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

REGION 2, CAGAYAN VALLEY REGION

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. In CY 2013, the Forest Management Bureau (FMB) again decided to update the 2003 RMPFD, taking into account the potential impacts of climate change to the forestry sector. A Philippine master plan for climate resilient forestry development (PMPCRFD) was formulated where the following strategic programs were identified for implementation:

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

This plan outlines the action plan of DENR region 2 to support implementation of the PMPCRFD. It supports the regional development plan of the Cagayan Valley region by giving focus on watershed protection / rehabilitation to support agriculture and biodiversity conservation for ecotourism.

II. Regional Profile

2.1 Location and political subdivisions:

Region 2, commonly known as the Cagayan Valley region, is located in the North-Eastern portion of Luzon and includes the scattered Batanes-Babuyan island group occupying the northern most tip of the archipelago (Figure 1). It is bounded by three mountain ranges, Sierra Madre Mountain on the East, Caraballo Mountain on the South and Cordillera Mountain on the West. On the north it is bounded by the Babuyan channel.

The topography of the Region is generally mountainous hilly to sloping and becoming gently sloping to level proceeding to the valley plains. Vast areas fall within steep slopes to very

steep slopes especially in the provinces of Nueva Vizcaya, Isabela and Quirino where plains and level areas are all situated in small valleys in between hills and mountains.

Figure 1. Location Map of Region 2, Cagayan Valley Region

Source: https://philippines-atbp.jimdo.com/ph-profile-regions-and-provinces

All provinces in the region belong to climatic types III and IV. Type III is characterized by no pronounced maximum rain period with a short dry season lasting from one to three months between March and May. A little less than half of the eastern part of all the provinces fall under this category, and are mostly mountainous areas. Type IV that covers the western parts is characterized by no pronounced maximum rain period and no dry season. In this type of climate, seasons are not very pronounced; relatively dry from December to April and wet during the rest of the year. Heavy precipitations generally occur from June to November during the southwest monsoon season with October having the heaviest precipitation. Temperature is distinctly tropical and the northern portion has a high precipitation due to the exposure of the north eastern air movements.

Soil types in the region belong to various soil series. These types of soils are deemed best for agricultural crops like corn, peanut, tobacco, mongo, sorghum vegetables and other fruit bearing trees. The other soil types which are located in the rolling uplands and hilly to mountainous areas are suitable for pasture and grazing. Those in the low lands however are recommended for upland rice and corn production and other crops like coffee, cacao and vegetables.

2.2 Socio-Economic Profile

Region 2 is composed of five (5) provinces, namely, Cagayan, Isabela, Nueva Vizcaya, Quirino and the Batanes group of islands. Tuguegarao, its capital town, is the seat of commerce and trade and center of learning. The dominant dialects spoken are Ilokano, Ybanag, Ytawes, Irraya, Gaddang, Tagalog, others. In Batanes, the people speak Ivatan.

Based on the 2015 national census of the Philippines the total population of the Cagayan Valley region is 3,451,410. Its annual population growth rates from CY 2000 to CY 2015 are consistently below the national annual population growth rates of the Philippines for the same period. Among the provinces of region 2, Isabela has the largest population at 1,593,566 followed by Cagayan at 1,199,320. Batanes is the least populated province of the region. However, in terms of population growth rate, Quirino has the highest annual population growth rate between CY 2000 and CY 2015, at 1.59% (table 1). It is followed by Isabela and Nueva Vizcaya with annual population growth rates of 1.41% and 1.38%, respectively. The population growth rates of these provinces are higher than the annual population growth rate of region 2 which is 1.35%. Batanes has the lowest annual population growth rate between CY 2000-2015, estimated at 0.30% only. It is estimated that about 640,812 of the region's population are residing in the uplands.

Table 1. Population and Population Growth Rates of Region 2, 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
BATANES	16,467	16,604	17,246	0.08	0.72	0.30
CAGAYAN	993,580	1,124,773	1,199,320	1.25	1.23	1.24
ISABELA	1,287,575	1,489,645	1,593,566	1.47	1.29	1.41
NUEVA VIZCAYA	366,962	421,355	452,287	1.39	1.36	1.38
QUIRINO	148,575	176,786	188,991	1.75	1.28	1.59
Total	**2,813,159**	**3,229,163**	**3,451,410**	**1.39**	**1.27**	**1.35**

Source: PSA, CY 2000, 2010, 2015

The region has a wide expanse of rich agricultural lands suitable to a wide variety of agricultural commodities. It has earned the distinction of being a major food supplier to the rest of the country, particularly in grains and legumes. Palay and corn are the leading commodities in Cagayan Valley with their respective shares of 41.86 percent and 29.60 percent of the region's agricultural output. The region ranked 1st in corn production and 2nd in palay production in 2013.

