

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

Cordillera Administrative Region

DENR – Cordillera Administrative Region

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## **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. The Master Plan contained 15 major programs under 3 umbrella programs, namely: a) man and the environment; b) forest management and products development; and c) institutional development.

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. 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. Hence, a Philippine master plan for climate resilient forestry development (PMPCRFD) was formulated where three strategic programs were identified to ensure that the forestry sector can respond to varying demands for forest ecosystems goods and services from multiple clients. The three major programs are:

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

This plan outlines the Cordillera Administrative Region's action plan to support implementation of the PMPCRFD. It supports the regional development plan of the Cordillera Administrative Region (CAR)

## **II. Regional Profile**

### **2.1 Physical Profile**

The Cordillera Administrative Region (CAR) is the only land-locked region in the Philippines. It is located in the mountain ranges of the north central part of Luzon and is composed of six provinces, namely, Apayao, Kalinga, Abra, Mountain Province, Ifugao and Benguet. It is bounded on the North by Cagayan; on the East by Isabela and Nueva Viscaya; on the South by Pangasinan and on the West by La Union, Ilocos Sur and Ilocos Norte (Figure 1)

The region is predominantly characterized by steep, mountainous and high elevation terrain. It has over a hundred peaks, ten of which are among the highest in the country. About 33% of the region's land lies more than 1,000 meters above sea level which is predominant in the provinces of Benguet and Mt. Province. This generally gives the cool temperate climate of these provinces. Table 1 shows the slope classification in the region with its corresponding area. As presented in the table, close to two thirds of the area in the region has a slope of more than 50%. Soils of the region are characterized by light medium and heavy soils. Soils used for rice production include the San Manuel Silt Loan, Uminga clay and Toran clay.

Figure 1. Relative Location of the Cordillera Administrative Region

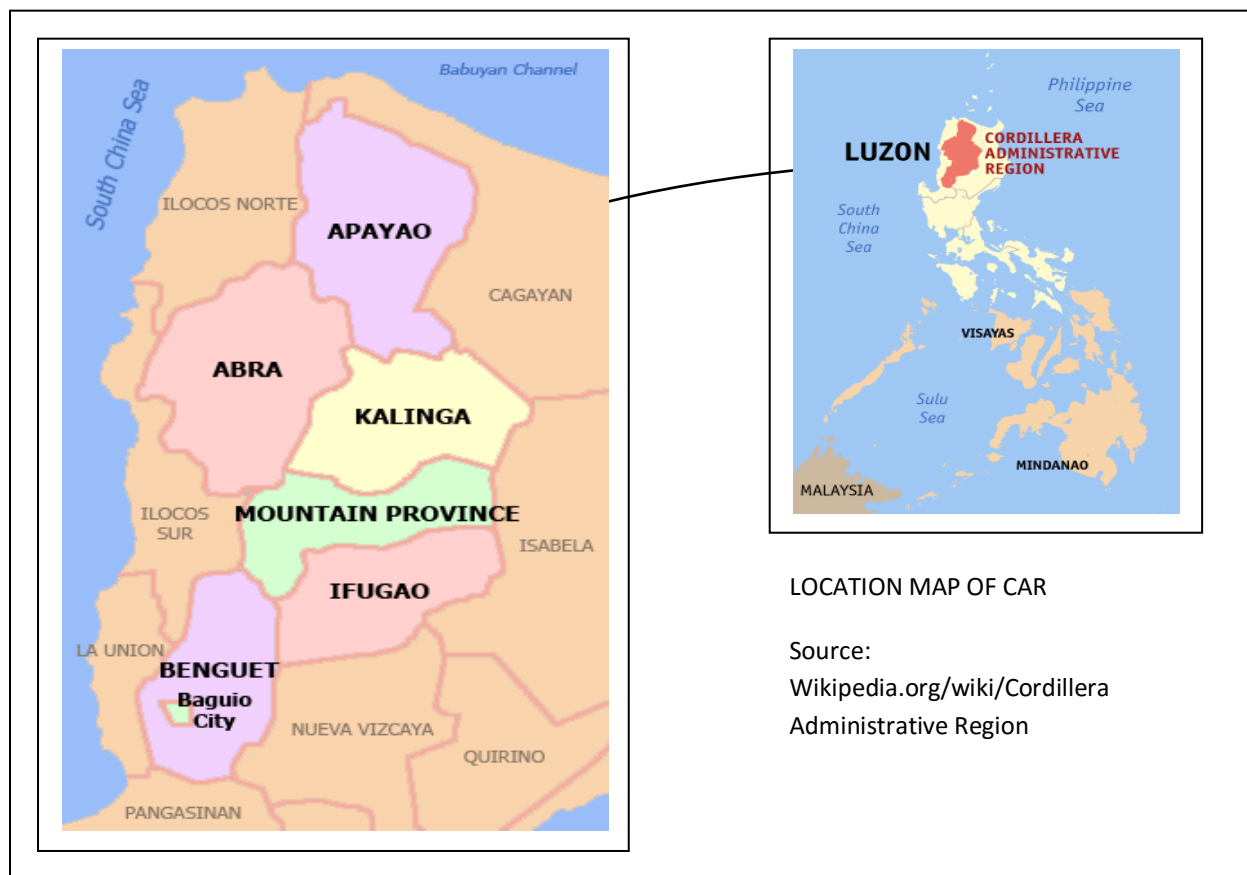


Table 1. Slope Classification in CAR

Slope Classification	Area	% of Area
0-3%	146,501.62	8.01%
3-8%	96,416.75	5.27%
8-18%	104,286.23	5.70%
18-30%	192,528.68	10.52%
30-50%	227,466.58	12.43%
50 and above	1,062,168.14	58.06%
Total	1,829,368.00	100.00%
Source: PMD-DENR CAR, 2010		

