RIDING THE WAVES OF CHANGE
STORIES TO INSPIRE

PAMBANSANG PANGASIWAAN SA KABUHAYAN AT PAGPAPAUNLAD · REPUBLIKA NG PILIPINAS ·

PHILIPPINE STATISTICS AUTHORITY

NATIONAL MAPPING AND RESOURCE INFORMATION AUTHORITY 1987

PCSD

WESTERN PHILIPPINES UNIVERSITY · 1910 ·

CONSERVATION INTERNATIONAL

MUNICIPALITY OF SOFRONIO ESPAÑOLA · 1995 ·

WAVES

THE WORLD BANK

WHY WAVES FOR THE PHILIPPINES

- Typhoon Haiyan, 2013
  - affected 14.1 million people
  - displaced 4.1 million
  - killed 6 201 and
  - caused severe damage to the agriculture sector (FAO)

- PHILEX MINING INCIDENT, 2012
  - P6.42 billion watershed damage cost as source of hydropower

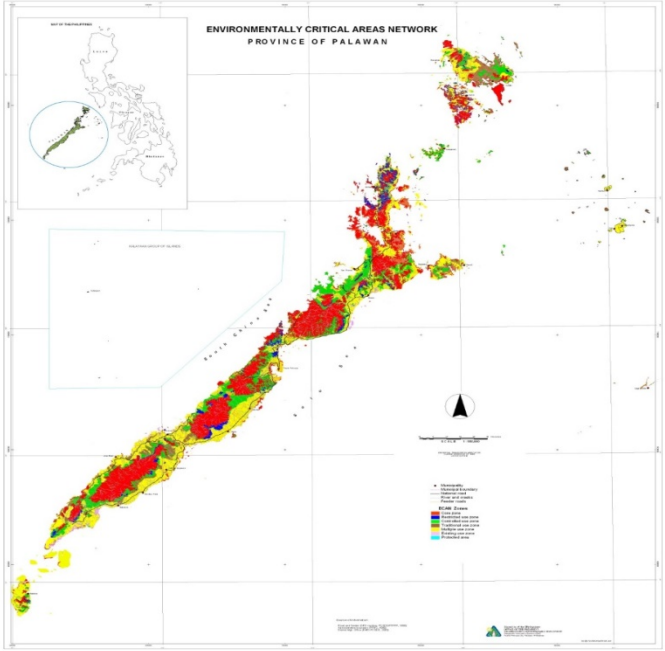
WAVES

SOUTHERN PALAWAN ECOSYSTEM ACCOUNTS

LAND USE ACCOUNT

UPLAND

- Timber (Materials provisioning service)
- Carbon (Regulating service)
- Water (Regulating service)
- Soil erosion/sedimentation control (Regulating service)



LOWLAND

- Rice, Oil palm, Coconut (Food provisioning service)

COASTAL

- Fish production (Food provisioning service)
- Coral Reefs, Seagrass beds, Mangrove Forests (Ecosystem extent and condition)

CHALLENGE 1 – RARING TO GO, BUT LOOK MA NO FREE PRIOR AND INFORMED CONSENT (FPIC)

