment


Programme Environnemental III

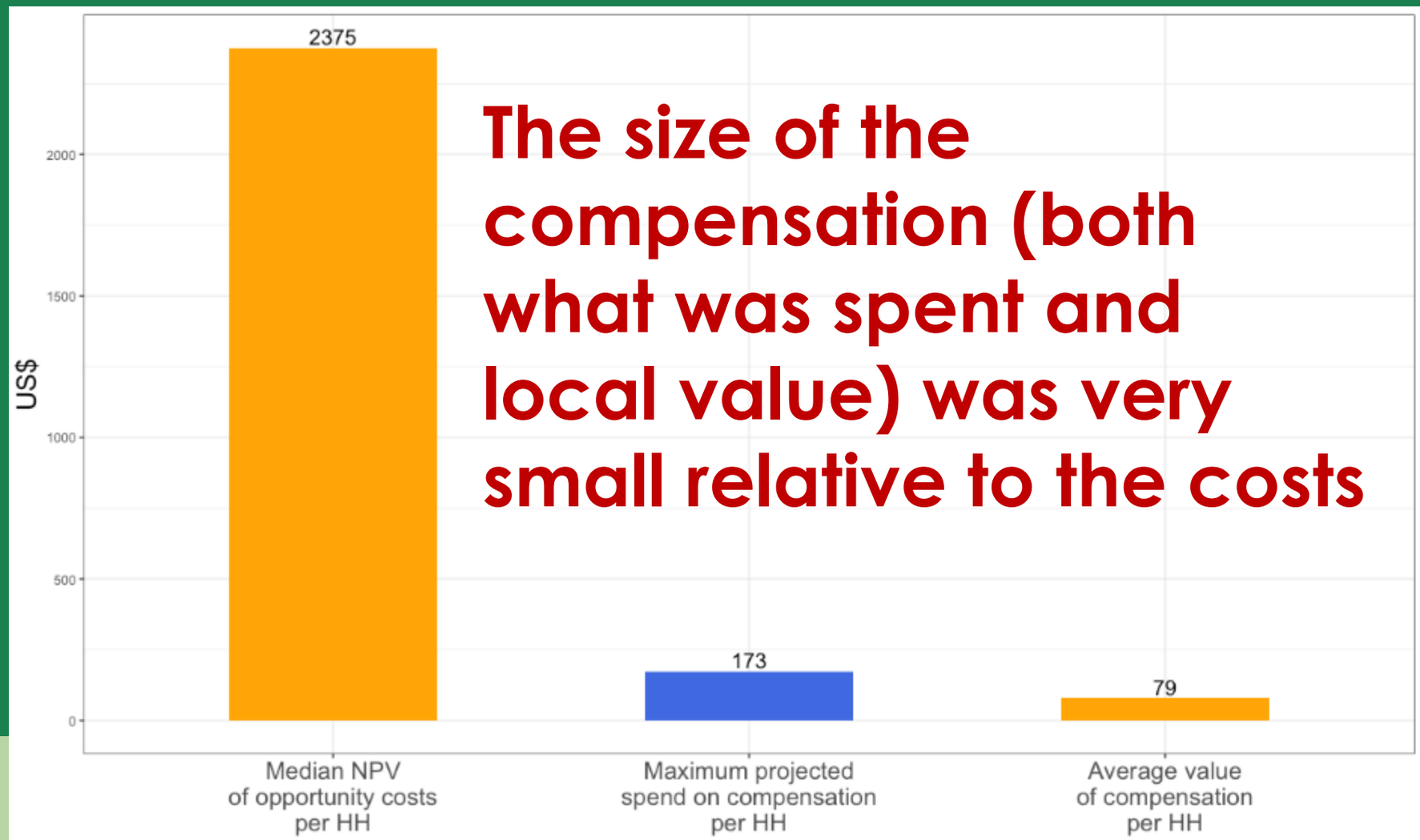
Nouvelle Aire Protégée du Corridor Ankeniheny-Zahamena
NAP CAZ

Etude de faisabilité
des Sous-Projets de Compensation
des
Personnes Affectées par le Projet

Novembre 2013

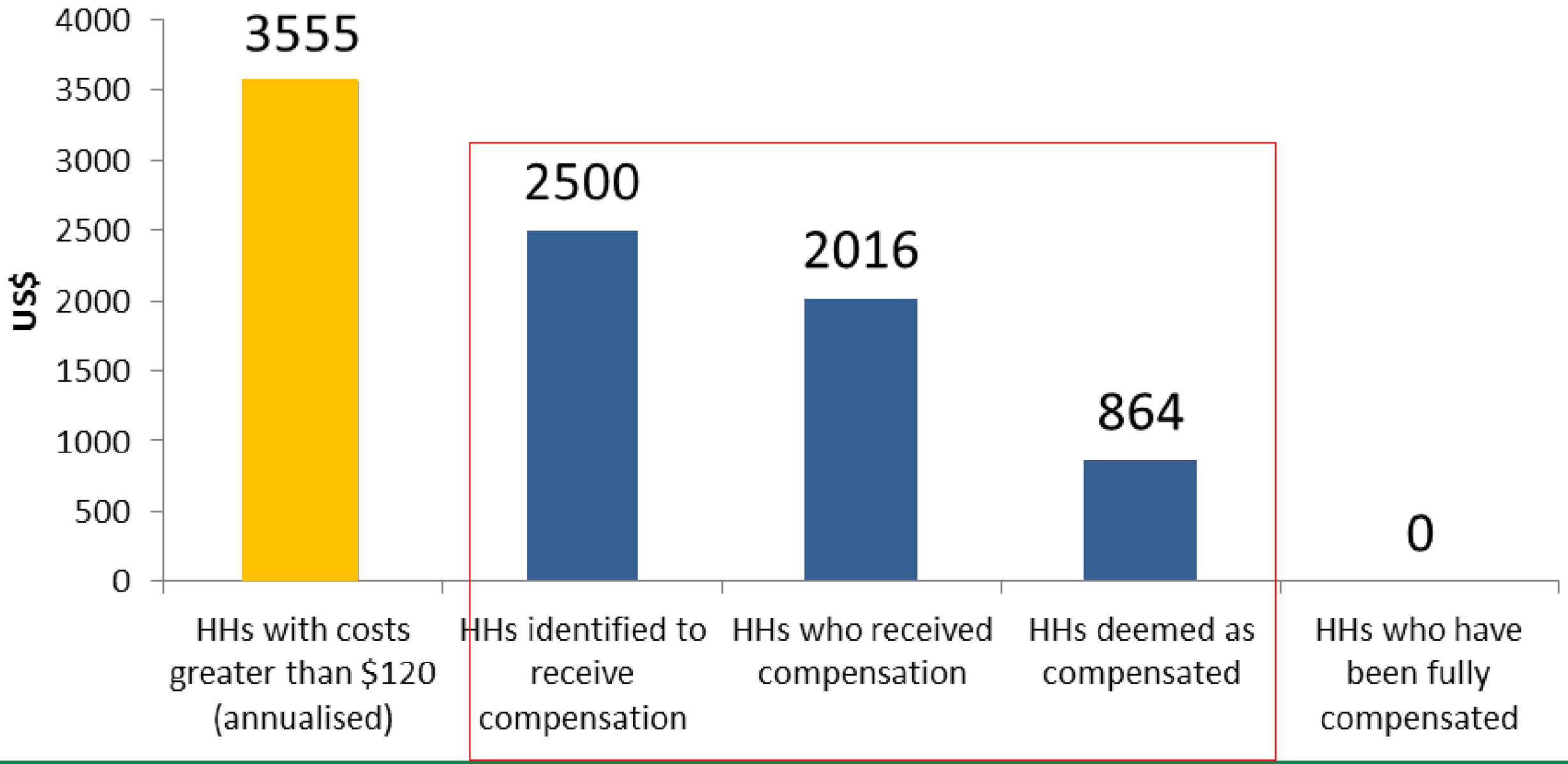
CONSERVATION INTERNATIONAL

sapm



The size of the compensation (both what was spent and local value) was very small relative to the costs

How does the overall number of people compensated in the CAZ compare with the numbers bearing costs?



Poudyal et al (in prep)

Important points

- The costs are born over many years-there is still time for compensation to be achieved (if more investment)
- There are other development projects linked to conservation (discussed in next presentation) which may help compensate

Main lessons for design of REDD+ safeguards:

a) Costs of conservation restrictions are significant and long lasting: Significant investment in social safeguards is needed

b) HH level compensation is costly and will likely miss some affected households

c) Whatever approach to social safeguards is taken-special effort will be needed to ensure forest-edge communities benefit




8) What have we learnt about the use of micro-development projects to share benefits and slow deforestation?

Tabor, K., Jones, K., Hewson, J., Rasolohery, A., Rambeloson, A., Andrianjoaninarivo, T., Harvey, C.





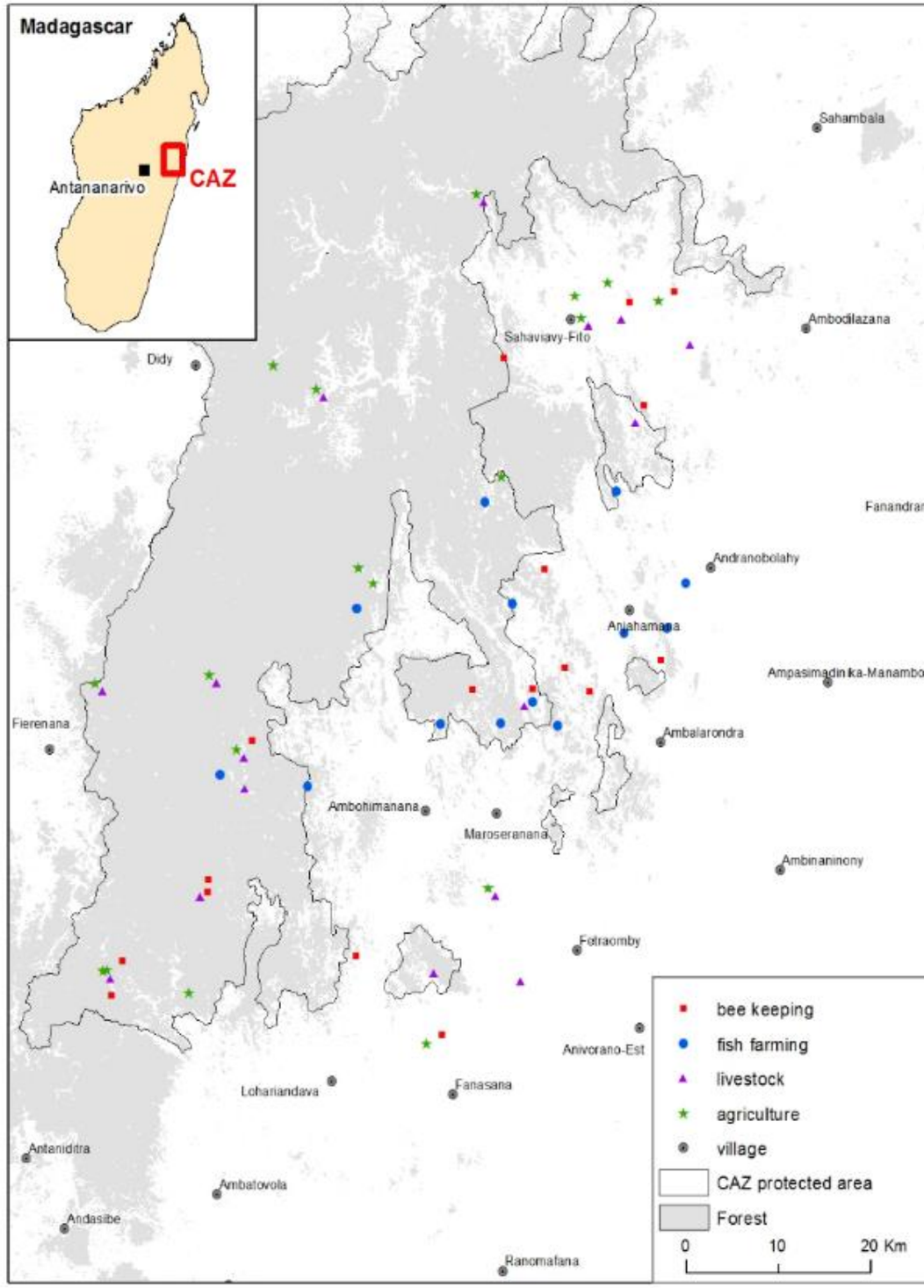
Many livelihood projects have been implemented across the CAZ

44 projects supported bee keeping.

