

Understanding Peoples Perceptions of Climate Change in Coastal Madagascar

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Issues Examined:

- The local identification of change at the local scale
- The understanding of the causality and temporality behind observed changes
- Local adaptive responses
- Approaches and methods that can be used to better understand perceptions in human-environmental interactions in the context of environmental and climatic change

Why is the local perception important?

- Many coastal communities, which depend on fishing and agriculture, are under stress from a number of interacting climatic and non-climatic drivers
- Anticipatory and autonomous adaptation to environmental change at the community level is shaped by the perceived changes and causes of change by people locally.
- There are also differences in perceptions of change by factors such as gender, age, occupation, educational attainment, or factors related to where an individual lives
- Starting point for anticipatory and autonomous adaptive responses (need to first perceive change occurring)
- The perceived causes of environmental change are important as they relate directly to risk perception within which adaptive responses unfold.
- Also they are fundamental for designing comprehensive and inclusive mitigation and adaptation plans both locally and nationally

Pilot Study

- Local ecological knowledge is important in shaping perceptions of environmental change at the community level, by defining the way environmental change and risk is interpreted and understood

- We conducted a pilot study at Ambola, SW MADAGASCAR to examine coastal resource-dependent communities' perceptions of environmental change during their lifetimes and what they perceive the causes of those changes to be.

- Specifically, we documented people's observed changes over the past decades across various environmental domains, and for each change, we asked respondents to identify the causes, timing, and people's adaptive responses.

- We also incorporated this information into a geographical information system (GIS) database to produce broad-scale base maps of local perceptions of environmental change across time.

Tell us about the changes you have perceived/recognized in the "domain"?

Phase 1. Personal Data. ***Individual Interview***

Basic Individual Information

1. Individual code:……
2. Village (location on the seascape):……
3. Age:……
4. Gender: M / F
5. Place of origin (birth):……
6. Community where he/she lives:……
7. Dependents (sons, grandsons,…):……
8. Self ascribed occupation:……
    a. Does he/she fishes?……
    b. For how long has he/she been fishing?……
    c. Does he/she own a canoe?……
    d. How do you fish (options?)?……
    e. Where (lagoon, open sea, reefs)?……
    f. How many times per week does he/she go out?……

Phase 2.a: Free-listing Open Sea

Tell us about the changes you have see/perceived/recognized in the *open sea*:
1.
2.
3.
4.
5.
6.
7.
8.
9.

Phase 3.a: Structured Interview. List for changes in the Open Sea

	Category/ since when	Description	Problem/Opportunity	Causality	Adaptation
1 example	Since I was young the waves are larger twice a year/ change happened ten years ago	Between March and April, and Sept. and Nov. we are receiving larger than usual (3 meters high) waves	We cannot get out to fish	We do not know/ or Is the result of having changed our traditional fishing rhythms	During those periods we concentrate on lagoon fisheries (specially x and z)
2					
3					
4					
5					
6					
7					

Methods

- Systematic sampling (interviewing each 4 houses)

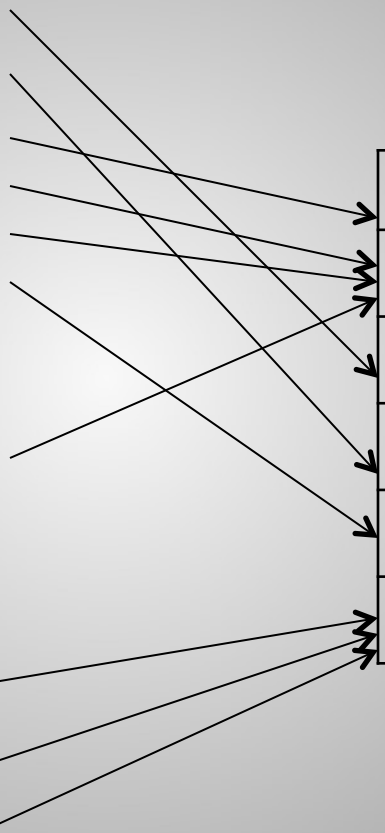
- Building database (Solomon Island model)
- Coding data into categories

Database extract

ID	Name	Gender	Age	Place of birth	Tribe	Occupation	Technique	Period of begin	Duration	Description
14	Robert	M	28	Tulear	Vezo	Menuisier charpentier	Filet Maillant	2011	5	Lamaira disparition
15	Anonym	F	36	Ambola	Vezo	Housewife	Peche a pied	1996	20	Octopus size decreased
15	Anonym	F	36	Ambola	Vezo	Housewife	Peche a pied	1996	20	Less fish
15	Anonym	F	36	Ambola	Vezo	Housewife	Peche a pied	2008	8	Less fish
15	Anonym	F	36	Ambola	Vezo	Housewife	Peche a pied	1996	30	Algae cover decrease
15	Anonym	F	36	Ambola	Vezo	Housewife	Peche a pied	1996	30	Less sea cucumber
15	Anonym	F	36	Ambola	Vezo	Housewife	Peche a pied	2010	6	Sedimentation
16	Anisa	F	26	Ambola	Tanalana	Fisher	Peche a pied	2012	4	Less fish and sea products
16	Anisa	F	26	Ambola	Tanalana	Fisher	Peche a pied	2012	4	Less sea cucumber
16	Anisa	F	26	Ambola	Tanalana	Fisher	Peche a pied	2012	4	Less fish and lobster
16	Anisa	F	26	Ambola	Tanalana	Fisher	Peche a pied	2015	1	Algae cover decrease
16	Anisa	F	26	Ambola	Tanalana	Fisher	Peche a pied	2015	1	Less fish
17	Zix	M	36	Ambola	Vezo	Fisher	Filet Maillant	2000	16	More corals
17	Zix	M	36	Ambola	Vezo	Fisher	Filet Maillant	1995	21	More corals and products
17	Zix	M	36	Ambola	Vezo	Fisher	Filet Maillant	1995	21	More products
17	Zix	M	36	Ambola	Vezo	Fisher	Filet Maillant	2012	4	More products

