

REGIONAL ACTION PLAN FOR IMPLEMENTING THE PHILIPPINE MASTER PLAN FOR CLIMATE RESILIENT FORESTRY DEVELOPMENT Region 1, Ilocos Region

I. Background and Rationale

In CY 2013, the Forest Management Bureau (FMB) decided to update the 2003 Revised Master Plan for Forestry Development (RMPFD). The updating was deemed necessary to take into account the potential impacts of climate change to the forestry sector. The updated forestry master plan, entitled Philippine Master Plan for Climate Resilient Forestry Development (PMPCRFD) has identified three strategic programs to ensure that the forestry sector can respond to varying demands for forest ecosystems goods and services from multiple clients while enhancing the resilience of forest ecosystems and communities to climate changes. 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 DENR region 1 to support implementation of the PMPCRFD.

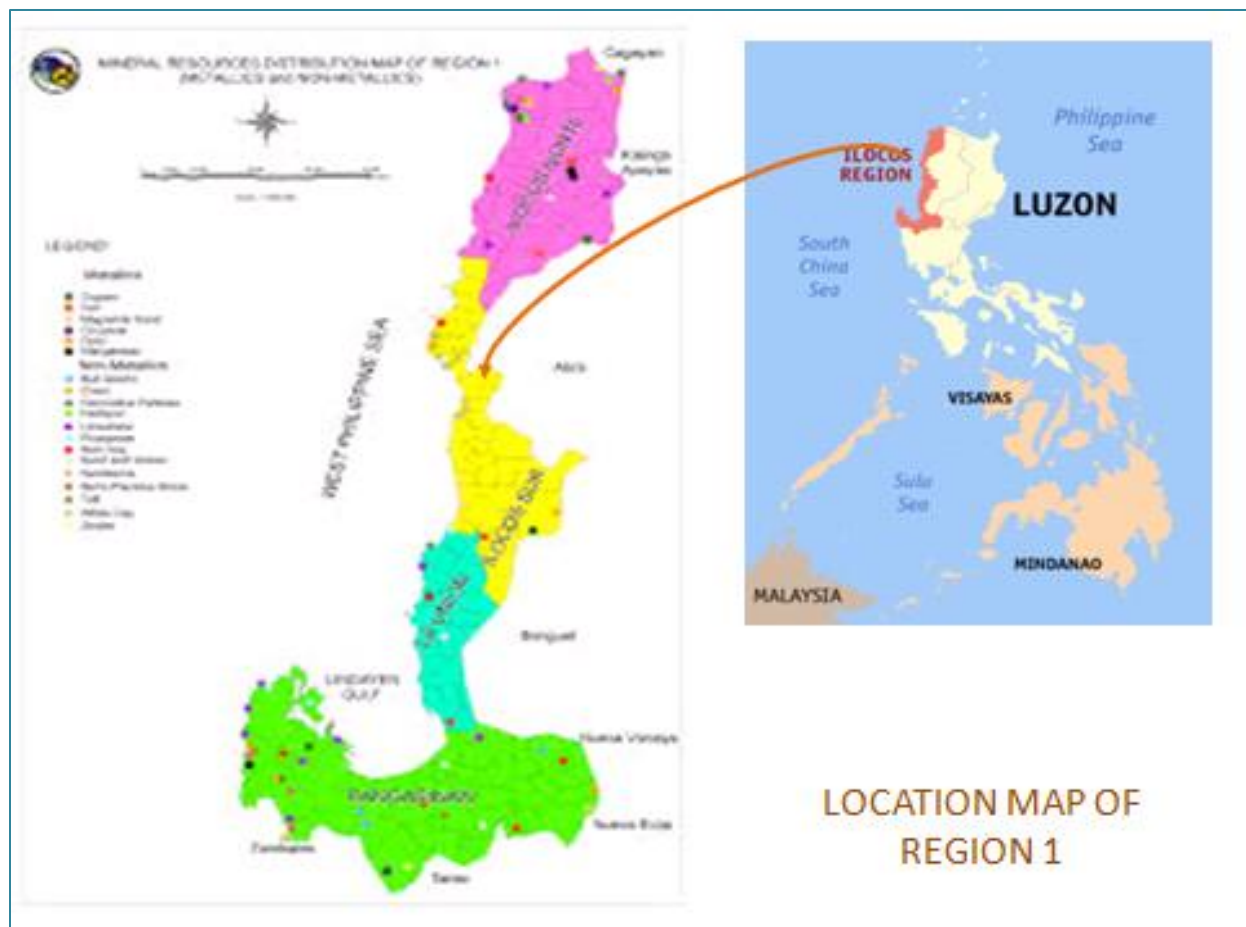
II. Regional Profile

2.1 Physical Profile

Region 1 is located in the north western section of Luzon island. It is bounded on the east, by Cagayan and the Cordillera Administrative Region; on the south, by Central Luzon; on the west, by the West Philippine Sea and on the north, by Bangui Bay (figure 1). The topography of the northern and western parts of both Ilocos Norte and Ilocos Sur are mountainous. Meanwhile, the western coast of the region is composed of narrow strip of plain between the mountainous portion of the region and the coastline from Ilocos to Pangasinan. The mountains and hills are close to the sea that a long strip of plain lands is available for farming purposes. Among the highest mountains in the region are: Mount Sicapoo (2,360m), Mount Malaya (2,352m), and Mount burnay (2, 115m).

