



Extent of Erosion, Poverty, and Food Security: The Case of Ayangan and Tuwali of Ifugao, Philippines

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Introduction

Erosion

- causes the loss of soil from land surfaces
- adversely affects the productivity of all natural ecosystems (Pimentel 2006)
 - In the next 25 years, 30% reduction in world food production (Buringh 1989 as cited in Pimentel 2008)
- Contribute to loss of income and higher poverty incidence

Objectives

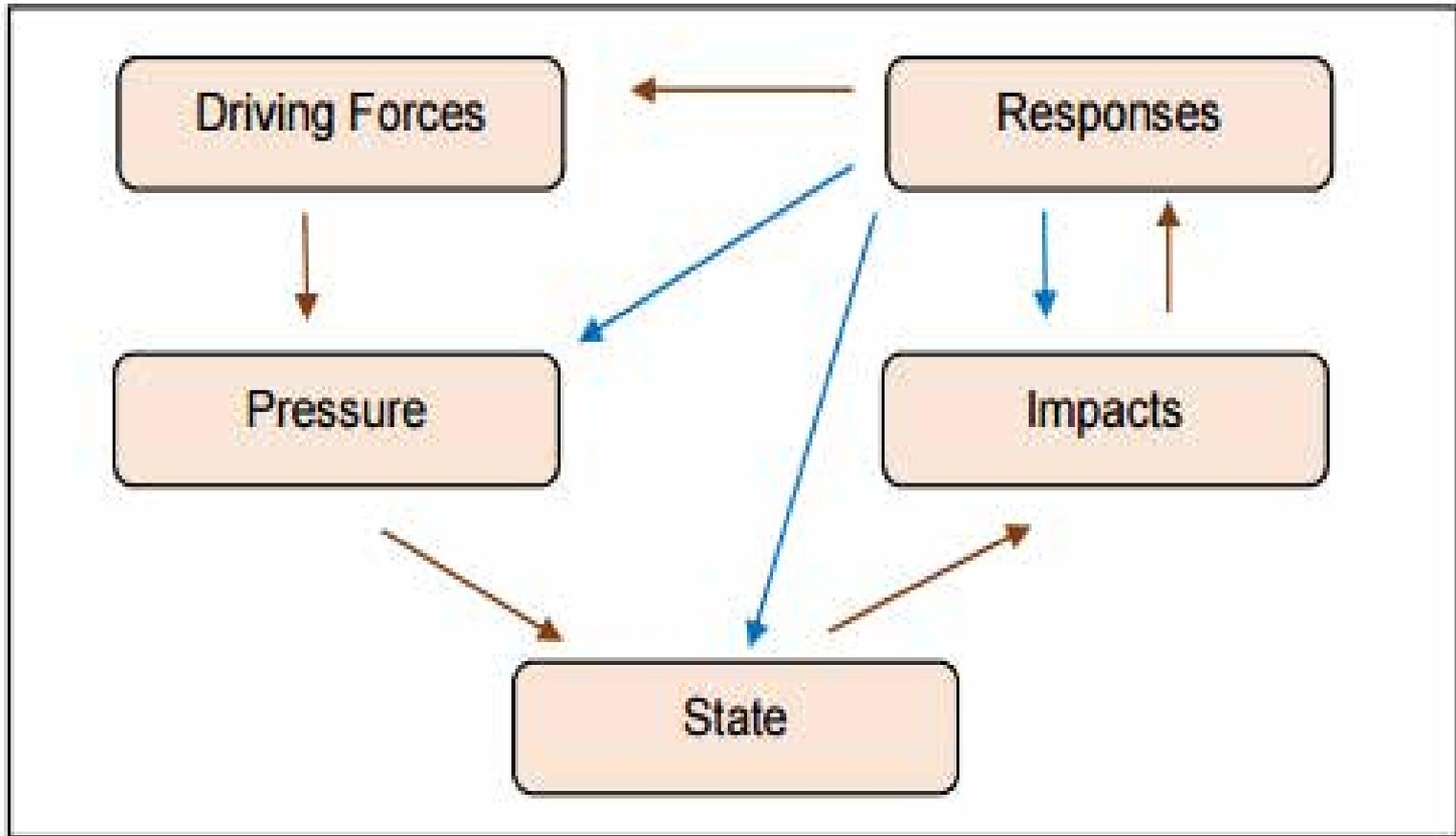
General

aims to determine the interaction of erosion, incidence of poverty, and food security in the province of Ifugao

