REGIONAL ACTION PLAN FOR IMPLEMENTING THE PHILIPPINE MASTER PLAN FOR CLIMATE RESILIENT FORESTRY DEVELOPMENT

Region 4A, CALABARZON Region

I. Background and Rationale

The first Philippine Master Plan for Forestry Development (PMPFD), which was formulated in 1990, was revised in 2003 in view of new developments in the forestry and environment sectors both at the local and international scenes. Among these are forest certification; development and implementation of criteria and indicators (C&I) for sustainable forest management; and the increasing recognition of the role of forests and forestry in poverty eradication and support of sustainable livelihood. In CY 2013, the Forest Management Bureau (FMB) again decided to update the 2003 revised master plan for forestry development (RMPFD), to take into consideration the potential impacts of climate change to the forestry sector. Hence, a Philippine master plan for climate resilient forestry development (PMPCRFD) was formulated where three strategic programs were identified for implementation to ensure that the forestry sector can respond to varying demands for forest ecosystems goods and services from multiple clients. The three major programs include the following:

1. Program on strengthening resilience of forest ecosystems and communities to climate change;
2. Program responding to demands for forest ecosystem goods and services; and
3. Program promoting responsive governance in the forestry sector.

This plan outlines the action plan of DENR Region IV-A to support implementation of the PMPCRFD for CY 2016-2028.

II. Regional Profile

DENR Region IV-A (CALABARZON) is located in the south-western part of Luzon, south-east of Metro Manila. It is bounded on the east by the Philippine sea and Bicol Region; on the south by Verde Island Passage, and on the west by West Philippine Sea. It is practically accessible via all types of land transportation. DENR Region IV-A was named CALABARZON REGION as it comprises the five (5) Southern Tagalog Mainland Provinces; Cavite, Laguna, Batangas, Rizal and Quezon (figure 1).

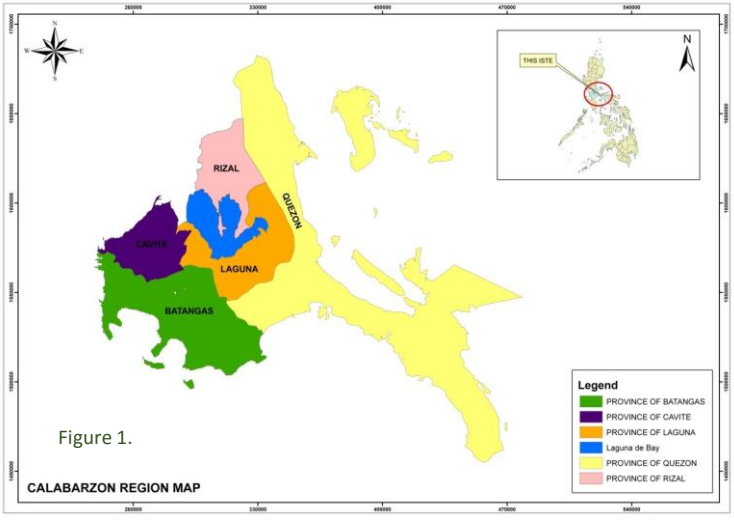


Figure 1.

2.1 Physical features

CALABARZON has varied land forms, consisting of flat coastal areas, upland interior areas of slightly moderate rolling or undulating plains and hills, and mountains. Almost sixty percent of the region's land area has a slope ranging from 0-18%.

Batangas' lands are mostly elevated; rolling hills, small low flat lands with scattered mountainous areas. Cavite province is characterized by rolling hinterlands punctuated by hills, with shoreland fronting Manila Bay at sea level, and rugged portion at the boundary of Batangas where Dos Picos mountains are located. Laguna is characterized with rugged terrain, from level to steep slope, while the province of Quezon, has a rugged terrain with few plains, valleys and swamps. Rizal province' topography is a combination of valleys and mountains, with flat low-lying areas on the western portion, rugged ridges and rolling hills which form part of the Sierra Madre ranges in the eastern portion.

Region IV-A is covered by all four (4) types of climate. A summary of the climatic types in each of the provinces of the region is presented in table 1.

Table 1. Climatic Types Per Province in Region 4-A.

Province	**Type of Climate**	**Description** (i.e. relatively dry from November to April and wet during the rest of the year near the southern boundary)
Batangas	Type I	Dry months from November to April, wet during the rest of the year
Cavite	Type I	Dry months from November to April, wet during the rest of the year
Laguna	Type I	Dry months from November to April, wet during the rest of the year
	Type II	No dry season with very pronounced maximum rain period from November to January
Quezon	Type III	Relatively dry from November to April and wet during the rest of the year
	Type IV	Even distribution of rainfall throughout the year
Rizal	Type I	Dry months from November to April, wet during the rest of the year

2.2 Socio-Economic Profie

CALABARZON Region is the most populated region in the Philippines with a population of 14,414,774 inhabitants based on the 2015 census. Its average annual population growth rate from 2010 to 2015 is about 2.58%. Cavite is the most populated province and has the highest annual population growth rate in the region (Table 2). Region 4-A has a total land area of 1,622,861 hectares composed of 570,913 forest lands and 1,051,948 alienable and disposable lands. It has 18 cities, 124 municipalities and 4,011 barangays.

Table 2. Population and Annual Population Growth Rates of CALABARZON Region

Provinces	Population			Annual Pop. Growth Rate		
	May 2000	May 2010	Aug. 2015	2000-2010	2010-2015	2000-2015
REGION IV-A (CALABARZON)	**9,320,629**	**12,609,803**	**14,414,774**	**3.07**	**2.58**	**2.90**
BATANGAS	1,905,348	2,377,395	2,694,335	2.24	2.41	2.30
CAVITE	2,063,161	3,090,691	3,678,301	4.12	3.37	3.86
LAGUNA	1,965,872	2,669,847	3,035,081	3.11	2.47	2.89

Provinces	Population			Annual Pop. Growth Rate		
	May 2000	May 2010	Aug. 2015	2000-2010	2010-2015	2000-2015
QUEZON (excluding LUCENA CITY)	1,482,955	1,740,638	1,856,582	1.61	1.23	1.48
LUCENA CITY	196,075	246,392	266,248	2.31	1.49	2.02
RIZAL	1,707,218	2,484,840	2,884,227	3.82	2.88	3.50

Source: PSA, CY 2000, 2010, 2015

2.3 Resources

CALABARZON has varied resources that include land, forests and biodiversity resources, water, and ecotourism areas, among others.

Land Resources

Region 4A has a total land area of hectares. Of this, 35 % or 570,913 hectares are classified as forestlands while 65% or 1,051,948 hectares are alienable and disposable lands (table 3). Most of the forestlands are situated in the province of Quezon, representing roughly 46% of the total area of the province.