216 projects supported staple crop production

107 projects supported livestock rearing

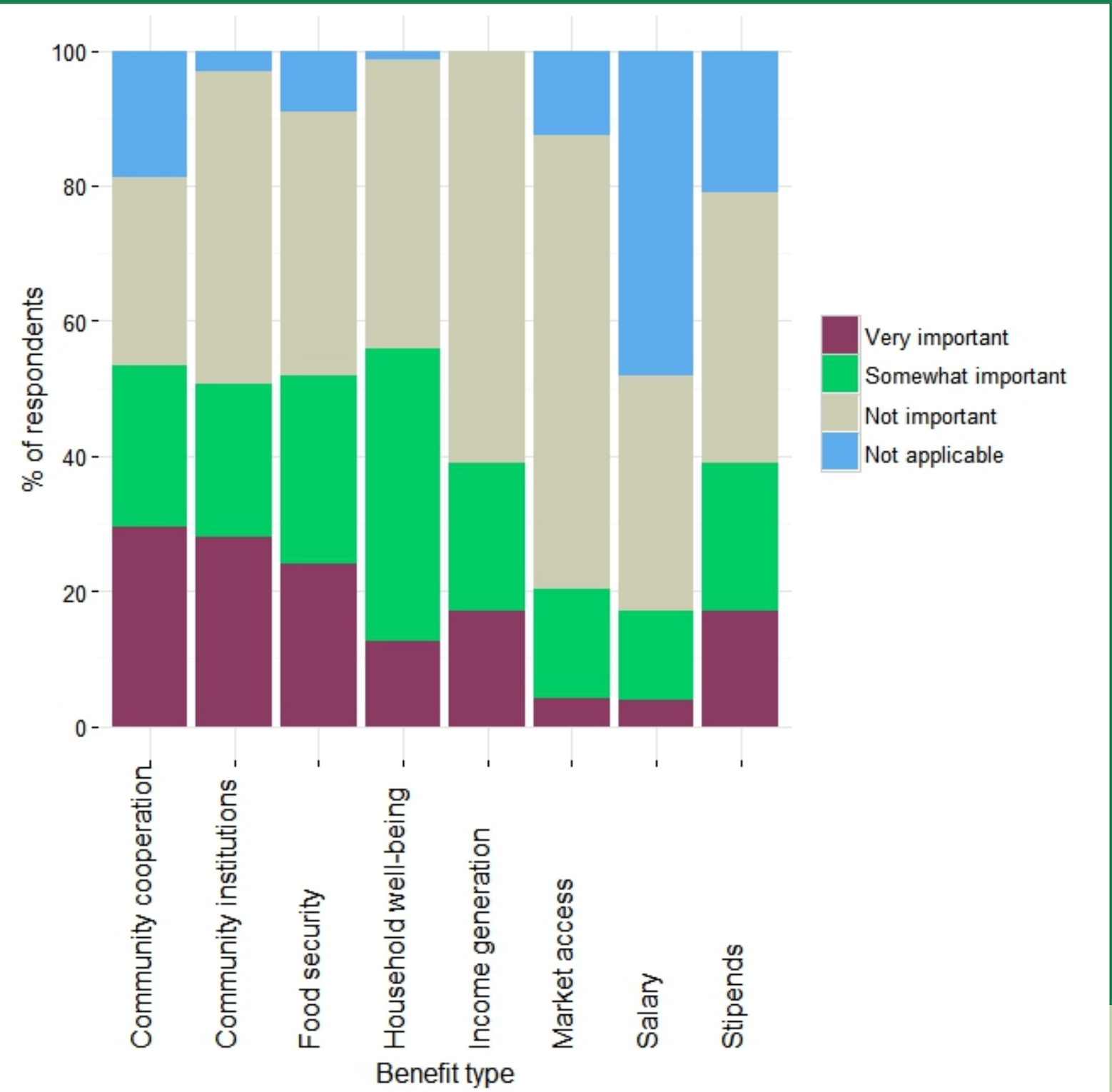
>420 projects delivered from 2008 to 2014



pAges

Harvey et al. (in prep)

We surveyed participants of 60 projects to explore the effectiveness of projects in delivering livelihood AND conservation benefits



- 58% of respondents indicated that the projects had provided them with benefits

- The most important benefits included improved household well-begin, improved community cooperation, strengthened community institution and improved food security.

The types of benefits delivered varied across project types

Agricultural and livestock projects were reported to have higher levels of benefit delivery, bee keeping the lowest

Some projects generated few benefits

Harvey et al (in prep)

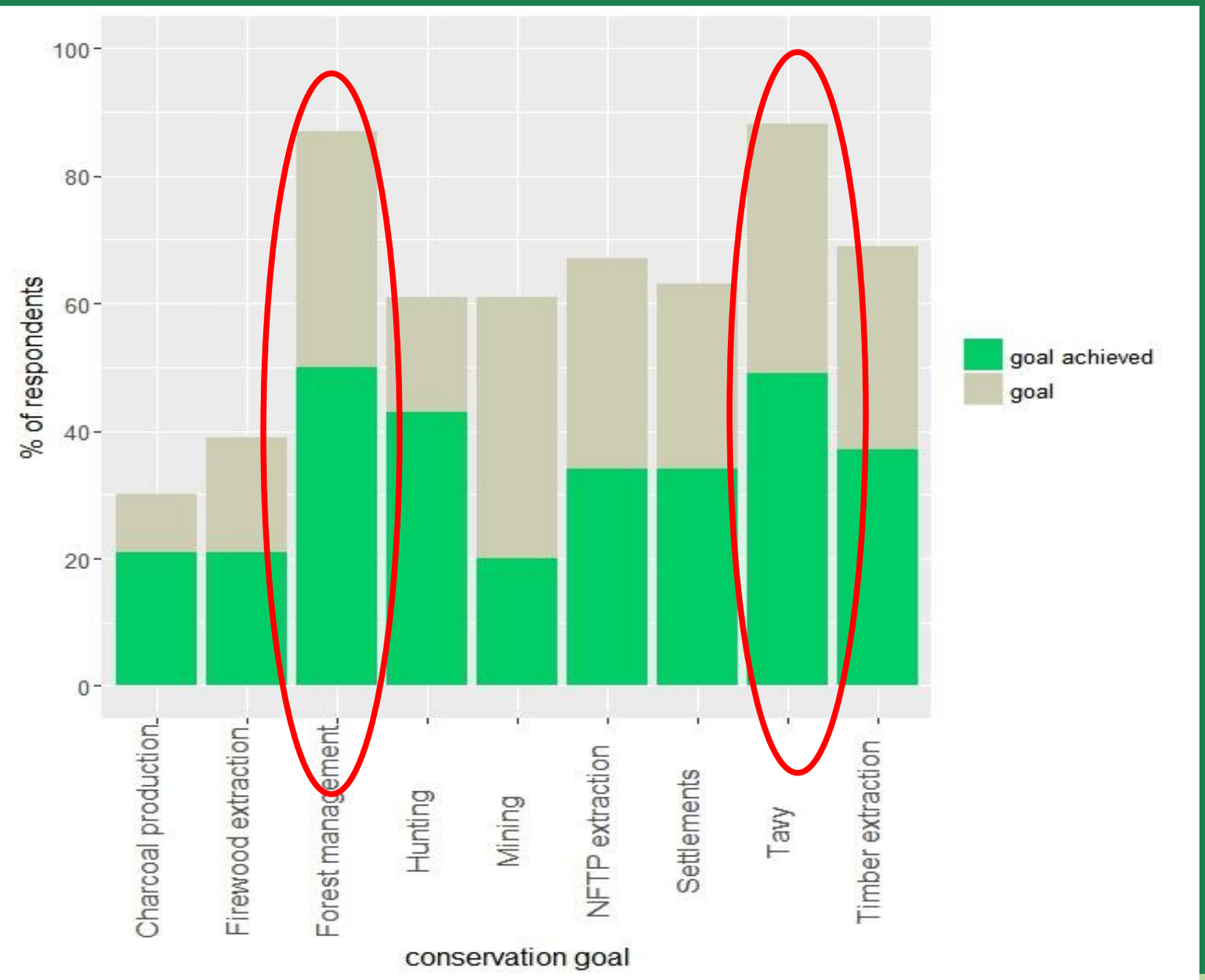
Micro-development projects are difficult to make to work in remote rural areas and with limited resources

Many of the chickens died as we did not have money to buy vaccines needed or keep them in good condition" Resident of Fierenana commune

The bee keeping project in our village failed because we lacked knowledge and technical support." Resident of Morarano Gare commune.

Rasoamanana et al (in prep)