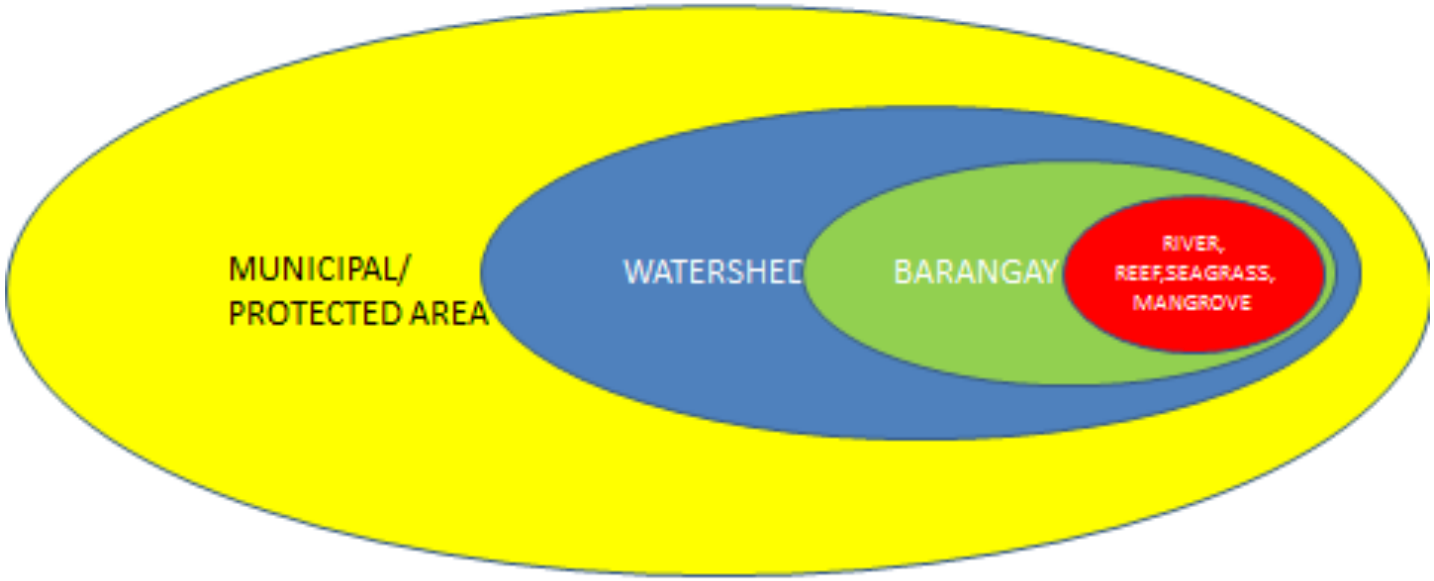
- **CERTIFICATION THAT ALLOWS FOR THE CONDUCT OF ANY ACTIVITIES IN THE ANCESTRAL AREAS OF THE INDIGENOUS PEOPLES**

- **NO CERTIFICATION, NO FIELD WORK**

CHALLENGE 2 - YES WE HAVE THE MAP/DATA BUT WE CANNOT USE IT FOR DEVELOPING THE ACCOUNT

SUMMARY

- DIFFERENT LEVELS OF DATA SETS



- DIFFERENT FORMATS: GIS READY, JPEG, PAPER FORMAT, DIGITAL
- MULTI-SOURCES: National, Provincial, Municipal, Private Sector

DATA ACCEPTABILITY AMONG PARTNERS/ LESS ACCURATE VS NO DATA

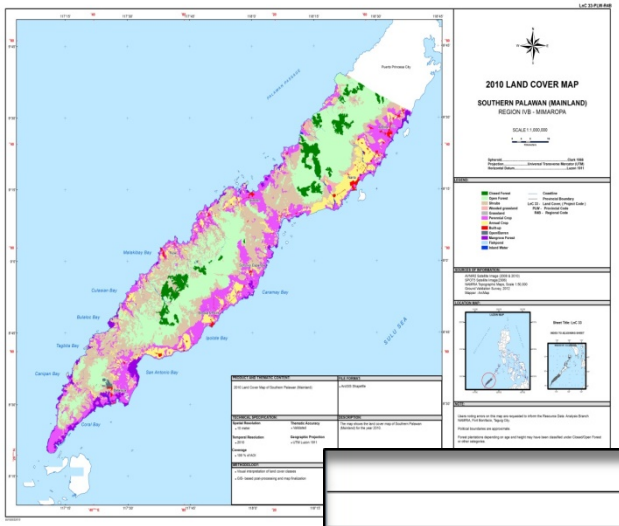
WAVES

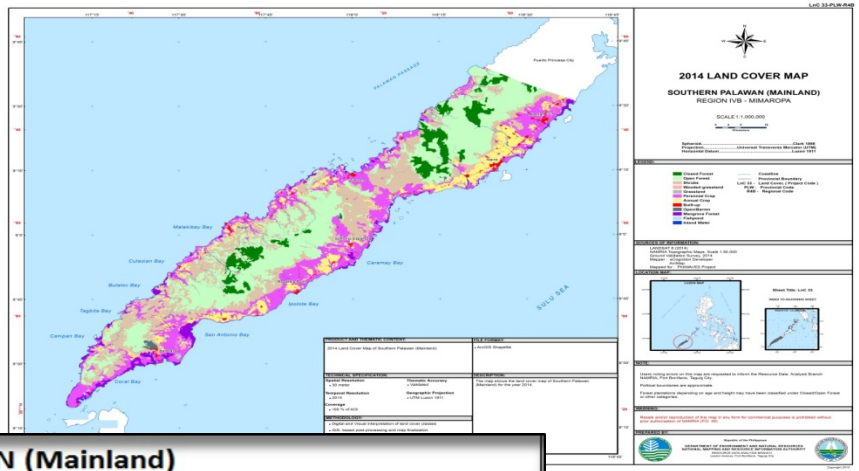
CHALLENGE 3- WHERE IS MY TEAM?

