

Livelihood adaptations in upland, lowland and coastal ecosystems of Infanta, Quezon: A decade after the flashflood disaster

Damasa B. Magcale-Macandog

Institute of Biological Sciences, University of the Philippines Los Baños

**Co-authors: Lilibeth A. Acosta, Maria Victoria O. Espaldon, Elaine Kuan-Hui Lin, Paula Beatrice M. Macandog, Elena A. Eugenio, Edwin Rosell Abucay, Joan Pauline P. Talubo
Ma. Charisma T. Malenab, and Marlon G. Reblora**



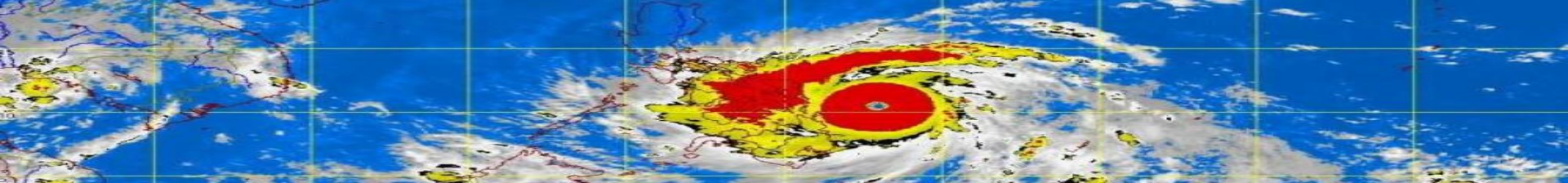
POTSDAM INSTITUTE FOR
CLIMATE IMPACT RESEARCH



Livelihood adaptations in upland, lowland and coastal ecosystems of Infanta, Quezon: A decade after the flashflood disaster

Outline:

1. Introduction
2. Objectives of the study
3. Case study area: Infanta, Quezon
4. Methods: Survey, FGD
5. Results
 - 5.1 HH demographics in 3 ecological zones
 - 5.2 Impacts on livelihoods
 - 5.3 Livelihood adaptations
6. Conclusions



Philippines is one of the world's most disaster-prone country (Center for Research on the Epidemiology of Disasters, 2010).

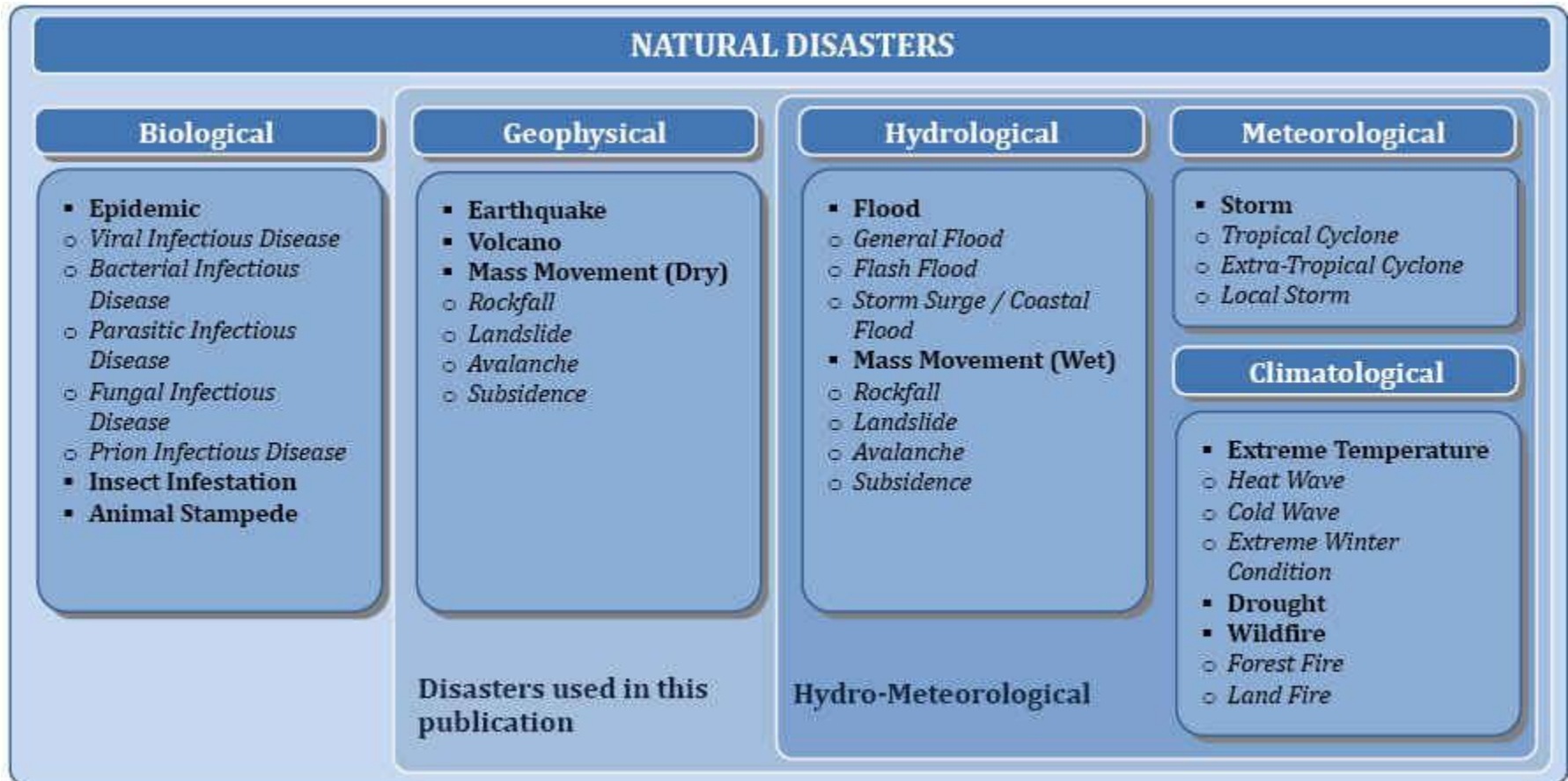
An average of 20 typhoons crosses the Philippine area of responsibility annually (PAGASA-DOST)

Typhoons in the Philippines caused floods & landslides due to:

- **lost up to 80 percent of mangrove forests in the last 50 years**
- **decrease in upland forest cover from 27.5M to 6.7M has between 1900 and 1990**



- Landslides can be classified under hydrological or geophysical, depending on the mechanism which triggered the particular event.



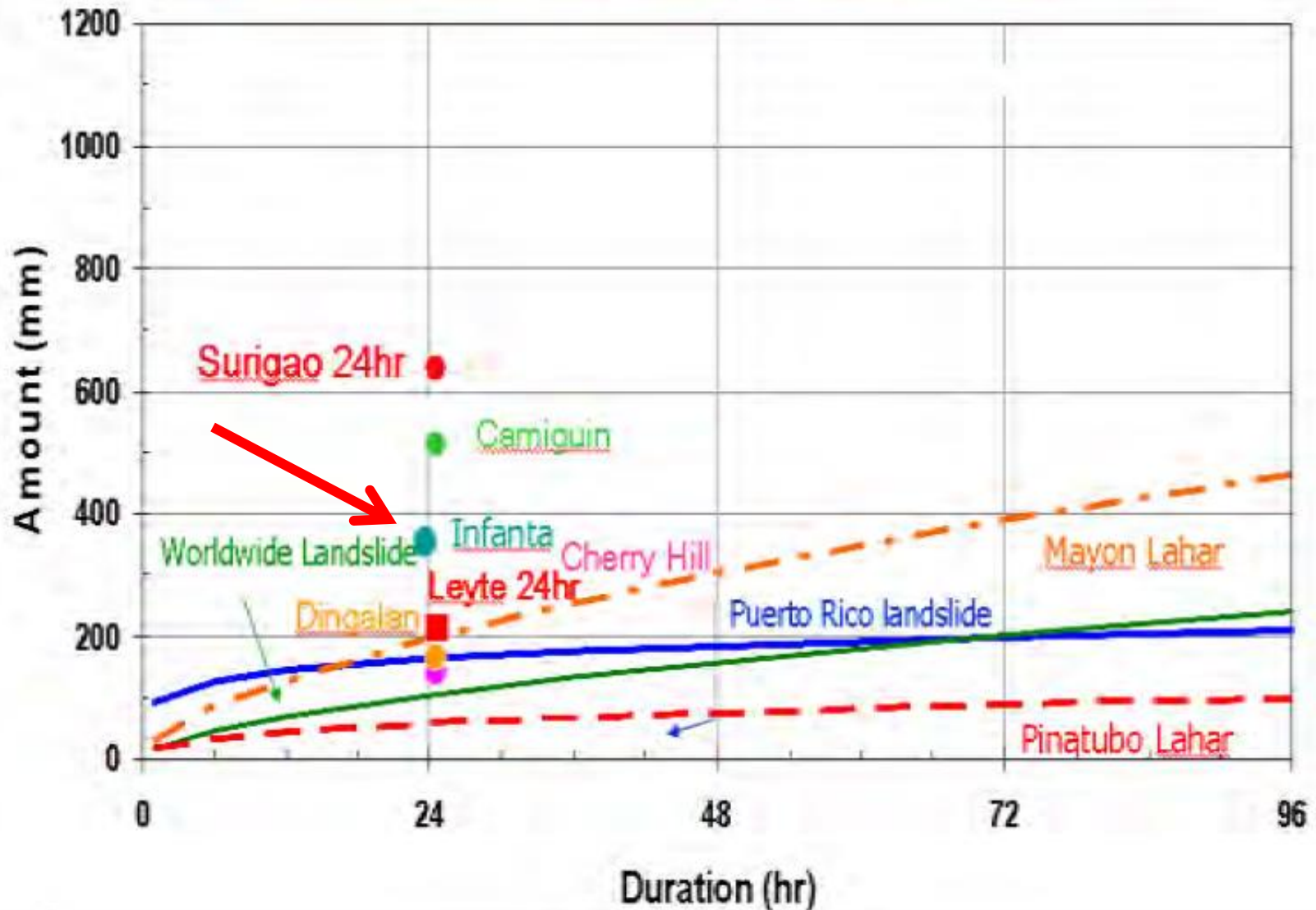
Classification of Natural Disasters (CRED, 2010)