2.3 Resources

Land Resources

Region 02, the second largest region in the country in terms of land area, has a total area of 2,687,517 hectares. About 64% of the region's land area or 1,714,695 hectares is forestland while alienable and disposable land is estimated to cover about 36% of its total land area or 972,822 hectares (table 2). Since only a small percentage of its total land area is alienable and disposable, there is very limited land for agriculture, residential and commercial purposes. As such, agricultural production and settlements have encroached on most of the forestlands of the Cagayan Valley region. These lands are generally planted to corn, upland rice and other root crops, thereby contributing to increased soil erosion that leads to increased sedimentation of rivers and streams. This situation has adverse consequences on biodiversity conservation as well as on watershed protection and conservation.

Table 2. Land Classification in Region 2

Land Classification	Area (ha)	%
Forestlands	1,714,695	63.80%
Classified Forestlands	1,669,590	62.12%
Established Timberlands	1,423,482	52.97%
Forest Reserves, National Park/ Prot. Areas & Other Reservations	246,108	9.16%

Land Classification	Area (ha)	%
Unclassified forestlands	45,105	1.68%
Alienable and disposable lands	972,822	36.20%
Total	2,687,517	100%

Source: Philippine Forestry Statistics, CY 2014

Forest Resources

Table 3 summarizes the land area of region 2 that is still forested. Approximately 39% of the Cagayan Valley region (1,044,507 hectares) is still covered with forest. Of the total area forested, 46% or 485,262 hectares, are closed forest indicating that there are still significant biodiversity resources in the region. This is equivalent to 18% of the total land area of region 2. Open forests cover 21% of the region's land area (553,344 hectares) while mangrove has an area of only 5,902 hectares (0.2%) located in Cagayan and Isabela province.

Most of the forests of region 2 are situated in Isabela and Cagayan, covering 14% and 13% of the region's land area, respectively. However, in terms of percentage of the province forested, Nueva Vizcaya has the highest percentage forested with 50% of its land area still covered with forest. This is followed by Quirino with 42% of its land area still forested. Quirino also has 68% of its forests (86,729 hectares) classified as closed forest while Nueva Vizcaya and Cagayan has 63% and 60% of their forests categorized as closed forest. Among the provinces of region 2, Batanes has the lowest forest cover with only 9% of its area forested equivalent to 1,819 hectares. These figures indicate that in terms of biodiversity conservation, the provinces of Quirino, Nueva Vizcaya and Cagayan should be given focus since these are the areas where significant close forests are still found.

In terms of forest conversion, the Cagayan Valley region lost an estimated 105,335 hectares from 2003 to 2010 or an annual forest loss of 15,048 hectares (table 4). The highest forest loss of 81,218 hectares occurred in Cagayan, followed by Isabela which lost 33,531 hectares within a period of 7 years. Surprisingly, Nueva Vizcaya had gained 50,484 hectares in closed forest but lost 32,699 hectares of open forest or a net forest gain of 17,785 hectares for the same period. Apparently, some of the open forest in Nueva Vizcaya has matured to closed forest, indicating that forest protection has been very effective. The reverse is happening in Quirino province where about 23,126 hectares of close forests were lost between 2003 and 2010 but 18,398 hectares were added to the open forests. It appears that some of the closed forests of the province were converted to open forest resulting to a net forest loss of 4,728 hectares or an annual loss of 675 hectares. This trend in forest cover indicate that forest protection is most crucial in the province of Cagayan where large areas of forest loss occurred on all types of forest (closed, open and mangrove forest). Isabela and Quirino are also areas of concern because the former is also losing significant forest cover for all types

of forests while the latter is losing lots of biodiversity resources due to conversion of close forest to lower quality open forest.

Table 3. Forest Cover of Region 2, CY 2010

Province	Land Area	Total Forest	Close Forest	Open Forest	Mangrove	% of Reg. 2 Forested	% of Prov forested	% forest close
Region 2	2,687,517	1,044,507	485,262	553,344	5,902	38.9%	39%	46%
Batanes	20,928	1,819	0	1,819	0	0.1%	9%	0%
Cagayan	904,026	342,994	206,475	131,341	5,179	12.8%	38%	60%
Isabela	1,066,456	378,272	69,444	308,106	723	14.1%	35%	18%
Nueva Vizcaya	390,387	193,708	122,615	71,093	0	7.2%	50%	63%
Quirino	305,720	127,714	86,729	40,986	0	4.8%	42%	68%
% of Region's area	100%	39%	18%	21%	0.2%			

Source: Philippine Forestry Statistics, CY 2014

Table 4. Forest Cover Change in Region 2 (CY 2003 – CY 2010)

