



PARAMETERS AND INDICATORS FOR MEASURING SUCCESS
OF REFORESTATION PROJECTS IN LUZON, PHILIPPINES

ASSESSMENT REPORT ON THE PERFORMANCE OF REFORESTATION PROJECTS (ANNEX B)



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UPLB FOUNDATION INC.

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Reforestation Projects in Luzon, Philippines**

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OF REFORESTATION PROJECTS**

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INTRODUCTION

Performance is the qualitative and quantitative indicator for assessing the success of reforestation initiatives. The most common indicators used for measuring establishment success in reforestation sites are survival rate of planted trees, area planted compared to the target area and number of seedlings planted. These indicators are commonly measured and monitored during the first three years of reforestation in NGP implementation. In other reforestation projects, socio-economic and environmental indicators were also used to determine reforestation performance. The socio-economic indicators used are increased income, employment opportunities, creation of alternative livelihoods, and capacitated communities. The environmental indicators or measures include climate amelioration, soil fertility, increase in biodiversity and improved environmental services, and decreased illegal activities.

Various institutional, technical/biophysical and socio-economic and socio-cultural factors were seen as contributing to the performance of the reforestation projects in the study areas. The following discusses the results of the reforestation performances in Regions I, II, III, and V and the factors contributing to their performance.

METHODOLOGY

Key informant interviews were conducted among different sectors from the government, LGUs, POs, private sector, non-profit organizations, private tree plantation holders (SIFMA, CTPO) and the academe in each region. A structured questionnaire was used to assess the factors leading to the performance of reforestation projects of the implementors. These were categorized into institutional, technical/biophysical, socio-economic and socio-cultural components. The respondents were also asked their perception on other suitable measures of reforestation performance.

RESULTS AND DISCUSSION

Factors Affecting Performance of Reforestation Projects

Institutional Component

This refers to the presence of formal collaborative mechanisms, reforestation project characteristics and budget.

Presence of formal collaboration. The presence of MOA/MOUs or management agreements and contracts ensures that the goals of the project are achieved within the agreed upon time frame. A strong and appropriate institutional support is critical for promoting investment and local participation in rehabilitation projects and ensuring their sustainability (Chokkalingam et al. 2005).

The DENR has executed MOAs/contracts between POs, LGUs, other government agencies, academe and the private sector/individuals to undertake reforestation activities. All NGP projects were conducted through Memorandum of Agreement (MOA) between DENR and various institutions (LGUs, POs, academe, and other government agencies like NIA, DPWH, and NPC). The MOAs/MOUs specify, among others, the duration of contract, responsibilities of each party, scope of work, modes of payment, deliverables, sanctions and incentives. For NGP projects the contract period is for three years. Organized POs, LGUs, NGOs were contracted to conduct seedling production, actual planting and maintenance of established

plantations. In general, the contractees were able to abide with the terms and conditions specified in their contract which is also an indication of their performance.

Project implementors are guided by their management plans or work and financial plans to properly implement their activities and as such have served as monitoring and evaluation tool to assess their accomplishments. According to the DENR, the MOA with WFP is used as a guide to monitor accomplishments under NGP in compliance with the specified amount of contract and details. This strategy is effective in dealing with POs, NGOs and LGUs with no conflict.

Reforestation project characteristics. Reforestation project characteristics are considered to influence reforestation outcomes. These characteristics include goals and objectives, project implementers and location and accessibility of project sites.

Recent reforestation objectives have departed from the traditional objective of wood production and have shifted towards economic benefits, ecosystems good and services, and wildlife conservation (cited in Le 2011). The objective of reforestation projects can generally be divided into physical and non-physical (CIFOR 2003). The physical objectives are to increase forest and land cover, increase timber production, protect watersheds and conserve biodiversity while the non-physical objectives are to increase community income, create livelihood opportunities, empower local communities, secure community access to land and to raise environmental awareness and education.