Philippines: Rainfall-induced Landslide events

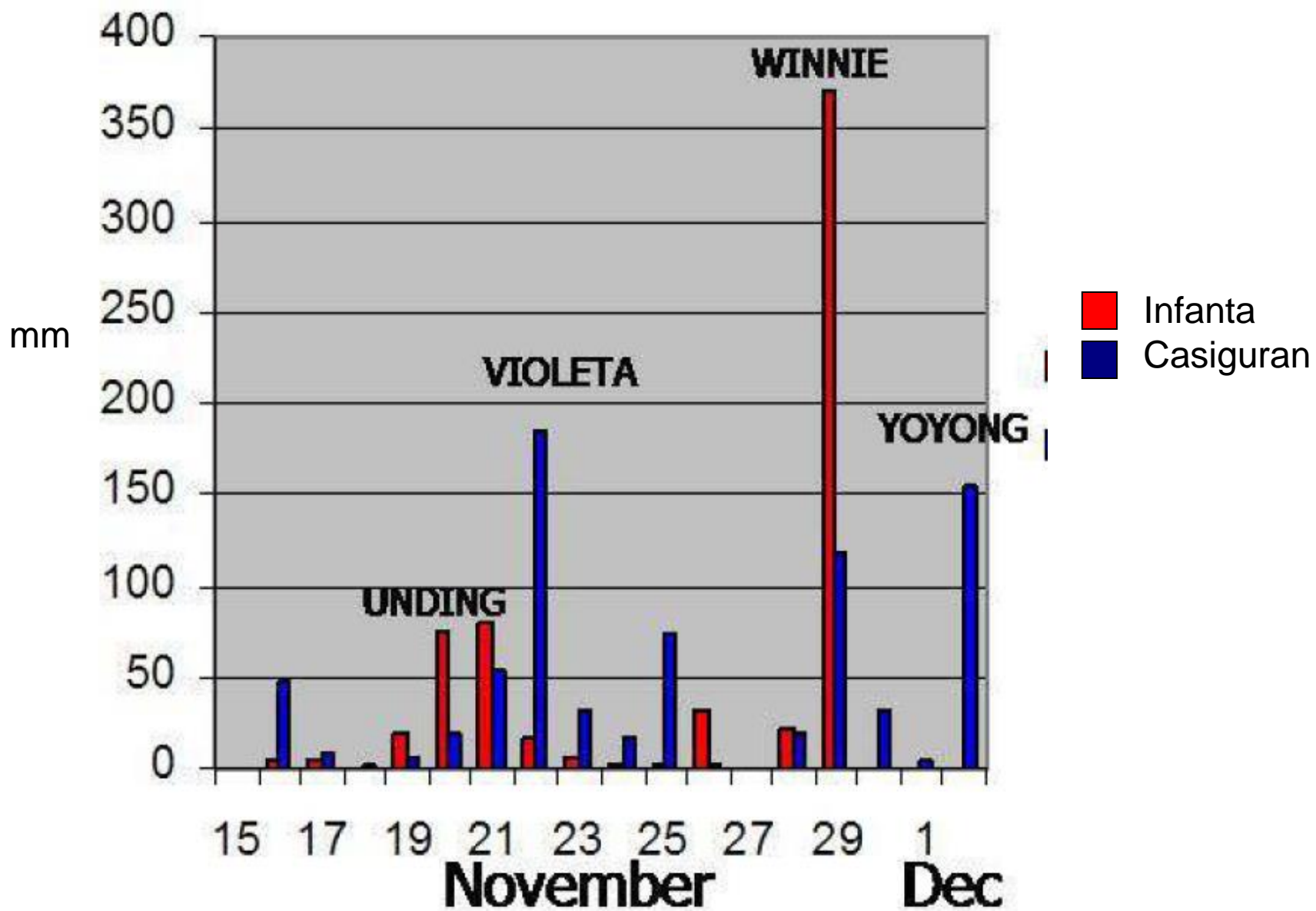
YEAR	RAINFALL EVENT	LANDSLIDE
2012	Pablo	New Bataan, Compostela Valley
2010	Ondoy	Parts of Metro Manila and Central Luzon
2009	Pepeng	Northern Philippines
2006	Caloy	Guinsaugon, Southern Leyte
2006	Durian	Albay
2006	Milenyo	Mt. Makiling in Laguna
2004	Winnie, Unding, Violeta, Yoyong	Infanta, Quezon
2000	Edeng	Payatas
1999	Ising	Cherry Hills
1991	Uring	Ormoc, Leyte

Collection of rainfall thresholds for various landslides in the Philippines.
Source: Daag et al. (2006) as cited by Ollet (2008)

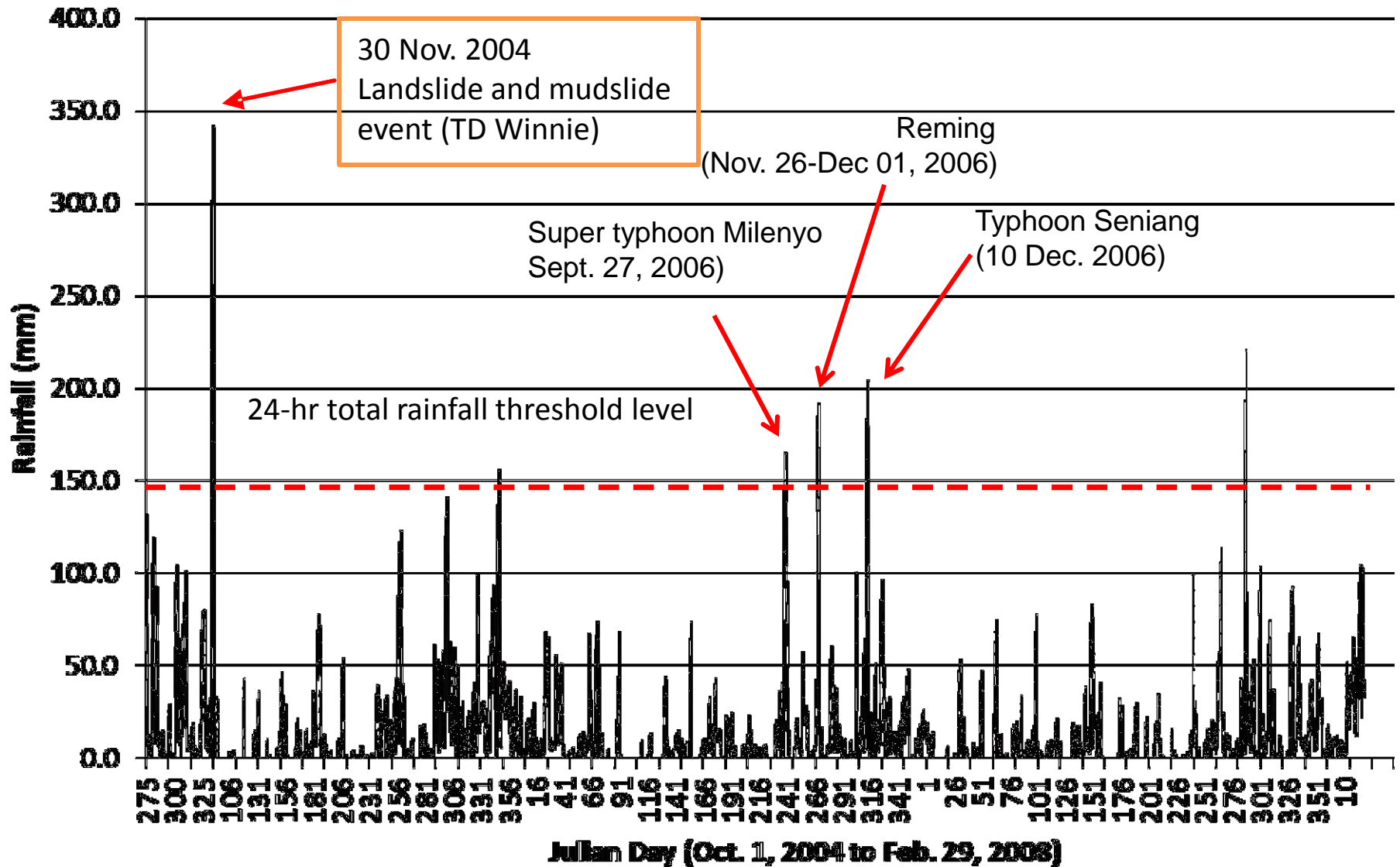
Rainfall Thresholds for Landslides and Debris Flows



Rainfall recorded during the successive typhoon events from Nov. 13, 2004 to Dec. 03, 2004

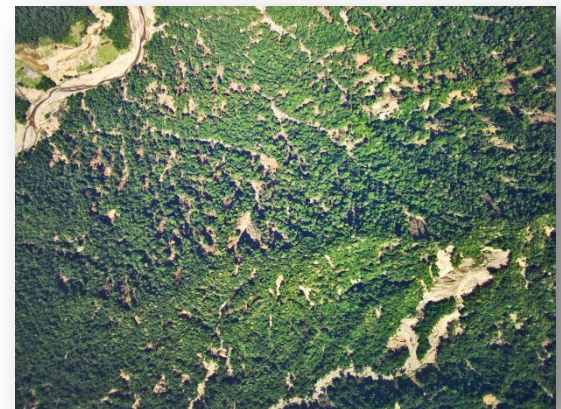
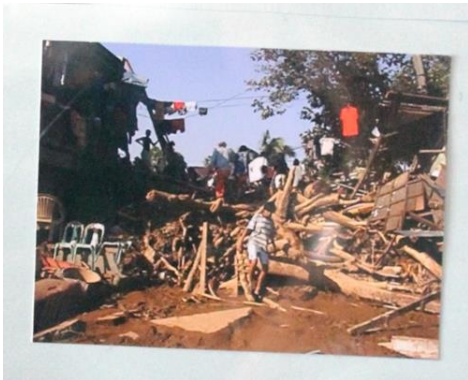


Daily rainfall from 01 October 2004 to 29 February 2008, Infanta, Quezon. (Data Source: PAGASA weather station in Infanta, Quezon)



The 2004 Landslide Event: Infanta, Quezon

- Between Nov. 14 and Dec. 29 of 2004, four successive typhoons (Winnie, Unding, Violeta and Yoyong) hit the Eastern coast of Luzon.
- Heavy rainfall caused massive landslides and devastating flash floods.



