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

Region 3, Central Luzon

I. Background and Rationale

The first Philippine Master Plan for Forestry Development (PMPFD) was formulated in 1990 to revitalize the continuously declining forestry sector in the country. After more than ten years of implementation, the 1990 Philippine forestry master plan was revised 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. Thus, in 2003 a revised Master Plan for Forestry Development (RMPFD) was formulated and approved.

In CY 2013, the Forest Management Bureau (FMB) again decided to update the 2003 RMPFD, this time taking into consideration the potential impacts of climate change to the forestry sector. 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. Programs on strengthening resilience of forest ecosystems and communities to climate change
2. Programs responding to demands for forest ecosystem goods and services and
3. Programs promoting responsive governance in the forestry sector

Other support programs are also identified in the master plan to enhance implementation of the above programs.

This plan outlines the action plan of region 3 to support implementation of the PMPCRFD. It also supports the regional development plan of region 3 which integrates ecotourism, forest conservation and industrial development. The action plan takes into account the vulnerability of Central Luzon to various climate change hazards and considers the comparative advantages and competitive goods and services of region 3 so that the forestry sector can maximize its contribution to regional development and to national development in general.

II. Regional Profile

2.1 Physical Profile

Region 3, known as Central Luzon Region, is located in the central section of Luzon. It is situated in between Northern Luzon and the National Capital Region, and is bounded on the North by Pangasinan and Nueva Vizcaya; Metro Manila, Cavite and Rizal on the south; Aurora and Dingalan Bay on the east and Palauig Bay and Subic Bay on the west. The region is composed of the provinces of Nueva Ecija, Tarlac, Pampanga, Zambales, Bulacan, Bataan and Aurora (Figure 1).

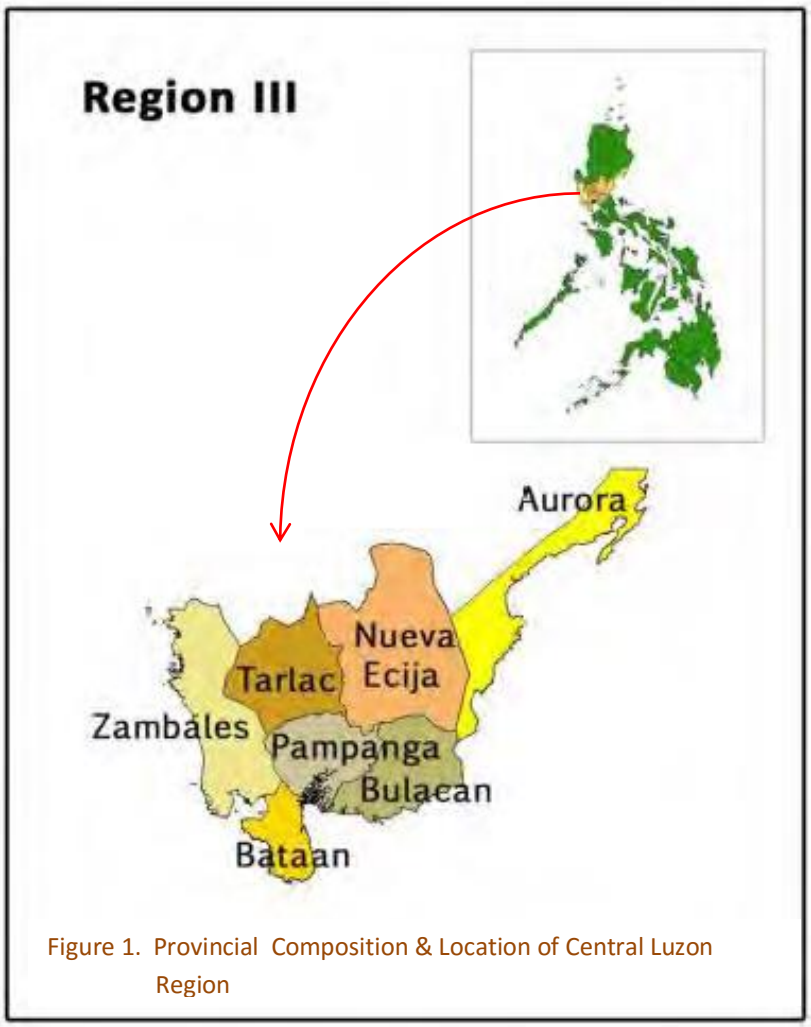

Figure 1. Provincial Composition & Location of Central Luzon Region

Central Luzon contains the largest plain in the country and is the gateway to the Northern Luzon regions. However, some portions of Zambales, Bulacan and Aurora are also mountainous with steep slopes especially in Aurora province. Dry season in the Region is from November to May while rains normally occur during the months of July to October. Observed data from PAGASA from 1971-2000 indicate that the amount of rainfall in the region ranges from 40.9 mm to 1,793.9 mm.