Making categories

ID	Name	...	Description
14	Robert	...	Lamaira disparition
15	Anonym	...	Octopus size decreased
15	Anonym	...	Less fish
15	Anonym	...	Less fish
15	Anonym	...	Algae cover decrease
15	Anonym	...	Less sea cucumber
15	Anonym	...	Sedimentation
16	Anisa	...	Less fish and sea products
16	Anisa	...	Less sea cucumber
16	Anisa	...	Less fish and lobster
16	Anisa	...	Algae cover decrease
16	Anisa	...	Less fish
17	Zix	...	More corals
17	Zix	...	More corals and products
17	Zix	...	More products
17	Zix	...	More products
18	Tovonasy	...	Less fish and sea products
18	Tovonasy	...	Less fish and sea products

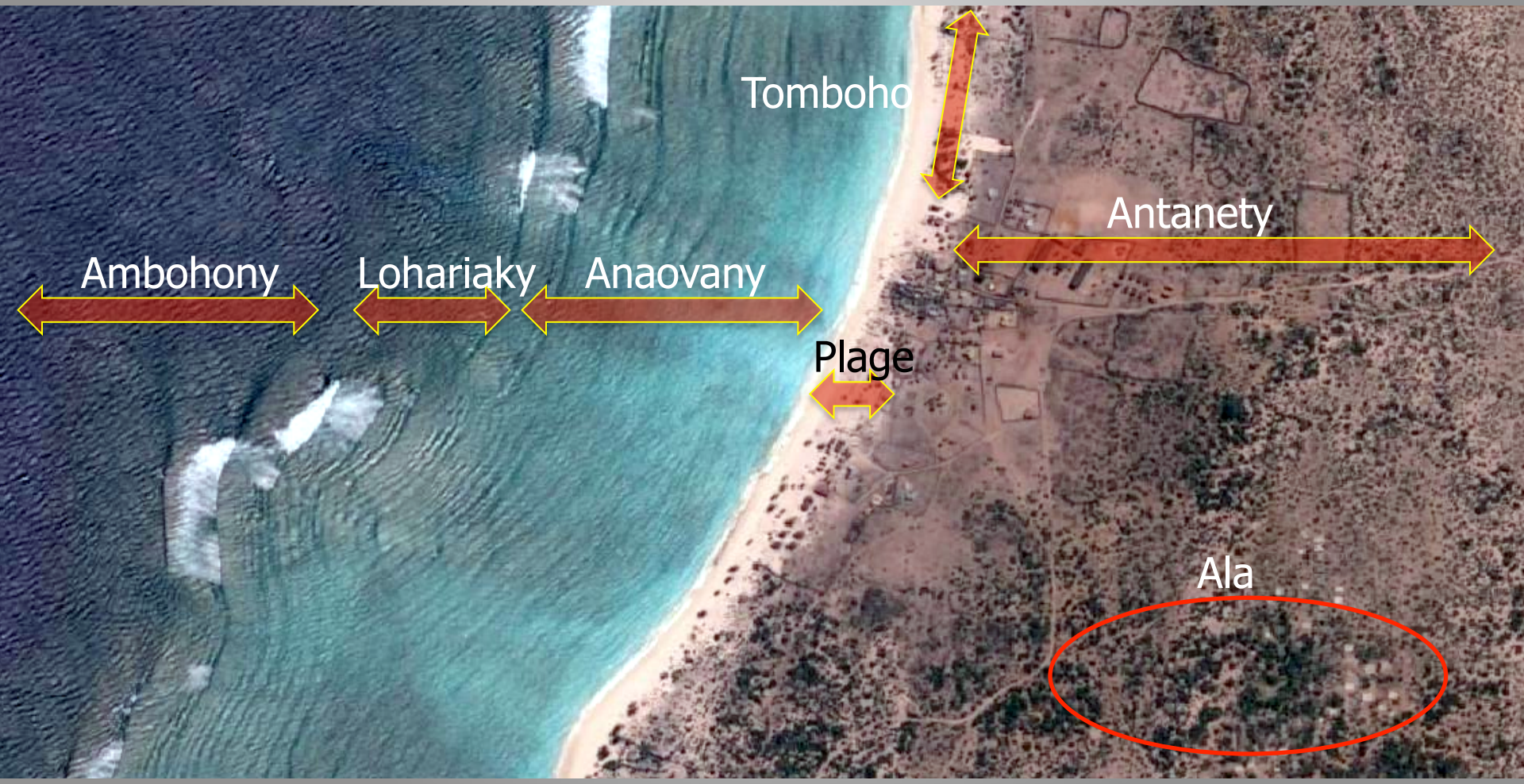


« Change » variable coding:

