

# Watershed-Based Integrated Land Use Planning: *Issues, Concerns and Needs*

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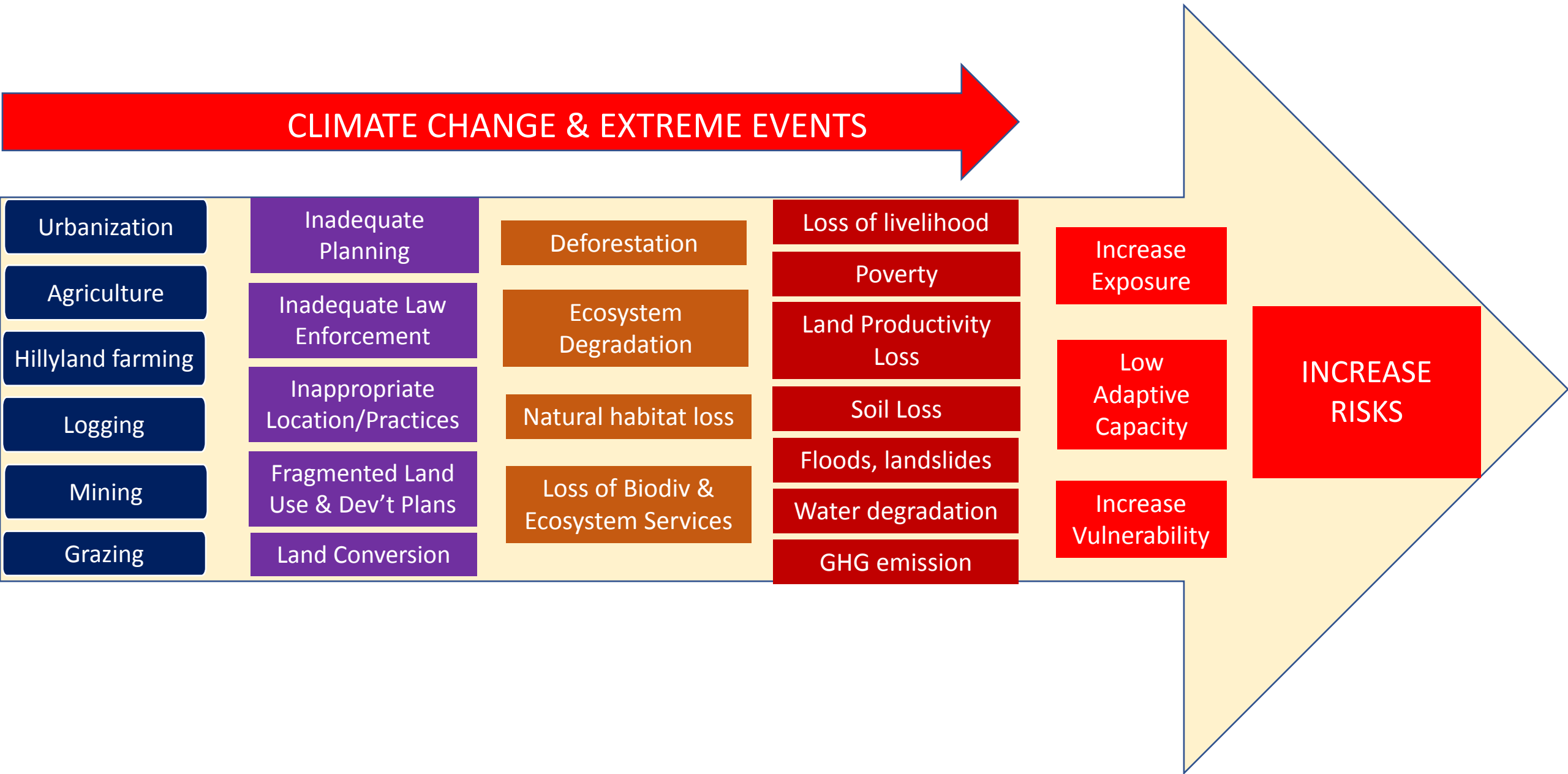
Academician, National Academy of  
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**LOS BAÑOS**



# Land Use and Climate Change Impinge on Human Security

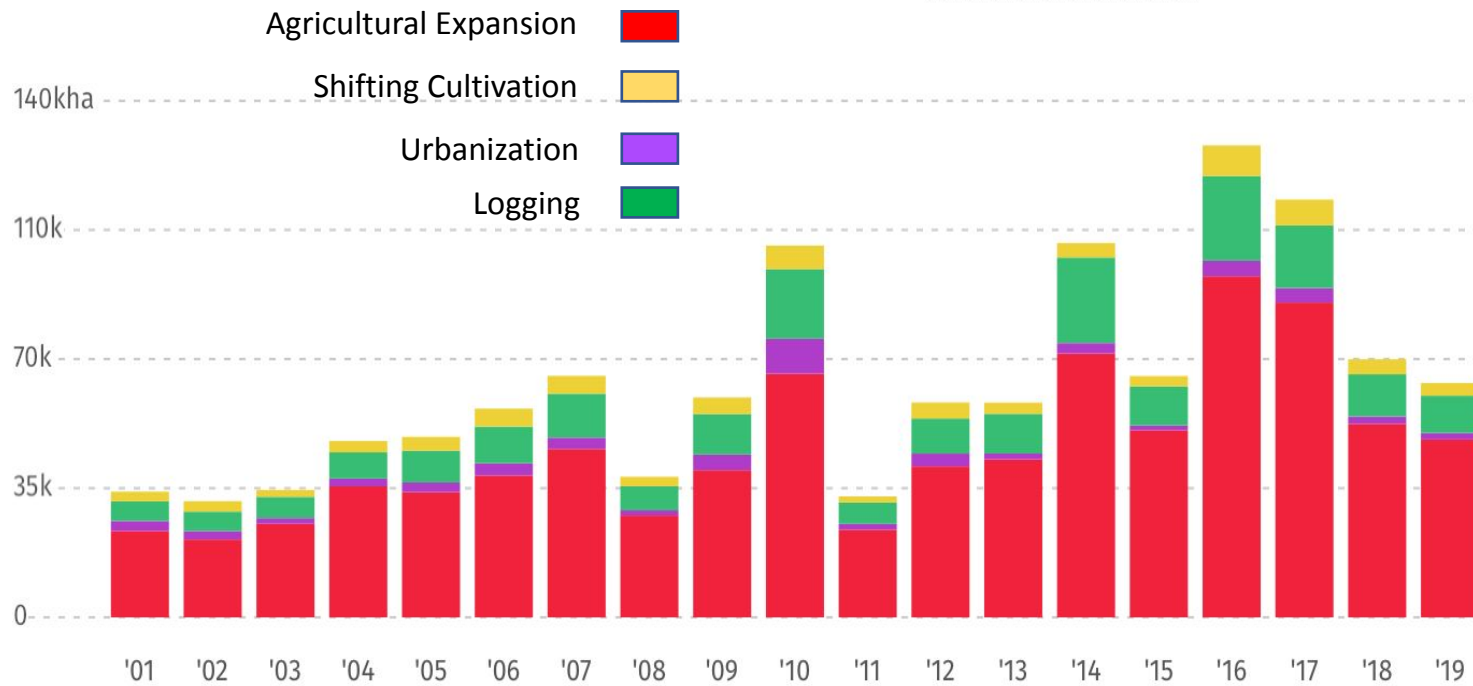


# Land Use Drivers of Deforestation

## ANNUAL TREE COVER LOSS BY DOMINANT DRIVER IN PHILIPPINES

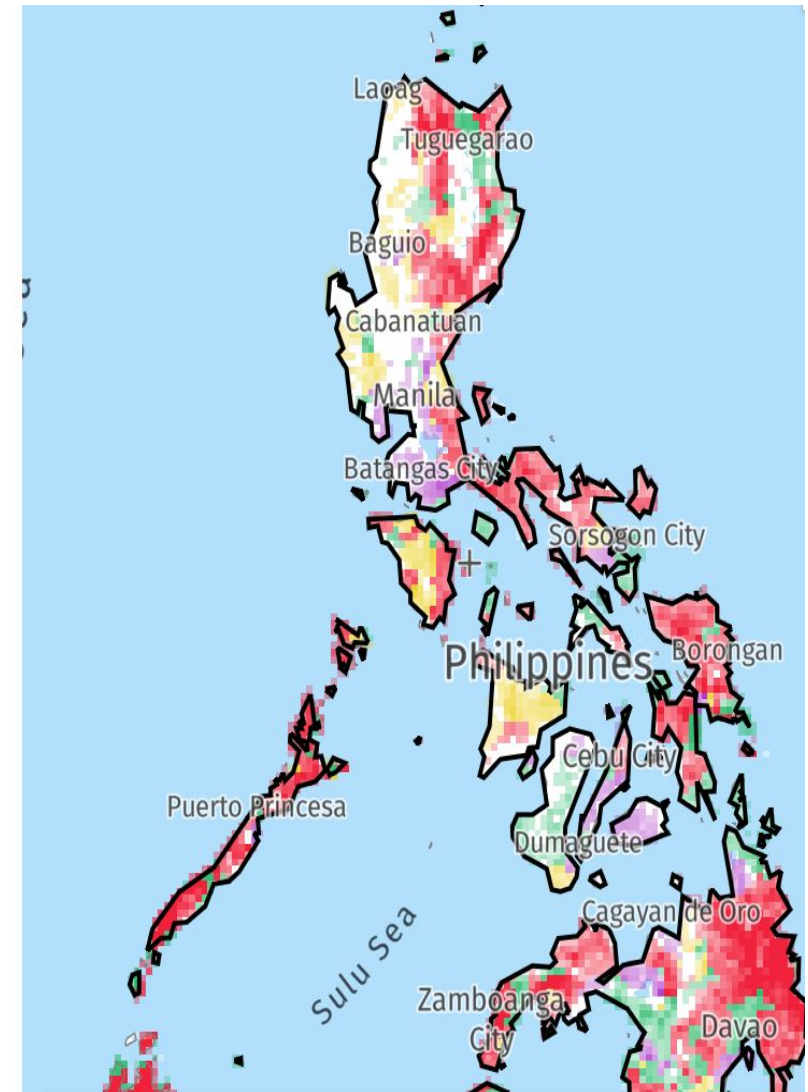


In **Philippines** from **2001** to **2019**, **76%** of tree cover loss occurred in areas where the dominant drivers of loss resulted in **deforestation**.



2000 tree cover extent | >30% tree canopy | these estimates do not take tree cover gain into account

Global Forest Watch



● Tree cover loss by dominant driver

# Rationale

**PCAARRD-funded Policy Analysis study  
by Dr. Rex Victor Cruz (2017):**  
“Policy Studies and Development to Promote the  
Resiliency of Philippine Watershed”



## **KEY FINDINGS**

### ***Inadequate vertical integration of planning systems***

- Local land use plans are inadequately coordinated with higher level physical framework and investment plans (i.e., provincial to the national level)

### ***Inadequate horizontal integration among LGUs, NGAs (DOST, DENR, DA, etc.) and other land management levels***

- Plans of LGUs sharing jurisdiction over the same watershed are usually not adequately synched

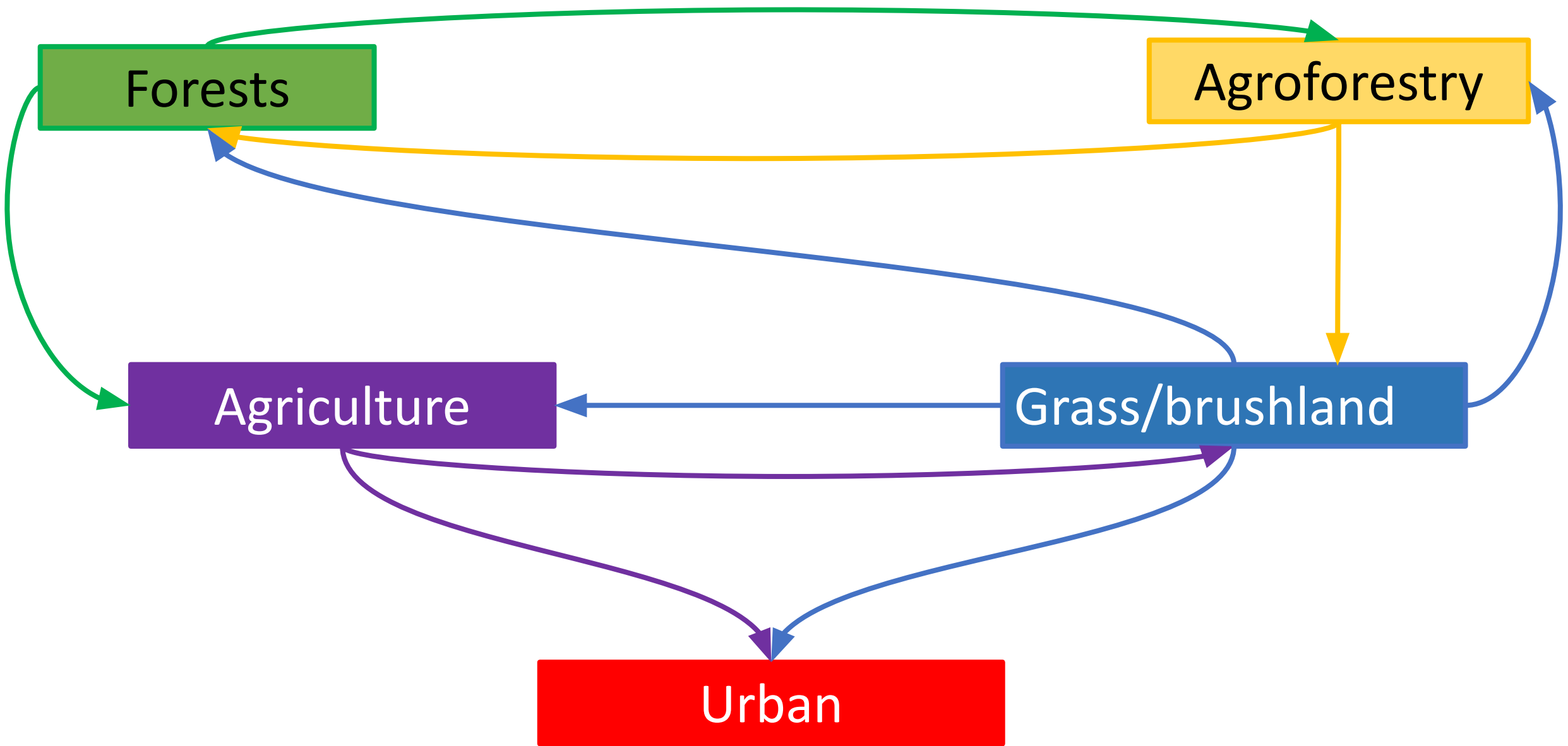
### ***Methodological frameworks exist***

- CLUP Guidebooks, DENR Technical Guidelines, etc.