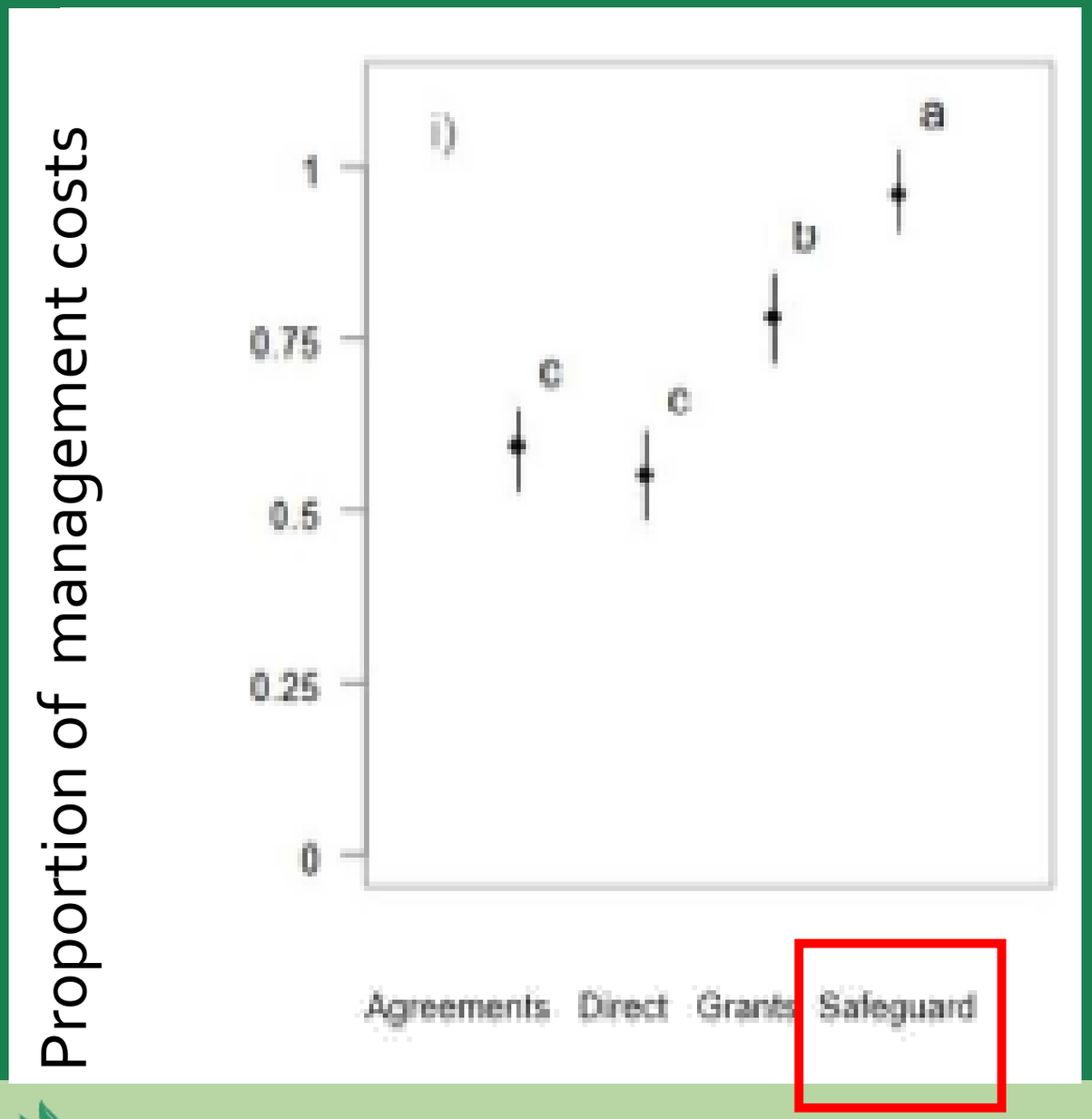
Many participants felt that the livelihood projects had made specific conservation goals and had made significant contributions to forest conservation outcomes, especially improving forest management and reducing tavy

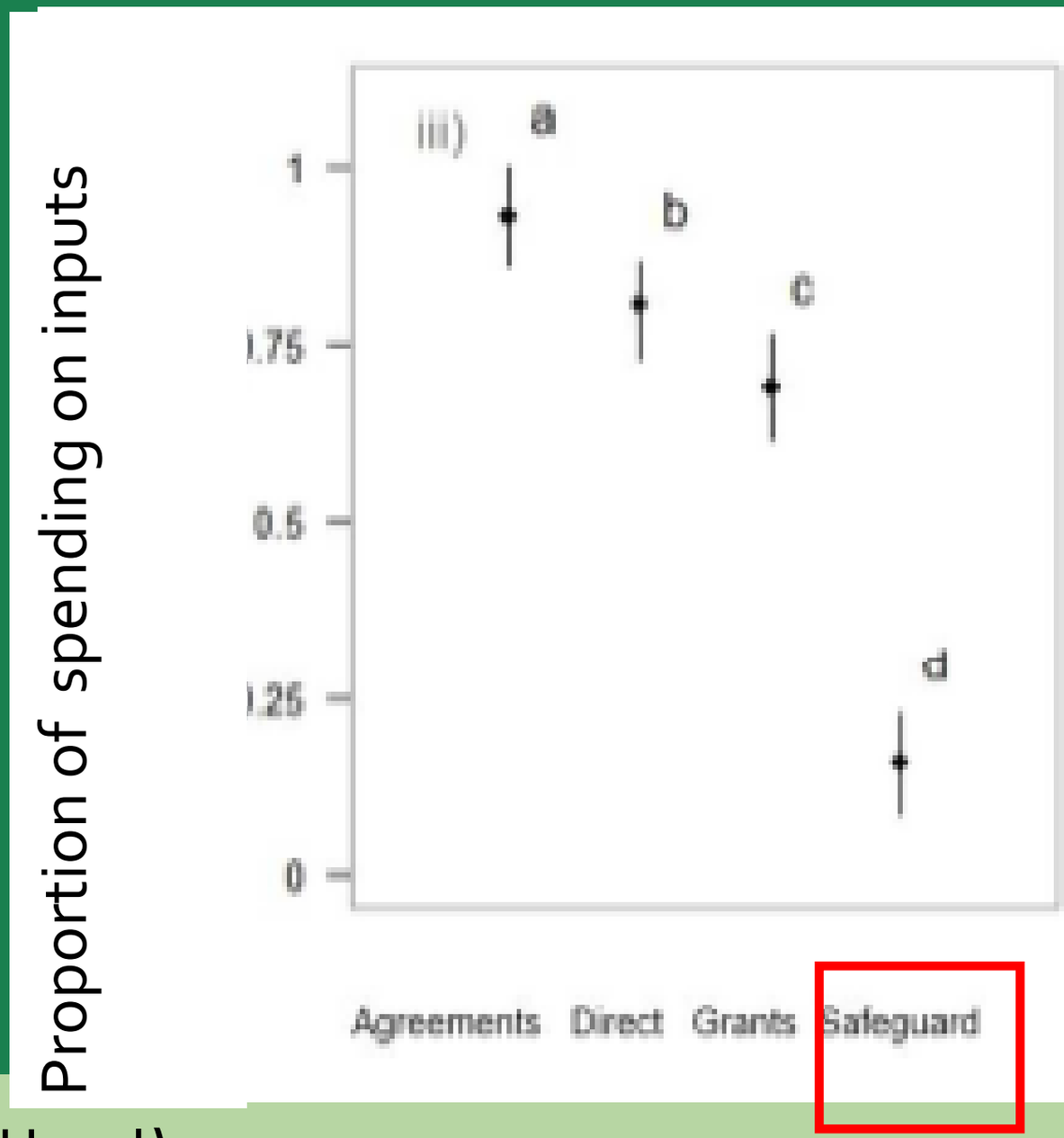


"Local people don't destroy forest if they have food and they are healthy and are able to send their children to school as well" Morarando Gare resident

Harvey et al (in prep)

Note: The transaction costs of delivering micro-development projects as parts of social safeguard process are very high (due to process of identifying 'PAPs'



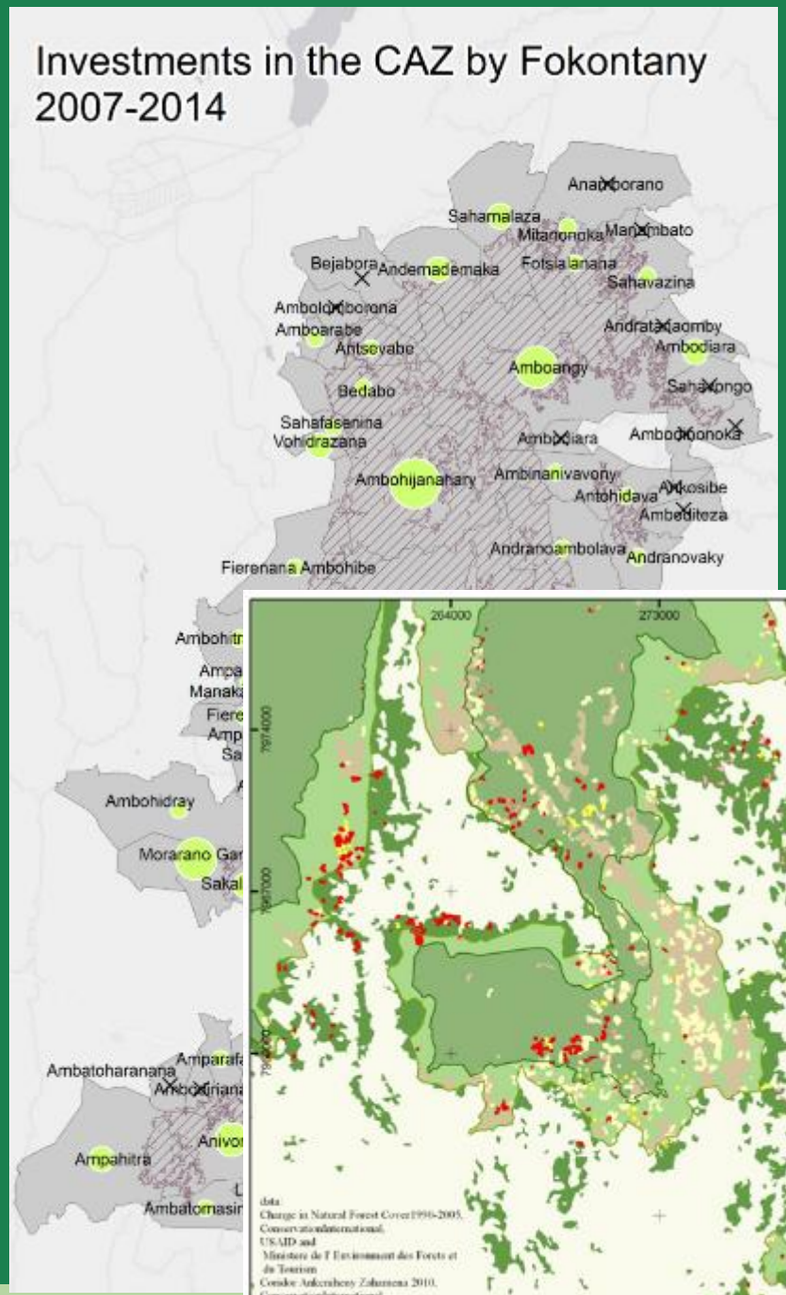


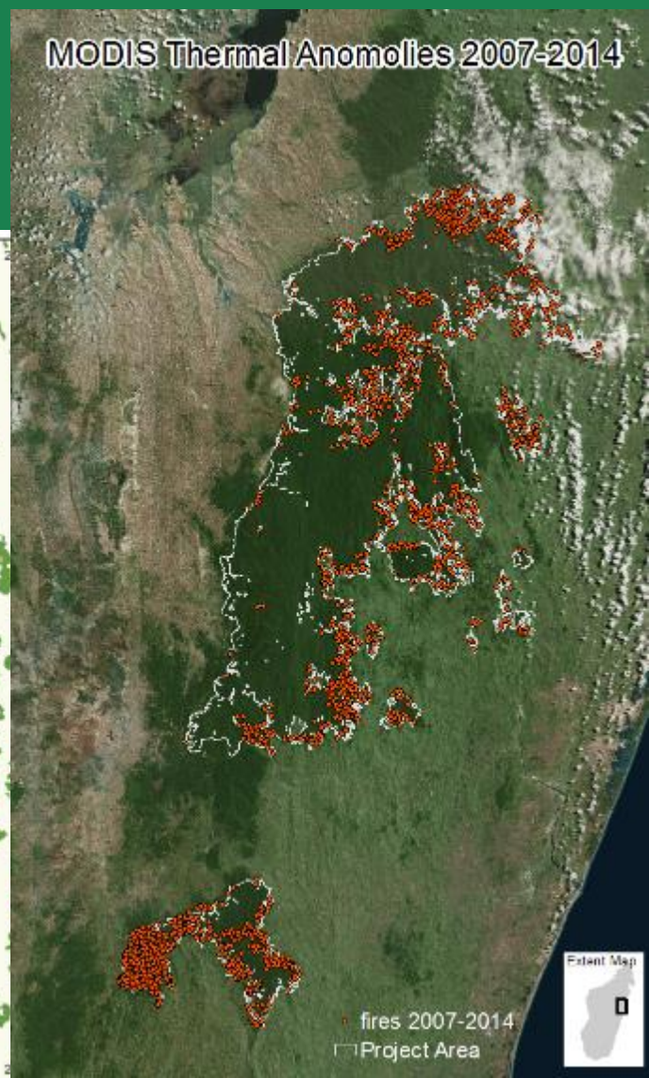
MacKinnon et al (submitted)

We evaluated the relationship between investment in micro-development and deforestation and forest fires between 2007-2014

There was a small effect on fires (not on deforestation) over the whole period

Investment did reduce deforestation in years of significant political instability





Tabor et al (submitted)

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Conclusions, recommendations and points for discussion

University of Zurich[UZH]

Queen's University Belfast

ITC UNIVERSITY OF TWENTE.