1	*Less fish*
2	*Benthic changes*
3	*Diversity loss*
4	*Size decrease*
5	*Sea property changes*
6	*Improved environment*

Making categories

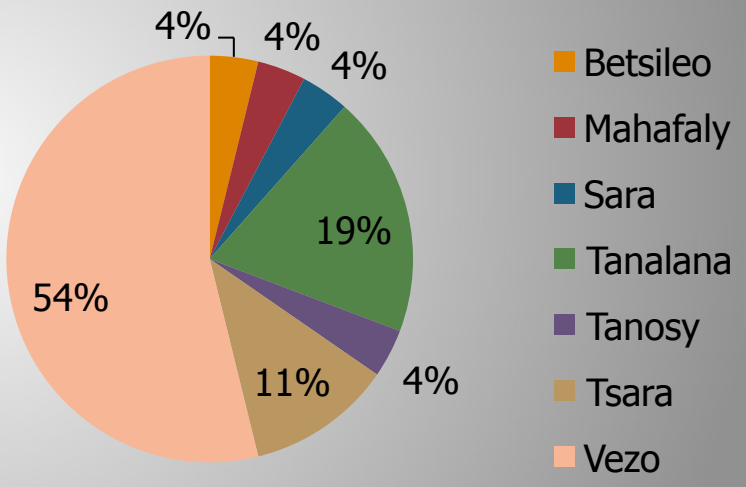
- 32 dimensions named by respondents => 7 categories
- 65 % sea, 35 % land



Results

- 26 respondants
  - 20 males
  - 6 females
- 126 observations (90 about sea and 36 about land)

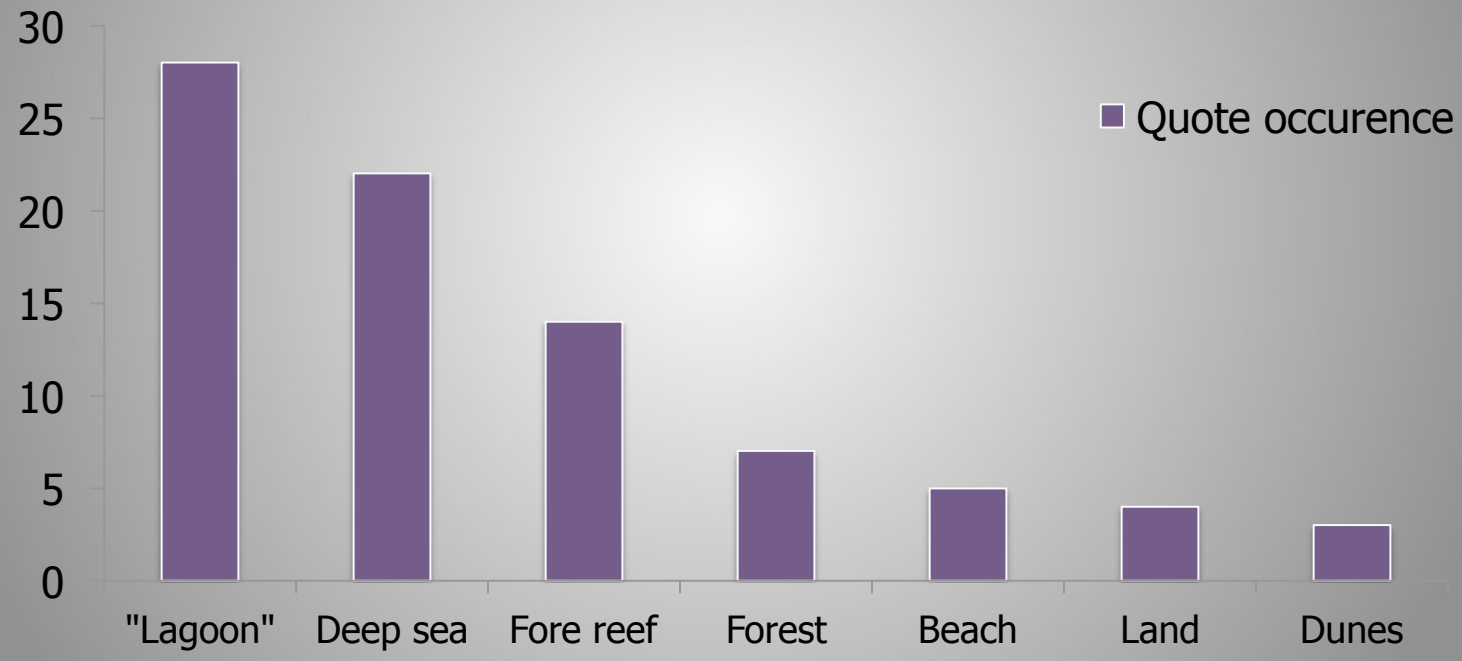
	n	*%*
F mature	*5*	*19.2*
F young	*1*	*3.8*
M elder	*5*	*19.2*
M mature	*11*	*42.3*
M young	*4*	*15.4*



