Household's resilience and livelihoods strategies in Oaxaca coast, Mexico

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Funders of this work:
UNAM- DGAPA- PAPIIT IN301516 "Socio-ecological resilience towards huricanes: the case of rural communities in Oaxaca Coast**"**

SEP-CONACYT-CB-2010-01-0152298 "Goods, capacities and exogeneous factors that determine diversification"

Socio-ecological system resilience

- The capacity of a system to absorb different perturbations and reorganize after a shock to maintain the system's function and structure and its essential characteristics (Walker et al. 2004)
- Households resilience : the possibility of the system to recover from a stress or shock, maintaining and arranging assets (capitals) for securing sustainable livelihoods (Plummer R. and D. Armitage 2007).

Livelihood strategies and resilience

- Livelihood strategies to manage shocks or stressors include: income diversification, agriculture intensification, migration, and accumulation of livestock to sell in an emergency (Ellis 2000).
- Different combinations of household assets provide alternative strategies for coping with different stressors and shocks.
- These forms of assets that become capital when they are invested or saved to produce additional resources (Emery, Fey, and Flora 2006) fall into the following five categories that can be used at a household or community level: human, social, natural, physical, and financial (Ellis 2000).

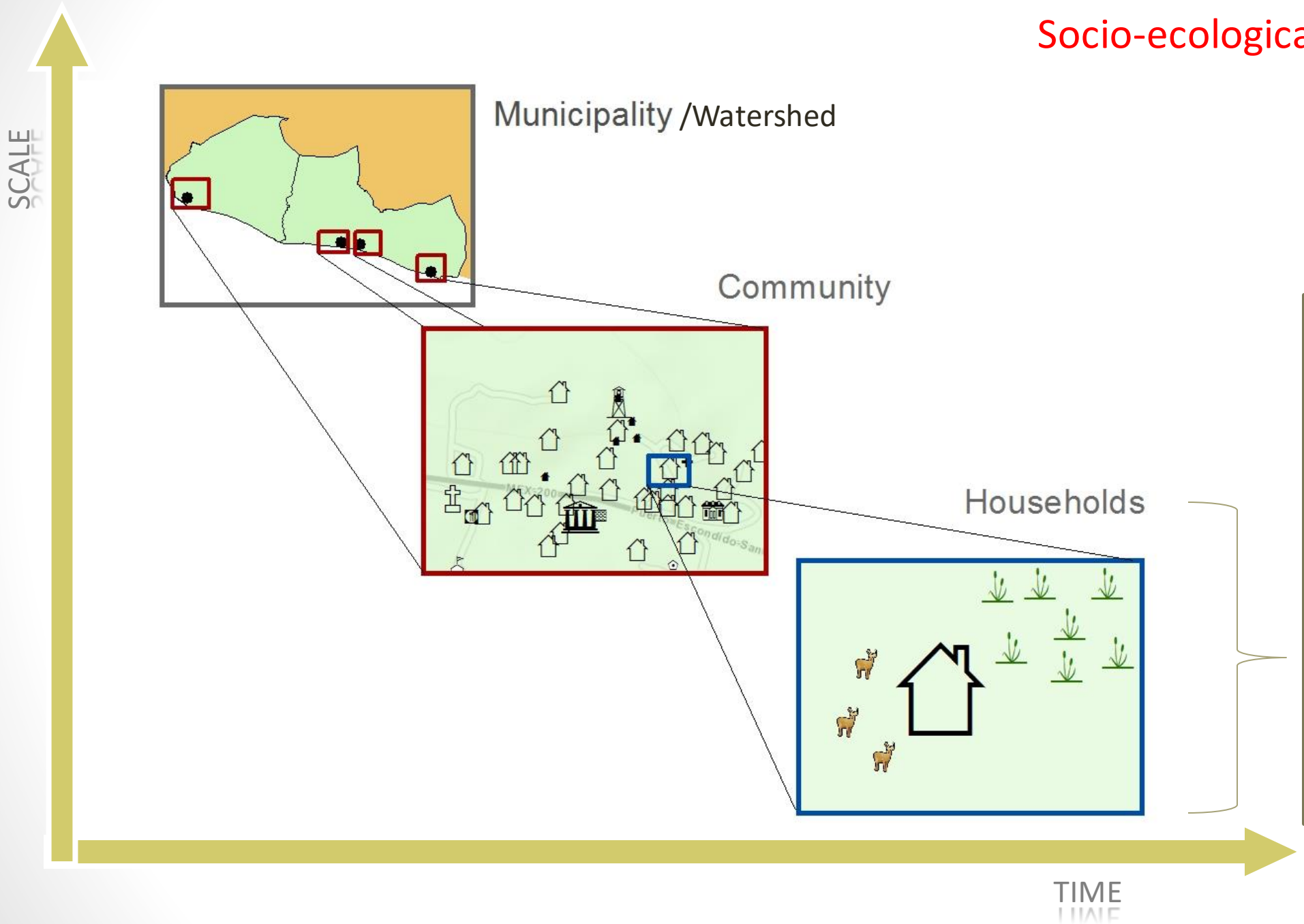
Diversification as a livelihood strategy