Province	Closed Forest			Open Forest*			Mangrove*			Net change
	2010	2003	Change	2010	2003	Change	2010	2003	Change	
Batanes	0	224	(224)	1,819	5238	(3,419)	0	0	0	(3,643)
Cagayan	206,475	250,126	(43,651)	131,341	166753	35,412)	5,179	7334	-2,155	(81,218)
Isabela	69,444	70,813	(1,369)	308,106	339723	(31,617)	723	1268	-545	(33,531)
Nueva Vizcaya	122,615	72,131	50,484	71,093	103792	(32,699)	0	0	0	17,785
Quirino	86,729	109,855	(23,126)	40,986	22588	18,398	0	0	0	(4,728)
Total	485263	503,149	(17,886)	553,345	638,094	(84,749)	5902	8602	-2,700	(105,335)

* Include plantations

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

Water Resources

Cagayan Valley region includes lands east of the Sierra Madre mountain, west of the foot hills of Cordillera mountain and south of Caraballo mountain. Thus, the region is a big watershed where all the head waters from the mountain ridges cascade down the tributaries to the Cagayan River, the second largest river in the country with a drainage area of 27,300 square kilometer and ground water reserve of 47,895 MCM. The Cagayan River, runs through the center of the region and flows out to the town of Aparri, Cagayan down to Babuyan channel. It has three major tributaries namely the Ilaguen river which drains a major portion of the eastern watersheds, the Magat river which drains the southern portion and the Chico river which drains most of the north western areas. These rivers and their tributaries are important sources of water for domestic use, irrigation and power generation and are used by local communities for fishing as additional source of livelihood. Some of the most important watersheds in the region are the Magat and Casecnan watershed. These watersheds have national significance because they supply most of the irrigation

water and power generation in Luzon. The watershed forest reserves in region 2 are listed in table 5.

Table 5. Watershed Forest Reserves in Region 2

Name of Watershed Forest Reserve	Provinces Covered	Area (ha)	Proc. No.
Casecnan River Watershed	Nueva Vizcaya, Quirino & Aurora	85219	136
Dupax Watershed Reservation	Dupax, Nueva Vizcaya	425	720
Bawa Watershed Forest Reserve	Gonzaga & Lal-lo	8955	108
Wangag Watershed Forest Reserve	Gonzaga & Lal-lo, Cagayan	6992	107
Enrile-Amulong-Solana Forest Reserve	Enrile, Amulong, & Solana, Cagayan	8,249	159
Tumauini Watershed Forest Reserve	Cabagan, San Pablo, Maconacon, Divilacan, Isabela	17670	355
Magat Watershed Reservation	Ifugao, Nueva Vizcaya, Isabela	4,300	573
Dupax Watershed Reservation	Dupax, Nueva Vizcaya	425	720
Bawa Watershed Forest Reserve	Gonzaga & Lal-lo	8955	108

Source: Philippine Forestry Statistics, CY 2014

Nature-Based Tourism Resources

Cagayan Valley region has great potential for eco-tourism. Both foreign and local tourists continue to explore its natural scenic areas such as its caves, sea for game fishing and its mighty mountains for trekking. Some of the nature-based tourism resources of the region are the following:

- Callao Caves in Penablanca, Cagayan boast of massive limestone and other rock formations, skylights and a chapel. The circadian flight of thousands of bats from their cave at dusk is also a major attraction.
- Dibulo Waterfalls in Dinapigue, Isabela which has an estimated length of 100 meters. It is being considered also as a possible power and energy sources.
- The Magat Dam Tourism Resort complex in Brgy. Aguinaldo, Ramon, Isabela is Asia's biggest dam project. The reservoir area is suitable for fishing, swimming, boating, sight-seeing and picknicking.
- Basco, Batanes in Sabtang Island, an undisturbed and unspoiled island, has intermittent white sand beaches, steep mountains, deep canyons, and small level area along the coastline.
- Mt. Pulag Nat'l Park in Kayapa serves as the gateway to the country's second highest peak, that of Mt.Pulag, which rises 9,630 feet above sea level. The park occupies parts of Nueve Vizcaya and Bengeut.

- Aglipay Caves in Quirino, with series of 38 caves, seven of which have already been developed for tourism, offer tourists an interesting contact with nature. Located in an area of undulating hills and rich forest reserve, the caves also feature an underground river.
- Governor Rapids in Maddela, Quirino offers swift, turbulent, crystal-clear waters ideal for water activities such as river rafting. It is also famous for its giant wall of limestone jutting out from one side of the Cagayan River, framing the Sierra Madre.
- Nagbukel Cave Diffun, Quirino located inside a dome-shaped mountain is frequented by domestic tourist during the Holy Week. It is an ideal site for hiking and picnicking.
- The town of Nagtipunan in Quirino which is surrounded by virgin forests is currently being developed as a gateway to Quezon province.
- Pongo River Valley in Maddela, Quirino is a natural area that offers scenic opportunities for some nature activities to visitors.