- MULTI-REPRESENTATION AT ALL LEVELS
- CLEAR TASKS
- CLEAR FUNDING SOURCE
- INCENTIVES

WAVES

WHERE WE ARE NOW?.... LAND COVER ACCOUNT





SOUTHERN PALAWAN (Mainland)				
	2010	2014	DIFFERENCE	PERCENT CHANGE %
FOREST/LAND COVER	AREA (Has.)	AREA (Has.)	AREA (Has.)	
Closed Forest	28,025	33,206	5,181	18%
Open Forest	184,235	181,486	(2,749)	-1%
Mangrove Forest	17,020	17,054	34	0%
Fallow	-	-	-	-
Shrubs	146,194	137,003	(9,191)	-6%
Wooded grassland	3,403	2,507	(896)	-26%
Grassland	881	1,821	940	107%
Annual Crop	47,950	50,340	2,390	5%
Perennial Crop	113,735	115,845	2,109	2%
Open/Barren	961	1,761	800	83%
Built-up	6,966	7,425	459	7%
Marshland/Swamp	-	-	-	-
Fishpond	1,440	1,407	(33)	-2%
Inland Water	2,696	3,653	957	36%
GRAND TOTAL	**553,508**	**553,508**	-	-

WAVES

WHERE WE ARE NOW?.... UPLAND

ACCOUNT TYPE	Closed forest	Open forest	Mangrove forest	TOTAL	% change
Opening Volume (2003)	25,984,864	9,648,187	1,536,456	37,169,506	
				0	
Volume Accumulation	479,305	11,243,049	273,527	11,995,882	
Due to Forest Conversion:	250,552	10,583,753	41,468	10,875,772	
Closed Forest to Other Land Cover		8,137,593	0	8,137,593	
Open Forest to Other Land Cover	250,552		0	250,552	
Mangrove Forest to Other Land Cover	0	0		0	
Shrubs to Other Land Cover	0	318,152	0	318,152	
Fallow to Other Land Cover	0	0	0	0	
Wooded Grassland to Other Land Cover	0	786,051	0	786,051	
Open/Barren to Other Land Cover	0	0	0	0	
Grassland to Other Land Cover	0	775,360	0	775,360	
Marshland to Other Land Cover	0	501,723	27,720	529,443	
Annual crop to Other Land Cover	0	0	0	0	
Perennial Crop to Other Land Cover	0	64,875	0	64,875	
Fishpond to Other Land Cover	0	0	13,748	13,748	
Built-up to Other Land Cover	0	0	0	0	
Inland Water to Other Land Cover	0	0	0	0	
Due to Regrowth (Ingrowth)	228,754	659,296	232,059	1,120,109	
Volume Reduction	10,693,201	2,129,656	64,131	12,886,988	
Due to Forest Conversion:	10,291,405	2,021,123	60,303	12,372,830	
Open and Mangrove to Closed Forest		250,552	0	250,552	
Closed and Mangrove to Open Forest	8,137,593			8,137,593	
Closed and Open to Mangrove Forest	0	0	0	0	
Forest to Shrubs	2,118,754	1,603,861	0	3,722,614	
Forest to Fallow	0	0	0	0	
Forest to Wooded Grassland	0	15,181	0	15,181	
Forest to Open/Barren	0	0	0	0	
Forest to Grassland	35,038	714	0	35,753	
Forest to Marshland	0	0	0	0	
Forest to Annual Crop	0	0	0	0	
Forest to Perennial Crop	0	150,804	0	150,804	
Open and Mangrove to Fishpond	0	0	30,068	30,068	
Forest to Built-up	20	11	9,150	9,182	
Forest to Inland Water	0	0	21,085	21,085	
Potential yearly loss from Ingrowth	401,796	108,534	3,828	514,158	
Computed Net Change in Volume	(10,213,895)	9,113,393	209,395	(891,107)	(2.46)