The Ilocos region has a type I climate where there are two pronounced seasons: dry from November to April and wet during the rest of the year. The region has a long dry season because of the Cordillera mountains that block the wind from the Pacific Ocean. The temperature is cooler during the months of December up to February while the hottest months are April and May. Of all the regions in the country, Ilocos has the shortest period of rainy season, lasting for only four months from June to September.

Figure 1. Location Map of Region 1



2.2 Socio-Economic Profile

Region 1 is composed of four (4) provinces, namely, Ilocos Norte, Ilocos Sur, La Union and Pangasinan; nine (9) cities (Laoag and Batac in Ilocos Norte; Vigan and Candon in Ilocos Sur; San Fernando in La Union; and Urdaneta, Dagupan, San Carlos and Alaminos in Pangasinan); 116 municipalities and 3,245 barangays. San Fernando City is the Regional Capital.

Based on the 2015 national census of the Philippines the total population of region 1 is 5,026,128. Its population has been increasing since CY 2000 although its annual population growth rate has been lower than the national population growth rates between CY 2000 TO CY2015. Among the provinces of the region, Pangasinan has the largest population at 2,956,726 and the highest population growth rate of 1.28% between CY 2000 and CY 2015 (Table 1).

Table 1 Population and Population Growth Rates of Region 1, 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
ILOCOS NORTE	514,241	568,017	593,081	1.00	0.83	0.94
ILOCOS SUR	594,206	658,587	689,668	1.03	0.88	0.98
LA UNION	657,945	741,906	786,653	1.21	1.12	1.18
PANGASINAN	2,434,086	2,779,862	2,956,726	1.34	1.18	1.28
Total	4,200,478	4,748,372	5,026,128	1.23	1.09	1.18

Source: PSA, CY 2000, 2010, 2015

This Region has three (3) distinct ethnic groups: Ilocanos, Pangasinenses and Igorots. Ilocanos occupy the coastal provinces of Ilocos Norte, Ilocos Sur and La Union and certain parts of Pangasinan. The natives of Pangasinan are the Pangasinenses. There are also Tingguians who live in the secluded mountains of Ilocos Sur.

The major industries of the Ilocos region include crop production, fishing, mining, manufacturing and cottage industries. It is a leading producer of tobacco and mangos, including rice, corn, vegetables and root crops. The Ilocos region is also rich in natural resources such as limestone for cement, feldspar for ceramics, fruits, vegetables, fish, poultry, and forest products such as bamboo and rattan. Other mineral resources include copper, gold, chromite, iron, manganese and silica. This region is known because of its longest coastlines. Region I is a well developed region with 99% of the cities, municipalities and barangays having access to electricity and telecommunications. This region is also an energy provider where two new large power plants will be built.

2.3 Resources

Land Resources

Region 1 has a total land area of about 1,284,019 hectares. Almost two thirds of its land is classified as alienable and disposable (A &D) lands which can be used for agriculture, residential and other commercial purposes. Only 36.8% or 473,097 hectares are forestlands (table 2). As

such most of the lands in the region are suited for agricultural production, such as rice, garlic,

Land Classification	Area (ha)	%
Forestlands	473,097	36.8%
Classified Forestlands	442,826	34.5%
Established Timberlands	201,164	15.7%
Forest Reserves, National Park/ Prot. Areas & Other Reservations	241,662	18.8%
Unclassified forestlands	30,271	2.3%
Alienable and disposable lands	810,922	63.2%
Total	1,284,019	

tobacco and other root crops.

Table 2. Land Classification in Region 1, Ilocos Region

Source: Philippine Forestry Statistics, 2014

Forest Resources

Of the total land area of region 1, only close to 10% or 124,477 hectares remain forested as of CY 2010. Most of its land (73%) are generally cultivated (468,543 hectares) or covered with wooded grasslands and shrubs (468,511 hectares). The remaining areas consist of natural grasslands, barren lands, built up areas and fishponds.