Biodiversity Resources and Protected Areas

Region 2 is rich in biodiversity resources. It has large areas of mossy forests, dipterocarp forests and mangrove forests. About 39% of the total area of the region is still forested of which 18% are closed forests. This type of forest is known to contain rich biodiversity resources especially those located in high elevation areas. To conserve these biodiversity resources, protected areas had been established in the region. Table 6 lists the protected areas in region 2.

Table 6. Protected Areas in Region 2

Region/ Name of Protected Area	Area (ha.)	Location/Province
1. Palaui Island Protected Landscape and Seascape	7,415.48	Cagayan
2. Baua Watershed Forest Reserve	8,955.00	Cagayan
3. Wangag Watershed Forest Reserve	6,992.00	Cagayan
4. Magapit Protected Landscape	3,403.62	Cagayan
5. Penablanca Protected Landscape	118,781.58	Cagayan
6. Tumauini Watershed Forest Reserve	17,670	Isabela
7. Fuyot Spring National Park	819	Isabela
8. Northern Sierra Madre Natural Park	359,486	Isabela
9. Casecnan Protected Landscape	68,362	Nueva Vizcaya
10. Bangan Hill National Park	13.01	Nueva Vizcaya
11. Salinas Natural Monument	6,675.56	Nueva Vizcaya
12. Dupax Watershed Forest Reserve	424.8	Nueva Vizcaya
13. Batanes Protected Landscape & Seascape	213,578.00	Batanes
14. Quirino Protected Landscape	175,943.61	Quirino
	*16,475	
TOTAL	**1,004,994.66**	

*-areas which are also part of Casecnan Protected Landscape

Other Resources

Managed pasturelands and natural grasslands cover significant areas of the Cagayan Valley region. These areas provide considerable potentials for livestock production and diversified upland farming. Beneath the vast, rich and fertile lands of the region also lie the metallic and non-metallic mineral reserves. Cagayan Valley has gold, silver, copper, limestone and manganese. Indigenous energy resources such as coal, natural gas, geothermal and hydroelectric capabilities have been found abundant in the Valley.

2.4 Vulnerability to Climate Change Hazards

Tables 7 and 8 present the projected seasonal temperature increases and rainfall change in 2050 in region 2 under the medium range emission scenario. As presented in the table, temperature in the region is expected to increase from 1.4^{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 forest fires especially during summer months.

In terms of rainfall, more rains are expected during the rainy months of June-August but there will be significant reduction in rainfall during the dry season. The amount of rainfall could increase by as much as 36% in Nueva Vizcaya from June to August but could decrease by about -33.9% in Quirino during the dry months of March to 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. Most of the region's flood prone areas in Cagayan and Isabela province are used as production areas for rice, corn, legumes, and vegetables, hence food production may be adversely affected by these climate changes. Apart from seasonal changes in rainfall, the Cagayan Valley region is also frequently exposed to typhoons which could further contribute to flooding and landslide. Region 2 ranks 8th in terms of vulnerability to landslide, with about 229,112 hectares highly at risk to landslide. Table 9 shows the ranking of the different regions in the Philippines in terms of vulnerability to landslide.

Table 7. Seasonal Temperature Increases (in °C) in 2050 under Medium-Range Emission Scenario in Region 2

Provinces	Observed Baseline (1971-2000)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Cagayan	24.5	28.1	28.9	27,1	2.0	2.2	2.0	1.8
Isabela	24.1	27.9	28.7	26.8	2.0	2.1	2.1	1.9
Nueva Vizcaya	22.3	25.1	25.4	24.4	2.0	2.1	1.9	1.9
Batanes	23.0	26.7	28.8	26.9	1.8	1.6	1.4	1.5
Quirino	23.7	26.8	27.6	26.2	2.0	2.2	2.0	2.0

Source: PAGASA, 2011

Table 8. Seasonal rainfall change (in %) in 2050 under medium-range emission scenario in Region 2

Provinces	Observed Baseline (1971-2000)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Cagayan	284.4	207.7	538.4	832.1	14.6	-23.3	0.9	-1
Isabela	412.2	325	530.8	867	25.1	-29.2	8.7	1.7
Nueva Vizcaya	180.9	416.8	1149.8	880.5	-7.8	-23.6	36.1	-0.5
Batanes	531.1	354.5	928.7	1057.8	-4.9	-4.4	10.2	-7.4
Quirino	419	465.9	776.4	957.9	-0.9	-33.9	12.1	-5.8