WHERE WE ARE NOW?.... UPLAND

LAND COVER		YEAR					
		2003		2010		2014	
A.Physical Account		TOTAL	PER HA	TOTAL	PER HA	TOTAL	PER HA
	AREA						
	(in hectares or ha)						
	Closed Forest	129,879		28,025		33,205	
	Open Forest	86,585		184,235		181,485	
	Mangrove Forest	15,962		17,020		17,054	
	Total:	***232,426***		***229,280***		***231,744***	
	CARBON STORAGE						
	(in tons Carbon or t C)						
	Closed Forest	8,701,681	67	1,877,631	67	2,107,672	63
	Open Forest	3,230,936	37	6,874,751	37	7,335,682	40
	Mangrove Forest	514,521	32	548,641	32	550,954	32
	Total:	***12,447,138***	***54***	***9,301,024***	***41***	***9,994,309***	***43***
	CARBON SEQUESTRATION						
	(in t C per year)						
	Closed Forest	672,084	5	145,021	5	171,826	5
	Open Forest	776,624	9	1,652,492	9	1,627,826	9
	Total:	***1,448,708***	***8***	***1,797,513***	***8***	***1,799,652***	***8***
B. Monetary Account							
	Net Present Value (NPV)						
	(in Pesos)						
	Closed Forest	2,608,407,212	20,083	564,213,524	20,133	668,499,913	20,133
	Open Forest	3,014,134,148	34,811	6,429,128,380	34,896	6,333,163,428	34,896
	Total:	***5,622,541,360***	***25,974***	***6,993,341,904***	***32,947***	***7,001,663,341***	***32,613***

