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Evaluation of the Reforestation Sites of the Community-Based Forest Association in Biliran Province, Philippines

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Abstract- Forest provides a significant contribution to the livelihoods of people community, especially in the developing countries. Forest losses in the Philippines and its vulnerability to climate change are no exemption. The main goal of this study was to evaluate the success of the plantation sites of the community-based reforestation initiatives in the Province. Our results show that the survival rate of the plantation was promising. Species planted were important species based on the list conservation status in the Philippines. Also, the positive impact of plantation on the local people was visible. However, possible threats are visible that will hinder the continued success of the plantation. This research suggests that continuous monitoring and protecting the plantation influences potential forest services and benefits.

Keywords- *Evaluation, Forest Association, Survival Rate, National Greening Program, Philippines*

I. INTRODUCTION

Forest provides a significant contribution to people's livelihoods, especially in the developing world [6]. For most developing countries, especially in rural areas, forests are sources of various products [1] and account for substantial shares of cash and subsistence [4, 12]. However, degraded forest lands and secondary forests significantly cover areas throughout the tropics [11]. Deforestation and forest degradation in the tropics have been listed in the global issues and given much concern, especially in climate change.

In the Philippine scenario, forest losses and their vulnerability to climate change are no exemption. Deforestation in the Philippines is caused by logging and the growing population, especially in the rural areas [7, 8]. Due to the growing interest in reforestation activity in degraded lands, different strategies have been carried out to combat environmental issues and combat climate change in a broader aspect. In response to this problem, the government established a massive forest rehabilitation program called the National Greening Program (NGP) under Executive order No. 26, issued on February 24, 2011, by President Benigno S. Aquino III. It seeks to grow 1.5 billion trees in 1.5 million hectares nationwide within six years from 2011 to 2016. Aside from being a reforestation initiative, the NGP is a government priority program to reduce poverty, promote environmental stability and biodiversity conservation, ensure food security, and enhance climate change mitigation and adaptation [5]. This strategy of the government's community approach was coined to cater to the upland dwellers to provide them alternative livelihood and reduce poverty while maintaining the natural resources of the Philippines. Usually, the people's organizations (PO) have been contracted by the Department of Environment and Natural Resources (DENR) because most of the plantations are located in the upland and managed mainly by the local communities. Further, in line with the government's community-based approach to natural resource management, the NGP has primarily involved community organizations engaged in Community-Based Forest Management (CBFM) projects.

CBFM emerged as a practical approach to allocating forests and forestlands to communities and indigenous peoples with Executive Order (E.O.) 263 in 1995 and the passage of the Indigenous People's Rights Act in 1997 [10]. One of the active PO in the Province is the Kawayan Community-Based Forest Management (CBFM) Producers Association (KCPA). However, limited information was available as to the current status of the plantation under the CBFM projects. The CBFM has been of varying success [12]. It has been criticized that the level of control granted to communities was limited. At the same time, they were subject to strict rules and received little help with implementing forest management activities [3]. Thus, this current research is timely and relevant to evaluate the success of the plantation sites operated by the KCPA.

In this current research, we hypothesized that the success of plantations is limited and depends on the management practices, availability of planting materials, and monetary benefits from the government-initiated activities. The main objective of this research was to evaluate the success of the plantation sites of the KPCA in the Province. The specific objectives were to address the following questions: (i) what are the species planted and the conservation status of the planted trees, and (ii) what is the survival rate of the plantation of the selected study areas?

II. METHODOLOGY

A. Study Area

The study was conducted at three Barangays (Tucdao, Ungale and Burabod) in the municipality of Kawayan, Province of Biliran (Fig. 1). The climatic type of Kawayan

belonged to Type IV where rainfall was more or less evenly distributed throughout the year. The project site in Barangay Tucdao was between two hilly mountains, in the east lied on Barangay Inasuyan mountain estuary and in the west was the mountain of Ungale tributaries. The terrain of the project site in Barangay Ungale was generally hilly to moderate mountainous comprising of 45 hectares. The topography condition of the NGP project site were slightly flat, rugged, hilly, gently rolling or sloping and mountainous terrain. The proposed site was situated within the forestlands, basically observed during the recently conducted perimeter survey as open patches areas and denuded zones. The vegetation in Barangay Tucdao and Burabod project site were closely similar often dominated with grassland species such as Cogon (*Imperata cylindrica*), Amorsico (*Chrysopogon aciculatus*), Hagonoy (*Chromolaena odorata*) and other associated species.