❑ These brought about damages to the lives and properties of communities in the towns of Real, General Nakar and Infanta in Quezon and Dingalan in Aurora.

❑ The calamity caused major physical damages and claimed the lives of more than 1,000 people.

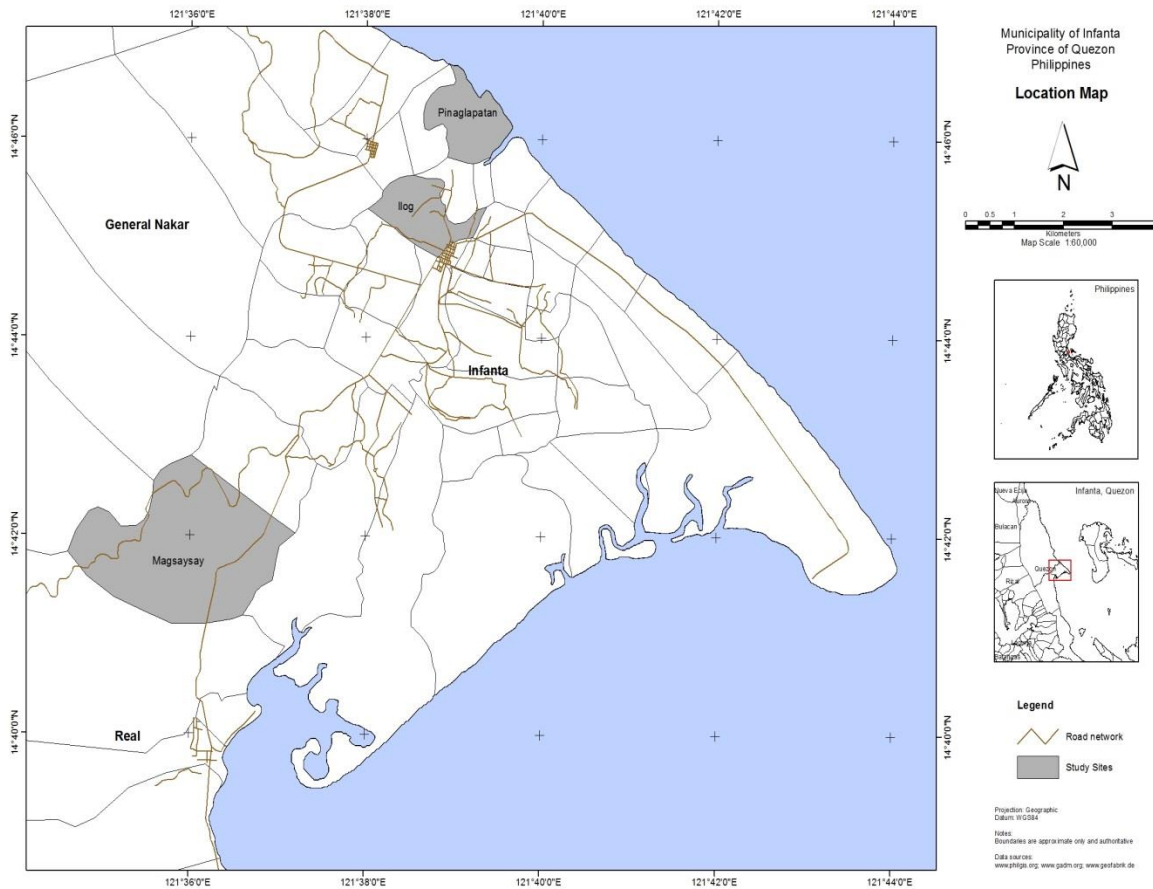
❑ As reported by the Office of the Civil Defense, more than 2.3 million people were affected and about P4.6 billion were lost in terms of infrastructure and agricultural damages (Cruz, 2005).



The Study Area



Infanta, Quezon



- 144 km northeast of Manila
- Type II Climate: No Dry Season but a very pronounced period of maximum rainfall from November to February
- a floodplain at the foot of the Sierra Madre
- total land area of 342.76 sq. km (34,276 ha)
- Population of 64,866 (Census, 2010 as cited in www.infanta.gov.ph)

Quickbird Satellite Image of Infanta



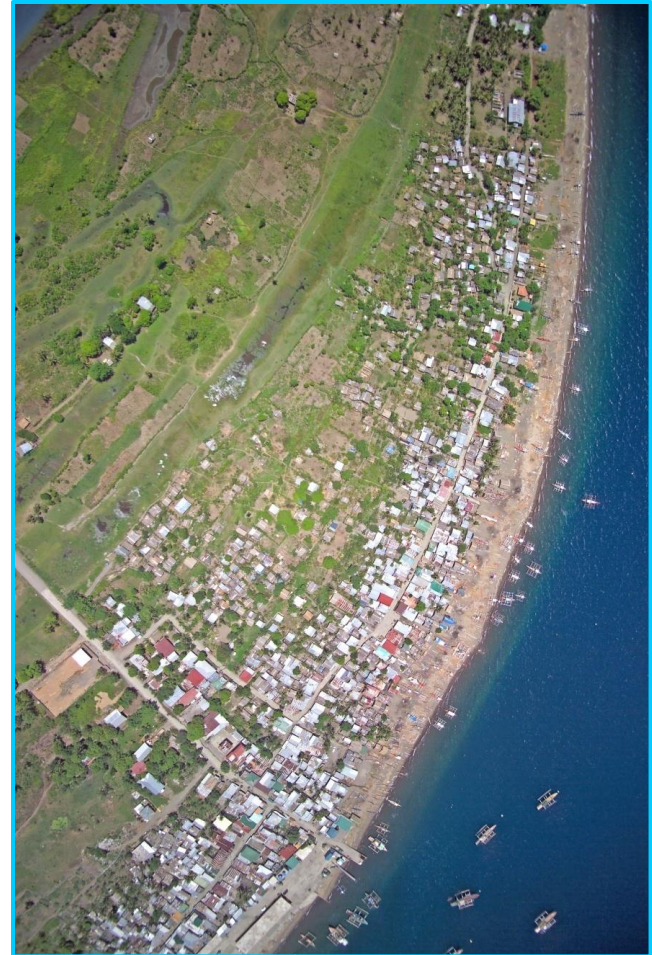
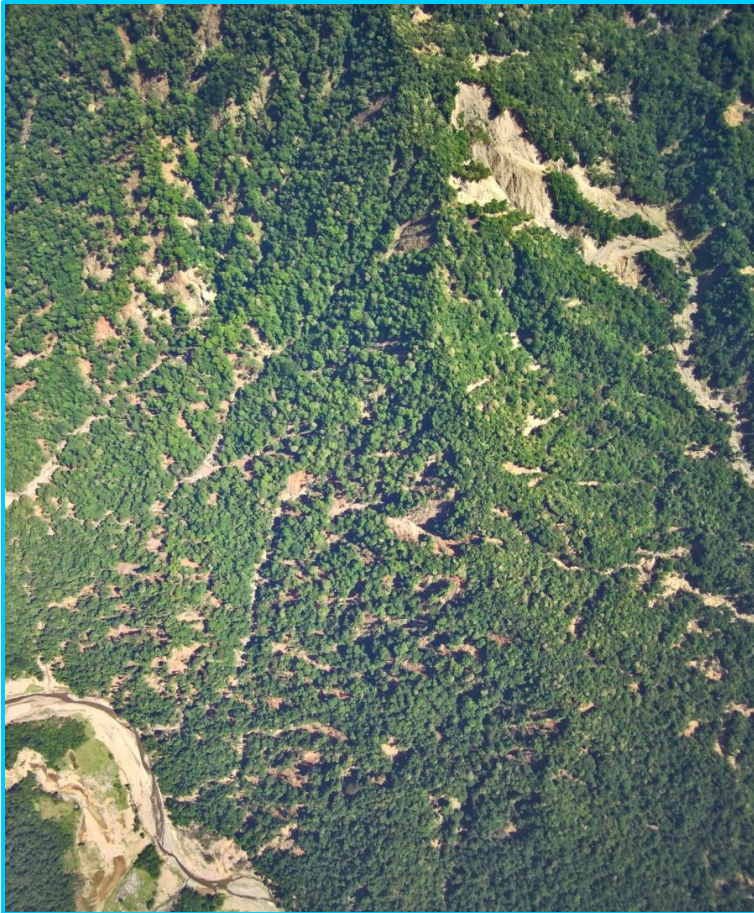
Brgy. Poblacion



Agos River

Aerial Photos of Infanta

Portion of Agos Watershed



Coastal area of Infanta

OBJECTIVE

To compare the livelihood adaptations in upland, lowland and coastal ecosystems of Infanta, Quezon