- 22 fishers, 4 non fishers
- 63 % using gillnets, gleaning (13%), spearfishing (13 %)
- 66 % fishing 7/7

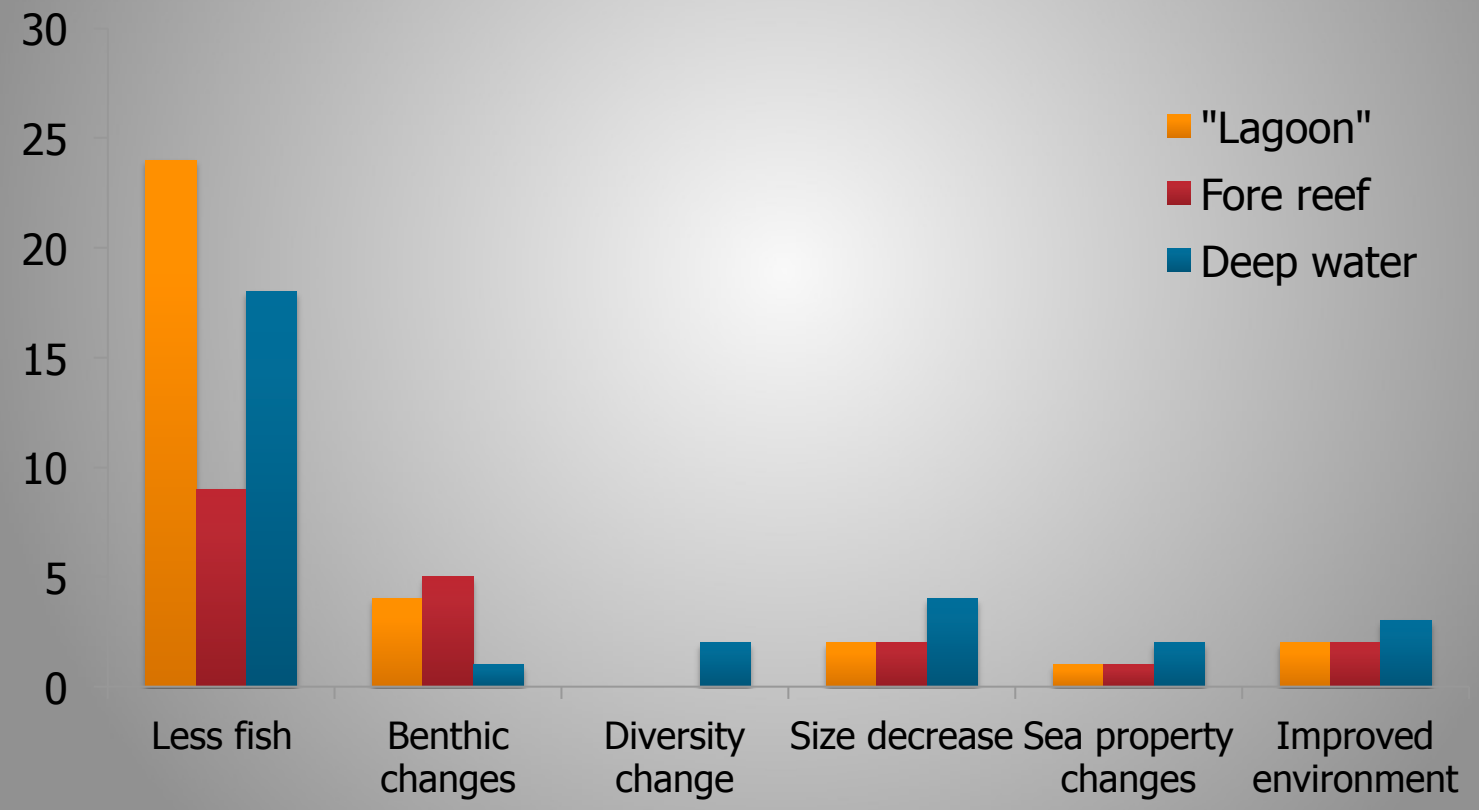
Dimensions cited

- Spatial distribution of change