The Cordillera is dominantly within the moist Agro-climate zone (74.97%) characterized by an average annual rainfall of 500-2500 mm. It has a favorable rainfall accumulation with substantial areas classified into type I and II. The northern section of CAR experiences an average of 5 cyclones in 2 years while the central and southern part experiences an average of 2 cyclones per year.

## 2.2 Socio-Economic Profile

The Cordillera Administrative Region is divided into 6 provinces and has a total population of 1,722,006 based on the 2015 census of Philippine population. The population of the region has been increasing over the years although its annual population growth rate (1.53%) is lower than the 1.84% national population growth rate of the Philippines (Table 2). Among the provinces, Benguet has the largest population at 446,224 (excluding Baguio City) while Apayao has the lowest population at 119,184. The population of Benguet province including Baguio city has been increasing faster compared to the other provinces and even compared to the national population growth rate.

**Table 2. Population and Population Growth Rates of CAR**

PROVINCES	TOTAL POPULATION			POPULATION GROWTH RATE		
	1-May-00	1-May-10	1-Aug-15	2000-2010	2010-2015	2000-2015
ABRA	209,491	234,733	241,160	1.14	0.52	0.93
BENGUET (excluding BAGUIO CITY)	330,129	403,944	446,224	2.04	1.91	1.99
BAGUIO CITY	252,386	318,676	345,366	2.36	1.54	2.08
IFUGAO	161,623	191,078	202,802	1.69	1.14	1.50
KALINGA	174,023	201,613	212,680	1.48	1.02	1.32
MOUNTAIN PROVINCE	140,631	154,187	154,590	0.92	0.05	0.62
APAYAO	97,129	112,636	119,184	1.49	1.08	1.35
<b>TOTAL</b>	<b>1,365,412</b>	<b>1,616,867</b>	<b>1,722,006</b>	<b>1.70</b>	<b>1.21</b>	<b>1.53</b>

Source: PSA, CY 2000, 2010, 2015

A significant percentage of the Cordillera population is composed of indigenous peoples (IPs), commonly known as Igorots. These IPs are also grouped into ethnic or ethno-linguistic identities, such as Apayao or Isneg, Tinggian, Kalinga, Bontoc, Kankanaey, Ibaloy, Ifugao, and Bago. Major dialects include Ilocano, Ibaloy, Kankanaey, Kalanguya, Ifugao, Kalinga, Itneg, and Isneg.

Mining, agriculture, export processing zone, tourism are among the economic activities in the different provinces of the region. It has abundant mineral reserves such as gold, copper, silver, zinc, and non-metallic minerals like sand, gravel and sulfur. Mineral reserves are found in all the provinces, but mining is concentrated mostly in Benguet. Vegetable crop production is well developed in Benguet, rice production in Ifugao and Abra, corn production in Mountain

Province, and Kalinga. Palay, corn and cabbage are the major crops in CAR contributing 43% to the region's agricultural output in 2013. CAR remained as the top producer of cabbage. It ranked 8th in corn production and 13th in palay production. About 47.35 percent of the region's total employment was absorbed by the agriculture sector. Of those employed in agriculture, 63 percent were male workers and 37 percent were female workers (PSA, 2013).

## 2.3 Resources

### Land resources

The Cordillera Administrative Region (CAR) covers a total land area of 1,829,368 hectares. Most (81%) of its land areas are categorized as forestlands while only 19% or 342,345 hectares are alienable and disposable lands (A & D). Table 3 summarizes the land classification in CAR. With very limited A & D lands for agriculture and for other commercial uses, cultivation of the region's forestlands is a common occurrence.

The lands of Cordillera have abundant mineral reserves consisting of metallic ores such as gold, copper, silver, zinc, and non-metallic minerals like sand, gravel and sulfur. Mineral reserves are found in all the provinces, but mining is concentrated in Benguet. Large areas are also covered with forests which are claimed by the indigenous peoples as part of their ancestral domains. As of CY 2012 about 23% of the region's forestlands or 340,999 hectares are already issued with certificate of ancestral domain titles (CADT).