Majority of the forested areas are located in Ilocos Norte (67,849 hectares) followed by Ilocos Sur (32,012 hectares) and Pangasinan (18,736 hectares). La Union has the least forested area, estimated at 5,880 hectares or 0.4% of the total land area of region 1. Most of the forests of the region are categorized as open forests covering a total area of 105,060 hectares. This forest type is generally located in Ilocos Norte and Ilocos Sur. Close forests also exist with an area of 18,390 hectares situated mostly in Ilocos Norte. Mangrove forest, with an area of 1,028 hectares is also found in Ilocos Sur, La Union and Pangasinan. The forest cover of region 1 is summarized in table 3.

Table 3. Forest Cover of Region 1, CY 2010

Province	Land Area	Total Forest	Close Forest	Open Forest	Mangrove	% forested in relation to CAR area
Ilocos Norte	339,934	67,849	14,266	53,583	0	5.3%
Ilocos Sur	257,958	32,012	78	31,723	211	2.5%

Province	Land Area	Total Forest	Close Forest	Open Forest	Mangrove	% forested in relation to CAR area
La Union	149,309	5,880	0	5,760	120	0.4%
Pangasinan	536,818	18,736	4,046	13,993	697	1.5%
Total Region 1	1,284,019	124,477	18,390	105,060	1,028	9.7%
% of Region	100%	9.7%	1.4%	8.2%	0.1%	

Source: 2010 NAMRIA Land Cover Map

The forest cover change in region 1 from 2003 to 2010 is summarized in table 4. As presented in the table, there is a net loss in forest cover of about 65,324 hectares in the Ilocos region within the 7 year period. This means that the region was losing 9,300 hectares of forest every year. If current conditions continue and no significant intervention is implemented, all the forests of region 1 would be lost in less than 14 years.

Most of the forest loss both in terms of close forest and open forest occurred in Ilocos Norte where the net loss was 54,576 hectares. A smaller loss in forest cover of 17,797 hectares (both close and open forest) was also recorded in Pangasinan while a net forest gain was observed in Ilocos Sur and La Union. However, in Ilocos Sur close forest also declined. A net gain in mangrove forest was recorded in Ilocos Sur, La Union and Pangasinan.

It is apparent from table 4 that Ilocos Norte is the most critical province in region 1 in terms of forest destruction. It is losing both its closed and open forests at an average rate of 7,796 hectares per year. If this trend continues, the province will completely loss its forest resources in about nine years.

Table 4. Forest Cover Change in Region 1, CY 2003-2010

Province	Closed Forest			Open Forest*			Mangrove*			
	2010	2003	Change	2010	2003	Change	2010	2003	Change	Net change
Ilocos Norte	14,266	31780	(17,514)	53,583	90645	(37,062)	0	0	0	(54,576)
Ilocos Sur	78	682	(604)	31,723	26306	5,417	211	0	211	5,024
La Union	0	0	-	5,760	3855	1,905	120	0	120	2,025
Pangasinan	4,046	5261	(1,215)	13,993	31121	(17,128)	697	151	546	(17,797)
Total Region	18,390	37,723	19,333)	105,059	151,927	(46,868)	1,028	151	877	(65,324)

*Include plantations

Source: NAMRIA Land Cover Map 2003 and 2010

Water Resources

Region I is drained by 29 river systems, aside from small mountain streams that sometimes swell up to three times their sizes during the rainy season. These rivers are valuable source of irrigation water for agricultural farms and for domestic use. The major rivers that drain the

Ilocos region are Laoag, Abra, Amburayan, Agno, Alaminos, and Balincaguin Rivers. The Agno River basin, with an area of 5,952 sq. km., and the third largest river in Luzon, covers the Pangasinan plain and extends up to the mountainous areas of Mountain Province and Benguet. It drains into the Lingayen Gulf. The Amburayan River basin is also one of the biggest covering about 1,386 sq. km. in some parts of Ilocos Sur, La Union and Benguet. Laoag River basin covers an area of 1,319 sq. km.

The region also has extensive coastlines and seacoasts with an estimated length of 708.165 kilometers. These coastal resources are important component of the ecotourism industry of the Ilocos region. Lingayen gulf is the most notable water body in the region containing several islands including the Hundred Islands National Park.

Watershed forest reserves have also been declared in the region as summarized in table 5.

Table 5. Proclaimed Watershed Forest Reserves in Region 1

Name of Watershed Forest Reserve	Provinces Covered	Area (ha)	Proc. No.
Ambayawan River Forest Reserve	Pangasinan	33,688	573
Ilocos Norte Metropolitan Forest Reserve	Pasquin, Ilocos Norte	2185	731 amended by 218
Manuang Watershed Forest Reserve	Batac, Ilocos Norte	152	220
Tanap Watershed Forest Reserve	Burgos, Ilocos Norte	41	803
Bigbiga Spring Watershed Forest Reserve	Narvacan, Ilocos Sur	135	431
Libunao Spring Watershed Forest Reserve	Sinait, Ilocos Sur	47	410
Lidlidda Watershed Forest Reserve	Lidlidda, Ilocos Sur	1228	79
Santa Watershed Forest Reserve	Santa, Ilocos Sur	25	844
Sta. Lucia Watershed Forest Reserve	Sta. Lucia, Ilocos Sur	174	333
Lon-oy Watershed Forest Reserve	San Gabriel, Santol, La Union	1460	378
Naguilian Watershed Reservation	Naguilian, La Union	90	52