- Diversification is nowadays a core strategy of rural livelihoods (Berhaus, et al , 2007; Mushongah & Scoones, 2012; Alobo, 2015), specially to cope climatic stressors and shocks projected to become more intense (World Bank 2013).
- It is defined as the process by which households have a portfolio of activities for surviving and increasing their well-being (Ellis, 2000).
- It can be measured as sectorial shift of rural activities away from farm to non-farm activities (Start, 2001) as part of the process of structural transformation or
- As the number of economic activities in any sector (Alobo, 2015)
- In Latin America, 20 to 30% of rural households have off-farm employment that represents 40% of their income (Reardon, et al., 2001).
- In Mexico, it has also been demonstrated that diversification is a livelihood strategy because off-farm self-employment and wages represent 49.2% of the total household incomes (Cerón & Yúnez-Naude, 2015).

Community-based wildlife watching

- 2017 was declared the International Year of Sustainable Tourism in a clear recognition of tourism's contribution to Sustainable Development Goals and its potential for poverty eradication, community development and protection of biodiversity
- Community-based initiatives (CB) seeks to create local enterprises that provide livelihood benefits to communities while protecting indigenous cultures and environments (Simpson, 2009)
- Wildlife watching aims to increase the probability of positive encounters with wildlife while protecting wildlife resources (Reynolds & Braithwaite, 2001).
- The economic revenues provided by wildlife watching are substantial in some countries (Avila-Foucat et al., 2017), and Reynolds and Braithwaite (2001) have found that approximately 40% of international tourism is wildlife-related
- In Mexico, wildlife watching represent 36% of nature tourists (CESTUR, 2006) and provide 26.5% of the revenues from this type of tourism.
- However, there is a lack of information on the community characteristics that are required or desirable for starting a community based (CB) wildlife watching compared to the issue of the effect of tourism on household assets (Shoo & Songorwa, 2013; Qian et al., 2017; Mbaiwa, 2011; Simpson, 2009).

Socio-ecological system



Which are the main shocks and stressors? Which are the assets determining households sustainable diversification?

Is diversification enhancing specific resilience?

Research questions of the project

System questions:

- Which are the main stressors and shocks of the system?
- How are the different scales connected?

Households scale questions:

- Which assets determine households to diversify into sustainable activities (CB wildlife watching)?
- Sustainable diversification (CB wildlife watching) contributes to enhance households resilience?
- How does community and regional aspects influence households resilience? (interactions between scales)/Which are slow variables?
- Which is the role of the diversity and connectivity of assets on specific households resilience towards huricane?

Community scale questions:

- Institutions involved in sustainable activities (ecotourism social networks)?
- Land use changes modify the provision of environmental services that are used by households?

Regional scale questions

- Which are the main policies and institutions promoting sustainable activities? In this case ecotourism (social network)

Methods

A total of 212 households were surveyed in January 2014, representing 73% of the total households of the four rural coastal communities. A panel survey in 2017 .

The survey included socioeconomic characteristics of households, and information about each capital, human, social, financial, physical, and natural.

Resilience section about the recovery of capitals

Head of households were surveyed (female or male) and information of all members was included

Semi-structured interview in 2016 in two communities

Econometric model and qualitative analysis

Table 2. Asset variables and questions to assess capital damage, resilience, diversity, and connectivity.