### ***Rooms for improvement of the application of R2R/WEM***

- Inadequate appreciation and understanding of importance
- Inadequate expertise and manpower





Land Cover 2010	Land Cover 2020												Total Area (ha)
	Annual Crop	Brush/Shrubs	Built-up	Closed Forest	Fishpond	Grassland	Inland Water	Mangrove Forest	Marshland/Swamp	Open Forest	Open/Barren	Perennial Crop	
Annual Crop	43,406	9,325	1,781	136	30	5,162	1,255	81	111	3,514	865	4,221	69,888
Brush/Shrubs	15,817	186,704	2,488	4,120	4	46,723	2,260	279		60,013	1,618	14,090	334,117
Built-up	666	490	3,261	10	4	117	56	25	1	139	63	433	5,264
Closed Forest	428	4,024	167	217,453		2,389	1,244	21		26,295	182	350	252,554
Fallow		868		150		4	53			342	4		1,421
Fishpond	7	6	6		404	9	22	140			7	27	628
Grassland	5,429	39,149	691	1,041	5	108,036	884	62		5,947	1,575	2,311	165,130
Inland Water	651	1,413	75	532	26	1,205	18,770	80	10	981	1,530	417	25,690
Mangrove Forest	61	236	21	4	28	64	55	2,089		13	7	236	2,812
Marshland/Swamp	-	-	-	-	-	-	-	-	-	-	-	-	-
Open Forest	4,880	26,465	977	70,300	3	6,974	2,871	52		323,572	620	4,632	441,346
Open/Barren	348	499	38	66	4	1,354	921	4		241	3,116	44	6,632
Perennial Crop	1,977	8,358	882	554	68	1,584	385	313	258	1,425	78	27,479	43,361
Total Area (ha)	73,670	277,537	10,388	294,367	575	173,620	28,776	3,146	380	422,482	9,664	54,238	1,348,842

Land Cover	Area (ha)		Relative Change (%)
	2010	2020	
Annual Crop	69,888	73,670	5.41
Brush/Shrubs	334,117	277,537	(16.93)
Built-up	5,264	10,388	97.32
Closed Forest	252,554	294,367	16.56
Fallow	1,421	-	(100.00)
Fishpond	628	575	(8.39)
Grassland	165,130	173,620	5.14
Inland Water	25,690	28,776	12.01
Mangrove Forest	2,812	3,146	11.89
Marshland/Swamp	-	380	-
Open Forest	441,346	422,482	(4.27)
Open/Barren	6,632	9,664	45.72
Perennial Crop	43,361	54,238	25.09
<b>Total Area (ha)</b>	<b>1,348,842</b>	<b>1,348,842</b>	<b>70.80</b>

Land Cover (2015)	Pagsanjan Lumban		Quiaoit		Saug		Abuan		Quinali		Muleta		Total	
	A&D	Forest Reserve	A&D	Forest Reserve	A&D	Forest Reserve	A&D	Forest Reserve	A&D	Forest Reserve	A&D	Forest Reserve	A&D	Forest Reserve
Annual Crop	5,339	535	8,420	30	6,183	872	2,208	279	18,398		87,992	43,998	128,539	45,713
Brush/Shrubs			8,420	30	329	3,007	124	294	644	333	7,956	15,026	17,474	18,690
Built-up			8,071	752	1,078	541	147	3	2,151		5,117	750	16,565	2,047
Grass			14	2	186	181		14	905	629	1,834	4,610	2,940	5,436
Closed Forest									255	604	777	20,707	1,032	21,311
Open Forest	330	827	16	225	14	205		48,140	572	1,023	641	10,301	1,572	60,720
Open/Barren	52	0	395		33	5	105		434	190	3	1	1,022	196
Perennial Crop	19,600	2,295	214		45,395	41,246			27,036	342	14,606	6,885	106,850	50,769
Grand Total	25,321	3,657	25,550	1,039	53,219	46,058	2,584	48,730	50,394	3,120	118,927	102,277	275,995	204,882



# Deforestation Causes Siltation & Reduces Groundwater Recharge

River Basin	Land Cover ('000 ha) 2010									
	Forest	Plantation	Cultivated	Shrubs	Barren and Grass	Mangrove	Marshland	Inland Water	TOTAL Area	% Forest
Abra	86	4	30	197	45	-	-	9	371	23
Abulog	216	0	78	120	10	3	0	7	433	50
Agno	110	6	290	169	83	0	0	27	685	16
Agus	75	-	22	9	2	0	-	33	141	53
Agusan	478	-	422	337	35	2	45	17	1,336	36
Bicol	29	-	226	18	16	2	0	8	299	10
Buayan-Malungon	8	-	67	60	10	-	-	2	146	5
Cagayan De Oro	43	-	61	34	9	0	-	1	148	29
Cagayan	1,320	16	961	640	299	3	1	44	3,286	40
Davao	28	-	33	76	13	-	-	2	151	18
Ilog Hilabangan	3	0	95	101	4	1	-	2	206	2
Jalaur	6	6	155	77	11	1	-	11	266	2
Mindanao	243	-	1,096	489	105	1	78	25	2,037	12
Pampanga	169	0	585	158	133	0	1	71	1,118	15
Panay	7	5	148	59	13	2	-	24	257	3
Pasig-Laguna	24	0	92	89	114	-	0	99	418	6
Tagaloan	45	-	52	37	29	0	-	1	164	28
Tagum-Libuganon	25	0	80	44	5	0	-	4	158	16

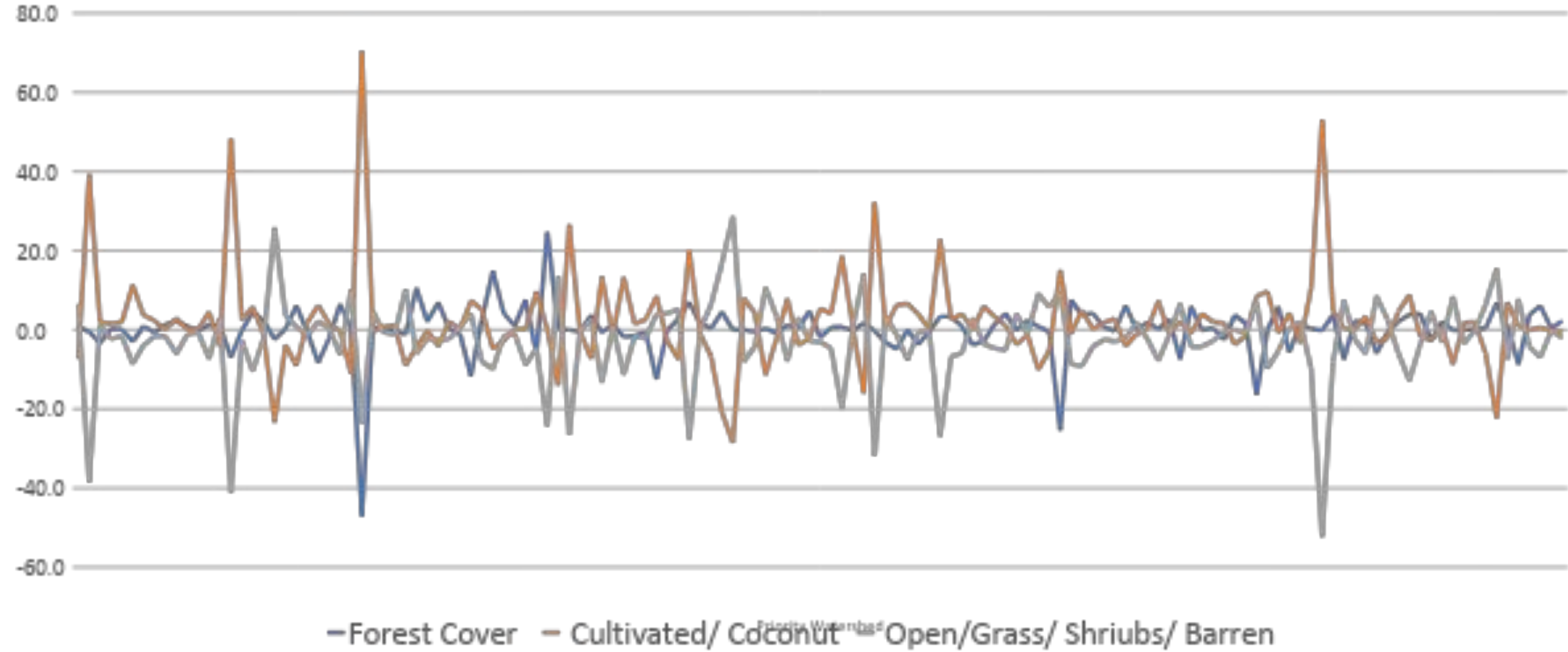
# Highly Uneven Proportion of A&D and Forestlands

River Basin	Alienable/ Disposable		Forest Land		Lake	Total Area (ha)
	ha	%	ha	%	ha	
<b>Abra</b>	95991	26	274831	74	0	370821
<b>Abulog</b>	109668	25	323469	75	0	433137
<b>Agno</b>	360982	53	323888	47	0	684870
<b>Agus</b>	17953	13	91097	64	32223	141272
<b>Agusan</b>	353798	26	981882	74	0	1335680
<b>Bicol</b>	248702	83	46023	15	4341	299066
<b>Buayan-Malungan</b>	27949	19	118049	81	0	145998
<b>Cagayan De Oro</b>	65171	44	83327	56	0	148498
<b>Cagayan</b>	939323	29	2346930	71	0	3286253
<b>Davao</b>	34921	23	116104	77	0	151025
<b>Ilog Hilabangan</b>	106481	52	99473	48	0	205954
<b>Jalaur</b>	225115	85	40819	15	0	265934
<b>Mindanao</b>	1000167	49	1030762	51	6560	2037488
<b>Pampanga</b>	723530	65	394482	35	0	1118013
<b>Panay</b>	216664	84	40794	16	0	257458
<b>Pasig-Laguna</b>	263278	63	66459	16	87857	417594
<b>Tagaloan</b>	61065	37	102606	63	0	163671
<b>Tagum-Libuganon</b>	70414	45	87608	55	0	158022

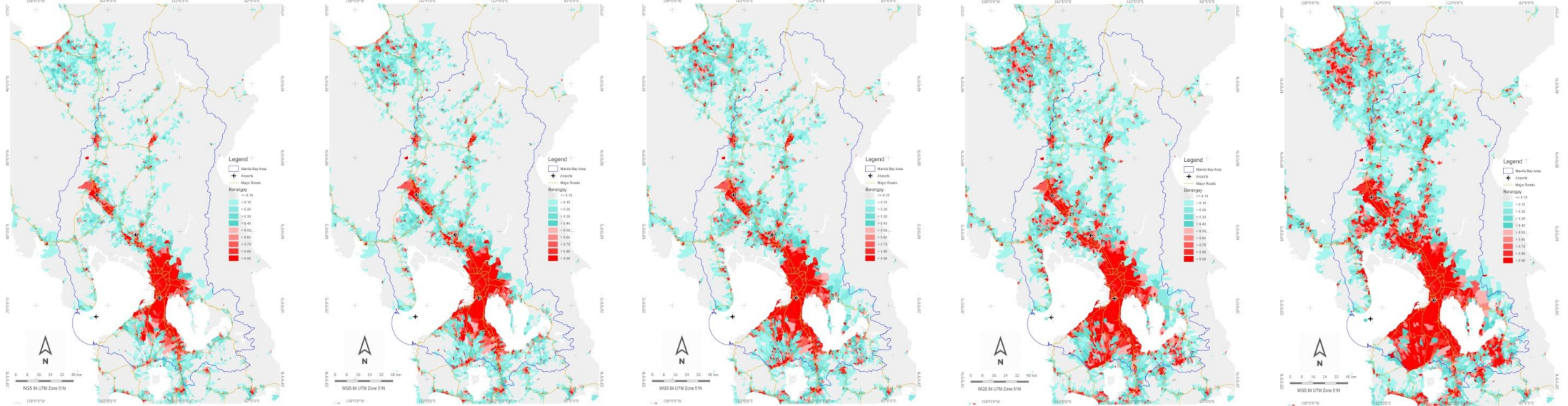
# Land use, deforestation and forest degradation

## Land Use Change in Priority Watersheds (2010-2015)

% Land Cover Change (2010-2015)



# Urbanization impinging on agricultural land and forests

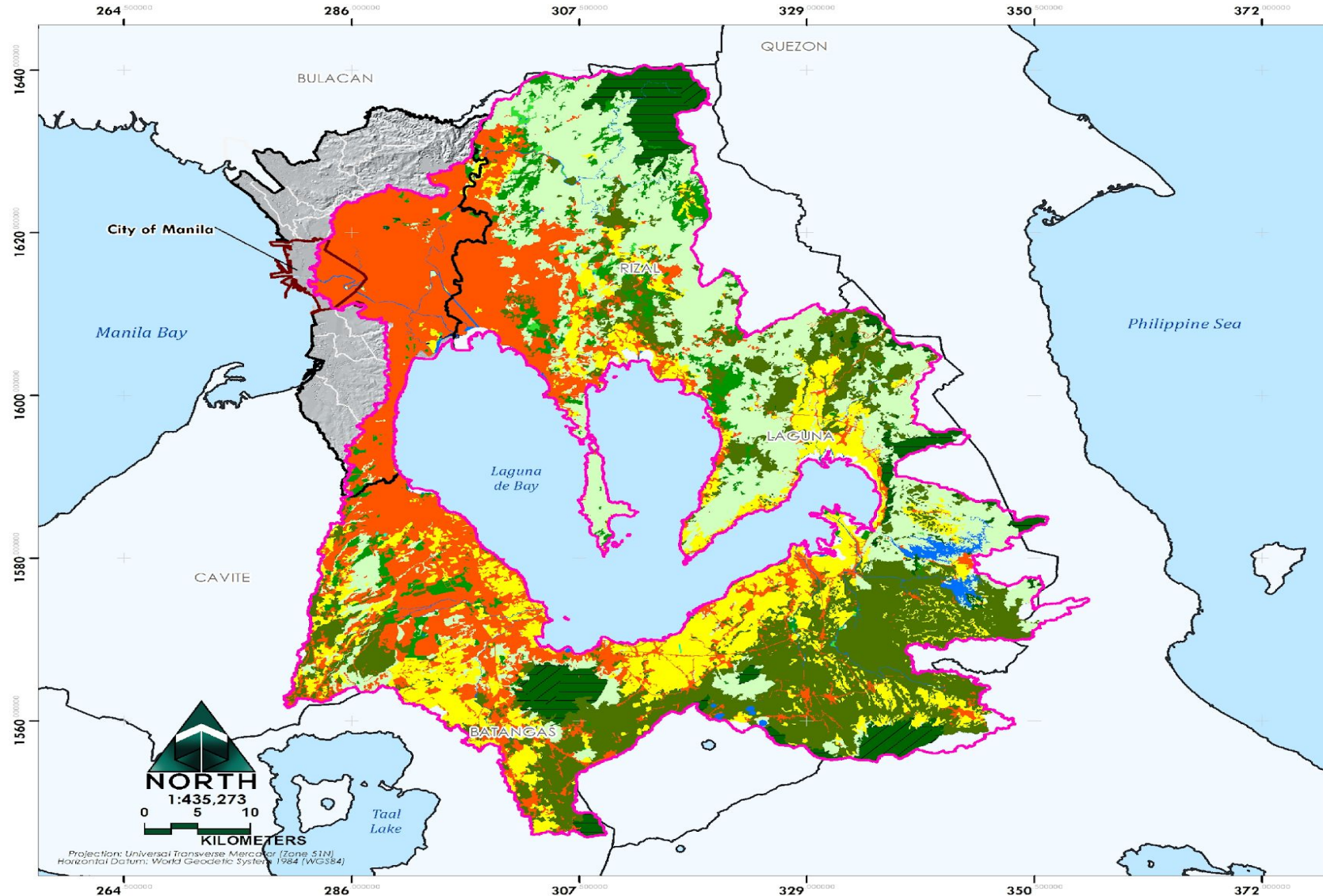


<b>Spatial model preliminary results</b>	<b>2015</b>	<b>2022</b>	<b>2030</b>	<b>2040</b>	<b>2055</b>
<b>Reference case population (million)</b>	32.8	36.6	41.2	45.9	50.4
<b>Land reclamations case population (million)</b>	32.8	36.9	41.6	46.4	51.1
<b>Reference case urban area fraction (%)</b>	13.8%	16.3%	19.2%	22.8%	28.0%
<b>Land reclamations case urban area fraction (%)</b>	13.8%	16.5%	19.4%	23.0%	28.3%

Manila Bay Situational Analysis Report (NEDA, 2018)



# Urbanization Degrades Water Resources



**Legend**

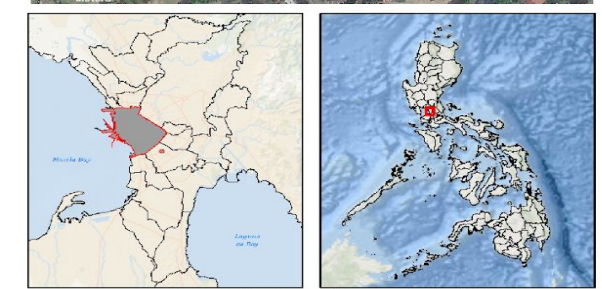
- City of Manila Boundary
- Adjacent City Boundary
- National Capital Region Boundary
- Provincial Boundary
- Pasig-Marikina-Laguna de Bay Basin

**Land Cover Type**

- Annual Crop
- Brush/Shrubs
- Built-up
- Closed Forest
- Fishpond
- Grassland
- Inland Water
- Marshland/Swamp
- Open Forest
- Open/Barren
- Perennial Crop

**Technical Note:**  
The Pasig-Marikina-Laguna de Bay land cover map shows the different type of land in the whole basin. The data acquired from the National Mapping and Resource Information Authority (NAMRIA).