Source: Philippine Forestry Statistics, 2014

Nature Based Tourism Areas

Tourism industry in the region takes advantage of its coastal beaches, waterfalls, forest resources and historical sites. Among its tourism resources are its islands, caves, waterfalls, springs and beaches. The Hundred Islands National Park, composed of 1,844 hectares of islands and islets scattered off the coast of Lucap in Alaminos, Pangasinan is a major tourist destination in the region. Santiago Island, located at the northeast coast of Bolinao, is a diver's paradise because its corals and reefs are swarming with marine life.

There are fine sands stretching along the beaches of Bauang, La Union and the rest of the region. Opportunities to engage in other water sports and activities abound. Cape Bolinao Beach, located in Barangay Patar, Bolinao, Pangasinan is very perfect for board surfing. In the vicinity also is a freshwater source believed to be an outlet of an underground river. The Tambobong White Beach, with its expanse of white sand beach is frequented by scuba divers for its diverse marine life. In addition, the Bangui-Pagudpud Beach, in these two municipalities is earmarked for development as tourism estates.

Other tourism sites in the region include the following:

- Cacupangan and Villacorta Caves which features huge basin-like formations, pools, waterfalls, terraced rock, palace-like chamber and gypsum flowers;
- Antong Falls, located on a mountainside overlooking lush sceneries of forest cover and rice fields, which is an ideal place for picnics and outdoor recreation;
- Paoay Lake National Park, declared as a National Park under Republic Act 5631 on June 21, 1969, has been developed into a sports complex and
- Mount Balungao, located about 5 kilometers southeast of the Balungao town proper, which is primarily visited for its hot springs believed to have medicinal benefits.

Biodiversity resources

Comprehensive inventory of biodiversity resources in the Ilocos region has not been undertaken. However, protected areas had been established which serve as habitat of various terrestrial and marine species. These protected areas (table 6) are also important in terms of water production, ecotourism and its historical values.

Table 6. List of Protected Areas in Region 1.

Name of Protected Area	Location	Legislation	Date	Area (ha)	
				PA	BZ
TOTAL (15)				24,926.80	3,465.52
A. National Parks (3)	Location	Legislation	Date	3,500.00	
1. Paoay Lake NP*	Paoay, Ilocos Norte	P.D. 1554 R.A. 5631	6/11/1978 6/21/1969	340.00	
2. Northern Luzon Heroes Hill NP*	Santa and Narvacan, Ilocos Sur	Proc.132	7/9/1963	1,316.00	
3. Hundred Island NP***	Alaminos, Pangasinan	Proc. 667	7/18/1940	1,844.00	

		P.D. 189 P.D. 1816 P.D. 2183	5/11/1973 1/30/1979 4/27/1982		
B. Watershed Forest Reserves (4)	Location	Legislation	Date	2,971.00	
1. Ilocos Norte Metro WFR*	Pasuquin, Ilocos Norte	Proc. 731	9/7/1934	2,815.00	
2. Santa WFR*	Santa, Ilocos Sur	Proc. 844	9/26/1935	25.00	
3. Naguilian Watershed Reservation*	Naguilian, La Union	Proc. 52	4/11/1936	90.00	
4. Tanap WFR*	Burgos, Ilocos Norte	Proc. 803	2/1/1971	41.00	
C. Natural Monument/Landmark (1)	Location	Legislation	Date	693.32	427.79
1. Bessang Pass Natural Monument/ Landmark**	Cervantes, Ilocos Sur	Proc. 284	4/23/2000	693.32	427.79
D. Protected Landscape(5)	Location	Legislation	Date	3,449.19	965.09
1. Manleluag Spring Protected Landscape**	Brgy. Malabobo, Mangatarem, Pangasinan	Proc. 576	3/10/2004	1,935.17	965.09
2. Libunao Protected Landscape**	Sinait, Ilocos Sur.	Proc. 280	4/23/2000	46.70	
3. Bigbiga Protected Landscape**	Narvacan, Ilocos Sur	Proc. 290	4/23/2000	135.71	
4. Sta. Lucia Protected Landscape**	Balidbed, Salcedo, Ilocos Sur	Proc. 296	4/23/2000	174.16	
5. Lidlidda Protected Landscape**	Lidlidda, Banayoyo, Ilocos Sur	Proc. 266	4/23/2000	1,157.44	
E. Protected Landscape and Seascape (1)	Location	Legislation	Date	10,513.30	135.64
1. Agoo Protected Landscape and Seascape**	Agoo, Sto. Tomas and Rosario, La Union	Proc. 277	4/23/2000	10,513.30	135.64
F. Natural Park (1)	Location	Legislation	Date	3,800.00	1,937.00