Columns represent the asset variables to assess capital damage and recovery.				
Examples of questions are as follow:				
Example 1: Did the hurricane cause any damage to your house? (yes or no) How severe was the damage? (Likert scale)				
Example 2: Has your hose recovered? (yes or no) What is the actual situation of your house? (Likert scale)				
Financial	Physical	Human	Social	Natural
Agricultural income	House	Health	Social cohesion	Mangrove
Tourism arrivals	Other Infrastructure	Education	Community agreements	Natural resource use
Sales	Livestock		Links with external organizations	Recreation areas
Employment	Boats		Traditions	
	Ecotourism infrastructure			
Columns represent asset variables for measuring the diversity and connectivity between capitals				
Example 3: Which of the following assets helped the recovery of your house?				
Financial	Physical	Human	Social	Natural
Remittances	Sale of an active	Migration	Community help	Reforestation
Employment change		Knowledge and capacity building	New agreements, enforcement and sanctions	Natural resources use
Diversification			Religion	
Savings			Ngo presence	
Credits			Government transfer	

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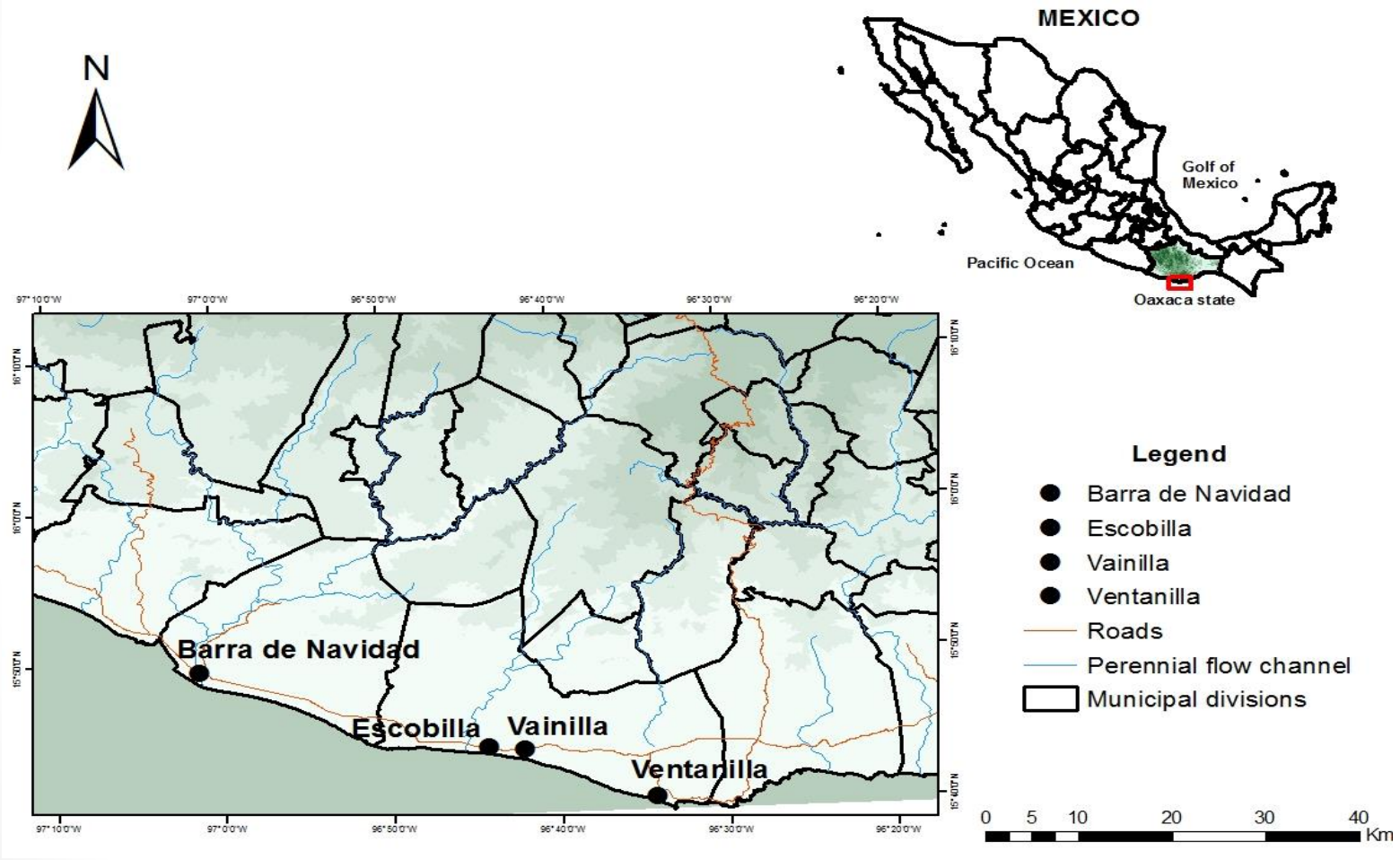
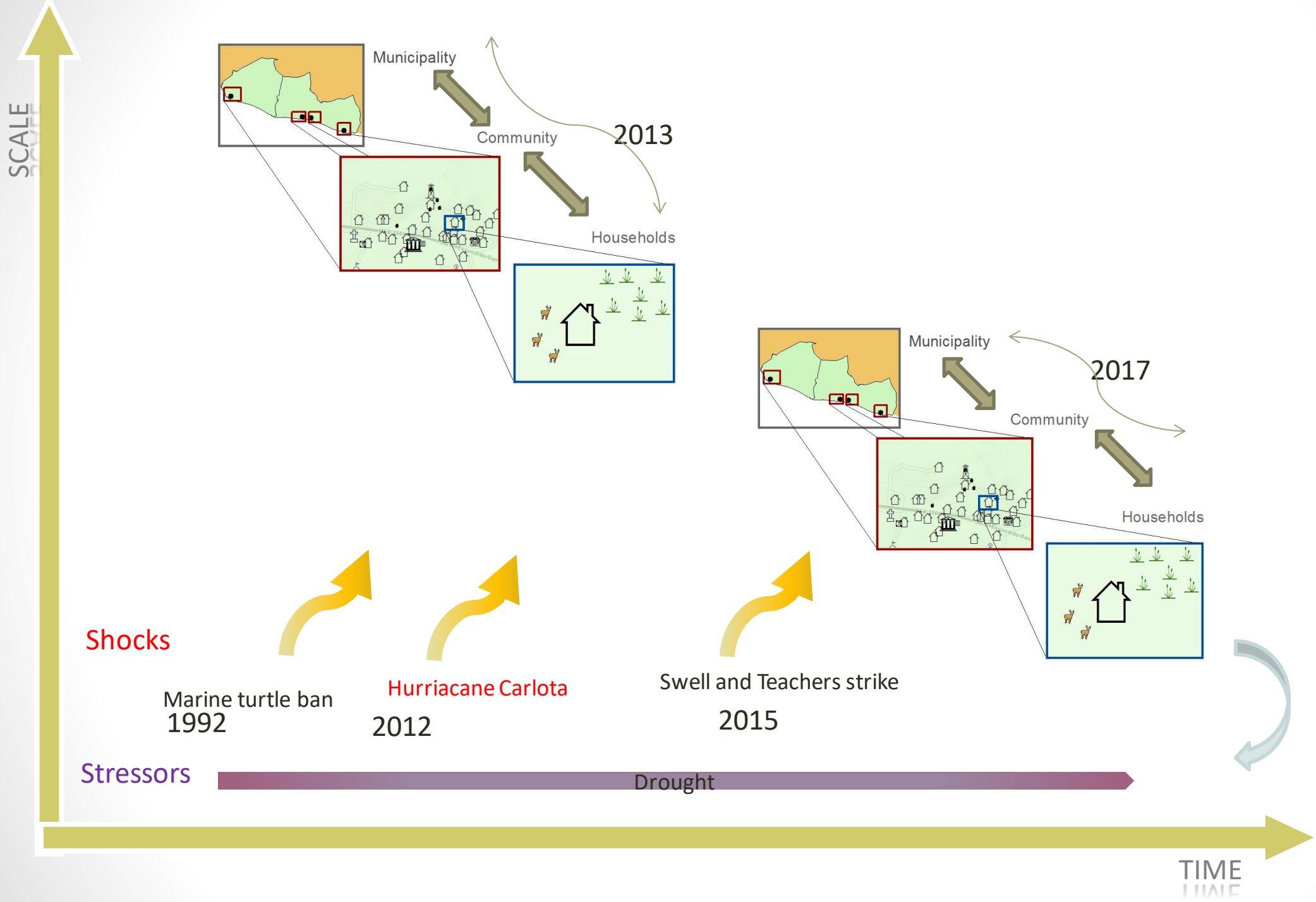
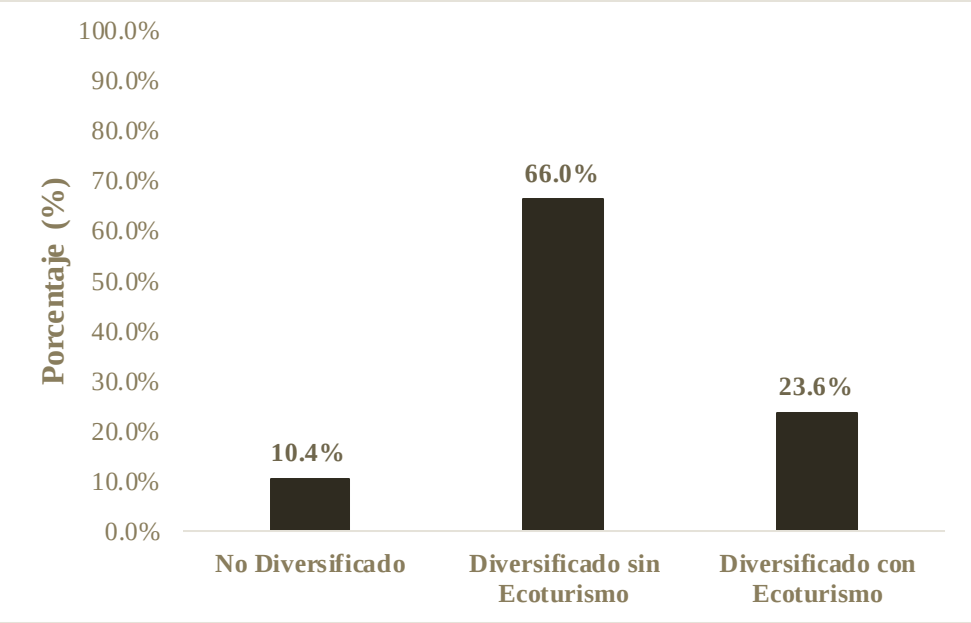
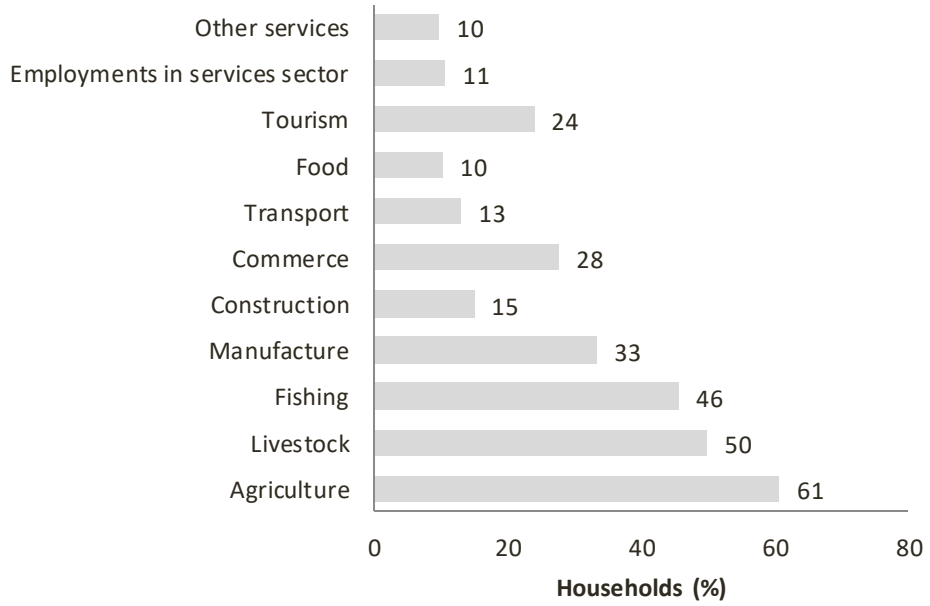
Area of study