**Data Sources:**  
District Boundary - CPDO-MNL and DTCA, 2020  
City of Manila Boundary - CPDO-MNL and DTCA, 2020  
Adjacent City Boundary - Philippine Statistics Authority (PSA), 2015  
Land Cover - National Mapping and Resource Information Authority (NAMRIA), 2015



Disclaimer: Political boundaries are not authoritative

**PlanMANILA2030:**  
Updating & Preparation of the  
MANILA COMPREHENSIVE LAND USE PLAN & ZONING ORDINANCE  
with the MANILA COMPREHENSIVE DEVELOPMENT PLAN  
and the Development of the  
DISASTER RISK REDUCTION AND MANAGEMENT SYSTEM

**PASIG-MARIKINA-LAGUNA DE BAY  
LAND COVER (2015) MAP**  
CITY OF MANILA, METRO MANILA

# Highly Uneven Population Density

River Basin	Population Density in Forests	Total Basin Pop	Total Basin Area (ha)	Basin Pop Density
Abra	0.114	760,809	370,821	2.1
Abulog	0.638	337,864	433,137	0.8
Agno	1.306	83,869	684,870	0.1
<b>Agus</b>	<b>0.030</b>	<b>2,469,448</b>	<b>141,272</b>	<b>17.5</b>
Agusan	2.085	229,171	1,335,309	0.2
<b>Bicol</b>	<b>0.009</b>	<b>3,365,159</b>	<b>299,066</b>	<b>11.3</b>
<b>Buayan-Malungon</b>	<b>0.003</b>	<b>2,795,119</b>	<b>145,993</b>	<b>19.1</b>
<b>Cagayan De Oro</b>	<b>0.005</b>	<b>9,240,427</b>	<b>148,498</b>	<b>62.2</b>
Cagayan	0.097	13,658,206	3,284,977	4.2
Davao	0.026	1,065,170	150,995	7.1
Ilog Hilabangan	0.002	1,614,669	205,954	7.8
Jalaur	0.014	419,114	265,935	1.6
Mindanao	1.044	232,411	2,037,479	0.1
Pampanga	0.045	3,728,846	1,118,013	3.3
Panay	0.032	227,443	257,458	0.9
Pasig-Laguna	0.071	335,251	417,594	0.8
Tagoloan	0.211	214,262	163,671	1.3
Tagum-Libuganon	0.109	230,801	157,996	1.5

# Road Development Drives Deforestation and Agriculture

River Basin	Forest	Plantation	Cultivated	Shrubs	Barren and Grass	Mangrove	Marshland	Inland Water
Abra	0.001	-	0.184	0.015	0.166	-	-	0.061
Abulog	0.076	-	1.656	0.410	17.224	0.067	-	0.456
Agno	0.706	-	2.087	0.228	14.501	9.155	-	1.890
Agus	-	-	0.003	0.062	0.018	-	-	-
Agusan	0.036	-	1.449	0.196	11.761	4.143	-	0.468
Bicol	0.263	-	2.248	0.779	22.305	0.971	-	0.500
Buayan-Malungon	-	-	0.931	0.065	3.130	-	-	0.751
Cagayan De Oro	-	-	0.186	0.027	16.828	-	-	0.686
Cagayan	0.039	0.459	0.698	0.314	3.260	0.282	-	0.216
Davao	-	-	1.042	0.070	15.565	-	-	2.126
Ilog Hilabangan	-	3.861	0.444	0.133	2.161	1.751	-	0.167
Jalaur	0.053	0.150	1.130	0.151	3.609	0.120	-	1.503
Mindanao	0.006	-	0.712	0.064	5.960	1.157	0.089	0.195
Pampanga	0.024	2.288	2.807	0.316	21.708	-	0.420	1.522
Panay	-	-	0.919	0.099	1.608	-	-	0.197
Pasig-Laguna	1.224	-	5.506	3.088	91.174	-	10.169	0.372
Tagaloan	-	-	0.532	0.196	0.395	-	-	0.326
Tagum-Libuganon	-	-	0.596	-	10.622	-	-	0.271





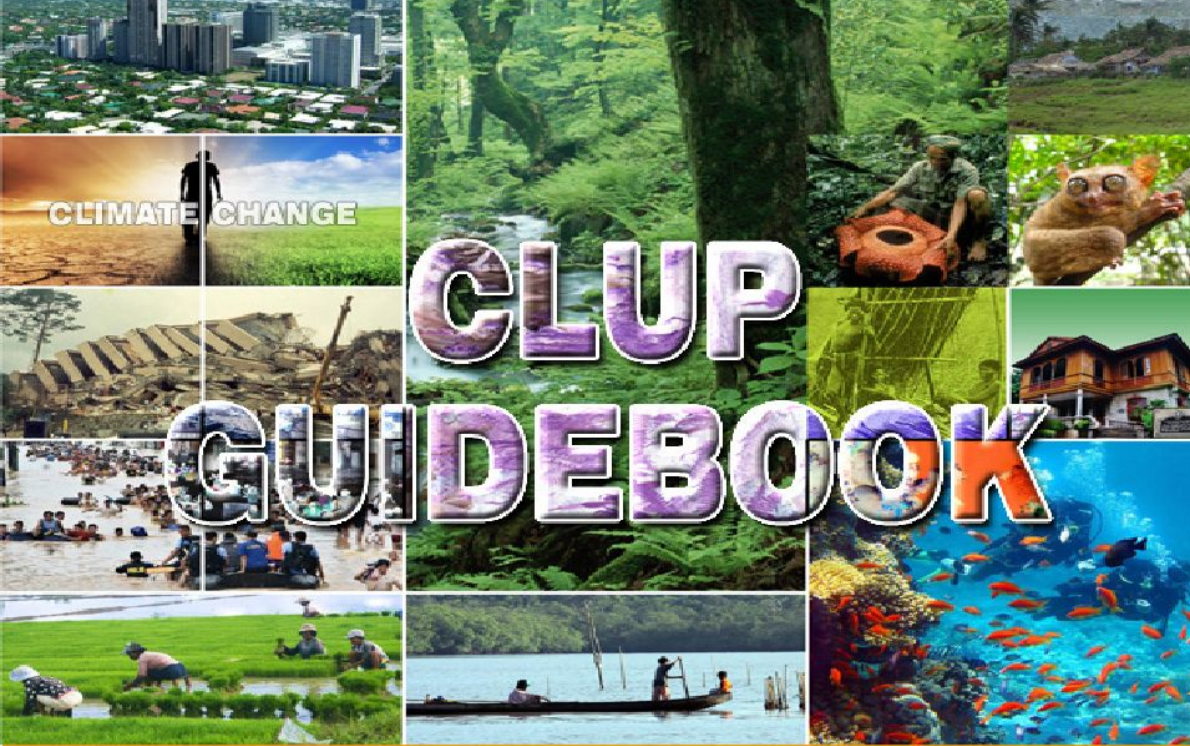
Department of Science and Technology (DOST)  
**Philippine Council for Agriculture, Aquatic and Natural Resources  
Research and Development (PCAARRD)**



# “Institutionalization of Guidelines on Watershed Integrated Area Land Use Planning towards Resiliency” (WILUP)

Project Leader: Dr. Vida Q. Carandang  
Agency: University of the Philippines Los Baños  
(College of Forestry and Natural Resources in  
partnership with the College of Development  
Communication)





# CLUP GUIDEBOOK

**A Guide to Comprehensive  
Land Use Plan Preparation  
2013**

**Volume 1  
The Planning Process**



HOUSING AND LAND USE REGULATORY BOARD

## 4.0 Principles and Approaches Adopted in the CLUP preparation process

### 4.1 Watershed as platform for land use planning

The watershed covering the ridge-to-reef features of the land shall serve as the common strategic physical planning (vertical) platform for the formulation and preparation of all land uses and physical plans. It shall be the unifying and integrating (horizontal) framework in the identification of both public and private land use management strategies and policies including disaster risk reduction and climate change adaptation and mitigation measures.

The increasing threat and impact of climate change and natural disaster and calamities arising from extreme weather occurrences further highlights the need to analyze local physical planning and development initiatives using an area's bio-physical condition as critical focal point. This is particularly significant at the provincial level where watersheds and sub-watershed are more clearly defined and interrelated. The integrated watershed or ecosystems management framework shall also be the physical reference for the formulation of specific sectoral and development plans by national and local government agencies.

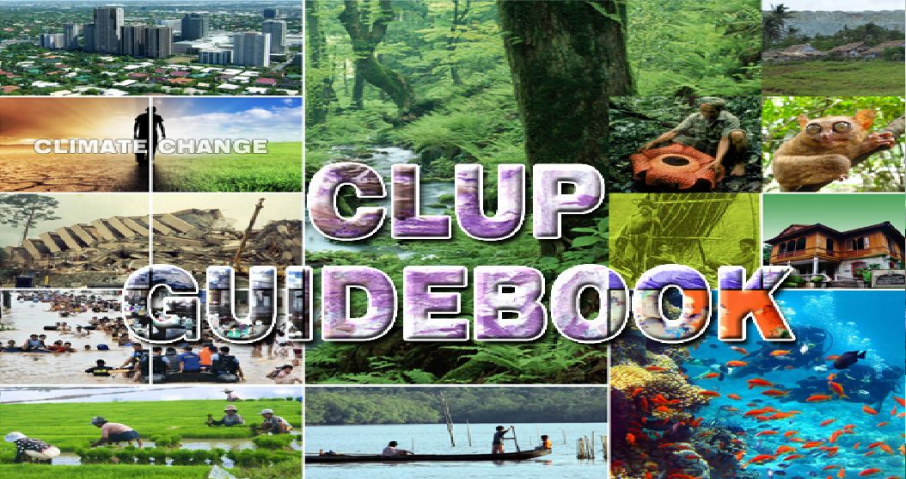
In the determination of specific land uses and development controls, the analysis and assessment of the watershed or its sub-watershed area, either within the territorial jurisdiction of an LGU and/or its adjacent LGUs, shall start from the uplands to the lowland areas down to the coastal areas, including municipal waters, as defined under RA 8550 or the Revised Fisheries Code. A prioritization of critical watershed areas, including its impact and affected communities and barangays, shall be ascertained based on the use values—economic, social, ecological, cultural, historical, institutional or infrastructural, at the community and LGU levels.



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# CLUP GUIDEBOOK

**A Guide to Comprehensive  
Land Use Plan Preparation  
2013**



DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT

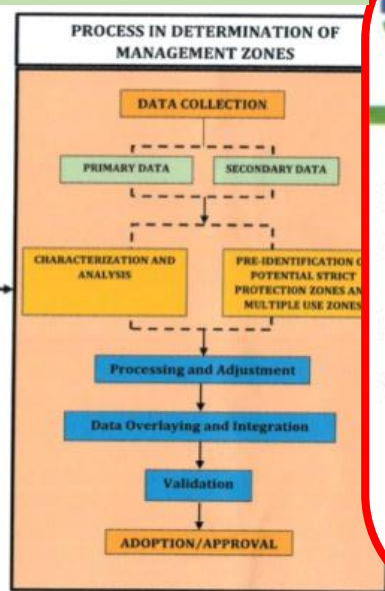
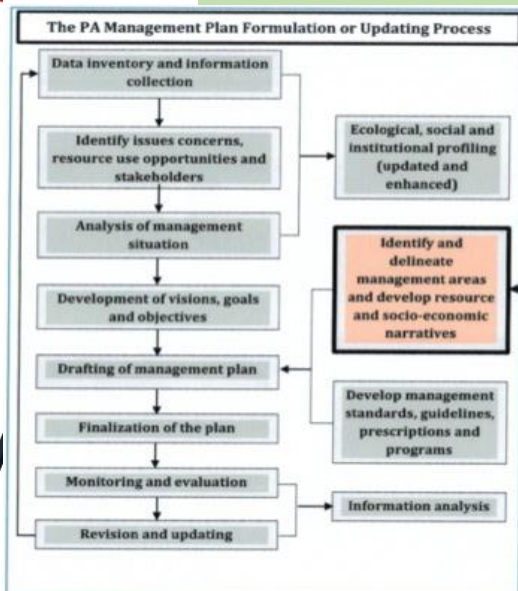
## LOCAL PLANNING ILLUSTRATIVE GUIDE

**PREPARING AND UPDATING THE  
COMPREHENSIVE DEVELOPMENT  
PLAN (CDP)**



## Forest Land Use Planning Training Guide

**[ NCIP ADMINISTRATIVE ORDER  
NO. 1, S. 2004, January 30, 2004 ]  
GUIDELINES ON THE  
FORMULATION OF THE  
ANCESTRAL DOMAIN  
SUSTAINABLE DEVELOPMENT  
AND PROTECTION PLAN (ADSDPP)**



Department of Agriculture  
**ADMINISTRATIVE ORDER NUMBER 6**  
Series of 1998

**IMPLEMENTING RULES AND REGULATIONS  
PURSUANT TO REPUBLIC ACT 8435:  
"AN ACT PRESCRIBING URGENT RELATED MEASURES TO  
MODERNIZE THE AGRICULTURE AND FISHERIES  
SECTORS OF THE COUNTRY IN ORDER TO ENHANCE  
THEIR PROFITABILITY, AND PREPARE SAID SECTORS  
FOR THE CHALLENGES OF GLOBALIZATION THROUGH  
AN ADEQUATE, FOCUSED AND RATIONAL DELIVERY  
OF NECESSARY SUPPORT SERVICES, APPROPRIATING  
FUNDS THEREFOR AND FOR OTHER PURPOSES",  
OTHERWISE KNOWN AS**