Methodology

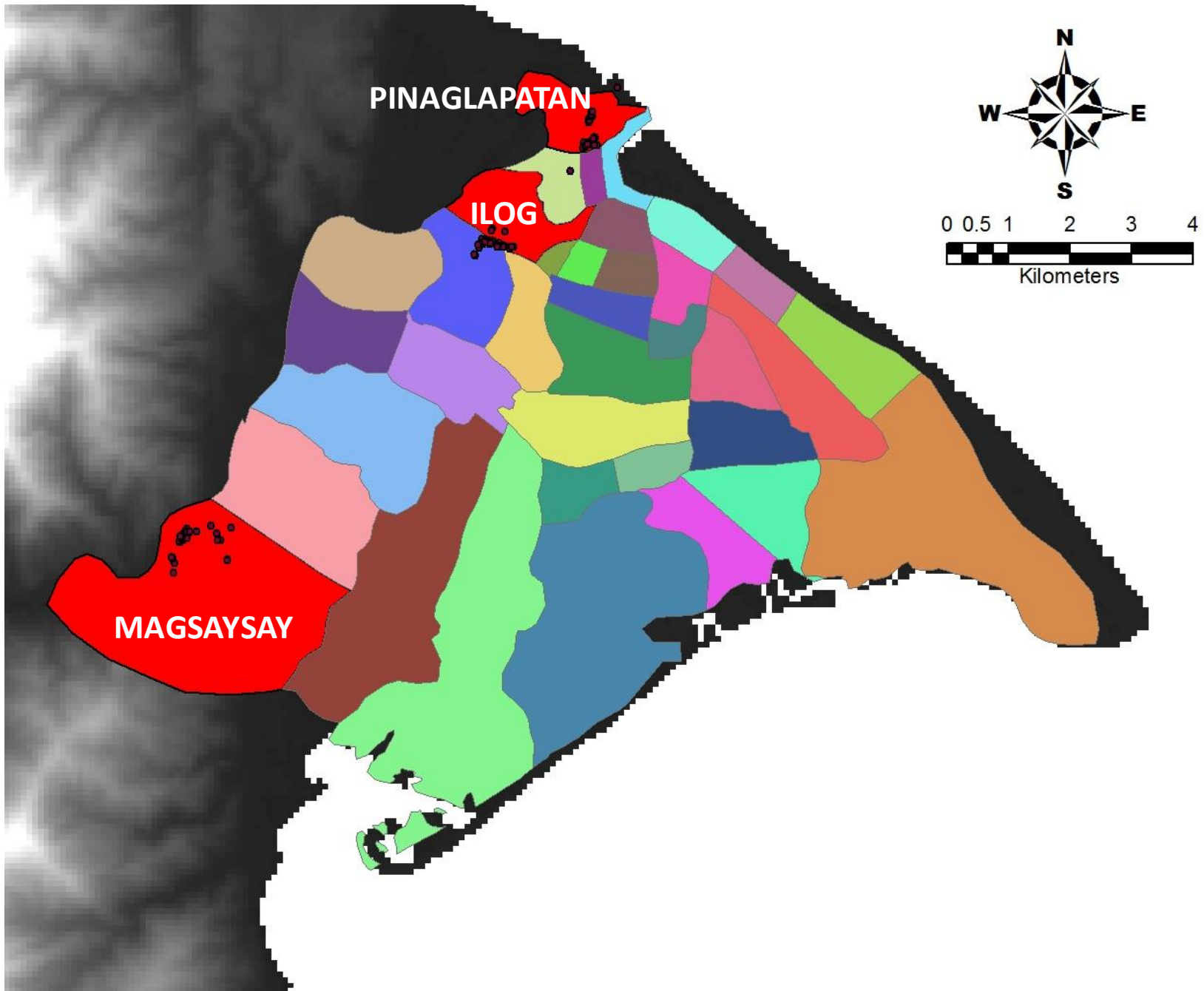
Reconnaissance, HH Survey and FGD

- **Years: 2008, 2013**
- HH demographic
- Livelihood activities
- HH survey: Magsaysay (33), Ilog (39), and Pinaglapatan (35) – *simple random sampling on site (Cochran, 1977)*
- FGD: local communities, LGU officials



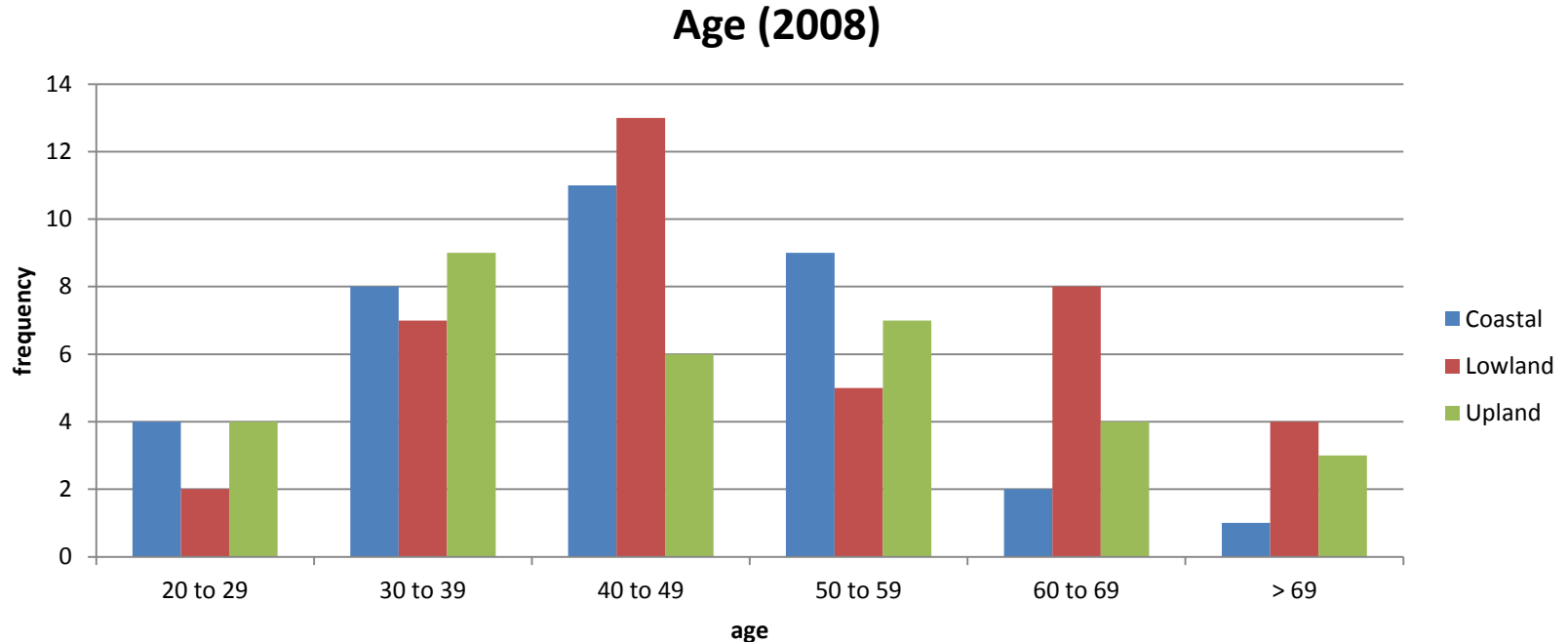
2013 HH Survey Research Team





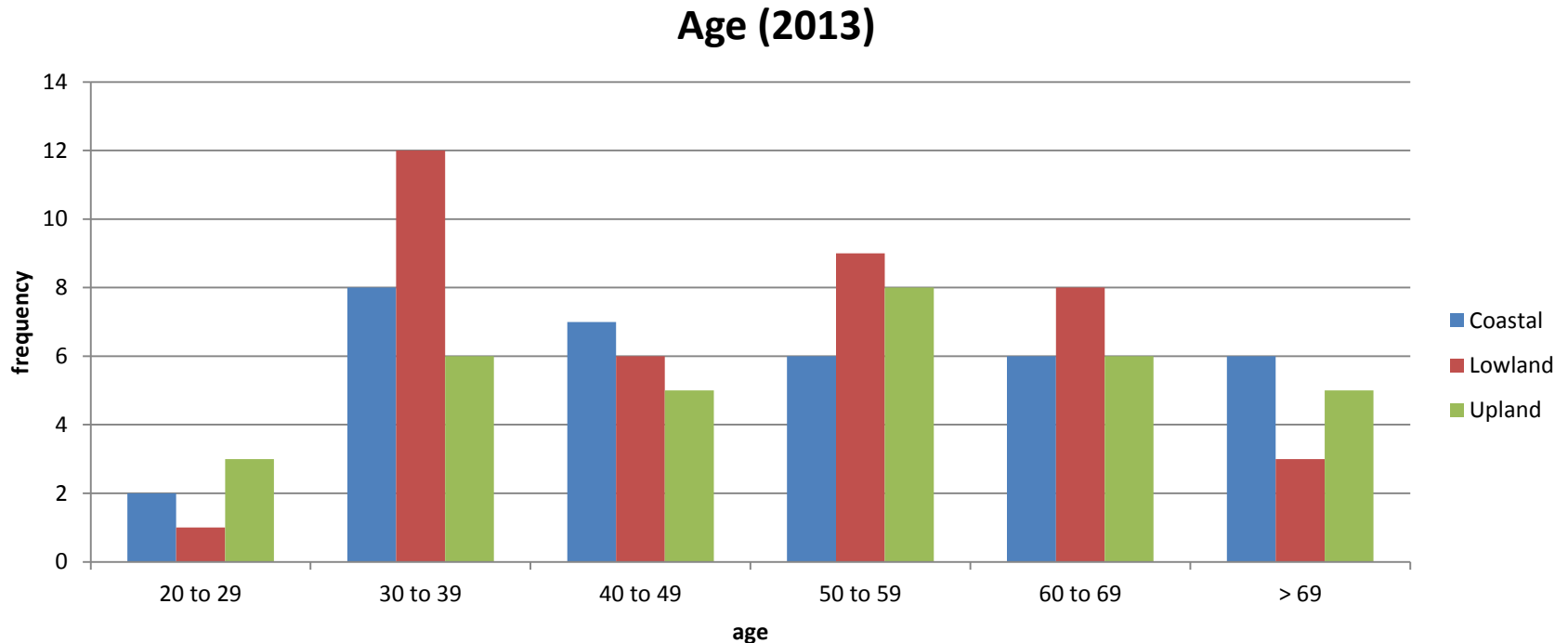
RESULTS

Age Classes



- Majority of respondents in coastal and upland ecological zones were within 30-49 years old classes
- Majority of respondents in lowland ecological zones were within 30-59 years old classes