Table 3. Land Classification in Region 4A

Land Classification	Area (ha)	%
Forestlands	570,913	35%
Classified Forestlands	549,881	34%
Established Timberlands	424,751	26%
Forest Reserves, National Park/ Prot. Areas & Other Reservations	125,130	8%
Unclassified forestlands	21,032	1%
Alienable and disposable lands	1,051,948	65%
Total	1,622,861	100%

Source: Philippine Forestry Statistics, CY 2014

Forests Resources

About 16.6% (269,656 hectares) of the region's land area are still forested consisting of open forest (11.2%), closed forest (4.3%), and mangrove forests (1.2%). Most of the forests are located in Quezon province covering 230,497 hectares or 26.5% of the total area of the province. Cavite has the least forest covering only an estimated area of 2,455 hectares. Table 4 summarizes the land cover per province in region 4A while figure 2 presents the land cover map of region 4A in CY 2010.

Table 4. Land Cover of Region 4A, CY 2010

Province	Land Area	Total Forest	Close Forest	Open Forest	Mangrove Forest	% of region Forested	% of Prov. Forested	% of total Forest Closed forest
Region 4A	1,622,861	269,656	69,544	181,175	18,937	16.6%	16.6%	26%
Batangas	316,581	3,507	334	2,761	413	0.2%	1.1%	10%
Cavite	128,755	2,455	0	2,305	150	0.2%	1.9%	0%

Province	Land Area	Total Forest	Close Forest	Open Forest	Mangrove Forest	% of region Forested	% of Prov. Forested	% of total Forest Closed forest
Laguna	175,973	16,427	1,234	15,193	0	1.0%	9.3%	8%
Quezon	870,660	230,497	63,838	148,285	18,374	14.2%	26.5%	28%
Rizal	130,892	16,770	4,139	12,631	0	1.0%	12.8%	25%
Total %		16.6%	4.3%	11.2%	1.2%			

The forest cover of region 4A has decreased considerably by about 20,016 hectares from CY 2003 to CY 2010. This means that about 2,859 hectares of forests were being destroyed annually during this period. In general, there was a decrease in forest cover in all provinces except in Laguna which registered a small increase of 222 hectares in forest cover. Among the provinces of region 4A, Batangas registered the highest rate of net forest cover loss. This province lost almost all its close forest and retained only about 24% of its original open forest area. Another critical province in terms of forest loss is Quezon province. While the net forest loss in this province is only 693 hectares, it converted more than 39% of its 2003 close forest into lower quality open forests and other types of vegetation. This will have great implications in terms of loss of biodiversity resources. The forest cover change in region 4A is summarized in table 5.

Table 5. Forest Cover Change in Region 4A (CY 2003-CY 2010)

Provinces	Close Forest			Open Forest			Mangrove Forest			Net Change
	2010	2003	Change	2010	2003	Change	2010	2003	Change	
Batangas	334	2232	(1,898)	2,761	11381	(8,620)	413	286	127	10,391)
Cavite	0	0	-	2,305	5439	(3,134)	150	298	-148	(3,282)
Laguna	1,234	1208	26	15,193	14997	196	0	0	0	222
Quezon	63,838	104919	(41,081)	148,285	115603	32,682	18,374	10,668	7,706	(693)
Rizal	4,139	8803	(4,664)	12,631	13745	(1,114)	0	94	-94	(5,872)
Total	69545	117162	(47,617)	181,175	161,165	20,010	18937	11346	7,591	20,016)

* Include plantations

Source: Philippine Forestry Statistics, CY 2004 and CY 2014.

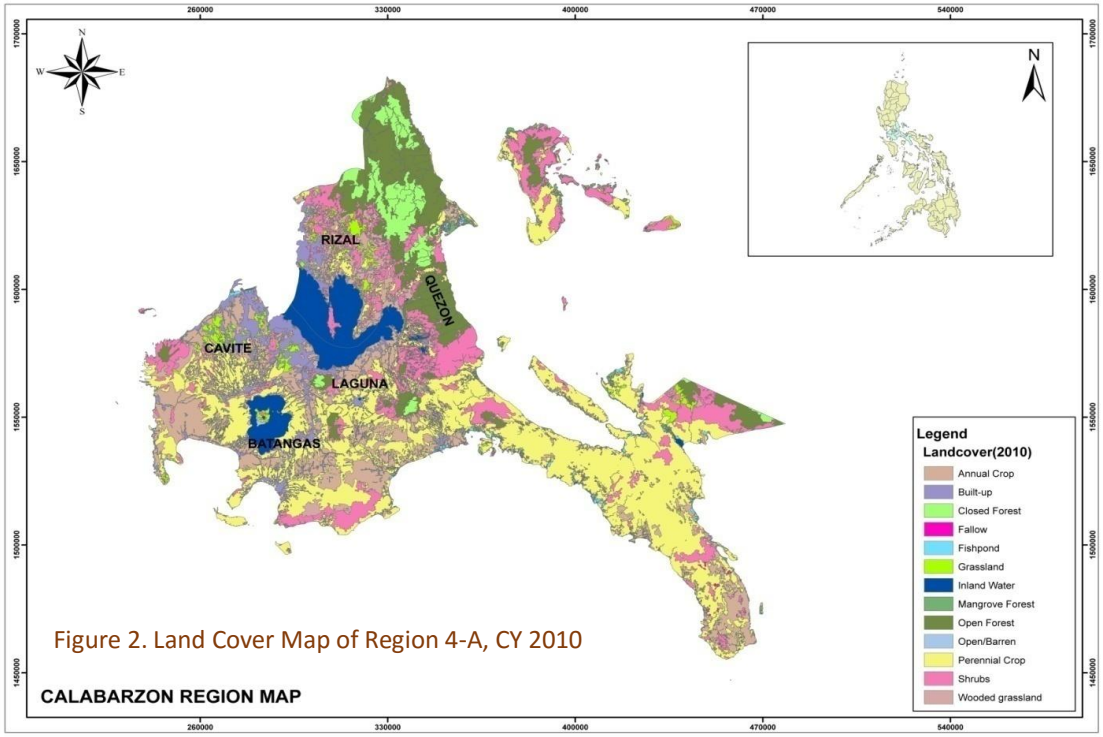
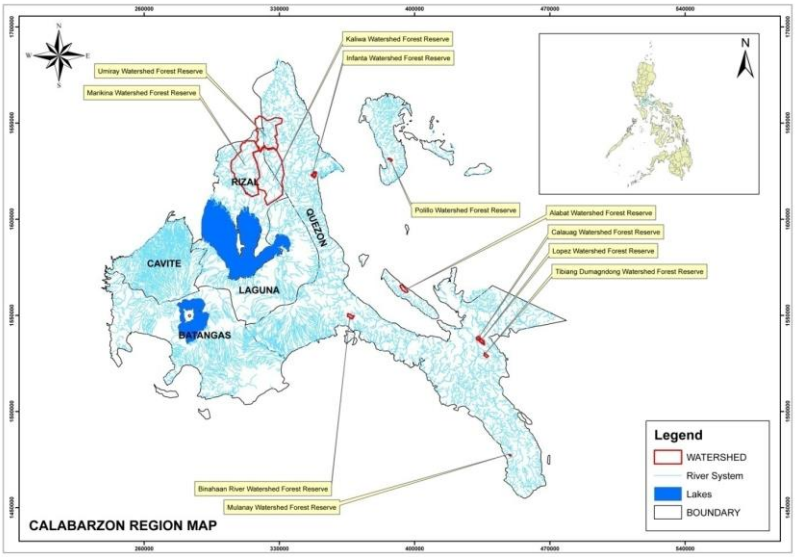