Source: PAGASA, 2011

Table 9. Regions vulnerable to Landslide, Area at Risk (hectares) and Ranking by Region

Region	Area at risk to landslide	
	Land area (in hectares)	Rank
CAR	507,666	1
Region IV-B	486,442	2
Region VI	293,427	3
Region I	280,704	4
Region V	272,279	5
Region VIII	265,558	6
Region XI	255,540	7
Region II	229,112	8
Region IV-A	189,386	9
Caraga	167,516	10
Region X	152,811	11
Region III	152,518	12
Region IX	45,154	13
Region XII	32,345	14
ARMM	4,937	15
NCR	-	
Region VII	-	
PHILIPPINES	3,335,395	

Source: Godillano, 2004

III. Development Challenges in the Forestry Sector of Region 2

The primary forestry concern in region 2 is the significant decline in its forest area. The region is losing about 8,777 hectares of forests annually or equivalent to 288 hectares every day. This situation will adversely impact on the ability of the forests to provide the

necessary ecosystem services to its growing population and even to other areas in Luzon. The high rate of forest loss in this region will greatly affect agricultural production in regions 2 and 3, the leading producers of food crops in the country, as the ability of critical watersheds of Magat and Casecnan to provide irrigation water will be adversely affected. Since these watershed are also used to produce energy, power generation will be affected as well. The rate of forest loss in the region may be further aggravated by climate change due to the projected increase in temperature which could trigger more grass/ forest fires in the Cagayan Valley region. At the same time since the projected rainfall is lesser during the dry season, water availability for irrigation, power generation and for domestic use will become more limited during this period.

The continuous decline in forest cover can potentially lead to more flooding and landslide in the region as the ability of the forests to mitigate these hazards is impaired. The expected increase in rainfall during the rainy season will further increase the chances of flooding and landslide in these areas, endangering lives and properties of local communities. Flooding will also lead to more damages to agricultural crops which will add up to decline in agricultural production of the region.

Aside from watershed deterioration, forest destruction in region 2 will also negatively impact on biodiversity resources. The forestry statistics indicate that from 2003 to 2010 the average annual decrease in close forest in region 2 is about 1,490 hectares or a daily loss of 49 hectares of close forest. This type of forest is rich in biodiversity resources and its destruction means the destruction of habitats of important species of flora and fauna, some of which may be rare and endangered.

While there was a general decrease in forest area in the region, it is important to note also that the province of Nueva Vizcaya registered a net increase in forest area most of which are increase in close forest. It may be worthwhile to document the experiences in this province in terms of forest protection and rehabilitation since apparently, open forests in the province have advanced to close forests while wooded lands and plantations may have developed into open forests. These documented lessons in forest protection and rehabilitation could provide guidance towards effective forestland management in other provinces of region 2.

IV. Regional Comparative Advantage and Competitive Goods and Services

The region's comparative advantages and competitive goods and services provide opportunities for the forestry sector to maximize its contribution to regional and national development. The comparative advantages of region 2 include the following:

1. Vast areas of agricultural lands suited for crop production;

2. Presence of watersheds for irrigation, power generation & for domestic use;
3. Presence of waterfalls, lakes, rivers and other bodies of water which are potential for ecotourism;
4. Skilled furniture makers using wood as raw materials;
5. Extensive areas of closed and open forests, caves, biodiversity resources and other historical sites that are potential for ecotourism;
6. Natural grasslands and pasture lands that can be developed further for grazing purposes;
7. Established markets for various products such as wood furniture, coffee, cacao, agricultural crops, fuelwood and other non-timber products;
8. Investors in cacao & coffee production;
9. Potential areas for REDD+; and
10. Relatively high rainfall in Nueva Vizcaya and Quirino 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 cacao, coffee and fruits
4. Water production to support agricultural crop production such as rice, corn, garlic and vegetables
5. Furniture making
6. Cattle raising and
7. REDD+

The matrix of comparative advantages and competitive goods and services of region 2 as identified by DENR region 2 is attached as annex 1.

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

This section discusses the action plan of region 2 to support implementation of the MPCRFD considering the forestry challenges and the opportunities provided by the comparative advantages and competitive goods and services of the Cagayan Valley 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. Institutionalization of climate responsive governance where various stakeholders collaborate and participate in making decisions in the management of forest resources and ecosystems is also given focus in the action plan.