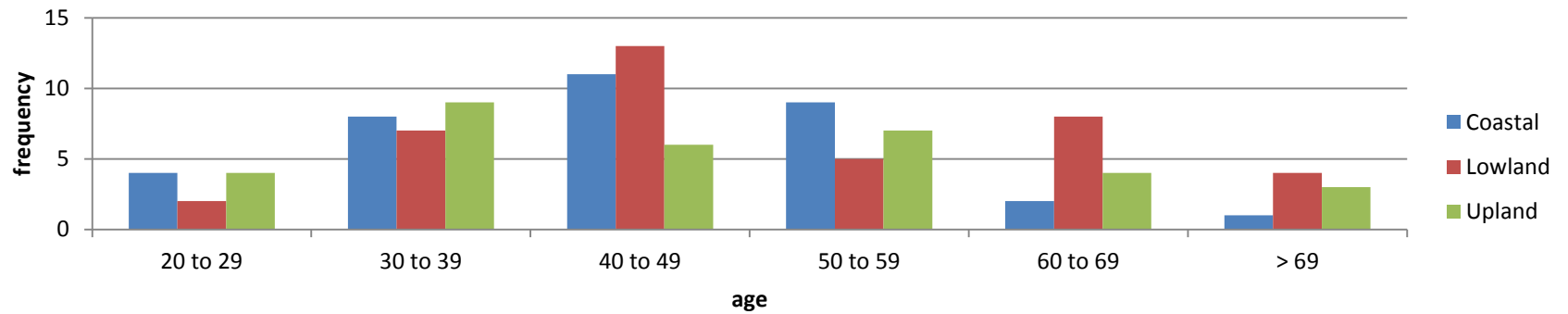
Age Classes



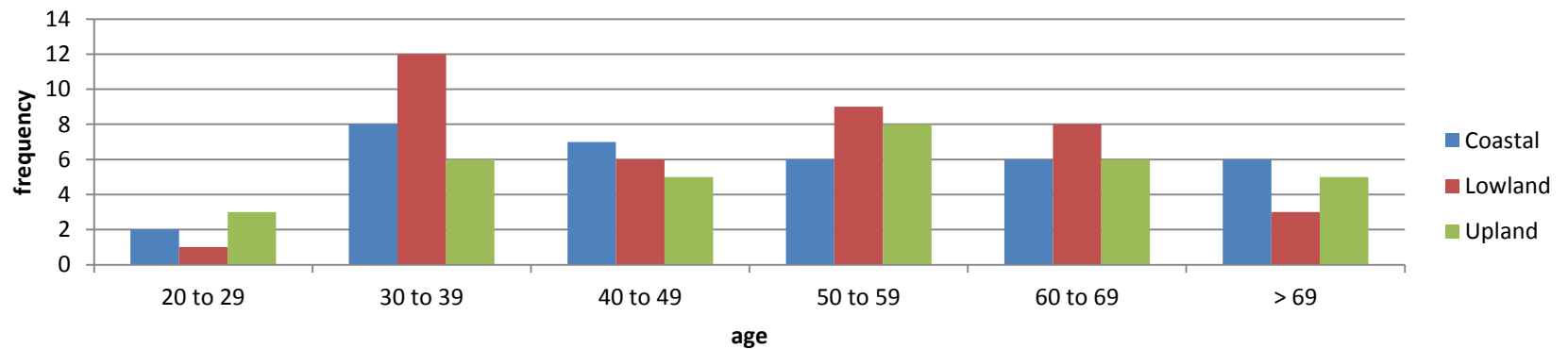
In all three ecological zones, the age classes of majority respondents ranged from 30-69 years old.

Age

Age (2008)

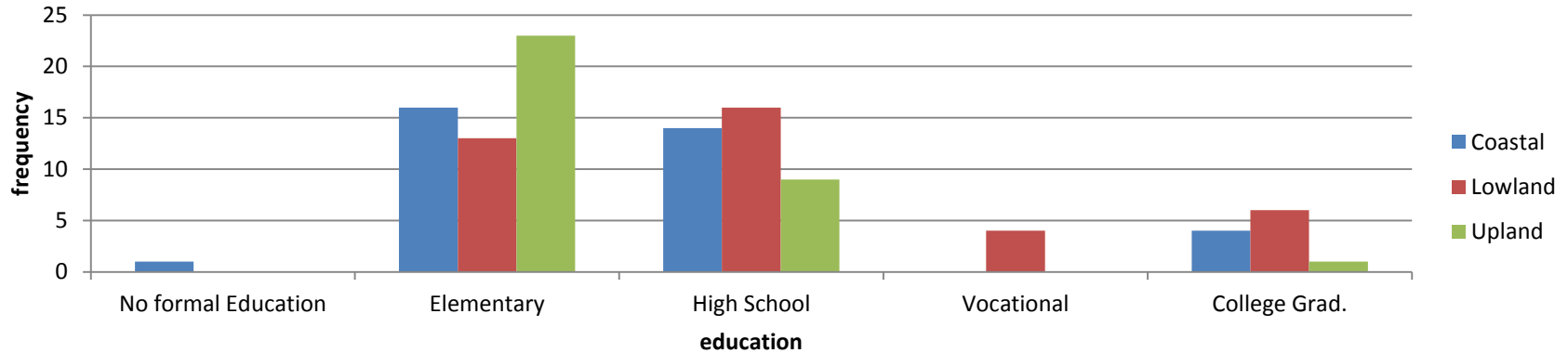


Age (2013)

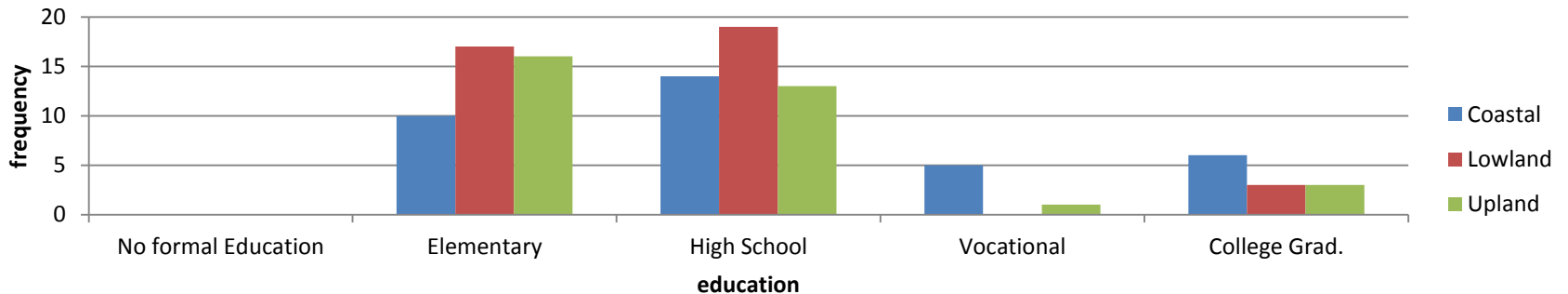


Educational Level

Education (2008)



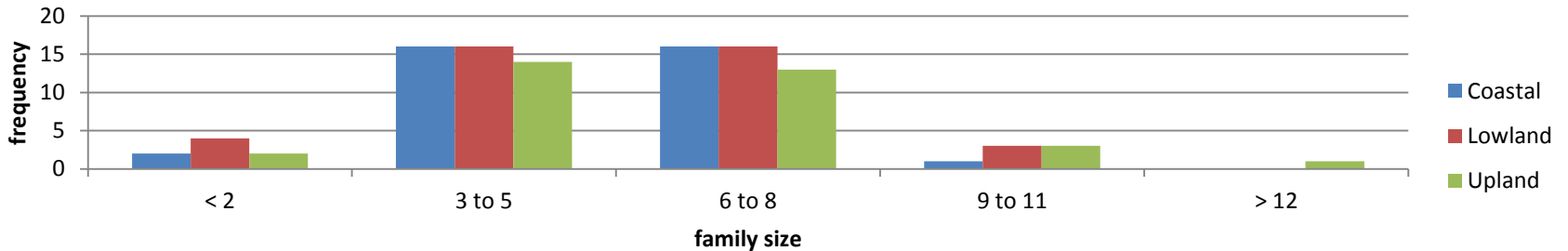
Education (2013)



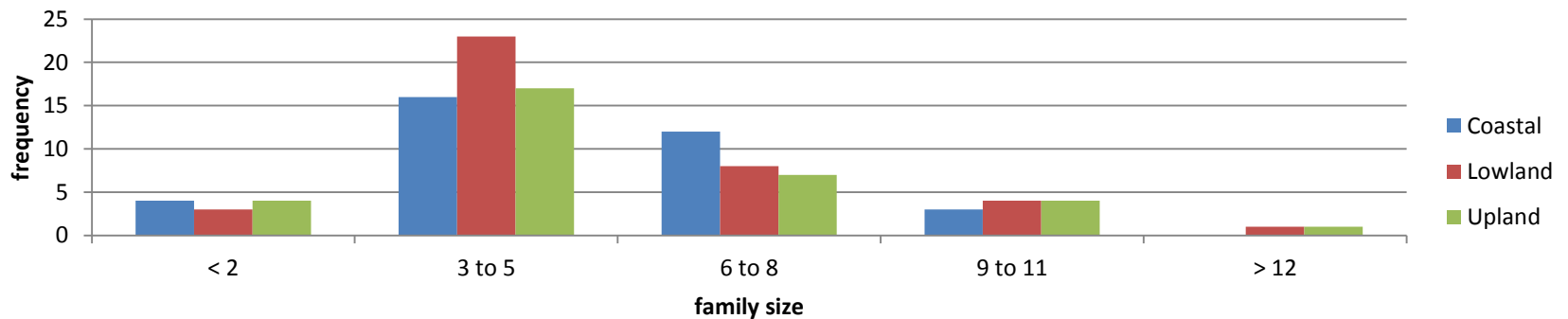
In all three ecological zones, most of the respondents had elementary and high school educational levels