**Table 3. Land Classification in the Cordillera Administrative Region**

Land Classification	Area (ha)	%
Forestlands	1,487,023	81%
Classified Forestlands	1,478,475	81%
Established Timberlands	666,219	36%
Forest Reserves, National Park/ Prot. Areas & Other Reservations	812,256	44%
Unclassified forestlands	8,548	0.5%
Alienable and disposable lands	342,345	19%
Total	1,829,368	100%

Source: Philippine Forestry Statistics, CY 2014

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### Forest Resources

The region still has significant areas covered with forests. The 2010 land cover map prepared by NAMRIA indicates that 773,191 hectares or 42% of CAR's land area are still covered with forests. This consists of 255,552 hectares of closed forests and 517,638 hectares of open canopy forests. Perennial tree crops cover 2,141 hectares while wooded grasslands and shrubs consist of 315,513 and 289,861 hectares, respectively. The rest of its land area consists of natural grasslands, cultivated annuals and non-vegetated lands composed of inland water, barren & built-up (NAMRIA 2010 Land Cover Map).

Most of the forests of CAR are located in the province of Apayao where about 218,340 hectares of forests still exist, representing 12% of the total land area of CAR. About 33% of the total forests of the region are considered close forests while 67% are open forests. Of the total close forests, 118,982 hectares, representing 46% of this type of forest in CAR are

situated in Apayao. On the other hand, open forests are largely found in the provinces of Benguet (116,430 hectares), Abra (103,384 hectares) and Apayao (99,358 hectares). The 2010 forest cover of CAR is presented in table 4.

**Table 4. CY 2010 Forest Cover of the Cordillera Administrative Region (CAR)**

Province	Land Area	Total Forest	Close Forest	Open Forest	% forested in relation to CAR area	% of Provl area forested
CAR	1,829,368	773,191	255,552	517,640	42%	
Abra	397,555	146,700	43,316	103,384	8%	37%
Apayao	392,790	218,340	118,982	99,358	12%	56%
Benguet	265,538	119,626	3,196	116,430	7%	45%
Ifugao	251,778	102,397	13,692	88,705	6%	41%
Kalinga	311,974	98,862	48,888	49,974	5%	32%
Mountain Province	209,733	87,266	27,478	59,787	5%	42%
%		42%	33%	67%		

Source: NAMRIA Land Cover Map, CY 2010

The change in forest cover in CAR is presented in table 5. As indicated in the table, except for the province of Apayao, all the other provinces of the region registered an increase in the total forest cover between CY 2003 and CY 2010. However a closer examination indicates that the quality of forests has deteriorated since in all provinces close forest declined. The total decline in the close forest of CAR is roughly 129,325 hectares over a period of seven years or an annual decrease of 18,475 hectares. If current conditions continue, the close forests of the region would all be converted into open forests in a span of 14 years. Among the provinces of CAR, Apayao registered the largest decrease in the area of close forest at 83,294 hectares or an annual rate of decrease of about 11,899 hectares. However, its open forest increased by 73,182 hectares resulting in a net decrease in its total forest cover of about 10,112 hectares. Thus, the most critical province in CAR in terms of forest destruction is Apayao since it is the only province that registered a net loss in total forest cover. The loss in area of close forest in all provinces is a major concern because of its adverse implications in terms of biodiversity loss. Close forests are known to be more diverse than open forests and as such, its destruction or conversion to other forest types means significant loss in biodiversity resources.

**Table 5. Forest Cover Change in the Cordillera Administrative Region**

Province	Closed Forest			Open Forest*			Net change
	2010	2003	Change	2010	2003	Change	
CAR							
Abra	43,316	54,508	(11,192)	103,384	46,458	56,926	45,734
Apayao	118,982	202,276	(83,294)	99,358	26,176	73,182	(10,112)
Benguet	3,196	4,252	(1,056)	116,430	111,787	4,643	3,587
Ifugao	13,692	26,632	(12,940)	88,705	46,425	42,280	29,340
Kalinga	48,888	55,590	(6,702)	49,974	22,687	27,287	20,585
Mt. Province	27,478	41,619	(14,141)	59,787	33,910	25,877	11,736
Total**	255,552	384,877	(129,325)	517,638	287,443	230,195	100,870

Source: NAMRIA Land Cover Map, CY 2003 and 2010

## Water Resources

The Cordillera is endowed by nature with several rivers and creeks. The region is the headwater of 13 major and principal river systems, being the watershed cradle of Northern Luzon. Most of the major river basins drain to regions 1 and 2. It supports different facilities like the hydroelectric dams for irrigation, domestic use, and hydropower. The agriculture sector is one of the main users of water in the region. Figure 2 shows the major watersheds that drain water from the Cordillera Administrative Region.

## Biodiversity Resources

The forests of the region are important since they are the habitat of various species of flora and fauna some which are either endemic, rare or have restricted range. Comprehensive inventory of biodiversity resources in CAR has not been undertaken, but since many areas in the region are situated in more than 1,000 meters above sea level, several species of flora and fauna which are unique to high elevation areas are also found. The Philippine Eagle and the Crested-Serpent Eagle are also found in the Province of Apayao. Table 6 presents the list of protected areas in the region where valuable biodiversity resources are situated.