**"THE AGRICULTURE AND FISHERIES MODERNIZATION ACT OF 1997"**



Republic of the Philippines  
Department of Environment and Natural Resources  
**FOREST MANAGEMENT BUREAU**  
Visayas Avenue, Diliman, 1100 Quezon City  
Tel. No. (632) 927-4788 Fax No. (632) 928-9313  
E-mail Address: fmbdenr@mozcom.com / Website: <http://forestry.denr.gov.ph>

### MEMORANDUM

FOR/TO : All Regional Executive Directors  
All Assistant Regional Directors for Technical Services

FROM : The Director

SUBJECT : **TECHNICAL BULLETIN NO. 16-A, REVISED  
SUPPLEMENTAL GUIDELINES AND PROCEDURES OF  
WATERSHED CHARACTERIZATION AND CLIMATE  
RESILIENT VULNERABILITY ASSESSMENT OF  
WATERSHEDS AND PREPARATION OF INTEGRATED  
WATERSHED MANAGEMENT PLAN**

DATE : JUL 12 2019

# REGIONAL SCIENCE AND POLICY FORUM ON R2R/WEM APPROACH TO CLUP AND PDPFP

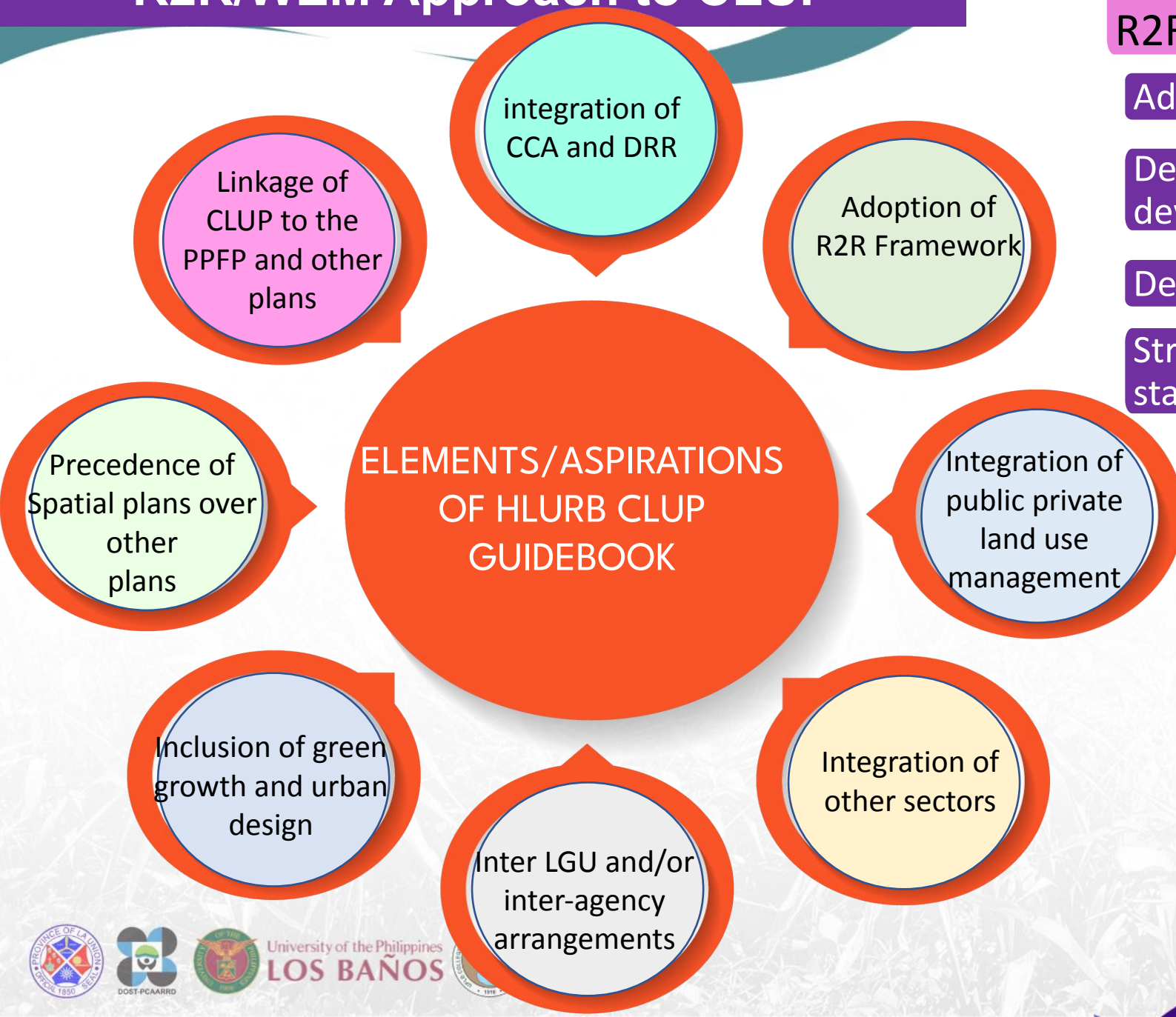


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# R2R/WEM Approach to CLUP



Facilitate the robust implementation of R2R/WEM Approach to CLUP

Advocacy and IEC activities

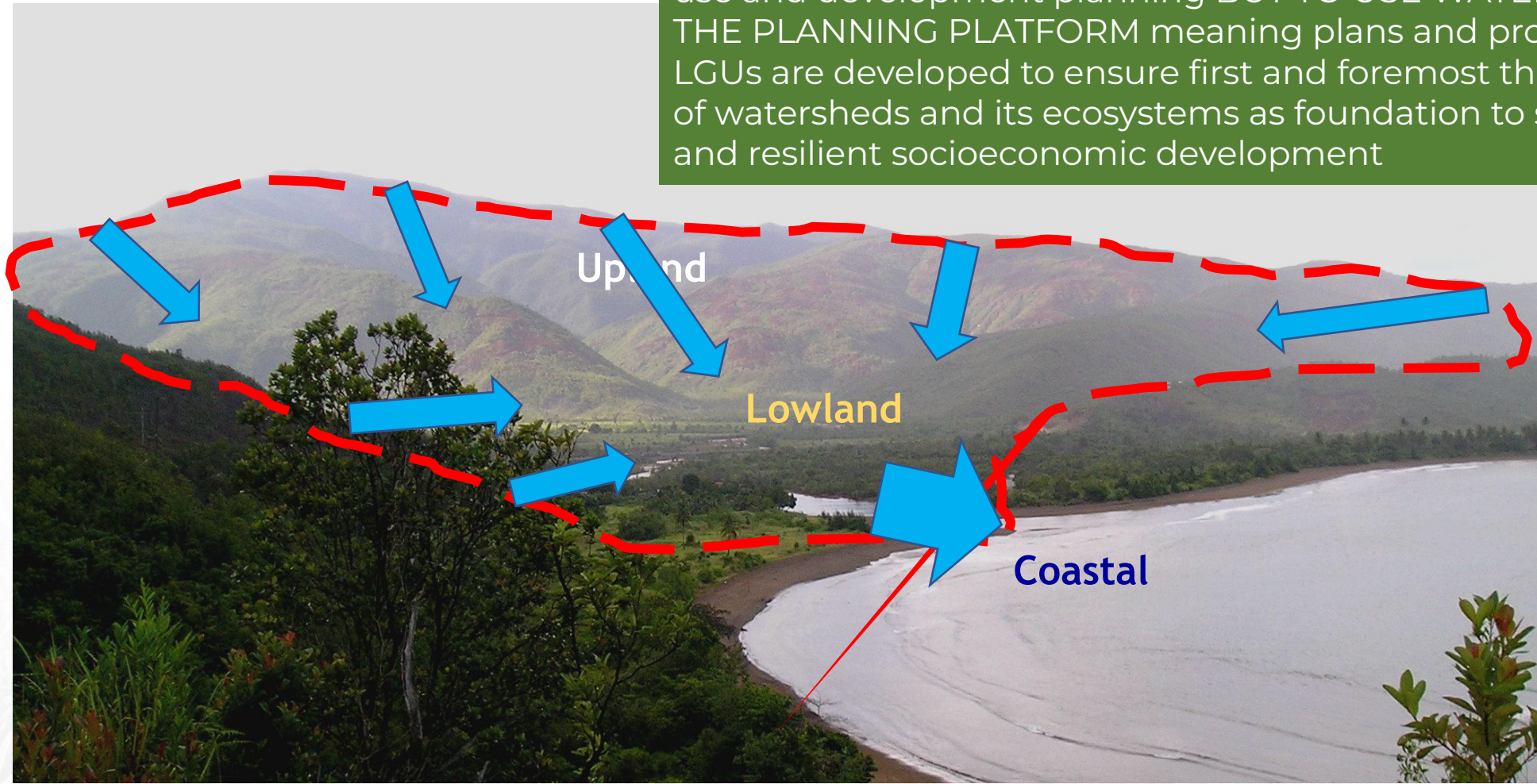
Development of more detailed guidelines developed thru WILUP Project

Demonstration of R2R CLUP

Strengthen capacity of LGUs, NGAs and other stakeholders

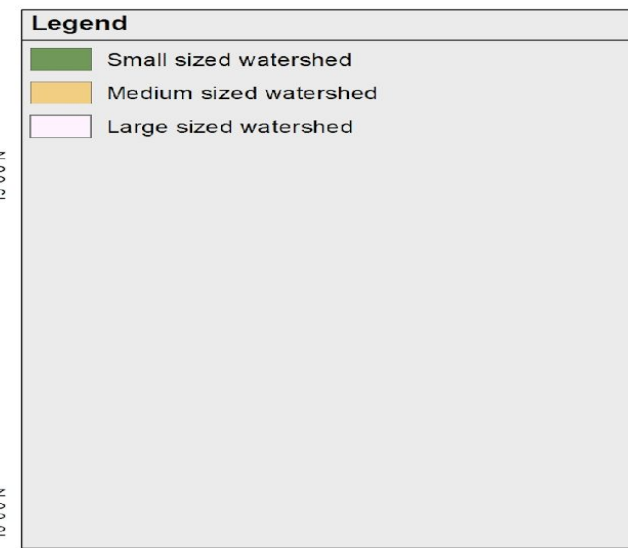
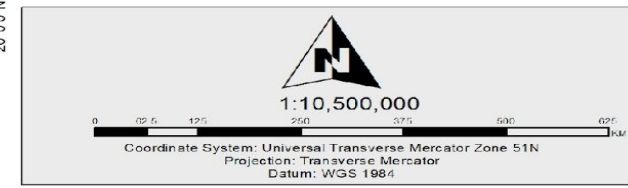
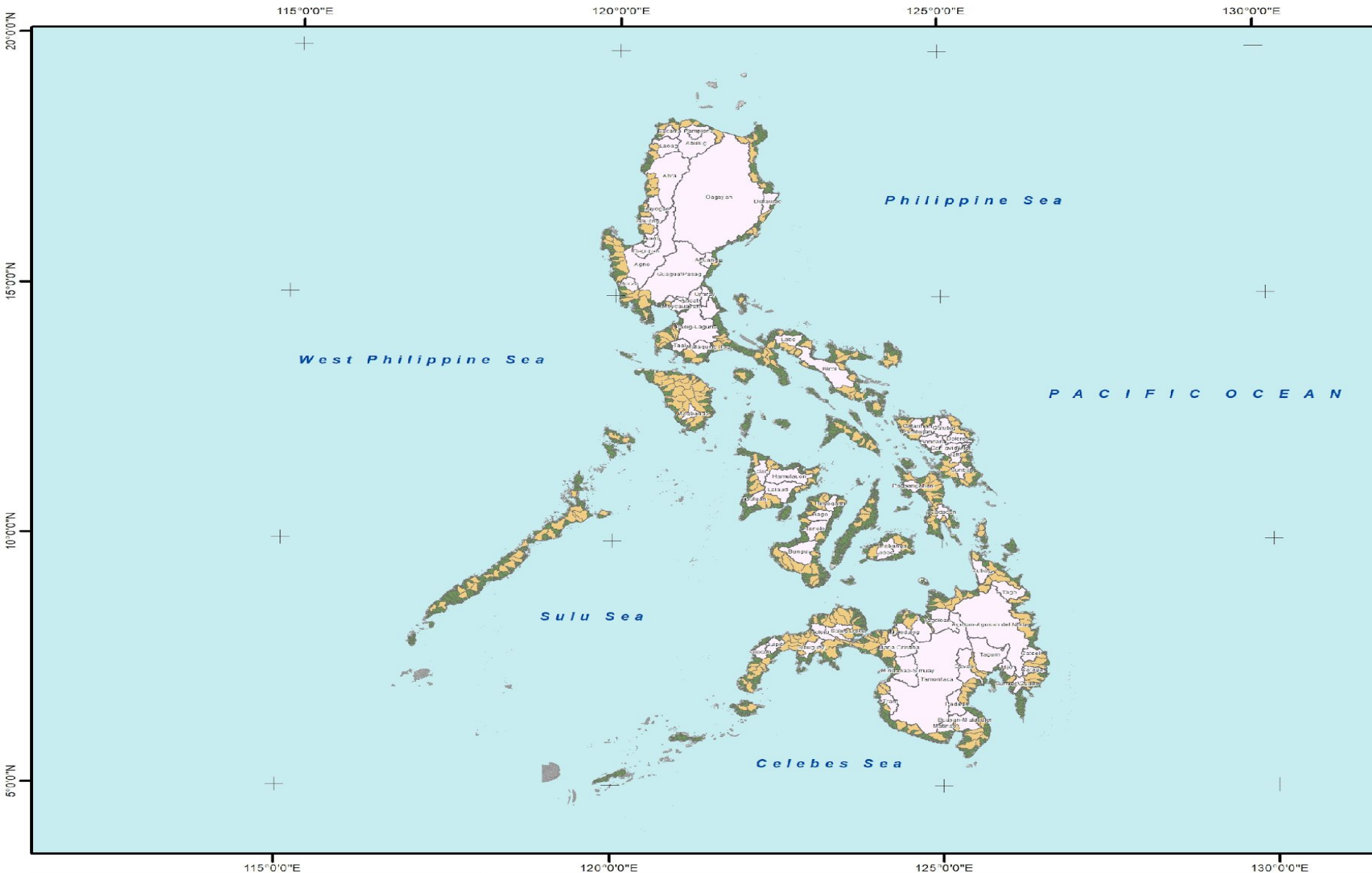
# (R2R/WEM) Approach: What is a Watershed?

The goal is not to include watershed protection as part of land use and development planning BUT TO USE WATERSHED AS THE PLANNING PLATFORM meaning plans and programs of LGUs are developed to ensure first and foremost the protection of watersheds and its ecosystems as foundation to sustainable and resilient socioeconomic development





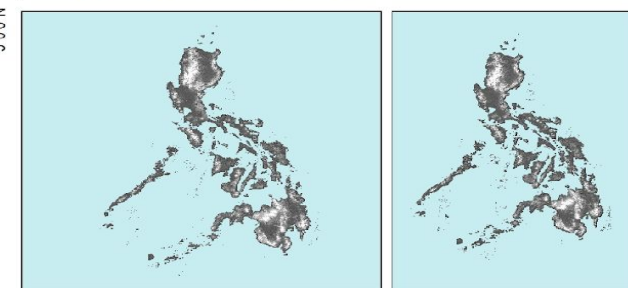
# Philippines is Subdivided Into Many Watersheds



**Data Sources**

Forest Management Bureau (watershed boundary); National Mapping and Resource Information Authority (DEM); and Philippine Statistics Authority (administrative boundary).