Family Size

Family Size (2008)

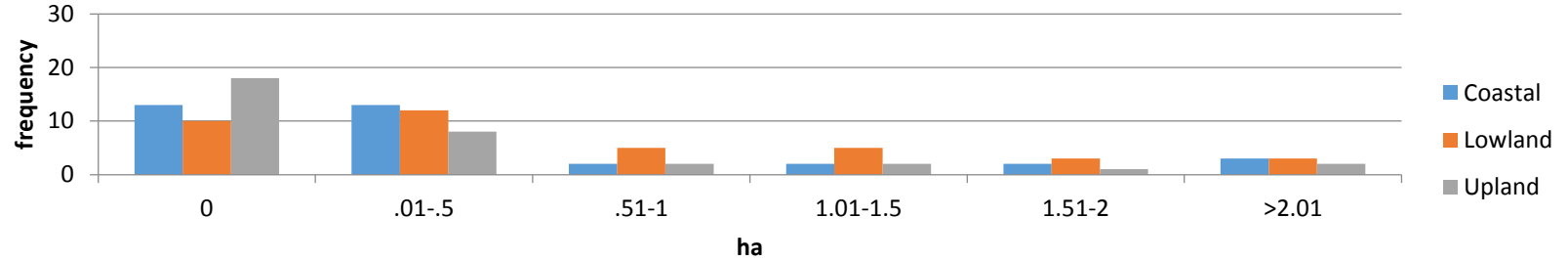


Family Size (2013)

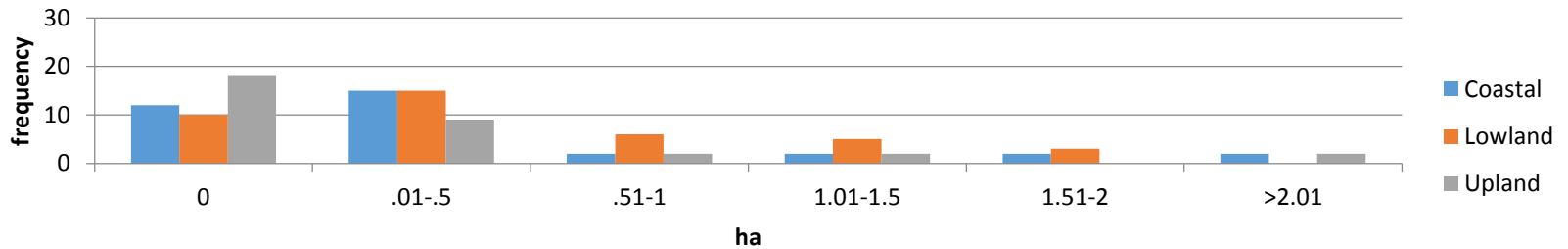


- In 2008, family of majority of respondents has 3-5 and 6-8 family members..
- In 2013, family size was reduced to 3-5 members.

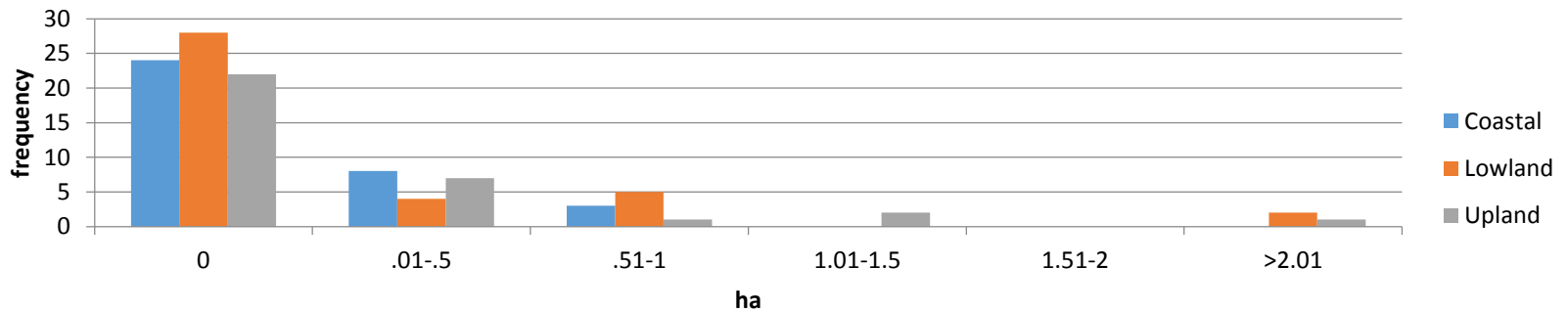
Farm sizes (2004, Before landslide)



Farm sizes (2008)

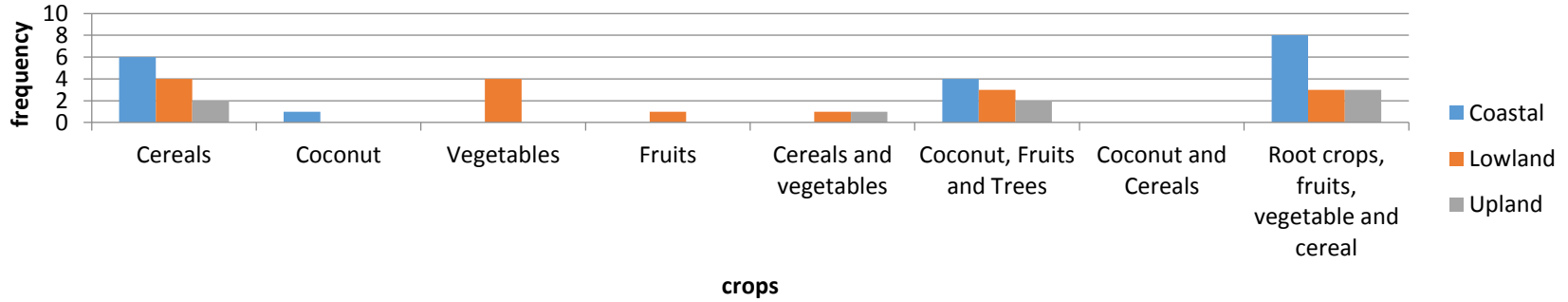


Farm sizes (2013)

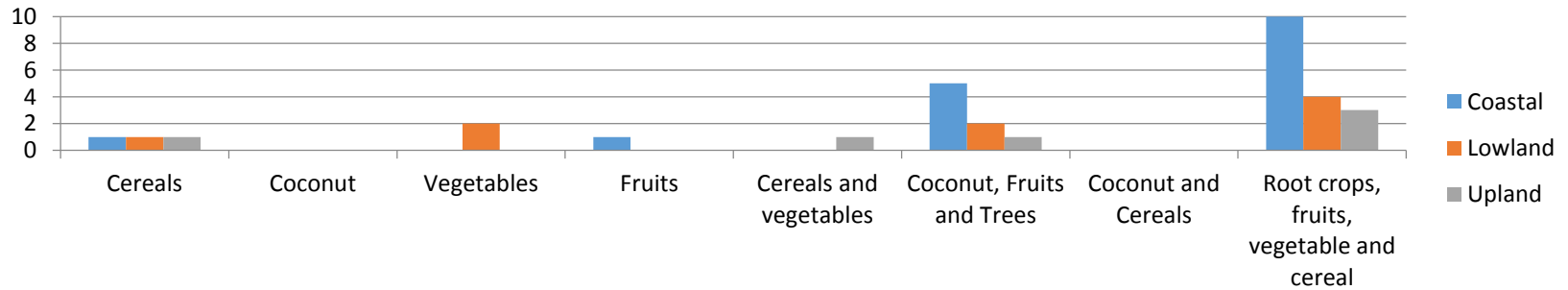


- Reduction in farm size in all 3 ecological zones in 2013

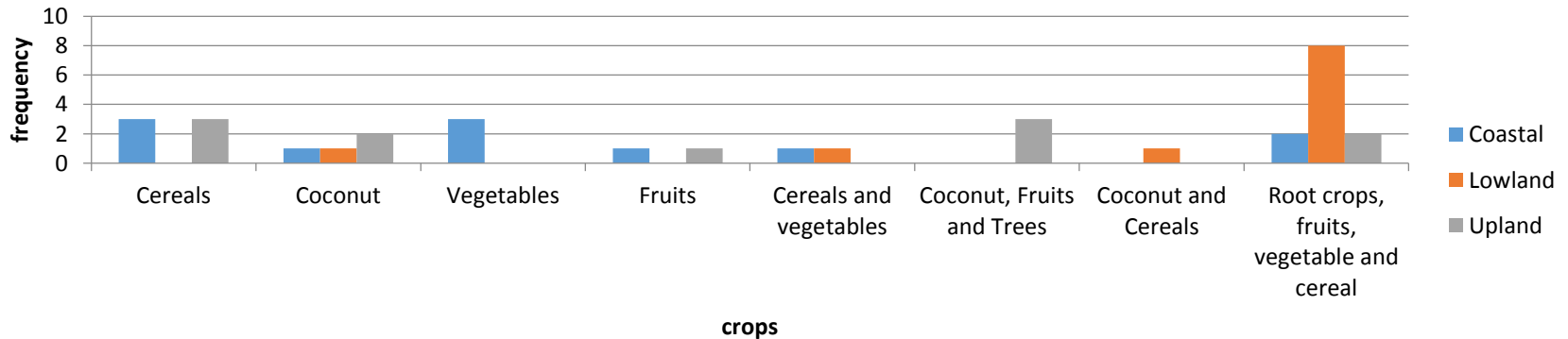
Crops (2004, Before Landslide)