2.2 Socio-Economic Profile

Region 3 covers 7 provinces: Nueva Ecija, Tarlac, Pampanga, Zambales, Bulacan, Bataan and Aurora. Based on the 2015 population census of the Philippines, region 3 has a total population of 11,218,177. Bulacan is the most populated province, with a total population of 3,292,071 as of August 2015. The least populated province is Aurora with a population of

214,336 only. The population of region 3 has increased consistently with its average annual population growth rate estimated at 2.07% which is higher than the national average of 1.84%.

Table 1. Population and Population Growth Rates of Region 3, CY 2000-CY 2015

PROVINCES	TOTAL POPULATION			POPULATION GROWTH RATE (%)		
	1-May-00	1-May-10	1-Aug-15	2000-2010	2010-2015	2000-2015
BATAAN	557,659	687,482	760,650	2.11	1.94	2.06
BULACAN	2,234,088	2,924,433	3,292,071	2.73	2.28	2.57
NUEVA ECIJA	1,659,883	1,955,373	2,151,461	1.65	1.84	1.71
PAMPANGA (excluding ANGELES CITY)	1,614,942	2,014,019	2,198,110	2.23	1.68	2.04
ANGELES CITY	267,788	326,336	411,634	2.00	4.52	2.86
TARLAC	1,068,783	1,273,240	1,366,027	1.76	1.35	1.62
ZAMBALES (excluding OLONGAPO CITY)	433,542	534,443	590,848	2.11	1.93	2.05
OLONGAPO CITY	194,260	221,178	233,040	1.31	1.00	1.20
AURORA	173,797	201,233	214,336	1.48	1.21	1.38
Total	**8,204,742**	**10,137,737**	**11,218,177**	**2.14**	**1.95**	**2.07**

Source: PSA, CY 2000, 2010, 2015

Central Luzon remained the top producer of palay, chicken, hog, tiger prawn and tilapia. Palay accounted for 25 percent of the region's agricultural output. Chicken and hog contributed 26.25 percent and 17.61 percent, respectively. Tiger prawn and tilapia had a combined share of 11 percent. For chicken eggs, the region ranked second in the national production.

The tons of lahar deposited in Pampanga and Tarlac as a result of the Mt. Pinatubo eruption, provided a new source of livelihood to the affected municipalities. Lahar quarrying became prevalent in both provinces, as lahar, when mixed with cement was found to produce better quality hollow blocks and concrete materials which can be used in various construction and

infrastructure projects. Also, situated in the region are the special economic and industrial zones like the Luisita Industrial Park (LIP) in Tarlac City, Subic Bay Freeport Zone (SBFZ) in Olongapo City, Authority for the Freeport Area of Bataan (AFAB) in Mariveles, Bataan and Clark Freeport Zone (CFZ) in Angeles City.

2.3 Resources

Central Luzon is rich in timber and mineral resources (both metallic and non-metallic). Aurora is known for its timber; Zambales for its refractory chromite, copper and nickel deposits; Tarlac for Manganese; Bulacan for marble; Pampanga for sand and gravel; and Nueva Ecija for feldspar. Fertile rice lands, melon patches and fishponds can also be found along banks of rivers and tributaries of region 3.

Land Resources

The total land area of region 3 is 2,147,036 hectares. Forestlands comprise roughly 44% or 942,387 hectares while the alienable and disposable lands cover 1,204,649 hectares or 56% of the region's land area (table 2). Significant areas of the alienable and disposable lands in the central Luzon region are developed into irrigated rice lands. These areas are highly dependent on the watersheds that provide irrigation water especially during the summer months.