SCALE
Municipality
Community
Households
2013
Municipality
Community
Households
2017
Shocks
Marine turtle ban
1992
Hurriacane Carlota
2012
Swell and Teachers strike
2015
Stressors
Drought
TIME

Livelihood strategies





Households income:
Non diversified households: $40,048
Diversified without ecotourism: $9,7195
Diversfied with ecotourism: $9,8475 and ecotourism represents 28% of their income

Avila-Foucat et al. In review. In Journal of Sustainble Tourism

Avila-Foucat and Rodríguez Robayo. In review. Tourism management

Households assets determining CBWW

Variables		Diversification into wildlife tourism (BL) (MgEff-dy/dx)
Human capital	Household size	-0.002
	Age (-)	-0.010(***)
Social capital	Participation in an Organization (+)	0.357(***)
	Income problems	-0.035
Natural capital	Environment generates well-being (+)	0.177(***)
	Land	0.102(*)
Physical capital	Value of physical assets	$-2.71e^{-07}$
	Washing machine	0.014
Financial capital	Income	$1{,}78e^{-07}$
	Credit – loans	0.009
	Transfers (+)	0.181(***)
N		183
Adjusted R^2		0.2034
Correctly classified		81.97%

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Diversification enhance resilience

Table 5. Household's perception of assets diversity and connectivity.