Specific

- characterize the *Ayangans* and the *Tuwalis* by zone;
- analyze the different dimensions of poverty by zone;
- determine the relationship between poverty, extent of erosion and rice productivity; and
- recommend policies to alleviate poverty while arresting the incident of erosion in the study areas.

Conceptual Framework

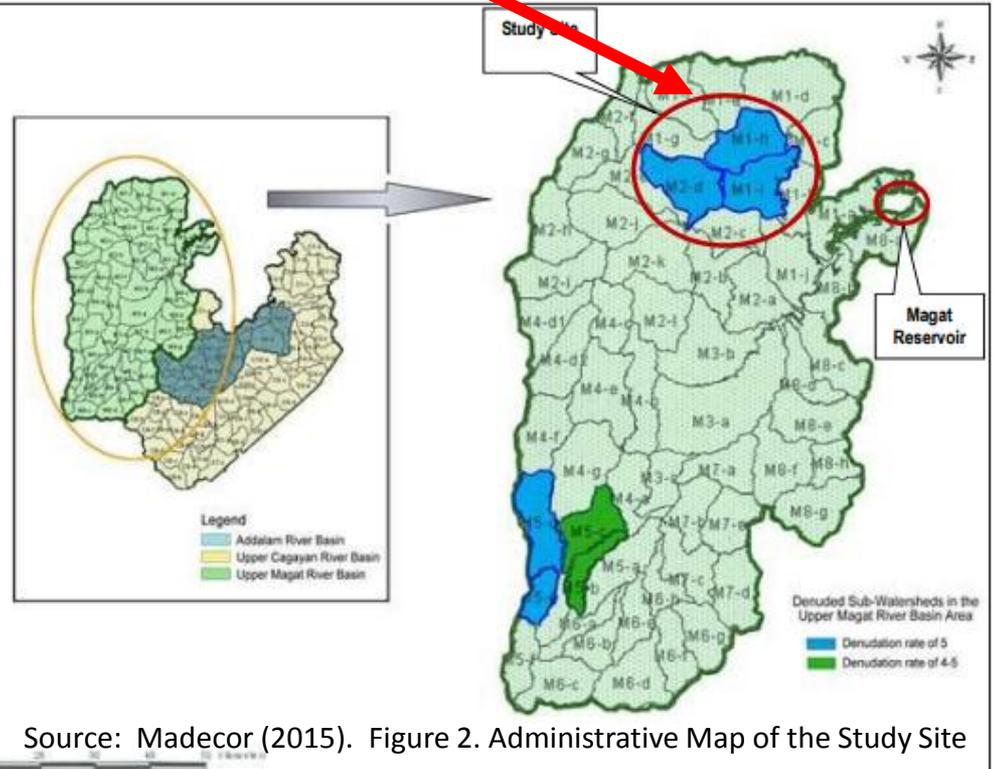


DPSIR: Driving Forces, Pressure, State, Impact, and Response.