MADAGASIKARA VOAKAJY

Laboratoire des Radioisotopes Université d'Antananarivo

UNIVERSITY OF Southampton

Université d'Antananarivo École Supérieure des Sciences Agronomiques 50e Anniversaire 1963-2013

PRIFYSGOL BANGOR UNIVERSITY

KING'S College LONDON

CONSERVATION INTERNATIONAL

PRIFYSGOL ABERYSTWYTH UNIVERSITY

Overall finding 1

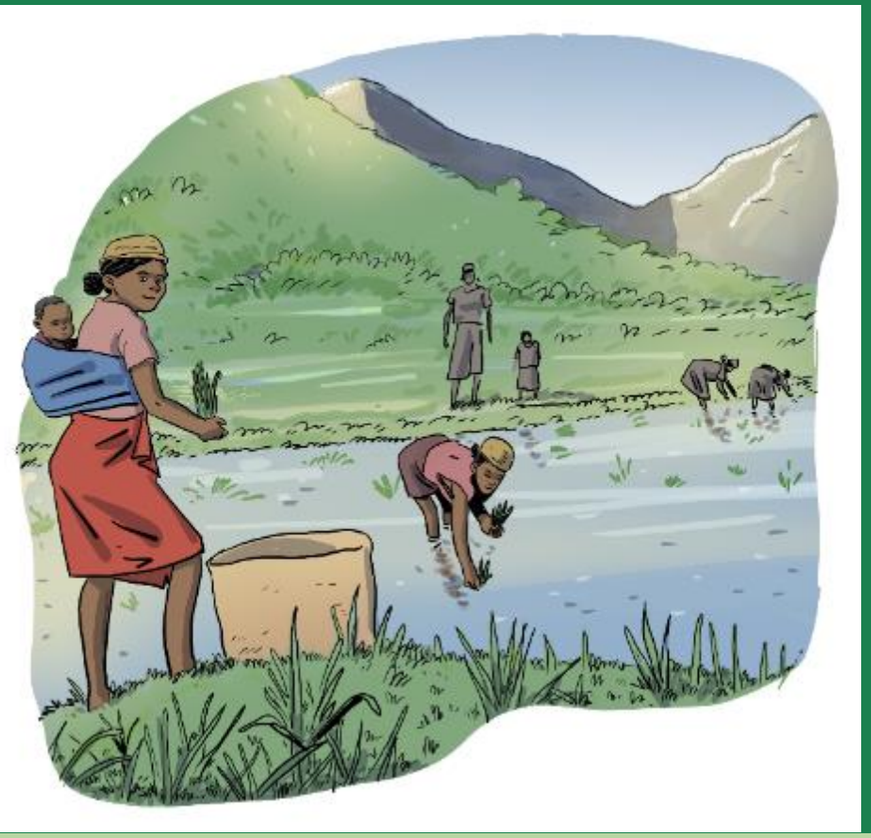
As forests are degraded through regular clearance for tavy , many of its values are reduced BUT tree fallows still provide many ecosystem services

Reforestation can restore some ecosystem services

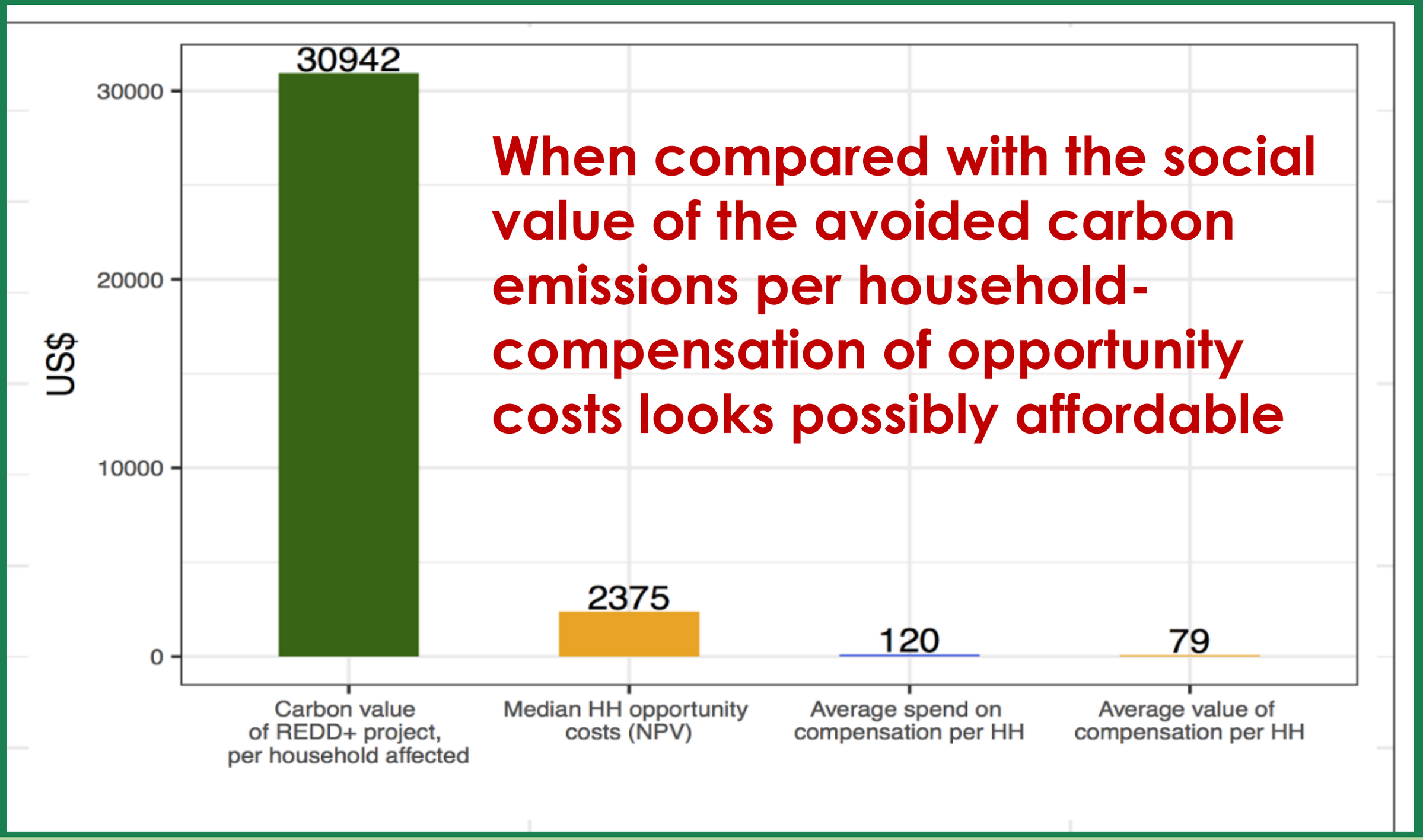
Overall finding 2

Forest conservation, while having some local benefits, also has local costs.

Livelihood projects are greatly appreciated but improvements can be made to their implementation and distribution and critically, much more investment is needed.



Substantial investment in development will be needed if opportunity costs are to be covered



Poudyal et al (in prep)

Recommendations

1) The government should continue to explore opportunities for funding forest conservation and reforestation through capturing international benefits (carbon storage and biodiversity).

2) Changes are needed to ensure the poorest people don't suffer because of forest conservation (grievance mechanism needs to be in place to ensure they have a way to raise issues).

3) Local people should be consulted to ensure livelihood projects are as effective as possible.

4) The role that forest and tree fallows play in protecting water and soil should be incorporated into national policy.

5) Tree fallows provide important ecosystem services and should be maintained in the landscape (tenure may be an issue here).

Aim: Can forest conservation (especially funded by REDD+) effectively contribute to reducing poverty in Madagascar?

Yes there is potential. More discussion is needed on how to harness benefits and compensate for costs of forest conservation.

The results presented today can help inform these critical discussions about forest conservation, sustainable development and REDD+.

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Thank you for listening
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University of Zurich[UZH]

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ITC
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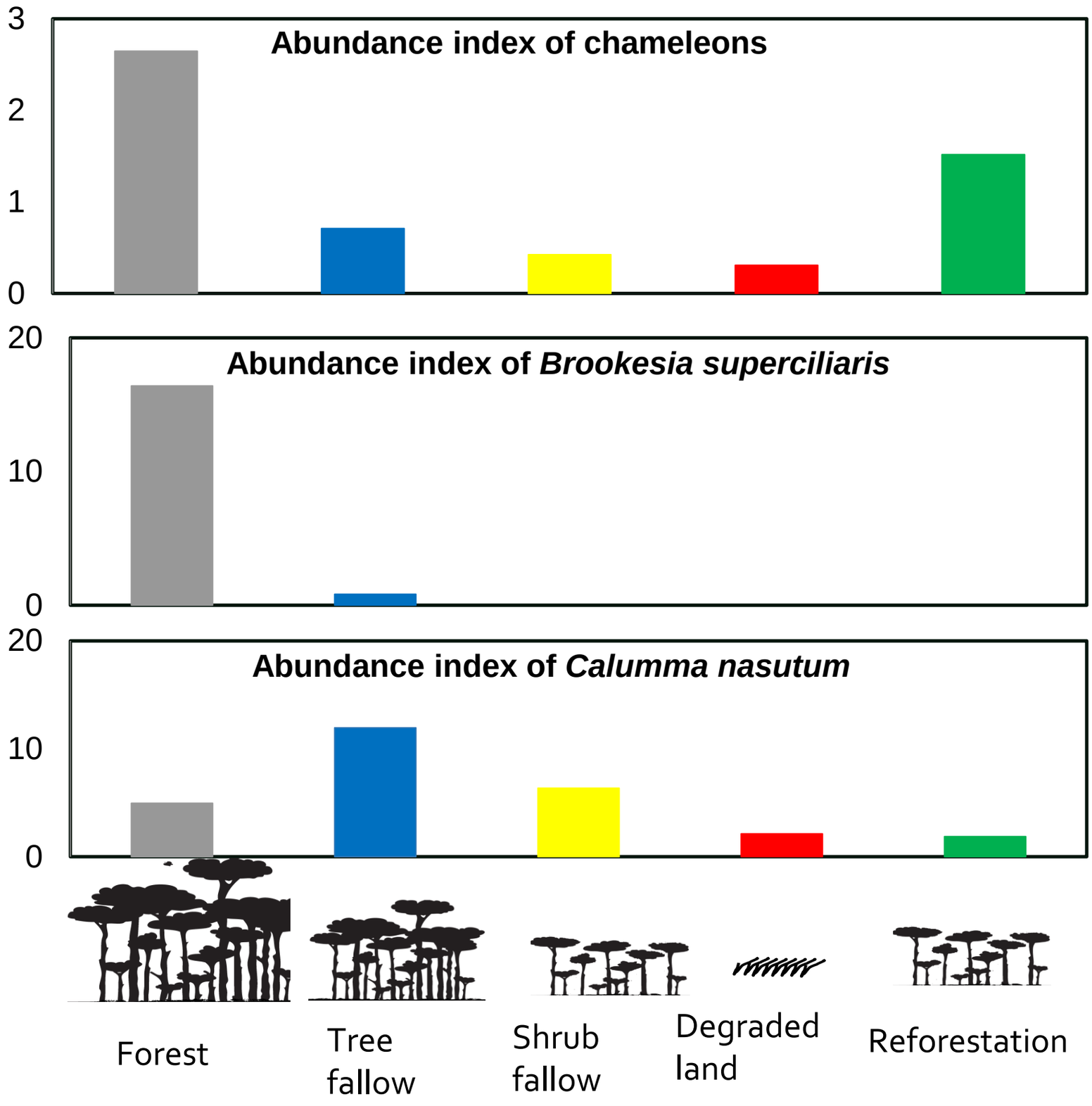
Abundance index per 1 km from each land use