observation in sea environment



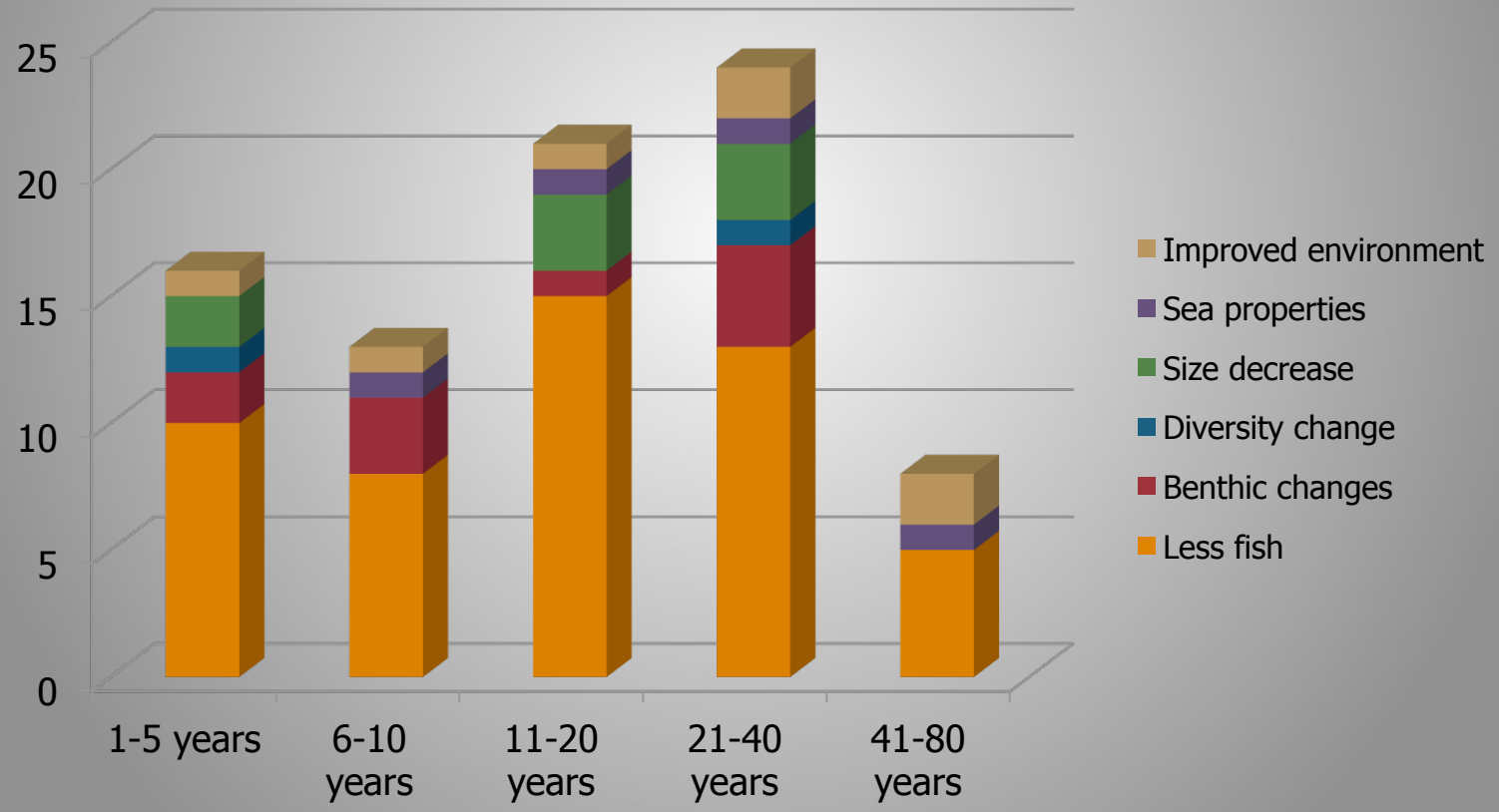
Change vs. sea dimensions

- Spatial distribution of change observation in **sea environment** **(change=1, n=82)**