WHERE WE ARE NOW?.... LOWLAND

Figure 1. Asset extent by barangay

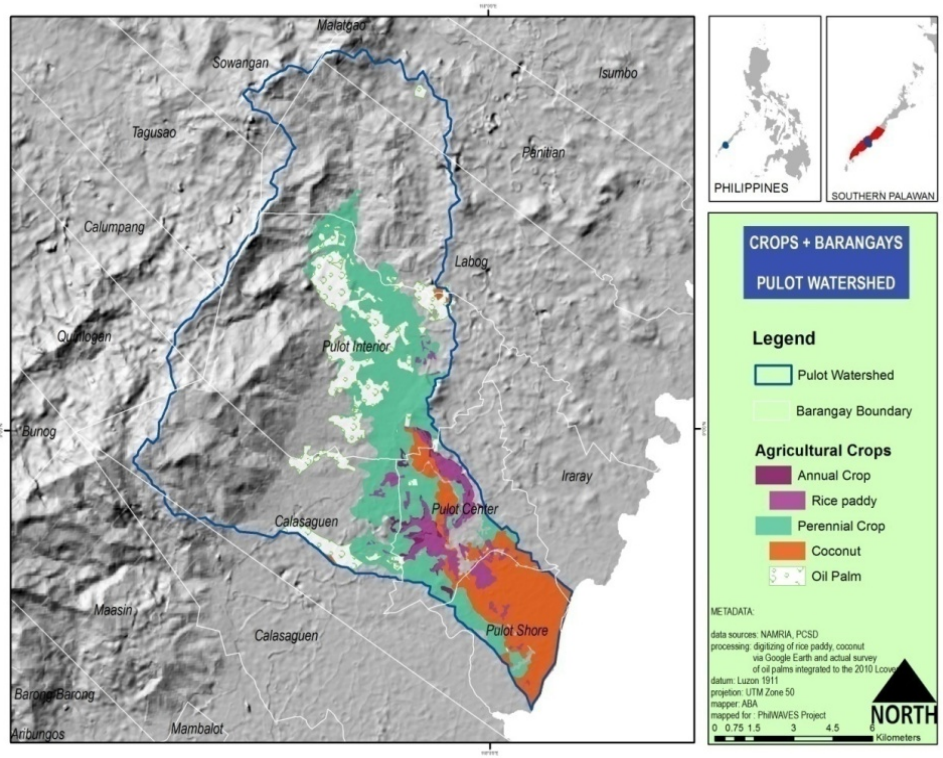
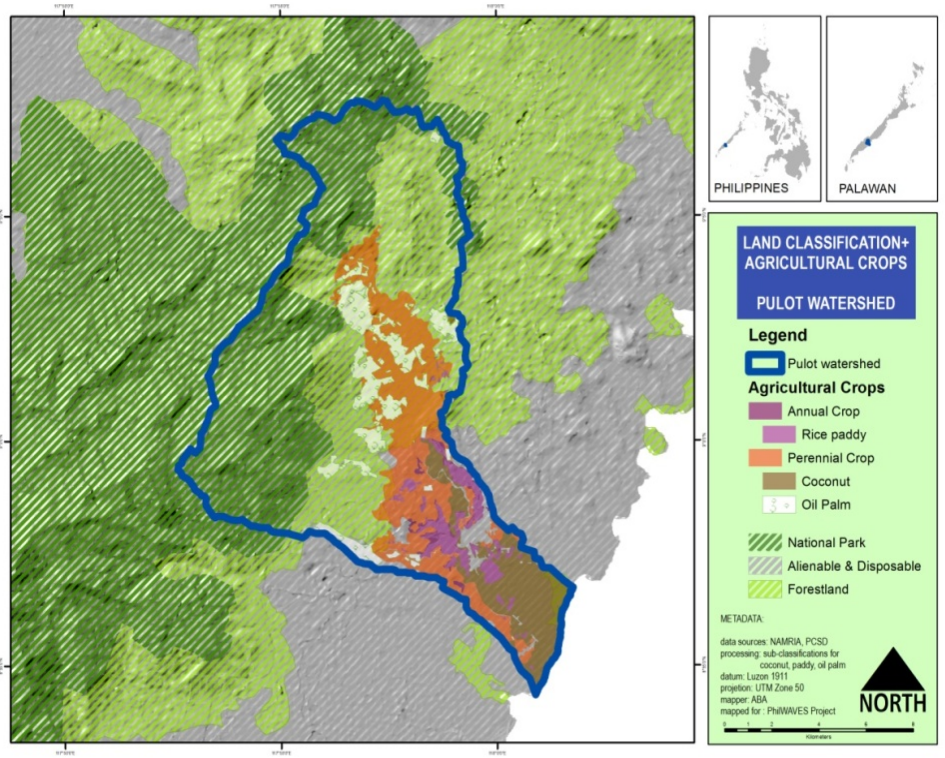