Disclaimer: Administrative boundaries are indicative and contain no authoritative information; intended for planning purposes only.



**PHILIPPINES**

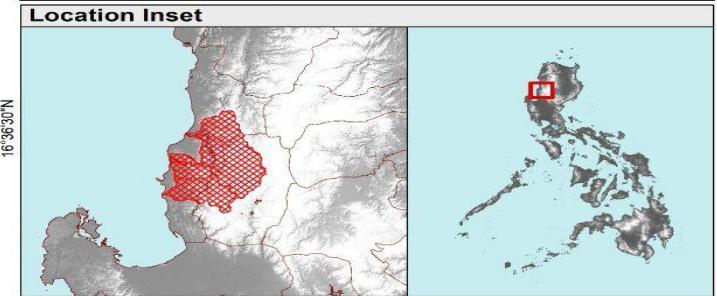
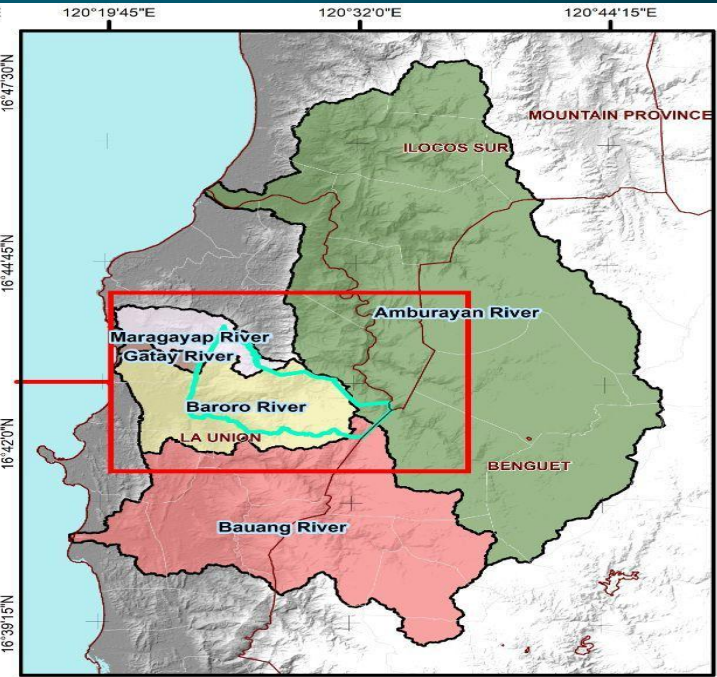
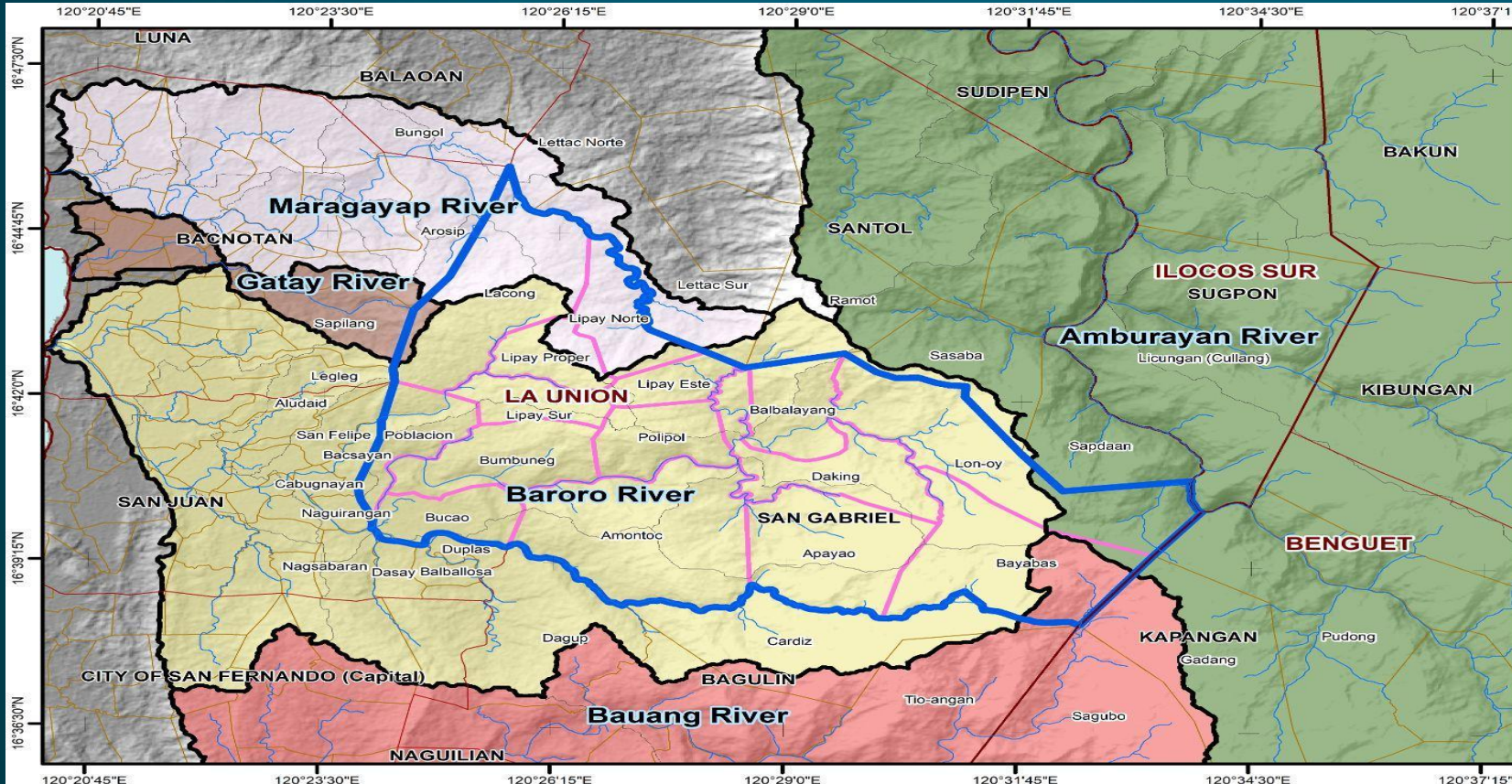
Institutionalization of Guidelines for the Watershed-Based Integrated Area Land Use Planning Towards Resiliency (WILUP)

**WATERSHEDS OF THE PHILIPPINES**

(Based on sizes)



# San Gabriel Encompasses Several Watersheds



**Legend**

- Watershed Boundary
- Subwatershed Boundary
- Provincial Boundary
- Municipal Boundary
- San Gabriel, La Union
- Barangay Boundary
- River Networks

**Watersheds within San Gabriel**

- Amburayan River
- Baroro River
- Bauang River
- Gatay River
- Maragayap River

Scale: 1:155,000  
 Coordinate System: Universal Transverse Mercator Zone 51N  
 Projection: Transverse Mercator  
 Datum: WGS 1984

**SAN GABRIEL, LA UNION**

Institutionalization of Guidelines for the Watershed-Based Integrated Area Land Use Planning Towards Resiliency (WILUP)

**WATERSHED MAP OF SAN GABRIEL, LA UNION**

(Amburayan, Baroro, Bauang, Gatay and Maragayap River Watershed)

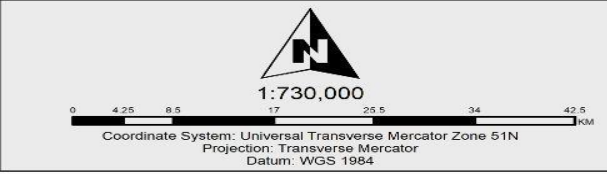
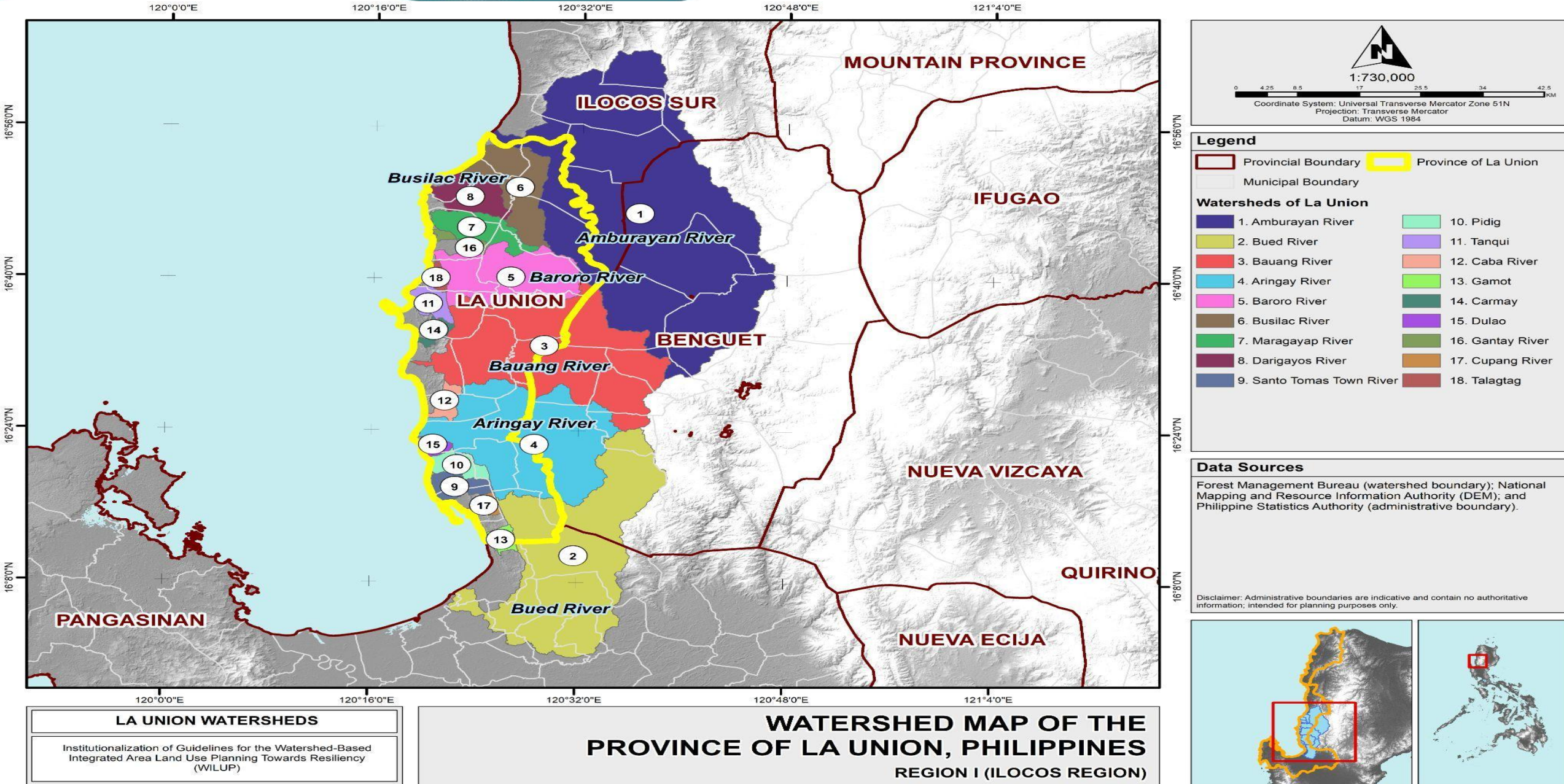
**Data Sources**

National Mapping and Resource Information Authority (DEM); and Philippine Statistics Authority (administrative boundary).

Disclaimer: Administrative boundaries are indicative and contain no authoritative information; intended for planning purposes only.



# Province of La Union Encompasses Many Watersheds



**Legend**

- Provincial Boundary (Red line)
- Municipal Boundary (Grey line)
- Province of La Union (Yellow outline)

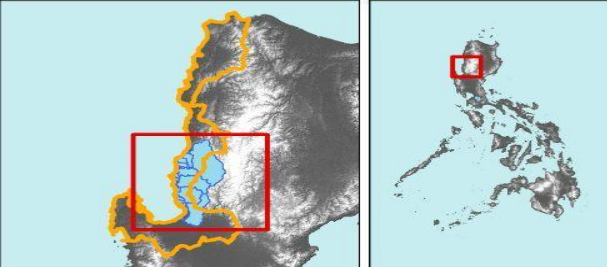
**Watersheds of La Union**

1. Amburayan River	10. Pidig
2. Bued River	11. Tanqui
3. Bauang River	12. Caba River
4. Aringay River	13. Gamot
5. Baroro River	14. Carmay
6. Busilac River	15. Dulao
7. Maragayap River	16. Gantay River
8. Darigayos River	17. Cupang River
9. Santo Tomas Town River	18. Talagtag

**Data Sources**

Forest Management Bureau (watershed boundary); National Mapping and Resource Information Authority (DEM); and Philippine Statistics Authority (administrative boundary).

**Disclaimer:** Administrative boundaries are indicative and contain no authoritative information; intended for planning purposes only.



**LA UNION WATERSHEDS**

Institutionalization of Guidelines for the Watershed-Based Integrated Area Land Use Planning Towards Resiliency (WILUP)

**WATERSHED MAP OF THE PROVINCE OF LA UNION, PHILIPPINES**

REGION I (ILOCOS REGION)

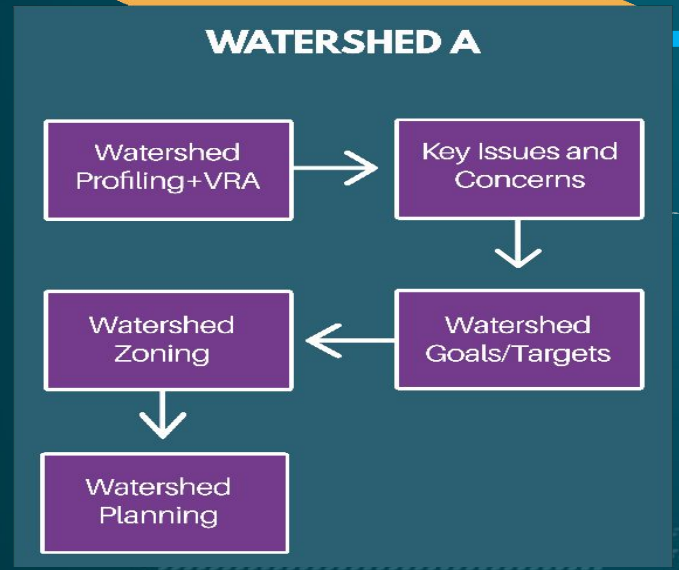
# Ridge to Reef Local Land Use/ Dev't Planning