1. Kalbario-Patapat Natural Park**	Pagudpud and Adams, Ilocos Norte	Proc. 1275	4/20/2007	3,800.00	1,937.00
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Source: Philippine Forestry Statistics, 2014

2.4 Vulnerability to Climate Related Hazards

Studies by PAGASA (2011) indicate that climate change will intensify in the coming years. Projections indicate that there will be lesser rains during summer when water is urgently needed for agriculture and domestic use but there will be more rains during the wet season. Table 7 presents the projected change in temperature and seasonal mean rainfall in region 1 based on medium-range emission scenario. Accordingly, there will be a projected decrease in rainfall of up to 31.3% during summer in 2050 while rainfall can increase up to 72.5% during the wet season.

The expected increase in rainfall during the rainy season may intensify the occurrence of landslides in the Ilocos region and put at risk the lives and properties of local populations. As indicated in table 8, region 1 ranks fourth among the regions in the Philippines in terms of vulnerability to landslide with about 280,704 hectares at risk to landslide hazards. A World Bank study also indicates that typhoon risk is very high in Ilocos Sur, La Union and Pangasinan while Ilocos Norte is highly at risk to typhoon. Thus, with its high exposure to flooding, the province of Pangasinan will be highly at risk to this hazard.

Table 7. Projected Change in Temperature (°C) and Seasonal Mean Rainfall (in %) in Reg. 1

Provinces	Observed Baseline (1971-2000)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
<i>A. Projected change in temperature (°C)</i>								
Ilocos Norte	25.3	28.1	28.3	27.4	2.1	2.2	1.7	1.8
Ilocos Sur	23.1	25.7	25.4	24.8	2.0	2.1	1.6	1.8
La Union	20.5	22.9	22.8	22.2	2.0	2.1	1.6	1.8
Pangasinan	25.0	27.4	26.9	26.4	2.2	2.2	1.8	2.0
<i>Projected change in seasonal mean rainfall (%)</i>								
Ilocos Norte	49.8	185.5	1106.4	595.4	-18.8	-31.3	20.9	4.7
Ilocos Sur	17.5	288.8	1575.4	672.9	-0.1	-27.6	58.1	33.3
La Union	14.7	395.6	1852.3	837.8	-1.1	-24.6	72.5	39

Provinces	Observed Baseline (1971-2000)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Pangasinan	19.4	298	1608.9	707.8	1.1	-11.2	22.9	11.9

Source: PAGASA, CY 2011

Table 8. 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

2.5 Institutional Collaboration in Resource Management

Various multi-sectoral bodies involved in forest resources management had been organized in the Ilocos region, indicating that some form of institutional collaboration exist in the area. These institutional bodies include the Multi Sectoral Forest Protection Committee, Protected Area Management Board and the Anti Illegal Logging Task Force. Most of these bodies are involved in forest protection work and include the local government units as major partners. However, in most cases LGUs lack technical capability and financial resources to manage and implement devolved forestry programs. They 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.

III. Development Challenges in the Forestry Sector of Region 1

The most pressing forestry concern in region 1 is the fast decline in its forest cover. With an average forest loss of about 9,332 hectares per year, its forest cover may be gone in less than 14 years. This situation has serious implications in biodiversity conservation, especially since significant areas of closed forest are also being destroyed. Existing statistics of the DENR indicate that around 2,762 hectares of closed forests are being lost every year in the region particularly in Ilocos Norte and Pangasinan. This means that on the average, about 8 hectares of closed forest is being lost every day in these two provinces. Forest destruction in the region has been attributed to illegal cutting due to the increasing demand for round wood and fuelwood.

The loss of forest cover will impact not only on biodiversity resources, but also on the ability of forest resources to provide other ecosystem services to its expanding population. Degradation of watersheds is already affecting agricultural production due to limited irrigation water during the dry season. The province of Pangasinan will be most affected since it has been identified as one of the water stressed provinces in the Philippines. Ecotourism and fisheries could also suffer if water quality of coastal areas, rivers and waterfalls deteriorate as a result of increased siltation and sedimentation. These will ultimately affect the economy of the region as most of the local population are dependent on agriculture and fisheries for livelihood.

In addition, forest destruction would aggravate risks to lives and properties due to climate related hazards, particularly flooding and landslide. Pangasinan will be greatly affected by flooding while Ilocos Norte is most vulnerable to Landslide. Unfortunately, many LGUs and majority of the population are not prepared to respond to hazards and communities are not organized for disaster risk reduction. Thus, appropriate adaptation measures should be put in place to mitigate the impacts of climate related hazards.