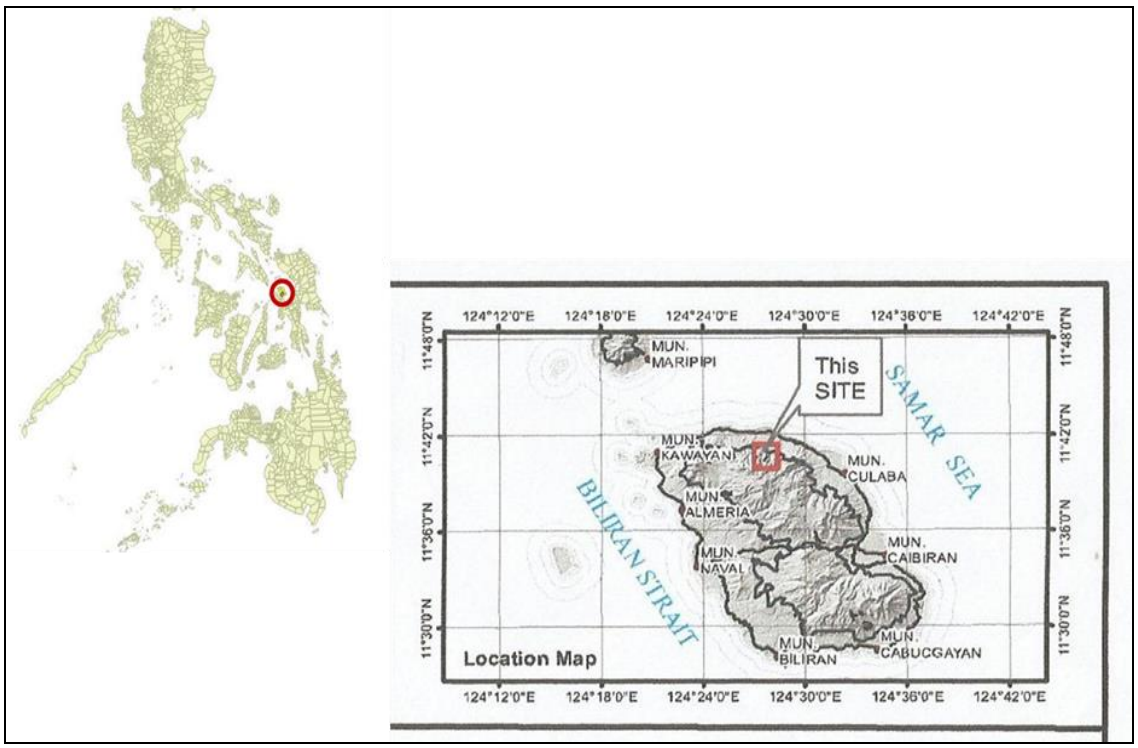

Figure 1. Location of the Biliran Province in the Philippines and (inset map) location of the study site in the Province (Source: PENRO, Naval, Biliran)

B. Data Collection

The research was conducted at the municipality of Kawayan, Province of Biliran. Due to time limitation, the field practitioners were not able to participate and observe in all activities in Provincial Environment and Natural Resources (PENRO) Biliran. The focus of the field practice is the survival rate of the three sites in Kawayan CBFM Producers Association (KCPA). Among the sites of PENRO Biliran Province in KCPA were Barangay Tucdao, Ungale, Burabod Kawayan Biliran. The major hands-on exposure of the field practitioner was on the survival rate of NGP site in KCPA, and interview with the project personnel involved.

An Interview with KCPA members on the demographic characteristics of the 47 respondent`s aged ranged from 25-40 years old showed that majority of the members were males and mostly are married. The ages of the members were 36 above. Almost half of them are elementary graduate (42 percent), and only 25 percent were college.

Primary and secondary data were collected. Primary data pertaining to the NGP activities were gathered through actual observation, participation and through a series of interview with the project personnel. Also, data such as background, project resource, biophysical information and map were obtained from the records and file kept by PENRO Biliran. Survival rate percentage and problems related to biodiversity conservation and management was identified and analyzed in order to come up with appropriate solution and to help improve the implementation of the program.

C. Data Analysis

No statistical analyses were conducted for this study, as we were only relied on the secondary data provided to us. However, descriptive statistics were involved during the survey with the respondents to support our findings. In addition, interpretations of the results were verified with the published available data.

III. RESULTS AND DISCUSSION

A. Species planted and survival rate

The PO planted various indigenous species in response to the NGP's goals and objectives to promote biodiversity conservation and climate change adaptation and mitigation aside from reforestation initiatives. The program was implemented nationwide to restore the Philippine forest along with other goals such as sustainable development for poverty reduction, food security, biodiversity conservation, and climate change mitigation and adaptation (NGP, 2011). There were nine tree species planted by the KCPA (Table 1). Out of the nine trees, two species such as Narra (Fabaceae) and White Lauan (Dipterocarpaceae) were listed as threatened species. According to the national list of threatened Philippines plants, Narra is listed as critically endangered, and White Lauan is listed as vulnerable species (DENR, 2007). In addition to this, according to the International Union for the Conservation of Nature (IUCN), White Lauan is a critically endangered species and needs conservation strategies.

TABLE I. CONSERVATION STATUS OF SPECIES PLANTED BY KCPA ORGANIZATION.