The matrix shows connectivity between assets used by households for their recovery. The number are the percent of households indicating that an asset is important for capital recovery

Capital	Variable	Financial %	Physical %	Social %	Human %	Natural %
Financial	Remittances	13 *	11	3	2	1
	Employment change	28	10	9	2	7
	Diversification	24	10	8	2	3
	Savings	29	33	6	8	1
	Credits	15	17	2	2	1
Human	Knowledge and capacity building	7	5	14	7	9
Physical	Sale of assets	6	4	0	1	1
Social	Community help, new agreements, and enforcement of sanctions	30	33	86	72	67
	NGO presence	7	4	11	4	11
	Government transfers	44	58	29	54	29
Natural	Natural resources use and reforestation	21	26	6	8	63

Note: only 2% mentioned migration as an important asset for recovering financial capital and 17% religion to recover social capital. Reforestation was only mentioned for the recovery of natural capital.

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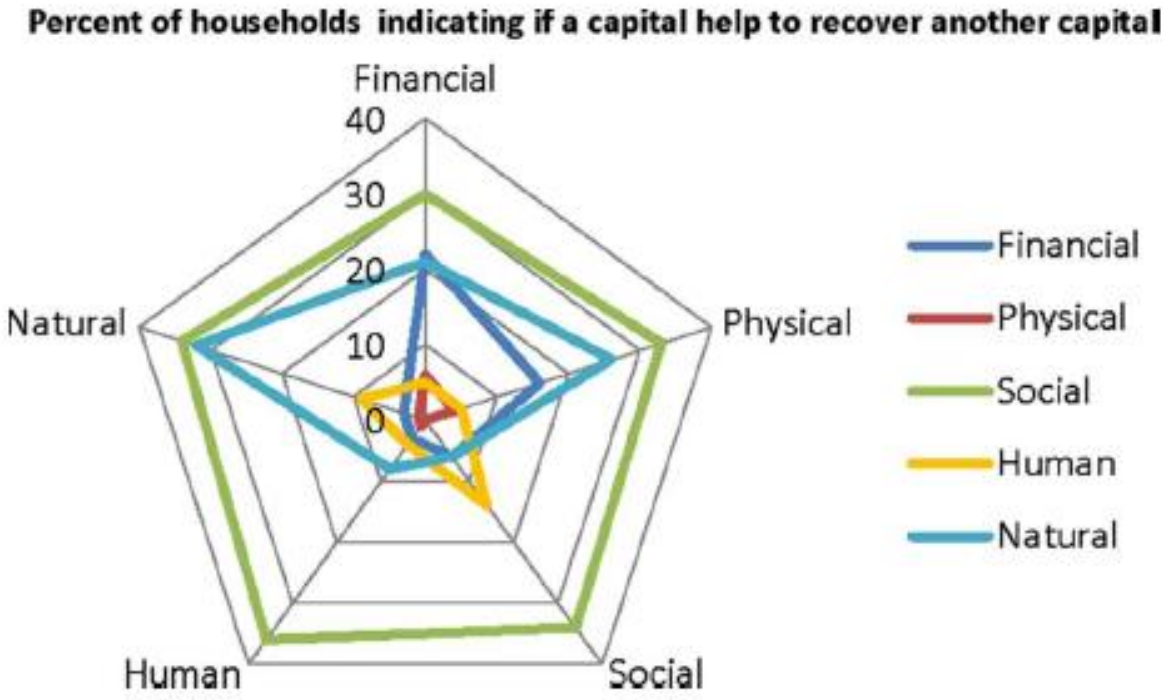

Figure 2. Households' perception of capital connectivity.

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Conclusions

- Diversification of income is used for the recovery of all capital but is particularly used for the recovery of financial capital as also shown in other studies (Nyenza, Nzunda, and Katani 2013; Orencio and Fujii 2013).
- Employment change and savings are equally or even more important for physical capital recovery.
- Thus, diversity of income is an important financial strategy for recovering after the hurricane but not the only one
- Social and natural and financial capitals are also important assets for a household's recovery, as they have a strong connection to other types of capital
- These forms of capital are crucial to the connectivity of the system and provide feedback to other sorts of capital in developing resilience.

- Young households, with basic needs covered by family agriculture and government transfers, and with environmental consciousness and social capital have more probability to be engaged into CBWW
- Thus, poverty, tourism and environmental policies need to be integrated in order to promote sustainable diversification and in this particular case community-based wildlife watching.

Questions?

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