Figure 2. Land Cover Map of Region 4-A, CY 2010

Water resources

Figure 3. Locations of Important Water Bodies & Watersheds in Reg. 4A



Region 4A is drained by many river systems that are used for power generation, irrigation and domestic purposes. It has 16 watershed forest reserves covering approximately 61,908 hectares (Annex 1). Many of its watersheds support national irrigation systems as indicated in annex 2. In addition, two of the 10 major lakes in the Philippines are located in region 4A. These are the Laguna de Bay, the largest freshwater lake in the Philippines with an area of 90,000 hectares and the Taal Lake covering an area of 23,400 hectares. Laguna de Bay supports agriculture, industry, recreation, and ecosystem services. Fisheries production from the lake is on the magnitude of 7.3 million pesos per year. The Kalayaan Hydroelectric Power Station in Laguna which draw water from Laguna lake, produces 600 megawatts of electricity. Laguna de Bay water quality is categorized as class C, which is "good" for fishery and industrial water supply. Figure 3 shows the location of major water bodies in the region..

Biodiversity Resources

The Region has 17 protected areas, of which 1 is legislated while the remaining 16 are still considered initial component under NIPAS. These protected areas contain important biodiversity resources of flora and fauna, some of which are considered vulnerable, rare or endangered. The list of protected areas in the CALABARZON region with their corresponding area, location & identified species of flora and fauna is presented in annex 3.

Ecotourism Areas

The CALABARZON Region is sometimes branded as Tourism Capital of the Philippines due to its waterfalls, hot spring, beautiful caves and beaches. Its rivers and springs are enjoyed by both the local and international tourist. Laguna is famous for its hot springs while Batangas is frequently visited for its beautiful beaches. Other tourist destination in the region are the Banahaw mountain in Quezon, Taal lake in Batangas, Mt. Makiling in Laguna, Tagaytay in Cavite and the Hinulugang Taktak in Rizal

2.4 Vulnerability to Climate Change Hazards.

Climate projections by PAGASA (2011) indicate that there will be increasing temperature in 2050. In terms of rainfall, rainy season will have more rainfall while dry season will become drier. For region 4A, the estimated increase in temperature will range from 1.8ºC to 2.2ºC, with higher temperature increase during the months of March to May. Meanwhile, decrease

in rainfall is estimated to range from –0.8% to 39.8%. The biggest reduction in rainfall is expected from March to May, while up to 24.8% increase in rainfall is expected during the rainy months of June, July and August. (table 6 and 7).

Table 6. Seasonal temperature increases in 2050 under medium-range emission scenario Region 4A

Provinces	Observed Baseline in ºC (1971-2000)				Change in 2050 in ºC (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Batangas	24.2	26.5	25.9	25.6	1.9	2.2	1.8	1.9
Cavite	25.7	28.2	27.3	26.9	2.0	2.2	1.8	1.9
Laguna	25	27.5	27.5	26.7	1.8	2.1	1.9	1.9
Quezon	25.1	27.2	27.6	26.7	1.8	2.1	2	1.8
Rizal	25.4	27.9	27.6	26.8	1.9	2.1	1.8	1.9

Source: PAGASA, 2011

Table 7. Seasonal rainfall change (in %) in 2050 under medium-range emission scenario in Reg. 4A

Provinces	Observed Baseline (1971-2000)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Batangas	231	280.4	856.5	746.4	-11.1	-23.1	17.2	6.3
Cavite	231	280.4	856.5	746.4	-19.1	-30.5	24.2	5.9
Laguna	629.2	386.8	845	1066.5	0.1	-34.8	6.8	0.4
Quezon	827.7	382.7	670	1229.3	6.6	-20.6	6.5	0.9
Rizal	262.4	241.5	1001.3	821.8	-11.5	-39.8	24.8	-0.8

Source: PAGASA (2011)

With more rains during the rainy season, floods, soil erosion and landslide may be aggravated endangering lives and properties of communities. On the other hand, with less rains during the dry season, water availability for irrigation, power generation and domestic use will be adversely affected. The region is already categorized as a water stressed region and this condition is expected to worsen with climate change. Other hazards to which the region is vulnerable is summarized in table 8.

Table 8. Provincial Vulnerability to Climate Related Hazards & Poverty Incidence in Reg. 4A

Region/ Province	Vulnerability					2012 Poverty Index Poverty Incidence among families (%)
	Typhoons	Earthquake	Tsunamis	Water stress	Combined Climate Risks	
Region 4-A						**11.2**
Batangas	High	Medium	High	High	Very High	19.4
Cavite	High	Medium	High	High	Very High	4.1
Laguna	High	Low	Medium	High	Very High	6.3
Quezon	Medium	Low	Medium	High	Medium	22.6
Rizal	High	Medium	No risk	High	Very High	7.6

Source: NSCB website: http://www.nscb.gov.ph

III. Development Challenges in the Forestry Sector of Region 4A

The challenges faced by the forestry sector in region 4A is summarized in the succeeding discussions.

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1. Protection of existing forests including mangroves is a major concern in the region. Its forests cover has decreased from 289,673 hectares in 2003 to only 269,657 hectares in 2010 equivalent to 6.9% decrease or an annual rate of forest loss of about 2,859 hectares. As a result, the forestry sector could hardly meet local demands for round wood, fuelwood and other non wood forest products.

2. Protection and rehabilitation of watersheds to ensure adequate supply of water for irrigation, domestic use and power generation. The ability of the region to continuously supply irrigation and domestic water as well as hydro electric energy may be compromised due to forest destruction and conversion and encroachment into its major watersheds. With agriculture, fishery, and forestry as major sources of income for most of the population in region, the livelihood of these communities, particularly the farming sector will be adversely affected.

3. Loss of Biodiversity is a critical problem that is going on unnoticed. A closer examination of the forest cover loss data in region 4A would show that large areas of close forests (47,617 hectares) had been destroyed in a span of 7 years from 2003 to 2010. Since close forests are known to contain rich biodiversity resources, large scale destruction of this type of forest imply loss of habitat of important biodiversity species.

4. Reducing the impacts of climate change hazards should be given priority attention. Region 4A is vulnerable to climate and geological related hazards such as typhoons, floods, landslides, storm surge, earthquakes, and volcanic eruptions. The increased frequency and intensity of these hazards, aggravated by changes in climatic conditions, will continue to endanger the lives and properties of communities. Most LGUs and majority of the population are not prepared for hazards and communities are not organized for disaster risk reduction.