Common Name	Scientific Name	Family Name	Conservation Status
Antipolo	Artocarpus blancoi	Moraceae	Not Listed
Bahai	Ormosia calavensis	Fabaceae	Not Listed
Banai-banai	Radermachera mindorensis	Bignoniaceae	Not Listed
Bitanghol	Calophyllum blancoi	Guttiferae	Not Listed
Hindang	Myrica javanica	Myrtaceae	Not Listed
Ipil-Ipil	Leucaena leucocephala	Fabaceae	Not Listed
Kakawate	Gliricidia sepium	Fabaceae	Not Listed
Narra	Pterocarpus indicus	Fabaceae	Critically Endangered*
White lauan	Shorea contorta	Dipterocarpaceae	Vulnerable*

*data are taken from DENR Administrative Order No. 01 series of 2007 "National List of Threatened Philippines Plants and their categories"

On the other hand, the survival rate showed a positive effect on the growth of seedlings (Table 2). The KCPA established a plantation in 2011 where they first planted tree species such as Narra (*Pterocarpus indicus*), Mahogany (*Swietenia macrophylla*), and Bahai (*Ormosia cavalensis*). The recorded survival rate was eighty-five percent (PENRO, 2016). From 2012 to 2014, the PO was contracted to plant fuelwood and rattan such as Kakawati (*Gliricidia sepium*), Ipil-ipil (*Leucaena leucocephala)*, and Kalapi. The survival rate was also above 80 percent. From 2015-2016, the PO contracted to plant various timber tree species, showing a high survival rate.

TABLE II. SURVIVAL RATE OF THE ESTABLISHED PLANTATION FROM CALENDAR YEAR 2011 – 2015 IN KAWAYAN, BILIRAN (PENRO, 2016).

Year Planted	Commodity	Species planted	Area planted	Seedlings planted	Survival rate
2011	Timber	Narra,Mahogany & Bahai	50 ha	25,000	85%
2015	Timber	Bahai, White lauan, Narra, Antipolo, Banai-banai	50 ha	25,000	88%
2016	Timber	Narra, Bahai, Hindang	27 ha	44,982	90%

Data taken from Provincial Environment and Natural Resources (PENRO) Naval, Biliran Province

Compared to the three sites, Brgy, Tucdao had the highest survival rate, followed by Ungale and Burabod (Table 3). The three plantation sites were planted with the same tree species, although the third location was planted with different species instead of Bitanghol. The choice of selecting the species was based on the availability of the seedlings or wildlings in the Province. Our results show that the survival rate is promising. However, we are aware that the numbers published here are based on the available data as we cannot provide the raw data, and we are aware of the possible bias produced in this table. Hence, we would recommend further research on monitoring the growth and the survival rate and comparing areas with other PO plantation sites. Further, the information were verified during the interview process on the benefits of reforestation initiatives to the local farmers. Lastly, we present here the positive impact of plantation initiatives that is engaging and could lead to in-depth research looking at other monetary benefits to the local farmers.

TABLE III. THE PERCENT SURVIVAL RATE OF INDIGENOUS TREE SPECIES OF THE THREE LOCATIONS.

Location	Commodity	Species planted	Area planted	Seedlings planted	Survival rate
Tucdao	Timber	Narra, Bahai, Bitanghol	20 ha	33,320	96%
Ungale	Timber	Narra, Bahai, Bitanghol.	27 ha	44,982	90%
Burabod	Timber	Narra, Bahai, Hindang.	80 ha	133,280	90%

Data were taken from Provincial Environment and Natural Resources (PENRO) Naval, Biliran Province.

B. Management implications

The KCPA, an active association on environmental-related activities, was awarded a long-term project by the PENRO. The PO as an active partner in the implementation of the NGP project. They were able to have support from the PENRO Biliran. The PENRO provided financial and technical support in establishing three sites in KCPA, equivalent to 127 hectares plantation. The indigenous tree species were being used in reforestation activity in support of the policy of the NGP in restoring the Philippine forest. In addition, the PO ventures the so-called agroforestry system to have additional income by incorporating trees with crops. Despite the high survival rate of the plantation and its positive impact on the PO members, there are visible threats that can have a significant impact on the plantation's success. The plantation is prone to fire outbreaks. Fire is seen as a natural hazard during the dry season. The area is dominated by cogon (*Imperata cylindrica*) which possibly trigger fire occurrence during the dry season. Every year, forest fires cause enormous and irreparable damage to the forest ecosystem, and, in some cases, damage the plantation permanently.

On the other hand, illegal logging was seen as a significant cause of forest degradation. Illegal logging in the study area is rampant and seen as a real threat to the forest. The trees are harvested from protected areas and then traded illegally. Trees are extracted at volumes significantly higher than is permitted. As a result, a tremendous role to play in tackling illegal logging- which often happens in critical species habitat- and the associated trade of such wood. Thus, careful planning, management, and monitoring of the plantation are recommended to protect the plantation and avoid possible threats that hinder the positive effect on forest goods and services and the livelihoods of rural people.

IV. CONCLUSION

The main goal of this study was to evaluate the success of plantation sites managed by KCPA. Forest benefits such as livelihoods and ecosystem services provided by plantations will be at stake. Thus, research has been carried out to evaluate the success of the plantation. Our study shows that the positive outcome of plantation based on the survival rate and the species planted were listed in the conservation status list in the Philippines. However, there are possible threats that will hinder the continued success of the plantation, thereby affecting the forest goods and services. Thus, this research suggests further monitoring and continued protection of the plantation.

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