Source: Adapted from EEA 1999

Methodology



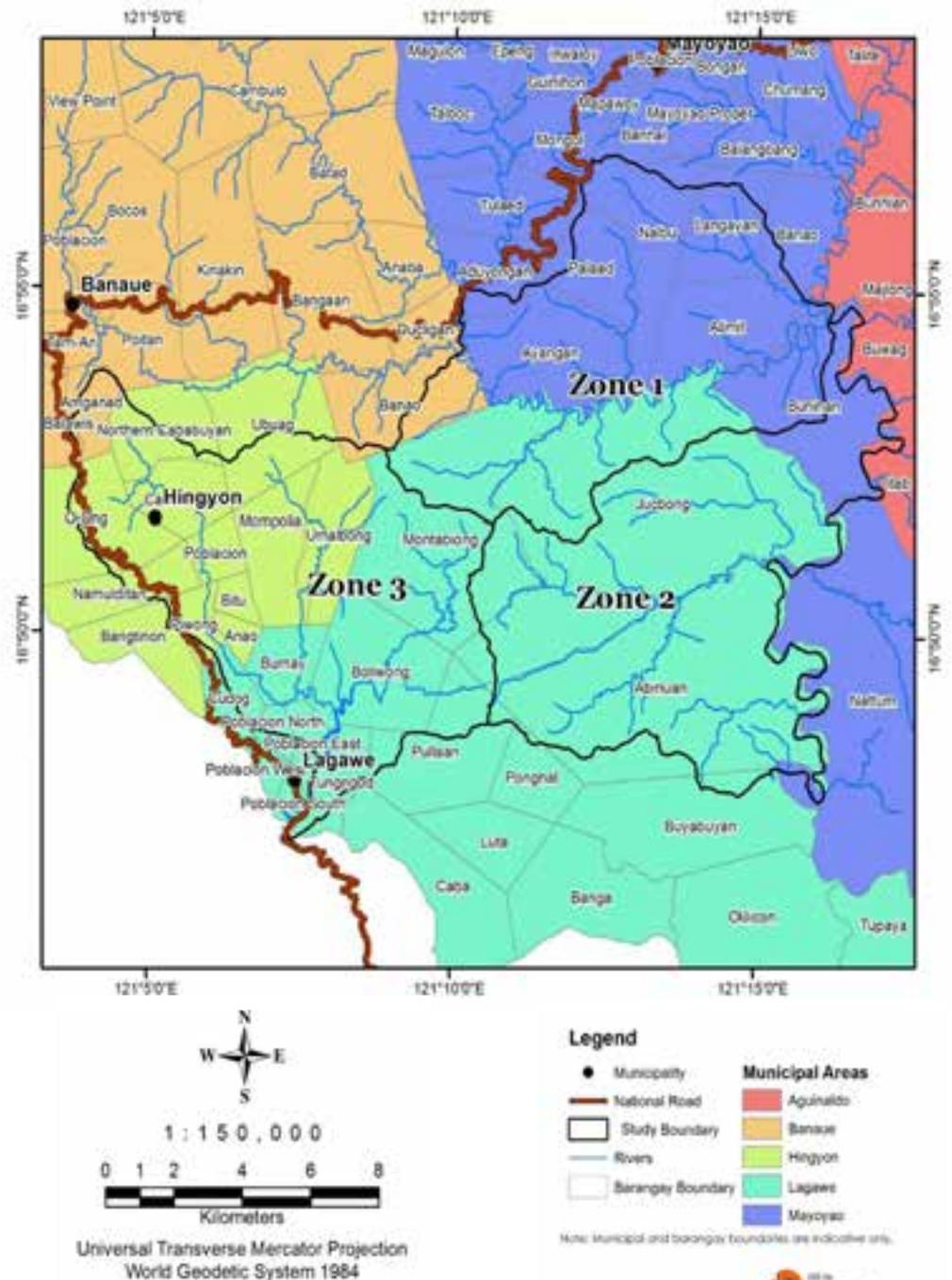


Location of the Study

Source: Madecor (2015). Figure 2. Administrative Map of the Study Site

➤ Study site subdivided into three sub-watersheds based of denudation rate and occurrence of soil erosion:

- ❑ **Zone 1** – Most denuded area (Upper Alimit sub-watershed);
- ❑ **Zone 2** – (Moderately denuded) the Lower Alimit sub-watershed; and
- ❑ **Zone 3** – (Least denuded) the Lagawe sub-watershed



Source: Madecor (2015). Figure 1. Denuded Sub-watersheds in the Upper Magat River Basin Area

**Example of bare land cover:
Burned steep slopes being used
for crop cultivation**



**Land cover of slash and burn or
kaingin system of crop cultivation**



Road Erosion Hotspots



Very thin land cover



Total and denuded area by zone

Zone	Total area (ha)	Denuded area (ha)	Percentage of denuded area (%)
Zone 1	7,915	4,608	58
Zone 2	7,634	3,198	42
Zone 3	7,947	1,012	13
Total	23,496	7,818	