6. Collaborative management is necessary to address the overlapping mandates of different agencies in the management of forests and forestlands. However, to be effective, the capabilities of members of the collaborative management bodies must be upgraded. Most LGUs for instance, lack technical capability and financial resources to manage and implement devolved forestry programs. They also lack the capability to enforce forestry laws and regulations and mobilize communities in forest protection activities. Most of them do not have approved forest land use plans which can complement their comprehensive land use plans and local development plans.

IV. Regional Comparative Advantages and Competitive Goods and Services: Opportunities for Forestry Development

While lots of challenges exist in the forestry sector, the region has inherent comparative advantages and competitive goods and services which can be strengthened to maximize the forestry sector's contribution to regional development. The comparative advantages of region 4A include the following:

1. It has vast areas of agricultural lands in Quezon suited for the production of rice and other crops;
2. Presence of watershed reservations that provide water for dams and other reservoirs for irrigation, power generation and for domestic use;
3. Skilled wood carvers in Paete, Laguna and Cavite;
4. Extensive areas of closed and open forests, waterfalls, lakes, rivers, biodiversity resources, and beaches that are potential for ecotourism;

5. Existing pasture areas in Batangas and Quezon that can be developed further for grazing purposes to satisfy local demand for meat;
6. Existing coconut plantations interplanted with fruit trees (lanzones, rambutan and coffee) show casing typical agroforestry farms;
7. Close proximity to Metro Manila
8. Established markets for various products such as fruits, agricultural crops, fuelwood and other non-timber products;
9. Potential areas for REDD+;
10. Presence of seedling producers in Batangas and
11. Relatively high rainfall in Quezon and Laguna provinces

The following are the region's competitive goods and services which can be supported through its regional action plan for PMPCRFD implementation, to maximize the forestry sector's contribution to regional and national development.

1. Ecotourism
2. Power generation
3. Agroforestry products such as coconuts, lanzones, rambutan and other fruits
4. Coffee and cacao in Cavite
5. Water production for domestic use and to support agricultural crop production such as rice, corn, garlic and vegetables
6. Wood carvings and wood furniture
7. Timber and fuelwood products
8. Cattle raising
9. Fisheries products such as the *tawilis* in Taal lake and the crabs in Calauag, Quezon and
10. REDD+

The matrix of comparative advantages and competitive goods and services of region 4A as identified by DENR region 4A is attached as annex 4.

V. Regional Action Plan for Implementing the Philippine Master Plan for Climate Resilient Forestry Development

The regional action plan for implementing the PMPCRFD addresses the forestry challenges and maximizes the opportunities provided by the comparative advantages and competitive goods and services of the region. It focuses on ensuring the health and resiliency of forest ecosystems and communities to climate change hazards so that forest resources can sustainably provide and meet the increasing demands for forest ecosystems goods and services. Equally important is the institutionalization of climate responsive governance where various stakeholders collaborate and participate in making decisions in the management of forest resources and ecosystems.

5.1 The Forestry Sector Vision

The region adopts the vision of the Philippine master plan for climate resilient forestry development as follows:

Climate resilient and sustainably managed watersheds and forest ecosystems, providing environmental and economic benefits to society

To achieve the vision and address the challenges in the forestry sector, the region has adopted the following goals of the PMPCRFD:

1. To place all forestlands under sustainable management in order to meet demands for forest goods and services and to promote resilience to climate change;
2. To strengthen resilience of forest dependent communities to climate change hazard;
3. To place all forestlands of the region under appropriate land management arrangements; and
4. To sustainably manage watersheds in partnership with stakeholders.

5.2 Strategic Programs

Considering the identified issues and the region's comparative advantages and competitive goods and services, the forestry programs in region 4A will focus on the following:

1. Protection of existing forests to support ecotourism, hazard mitigation and watershed management for power generation, irrigation and domestic water supply;
2. Grazing land management to take advantage of the region's existing pasture areas;
3. Forest Plantation development to address local demand for lumber and support the furniture industry and fuelwood demands;
4. Rehabilitation of watersheds and other protection forests;
5. Agroforestry farm development to diversify livelihood & support fruit production in Laguna;
6. Institutionalizing collaborative management and
7. REDD + implementation

a. Program to Strengthen Resilience of Forest Ecosystems and Communities to Climate Change Hazards

Effective climate change mitigation and adaptation strategies will be integrated into the regional forestry action plan to meet the multiple objectives of preventing further forest degradation, reducing disaster risks, maximizing productivity, and reducing vulnerability to climate hazards.

Objectives

1. To align land uses within watersheds and forest ecosystems by integrating the forest land use plans of 89 LGUs into their comprehensive land use plans;
2. To undertake vulnerability assessment and adaptation planning in 4 priority watersheds;
3. To formulate the integrated watershed management plan of 11 priority watersheds;
4. To protect 287,042 hectares of existing forests and plantations starting in 2016 gradually increasing to 373,500 hectares in 2028;

5. To diversify livelihood of local communities by developing 8,999 hectares of agroforestry farms;
6. To rehabilitate 7,331 hectares of protection forests through assisted natural regeneration and
7. To implement REDD+ in Quezon province

Strategic Activities, Targets and Period of Implementation

The activities that will be implemented to strengthen resilience of forest ecosystems and communities to climate change hazards, and their implementation period and targets are summarized in table 9.

Table 9. Summary of Activities and Period of Implementation to Strengthen Resilience of Communities and Ecosystems to Climate Change Hazards

Strategic Programs and Activities	Targets and Implementation Period			
	2016	2017 - 2022	2023 - 2028	Total
1. Vulnerability assessment and adaptation planning in priority watersheds (no.)	1	3		4
2. Formulation of integrated watershed management plans (no.)	8	3		11
3. FLUP formulation (no. of LGUs)	3	86		89
4. Protection of existing forests and plantations including mangroves (ha)	287,042 ha	327,537 ha	373,500 ha	373,500 ha
5. Establishment of vegetative soil and water conservation measures (cubic meters)	0	250 cu. M.	0	250
6. Agroforestry development (mixed crops in ha)	8,952 ha	47 ha	0	8,999 ha
7. Rehabilitation of protection forests (ANR)	7,331 ha	0	0	7331 ha
8. REDD+ implementation (no of provinces)	0	0	1	1
9. Training on vulnerability assessment, adaptation planning, integrated pest management, IWM, FLUP (no. of training)	0	4	0	4

b. Program to Address Increasing Demands for Forest Goods and Services

Considering the regional comparative advantages, and its competitive goods and services, the regional action plan of region 4A will give more focus on addressing demands for round wood, fuelwood, grazing, water, biodiversity, and the need to reduce disaster risks.

Objectives

The specific objectives of this program are:

1. To develop commercial plantations for timber and fuelwood production;
2. To protect, conserve and rehabilitate priority watersheds for power generation, domestic and industrial use and for irrigation to support production of rice and other agricultural crops;
3. Continue to develop existing pasture areas to address local demands for meat; and
4. To develop forest parks, and green belts in key cities of the region

Strategic Activities, Targets and Period of Implementation

The activities, targets and their period of implementation to address demands for forest goods and services are summarized in table 10.