Table 2 . Land Classification in Region 3, Central Luzon

Land Classification	Area (ha)	%
Forestlands	942,387	43.89%
Classified Forestlands	915,119	42.62%
Established Timberlands	493,882	23.00%
Forest Reserves, National Park/ Prot. Areas & Other Reservations	421,237	19.62%
Unclassified forestlands	27,268	1.27%
Alienable and disposable lands	1,204,649	56.11%
Total	2,147,036	100%

Source: Philippine Forestry Statistics, CY 2014

Forest Resources

About 24% of the total land area of region 3 is still forested. These forests are mostly situated within forestlands of the region and are composed of close forest, open forest and mangrove forests. Close to 42% of the total forests of region 3 are situated in Aurora (218,588 hectares), followed by Zambales with 94,869 hectares forests and Nueva Ecija, still with 74,604 hectares forested. Pampanga has the least area forested covering only 7,465 hectares. While most of the forests of the region are classified as open forest, a significant percentage of the total forested area (43%) is still covered by close forest containing rich biodiversity resources. Among the provinces of region 3, Aurora and Bulacan still have large tracks of close forests, covering 132,548 hectares (61% of total forest of the province) and 35,266 hectares (60% of the province' total forests), respectively. Mangroves comprise a

very small portion of the forested area of region 3 (0.2%), and are generally located in Aurora, Bataan, Zambales and Pampanga.

Table 3. Forest Cover of Region 3, CY 2010

Province	Land Area (ha)	Total Forest (ha)	Close Forest (ha)	Open Forest (ha)	Mangrove (ha)	% Forested vs Reg 3 area	% of Province forested	% Close forest
Region 3	2,147,036	520,598	225,352	294,291	955	24.2%	24%	43%
Aurora	323,954	218,588	132,548	85,518	521	10.2%	67%	61%
Bataan	137,291	31,617	10,618	20,791	208	1.5%	23%	34%
Bulacan	262,505	58,613	35,266	23,347	0	2.7%	22%	60%
Nueva Ecija	528,433	74,604	9,530	65,074	0	3.5%	14%	13%
Pampanga	218,068	7,465	773	6,607	85	0.3%	3%	10%
Tarlac	305,345	34,842	5,407	29,435	0	1.6%	11%	16%
Zambales	371,440	94,869	31,209	63,519	140	4.4%	26%	33%
% of Region's area		24%	10%	14%	0.2%			

Source: Philippine Forestry Statistics, CY 2014

The forests of Central Luzon have decreased considerably from 589,495 hectares in 2003 to 520,598 hectares in 2010. Over a period of 7 years, the region lost about 68,898 hectares of forests. This means that about 9,842 hectares of forests are being lost in the region every year. Aurora and Nueva Ecija are the major losers of forests, with their forests decreasing about 20,000 hectares from 2003 to 2010. Bulacan also lost large areas of forests for the same period, estimated at 15,284 hectares. Forest destruction in Bulacan is more alarming because all forest losses were registered in the close forest, adversely affecting biodiversity resources in the province. In contrast, forest destruction in Aurora were concentrated in the open forests which

are accessible. With the registered increase in close forest in Aurora, it appears that some of the inaccessible open forests have matured into close forest. Among the provinces, only Pampanga registered an increase in forest cover of 1,473 hectares from 2003 to 2010. Table 4 presents the forest cover change in region 3.

Water Resources

Central Luzon region is drained by many river systems which have both local and national significance. Its central section is mainly drained by the Pampanga river which empty into the Pampanga delta and eventually to Manila Bay. Thus, this river system is important not only for region 3 but also for the constituents of Metro Manila. Unfortunately, most of the tributaries of Pampanga river are now heavily polluted. Tarlac, Bulacan and Nueva Ecija had developed piggery and poultry projects which contribute much to the pollution load in water bodies. There are also small-scale piggery farms that cannot afford to construct wastewater treatment facilities which further pollute the rivers and streams.

Table 4. Forest Cover Change in Region 3 (CY 2003 – CY 2010)

Province	Closed Forest			Open Forest*			Mangrove*			Net change
	2010	2003	Change	2010	2003	Change	2010	2003	Change	
Aurora	132,548	118097	14,451	85,518	120311	(34,793)	521	368	153	(20,189)
Bataan	10,618	14880	(4,262)	20,791	17325	3,466	208	0	208	(588)
Bulacan	35,266	56168	(20,902)	23,347	17729	5,618	0	0	0	(15,284)
N. Ecija	9,530	13654	(4,124)	65,074	80997	(15,923)	0	0	0	(20,047)
Pampanga	773	984	(211)	6,607	5008	1,599	85	0	85	1,473
Tarlac	5,407	6198	(791)	29,435	35521	(6,086)	0	0	0	(6,877)
Zambales	31,209	16260	14,949	63,519	85995	(22,476)	140	0	140	(7,387)
Total	225,351	226,241	(890)	294,291	362,886	68,595)	955	368	587	(68,898)

* Include plantations

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

The rivers and tributaries of the region are tapped for domestic use, irrigation and power generation. Among the major dams in region 3 that have national importance are the Pantabangan, Angat and Ipo dam. The watersheds providing water to these infrastructures are being degraded at alarming rates. To protect the watersheds of these infrastructures and other water infrastructures in the region, several watershed reservations were established as listed in annex 1.