Figure 2. Major Watersheds in Northern Luzon Draining Water From CAR

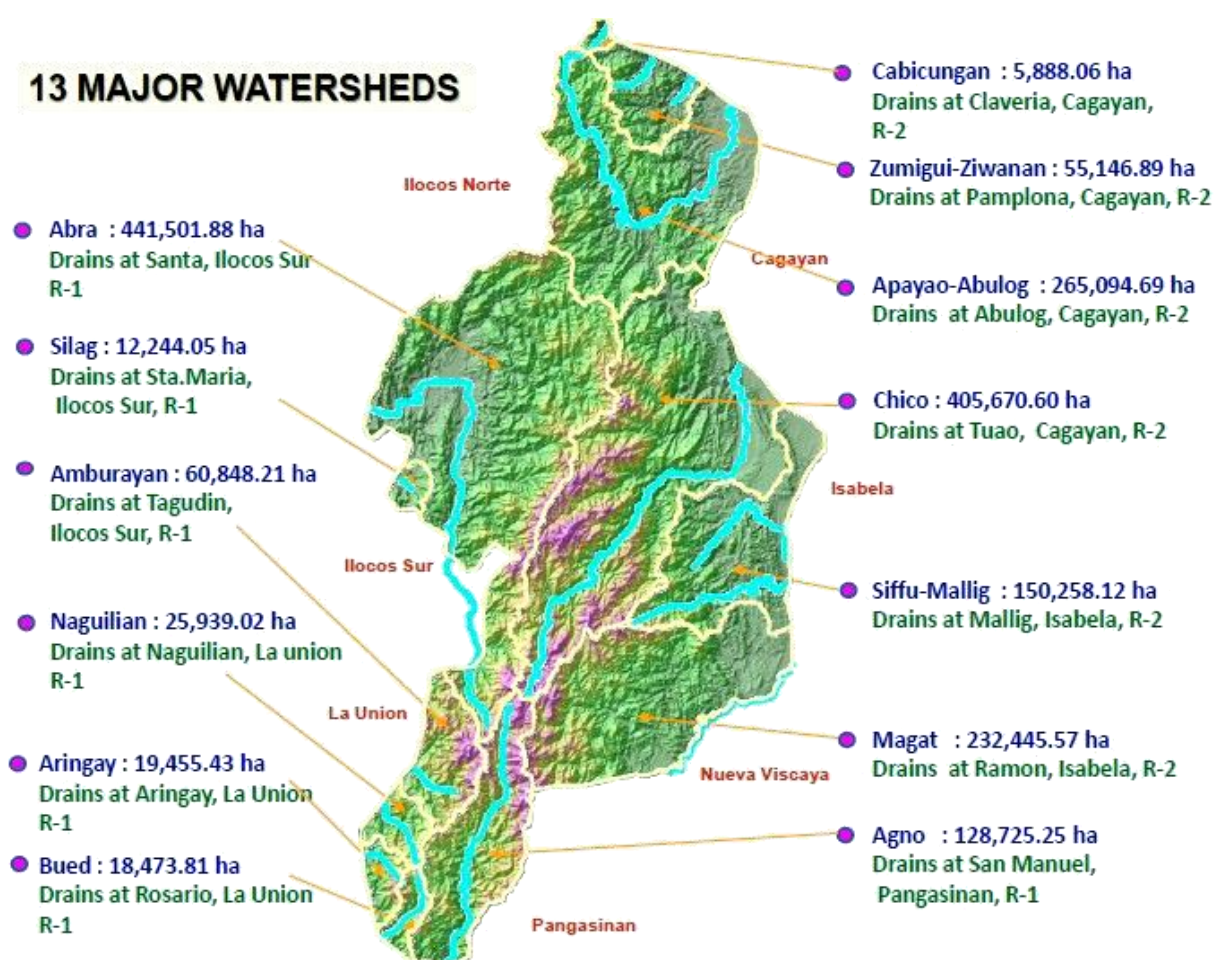




Table 6. Protected Areas in CAR and Their Locations

Name of Protected Areas	Area (ha)	Location	Key biodiversity resources/ rare, threatened, endangered & vulnerable species
1.Casamata Hill NP	57	Abra	Native Philippine Palm, Natural Forest (Teak, Narra)
2.Mt. Pulag NP	11,550	Benguet	Mossy Forest,Dwarf Bamboo, Orchids, Cloud Rat, Inland lakes
3.Balbalasang Balbalan NP	1,338	Kalinga	Dipterocarp Forest, Wild Deer, Wild Boar
4. Mt. Data NP	5,512	M. Province, Benguet	Mossy Forest (Oak Tree, Igem) Pine Forest

Source: DENR CAR

### Nature-Based Tourism Areas

The Cordillera is the Philippines' Premiere Highland Region, with scenic sights, cool climate, and a unique culture and people. The protected areas, particularly Mt. Pulag which is the second highest mountain in the Philippines with an elevation of 2,922 meters above sea level, provide additional attractions for tourists. Other tourism sites in the region include the world-famous Banaue Rice Terraces in the province of Ifugao which used to be the "Eighth Wonder of the World". Natural attractions of the region likewise include the Sumaguing Cave in Sagada and the mummy caves of Benguet and Mt. Province ([www.nnc.gov.ph](http://www.nnc.gov.ph)). The city of Baguio, commonly referred to as the "summer capital of the Philippines", is a major tourist destination in the region as well.