Sources of Data

Secondary Data

- Community-Based Monitoring System (CBMS 2012)
- Socio-economic and Annual Reports

Primary Data

- Socio-economic Survey
- Focus Group Discussions

Validation Workshops



Results and Discussion

Demographic Characteristics

Zone	Total Population	Population Density (number of persons/square kilometer)	Annual Population Growth Rate (2000-2010)	Number of Households	Average Household Size
Zone 1	3,368	53	0.35	842	4
Zone 2	1,403	19	0.30	281	5
Zone 3	23,286	189	2.48	4,657	5
All	28,057			5,611	5

Source of basic data: NSO. 2010 Census of Population

Population engaged in agriculture, fishing, and livestock production (in %)

Zone	Agriculture	Livestock	Fishing
Zone 1 (n=29)	95.74	78.60	16.75
Zone 2 (n=7)	94.11	77.82	7.58
Zone 3 (n=17)	60.70	24.88	2.19

Source of data: CBMS

Tenure of farm per parcel cultivated (in %)

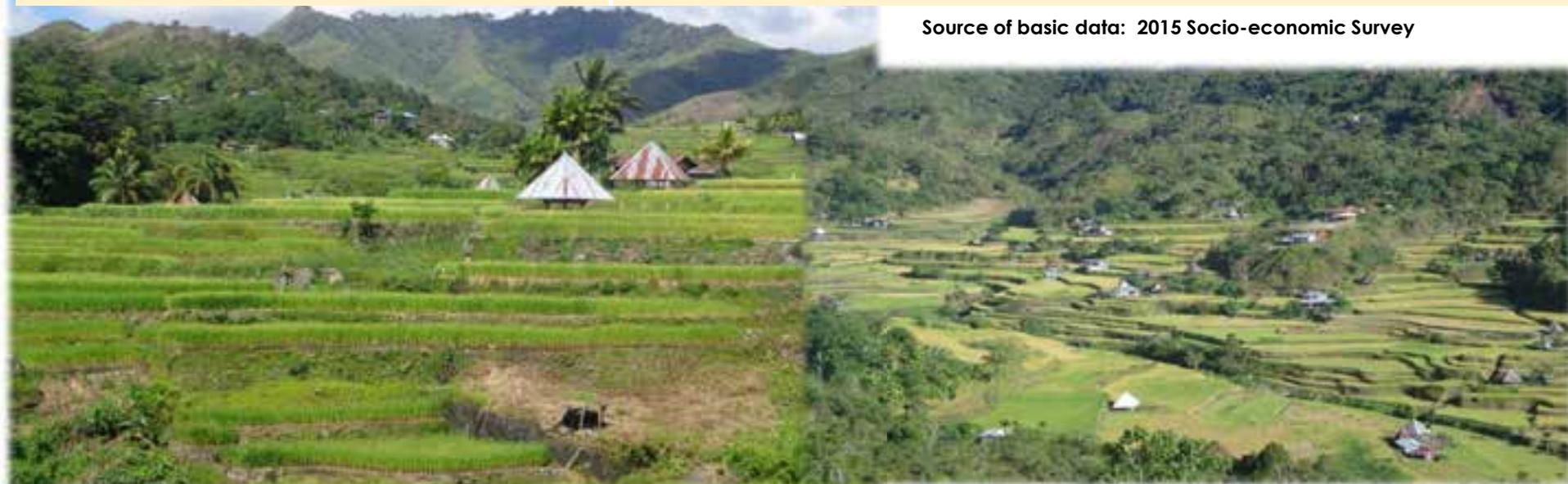
Zone	Owner cultivator	Share Tenant
Zone 1 (n=29)	76.92	17.95
Zone 2 (n=7)	87.10	3.23
Zone 3 (n=17)	57.14	32.54

Source of data: CBMS

Average rice farm size (ha.) by zone, 2015

Zone	Area (ha)
Zone 1	0.60
Zone 2	1.63
Zone 3	0.51

Source of basic data: 2015 Socio-economic Survey



Cropping system by zone, 2014

(% of households)

Zone	Mono-cropping	Multiple Cropping	Inter-cropping	Agro-forestry
Zone 1	81.53	18.47	0.00	0.00
Zone 2	68.00	20.00	12.00	0.00
Zone 3	85.47	11.54	2.14	0.85
n	345	61	8	2

Multiple responses.