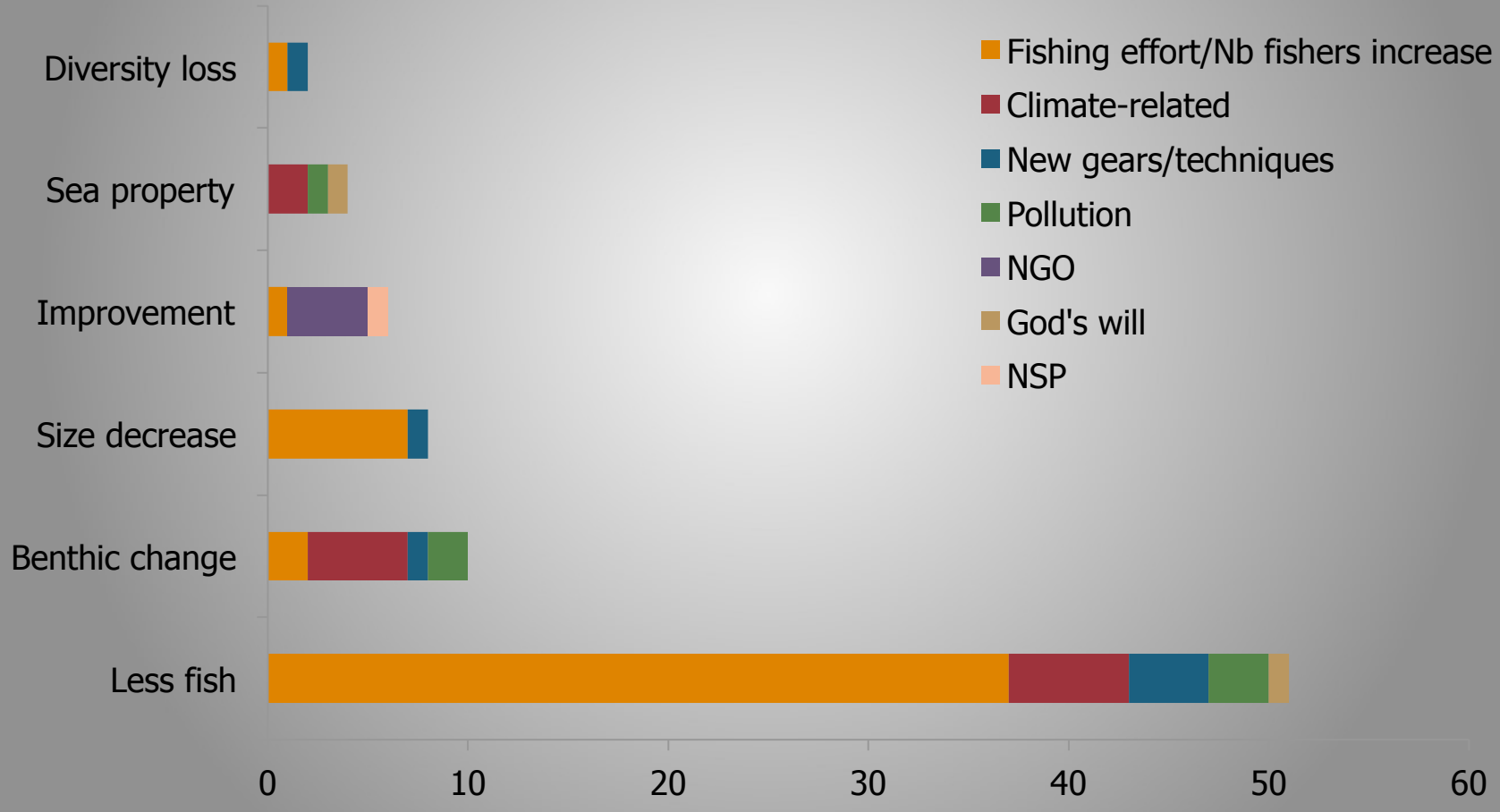
Change vs. time

- Temporal distribution of change observation in **sea environment (change=1, n=82)**