Table 10. Summary of Activities, Targets and Period of Implementation to Address Demands for Forest Goods and Services

Strategic Activities	Targets and Implementation Period			
	2016	2017 - 2022	2023 - 2028	Total
1. Demarcation of forestland boundaries &forest management zones (ha.)	0	570,913	0	570,913
2. Development of seed production areas in all provinces(no.of sites)	0	9	0	9
3. Establishment of mechanized nurseries in U.P. Los Banos (no.)	0	1	0	1
4. Commercial forest plantation development for round wood production in Quezon, and Laguna (ha)	0	1,691	24,027	25,718
5. Fuelwood/ bio energy plantation dev't in all provinces (ha)	3,537	23,652	22,811	50,000
6. Management of grazing lands in Quezon & Batangas (ha)	1,035	1,035	2,035	2,035
7. Watershed rehabilitation (ha)	1,000	1,748	0	2,748
Organization and capacitation of watershed management bodies , such as the watershed management council (no.)	0	5	0	5
8. Support to urban forestry in major cities and urban centers (LGUs assisted)	0	9	0	9

c. Institutionalizing Responsive Governance in Forestry

The governance of forestlands and protected areas in the region has been complicated, by overlapping institutional mandates and overlapping tenure at the forest management unit level. With different policy issuances, such as the local government code, indigenous peoples rights act, national integrated protected area system act and the water code, among others, DENR no longer has exclusive jurisdiction over forest ecosystems. This overlapping mandates have resulted to overlapping tenure instruments at the forest management unit level. In many instances, CADTs, protected areas, watershed reserves, and CBFMAs overlap with each other, leading to confusion on who is accountable for the management of the allocated forestlands and protected areas.

Apart from overlapping mandates and overlapping tenure, the different demands for forest ecosystems goods and services from multiple clients, which often times are conflicting, requires collaborative management of forests and forestlands. In view of this situation, the forestry sector in the region will enhance its forestry policies, and improve the skills and capabilities of its personnel so that it can effectively collaborate with other stakeholders in implementing programs on strengthening resilience to climate change hazards and respond to demands for forest ecosystems goods and services.

Objectives

The primary objectives of this program are the following:

1. To establish clear accountability in the management of forestlands;

2. To promote active participation of stakeholders in the management of forests and forestlands;

3. Keep track of progress in the implementation of the Philippine forestry master plan and

3. Strengthen the capabilities of DENR and other stakeholders in implementing forest management programs related to enhancing resilience to climate change and responding to demands for forest goods and services from multiple clients.

Strategic Activities and Targets

The activities, targets and their implementation periods to institutionalize responsive governance in the forestry sector in region 4A are summarized in table 11.

Table 11. Summary of Activities, Targets and Period of Implementation to Insti8tutionalize Responsive Governance in Region 4A

Strategic Programs and Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
Promoting Responsive Governance				
1. Tenure issuance in open access forestlands (ha)	0	105,497	0	105,497
2. Organization and capacitation of multi-sectoral collaborative management bodies (region and province)	0	6	6	6
3. Creation and operationalization of regional/ provincial TWG on climate change (no.)	0	6	6	6
4. Capability enhancement for DENR/ LGUs (no. of trainings)	1	12	12	25
5. Semi-annual / annual monitoring and evaluation of PMPCRFD implementation (No.)	0	12	12	24
6. Performance assessment of tenure holders (No.)	0	6	6	12

d. Support programs

Cross cutting support programs will focus on facilitating implementation of the three major forestry programs in the region. These are designed to inform the public of the important role of forest ecosystems in mitigating the adverse impacts of climate change and in securing water supply and other forest ecosystems goods and services. These are also intended to develop sustainable financing mechanisms, promote science based decision making and improve accountability through forest certification and improved data base.

Objectives

The support programs aim to:

1. Generate stakeholders' support in the implementation of the Philippine master plan for climate resilient forestry development;
2. Develop a data base management system to establish appropriate baseline data as basis for management decisions and monitoring and evaluation
3. Identify sustainable sources of financing for implementing the forestry master plan

4. Institutionalize a system for certifying sustainably managed forests and industries
5. Provide research based information for forest management decision making, vulnerability assessment and climate change adaptation planning

Strategic Activities, Targets and Period of Implementation

The strategic activities, targets and period of implementation to achieve the objectives of this program are summarized in table 12,

Table 12. Summary of Support Program Activities, Targets and Implementation Period

Strategic Activities	Targets per Implementation Period			
	2016	2017 - 2022	2023 - 2028	Total
1. Information, education and communication campaign (no. of LGUs)	18	43	43	104
2. Upgrading of regional MIS facilities (no.)	0	6	6	12
3. Implementation of forest certification (Provinces)	0	5	5	5
4. Identification and assessment of sustainable sources of financing in forestry projects (No. of sites assessed)	0	5	5	10
5. forestry research (no. of studies)	0	5	5	10

VI. Plan Implementation

This regional action plan shall be implemented by DENR region 4A in collaboration with LGUs, NCIP, CBFMA/ CADT holders, private investors, and other relevant stakeholders. Orientation/ information campaign about the regional action will be undertaken for LGUs and key stakeholders to encourage them to participate in its implementation.

Financing of the regional action plan for implementing the PMPCRFD will come both from the government and the private sector. Government financing will primarily come from existing programs/ projects of the DENR and to some extent from existing programs of the LGUs, especially those related to disaster risk reduction, climate change adaptation and the formulation/ updating of the comprehensive land use plans which integrates the FLUP, protection area management plans, ADSDPP and the watershed management plans as mandated under existing guidelines. Fund sourcing will be undertaken for activities and programs which are not included in existing programs and projects of DENR, LGUs and other agencies. Where there are opportunities for donor assistance, unfunded programs and projects will be submitted for possible financial support.

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ANNEXES

ANNEX 1. LIST OF PROCLAIMED WATERSHED FOREST RESERVE

Province/Name of Watershed Reservation		Location	Area (Has.)	Presidential Proc. No.	Proclamation Date
Laguna			**11,154.92**		
1	Malabanban Watershed For. Res.	Sto. Angel and San Diego , San Pablo City	384.210	82	February 24, 1999
2	Caliraya-Lumot River WFR	Paete, Cavinti, Kalayaan, Lumban	10,770.71	573	June 26, 1969
Quezon			**31,787.9**		
1	Rea.l-Infanta WFR	Brgys. Gumian & Magsaysay, Infanta, Quezon & Brgy. Cawayan, Real, Quezon	384	158	February 13, 1967
2	Polillo WFR	Polillo	130	72	August 9, 1966
3	Binahaan River WFR	Brgy. Binahaan, Pagbilao, Quezon	465	735	May, 29, 1991
4	Panukulan WFR	Panukulan, Quezon	178.68	290	November 6, 1993
5	Umiray Watershed Reserve	Umiray, Gen. Nakar, Quezon	16,722.75	264	September 28, 1993
6	Mulanay WFR	Brgy. Buenavista, Mulanay, Quezon	25.6	296	July 21, 1938
7	Lopez WFR	Calauag and Guinayangan, Quezon	418	566	June 22, 1940
8	Tibiang-Domagandong WFR	Guinayangan, Quezon	280	295	July 21, 1938
9	Calauag WFR	Barrio Yaganas, Calauag, Quezon	327.8577	367	January 2, 1939
10	Alabat WFR	Alabat, Quezon	688	156	September 18, 1987
11	Buenavista Watershed	Buenavista, Quezon	356	166	June 27, 1937
12	Maulawin Spring WFR	Guinayangan, Tayabas, Quezon	204	365	January 2, 1939
13	Kaliwa River Forest	Gen. Nakar, Quezon	11608	573	June 26, 1969
Rizal			**18,966**		
1	Marikina WFR	Antipolo, Montalban, Tanay, and San Mateo	18,966	2480	January 29, 1986
Total			**61,908.82**		