Figure 2. Asset extent by Land Classification



Mapping ecosystem assets by management boundaries

WAVES

WHERE WE ARE NOW?.... LOWLAND

Figure 3. Asset extent by ECAN Zones

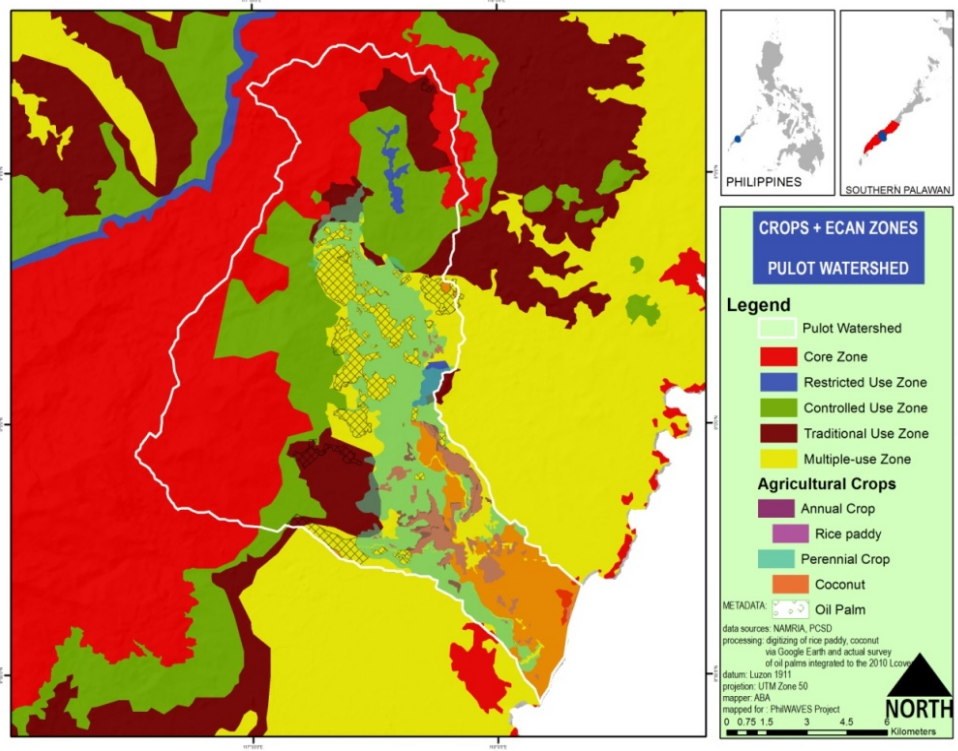
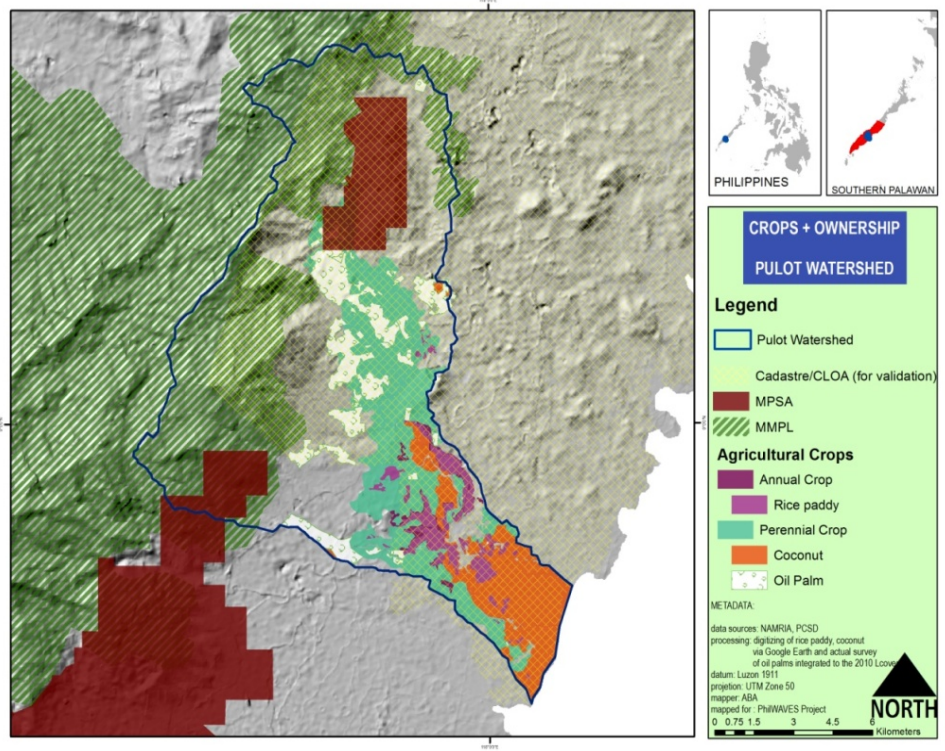


Figure 4. Asset extent by Tenurial Instrument



Mapping ecosystem assets by management boundaries

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WHERE WE ARE NOW?.... LOWLAND

Ecosystem Asset Account

Physical Asset Account for Oil Palm, Rice and Coconut ecosystem for 2010 and 2014.

ACCOUNT TYPE	Land Cover			
	Rice	Coconut	Oil Palm	Total
Opening (2010)				
Area (in hectares)	562	1,455	1,013	3,333
Addition to stocks	3.9		302.7	306.6
Reductions in stocks		0.6		0.6
Revaluations				
Closing stocks Area (2014)*	565.9	1,454.4	1,315.7	3,309

*based on 2014 preliminary land cover statistics of Pulot Watershed prepared by NAMRIA

- Account tables reflecting asset distribution by management boundaries were also prepared.