Biodiversity Resources and Protected Areas

With more than 225,000 hectares of close forests, Central Luzon region still has rich biodiversity resources. The three-layered virgin forest of Subic Bay and Bataan is home to the world's largest bats: the giant flying fox (Acerodon jubatus) and the golden crown flying fox (Pteropus vampyrus). Over the years, these two species of giant fruit bats have roamed the 10,000-hectare Subic Watershed and Forest Reserve, which is among the world's largest roosting sites for bats.

In Zambales, the 17,000-hectare Mt. Tapulao is home to species of murrid rodents, the Rhyncomys tapulao and Apomys brownorum. These rodents can only be found in Mt. Tapulao. Seven insectivorous bats were also recorded in Mt. Tapulao, three of which are endemic to the Philippines -- the yellow-faced horseshoe bat (*Rhinolophus virgo*), large-eared horseshoe bat (*Rhinolophus philippinensis*), and the orange-fingered myotis (*Myotis rufopictus).*

Central Luzon also has 24 sites included in the initial components of the National Integrated Protected Areas System (NIPAS), consisting of eight national parks, one bird/fish sanctuary, and 15 watershed forest reserves. Of these, the following have already been proclaimed as protected areas: Roosevelt National Park (Bataan), Dinadiawan River (Aurora), Amro River (Aurora), Talaytay River (Aurora), Simbahan-Talagas River (Aurora), and Masinloc & Oyon Bays Marine Reserve (Zambales).

Nature Based Tourism Sites

Region 3 has great potential for ecotourism. The main features of its ecotourism sites are the biodiversity and coastal resources in these areas. Thus, biodiversity conservation and protection as well as effective watershed management would be very crucial in maintaining the viability of these ecotourism areas. Among its ecotourism destination are Subic bay, Bataan National Park, and the different beaches in Aurora, Zambales, and Bataan.

2.4 Vulnerability to Climate Related Hazards

The eruption of Mt. Pinatubo in 1991 altered the geographical features of the region particularly in Pampanga as many municipalities were covered by lahar. Lahar deposits in the province's natural drainage caused the clogging of waterways and the siltation of various water bodies resulting to flooding and prolonged submersion of several low-lying municipalities in floodwaters. Flooding is most prominent in Pampanga; Malolos and Calumpit in Bulacan; Cabanatuan, Sn Leonardo and Gapan in N. Ecija; and Moncada and Camiling, in Tarlac.

Apart from flooding, the mountainous areas of Gabaldon, Nueva Ecija; most of the towns of Aurora; and Subic and Olongapo in Zambales are highly vulnerable to landslide. The municipalities of Bagac, Bataan and Casiguran in Aurora including some areas in Zambales are also highly at risk to storm surge and tsunami.

Vulnerability of the region to climate change hazards will be further aggravated by climate changes. Tables 5 and 6 present the projected seasonal temperature increases and rainfall change in 2050 in region 3 under the medium range emission scenario. As projected by PAGASA, temperature in region 3 is expected to increase from 1.7^{o}C to 2.2^{o}C in 2050. This increase in temperature will have impacts on forest resources and on biodiversity as this could lead to more grass/ forest fires especially during summer months. Meanwhile, more rains are expected during the rainy months of June-August but there will be significant reduction in rainfall during the dry season. The increase in rainfall would range from 7.4% (in Aurora) to as much as 31.4% (in Zambales) during the rainy season of June to August. However, this could decrease from -8.1% (in Bataan) to about -36.4% (in Bulacan) during the dry months of March, April and May in 2050. This seasonal change in rainfall could result to more flooding and landslide during the wet months and reduced availability of water during the dry season for irrigation, power generation and for domestic use. Region 3 is already a water stressed region and decrease in rainfall during summer months would worsen this situation. With reduced irrigation capacity, food production would also be adversely affected, especially since Central Luzon is the leading producer of rice in the country. Most of the provinces in Region 3 are also frequently exposed to typhoons which could further worsen the occurrence of flooding and landslide in the region. Table 7 presents the provincial vulnerabilities to climate related hazards and poverty incidence in region 3.