### Agricultural Lands

The alienable and disposable land of CAR is estimated at 342,345 hectares. About 201,154 hectares are planted to various agricultural crops such as rice, palay, and vegetables. Rice lands cover 142,217 hectares of which 43,926 hectares are rice terrace irrigated areas. Vegetables cover 22,601 hectares while corn, coffee and pasture cover 20,143 hectares; 5,914 hectares and 6,219 hectares, respectively ([www.ati.da.gov.ph/car/about](http://www.ati.da.gov.ph/car/about) cordillera administrative region accessed on January 2017).

## **2.4 Vulnerability to Climate-Related Hazards**

Climate change projections by PAGASA (2011) indicate that summer months will become drier and rainy months will be wetter. This means 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 (°C) and seasonal mean rainfall (in %) in CAR based on medium-range emission scenario. Accordingly, there will be a projected decrease in rainfall of up to 28.1% during summer in



2050 while rainfall can increase up to 63.1% during the wet season. These changes in climate will further increase the risk associated with climate hazards. As indicated in table 8, the Cordillera ranks first in terms of vulnerability to landslide with close to 28% of its total land area highly at risk to landslide hazard. Thus, the expected increase in rainfall during the rainy season coupled with the steep slopes of most areas in the region may intensify the occurrence of landslides and put at risk the lives and properties of local populations. Soil erosion is also expected to increase due to the combined effect of increased rainfall, steep slopes and vegetable farming in upland areas. About 21% of the regional area is subjected to severe erosion and predominantly observed in the provinces of Ifugao and Mt. Province. Apart from landslide and soil erosion, the region is also highly at risk to projected temperature increase. This may lead to more forest fire in grassland areas and coniferous forests that could expand to adjoining dipterocarp forests.

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

Provinces	Observed Baseline (1971-2000)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
<i>A. Projected change in temperature</i>								
Abra	24.5	27.4	27.2	26.4	2.0	2.1	1.6	1.9
Apayao	24.8	28.0	28.4	27.1	1.9	2.1	1.9	1.8
Benguet	19.4	21.9	22.0	21.2	2.0	2.1	1.7	1.9
Ifugao	22.2	25.6	25.8	24.5	1.9	2.1	2.0	1.9
Kalinga	23.8	27.5	27.7	26.1	1.9	2.1	2.0	1.9
Mt. Province	22.7	26.0	26.1	24.9	1.9	2.1	1.9	1.9
<i>Projected change in seasonal mean rainfall</i>								
Abra	43.5	220.6	1218.9	634.4	-2.1	-28.1	35.0	15.9
Apayao	144.6	184	822.7	720.1	3	-23.7	1.1	-0.3
Benguet	47.7	422.3	1734.9	931.8	-6	-26.7	63.1	21.8
Ifugao	102.6	321	1071.1	724.9	-1.3	-24.2	17.6	-2.9
Kalinga	92.3	228	892.3	691.9	4.2	-21	3.9	1.1
Mt. Province	74.8	286.8	1121.1	699.2	1.1	-27.4	26.6	8.5

Source: PAGASA, CY 2011

**Table 8. Regions Vulnerable to Landslides, Area (in hectares) at Risk 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	Area at risk to landslide	
	Land area (in hectares)	Rank
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 Collaboration in Resource Management

Various multi-sectoral bodies involved in forest management and protection had been organized in the Cordillera, indicating that some form of institutional collaboration exist in the region. For instance, six provincial and one regional Multi-Sectoral Forest Protection Committees were organized as partners of the DENR- CAR in the forest protection efforts of the region. Regional (1) Provincial (6) and Municipal (39) Anti- Illegal Logging Task Forces were also formed and mobilized for forest law enforcement in support to EO 23. On the management of National Parks, four (4) Protected Area Management Boards are in place as policy making body for the protection and management of protected areas in the region.

## III. Development Challenges in the Forestry Sector of the Cordillera

The Cordillera is endowed with rich forest resources that can provide forest goods and services needed by its expanding population. However, the quantity and quality of these resources are deteriorating due to illegal cutting of trees, conversion to other inappropriate land uses, and unsustainable practices such as slash and burn agriculture. The close forests of CAR are most vulnerable to destruction as this type of forest has decreased in all its provinces. This situation will have adverse consequences to biodiversity and its beneficial uses.

Agriculture and forestry are major sources of income for most of the population in CAR. But most families dependent on this sector are poor as the natural resource base is continuously being degraded. Productivity of agricultural lands is constrained due to soil erosion resulting from inappropriate agricultural practices in steep slopes

Region CAR is a major supplier of irrigation and domestic water as well as of hydro electric energy. The ability of the region to continuously provide these services may be

compromised as a result of forest destruction and conversion and encroachment into its major watersheds.

Ecotourism and its related service industries play an important role in the region's economy. But the sustainability of its tourist destinations is threatened by conflicting land uses, encroachment of settlements and improper disposal of wastes that pollute the environment.

The Cordillera is likewise vulnerable to climate and geologic hazards such as typhoons, landslides, erosion, and forest fire. The frequency and intensity of these hazards may be aggravated by changes in climatic conditions which could lead to more damages to life and properties of local populations. Most LGUs and majority of the population are not prepared for hazards and communities are not organized for disaster risk reduction. Appropriate adaptation measures are not in place to mitigate the impacts of climate related hazards.

Most 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. The conflicting development priorities of different agencies that have overlapping mandates also contribute further to unharmonized land uses in forestlands.