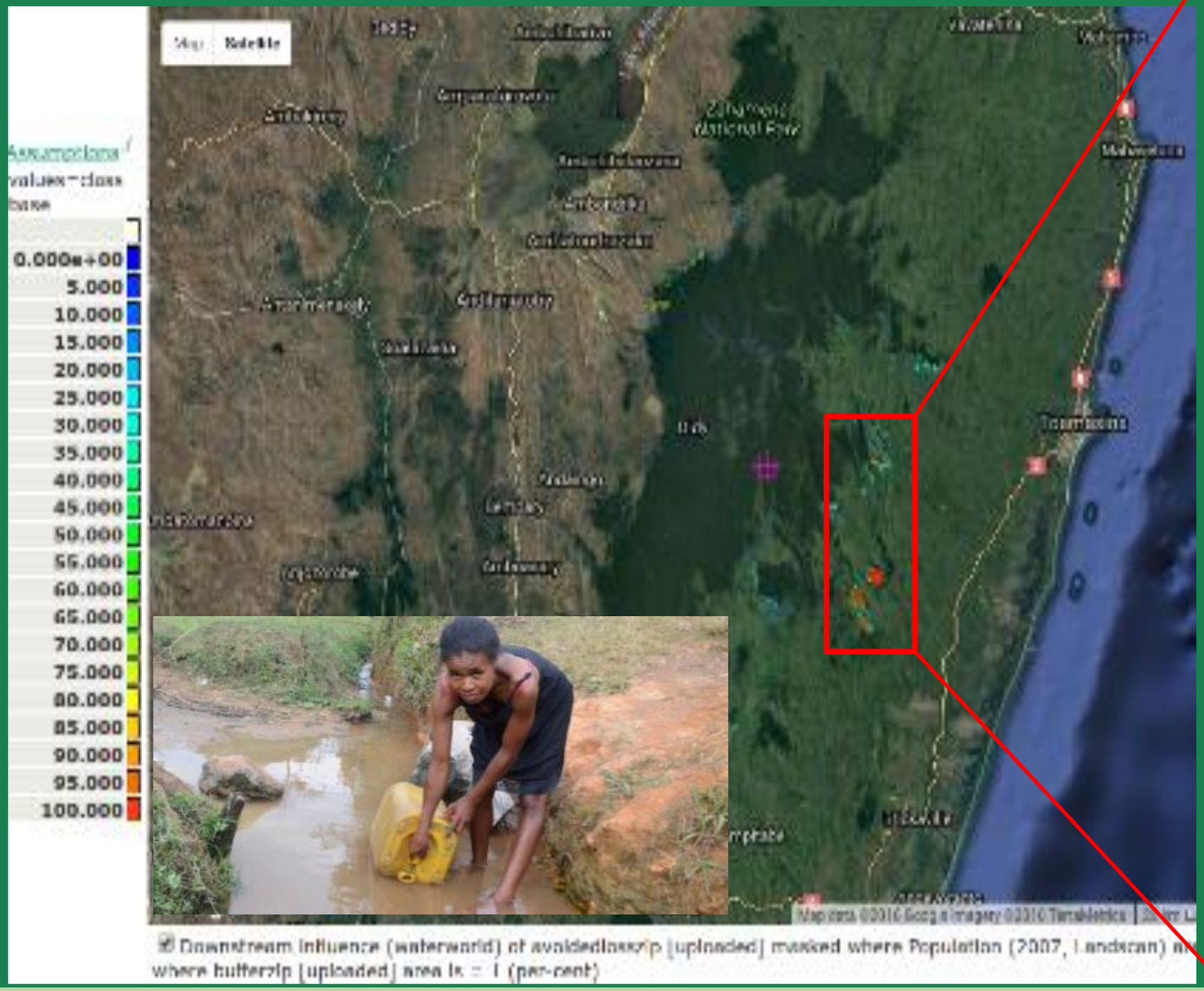
Calumma parsonii

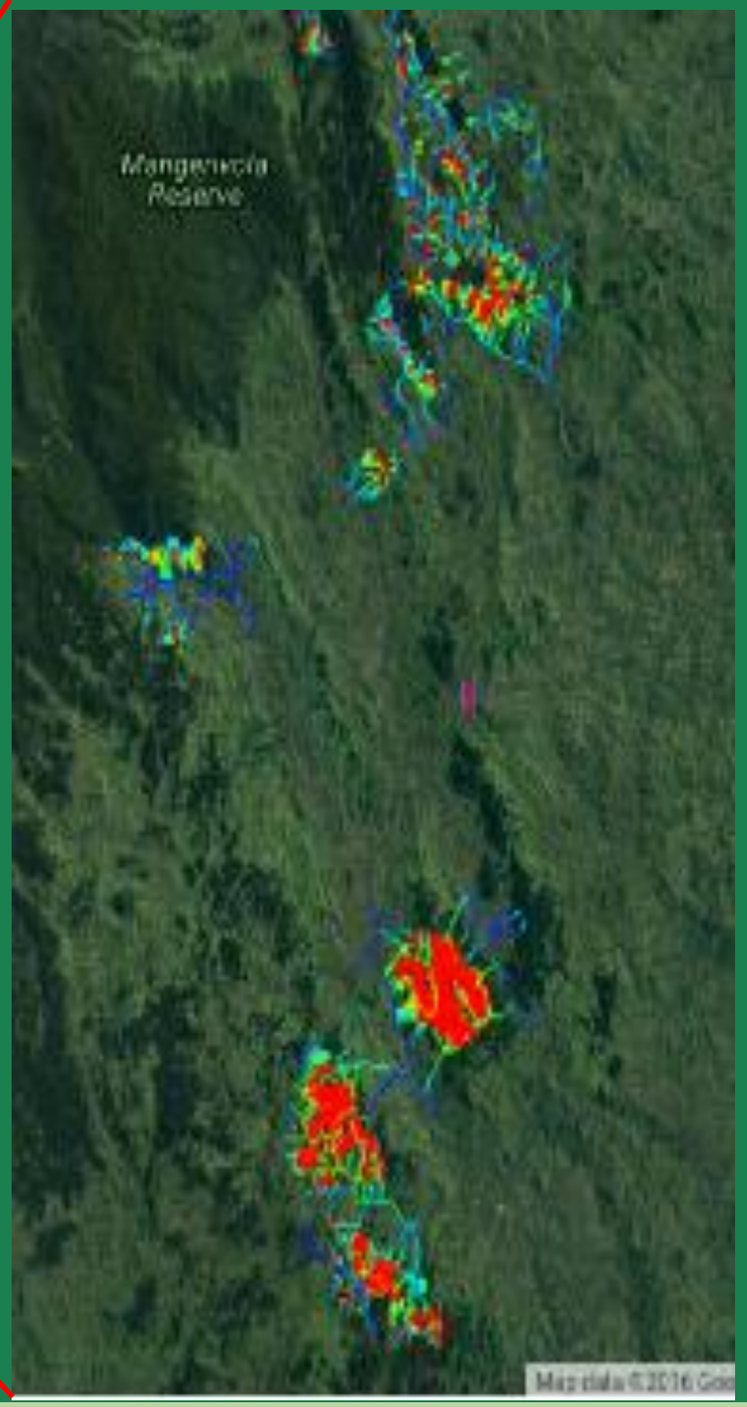
Brookesia superciliaris

Calumma nasutum



BUT few of these (<3000) are close to the forest (ie those feeling the opportunity cost of conservation)

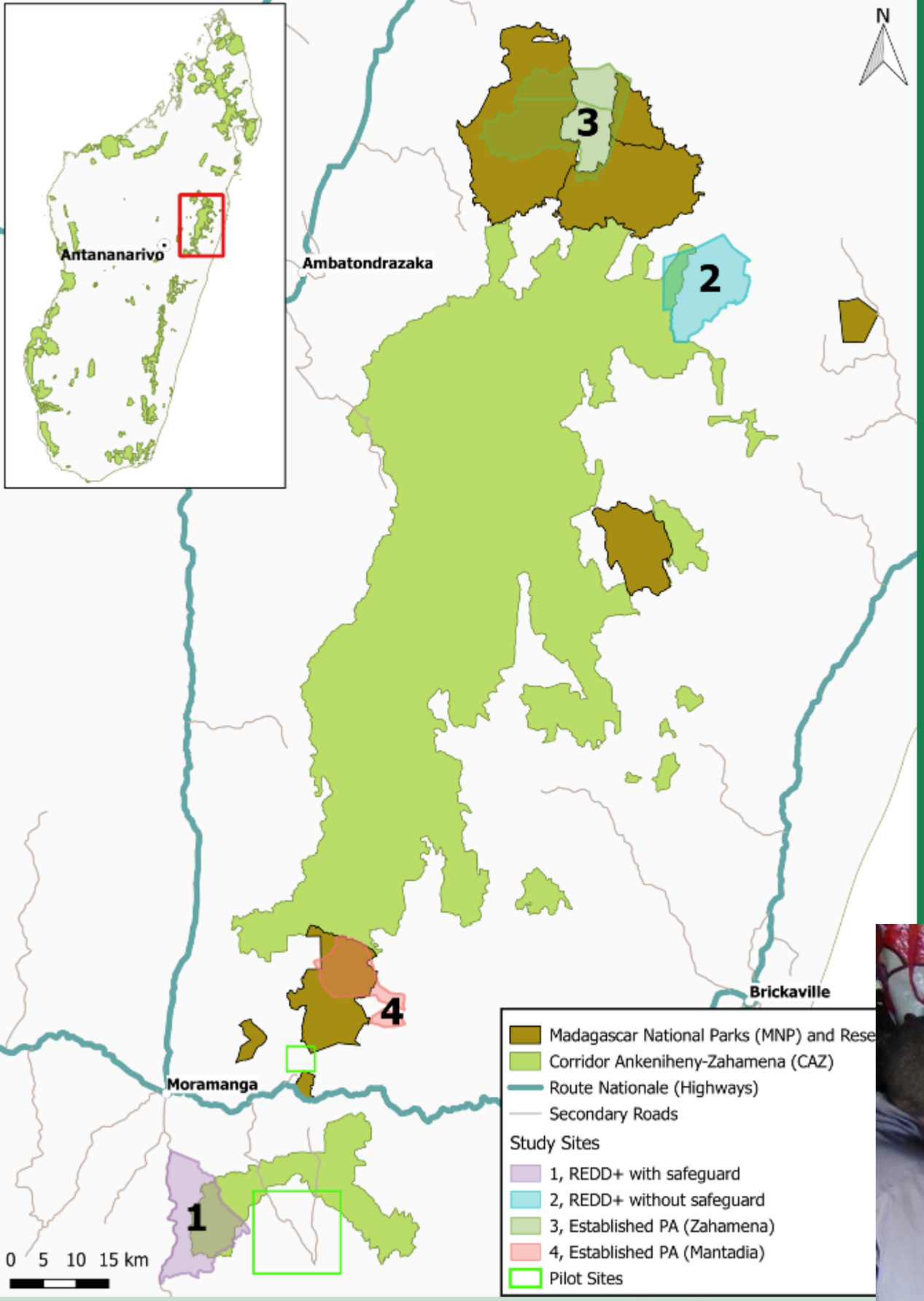




Source: Mulligan (in prep)