Table 5. Seasonal temperature increases (in °C) in 2050 under medium-range emission scenario in Region 3 (PAGASA, 2011)

Provinces	Observed Baseline (1971-2000)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Aurora	24.5	27.1	27.9	26.7	1.9	2.0	2.0	2.0
Bataan	26.4	28.7	27.6	27.3	2.0	2.1	1.7	1.9
Bulacan	25.6	27.9	27.1	26.7	1.9	2.1	1.7	1.9
Nueva Ecija	25.3	27.7	27.5	26.8	2.0	2.1	1.8	2.0
Pampanga	26	28.3	27.5	27.1	2.1	2.2	1.8	2.0
Tarlac	26.1	28.3	27.8	27.3	2.2	2.2	1.9	2.1
Zambales	26.3	28.3	27.4	27.2	2.1	2.1	1.7	1.9

Table 6. Seasonal rainfall change (in %) in 2050 under medium-range emission scenario in Region 3 (PAGASA, 2011)

Provinces	Observed Baseline (1971-2000)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Aurora	615.7	546.4	768.7	1151.1	8.7	-29.2	7.4	-5.7
Bataan	71.7	368.7	1326.2	872.6	-8.2	-8.1	29.1	1.5
Bulacan	212.4	288.9	1041.4	842.1	-13.2	-36.4	23.6	-3.3
Nueva Ecija	155.2	316.5	995	745	-7.4	-25.7	22.7	-2.4
Pampanga	120.8	320.6	1030.4	785.2	-15.4	-26.4	13.9	-7.2
Tarlac	43.4	265.4	1193.5	644.3	-6.7	-18.2	8.8	-5.5
Zambales	40.9	368	1793.9	872	-2.2	-21.6	31.4	5.6

Table 7. Matrix of Provincial Vulnerability to Climate-Related Hazards & Poverty

Region/ Province	Vulnerability						2012 Poverty Index (Poverty Incidence among families) (%)
	Temp. Increase	Typhoon	Earthquake	Tsunamis	Water stress	Combined Climate Risks	
Region 3							**12.2**
Aurora	Low	High	Medium	Low	High	Medium	30.7
Bataan	Low	Medium	Medium	Medium	High	Medium	7.3
Bulacan	Medium	Medium	Medium	Medium	High	Medium	6.7
N. Ecija	Medium	High	Medium	No risk	High	High	23.0
Pampanga	Medium	High	High	No risk	High	Very High	6.4
Tarlac	Medium	High	High	High	High	High	14.0
Zambales	Low	High	High	High	High	Medium	18.0

III. Development Challenges in the Forestry Sector of Region 3

Based on the foregoing assessment, the challenges in the forestry sector of region 3 that have to be addressed are as follows:

1. Deteriorating water quality of major rivers such as the Pampanga river system;

2. Declining forest cover, especially in the provinces of Aurora, Nueva Ecija and Bulacan;
3. Difficulty in meeting demands for wood and non wood products due to continuous decline in forest resources;
4. Decreasing water supply for irrigation, power generation and domestic/ industrial use, especially during the summer months;
5. Increasing vulnerability of the livelihood of farming (both upland and lowland) and fishing communities due to climate change;
6. Increasing threat to ecotourism due to forest destruction, loss of biodiversity and sedimentation of rivers and coastal areas;
7. Increasing vulnerability to climate related hazards such as typhoons, floods, landslides, storm surge, and drought. The increased frequency and intensity of these hazards, as a result of changes in climatic conditions, will 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;
8. Management of watersheds and forest resources in the region are being complicated by overlapping mandates among different agencies. There is a need to establish collaborative management mechanisms within the region to harmonize conflicting land uses.

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 region's comparative advantages include the following:

1. It has vast areas of agricultural lands 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 furniture makers in Pampanga using wood as raw materials;
4. Extensive areas of closed and open forests, caves, waterfalls, lakes, rivers, biodiversity resources, beaches and other historical sites that are potential for ecotourism;
5. Existing pasture areas that can be developed further for grazing purposes to satisfy local demand for meat;
6. Existing mango plantations in Zambales producing quality mango fruits;
7. Existing IFMA areas that have developed tree plantations;
8. Established markets for various products such as wood furniture, agricultural crops, fuelwood and other non-timber products;

9. Potential areas for REDD+; and
10. Relatively high rainfall in Aurora province

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 mango and other fruits
4. Water production to support agricultural crop production such as rice, corn, garlic and vegetables
5. Furniture making
6. Timber and fuelwood products
7. Cattle raising and
8. REDD+

The matrix of comparative advantages and competitive goods and services of region 3 as identified by DENR region 3 is attached as annex 2.