The reforestation program and projects of the DENR, in general, have multiple objectives covering both physical and non-physical aspects such as environmental, socio-economic and institutional. Increasing forest cover and soil and water management remain the dominant objectives of reforestation across sectors and regions as well as the goal of poverty reduction. In all the study areas, both physical and non-physical objectives of reforestation are being realized.

The implementors of reforestation projects are also determinants of reforestation success. These implementors are government agencies (e.g. DENR, NIA), LGUs, POs, private sector/NGO, academe and private individuals. DENR reforestation projects focused on providing jobs by hiring people to establish plantations. The academe engage in reforestation projects for research, education and instruction purposes. Most of the LGUs undertake reforestation for protection and enhancement of environmental services. Interview results showed that the private sector can sustain the management of their reforestation sites from nursery, plantation to maintenance and protection due to availability of funds and as part of their CSR unlike government funded projects like NGP and CBFM. The DENR should therefore forge more partnerships between NGOs and private companies in their greening projects.

The location and accessibility of reforestation sites are important factors in reforestation success. In the regions, most of the remaining sites identified for reforestation are located in highly inaccessible areas. The distance of project sites affects the hauling and transport of seedlings (resulting to damaged seedlings), the frequency of monitoring, and maintenance and protection. It was mentioned that maintenance and protection was not done on schedule especially during the rainy season when sites can become inaccessible. If planting sites are to be located in inaccessible areas, appropriate revegetation strategies should be considered beforehand to ensure the establishment of the plantations.

Budget sufficiency and timely release of funds. Availability of funds or budget and its timely release is an important factor that affects the performance of reforestation projects specially for POs who are dependent on the availability of funds to implement their reforestation activities. Since their activities are target driven, the timely release of funds is critical. DENR and PO respondents mentioned cases where planting was delayed and that the planting schedule was shortened due to the late release of funds. Funds allocation and release schedule should be on time to be able to follow the planting schedule under the WFP, specially for NGP project. Also, according to the respondents, allocating a larger share of the budget on maintenance and protection even beyond the contract period is essential to ensure that the plantations will be well established. For LGUs and the private sector, they have a regular budget allotted for reforestation activities including hiring of labor, procurement of seedlings, infrastructure and others.

Planting seedlings at the right time is crucial, because this directly affects the survival of seedlings (Nawir, et al. 2007). As stipulated in DAO 2019-03, planting of seedlings has to be conducted at the beginning of the rainy season and stop in at least two months before the end of the rainy season. However, factors such as the late release of budget coupled with the late arrival of seedlings, meant that seedlings were planted at the wrong time of the year (e.g. at the end of the rainy season or during the dry season. This supports the findings of Chokkalingam et al. (2006a) wherein the most common problem with reforestation in the country is limited funding or poor access to funding, as well as delayed funding releases from the government. Timely releases of funds for reforestation is crucial because planting has to be done during the few wet months of the year, otherwise seedling mortality becomes high.

Technical and Biophysical Component

The technical and biophysical components that affects the performance of reforestation projects include conduct of survey, mapping and planning (SMP), location and accessibility of reforestation sites, quality and condition of seedlings planted, site preparation and planting, timing of planting, and maintenance and protection.

SMP/Planning. Survey, mapping and planning (SMP) is the baseline information required for every reforestation project to ensure availability of areas for development, suitability of species to be planted, bio-physical and environmental characterization, as well as assessment of the social and institutional conditions in the area. This activity should be conducted before the implementation of reforestation projects. However, interviews showed that not all of the SMP activities were conducted during the early implementation of NGP projects. Reforestation activities were fast-tracked without adequate preparation and support from stakeholders, as supported by the 2019 Performance Audit conducted by the Commission on Audit of NGP projects. It concluded that fast-tracking the reforestation activities without adequate preparation and support of stakeholders increased waste of resources.