Tenure is a major issue as tree fallows are important for ecosystem services supply, yet current tenure system incentivises clearance as treats all land with trees as state land

Source: Ranjatson et al (in prep)

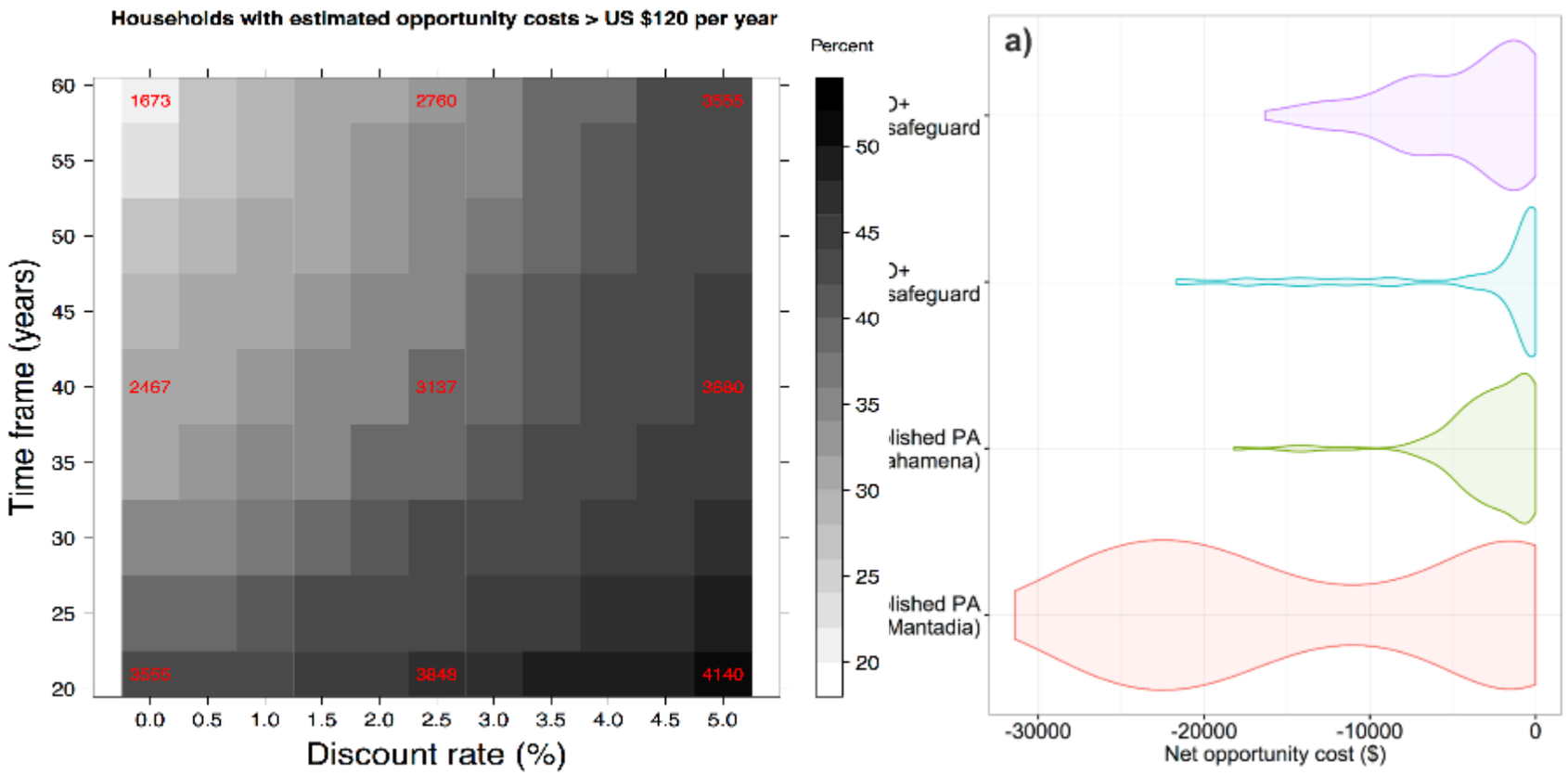


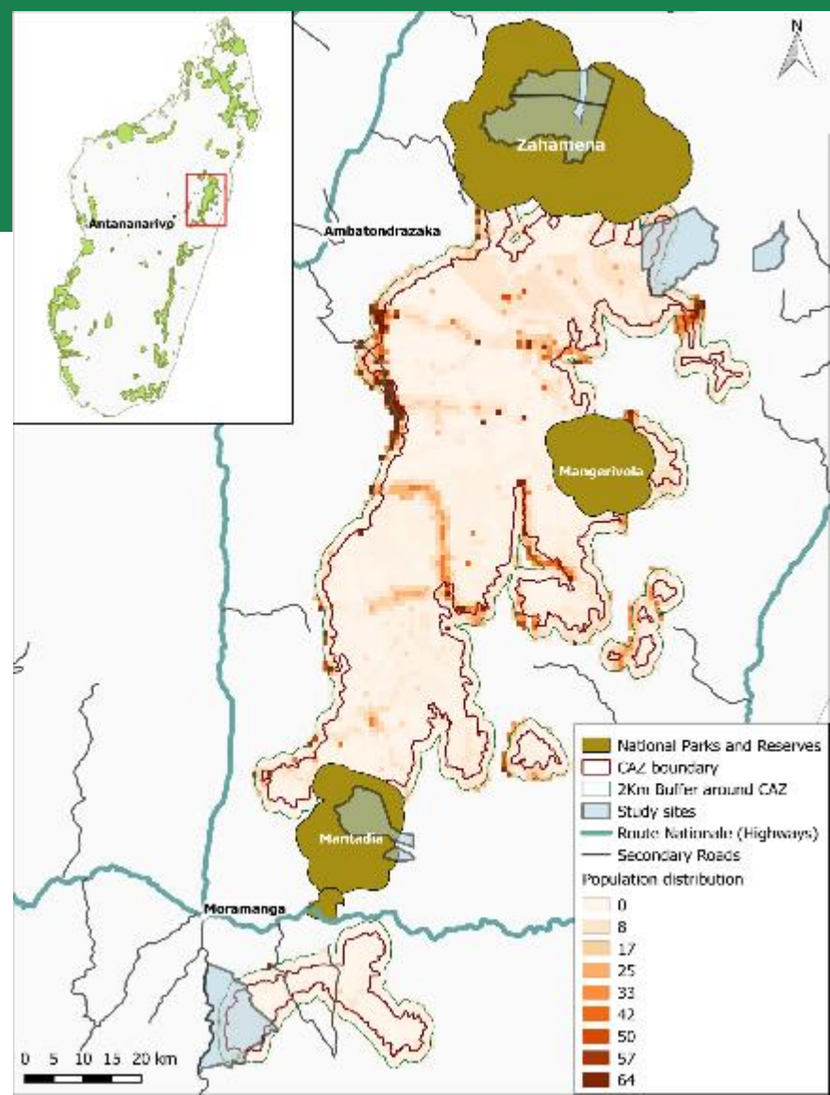
Data collection in study sites:

- >**453** household surveys
- >**453** choice experiments
- >**170** detailed agricultural and wild product use survey (Sites 1, 2, 3)
- >**63** safeguards follow-up (Site 1)

How does the overall number of people compensated compare with the numbers bearing cost?

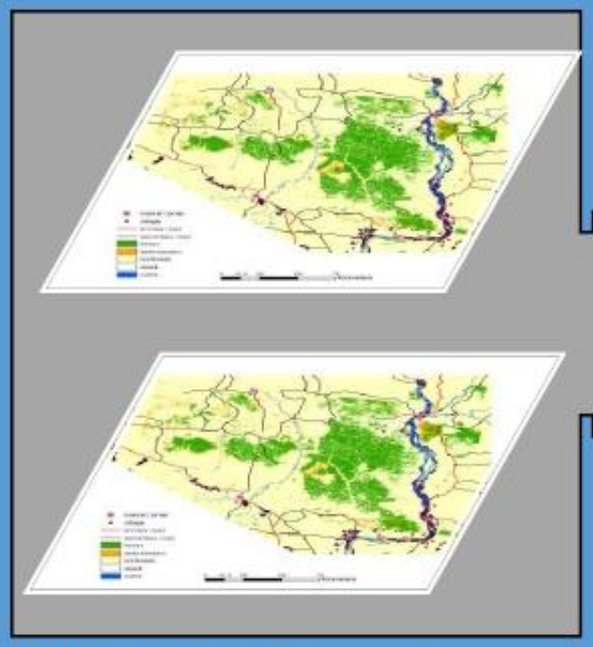
- Using a model of population, our estimates of the distribution of costs, and a range of assumptions, we estimate approximately 3500 households bear significant opportunity costs



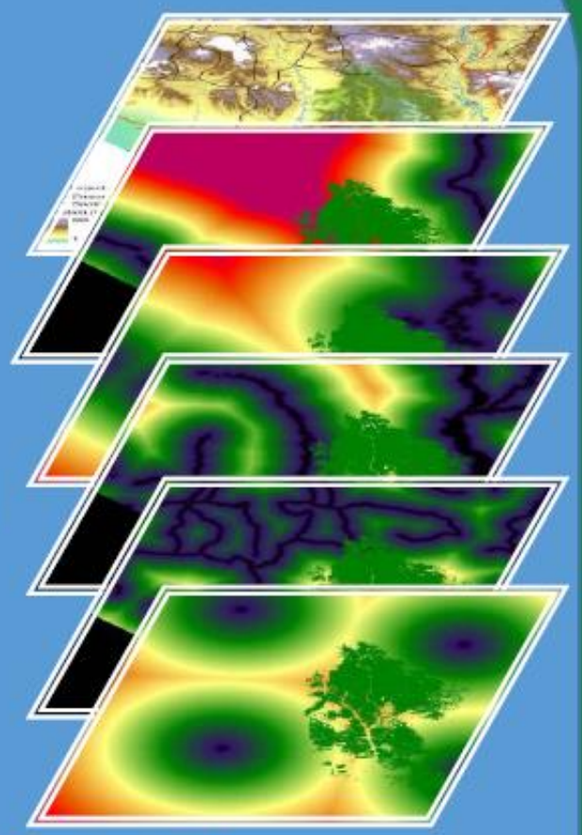


We used spatial modelling (& expert opinion) to predict likely future change in forest cover