STEP 1

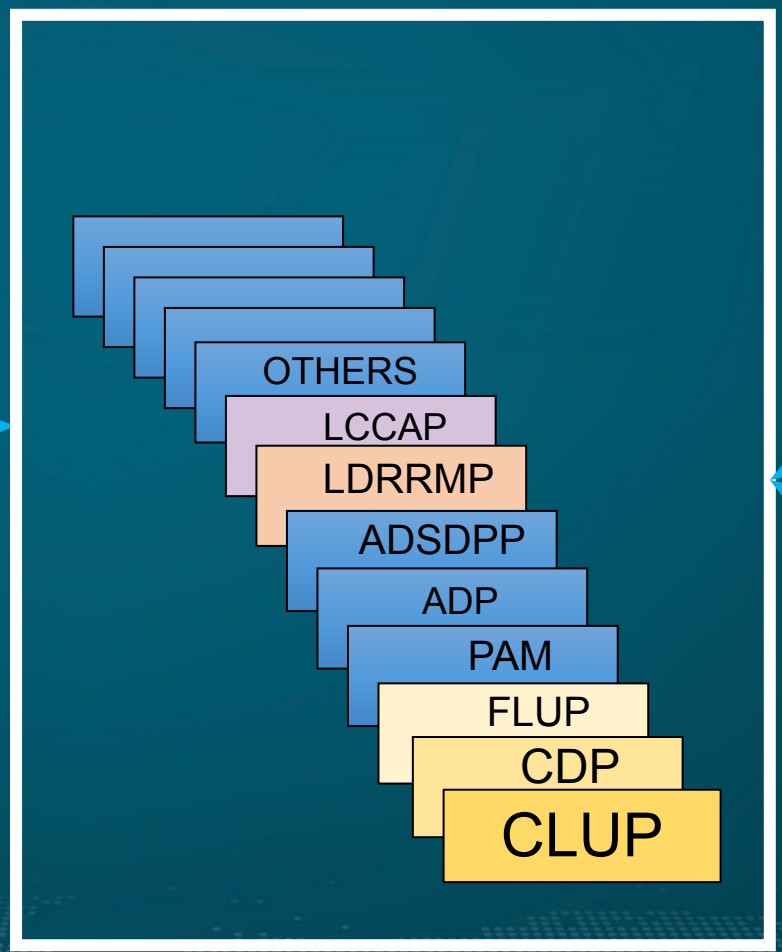
WATERSHED D

WATERSHED C

WATERSHED B



STEP 2



RDP

PDPFP

Ensures protection of ecosystems

Ensures sustainable economic dev't



# R2R Approach to CLUP, CDP, sectoral Plans of SAN GABRIEL, LA UNION

STEP 1

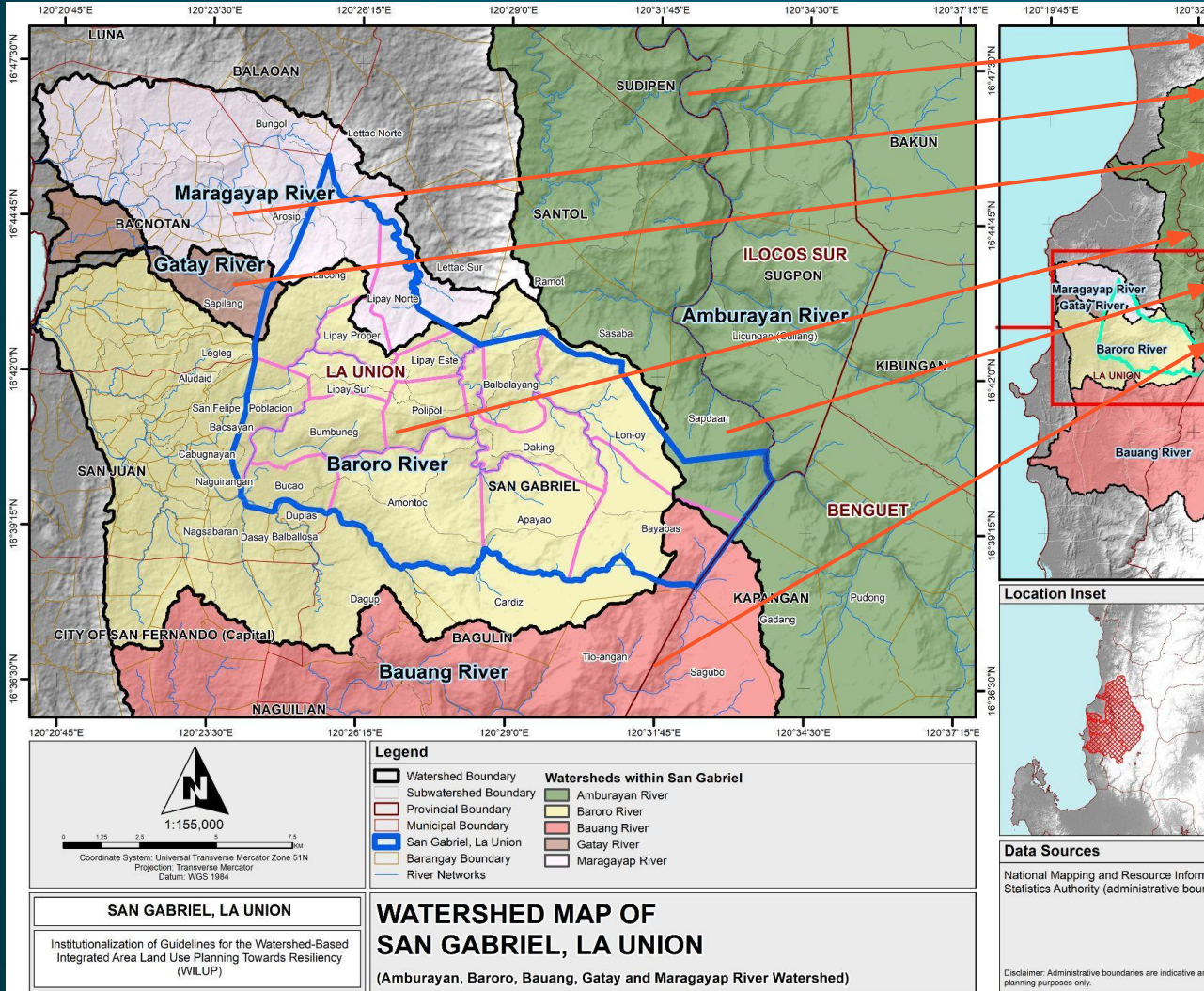
PREPARE ZONING AND MANAGEMENT PLAN FOR BARORO & OTHER WATERSHEDS

- Production zone
- Protection zone
- Identify best uses for each zone that will help achieve protection

STEP 2

USE WATERSHED ZONING AND MANAGEMENT PLANS AS FRAMEWORK FOR DEVELOPING :

- CLUP
- CDP
- LCCAP
- LDRRMP
- FLUP
- ADSDPP





# R2R Approach to CLUP, CDP, sectoral Plans of LOS BAÑOS, LAGUNA

STEP 1

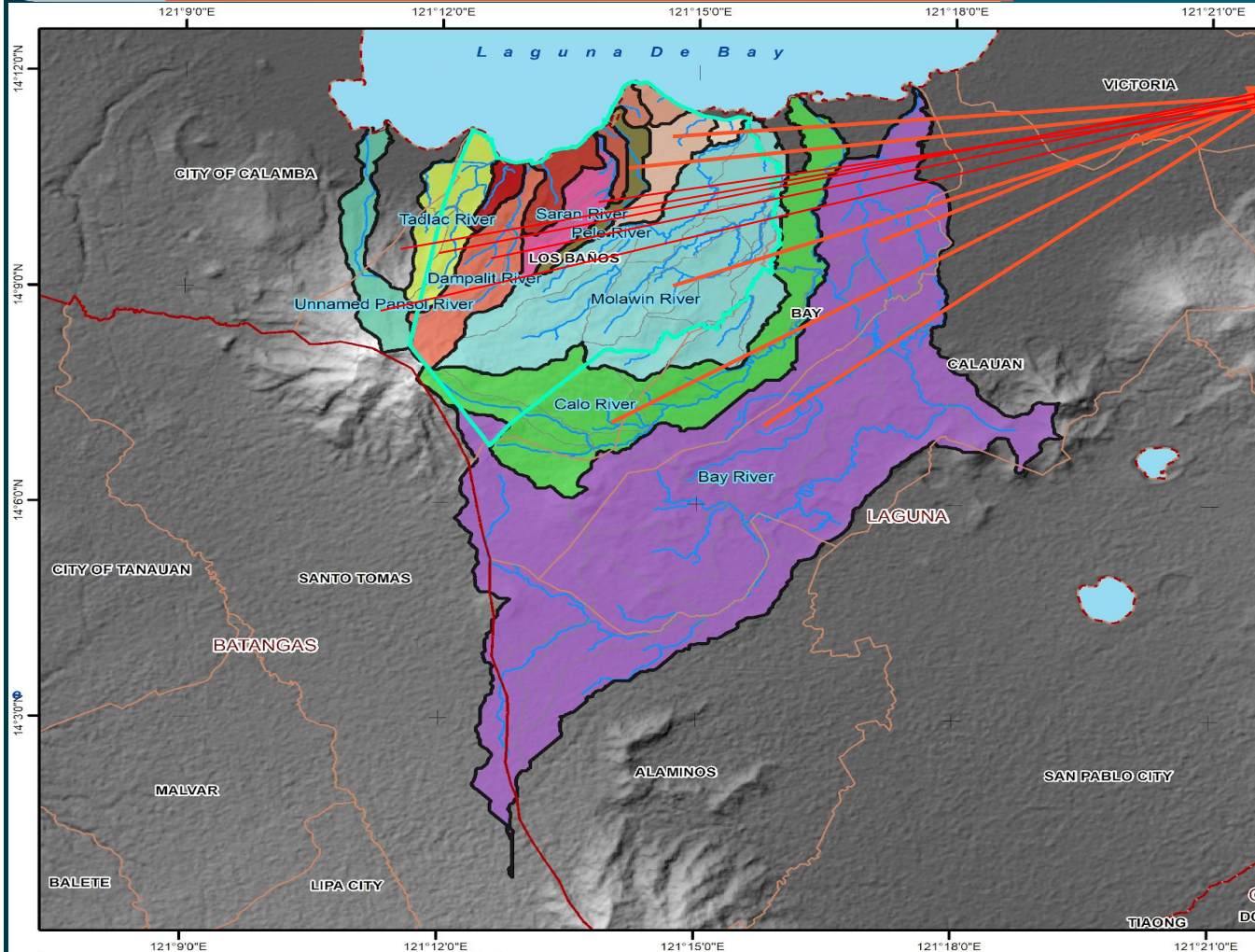
PREPARE ZONING AND MANAGEMENT PLAN FOR ALL WATERSHEDS W/ PORTIONS INSIDE LB BOUNDARY

- a. Production zone
- b. Protection zone
- c. Identify best uses for each zone that will help achieve protection of the watershed and ecosystems, and at the same time achieve economic development goals

STEP 2

USE WATERSHED ZONING AND MANAGEMENT PLANS AS FRAMEWORK FOR DEVELOPING :

- CLUP
- CDP
- LCCAP
- LDRRMP
- FLUP
- ADSDPP
- AGRI DEV'T PLAN
- TOURISM
- OTHER PRESCRIBED PLANS



LOS BAÑOS, LAGUNA

Institutionalization of Guidelines for the Watershed-Based Integrated Area Land Use Planning Towards Resiliency (WILUP)

WATERSHED MANAGEMENT PLAN  
LOS BAÑOS, LAGUNA

(Bay, Cambantoc, Molawin, Pele, Saran, Dampalit, Tadiac, Pansol River Watersheds)



# Ridge to Reef Land Use and Dev't Planning

STEP 1

WATERSHED D

WATERSHED C

WATERSHED B

WATERSHED A

Watershed Profiling+VRA

Key Issues and Concerns

Watershed Zoning

Watershed Goals/Targets

Watershed Planning

STEP 2

RDP

PDPFP

STEP 3

OTHERS

LCCAP

LDRRMP

ADSDPP

ADP

PAM

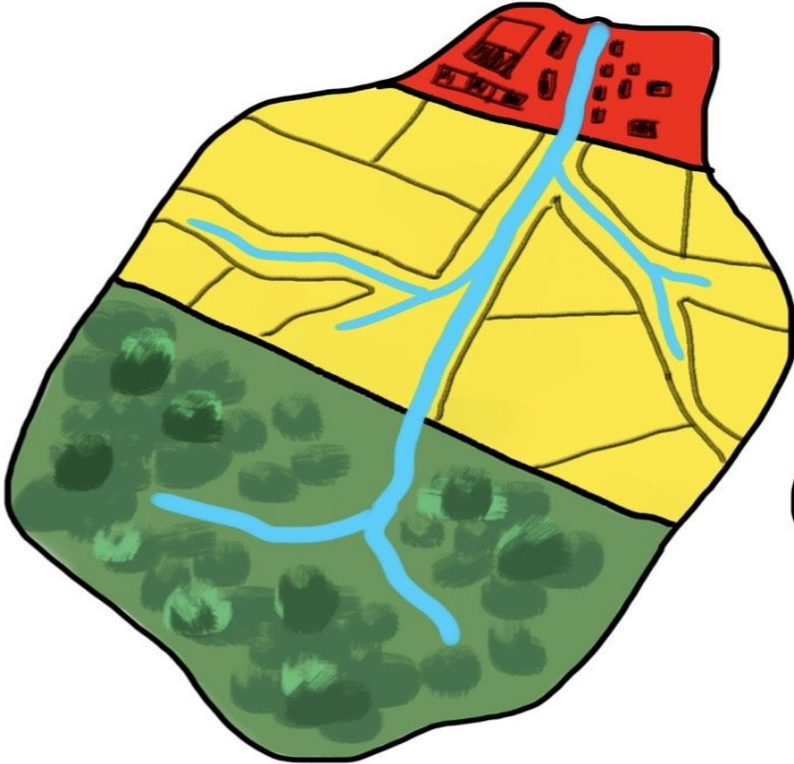
FLUP

CDP

CLUP

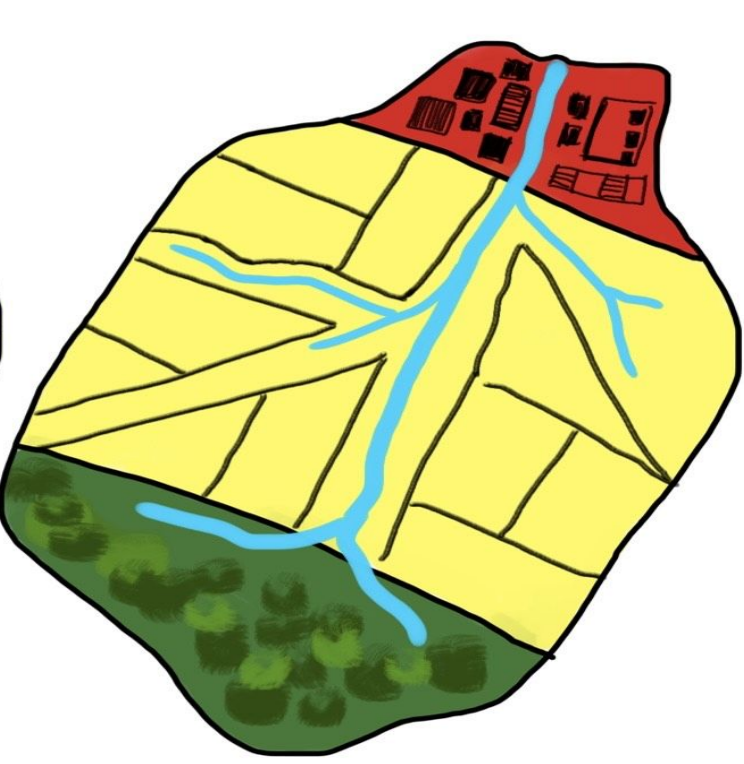
Ensures protection of ecosystems

Ensures sustainable economic devt



<b>Forests</b>	<b>40%</b>
<b>Agriculture</b>	<b>40%</b>
<b>Urban</b>	<b>20%</b>

<b>Water (mcm)</b>	<b>100</b>
Sp Richness	1000
Food (tons)	500
GHG Emi	5



<b>Forests</b>	<b>30%</b>
<b>Agriculture</b>	<b>45%</b>
<b>Urban</b>	<b>25%</b>

<b>Water (mcm)</b>	<b>85</b>
Sp Richness	800
Food (tons)	700
GHG Emi	10



<b>Forests</b>	<b>10%</b>
<b>Agriculture</b>	<b>50%</b>
<b>Urban</b>	<b>40%</b>

<b>Water (mcm)</b>	<b>75</b>
Sp Richness	400
Food (tons)	1000
GHG Emi	20



# R2R-Approach to La Union PDPFP

STEP 1

PREPARE ZONING AND MANAGEMENT PLANS FOR EACH WATERSHED

- Production zone
- Protection zone
- Identify best uses for each zone to achieve protection of the watershed/ecosystems, and economic development goals