5.1 The Forestry Sector Vision

Region 2 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 likewise 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 2 under appropriate land management arrangements; and
4. To sustainably manage watersheds in partnership with stakeholders

5.2 Strategic Programs

Following the PMPCRFD, three major programs will be implemented to achieve the vision and goals of the forestry sector in the region, namely, program on strengthening resilience of forest ecosystems and communities to climate change hazards, program to meet increasing demands for forest goods and services and 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 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 potential pasture areas;
3. 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 coffee and cacao production;
6. Rehabilitation of selected mangrove areas; and
7. REDD + implementation

5.2.1 Strengthening 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 forest degradation, 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 58 LGUs into their comprehensive land use plans;
2. To protect 1,076,098 hectares of existing forests and plantations starting in 2016 gradually increasing to 1,154,293 hectares in 2028;
3. To rehabilitate 11,184 hectares of degraded protection forests through assisted natural regeneration and 626 hectares of mangroves in order to reduce risks to forest ecosystems and communities associated with climate change hazards;
4. To diversify livelihood of local communities by developing 6,467 hectares of agroforestry farms;
5. To complete the formulation of integrated watershed management plans for 35 watersheds; and
6. To implement REDD+ in 4 provinces

Strategic Activities

The activities that will be implemented to strengthen resilience of forest ecosystems and communities to climate change hazards include the following:

1. Formulation of forest land use plans (FLUP) for 58 LGUs and the integrated watershed management plans of 35 watersheds. These plans will be integrated into the LGUs' comprehensive land use plans so that land uses from ridge to reef are harmonized, eventually reducing the risks associated with landslide, flooding and other climate change related hazards. As part of the FLUPs, 26 LGUs will be assisted also in conducting vulnerability assessments.
2. Protection, conservation and rehabilitation of existing natural forests, established plantations, mangrove forests and other protection forests to enhance the protective values of forest so that they can continue to provide water and mitigate risks due to landslide, flooding and other climate related hazards. Biodiversity resources are also expected to be conserved and protected.
3. Agroforestry farm development in order to diversify livelihood sources of upland farmers, particularly in CBFMA and CADT areas. This activity reduces vulnerability of community livelihood by reducing risk of crop failures through multiple cropping in upland farms.

Coffee and cacao will be the primary crops because of the interests of some private investors and the availability of market.

4. Implementation of REDD+ in the provinces of Cagayan, Isabela, Nueva Vizcaya and Quirino. Aside from reducing carbon emission which contributes to climate change, this activity also enhances the ability of existing forests to provide ecosystem services to communities.

Program Targets

The regional targets to strengthen resilience of forest ecosystems and communities to climate related hazards are summarized in table 10.

Table 10. 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
A. Strengthening Resilience of Forest Ecosystems and Communities to Climate Change				
1. Vulnerability assessment of priority watersheds (no.)	0	26	0	26
2. Adaptation planning in priority watersheds (no)	0	1	1	2
3.Rehabilitation of degraded protection areas (ANR in hectares)	7,123	4,061	0	11,184
4. Protection of existing forests including mangroves (ha)	1,076,098	1,105,612	1,154,293	1,154,293
5. Mangrove rehabilitation (ha)	180	446	0	626
6. Agroforestry development	1,467	5,000	0	6,467
7. Formulation of integrated watershed management plans / PA plans (no.)	14	6	15	35
8. FLUP formulation (no. of LGUs)	16	24	18	58
9. REDD+ implementation (no of provinces)	0	4	0	4
10 Training on vulnerability assessment, adaptation planning, integrated pest management, IWM, FLUP (no. of training)	0	10	0	10

5.2.2 Responding to Increasing Demands for Forest Goods and Services

Considering the regional comparative advantages, and its competitive goods and services, the regional action plan will give more focus on addressing demands for fuelwood, water, biodiversity conservation, ecotourism and the need to reduce disaster risks. Grazing will be undertaken because of the existing pasture permit holders in the region. Production of

round wood will be supported also in Nueva Vizcaya and Quirino to support raw materials for furniture making.

Objectives

The specific objectives of this program are:

1. To demarcate on the ground the production, multiple use and protection zones in forestlands and protected areas;

2. To develop 40,100 hectares of commercial forest plantation as source of wood raw materials for furniture making;

3. To develop 20,000 hectares of fuel wood plantations;

4. To sustainably manage 17,895 hectares of grazing lands for meat and dairy production;

5. To protect, conserve and rehabilitate priority watersheds for irrigation, energy and domestic and industrial use. About 4,113 hectares of degraded watersheds will be rehabilitated; and

6. To develop forest parks, and green belts in 4 cities and urban centers of the region

Strategic Activities

The following activities will be implemented by DENR region 2 to respond to demands forest goods and services:

- Demarcate appropriate management zones (strict protection, multiple use and production zones) within forestlands and protected areas; About 1,714,695 hectares of forestlands is targeted for this activity which will rationalize the land uses in forestlands;
- Broker partnership between private investors/ processors and forest dependent communities in developing forest and agroforestry plantations. Priority areas for forest plantation development will be in Nueva Vizcaya and Quirino where rainfall is relatively higher compared to the other provinces; The mechanized nursery established in 2016 will be used to supply quality seedling for the wood plantation to be established. Gmelina and mahogany will be the main species to be planted as these are already being used by existing furniture industries;
- Agroforestry development using coffee and cacao as primary crops intercropped with other perennial and annual crops;
- Fuelwood plantation development in all provinces except Batanes. Fast growing species such as kakawate and ipil-ipil will be used because of their ability to coppice profusely.