ANNEX 2. CRITICAL WATERSHEDS SUPPORTING NATIONAL IRRIGATION SYSTEM (NIS)

River Basin Covered	Name of Watershed	No. of RIS	NIS Supported	Watershed Location/ Coverage		NIS Service Area (in Has.)	Watershed Area (NIA) (in Has.)
				Province	Municipality		
1 Pasig-Laguna de Bay RB	Balanac River Watershed	1	Balanac RIS	Laguna	Magdalena, Majayjay and Lusiana	1,056	6,660
2 Pasig-Laguna de Bay RB	Mabacan River Watershed	2	Mabacan RIS	Quezon	Lucban,	492	4,900
3 Pasig-Laguna de Bay RB	Llano River Watershed	3	Mayor RIS	Laguna and Quezon	Sta. Maria, Siniloan and Real	372	3,300
4 Pasig-Laguna de Bay RB	Sta. Cruz River Watershed	4	Sta. Cruz RIS	Laguna	Sta. Cruz, Magdalena and Nagcarlan	3,100	8,000
5 Pasig-Laguna de Bay RB	San Antonio River Watershed	5	Sta. Maria RIS	Laguna, Rizal & Quezon	Sta. Maria, Tanay and Real	801	1,150
6 Pasig-Laguna de Bay RB	NPC Tailrace and Lewin Creek	6	Lumban RIS	Laguna	Lumban	102	1,350
			Laguna FLIS			3,033	30,630
7 Pasig-Laguna de Bay RB	Macabiling River Watershed	7	Macabiling RIS			752	
8 Pasig-Laguna de Bay RB	San Cristobal River Watershed	8	Cabuyao East PIS	Laguna	Cabuyao, Canlubang and Calamba	575	
		9	San Cristobal RIS			387	
		10	Diezmo RIZ	Cavite	Silang and Tagytay City	810	
9 Pasig-Laguna de Bay RB	San Juan River Watershed	11	San Juan RIS	Laguna	Calamba	509	
				Batangas	Sto. Tomas, Tanauan and Malvar		
			Cavite FLIS			13,083	52,900
CRITICAL WATERSHEDS SUPPORTING NATIONAL IRRIGATION SYSTEM (NIS)							

10 Maragondon RB	Maragondon River Watershed	12	Balayugan A-Dam	Cavite	Naic	984	
			Balayugan B-Dam		Naic	717	
11 Labac RB	Caisobo River Watershed	13	Culong-culong Dam	Cavite	Indang	611	
12 Labac RB	Labac-Alemang River Watershed	14	Sahing Dam	Cavite	Naic	467	
		15	Bancud Dam	Cavite	Indang	506	
13 Timalan RB	Timalan River Watershed	16	Tres Cruses Dam	Cavite	Tanza	872	
14 Canas RB	Canas River Watershed	17	Bayan Dam	Cavite	Gen. Trias		
		18	Plucena Dam	Cavite	Gen. Trias	794	
		19	Matanda A- Dam	Cavite	Tanza	1,026	
			Matanda B- Dam	Cavite	Tanza	940	
15 San Juan RB	Ylang-ylang River Watershed	20	Pasong Kastila Dam	Cavite	Imus	532	
		21	Butas Marcelo Dam	Cavite	Gen. Trias	969	
		22	San Agustin Dam	Cavite	Dasmariñas	692	
		23	Butas Navarro Dam	Cavite	Gen. Trias	660	

CRITICAL WATERSHEDS SUPPORTING NATIONAL IRRIGATION SYSTEM (NIS)

River Basin Covered	Name of Watershed	No. of RIS	NIS Supported	Watershed Location/ Coverage		NIS Service Area (in Has.)	Watershed Area (NIA) (in Has.)
				Province	Municipality		
16 San Juan RB	Lasong Camachile River Watershed	24	Butas Lawang Bato Dam	Cavite	Gen. Trias	632	
17 Imus RB	Imus River Watershed	25	Julian Dam	Cavite	Imus	431	
		26	Makuling	Cavite	Dasmariñas	338	
		27	Luksuhin	Cavite	Dasmariñas	528	
		28	Embarcadero Dam	Cavite	Dasmariñas	941	

18	Zapote RB	Zapote River Watershed	29	Molino	Cavite	Bacoor	443	
19	Lian RB	Palico River Watershed	30	Palico RIS	Batangas	Tuy and Nasugbu	386	11,800
20	Lagnas RB	Lagnas River Watershed	31	Lagnas RIS	Quezon	Candelaria	753	1,860
21	Janagdong RB	Janagdong River Watershed	32	Janagdong RIS	Quezon	Candelaria and Sariaya	329	1,360
22	Dumacao RB	Dumacao River Watershed	33	Dumacao RIS	Quezon	Tayabas	2,227	8,500
23	Agos RB	Agos River Watershed	34	Agos RIS	Quezon	Gen. Naka, Infanta and Real	1,119	91,260
					Rizal	Tanay, Teresa		
24	Pasig-Laguna de Bay RB	Marikina River Watershed	35	Wawa Dam	Rizal	Tanay, Montalban, Antipolo, Baras and Teresa		18,966
Total							**42,969**	**242,636**