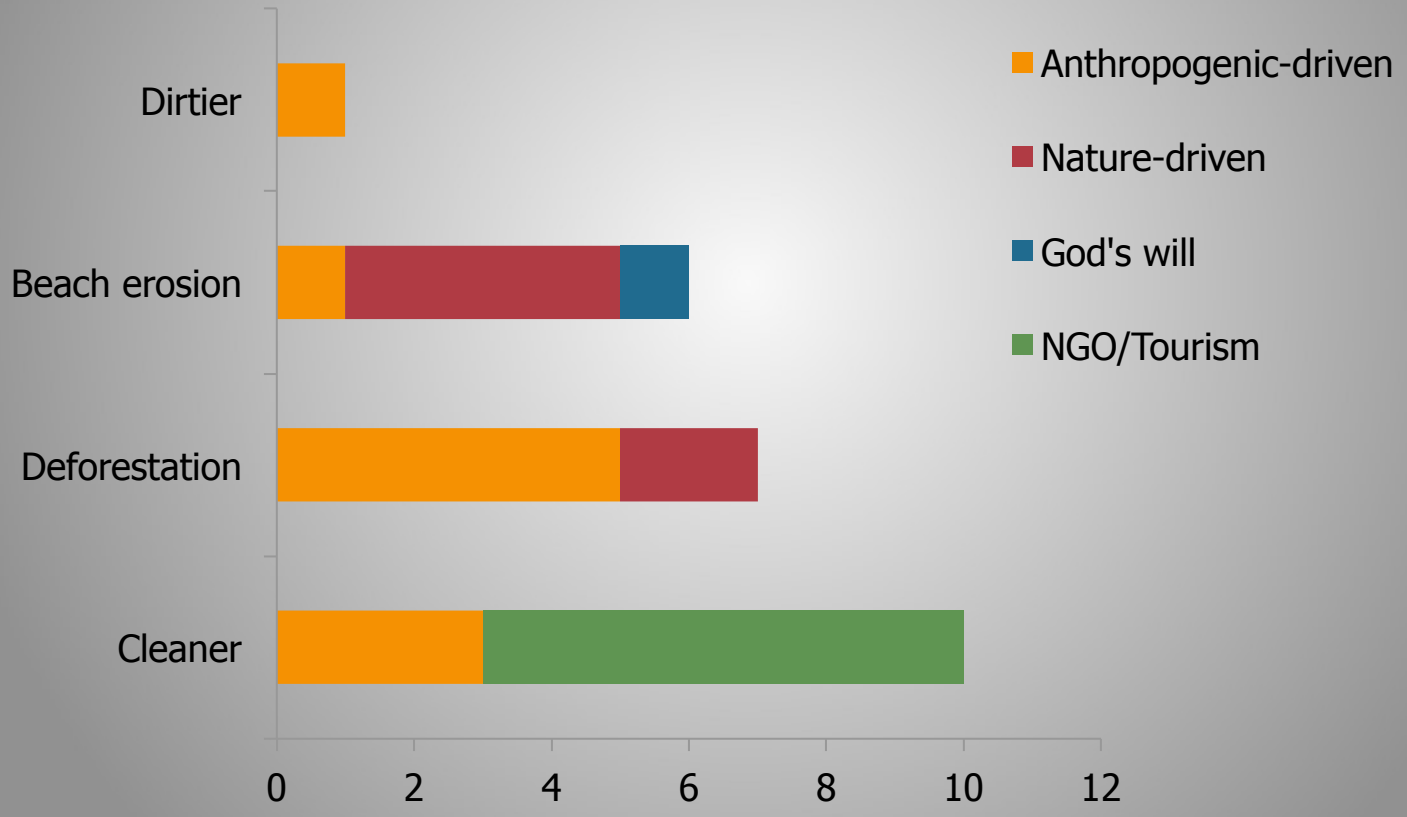
Change vs. causality

- Cause of change in **sea environment (change=1, n=82)**



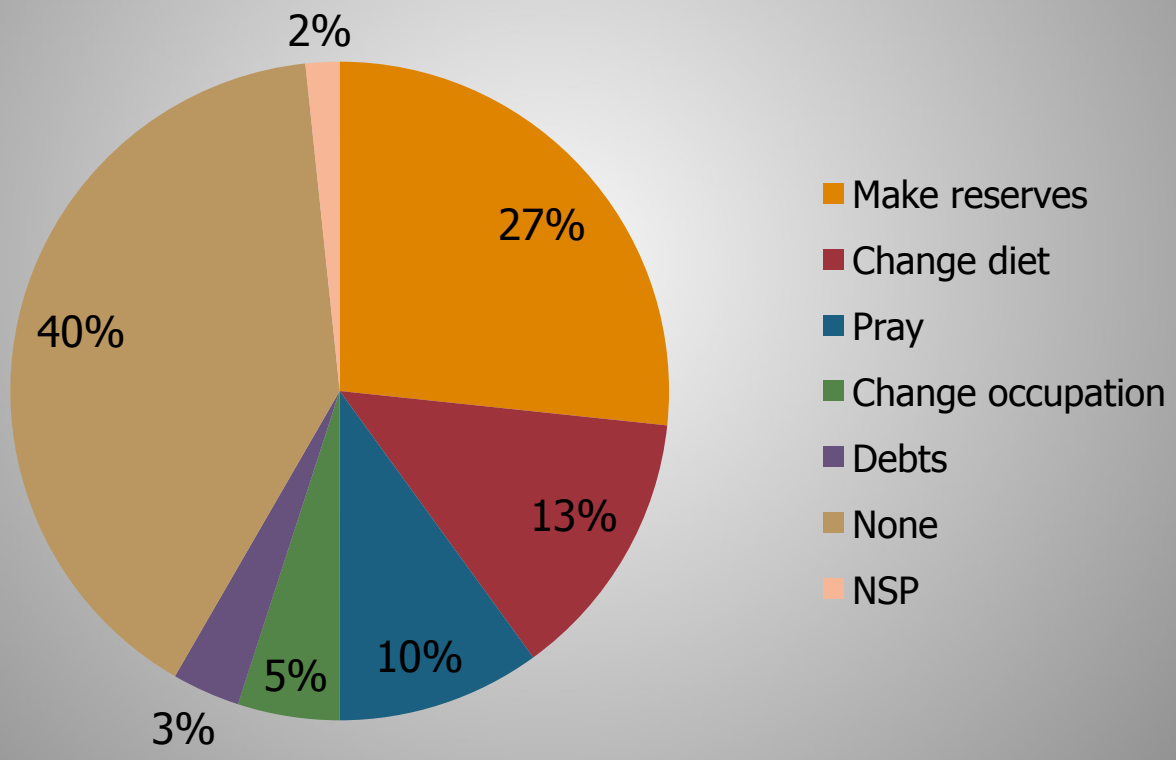
Change vs. causality

- Cause of change in **land** **(change=1, n=24)**



Adaptation responses

Adaptation responses for sea environment changes (n=82)



Perspectives

- Multivariate analysis (more than 30 variables)

- Spatialising perceptions of change and responses using households location informations

- Treating Ambotsibotsiky data (different context, issues and challenges)

- Comparing Ambola/Ambotsibotsiky communities perception of change and adaptation mechanism

- Assessing villagers' perceptions of climate change and community response to environmental issues

- Further research should increase sampling effort + comparison with Solomon, Angola, Mozambic outcomes.