STEP 2

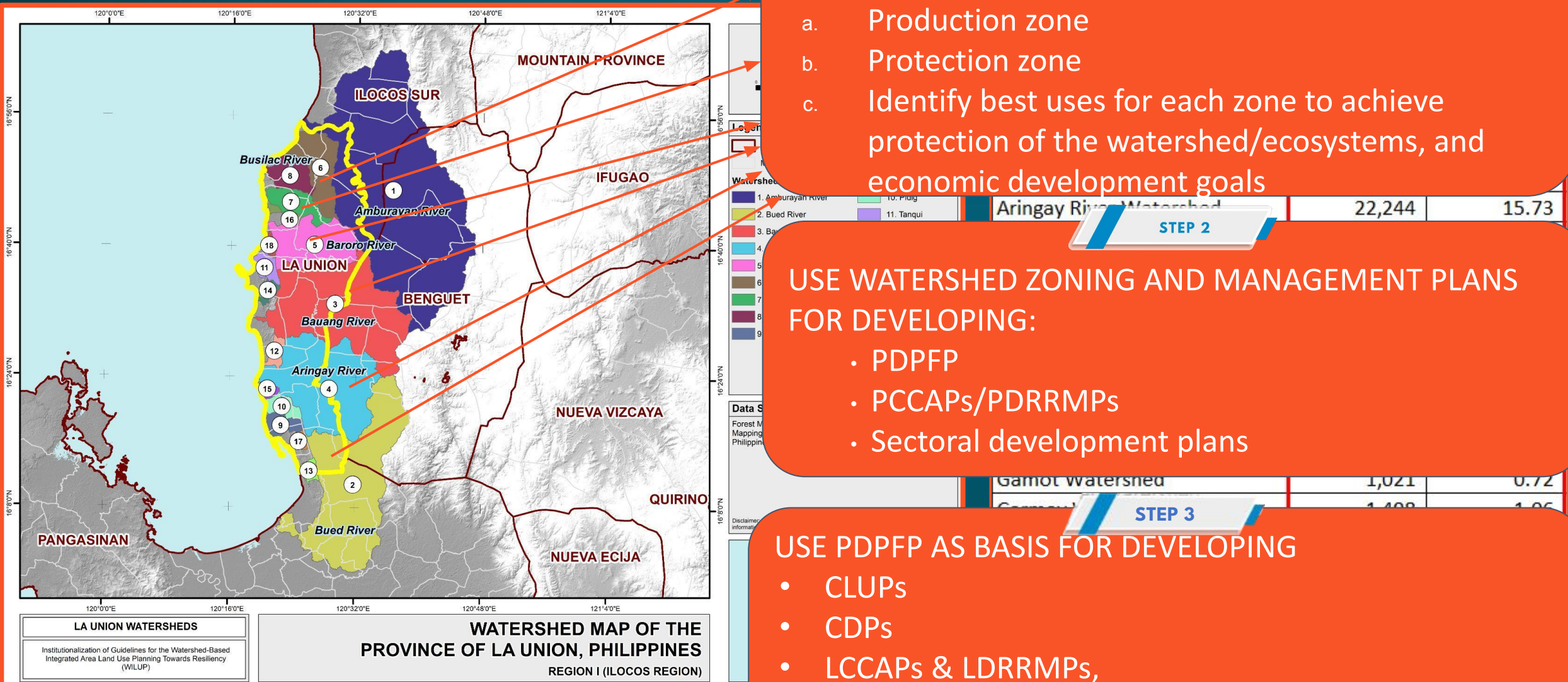
USE WATERSHED ZONING AND MANAGEMENT PLANS FOR DEVELOPING:

- PDPFP
- PCCAPs/PDRRMPs
- Sectoral development plans

STEP 3

USE PDPFP AS BASIS FOR DEVELOPING

- CLUPs
- CDPs
- LCCAPs & LDRRMPs,
- FLUPs
- Other prescribed sectoral plans



# R2R-Approach to Laguna PDPFP

## STEP 1

PREPARE ZONING AND MANAGEMENT PLANS FOR EACH WATERSHED

- Production zone
- Protection zone
- Identify best uses for each zone to achieve protection of the watershed/ecosystems, and economic development goals

## STEP 2

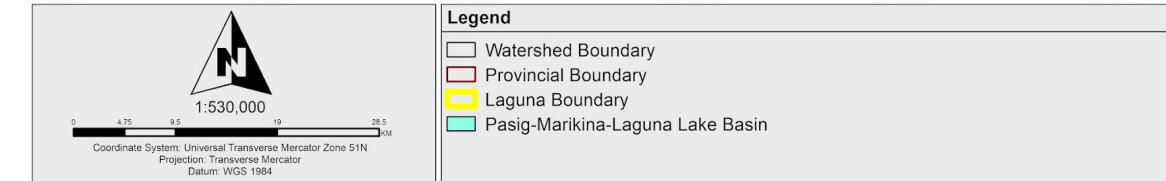
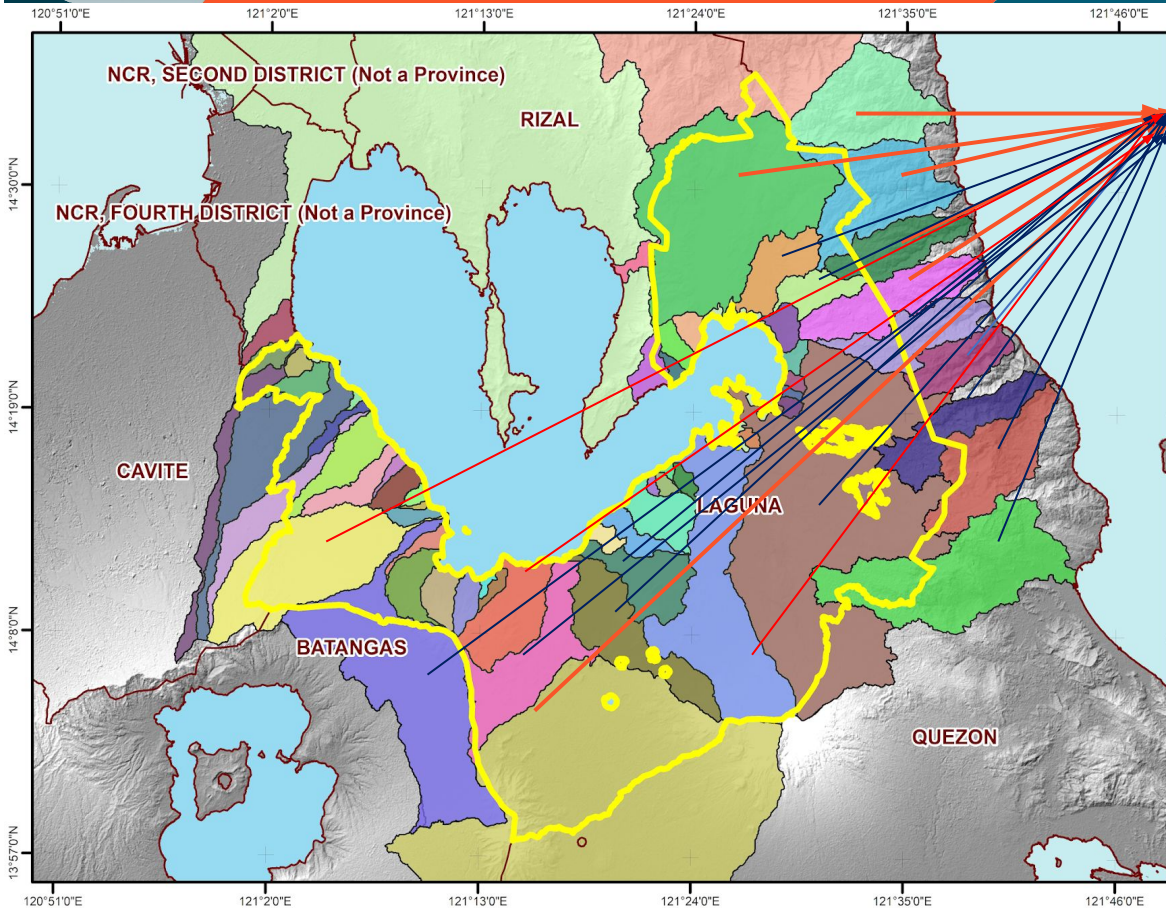
USE WATERSHED ZONING AND MANAGEMENT PLANS FOR DEVELOPING:

- PDPFP
- PCCAPs/PDRRMPs
- RDPs

## Step 3

USE PDPFP AS BASIS FOR DEVELOPING

- CLUPs
- CDPs
- LCCAPs & LDRRMPs,
- FLUPs
- Other prescribed sectoral plans



### LAGUNA WATERSHEDS

Institutionalization of Guidelines for the Watershed-Based Integrated Area Land Use Planning Towards Resiliency (WILUP)

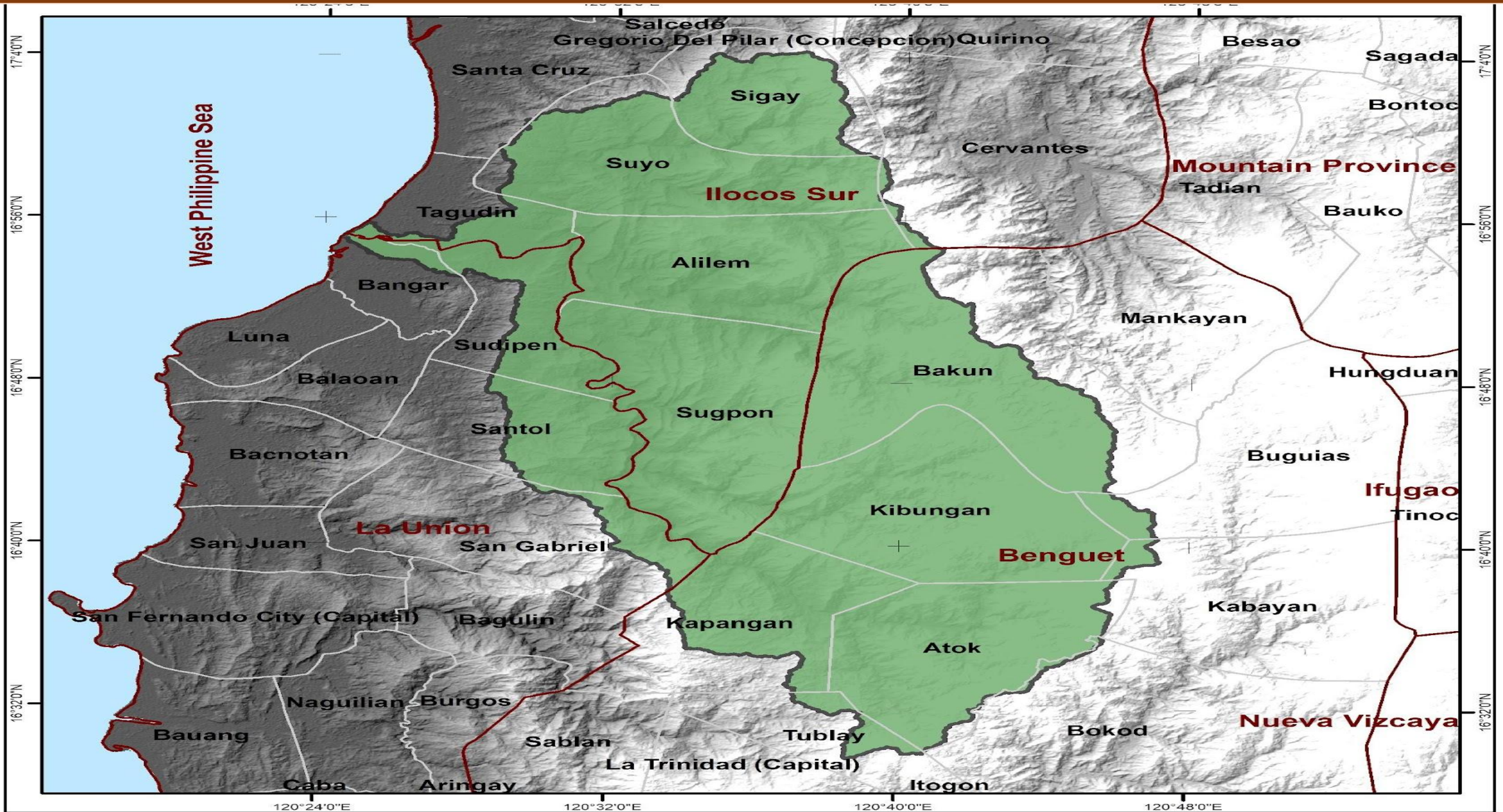
### WATERSHED MAP PROVINCE OF LAGUNA

(Major and Minor River Watershed)

Disclaimer: Administrative boundaries are indicative and contain no authoritative information; intended for planning purposes only.