INPUTS



Historical forest cover & deforestation maps



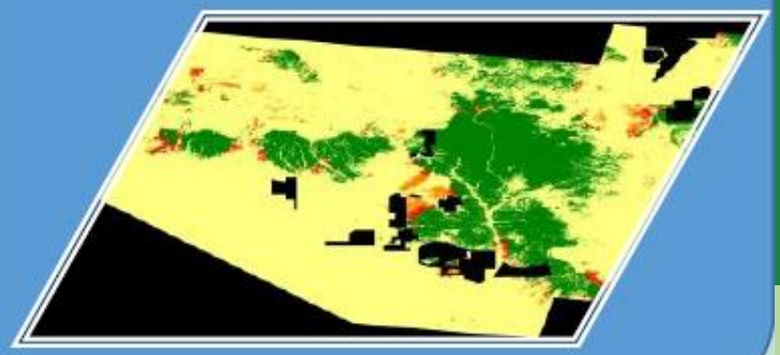
Potential deforestation drivers

and expert opinion

Build relationship between deforestation & drivers

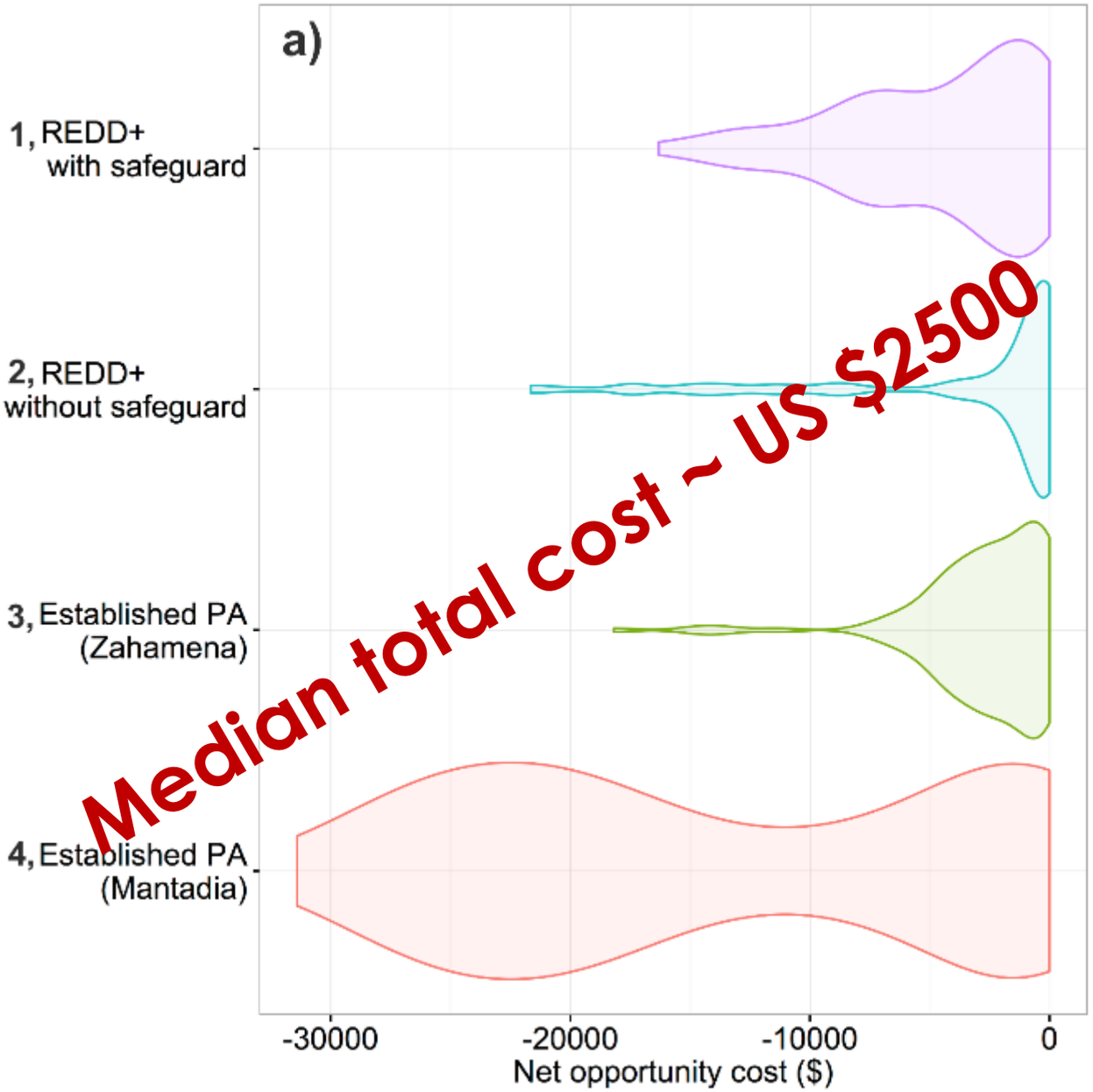
Spatially-explicit potential deforestation map

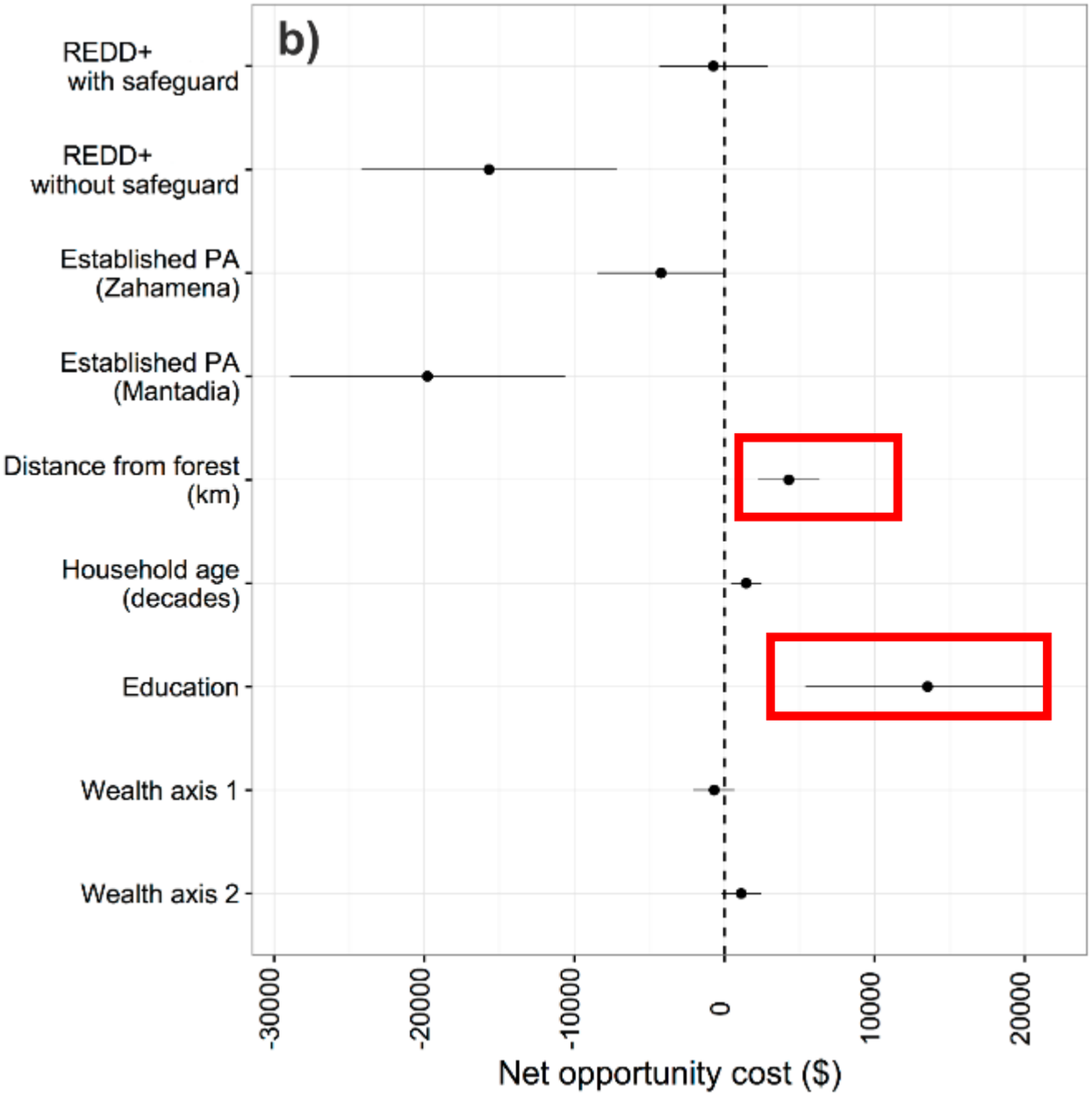
OUTPUT



Local costs are very significant

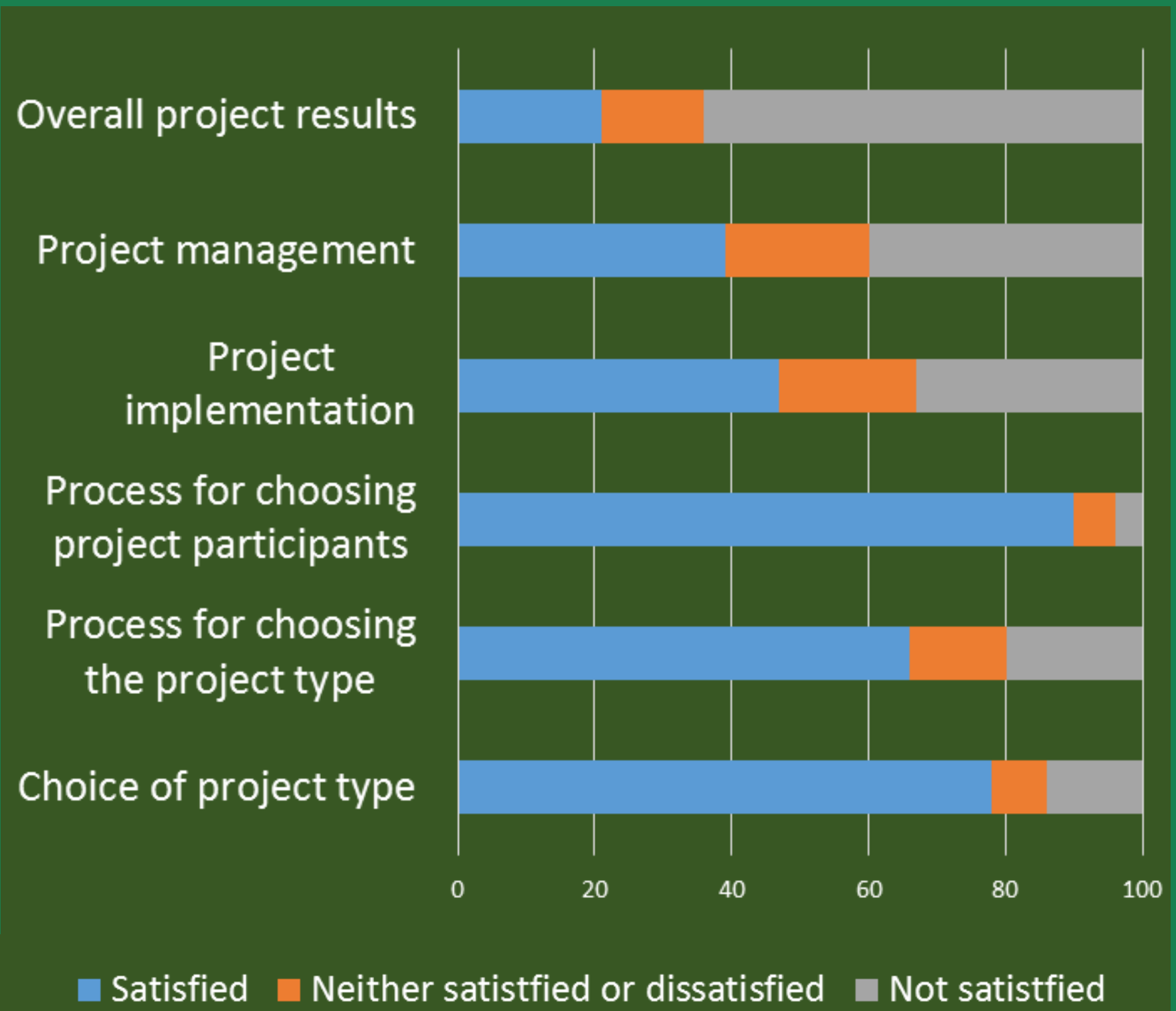
They are highest for people close to forest and with low education





Poudyal et al (in prep)

How have the livelihood projects been received?