#### **IV. Regional Comparative Advantages and Competitive Goods and Services**

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 is considered as the watershed cradle in the north Philippines being the headwaters of major river basins that flow to regions 1, 2 and 3. These river basins support hydropower facilities that generate electricity and provide water for irrigation and domestic use. This includes the Magat dam in Isabela and the San Roque Multi-purpose dam at San, Manuel, Pangasinan.

The cool climate, scenic spots and cultural attractions of CAR also enhances its ecotourism potential. The existing ecotourism destinations such as the Mt. Pulag, Mt. Purgatory, Mt. Ugo in Benguet, Balbalasand National Park at Kalinga, Rice Terraces and the Sagada Caves of Mt. Province are major attractions in the region that could help provide more employment to local communities.

The region also has a comparative advantage to high value commercial commodities that deserve priority development in the different provinces. These crops include coffee, tomatoes, vegetables, white potatoes and passion fruit. Benguet province also has advantage in the production of cut flowers, asparagus and strawberry.

There are still existing pasture leases in the Cordillera covering about 4,239 hectares. These areas may be managed continuously to partly supply demands of local populations

for meat. However, improved pasture practices will have to be implemented to increase meat production. Apart from these, IPs also possesses skills in furniture making and wood carving and as such included in their competitive goods are wooden furniture and non timber forest products processing.

The matrix of comparative advantages and competitive goods and services of the Cordillera Administrative Region is presented in 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, social 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 adopts the following goals:

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 Cordillera under appropriate land management arrangements
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, programs on strengthening resilience of forest ecosystems and communities to climate change hazards, programs to meet increasing demands for forest goods and services and programs to promote responsive governance. Support programs were also identified to facilitate implementation of the major programs. Considering its

comparative advantages and its competitive goods and services, priority focus will be given on the protection and rehabilitation of watersheds, the protection of existing forests, especially the close forests to enhance ecotourism and the promotion, management of grazing lands, the integration of soil and water conservation in upland farming and strengthening institutional collaboration to improve support to livelihood of communities (furniture making, development of non timber products, vegetable farming, cut flower production, rice farming, etc) and mitigation of risk associated with climate-related hazards.

#### Program on Strengthening Resilience of Forest Ecosystems and Communities to Climate Change Hazards

The forest resources of the Cordillera are threatened by unregulated land uses and conversion due to competing demands from increasing population such as for cultivation into vegetable farms, and settlements. Climate change is expected to aggravate these threats leading to more forest destruction. This will diminish the capacity of forests to provide goods and services and eventually impact on livelihood of local communities.

The Region is highly exposed to typhoons. With more rains projected during the rainy season, the mountainous areas of the Cordillera will be increasingly vulnerable to soil erosion which will eventually diminish agricultural productivity. Landslide is also likely to aggravate in these areas as a result of more rainfall, threatening the lives and properties of communities. The projected temperature increase in the provinces may lead to increased incidence of forest fires resulting to more forest destructions. As climate change intensifies, 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.

The objectives of this program are the following:

1. To identify areas in at least four priority watersheds, protected areas and other forest ecosystems which are vulnerable to climate change;
2. To align resource uses within watersheds and forest ecosystems by integrating the forest land use plans of 43 LGUs into their comprehensive land use plans;
3. To rehabilitate 51,466 hectares of degraded protection forests through assisted natural regeneration to reduce risks to forest ecosystems and communities associated with climate change hazards;
4. To protect 1,081,660 hectares of existing forests and plantations;
5. To diversify livelihood of local communities by developing 12,084 hectares of agroforestry farms;
6. To implement REDD+ in the provinces of Abra, Apayao and Benguet; and
7. To reduce soil erosion by establishing soil and water conservation measures in at least 5000 hectares of upland farms

To attain the foregoing objectives, the DENR – CAR has identified the following strategic activities for implementation in the remaining period of the master plan:

1. Identification of areas vulnerable to climate change hazards and corresponding adaptation measures in collaboration with LGUs and other stakeholders. This activity will allow local communities and LGUs to identify specific areas within priority watersheds which are vulnerable to specific hazards and formulate appropriate adaptation measures.
2. Formulation of forest land use plans (43 LGUs) and watershed management plans in at least 3 priority watersheds. These plans will be integrated into the LGUs' CLUP to harmonize land uses from ridge to reef.
3. Protection, conservation and rehabilitation of existing natural forests, established plantations, degraded watersheds and other protection forests to sustain the provision of ecosystems goods and services and reduce the risks associated with climate change hazards
4. Integration of soil and water conservation measures in upland farming systems. With upland agriculture encroaching into the forestlands, it is necessary to incorporate soil and water conservation to reduce further deterioration of land productivity and prevent further sedimentation of rivers and creeks downstream.
5. Diversification of 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.
6. Implementation of REDD+ in Abra, Apayao and Benguet. Together with the other regions, this activity will increase carbon sequestration and carbon stock which are necessary as the country's contribution to climate change mitigation.

The targets and implementation period for these activities is summarized table 9.