In summary, the forestry sector in the region faces the following challenges:

1. Ensuring the protection of existing forests
2. Protection and rehabilitation of watersheds to ensure adequate supply of water for irrigation, domestic use and power generation
3. Meeting the increasing demands for round wood and fuel wood

4. Reducing the impacts of climate change hazards such as flooding, landslide, and storm surge
5. Preventing further conversion of forestlands into other unsustainable land uses and
6. Strengthening stakeholders' collaboration in the management of forest resources

IV. Regional Comparative Advantages and Competitive Goods and Services

The region's comparative advantages and competitive goods and services provide opportunities for the forestry sector to be able to contribute to the development of region 1. The comparative advantages of Ilocos region include the following:

1. Vast areas of alienable and disposable lands which can be developed for agriculture
2. Extensive marine resources that support fisheries
3. Long beaches that provide attraction to tourists
4. Existence of dams, windmill and other resources that generate power
5. Presence of waterfalls, lakes, rivers and other bodies of water which are tapped for ecotourism
6. Skilled furniture makers using wood and bamboo as raw materials
7. Established markets and favorable climate for various products like tobacco, garlic, mango, etc.
8. Improved infrastructures that facilitate transport of tourists and products and
9. The existence of closed forests, caves, mangroves, biodiversity resources and other historical sites that are potential for ecotourism

Following these comparative advantages, region 1 has competitive goods and services which can be developed further to improve the economy of Ilocos region. The following are the region's competitive goods and services which the forestry sector can also support through its regional action plan for PMPCRFD implementation.

1. Ecotourism
2. Power generation
3. Agroforestry products such as mango fruits
4. Tobacco products
5. Agricultural crop production such as rice, garlic and vegetables
6. Bangus production and
7. Furniture making

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

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*

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 the Ilocos region under appropriate land management arrangements
4. To sustainably manage watersheds in partnership with stakeholders

5.2 Strategic Programs

Considering the assessment in the previous sections, the regional comparative advantages and the region's competitive goods and services, forest resources management in the Ilocos region will focus on the following:

1. Protection and conservation of existing forests to enhance ecosystem services, such as water production, hazard mitigation and ecotourism;
2. Fuelwood production to support tobacco curing and household demands;
3. Agroforestry development for the production of mango, bamboo and other crops and
4. Rehabilitation of degraded watersheds and protection forests.

Apart from these focal programs, the existing pasture areas will be maintained for meat production. Limited plantations for round wood will be developed also to provide long term source of raw materials for the wood based furniture making in La Union and Pangasinan. Likewise, multi-sectoral governance will be institutionalized to promote collaboration among stakeholders in forest management. Following the PMPCRFD, these interventions are grouped under three major programs, 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 are also identified to facilitate implementation of the major programs.

5.2.1 Strengthening Resilience of Forest Ecosystems and Communities to Climate Change Hazards

The forest resources of region 1 are threatened by unregulated fuelwood gathering and conversion due to competing demands from various users. Climate change is expected to aggravate these threats leading to more forest destruction.

The Ilocos region is highly exposed to typhoons. With more rains projected during the rainy season, landslide is likely to aggravate in many areas of the region. The coastal areas are also vulnerable to tsunami, storm surge and sea level rise while the province of Pangasinan will be increasingly threatened by flooding and water shortage. As climate change intensifies, damages from these hazards 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 resource uses within watersheds and forest ecosystems by integrating the forest land use plans of 72 LGUs into their comprehensive land use plans;
2. To rehabilitate 2,249 hectares of degraded protection forests through assisted natural regeneration and 490 hectares of mangroves in order to reduce risks to forest ecosystems and communities associated with climate change hazards;
3. To protect 221,397 hectares of existing forests and plantations;
4. To diversify livelihood of local communities by developing 6,000 hectares of agroforestry farms;
5. To reduce soil erosion by establishing soil and water conservation measures in at least 111,000 sq. meters of upland farms/ river banks; and
6. To complete the formulation of integrated watershed management plans for 22 additional watersheds

Strategic Activities

To achieve the identified objectives, DENR – Region 1 will implement the following activities:

1. Formulate the forest land use plans of 72 LGUs and the integrated watershed management plans of 22 additional watersheds. These plans will be integrated into the LGUs' comprehensive land use plans so that land uses from ridge to reef are harmonized. The harmonized plan will eventually reduce the risks associated with landslide, flooding and other climate change related hazards.
2. Protect, conserve and rehabilitate existing natural forests, established plantations, mangrove forests and other protection forests. These activities are directed towards enhancing the protective values of forest resources so that existing forests 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. Diversify livelihood sources of upland farmers, particularly the CBFMA and CADT holders through multi storey agroforestry. This activity reduces vulnerability to crop failures by

integrating multiple crops in upland farms. The implementation of this activity will be in partnership with private investors and forest products processor.