Benefits:

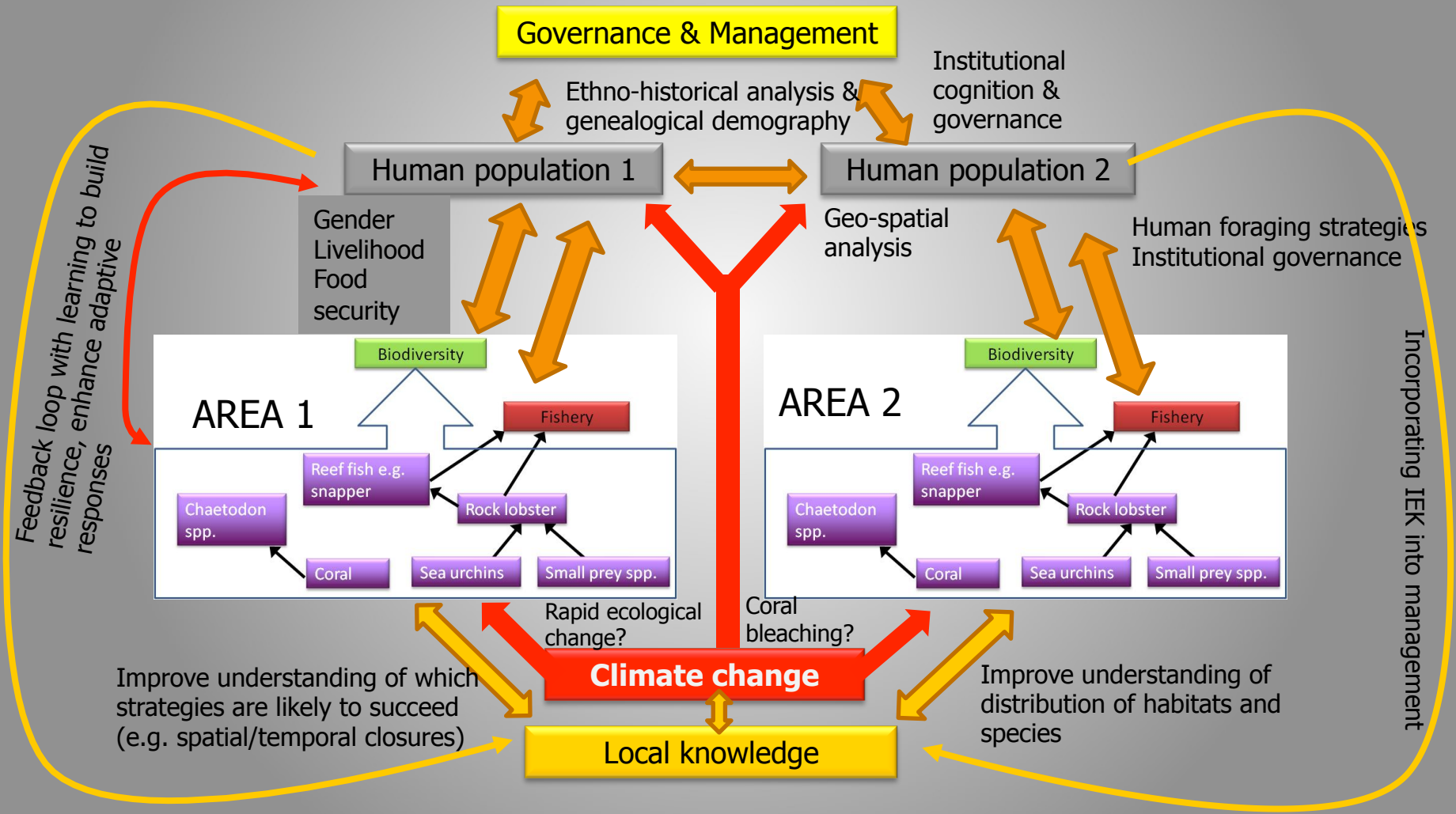
- Reconstruct the local environmental history .The intergenerational approach combined with collective memory will generate an oral proxy for history

- Identifying local versions of environmental change causality to pair them up with the scientific explanations. The goal is to compare but also to generate more nuanced explanations.

- The main challenge is to design a methodology capable of fleshing out the local perception of change without influencing the local definition of it and without imposing Western categories of change and causality.

- Local participation through the inclusion of IKS is important when designing adaptation plans

Building a conceptual model (as a first step for constructing a MICE quantitative model): *Considering 2 spatial areas and links with human systems*



Plaganyi & Aswani Conceptual Model

Benefits of the conceptual model

- **One can upgrade this to a qualitative model that shows positive and negative impacts (by including some specific examples)**
- **Next we can construct a quantitative model of current ecosystem services losses, and simulate a "post climate change scenario" (projections) for marine resources in coral reefs [ongoing effort to model CM systems with Eva Plaganyi-CSRIO]).**
- **Not a predictive tool yet, but useful to highlight how SES can be integrated into models**
- **Integrating ISS into models and analyses increases the number of management levers and probability of successful implementation of management actions**
  - E.G., If communities are changing and one understands the changing demography/gender/ economic and other drivers, one can better predict future fishing effort and strategies that will be more effective to manage the resource.

Discussion

- There are many social processes that drive the success or failure of CC adaptation programs, hence mi that are often missed by natural scientists, hence interdisciplinary approaches are necessary.

- Interdisciplinary approaches are in a good position to envision multiple and comprehensive approaches to environmental management and CC adaptation plans.

- We can develop *hybrid management*--i.e., institutions that take advantage of both customary/local and modern governance and management systems.

- We can refine a set of empirical research tools and policy guidelines that can be used by natural and social scientists alike (e.g., designing conservation projects).


Thank You