**Table 9. Summary of Activities on Strengthening Resilience to Climate Change Hazards, and Corresponding Targets per Period**

Strategic Programs and Activities	Targets and Implementation Period			Total
	2016	2017 -2022	2023 -2028	
<b>A. Strengthening Resilience of Forest Ecosystems and Communities to Climate Change</b>				
1. Vulnerability assessment of priority watersheds and PAs (no.)	0	3	0	3
2. Adaptation planning in priority watersheds & PAs (no)	0	3	0	3
3. Management & rehabilitation of degraded protection forests (ANR in hectares)	2,640	48,826	0	51,466
4. Protection of existing forests & plantations (ha)	820,876	991,660	1,081,660	1,081,660

Strategic Programs and Activities	Targets and Implementation Period			Total
	2016	2017 -2022	2023 -2028	
5. Establishment of vegetative soil and water conservation measures (hectares)	0	5000	0	5000
6. Agroforestry development (mixed crops)	1,145	10,939	0	12,084
7. Formulation of integrated watershed management plans / PA plans (no.)	0	3	0	3
8. FLUP formulation (no. of LGUs)	28	15	0	43
9. REDD+ implementation (no of provinces)	0	1	2	3
10 Training on vulnerability assessment, adaptation planning, integrated pest management, IWM, FLUP (no. of training)	2	20	0	22

### Program on Responding to Increasing Demands for Forest Goods and Services

Forests have been viewed primarily as the source of wood and non wood products. However, with increasing population and with the impacts of climate change hazards being manifested in recent years, the importance of biodiversity, the forest's protective functions, ecosystems services, and socio-economic considerations have become more dominant. These multiple demands from various clients will be responded by the forestry sector in the region. However, considering the regional comparative advantages and its competitive goods and services, the regional action plan will give more focus on addressing demands for water, grazing, biodiversity for 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 water and grazing. Limited production of round wood will be undertaken also in appropriate areas to address some of the local demand for wood products.

The specific objectives of this program include the following:

1. To demarcate on the ground 1,487,023 hectares of forestlands as production and protection forests;
2. To develop 2,794 hectares of commercial forest plantation in appropriate areas for round wood production;
3. To sustainably manage 4,239 hectares of grazing lands for meat and dairy production;
4. To protect and conserve priority watersheds and rehabilitate 194,140 hectares of degraded watersheds to enhance water production for irrigation, energy and domestic and industrial use; and
5. To develop forest parks and green belts in at least two cities/ urban centers of the region

The activities necessary to achieve the objectives of this program include the following:

1. Ground demarcation of forestland boundaries and the corresponding protection and production zones. This activity will identify areas where forest plantations, grazing and



other production oriented activities may be undertaken as well as areas for protection such as those for biodiversity and soil and water conservation.

2. Conservation and rehabilitation of degraded watersheds to enhance water production for irrigation, energy, domestic and industrial use. Being the watershed cradle of the North, the protection, conservation and rehabilitation of priority watersheds will be undertaken. Degraded forestlands within the priority watersheds will be identified and reforested using indigenous forestry species. This activity will be undertaken in partnership with LGUs and peoples' organizations. To provide oversight in the management of priority watersheds, multisectoral watershed management bodies will be organized and capacitated through trainings and field visits.
3. Development of forest plantations for round wood. This activity will support the raw material requirements of wood based enterprises such as furniture making and wood carving. It will also partly respond to local demands for construction wood with the other requirements to be sourced from other regions or from imported wood.
4. Sustainable management of existing pasture areas to address meat demands. The existing pasture leases will continue to be managed as such to support the meat requirement of the country. To improve meat production, improved pasture will be adopted by encouraging pasture permittees to planting improved pasture grasses and practicing cut and carry grazing.
5. Development of forest parks in urban areas/ cities. Development of forest parks is intended to alleviate the environmental condition in key cities and urban centers. Forest trees and ornamental plants will be planted in identified areas within highly urbanized centers to improve air quality and safeguard the health of local constituents

The activities, targets and implementation period for this program are summarized in table 10.

**Table 10. Activities, Targets and Implementation Period to Meet Demands for Forest Goods and Services**

Strategic Programs and Activities	Targets and Implementation Period			
	2016	2017 -2022	2023 -2028	Total
<b>B. Responding to Demands for Forest Ecosystems Goods and Services</b>				
1. Demarcation of forestland boundaries & forest management zones (ha./ kms.)	0	1,487,023	0	1,487,023
2. Development of seed production areas (no. of sites)	6	6	6	6
3. Establishment of mechanized nurseries (no.)	0	0	0	0
4. Commercial forest plantation development for round wood prodn. (ha)	300	2,494	0	2,794
5. Management of grazing lands (ha)	4,239	4,239	4,239	4,239
6. Watershed rehabilitation				
Reforestation of degraded areas (ha)	9,140	110,000	75000	194,140
Organization and capacitation of watershed management bodies , such as the watershed management council (no.)	0	12	0	12
Identification/ assessment of other	0	3	0	3

Strategic Programs and Activities	Targets and Implementation Period			
	2016	2017 -2022	2023 -2028	Total
watersheds (no.)				
7. Support to urban forestry in major cities and urban centers (LGUs assisted)	0	2	0	2

### Program on 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. Even within the DENR there is overlapping mandates among the different sectors (i.e Biodiversity Management Bureau, Forest Management Bureau and the Mines and Geosciences Bureau) in the management of forestlands. 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 have to enhance its forestry policies, 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.