Source of basic data: 2015 Socio-economic Survey

Crops planted by zone, 2015

(% of households)

Zone	Rice	Corn	Coconut	Fruit Trees	Others
Zone 1	93.2	3.1	0.0	0.6	3.1
Zone 2	51.6	6.5	6.5	12.9	22.6
Zone 3	84.4	2.4	1.2	5.2	6.8
n	377	13	5	4	43

Multiple response.

Source of basic data: 2015 Socio-economic Survey

Crop production problems by zone, 2015 (in percent)

Zone	Pests and diseases	Drought	Lack of capital	Others
Zone 1 (n=124)	62.90	25.00	9.68	2.42
Zone 2 (n=16)	62.50	6.25	18.75	12.50
Zone 3 (n=135)	67.41	18.52	2.22	11.85

Multiple response.

Source of basic data: 2015 Socio-economic Survey



Marketing problems by zone, 2014 (in percent)

Zone	Poor farm to market road/ Transport	Low price of produce	Distance to market	Others
Zone 1 (n=29)	51.72	6.90	41.38	0.00
Zone 2 (n=7)	28.58	57.14	14.29	0.00
Zone 3 (n=17)	0.00	94.12	0.00	5.88

Multiple response.

Source of basic data: 2015 Socio-economic Survey

Source of income by zone, 2014

Source of Income	Annual Income by Zone		
	1	2	3
On farm	21,122	27,825	15,624
Off farm	37,638	38,040	53,999
Non-farm	42,410	47,409	157,883
Total	58,789	94,338	172,592



Source of data: 2015 Socio-economic Survey

Source of non-farm income by zone, 2014 (in percent)