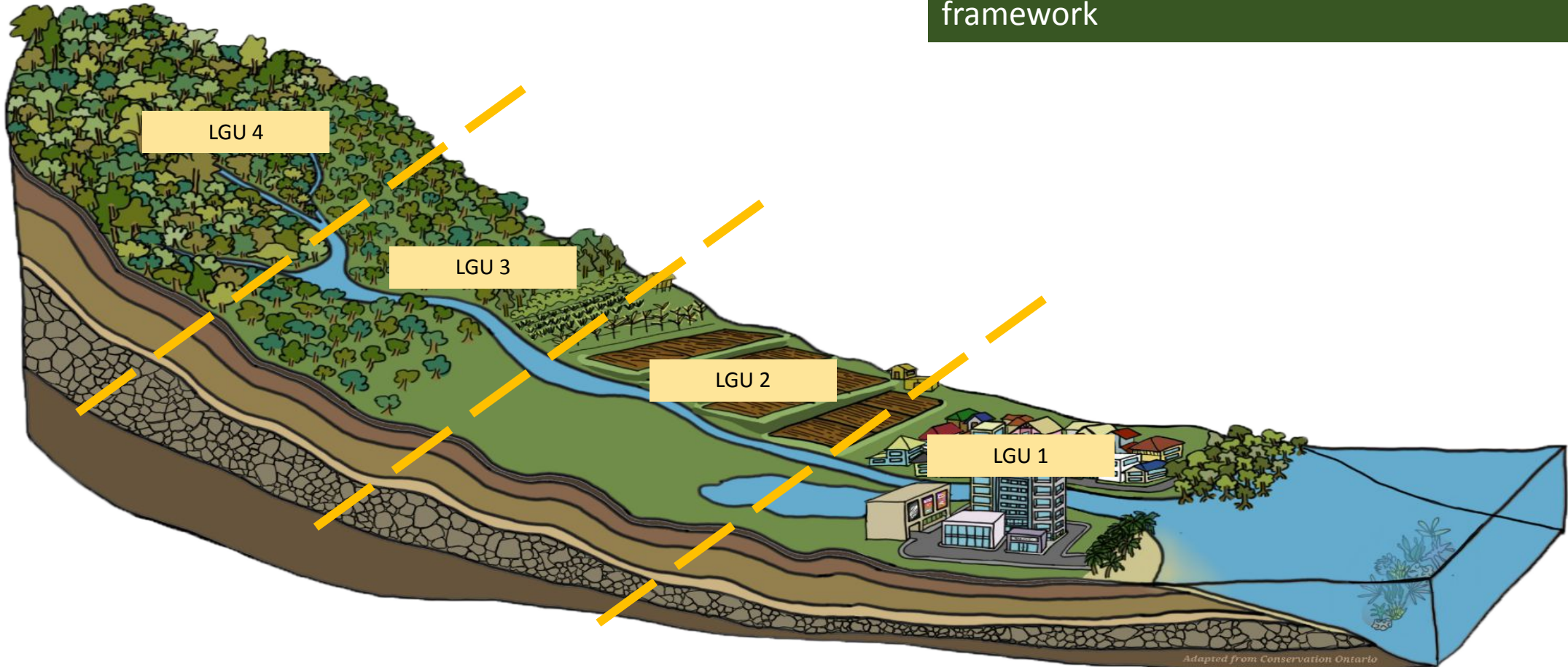
# Challenges to R2R/WEM Approach to Land Use Planning





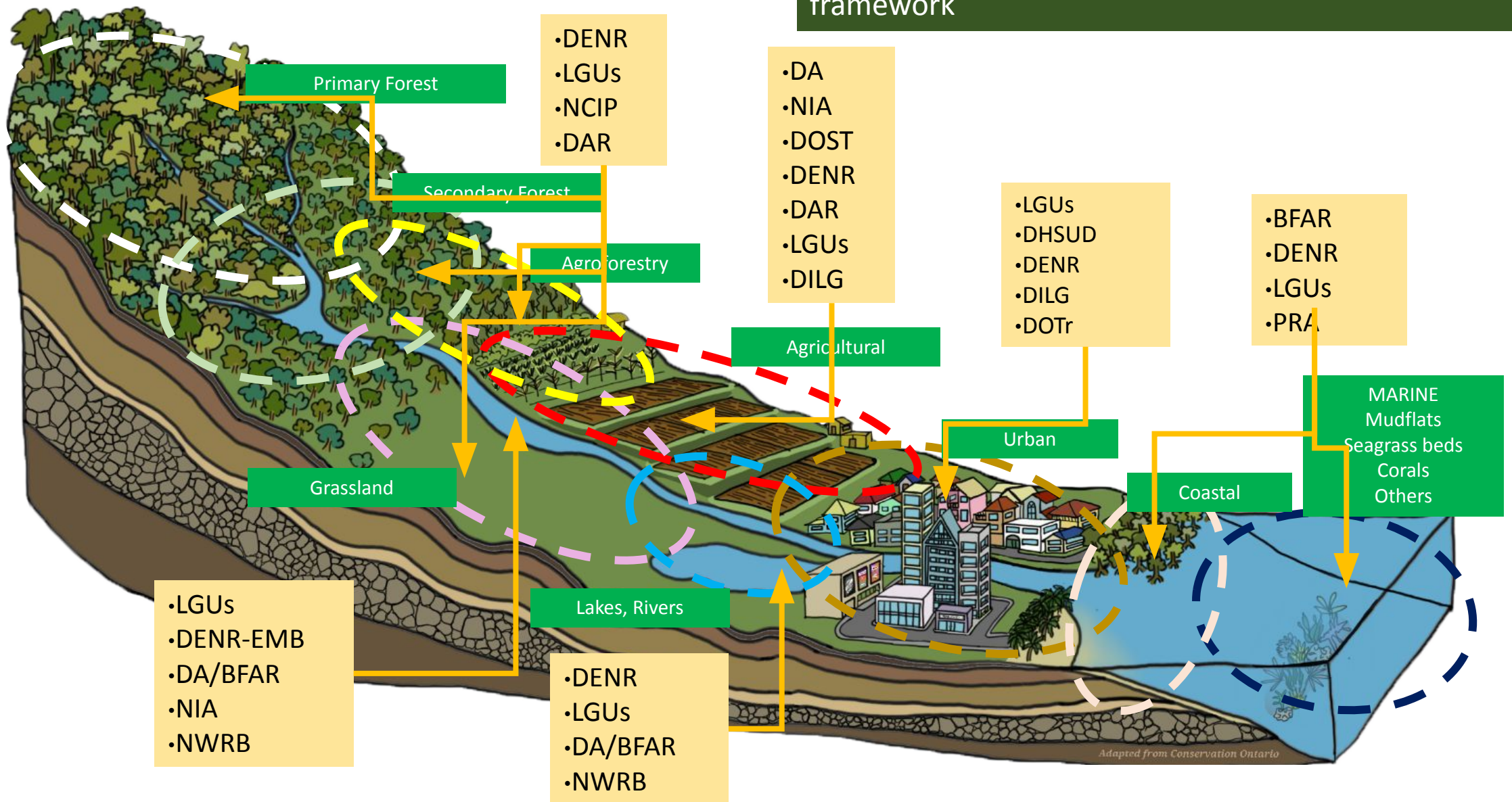
# Challenges to R2R/WEM Approach to Land Use Planning

All LGUs sharing a common watershed must use the zoning of that watershed as the common planning framework



# Challenges to R2R/WEM Approach to Land Use Planning

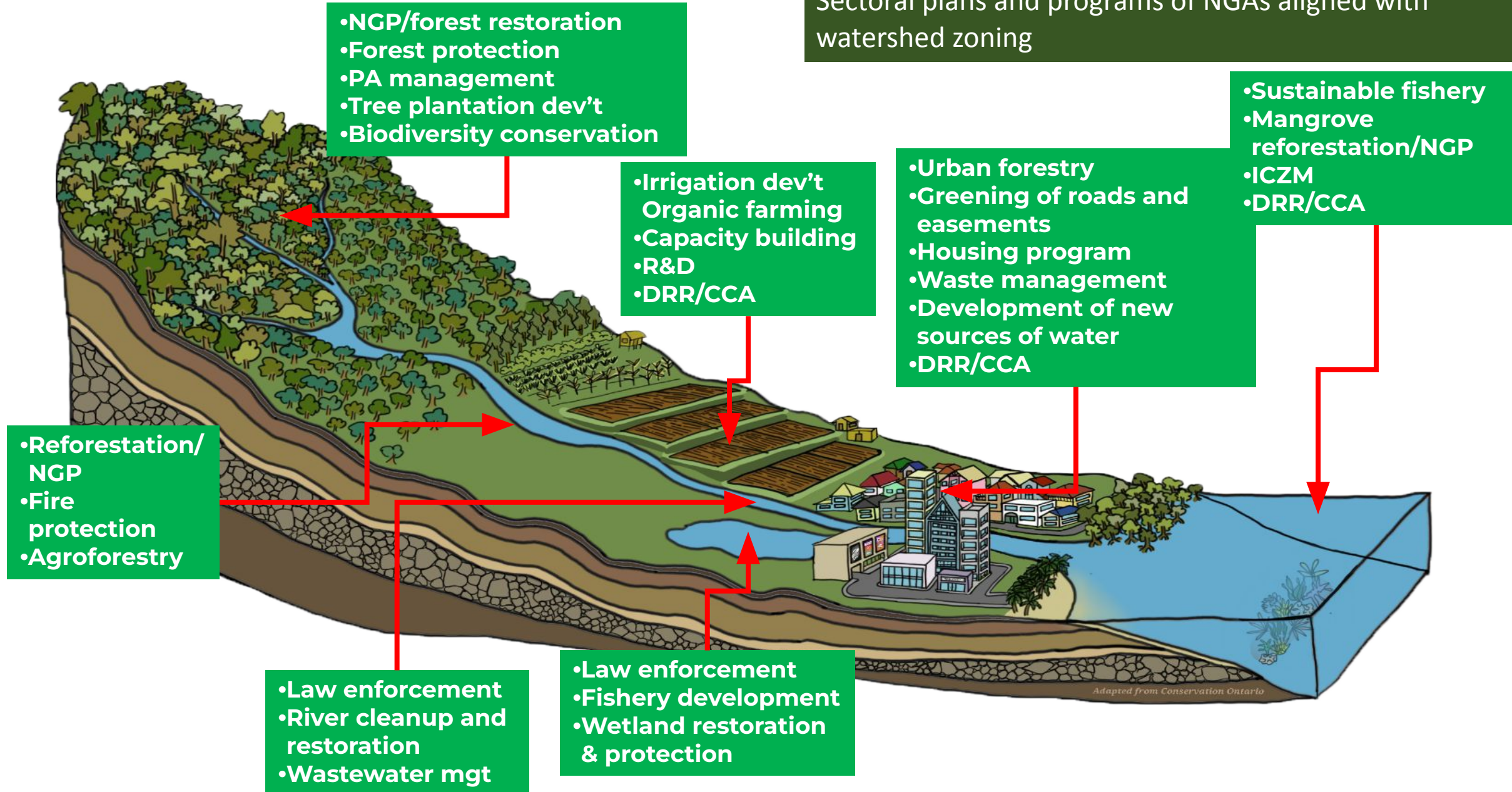
NGAs must use watershed zoning as common planning framework





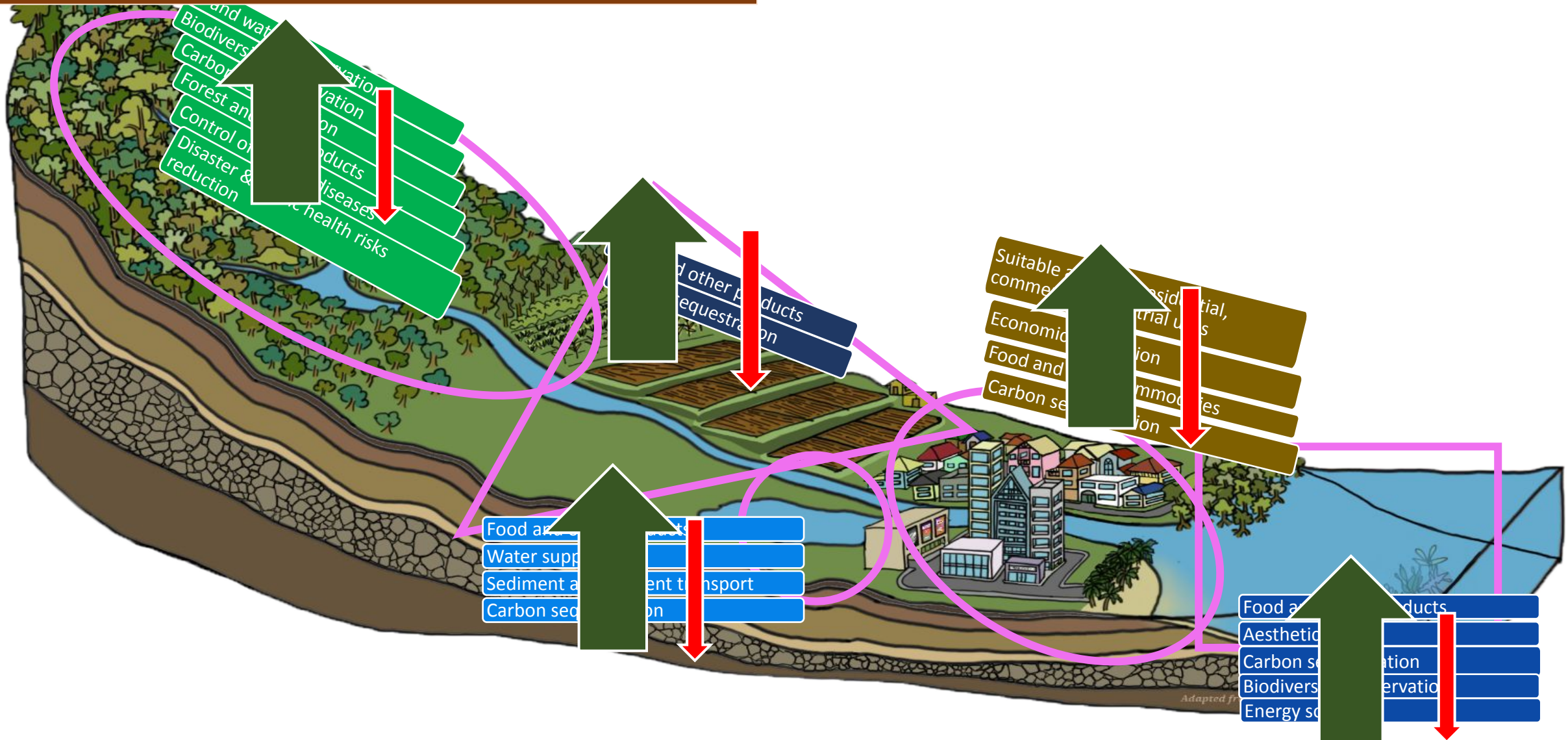
# Challenges to R2R/WEM Approach to Land Use Planning

Sectoral plans and programs of NGAs aligned with watershed zoning

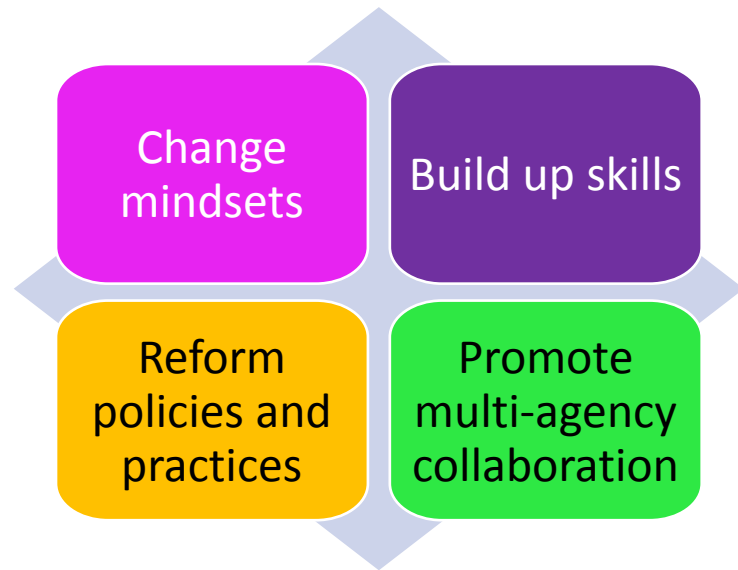


# R2R/WEM Approach: Key Features

*The goal is to enhance/conserves and minimize losses of ecosystem services*



# Imperatives



## Grow understanding on

- interactions of various ecosystems
- Impacts of climate change and land use on ecosystems
- Responses of human and natural systems to adaptation and mitigation
- Assessment of risks associated with multiple hazards

## Technology development

- Continuous monitoring of ecosystems, climate, land use in a watershed
- Tools for land use planning and analysis of tradeoffs among various land uses

## Institutional development

- Harmonization of planning guidelines
- Mechanisms for inter LGU collaboration
- Mechanisms for inter agency collaboration
- Mechanisms for LGU-NGA collaboration



# Thank You



University of the Philippines  
**LOS BAÑOS**