4. Implement vegetative soil and water conservation measures in upland farming systems and in protecting river banks. This approach will contribute to minimizing soil erosion and sedimentation which aggravate flooding in downstream communities.

Program Targets

The regional targets to strengthen resilience of forest ecosystems and communities to climate related hazards are summarized in table 9.

Table 9. Summary of Activities for Strengthening Resilience to Climate Change Hazards, Corresponding Targets and Period of Implementation

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. Watershed characterization		22	0	22
2. Formulation of integrated watershed management plans / PA plans (no.)	0	18	4	22
3. Management & rehabilitation of protection forests (ha)	1,249	1,000	0	2,249
4. Protection of existing forests including mangroves (ha)	169,882	200,383	221,397	221,397
5. Mangrove rehabilitation (ha)	0	490	0	490
6. Establishment of vegetative soil and water conservation measures (sq. m)	0	73,500	37,500	111,000
7. Agroforestry development (mixed)	1,000	5,000	0	6,000
8. FLUP formulation (no. of LGUs)	2	70	0	72
9. REDD+ implementation (no of provinces)	0	0	0	0
10. Training on vulnerability assessment, adaptation planning, integrated pest management, IWM, FLUP (no. of training)	0	15	0	15

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, ecotourism and the need to reduce disaster risks. The activities for reducing disaster risks and biodiversity conservation were already discussed in the first program, hence this section will deal more on the demands for fuelwood, water and ecotourism. Grazing and

round wood production will be undertaken also because of the existing pasture permit holders in the region. Limited production of round wood will be supported also in appropriate areas to address some of the local demand for wood raw materials by furniture makers.

Objectives

The specific objectives of this program are:

1. To demarcate on the ground 473,097 hectares of forestlands for production and protection purposes
2. To develop 3,500 hectares of commercial forest plantation for round wood production;
3. To develop 40,000 hectares of fuel wood/ bio energy plantations;
4. To sustainably manage 1,441 hectares of grazing lands for meat and dairy production;
5. To establish 10,600 sq. meters of structural soil and water conservation measures in erosion prone areas; and
6. To rehabilitate 2,000 hectares of degraded watersheds

Strategic Activities

DENR region 1 will implement the following strategic activities to attain the objectives of this program.

1. Demarcation of production and protection forests. This activity will identify on the ground areas where production activities, such as fuelwood and round wood production areas, may be undertaken those areas where conservation activities will be implemented
2. Development of commercial plantations for fuelwood and round wood. This will address the demand for fuelwood in tobacco curing and for furniture making, apart from responding to household demand for wood. DENR will assist upland farmers in forging partnership with private investors to ensure market for the wood products. To ensure quality plantations, seed production areas will be developed in appropriate locations.
3. Sustained management of existing grazing lands to ensure meat and dairy production. Existing permit holders will be assisted to adopt improved grazing through the introduction of appropriate practices in silvopasture.
4. Rehabilitation of degraded watersheds. This will ensure continuous supply of water for irrigation, power generation and for domestic use. Reforestation and structural measures will be implemented to minimize soil erosion and conserve water resources. This activity will support fisheries and ecotourism by preventing/ minimizing soil erosion and sediment load

in river systems that eventually flow into the coastal areas. To strengthen the management of watersheds, watershed management councils will be organized in areas where this has not been formed. Capability enhancement training will undertaken also among members of the council to equip them better in the management of important watersheds.

Program targets

The regional targets to address demands for forest goods and services in region 1 are summarized in table 10.

Table 10. Summary of programs, targets and their locations 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.)	0	473,097	0	473,097
2. Development of seed production areas (no.of sites)	0	7	1	8
3. Establishment of mechanized nurseries (no.)	0	0	0	0
4. Commercial forest plantation development for round wood prodn. (ha)	0	0	3,500	3,500
5. Fuelwood/ bio energy plantation dev't (ha)	2,538	22,238	15,224	40,000
6. Management of grazing lands (ha)	1,441	1,441	1,441	1,441
7. Watershed rehabilitation				
Reforestation of degraded areas (ha)	500	1,500	0	2,000
Structural measures and instrumentation (cu. meters)	0	5,300	5,300	10,600
Organization and capacitation of watershed management bodies , such as the watershed management council (no.)	5	7	0	12

5.2.3 Program on Institutionalizing Responsive Governance in Forestry

Due to overlapping institutional mandates, overlapping tenure and the different demands for forest ecosystems goods and services from multiple clients, it is necessary to institutionalize collaborative management of forests and forestlands. Thus, the forestry sector in the region will initiate the formation of multi sectoral collaborative management bodies which will provide oversight support in forest management. These bodies will be organized at the regional and provincial level as venue for resolving local issues in forest management.

Objectives

1. 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 to develop strategies to enhance resilience of forest ecosystems and communities to climate change and respond to demands from multiple clients.