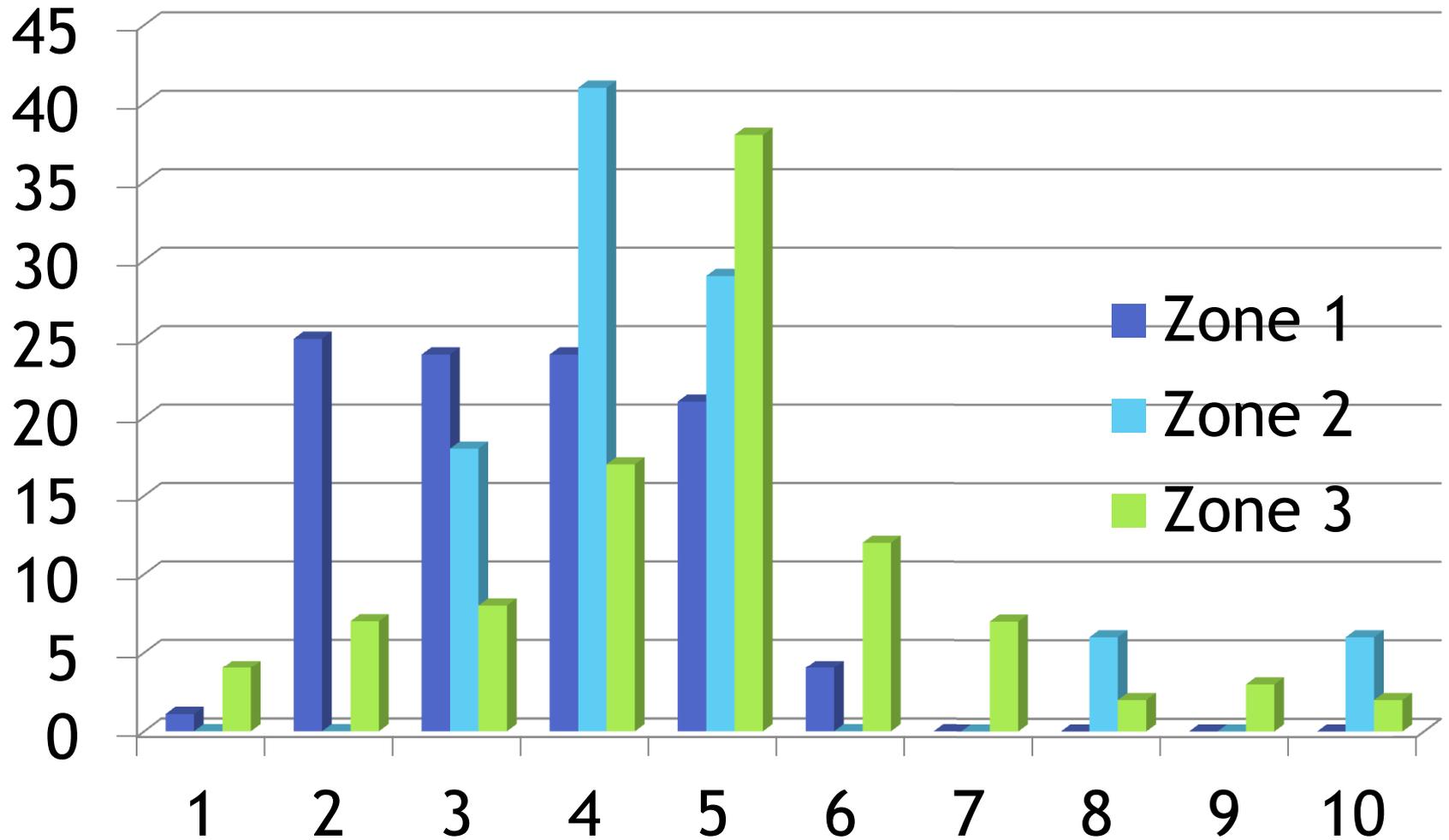
Non-farm employment	Zone			Total
	Zone 1	Zone 2	Zone 3	
Professional	5.19	3.70	14.58	12.41
Farm products	20.78	14.81	4.09	9.77
Sales worker	5.19	0.00	11.00	8.64
Service worker	3.90	7.41	13.81	10.71
Laborer, production worker	38.31	48.15	23.27	30.64
Local/national government official	14.94	7.41	11.76	13.35
Overseas Contract Workers	0.00	3.70	0.51	0.56
Others	11.69	14.82	20.98	13.92
Total	100.00	100.00	100.00	100.00
n	154	27	391	532

Households by different dimensions of poverty (in percent)

Dimensions of Poverty	Zone			Total
	1	2	3	
Households with income below poverty threshold	74.90	65.18	52.40	60.34
Households with income below food threshold	63.18	48.03	36.85	45.55
Households who experienced food shortage	1.71	0.45	0.16	0.61

Source of data: CBMS

Perceived Quality of Life



Extent of erosion, poverty incidence and hunger by Zone.

Zone	Extent of Erosion	Percent of Population Engaged in Agriculture	Poverty incidence		Households which Experienced Hunger
			Percent of Households Below the Poverty Threshold	Percent of Households Below the Food Threshold	
Zone 1	Most denuded	96	74.90	63.18	1.71
Zone 2	Moderate	94	65.18	48.03	0.45
Zone 3	Least	61	52.40	36.85	0.16

Conclusion

Zone 1

- most denuded among the three zones
- mostly depend on agriculture, very few small non-agricultural economic opportunities present in the zone.
- average rice farm size is small at 0.61 hectare and rice yield is lowest at 67.72 cavans per hectare.
- Poorest among the Zones

Conclusion

Zone 3

- the least poor based on the average annual income, incidence and dimensions of poverty, and the perceptions of the households on their quality of life.
- highest number of population but have more options for economic activities

Recommendations

- Both areas need intervention but of different nature.
- For Zone 1, livelihood opportunities (short-term and long-term) coupled with environmental programs are a must.
- For Zones 2 and 3, environmental programs are a priority.
- Particularly for Zone 3, there is a need to slow down the rate of population growth.