On the other hand, in reforestation projects funded by ADB loans 1 and 2 and those implemented by private groups (SIFMA, CTPO, First Gen Corporation, Tan Yan Kee Foundation, Inc.), pre-implementation activities were conducted such as site assessment, household survey, site-species matching, and participatory approach on deciding what to plant. Survey, mapping and planning (SMP) was a key component activity of the National Forestation Program of the Philippines (Carandang & Lasco 1978). This is a requirement before a contract reforestation project can be implemented in the said area. According to Domingo (1977), in the implementation of reforestation programs, it is important to determine

the soil characteristics in the planting area. Failure in reforestation had been due to adverse site conditions which are not given appropriate and sound soil fertility management practices. According to some of the respondents SMP is an important activity specially in preventing future disputes due to boundary conflicts.

Formulated Management Plan. Tenure holders with management agreements such as CBFMA, SIFMA, IFMA are required to prepare a management plan detailing how they would accomplish its objectives in the development, protection and management of areas granted to them. The management plan has to be submitted before a tenure holder starts his operation. Studies on reforestation howe that a management plan was positively correlated with the long-term maintenance and protection of reforestation projects. Thus, Chokkalingam et al. (2006a) proposed three indicators for assessing the sustainability of project management: a) the existence of a long-term management plan; b) having a long-term monitoring and evaluation; and c) having a feedback mechanism.

For NGP projects, the Work and Financial Plan (WFP) serves as the management plan that guides the activities of POs in achieving their targets. The WFP includes the scheduled activities and corresponding budget as well as the various SMP activities that shall be conducted. The respondents mentioned that the plans should also consider factors such as suitable species, topography, soil condition, present vegetation, application of silvicultural treatments, water source, market, and livelihood.

While a management plan/WFP is essential, equally important is adequate budget to conduct the scheduled activities. The performance of reforestation projects therefore depends on the timely release of funds.

Percent survival of planted seedlings. Survival rate is one of the basis for determining the performance of reforestation projects. The DENR needs to determine the compliance of POs for NGP projects with the terms and condition in their MOA on whether the reforestation project was able to attain a survival rate of at least 85% at the end of the duration of the contract. The performance of the project will be measured by the survival rate of the seedlings and extent of area planted based on total number of seedlings alive during validation over the total number of seedlings required based on the contract.

The reforestation projects in most of the study areas reportedly met their target of 85% survival set by the DENR. The DENR and PO respondents attributed this to replanting with maintenance starting from Year 1 up to Year 3 to attain the 85% survival required of the POs, which is the basis for payment of the 10% retention fee and for billing purposes. The plantation should attain a minimum survival rate of 85% up to the third year, otherwise replanting should be undertaken (NGP Implementation Manual 2012).

For NGP, the percentage survival should be 90-95% (Year 1), 85-90% (Year 2), 87% (Year 3) according to the DENR. The PO respondents however mentioned that the percent survival rate decreased from 85% (Year 1) to 70% (Year 2 and 3). There is more than 85% survival from Year 1 and 3 due to availability of funds for maintenance and protection. However, for the succeeding years, percent survival of planted seedlings become lower (40-50%) since replanting is no longer conducted. In some cases, there is high mortality rate of replanted seedlings after the project since the seedlings are sourced from around the vicinity where quality is not assured or whatever is available.

For the private sector, survival of alibangbang (*Bauhinia* spp) was high (98%) which was used as pioneer species. In the academic sector, however, indigenous species planted have a low survival (38%). For some reforestation areas with low survival rates the respondents cited poor soil/rocky, drought, fire, typhoons, delay in release of budget and grazing animals.

Actual area planted compared to target area. Another indicator used for measuring performance of reforestation projects is to compare the actual area planted to the target area. This indicator is commonly measured within months of planting and monitored regularly during the first three years of reforestation. Based on literature review, the factors that greatly affect the actual planted area compared to targeted area include: site preparation, number of seedlings planted, maintenance activities like frequency of cleaning and weeding, percentage of seedlings selected, number of seedlings replanted, and kind of planting stock used (cuttings, potted seedlings or bareroot seedlings).