- Manage the existing watersheds to support water requirements for irrigation, power generation and for domestic consumption.
- Manage natural grasslands in Batanes, Nueva Vizcaya, Cagayan and Isabela through improved grazing by planting improved forage to support more cattle per land area; and
- Urban forestry development by providing support to local government units in the establishment of tree parks and greenbelts in strategic areas.

Program targets

The programs and targets to meet demands for forest goods and services are summarized in table 11 as follows:

Table 11. Summary of Program Activities and Targets to Meet Demands for forest Goods and Services

Strategic Programs and Activities	Targets and Implementation Period			
	2016	2017 -2022	2023 -2028	Total
B. Responding to Demands for Forest Ecosystems Goods and Services				
1. Demarcation of forestland boundaries &forest management zones (ha./ kms.)	0	1,714,695	0	1,714,695
2. Development of seed production areas (no.of sites)	0	0	0	0
3. Establishment of mechanized nurseries (no.)	1	0	0	1
4. Commercial forest plantation development for round wood prodn. (ha)	0	7,600	32,500	40,100
5. Fuelwood/ bio energy plantation dev't (ha)	0	4,700	15,300	20,000
6. Management of grazing lands (ha)	14,082	17,895	17,895	17,895
7. Watershed rehabilitation				
Reforestation of degraded areas (ha)	1,000	3,113	0	4,113
Organization and capacitation of watershed management bodies , such as the watershed management council (no.)	0	4	0	4
Identification/ assessment of other watersheds (no.)	0	0	3	3
8a. Support to urban forestry in major cities and urban centers (LGUs assisted)	0	0	4	4

5.2.3 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 area.

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 institutionalize collaborative management of forest resources and improve the skills and capabilities of its personnel so that it can effectively implement programs on strengthening resilience to climate change hazards and respond to demands for forest ecosystems goods and services.

Objectives

1. Establish clear accountability in the management of forestlands;
2. Promote active participation of stakeholders in the management of forests and forestlands; and
3. Strengthen the capabilities of DENR in improving resilience of ecosystems and communities to climate change impacts in the forestry sector and respond to demands from multiple clients.

Strategic activities

1. Place at least 300,000 hectares of open access forest lands under appropriate management arrangement to promote tenure-focused accountability in the management of forestlands;
2. Institutionalize 5 collaborative management bodies in the provinces
3. Enhance the capabilities of LGUs and DENR field personnel in working with other stakeholders in forest resources management
4. Conduct regular performance monitoring of tenure holders.
5. Mainstream climate change concerns into the DENR's policy and institutional approaches

Program Targets

The specific activities and targets are summarized in table 12.

Table 12. 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				

Strategic Programs and Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
1. Tenure issuance in open access forestlands (ha)	0	200,000	200,000	400,000
2. Organization and capacitation of multi-sectoral collaborative management bodies (region and province)	0	5	0	5
3. Creation and operationalization of regional/ provincial/ community TWG on climate change (no.)	0	5	0	5
4. Capability enhancement for DENR/ LGUs (no. of trainings)	2	8	6	16
5. Performance assessment of tenure holders	1	6	6	13

5.2.4 Support programs

Cross cutting support activities will be undertaken 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 results based M & E, 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. Keep track of progress in the implementation of the PMPCRFD in region 2;
4. Identify sustainable sources of financing for implementing the forestry master plan ;
5. Provide research based information for forest management decision making, vulnerability assessment and climate change adaptation planning

Strategic Activities

1. Intensive information, education and communication campaign especially on climate change and its impacts on forest ecosystems and communities;
2. Upgrading of the regional forestry data base management system;
3. Regular monitoring and evaluation of DENR region 2 program implementation;

4. Document good practices in forest resource management and develop / publish corresponding IEC materials;
5. Conduct studies on payment for ecosystem services and assess other potential sources of sustainable financing for forest protection, rehabilitation and development; and
6. Conduct other studies towards enhancing resiliency of ecosystems and communities to climate change hazards.

Program Targets

The summary of activities and corresponding targets for the support program in region 2 is presented in table 13.