WAVES

WHERE WE ARE NOW?.... LOWLAND

Ecosystem Crop Production Physical Account

Provisioning service flow for coconut, oil palm, rice paddy (MT/ha/yr)

Land Cover Units	Area (Ha)	Total No. (Productive stands)	Yield (MT/Yr)	Ave. Yield (MT/ha/Yr)
Coconut	869.59	77,202	1,654.32	1.9
Oil Palm (mature stands)	1,011.82	283,451	9,782.79	9.67
Oil Palm (immature stands)	1.18	0	0	0
Rice Paddy	565.93		2,218.43	3.92

Assumptions:
Data covers 2013 only for coconut and oil palm (FFB)
Average average yield (MT/ha) is equal to yield (MT/yr) divided by area (in hectares)
Yield (MT/yr) of copra is equal to 75 nuts* no. of trees divided by 3.5 nuts
Oil palm (MT/year) is actual data from Agumil
Average yield per hectare of rice is equal to 3.92 MT based on OPA, Palawan Report

WAVES

WHERE WE ARE NOW?.... LOWLAND

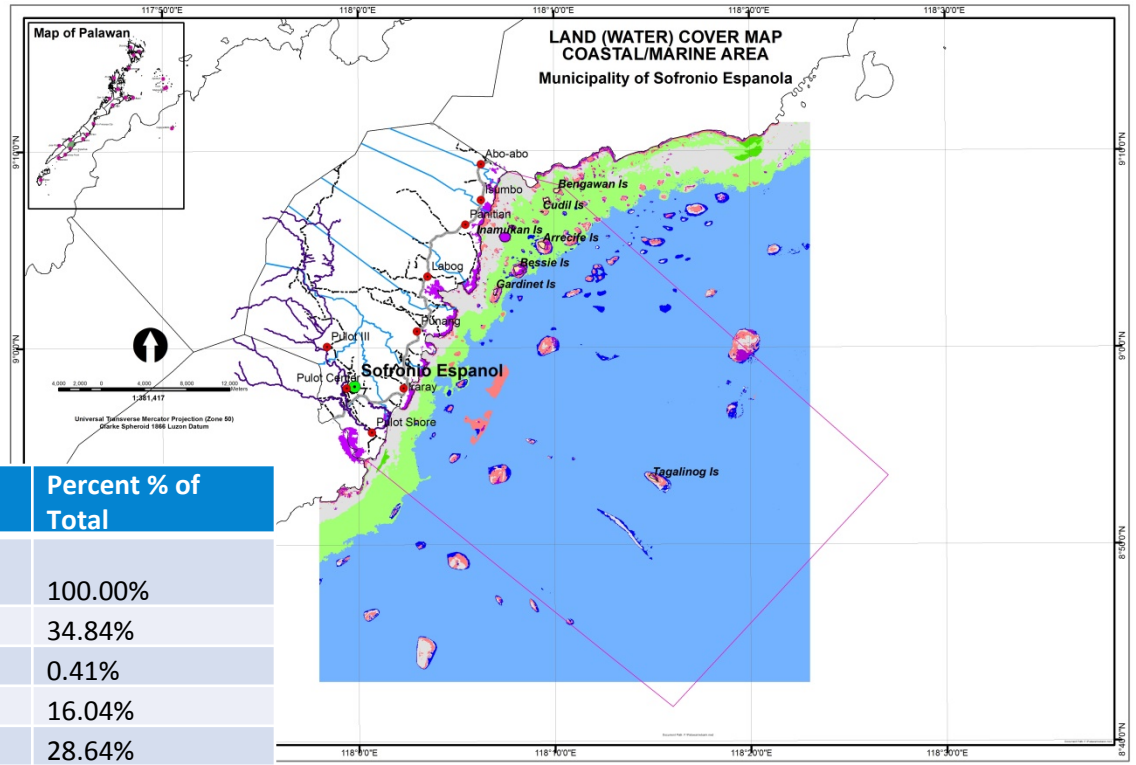
Ecosystem Production Monetary Account

Value of the provisioning service (crop production) provided by Pulot Watershed

Ecosystem Service (Crop Production)	Economic Value (PhP), 2013	Net Value (PhP), 2013
- Rice	6.13 M	4.2 M
- Coconut	20.47 M	5.18 M
- Oil Palm	52.29 M	?
Total value of the selected service	78.89 M	?