For NGP projects, the DENR Central Office sets the target area to be planted which is then downloaded to the field offices for compliance. The actual area planted compared to target area planted is monitored by DENR personnel (EOs) and POs based on the WFP and TOR for NGP, unlike in past reforestation programs and projects which is based on management plans. Replanting is done to meet the survival rate based on the target area. According to the DENR and PO respondents, the POs were able to meet their target. The respondents from the private sector, LGUs, OGAs and academe likewise use their WFP to monitor whether they have achieved their targets.

Growth performance. Growth performance of seedlings is another indicator of reforestation performance wherein the height and diameter of planted seedlings and stand density is measured through inventory. Growth of seedlings is monitored in nurseries. To ensure its survival in the field, seedlings to be outplanted should have reached a height of 1.5 ft above the root and 30 cm in diameter or an average of 2 ft. However, only a few of the implementors monitor growth performance on the site, especially among the government-initiated reforestation projects. In private plantations, growth performance is monitored and reported. It is important to monitor the growth performance of planted seedlings particularly if the purpose of reforestation is for timber production where timber quality is a valuable factor.

Quality of planting materials. Selection of appropriate species to be planted in an area must consider the prevailing conditions therein. The quality of seedlings is another determinant of reforestation performance. The use of genotypically superior seedlings ensures a better performance of plantations. According to Carandang and Lasco (1998), the genetics of reforestation can be operationalized initially by the use of quality seeds from superior sources.

The respondents produced their own seedlings but also buy from different sources to meet their targets. The quality of seedlings therefore cannot be assured since no assessment was made on the quality of seedlings purchased. Seedlings procured from outside the province are also subject to stress due to distance of travel. The respondents from the study sites observed that the quality of seedlings is also affected by improper handling and transporting which in turn may affect its survival. Seedlings that are manually hauled from the nursery to the plantation are more prone to damage particularly if these are carried in sacks.

DENR respondents recommended that before out-planting, seedlings should be graded or sorted to ensure that only vigorous seedlings are planted in the field. DENR respondents mentioned that the seedlings raised in nurseries should at least be 1 ft in height and 1 cm in

diameter (pencil size) to be considered of good quality. Seedlings should also be sturdy and must be free from infestation.

Site Preparation. Site preparation aims to secure high seedling survival and rapid early growth by controlling competing vegetation, removal of physical obstruction to tree growth, cultivating to control soil structure to aid rooting and nutrient availability, and modifying natural drainage to either improve drainage on wet sites or retain moisture on dry sites. It can also involve the construction of fences to exclude grazing livestock (Evans 1992 as cited by Folledo 2000).

All of the respondents conducted site preparation activities. According to the DENR respondents, reforestation projects could be further guided by the DENR Technical Bulletins which details the steps/procedures in preparing the sites for reforestation. The site preparation includes strip brushing, staking of using planting distances appropriate for species, usually 4m x 5m for timber and for bamboo and agricultural crops, varying spacings, hole digging (4m x 6m). Since the POs receive payment for these activities, there is also a corresponding contract that the parties will have to enter into (COA 2019). Some of the respondents mentioned that the guidelines were not followed e.g. spacing

The manner of planting also contributed to the low survival wherein the prescribed guidelines contained in DENR Technical Bulletins were not followed like proper spacing for timber, fuelwood and agroforestry species, the proper silvicultural treatments required which has led to low survival rates of seedlings.

All the respondents agreed that site preparation activities are necessary. DENR respondents also mentioned that application of organic fertilizer can contribute to the increase of seedling survival. Some POs use compost as fertilizer.

Timing of planting. Planting is preferably done at the onset of or during the rainy season. However, the DENR and PO respondents mentioned that this was not often followed due to the delayed release of budget. They added that the schedule of planting was dependent of the timely release of the budget. However, they have to conduct planting regardless of the timing so as to meet their targets. They observed that low survival of seedlings happened because the planting was conducted during the dry season.