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. The Pampanga River Basin is now under the highest institutional governance body of the Region - the Regional Development Council III, to ensure coordination and collaboration in forestry and other related developments. This plan provides specific measures to sustain this collaborative mechanism so that land uses in the river basin is harmonized.

5.1 The Forestry Sector Vision and Goals

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

This vision will guide the region's forestry sector objectives, strategies and programs as contained in the action plan. 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 region 3 under appropriate land management arrangements; and
4. To sustainably manage watersheds in partnership with stakeholders.

5.2 Strategic Programs

Three major programs were identified to achieve the vision and goals of the forestry sector in the region, namely:

1. Program on strengthening resilience of forest ecosystems and communities to climate change hazards;
2. Program to meet increasing demands for forest goods and services and
3. Program to promote responsive governance.

Support programs were also identified to facilitate implementation of the major programs.

Considering the region's comparative advantages and competitive goods and services, the forestry programs in region 3 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 support the furniture industry and fuelwood demands;
4. Rehabilitation of watersheds and other protection forests;
5. Agroforestry farm development to diversify livelihood & support mango production in Zambales;
6. Rehabilitation of selected mangrove areas; and
7. REDD + implementation

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

Region 3 is highly exposed to typhoons. With more rains projected during the rainy season, the mountainous areas of Nueva Ecija, Zambales and Aurora will be vulnerable to increased soil erosion which will adversely affect agricultural productivity. Tributaries draining to the Pampanga River systems and the Agno river System inundates the rich rice lands of these areas resulting to crop losses and danger to life and properties. Landslide is likely to aggravate in these areas as a result of more rainfall.

The coastal areas of Zambales, Bataan and Aurora are also vulnerable to storm surge and sea level rise. The projected temperature increase in all the 7 provinces will lead to increased incidence of forest fires resulting to more forest destructions. As climate change intensify, the damages from these hazards to forest ecosystems and communities will likely increase. Hence, effective climate change mitigation and adaptation strategies will be integrated into the regional forestry action plan to meet the multiple objectives of preventing 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 66 LGUs into their comprehensive land use plans;
2. To protect 560,966 hectares of existing forests and plantations starting in 2016 gradually increasing to 727,527 hectares in 2028;
3. To rehabilitate 180 hectares of mangroves in order to reduce risks to communities associated with storm surge and tsunami;
4. To diversify livelihood of local communities by developing 1,930 hectares of agroforestry farms;
5. To undertake vulnerability assessment and adaptation planning in 18 priority watersheds;
6. To complete the formulation of integrated watershed management plans for 19 watersheds; and
7. To implement REDD+ in the province of Aurora and Zambales

Strategic Activities

The following activities will be implemented under this program:

1. Identification of areas vulnerable to climate change hazards and corresponding adaptation measures in collaboration with LGUs and other stakeholders;
2. Harmonization of land uses from ridge to reef by Integrating forest land use plans of LGUs, watershed management plans of priority watersheds, and other related forestry plans into the LGUs' comprehensive land use and development plans;

3. Protection, conservation and rehabilitation of existing natural forests, established plantations, mangroves, and watersheds to enhance the protective value of forests and sustain the provision of ecosystems goods and services;
4. Integration of soil and water conservation measures in upland farming systems;
5. Diversification of livelihood sources of upland farmers, particularly the CBFMA and CADT holders through multi storey agroforestry and partnership with private investors and forest products processors.
6. Implementation of REDD+ in Zambales and Aurora to reduce carbon emission and enhance provision of ecosystem services to communities

Program Targets

The targets and implementation period for these strategic activities are summarized in the table 8.

Table 8. Summary of Programs on Strengthening Resilience to Climate Change Hazards and Corresponding Targets per Period

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	17	0	18
2. Formulation of integrated watershed management plans (no.)	0	10	9	19
3. FLUP formulation (no. of LGUs)	9	57	0	66
4. Protection of existing forests and plantations including mangroves (ha)	560,966	617,002	727,527	727,527
5. Mangrove rehabilitation (ha)	0	60	120	180
6. Establishment of vegetative soil and water conservation measures (meters)	0	10,000	10000	20000
7. Agroforestry development (mixed crops in ha)	430	1,500	0	1,930
8. REDD+ implementation (no of provinces)	0	2	0	2
9. Training on vulnerability assessment, adaptation planning, integrated pest management, IWM, FLUP (no. of training)	1	6	6	13

5.2.2 Program to Meet Increasing Demands for Forest Goods and Services

The multiple demands for forest goods and services from various clients will be responded by the forestry sector considering the regional comparative advantages, and its competitive goods and services.