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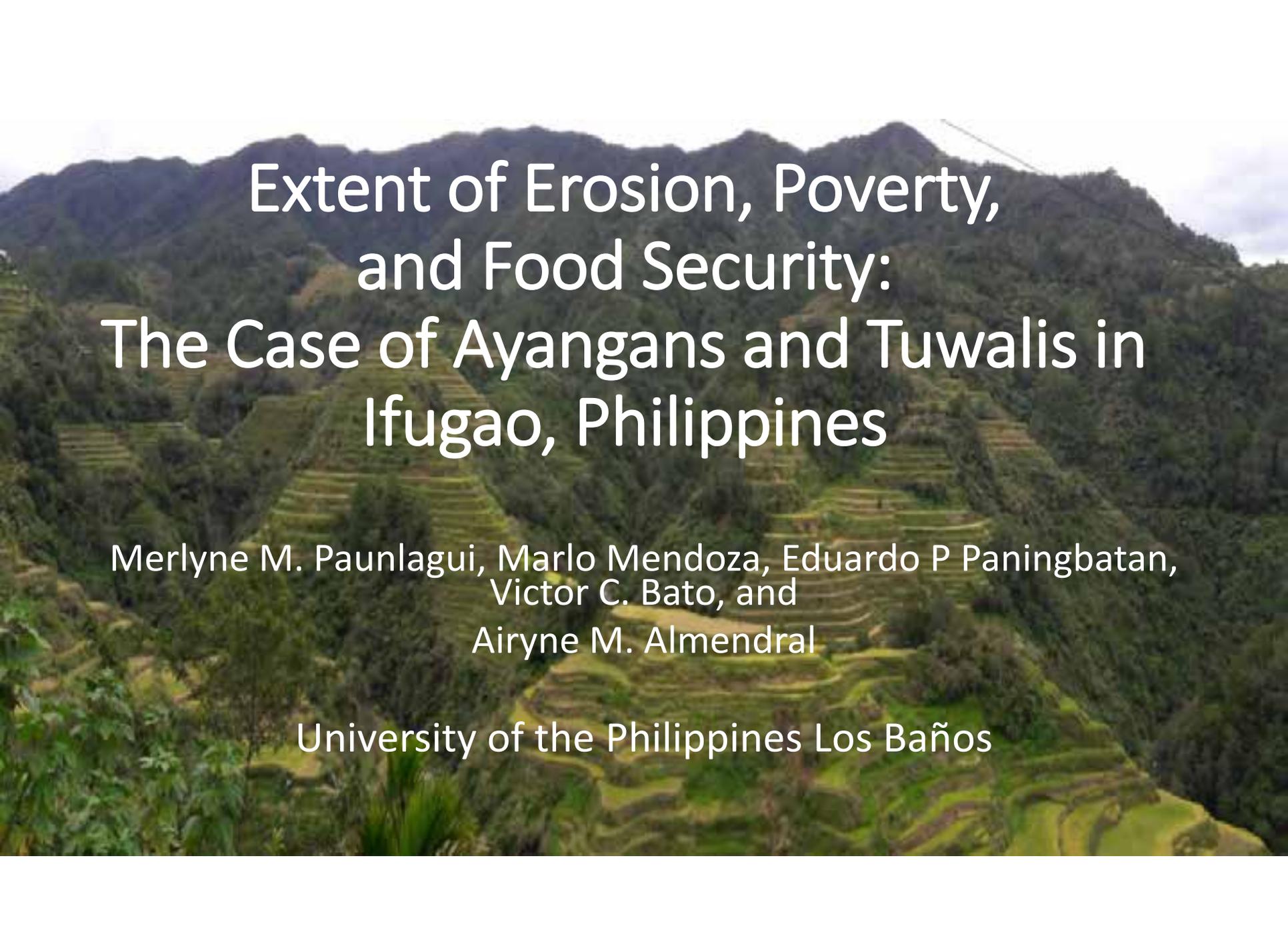
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Thank You



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