Crops (2008)

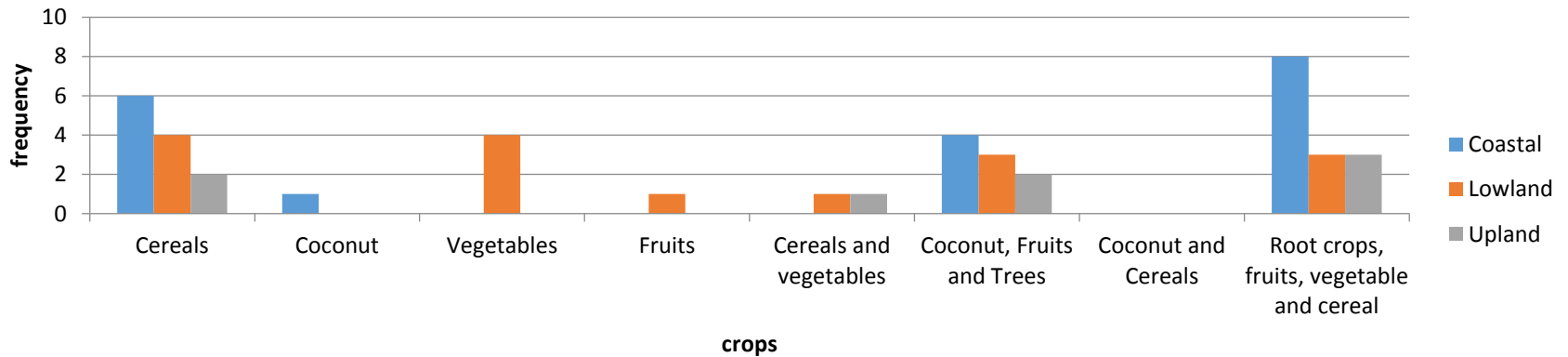


Crops (2013)



2004 Crops

Crops (2004, Before Landslide)

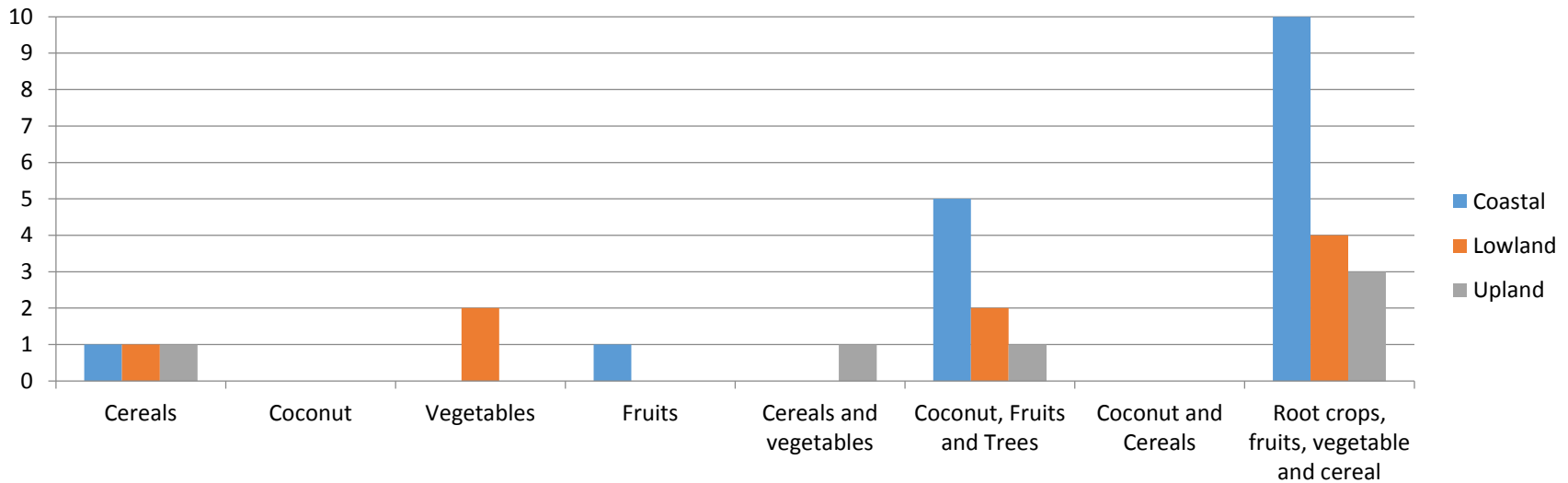


- In all 3 ecological zones:
Cereals (rice , corn);
coconut & fruit trees; root
crops, fruits, vegetables &
cereals
- Vegetables grown mainly in
lowland areas



2008 Crops

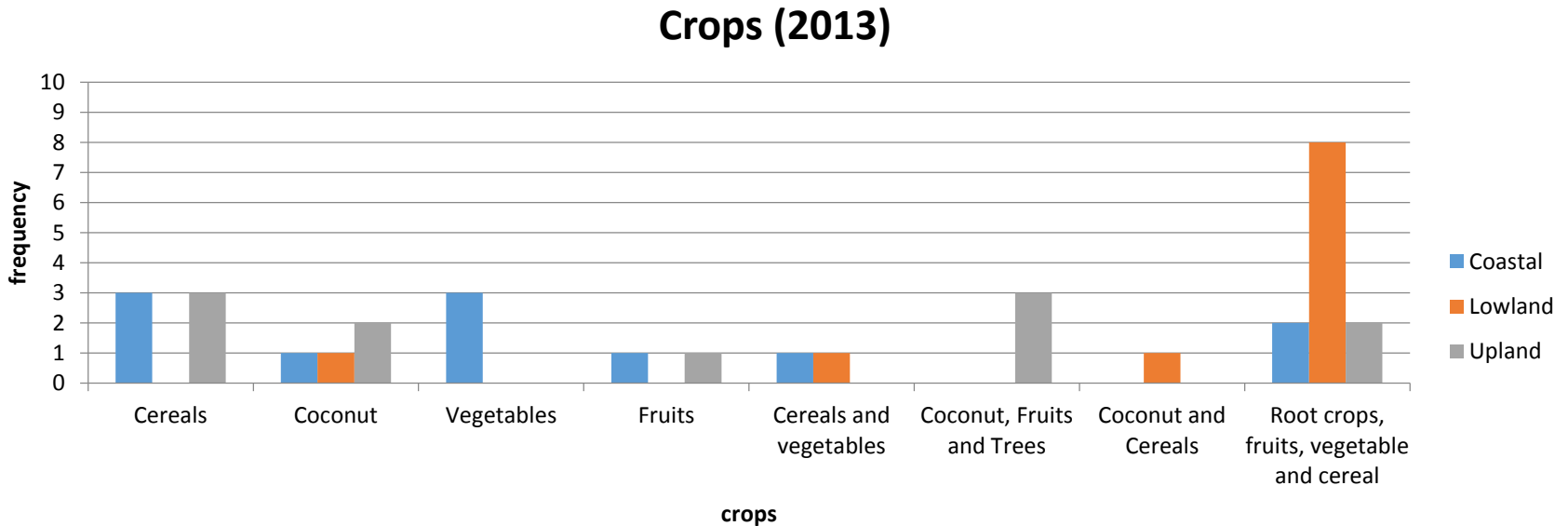
Crops (2008)



- Planting of cereals (rice and corn), coconut, vegetables and fruits in lowland and coastal areas severely affected by the landslide