Table 13. Activities, Targets and Implementation Period for the Support Program in Reg. 2

Strategic Programs and Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
D. Other Support Programs				
1. Information, education and communication campaign (no.)	5	5	5	5
2. Upgrading of regional MIS facilities (no.)	6	6	6	6
3. Results based monitoring and evaluation (no.)	1	6	6	13
4. Documentation of good practices in forestland management	0	6	6	12
5. Publication of IEC materials	0	6	6	12
4. Assessment of sustainable sources of financing in forestry projects (No. of sites assessed)	0	2	2	4
5. Other forestry research (no. of studies)	0	10	10	20

VI. Plan Implementation

This regional action plan shall be submitted to the Regional Development Council of Region 2 for inclusion into the investment plan of the region. It will be implemented by DENR region 2 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.

References

Climate Change Commission. (2011). *National Framework Strategy on Climate Change 2010- 2022*. Malacanang, Manila.

FMB/DENR (2003). *Revised Master Plan for Forestry Development: Condensed Report*. Forest Management Bureau with Assistance from the FAO of UN. DENR, Visayas Avenue, Quezon City.

FMB/DENR. (2015). *2014 Philippine Forestry Statistics.* FMB, DENR, Quezon City.

FMB/DENR. (2004). *2003 Philippine Forestry Statistics*. FMB, DENR, Quezon City.

FMB/DENR. (2015). Philippine Master Plan for Climate Resilient Forestry Development, Draft. FMB, DENR, Quezon City.

Libosado, Carlos M.: "Domestic Tourism". Anvil Publishing, Inc. 2010. www.wikipedia.com www.googleimages.com Department of Tourism "It's more fun in the Philippines"

NCSO, (2015). Population by Region Census Years 2000, 2010 and 2015.

National Commission on Indigenous Peoples (NCIP). (2012). *Ancestral Domain Areas in the Philippines in Hectares*. Quezon City, Philippines.

National Economic Development Authority/Philippine Development Plan (NEDA/PDP). (2011). *Philippine Development Plan 2011-2016*. Pasig City: National Economic and Development Authority. Manila, Philippines.

PAGASA, 2011. Climate Trends and Projections. Diliman, Quezon City.

www.nnc.gov.ph/regional-offices/region-ii-cagayan-valley/62-region-2-profile/395-

ANNEXES

Annex 1. Comparative advantages and Competitive Goods and Services of Region 2

Comparative advantages	Fruits	Cattle	Fuelwood	Rice	round wood	wood furniture	water	ecotourism	fisheries	non timber products	cacao	coffee	REDD+
vast areas of ricelands				Cagayan, Isabela, Nueva Vizcaya, Quirino									
watersheds				Cagayan, Isabela, NV, Q.			Isabela,Nueva Vizcaya, Quirino						
grazing lands		Batanes, Cagayan, Isabela, NV											
more rainfall	Nueva Vizcaya, Quirino		Cagayan, Isabela,Nueva Vizcaya, Quirino		Isabela,Nueva Vizcaya, Quirino						Isabela,Nueva Vizcaya, Quirino	Cagayan, Isabela,Nueva Vizcaya, Quirino	
dams for irrigation and power				Cagayan, Isabela,Nueva Vizcaya, Quirino			Cagayan, Isabela,Nueva Vizcaya, Quirino						
Existing tree plantations					Cagayan, Isabela,Nueva Vizcaya, Quirino	Cagayan, Isabela,Nueva Vizcaya, Quirino							
fruit orchards	Nueva Vizcaya, Quirino												
established markets	,Nueva Vizcaya, Quirino	Cagayan, Isabela,Nueva Vizcaya, Quirino	Cagayan, Isabela,Nueva Vizcaya, Quirino	Cagayan, Isabela,Nueva Vizcaya, Quirino	Isabela,Nueva Vizcaya, Quirino	Cagayan, Isabela,Nueva Vizcaya, Quirino				All provinces	Isabela,Nueva Vizcaya, Quirino	Cagayan, Isabela,Nueva Vizcaya, Quirino	
skilled furniture makers						All provinces except Batanes							
Wood processing plants						Cagayan							
Natural forests								Cagayan, Isabela,Nueva Vizcaya, Quirino		Batanes, Cagayan, Isabela,Nueva Vizcaya, Quirino			Cagayan, Isabela,Nueva Vizcaya, Quirino
Protected areas								All provinces					
caves								Cagayan, Isabela,Nueva Vizcaya, Quirino					
beaches								Batanes, Isabela					
waterfalls								All provinces					
lakes and rivers								Cagayan, Isabela,Nueva Vizcaya, Quirino	Batanes, Cagayan, Isabela				
mangroves			Cagayan, Isabela						Cagayan, Isabela				
coffee/cacao investors											All provinces except Batanes	All provinces except Batanes	