Objectives

The main 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 like the Green City in Metro Clark and the East leg of the W-Growth Corridor

Strategic Activities and Targets

The following activities with their corresponding targets will be implemented in this program:

1. Demarcation on the ground of 942,387 hectares of forestlands and protected areas into production, multiple use and strict protection zones;
2. Development of 31,175 hectares of commercial forest plantation for timber production to support the raw material requirements of wood furniture;
3. Development of 13,708 hectares of fuel wood/ bio energy plantations;
4. Protection, conservation and rehabilitation of 138,393 hectares of priority watersheds for power generation, domestic and industrial use and for irrigation to support rice production and other agricultural crops;
5. Development of 8,295 hectares of grazing lands to meet demands for meat production;
6. Development of forest parks, and green belts in four (4) key cities of the region like the Green City in Metro Clark and the East leg of the W-Growth Corridor

The targets and the period for implementing the various activities under this program are summarized in table 9.

Table 9. Summary of Activities, Targets and the Period of Implementation to Meet Demands for Forest Goods and Services

Strategic Activities	Targets and Implementation Period			
	2016	2017 -2022	2023 -2028	Total
Responding to Demands for Forest Ecosystems Goods and Services				
1. Demarcation of forestland boundaries &forest management zones (ha.)	0	942,387	0	942,387
2. Development of seed production areas (no.of sites)	0	7	0	7
3. Establishment of mechanized nurseries (no.)	1	0	0	1
4. Commercial forest plantation development for round wood prodn. (ha)	0	500	30,675	31,175
5. Fuelwood/ bio energy plantation dev't (ha)	3,708	1,900	8,100	13,708
6. Management of grazing lands (ha)	6,735	6735	8,295	8,295
7. Watershed rehabilitation	8,598	52,600	77,195	138,393
Identification/ assessment of other watersheds (no.)	1	10	5	16

Strategic Activities	Targets and Implementation Period			
	2016	2017 -2022	2023 -2028	Total
Organization and capacitation of watershed management bodies , such as the watershed management council (no.)	0	2	0	2
8. Support to urban forestry in major cities and urban centers (LGUs assisted)	0	4	0	4

5.2.3 Institutionalizing Responsive Governance in Forestry

Due to overlapping mandates among different agencies and overlapping tenure in forestlands, it is imperative to institutionalize collaborative management of forest resources among different stakeholders. As such, the forestry sector in region 3 will organize collaborative management bodies to harmonize conflicting land uses. Members of this management body will be trained on forest management to improve their skills and capabilities in implementing programs on strengthening resilience to climate change hazards and programs on responding to demands for forest ecosystems goods and services.

Objectives

1. To establish clear accountability in the management of forestlands;
2. To promote active participation of stakeholders in the management of forests and forestlands; 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 from multiple clients.

Strategic Activities and Targets

The activities, targets and their implementation periods to institutionalize responsive governance in the forestry sector in region 3 are summarized in table 10, below.

Table 10. Summary of Activities and Targets on Promoting Responsive Governance

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	25,000	75,000	100,000
2. Organization and capacitation of multi-sectoral collaborative management bodies (region and province)	0	8	8	8
3. Creation and operationalization of regional/ provincial TWG on climate change (no.)	0	8	8	8
4. Capability enhancement for DENR/ LGUs (no. of trainings)	2	8	6	16

Strategic Programs and Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
5. Quarterly and annual monitoring and evaluation of PMPCRFD implementation in region 3 (No.)	4	24	24	52
6. Performance assessment of tenure holders (No.)	1	6	6	13

5.2.4 Support programs

Cross cutting support programs have also been identified to facilitate 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 program aims 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. Implement a forest certification 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 and Targets

The strategic activities and targets to achieve the objectives of this program are summarized in table 11, below:

Table 11. Summary of Support Program Activities, Targets and Implementation Period

Strategic Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
D. Other Support Programs				
1. Information, education and communication campaign (no. of LGUs)	0	92	92	92
2. Upgrading of regional MIS facilities (no.)	0	6	6	6
3. Implementation of forest certification (Provinces)	0	7	7	7
4. Identification and assessment of sustainable sources of financing in forestry projects (No. of sites assessed)	0	3	3	6
5. forestry research (no. of studies)	0	5	5	10