The specific objectives of this program are:

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. To strengthen the capabilities of DENR, LGUs and other stakeholders in the joint management of forests and forestlands to meet demands for forest goods and services from multiple clients.

The following activities will be implemented by DENR-CAR to improve governance in the forestry sector

1. Issuance of tenure instruments and other appropriate management arrangements in open access forestlands. All open access forestlands of the region will be placed under tenure and other management arrangements to ensure that there are responsible on-site managers in the area. However, due to overlapping mandates and other policy/operational constraints, only 400,000 hectares will be targeted for tenure issuance within the master plan period.

2. Organization and capacitation of multi sectoral collaborative management bodies. DENR-CAR will facilitate the formation of multi sectoral collaborative management bodies in each province and in the region which will provide oversight in forest management. This approach is part of the strategy to provide venue for harmonizing operational policies and management arrangements especially in areas with overlapping institutional mandates, overlapping tenure instruments and with multiple stakeholders and competing demands for forest ecosystems goods and services.
3. Capability enhancement for DENR and LGU staff. In consideration of the evolving institutional reforms within the DENR, and the increasing role of LGUs in forest resources management, it is necessary to enhance the capabilities of their personnel in such areas as IEM planning, forest land use planning, vulnerability assessment, political communications, conflict resolution, and other skills related to development management.

The specific targets and their implementation periods for institutionalizing responsive governance in the forestry sector are summarized in table 11.

**Table 11. Activities, Targets and Implementation Period to Institutionalize Responsive Governance in the Forestry Sector**

Strategic Programs and Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
<b>C. Promoting Responsive Governance</b>				
1. Tenure issuance in open access forestlands (ha)	0	200,000	200,000	400000
2. Re-survey and mapping of tenured CBFM areas (CBFM sites)	0	15	0	15
3. Organization and capacitation of multi-sectoral collaborative management bodies (region and province)	0	7	7	7
4. Capability enhancement for DENR/ LGUs (no. of trainings)	0	36	36	72

### Support programs

Cross cutting support programs have 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, forest certification and improved data base.

The primary objectives of this program are:

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
5. Provide research based information for forest management decision making, vulnerability assessment and climate change adaptation planning

The strategic activities to achieve the foregoing objectives include the following

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 tenure holders/ on site managers;
4. Identification and assessment of potential sources of sustainable financing for forest protection, rehabilitation and development; and
5. Conduct of forestry research in support of forestry master plan implementation

Table 12 summarizes the targets and implementation period for the different activities in support of the forestry master plan implementation.

**Table 12. . Activities, Targets and Implementation Period for the Forestry Master Plan Support Program**

Strategic Programs and Activities	Targets per Implementation Period			
	2016	2017 -2022	2023 -2028	Total
<b>D. Other Support Programs</b>				
1. Information, education and communication campaign (no. of LGUs)	6	66	76	158
2. Upgrading of regional MIS facilities (no.)	0	2	2	2
3. Results based monitoring and evaluation (no.)	6	36	36	78
4. Additional support to forestry research (no. of studies)	1	5	5	11

## V. Plan Implementation

This regional action plan shall be implemented by DENR-CAR 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, such as the FMP and INREM, 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, ADS DPP 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.
- 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.
- [www.ati.da.gov.ph/car/about](http://www.ati.da.gov.ph/car/about) cordillera administrative region accessed on January 2017
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# ANNEXES

## Annex 1. Matrix of comparative advantages and competitive goods and services

Comparative Advantages	Cattle	Rice	Wood furnitures,	Water supply	Eco- tourism	Non timber products	Coffee	Minerals	Cut flower	Vegetables, strawberry	Carbon Sequestration
Terraced forestlands		Apayao, Kalinga			Mt. Province						
watersheds				Abra, Apayao, Kalinga, Ifugao, Mt, Prov.	All provinces except Benguet						
grazing lands	Abra, Kalinga, Ifugao, Mt, Prov.										
dams for irrigation and power				Benguet, Ifugao, Apayao							
established markets	Abra, Kalinga, Ifugao, Mt, Prov.	Kalinga, Apayao, Abra	Abra, Ifugao				Benguet, Kalinga, Mt. Prov.	Benguet, Abra, Mt. Prov.		Benguet, Ifugao, Mt, Prov.	
skilled workers			All provinces			All provinces					
Natural forests					Apayao, Kalinga, Mt. Province						All provinces
Protected areas					Abra, Mt. Prov Benguet, Kalinga						
caves					All provinces except Ifugao						
waterfalls				Apayao, Benguet, Mt. Prov.	Apayao, Mt. Prov. Ifugao Benguet,						
lakes and rivers				All provinces	All provinces						
Business Investors	All prov. except Benguet		All provinces		Abra, Benguet, Kalinga, Mt. Prov.		All prov. Except Kalinga	All provinces			
- Mineral Lands								All prov. Except Ifugao			
Suitable Climate		Apayao, Kalinga			Benguet, Mt. Prov.		All provinces		Benguet	Benguet, Mt. Prov.	