WHERE WE ARE NOW?.... COASTAL

Coastal-Marine Land/Water Ecosystem Account, Sofronio Espanola, Palawan, Philippines, August 2014
Source: European Satellite Agency, August 2014



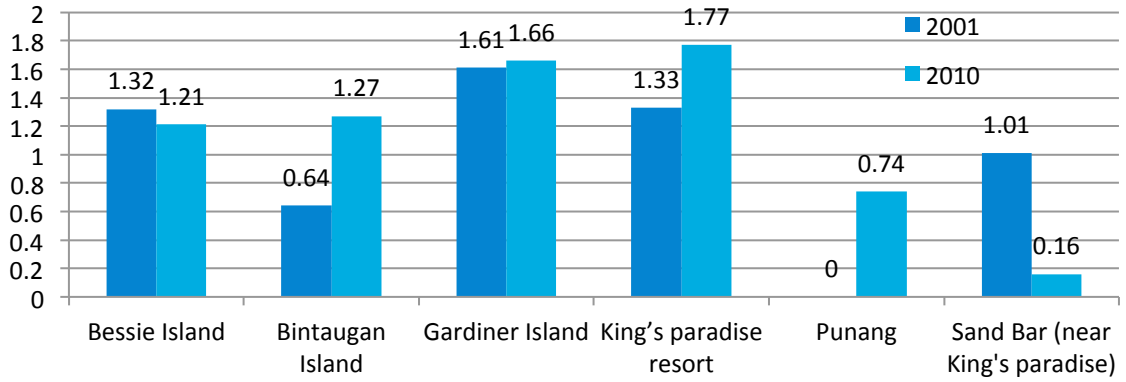
	Area, Ha	Percent % of Total
Total Coastal Ecosystem Accounting Unit	29,063	100.00%
Coastal/Marine deep waters	10,125	34.84%
Land/Island	119	0.41%
Sand or Bare Substrate	4,663	16.04%
Seagrass beds and Macroalgae	8,323	28.64%
Thin vegetation	8,254	28.40%
Dense vegetation	69	0.24%
Coral Reefs	4,253	14.63%
Reef flat/coral and rubble field	2,201	7.57%
Reef crest/high coral cover	574	1.98%
Reef slope/deep reef	1,478	5.09%
Mangrove Forest	1,580	5.44%

ECOSYSTEM ACCOUNTING UNIT/ LAND/WATER COVER ECOSYSTEM ACCOUNTING UNIT

WAVES

WHERE WE ARE NOW?....COASTAL

SURVEY STATIONS	COORDINATES		2001			2010		
	Latitude	Longitude	Species diversity	Density, shoots/m2	Cover, %	Species diversity	Density, shoots/m2	Cover %
Bessie Island	9⁰ 03’ 56.95”	118⁰ 07’ 51.69”	1.32	332	37.73	1.21	114	3.49
Bintaugan Island	9⁰ 06’ 10.32”	118⁰ 07’ 41.80”	0.64	206	16.6	1.27	281	17.38
Gardiner Island	9⁰ 02’ 49.73”	118⁰ 06’ 50.61”	1.61	927	53.48	1.66	482	9.77
King’s paradise resort	9⁰ 05’ 22.74”	118⁰ 09’ 20.65”	1.33	922	58.36	1.77	666	21.4
Punang	9⁰ 00’ 14.13”	118⁰ 03’ 50.31”	No data		13.45	0.74	146	8.01
Sand Bar (near King's paradise)	8⁰ 54’ 16.23”	118⁰ 00’ 48.95”	1.01	812	45.18	0.16	307	7.65



WAVES

Next steps

- Refinement of data and methodologies with the engagement of Philippine Statistics Authority
- Preparation of Ecosystem Condition Accounts, ie lowland
- Ecosystem Service Flow Monetary Accounts
- Updating of all the accounts using the 2014 Land Cover Map of NAMRIA
- Model and quantify the effects of forest cover change on erosion rates and water availability for paddy irrigation, using the SedNet model.
- Stakeholders consultation
- Policy analysis/scenario building
- Scaling up

WAVES

THANK YOU FOR YOUR KIND ATTENTION!!!

NO PERFECT ACCOUNT

DATA WILL ALWAYS BE LIMITED

GOOD OLD TEAM WORK FROM ALL LEVELS OF GOVERNANCE

WAVES