VI. Plan Implementation

This regional action plan shall be implemented by DENR region 3 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 Watershed Forest Reserves in Region 3

Name of Reserve	Location/ Provinces Covered	Area (ha)	Proc. No.
Amro River Watershed Forest Reserve	Casiguran, Dilasag, Aurora	6470	633
Aurora Watershed Forest Reserve	Baler, Aurora	430	34
Bazal River Watershed Forest Reserve	Maria Aurora, Aurora	4403	402
Bulawan Falls Watershed Forest Reserve	Dinalungan, Aurora	986	395
Calabagan Watershed Forest Reserve	Casiguran, Aurora	4803	915
Diaat River Watershed Forest Reserve	Maria Aurora, Aurora &Dupax, Nueva Vizcaya	3219	399
Dibalo-Pingit-Zabali-Malayat Watershed	Baler & San Luis, Aurora	4528	908
Dinadiawan River Watershed Forest Reserve	Dipaculao, Aurora	3387	918
Dingalan River Watershed Forest Reserve	Dingalan, Aurora	1788	23
Dipaculao Watershed Forest Reserve	Dipaculao, Aurora	1786	116
Diteki River Watershed Forest Reserve	San Luis, Maria Aurora, Aurora	12970	20
Pacugao River Watershed Forest Reserve	Maria Aurora, Aurora & Dupax del Norte, Nueva Vizcaya	3247	110
Pinamacan River Watershed Forest Reserve	Dilasag, Aurora	2905	236
San Luis Watershed Forest Reserve	San Luis, Aurora	2789	109
Simbahan- Talagas River Watershed Forest Reserve	Dinalungan, Aurora	2266	905
Talaytay River Watershed Forest Reserve	Dinalungan, Aurora	3528	670
Angat River-Bustos Dam Forest Reserve	Bulacan	28,550	574
Angat Watershed Forest Reserve	Rizal, Bulacan, & Nueva Ecijja	55709	71 amended by 505
Angat watershed and Forest Range (Pilot)	Rizal, Bulacan, & Nueva Ecijja	6600	391
Watershed Purposes of Mariveles (Palanas)	Mariveles, Bataan	325	E. O. 20
Pantabangan-Carranglan Watershed Reserve	Pantabangan, & Carranglan, N. Ecija	84500	561
Peñaranda River Forest Reserve	Gen. Tinio, N. Ecija	14,888	573
Talavera River Watershed Reservation	Nueva Vizcaya, Bulacan & Nueva Ecija	37156	350 amended by 244
Dona Remedios Trinidad/ General Tinio Watershed	Dona Remedios, Bulacan & General Tinio, Nueva Ecija	20760	230
Olongapo Watershed Forest Reserve	Olongapo City, Zambales	6335	238 amended by 66
Subic Watershed Forest Reserve	Bataan	10000	926
Mangan- Vaca Watershed Forest Reserve	Subic, Zambales	300	1607
Umiray River Watershed Reservation	Quezon, Bulacan, and Rizal	16,723	264

Annex 2. Matrix of comparative advantages and competitive goods and services of Region 3

Comparative advantages	COMPETITIVE GOODS AND SERVICES											
	Mango	**Cattle**	**Fuel-wood**	**Rice & onions**	**round wood/**	**wood furniture**	**water supply (for power, irrigation & domestic use**	**eco- tourism**	**fisheries**	**non timber products**	**REDD+**	**Others**
vast areas of plain agricultural lands				N.Ecija; Pampanga								Tarlac (sugar cane)
watersheds				N. Ecija			Pantabangan, Angat, Ipo, PRB	Arayat, Pantabangan				
dams for irrigation and power							Pantabangan, Angat, Ipo,					
fruit orchards	Zambales											
Existing IFMA					Aurora							
Existing grazing lands		√										
Proximity to M. Manila			√									
skilled furniture makers						Pampanga (Betis Furniture)				Pampanga		
Natural forests								All provinces except Tarlac		All Province	Aurora Zambales	
Protected areas							AMNP, Arayat, Minalungao	MOBMR, Arayat, Biak na Bato, Minalungao, BNP, AMNP	MOBMR			
caves								Minalungao, Biak na Bato,				
beaches								Bataan, Aurora, Zambales				
waterfalls								Bataan, Aurora				
lakes and rivers								Wetlands, Mt. Pinatubo, Tarlac, Zambales	Pampanga			
coastal resources including mangroves								Zambales, Aurora	Zambales, Aurora, Bulacan			
- Mineral Lands												(Pampanga, Zambales, Bulacan)