Participants were generally satisfied with the choice of projects, but less satisfied with implementation and overall results

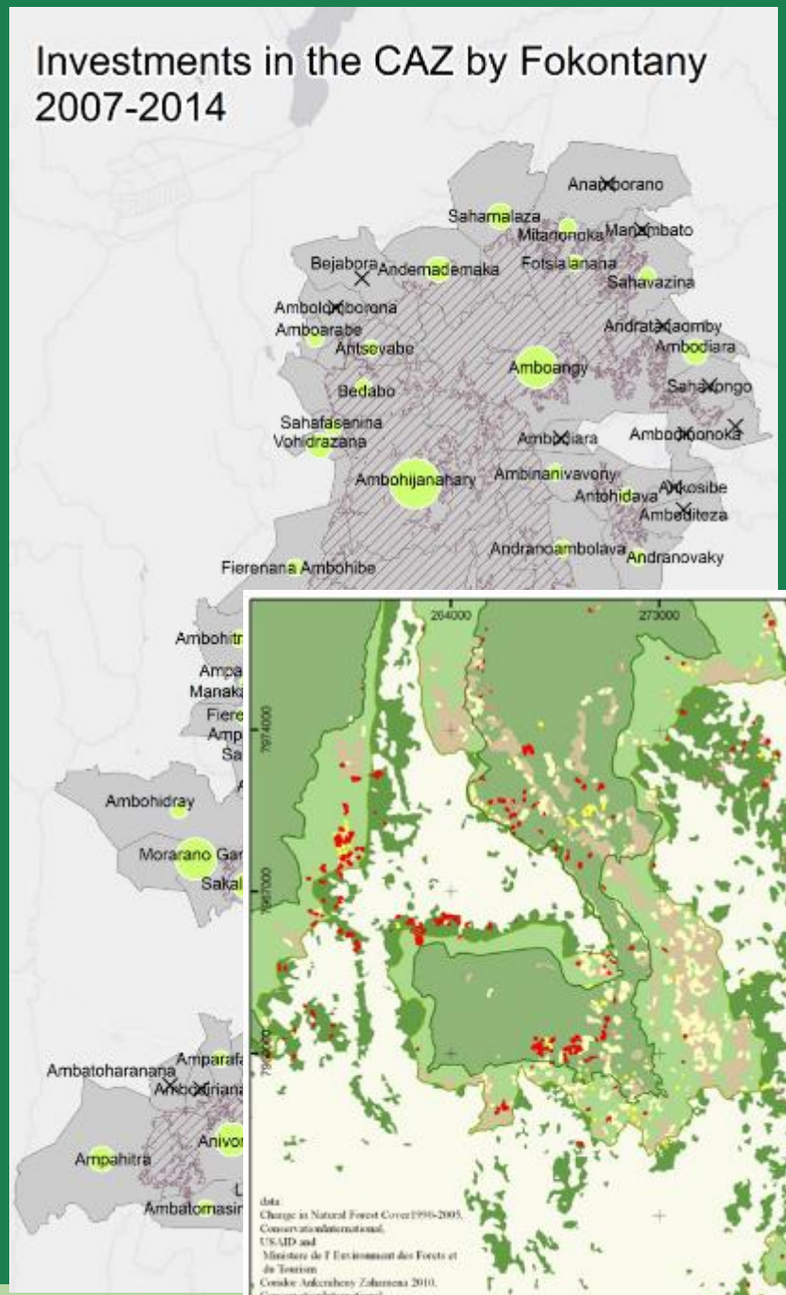
Harvey et al. (in prep)

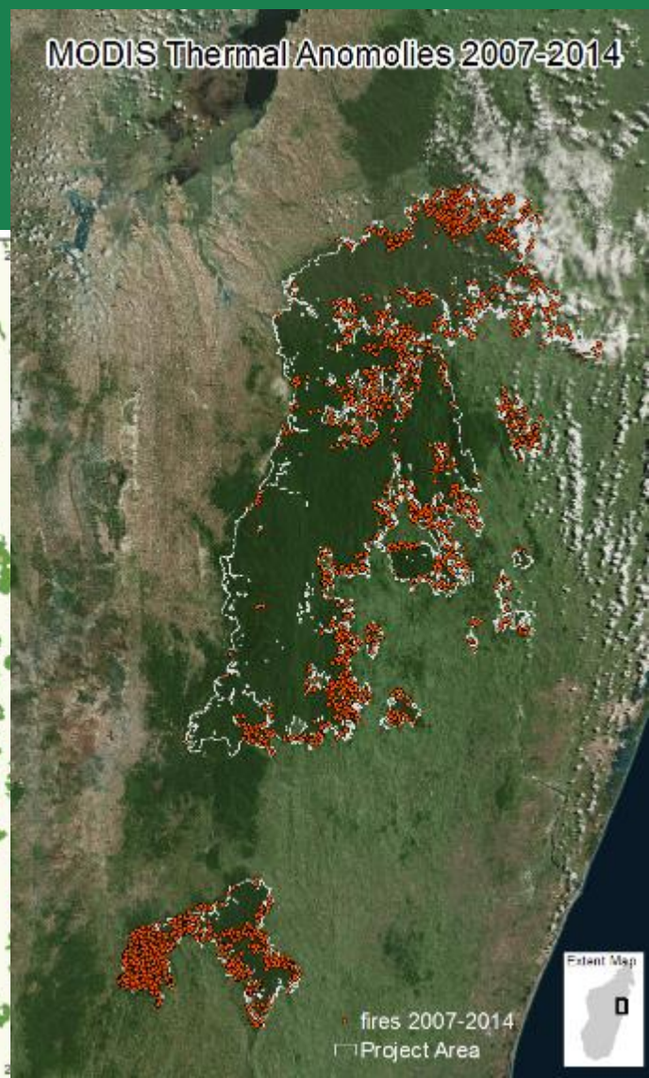
We evaluated the relationship between investment in micro-development and deforestation and forest fires between 2007-2014

Investment database (600+ investments: types and costs), mapped to fokontany

Annual deforestation data (digitized Landsat: 15m)

Annual fire counts (MODIS thermal anomalies: 1km)



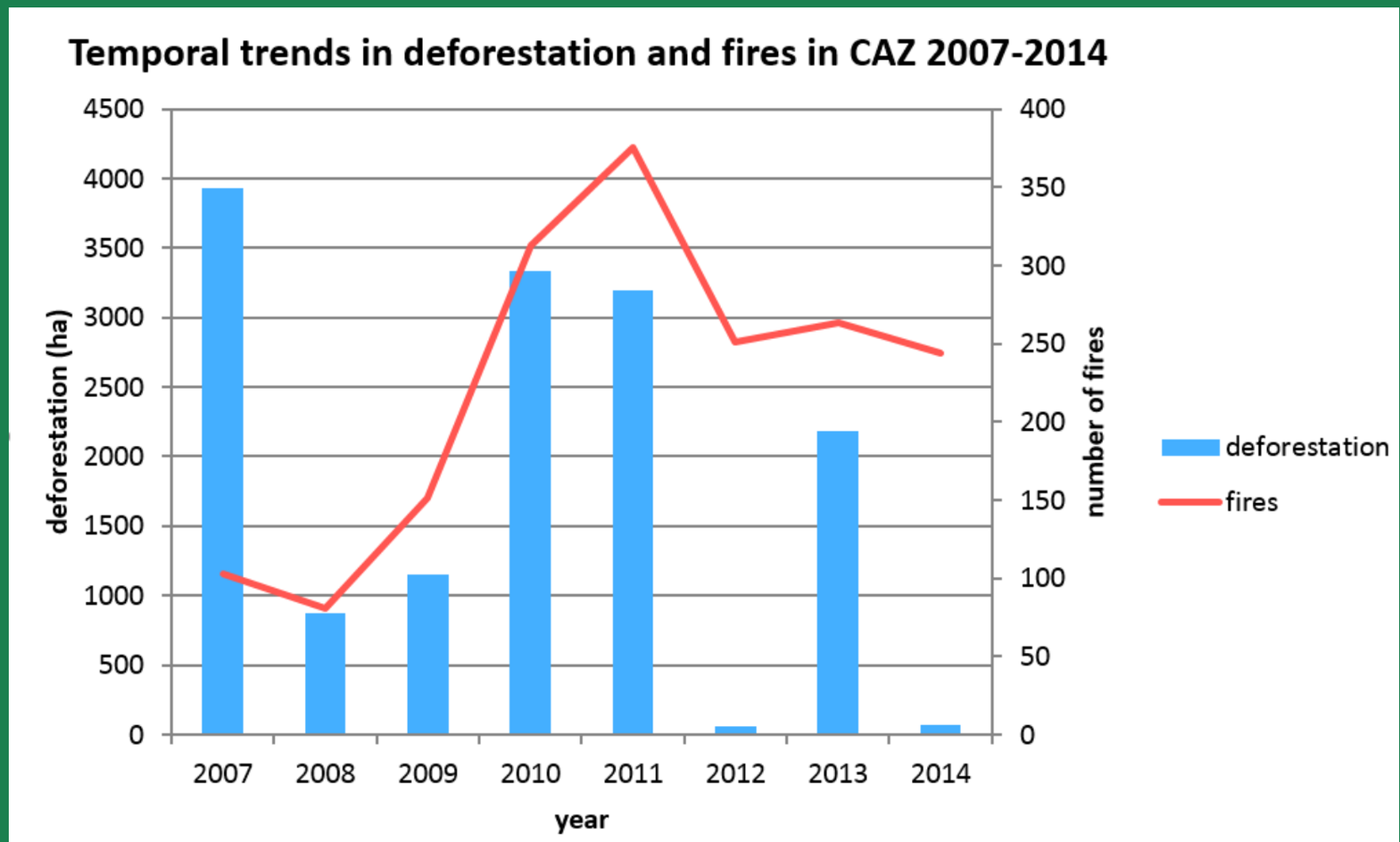


Tabor et al (submitted)

Did investments lead to reduced deforestation or reduced fires individual years?-particularly in years of instability

Relationships between investments and outcomes vary between years

Investments may have abated deforestation rates during times of political instability or lack of governance



Tabor et al (submitted)

Possible explanations for why we didn't find a stronger effect of investment in micro-development projects on deforestation or fire?

Conservation investments were targeted to areas of higher deforestation rates (rates may have been even higher without the investment)

Fire data is coarse resolution, may be picking up fires outside forest edge

However also, investment may currently be too low to expect a change in the clearing of forests for agriculture

Tabor et al (submitted)

Chameleon species present per habitat

Genus	Brookesia (n=48_			Calumma (n=101)									Furcifer (n=11)			# Species
Species	*superciliaris	therezieni	thieli	cf. fallax	cf. vencesi	*brevicorne	furcifer	gallus	gastrortenia	malthe	nasutum	parsonii	bifidus	lateralis	willsii	
Closed Canopy Forest	√	√	√		√	√		√	√	√	√	√				10
Tree fallow		√	√	√				√	√		√		√		√	8
Shrub fallow		√	√								√				√	4
Degraded land				√							√			√		3
Reforestation	√		√			√	√	√			√				√	7