Annex 3. List of Protected Areas and Key Biodiversity Resources

Name of Protected Areas	Area (ha)	Location	Key biodiversity resources/ rare, threatened, endangered & vulnerable species
1. ALABAT WATERSHED FOREST RESERVE (AWFR)	688.00 has.	Bacong, Caglate, Villa Norte and Villa Victoria all of Alabat, Quezon	***Flora:*** Dao, Narra, Pili, Apitong, Molave, Yakal, Guijo, Bunliw, Tangisang Bayawak, Rattan ***Fauna*** Kilyawan, Black-Naped, Oriole, crow. Hornbill, Monitor lizard, Wild chicken, Deer, Wild boar, Monkey
2. ALIBIJABAN ISLAND WILDERNESS AREA (AWA)	430.00 has.	Barangay Alibijaban, San Andres, Quezon	***Flora:*** Kulasi, Pagatpat, Tangal, Tawalis, Tabigi, Tabau, Pototan lalaki, Bungalon, Busain, bakauan Lalaki, Bakauan Bato, Bantingi, Piagau, Banalo, Nilad, alatangal, Aroma, Bani, Malubago, Tinduk-tindukan, Ipil-ipil, Talisay ***Fauna*** White-collared kingfisher Large- billed crow, Black-napped oriole, Philippine turtle dove, Philippine glossy starling, Chestnut munia, Pied fantail, Green-winged dove, Black-crowned night heron, Common snipe, Nutmeg imperial pegion, Tree sparrow, Tabon birds , nesting only), Fruit bat, Pawikan/ Marine turtle, Monitor lizard
3. **BINAHAAN RIVER WATERSHED FOREST RESERVE (BRWFR)**	465.00 Has.	Brgy. Binahaan, Pagbilao, Quezon	***FLORA:*** Kalantas, Panglomboism, Talang gubat, Hagimit Malasaging, Tibig, Makaasim, Guijo, Almon, Mayapis, Bagtikan Kamagong,Pagsahingin, Red lauan, Dalingdingan, Whilte lauan, Narra, Lamio, Mahogany, Bolong-eta, Apitong, Niog-niogan, Ipil, Hawili, Malatibig, Tanguisang-bayawak, Anabiong Malapapaya, Kupang,Magabuyo, Manggachapui, Santol, Antipolo, Tampoi ***FUANA:***Rufous coucal, Phil. Forest kingfisher, Spotted wood kingfisher, Luzon little crow, Phil. Turtle dove, Orioles Hawk , Tarictic hornbill, Brahminy kite, Rufous hornbill, Phil. Monkey, Phil. Deer, Phil. Rind Rat, Snake, Salamanders Monitor lizard
4. **BUENAVISTA PROTECTED LANDSCAPE (BPL)**	284.27 Has.	Brgy. Buenavista, Mulanay, Quezon.	***Flora:*** Duguan, Bulong-eta, Toog, Balobo Malaikmo, Taluto, Kalumpit, Amuguis , Malapapaya ***Fauna:*** monitor lizard, wild cat, hornbill, owl wild dove
5. **HINULUGANG TAKTAK PROTECTED LANDSCAPE (HTPL)**	3.20 Hectares	Dela Paz, San Isidro, San Jose, San Roque and Sta. Cruz, Antipolo City, Riz al	***Flora:*** Ilang-ilang, Mahogany, Narra, Kakawate, Yemane Ipil-ipil, Tibig, Pili, Kawayang Kilin ,g, Hawili, Takip asin, Antipolo, Rain Tree, Bucawe, African Tulip Niog-niogan, Guava, Camachille, American Kapok, Akleng Parang, Fire Tree, Tangisang Bayawak, Macopa, Balete, Lumbang, Dita, Alagau, Salaking Pula, Alibangbang, Tamayuan, Champaca Kaong **Fauna:** Walak-walak, Gigintod, Kingfishers Owls, Swifts
6. INFANTA WATERSHED FOREST RESERVE (IWFR)	384.0 Hectares	Brgy. Cawayan Magsaysay and Gumian Infanta, Quezon	***Flora:***Red & White Lauan, Tanguile, Apitong, Malaruhat, Balobo, Rattan, Anabiong ***Fauna:*** Wild pig, Snakes, Deer, Lizards, Monkey, Bat, Kalaw
7. **KALIWA WATERSHED FOREST RESERVE**	27,608 Has.	Sta. Ines, Sto. Nino, Daraitan, Laiban, Mamuyao, Cayabu,	***Flora:***Anabiong, Makaasim, Antipolo, Malaruhat, Narra, Yemane, Banaba, Ipil, Malapapaya, Tibig ***Fauna:***Giant marine toad, Common tree frog

(KWFR)		Cuyambay, Sampaloc, San Andres and Tinucan in Tanay, Rizal and Lumutan Pagsangahan in Gen. Nakar, Quezon	Common pond frog, Common green frog, Flat-bodied house gecko, Tender-skinned house gecko, Toko narrow-disked gecko Common house gecko, Sailfin Water lizard Spotted green tree skink, Common mabouya,Variable Malay monitor, Gray's monitor lizard, Philippine freshwater crocodile, Reticulated python, Philippine common cobra, Malayan softshell turtle
8. **MAULAWIN SPRING PROTECTED LANDSCAPE (MSPL)**	204 Hectares	Barangays Himbubulo Weste, Magsaysay and San Pedro 1, Guinayangan, Quezon	Mixed molave, Dipterocarp species: kamagong, Molave, white and red lauan Mammals, reptiles, amphibians, birds and insects as well as mollusks ***Threatened Species in MSPL*** Visayan/Tarictic, Hornbill Balobo, White-winged Cuckoo Shrike, Molave, Roundleaf Apitong, Yakal, Duguan, Red Lauan, Kalingag, White Lauan, Narra, Mabolo Manggachapui
9. MTS. BANAHAW-SAN CRISTOBAL PROTECTED LANDSCAPE (MBSCPL)	10,900.59 hectares	Municipalities of Lucban, Tayabas, Sariaya, Candelaria and Dolores, Quezon, and in the Municipalities of Rizal, Nagcarlan, Liliw, Majayjay and San Pablo City, Laguna	**358 tree species,** 19 species of vines, 15 species of palms, 39 species of ferns, 15 species of grasses and 42 species of fungi. The species of trees are representatives of 71 families. **Wildlife Species:** 246 birds species (133 endemic, 8 endangered & 20 rare), 38 Reptiles (2 endangered, 15 endemic), 62 Mammals (3 endangered, 7 endemic), 43 Amphibian species (7 endemic), and 188 species of insects (76 species of butterflies).
10. MTS. PALAY-PALAY/MATAAS-NA-GULOD PL (MPPMNGPL)	3,973.13 Has.	Ternate and Maragondon, Cavite and Nasugbu, Batangas.	***Flora:*** Bolong-eta, Kamagong, Guijo, White Lauan, Palosapis, Bagtikan, Kalingag, Katmon, Duguan, Palasan, Tangisang Bayawak, Mambog, Mabolo, Mahogany Bikal, Tara-tara, Palomaria, Takip-asin Kupang, Rattan, Malapapaya, Kalumpit, Tibig, Batino, Bayog, Pili, Balete, Malamangga, Lamio, Dao, Bignai, Santol, Piling-gubat, Malabayabas, Lanutan,Tindalo ***Fauna*** Philippine Falconet, Blue-naped Parrot or Loro, Rufous Hornbill or Kalaw, Philippine Woodland Frog, Wild boar, Reticulated python, Yellow Vented Bulbul Labuyo (Wild Chicken), Tarictic Hornbill Bleeding Heart Pigeon, Monkey, Philippine Coucal, Pigeon, Serpent Eagle, Kalaw, Hawk-eagle, Colleto, Philippine Bulbu Fruit Pigeon
11. **MULANAY WATERSHED FOREST RESERVE (MWFR)**	26.0 Has.	Brgy. Cawayan II, San Francisco, Quezon	***Flora:***Digaa, Pili, Kubi, Acacia, Alim, Libas Amugis, Ipil-gubat, Tangisang Bayawak, Libas, Toog, Kubing-tahiran, Lauan, Dao, Balete, Mahogany, Antipolo, Rattan Binunga ***Fauna;*** Sabukot, Kilyawan, Tamsi, Papan Kuling, Balikasyaw, Tarungan, Kulo-Kulo Kuwago, Musang, Labuyo, Bayawak, Agbaan, Uwak, Paniki, Kingfisher, Balod Sawa, Tahaw
12. PAMITINAN PROTECTED LANDSCAPE (PPL)	600.00 Has.	So. Wawa, Brgy. San Rafael, Rodriguez,	***Flora:***Rain tree, Ipil, Mahogany, Kupang, antipolo, Malapapaya, Banaba, Narra, Tibig, Makaasim, Bulong-eta, Alagau, Taratara,