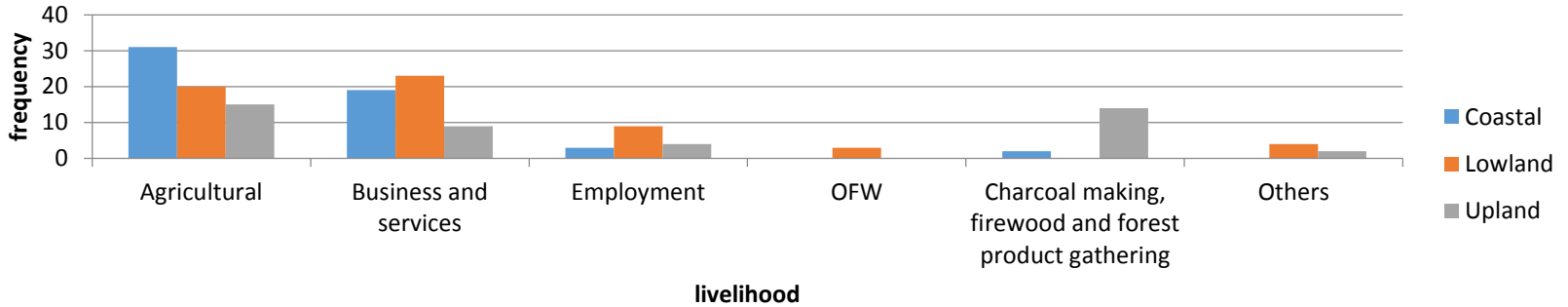


Crops 2013

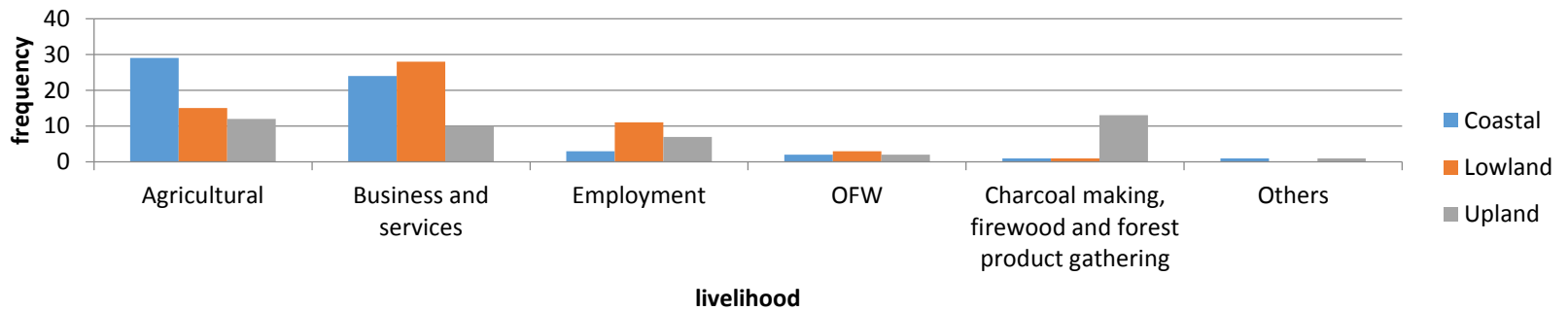


- Cereals were planted in coastal and upland areas but not in lowland areas
- Lowland areas were planted to a combination of root crops, fruits, vegetable and cereals
- Vegetables were planted in coastal areas
- Some farms in the uplands were planted to multi-storey plantations of coconut, fruits and trees
- **Coconut and Copra** – main crops of Infanta

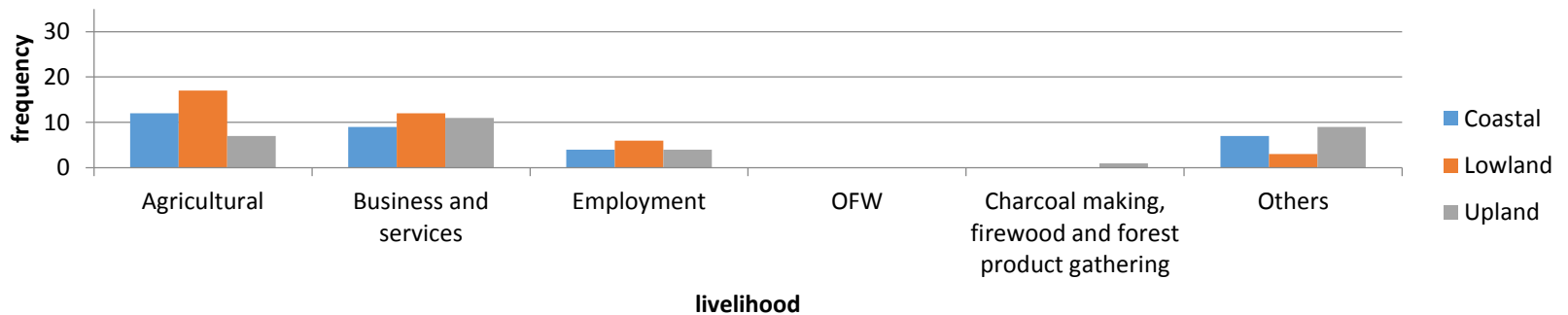
Livelihood (2004, Before Landslide)



Livelihood (2008)



Livelihood (2013)

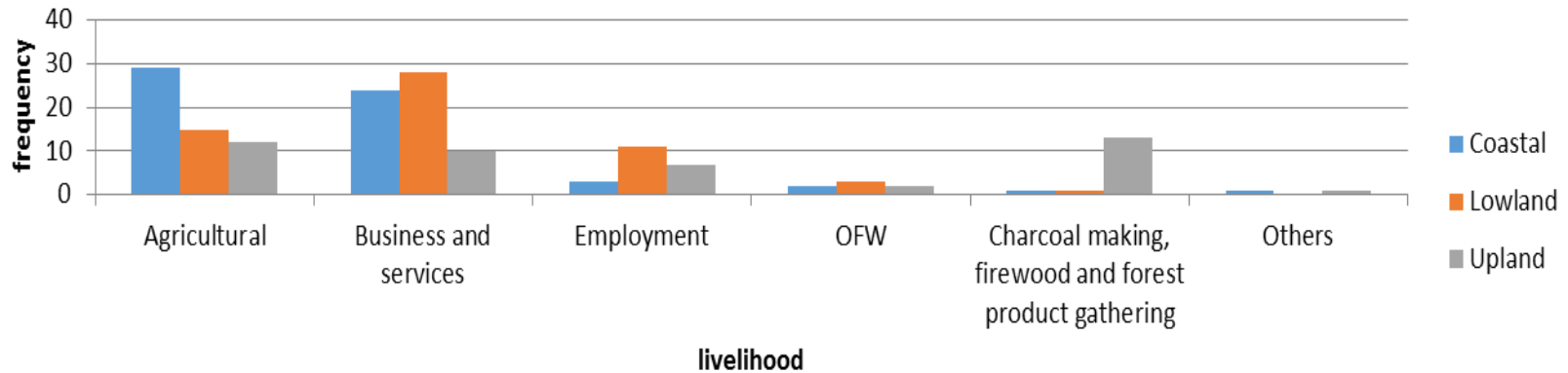


Livelihood (2004, Before Landslide)



- Agriculture was the main livelihood of respondents from the coastal and upland ecological zones
- Charcoal making and forest product gathering was a major livelihood in the uplands
- Business and services were the main livelihood of respondents in the lowland ecological zone

Livelihood (2008)



- Agriculture was the main livelihood in the coastal zone
- Business and services were the main livelihood in the lowlands
- Charcoal making and forest product gathering were the main livelihood activities in the uplands
- Employment was a minor source of livelihood

AGOS RIVER: 2008



2008 Charcoal Making along Agos River and Sea



Livelihood assistance from NGOs:

Production of charcoal bricks – this was a project created for the local women.

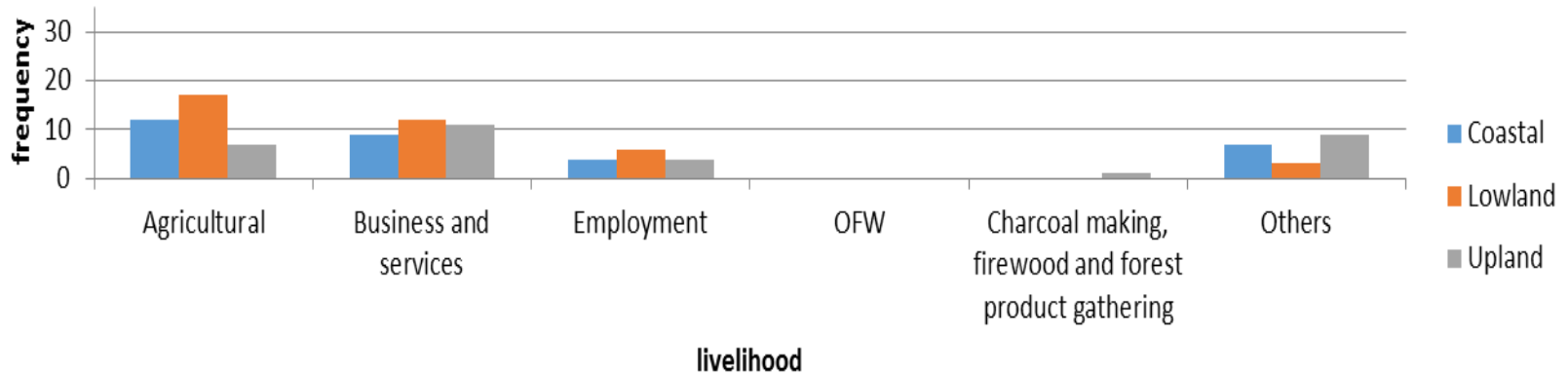
They made use of debris from flood that were scattered along the sea and river



2008 Upland Ecological Zone



Livelihood (2013)



- Agricultural activities in the coastal zone greatly reduced
- Charcoal making and forest product gathering in the upland zone greatly reduced
- Engaged in **OTHER** livelihood activities in the 3 ecological zones:
 - With the completion of the diversion highway from Infanta to Manila, many residents sought **JOBS** in Metro Manila
 - Tricycle driver
 - Variety stores



2013 Upland and Lowland Ecological Zones



Planting Nipa in coastal areas: 2013



- Previously, there were a lot of abandoned fish ponds.
- The fish ponds were prolific during the 1980s-1990
- Locals started planting nipa trees on these abandoned areas
- NGO ICDAI helped the locals process their permit with DENR, LGU was also a collaborator
- 17 hectares for Community-based Forest Management (CBFM) project was established back in 2002
- The local cooperative: Binonoan Producers' Cooperative (BiPCo)
 - o Mixed plantation
- Avicennia planted at coastal areas
- Nipa were planted at relatively higher lands
- Households own an average of 4-5 hectares of nipa
- There are currently 100 ha planted with Nipa in Brgy. Binonoan. While there are 80 ha in Brgy Alitas, a neighbour barangay.
- 15 barangays in Infanta plant Nipa trees

Nipa mangroves in coastal areas: 2013

Prospects of Bioethanol from Nipa

- Exploratory research was conducted by a Japanese private company
- Nipa is probably more sustainable than sugarcane
- By-products of Nipa tree include nipa sugar, lambanog, vinegar
- However, nipa sap could only be used for one purpose, depending on the personal preference of farmers (i.e. either lambanog or vinegar)
- Nipa is more resilient to typhoons than coconuts
- Binonoan Producers' Cooperative
- Organized by NGO 'ICDAY'



2008 VALE Research Team



2013 IRDR Research Team



ARIGATO GOZAI MASU

THANK YOU FOR LISTENING !