Strategic activities

1. Tenure issuance in open access forestlands. This is to promote tenure-focused accountability in the management of forestlands with the DENR providing policy support and standards to ensure performance of tenure holders. Part of this strategy is to complete census/inventory of forest occupants in forestlands;
2. Organize and capacitate multi sectoral management bodies in the provinces and municipal/city LGUs;
3. Enhance the capabilities of LGUs and DENR field personnel in working with other stakeholders in forest resources management and in mainstreaming climate change concerns into the DENR's policy and institutional approaches; and
4. Conduct regular performance monitoring of tenure holders and annual assessment of DENR program implementation.

Program targets

The specific targets in institutionalizing responsive governance in forest management are summarized in table 11, below.

Table 11. Summary of Program Targets in Promoting Responsive Governance in Region 1

Strategic Programs and Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
C. Promoting Responsive Governance				
1.Inventory of forest occupants (No.)	0	30,941	0	30,941
2. Tenure issuance in open access forestlands (ha)	0	50,000	100,000	150,000
3. Organization and capacitation of multi-sectoral collaborative management bodies (region and province)	0	12	3	15
4. Capability enhancement for DENR/ LGUs (no. of trainings)	2	8	6	16
5. Performance monitoring of tenure holders (No.)	60	318	221	599
6. Annual assessment of DENR program implementation	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 results based M & E, 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. Keep track of progress in the implementation of the Philippine forestry master plan
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. Conduct intensive information, education and communication campaign to LGUs and local communities, especially on climate change and its impacts on forest ecosystems and communities;
2. Document good practices in forest resource management and develop / publish corresponding IEC materials;
3. Upgrade the regional and provincial forestry data base management system;
4. Identify and assess potential sources of sustainable financing for forest protection, rehabilitation and development; and
5. Conduct forestry researches / impact assessments of forestry programs and projects

Program targets

The targets for the support program activities are summarized in table 12.

Table 12. Activities, Targets and Implementation Period for the Support Program

Strategic Programs and Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
D. Other Support Programs				
1. Information, education and communication campaign (Provinces & region)	5	5	5	5
2. Documentation of good practices	0	8	8	16
3. Publications (No.)	5	10	10	20
3. Upgrading of regional / Provincial MIS facilities (no.)	5	5	5	5
4. Assessment of sustainable sources of financing in forestry projects (No. of sites assessed)	0	1	2	3
5. Additional support to forestry research (no. of studies)	1	23	26	50

5.3 Plan Implementation

This regional action plan shall be implemented by DENR region1 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. Private sector will be encouraged to partner with upland farmers / peoples' organizations in the development of commercial forest plantations and fuelwood plantations. Fund sourcing will be undertaken also 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. Comparative Advantages and Competitive Goods and Services of Region 1

Comparative Advantages	COMPETITIVE GOODS AND SERVICES											
	Fisheries (Bangus)	Mango Prodn	Wooden Furnitures	Bamboo Furnitures	Ecotourism	Water Supply	Power Supply	Salt Production	Rice, garlic, vegetable, Onion	Tobacco	Mineral Production	Cement Prodn
Vast A&D lands		Pangasinan						Pangasinan	Pangasinan	Ilocos Sur		
Watersheds						Region 1						
Marine resources	Pangasinan, La Union											
Existence of Dams							Pangasinan					
Quarry Deposits											Ilocos Norte, Pangasinan	La Union, Pangasinan
Religious Sites					Region 1							
Historical Sites					Ilocos Sur							
Windmills					Ilocos Norte		Ilocos Norte					
Solar Panels					Ilocos Norte		Ilocos Norte					
Diptercocarp virgin forest					Ilocos Norte							
Biodiversity					Ilocos Norte							
Tourism Facilities					Region 1							
fruit orchards		Region 1										
established markets	Dagupan	San Carlos					Ilocos Norte		Urdaneta	Region 1		
skilled furniture makers			La Union, Pangasinan									

	COMPETITIVE GOODS AND SERVICES											
Comparative Advantages	Fisheries (Bangus)	Mango Prodn	Wooden Furnitures	Bamboo Furnitures	Ecotourism	Water Supply	Power Supply	Salt Production	Rice, garlic, vegetable, Onion	Tobacco	Mineral Production	Cement Prodn
Beaches					La Union, Pangasinan							
Sand Dunes					Ilocos Norte							
Protected Areas					Ilocos Sur							
caves					Pangasinan							
waterfalls					Region 1	Region 1						
lakes & rivers	Region 1				Region 1	Region 1	Pangasinan					
mangroves					Pangasinan							
sea/ Airports												
Roads	Region 1	Region 1	Region 1	Region 1	Region 1		Region 1	Region 1	Region 1	Region 1	Region 1	Region 1
Ground water	Region 1	Region 1			Region 1				Region 1	Region 1		
Favorable climate		Region wide							Region wide	Region wide		