		Rizal	Malaruhat, Gmelina, Ebony Anabiong, Ilang-ilang ***Fauna*** Black napped oriole, Striped headed creeper, Yellow vented bulbul, Brown Shrike Striated Canegrass, Phil. Crow, Shack Shrike, Rough crested cuckoo, Phil. Bulbul Mountain sunbird, Mountain white eye Brown fruit dove, Pigmy swiftlet White breasted wool swallow Crimson back wood pecker
13. PP 1636 (UNNAMED NATIONAL PARK, WILDLIFE SANCTUARY AND GAME PRESERVE)	46,310.00 Has.	-72,355.0 hectares in Real, Infanta and General Nakar -50,735 hectares in the Municipalities of Rodriguez, San Mateo, Antipolo and Tanay -10,720 hectares in Sta. Maria, Siniloan, Famy, Pakil and Paete.	***Flora:*** Red Lauan, White Lauan, Tanguile, Mayapis, Malabayabas, Kaong, Tibig, Tangisang Bayawak, Malapapaya, Dapdap Bamboo, Pugahan, Narra, Mahogany Acacia ***Fauna***Birds, wild pigs, wild chicken, owl and deer. Identified endangered species include Rufous coucal, Philippine forest kingfisher, spotted wood kingfisher, Luzon little crow and painted quail. Reptiles include snakes, ground lizard, salamanders and Philippine tukko.
14. POLILIO WATERSHED FOREST RESERVE (PWFR)	130.0 Hectares	Sitio Maganit Francisco, Barangay Sibulan, Polilio, Quezon.	Rare flora found in the area are: Narra, Diptero spp. and Softwood ***Fauna*** Butaan Snakes, Deer, Wild pig, Tariktik
15. QUEZON PROTECTED LANDSCAPE (QPL)	983.0765 Has.	Brgy. Silangang Malicboy, Pagbilao, Quezon; Brgys. Sipa and Hinguiwin, Padre Burgos, Quezon; and, Brgy. Sta. Catalina and Malinao Ilaya, Atimonan, Quezon	***FLORA*** D*ipterocarpus*, *Shorea*, *Parashorea* and *Pentacme*. Non-dipterocarp species which are equally abundant are *Ficus*, *Diospyros*, *Syzigium* and *Aglala*. Large number of *Calamus spp*. (Rattan) is also observed in the area. A few patches of *Imperata cylindrica* (cogon) and *Saccharum spontaneum* (talahib) are also found particularly along the boundaries where human activities are prominent. ***Fauna*** Wildlife resources that move freely through the three-storied forest canopy of the protected landscape include several groups of monkeys, birds, lizards, snake, and insects. Some of the wildlife species that are found in the park and considered endangered are Philippine macaque, Philippine rind rat, Rufous hornbill and Philippine deer. Other species of birds which are also endangered include Rufous coucal, Philippine forest kingfisher, Spotted wood kingfisher and Luzon little crow.
16. TAAL VOLCANO PROTECTED LANDSCAPE (TVPL)	62,292.1369 hectares	TVPL is located within: the Municipalities of Talisay, Malvar, Tanauan, Laurel, Agoncillo, Sta. Teresita, Cuenca, Alitagtag, Mataas na Kahoy, Lipa City, Balete, San Nicolas, Lemery and Taal, all in the Province of Batangas; and, the municipality of Tagaytay City in Cavite Province.	***Flora*** Rain tree, Banaba, Bitanghol, Niyog, Kalantas, Kapok, ipil Ipil, Kakawate, Malunggay, Pahutan, Talisay, Atis, Anonang, Kamachile, Bayabas, Mangga Tamarind, Siniguelas ***Fauna*** -White-eared brown dove, Elegant tit, Philippine tailor bird, Grey-backed tailorbird, Philippine bulbul, Philippine pygmy woodpecker and Stripe-headed rhabdornis -freshwater seasnake, duhol and the bayawak (Monitor lizard), **-**Tawilis, Maliputo, Tilapia, Bangus, Hito, Dalag, Biya and Ayungin, **-** Tawilis (*Sardinella tawilis*)`
17. UPPER	26,125.64	Located within five (5)	***Flora***

MARIKINA RIVER BASIN PROTECTED LANDSCAPE (UMRBPL)	Has.	municipalities and eight (8) barangays, namely: 1) Municipality of Rodriguez; 2) City of Antipolo (Brgy. San Jose, Calauis, San Juan and San Isidro); 3) Municipality of Baras (Brgy. Pinugay); 4) Municipality of San Mateo (Brgy. Pintong Bocaue); 5) Municipality of Tanay (Brgys. Sta. Ines, Cuyambay).	Tanguile Red lauan Mayapis White lauan Bagtikan Nato Akleng Parang Molawin Dungon Balayong ***Fauna*** Philippine Eagle Labuyo Quail Phil. Hawk Eagle Deer Wild Pig Palm Civet Cat Sawa/python Bayawak-Monitor Lizard

Annex 4. Comparative Advantages and Competitive Goods and Services, Region 4A

Comp. advan-tages	Competitive Goods and Services									
	Coconuts, Lanzones, rambutan	Cattle	Fuel-wood	Rice	Wood carvings& furniture	Water (power, irrigation)	Eco-tourism	Fisheries	Cacao & Coffee	Others (REDD+, seedlings)
Vast areas of ricelands				Quezon						
Watershed & dams						Quezon, Laguna, Rizal & Cavite				
Existing grazing lands		Batangas, Quezon								
More rainfall	Quezon, Laguna		X							
established markets	X	X	X	X	X				Batangas, Cavite	
skilled wood carvers					Paete, Laguna & Cavite					
Natural forests							X			Quezon (REDD+)
Protected areas							X			
Beaches & mangroves							Quezon, Cavite Batan-gas	Quezon, Cavite & Batangas		
Waterfalls							Laguna			
Lakes and rivers							Laguna, Batan-gas	Laguna, Batangas		
Others (seedling producers)	X		X						X	Batangas for seedlings