Planting seedlings at the right time is crucial, because this directly affects the survival of the seedlings in the field (Nawir *et al.* 2007). Typically, the most appropriate time to plant tree seedlings is at the beginning or in the middle of the rainy season. However, many factors, such as the late arrival of seedlings, or delayed release of the project budget, can mean that seedlings are planted at an inappropriate time of year (e.g. at the end of rainy season or during the dry season). As stipulated in DAO 2019-03 (Revised Implementing Rules and Regulations of Executive Order No. 193, Series of 2015: Expanding and Enhancing the Coverage of the National Greening Program), planting has to be conducted at the beginning of the rainy season and stop at least two (2) months before the end of the season.

Maintenance and Protection. Maintenance of established plantations including silvicultural treatments applied at the establishment and early growth phase of forests are important to reforestation success. Maintenance activities if not managed properly, can cause reforestation failure. DENR had specified activities to be conducted as part of maintaining the planted sites that are detailed in a technical bulletin. All the sectors in the different study sites conducted maintenance activities like ring weeding, mulching, replanting and fertilizer application. The

respondents appreciated the importance of these activities specially during the early growth phase of reforestation to ensure success and survival of planted seedlings. Maintenance of plantations is usually conducted twice a year or during the rainy season when weeds tend to grow fast and frequent brushing and weeding is needed. Establishment of small water impounding systems (SWIS) can help increase the survival of the seedlings as required in NGP projects but it is not mandatory for all reforestation sites (Experts' Consultation 2021).

Uncontrolled grazing and fires, uncontrolled cutting, charcoal and kaingin making are the many causes of reforestation failure. To combat these, the DENR required all tenurial holders (CBFMA, IFMA, SIFMA etc.) and private plantation owners to protect their areas by conducting foot patrol and establishing firelines and firebreaks and constructing lookout towers. The DENR also uses a monitoring tool, LAWIN, to aid in forest protection. CBFM POs and other stakeholders were trained on how to use this technology.

Some of the factors affecting the maintenance and protection activities of the POs, in particular, is the inadequate budget. Some PO members do not like to work without compensation and hire themselves out in other plantations. Another is the relatively distant sites of plantations which has constrained the POs from regularly conducting maintenance and protection particularly during the rainy season when conditions can be hazardous. The private companies, on the other hand, have allocated funds for reforestation activities and can afford to hire workers as needed. According to Paje et al. (2010) maintenance activities have to be conducted every six (6) months to remove the competing vegetation and to ensure survival of the outplanted seedlings. Proper care and maintenance of reforestation sites is needed until forests are self-maintaining (if planted for conservation purposes) or reach a harvestable age if trees are planted for commercial purposes.

Infrastructure. The presence of infrastructure such as roads, watchtowers and SWIS are important features in reforestation areas that contribute to successful plantation establishment. Roads provide ease of hauling and transportation of seedlings and equipment to the plantation area. The respondents mentioned the risk of damage to seedlings if these are manually hauled to the site. Roads therefore provide accessibility to vehicles and reduces the time spent to reach the reforestation areas where timing of planting is essential. In Regions 1 and 3, the long dry season, drought and occurrence of fire are major causes of reforestation failure. Watchtowers and SWIS are therefore needed as protection measures against these risks.

Monitoring. Regular monitoring either by DENR or the implementors themselves helps increase the chance of reforestation to become successful. Different monitoring activities were undertaken by DENR which influenced the performance of its reforestation projects. These include: regular monitoring of seedling production to ensure completeness of targets; requiring POs/BOD to conduct internal monitoring; monitoring of nursery activities, among others. These accomplishments are reported by FEOs and checked against the WFP of the POs. Since FEOs need to frequently monitor their assigned areas and provide technical assistance to the POs, it was desired that they be provided with vehicles for better mobility.

Other respondents like the LGU and academe also conduct regular ocular inspections in their area together with DENR staff wherein they monitor the survival rate of planted seedlings and conduct sample height measurements. Respondents from the private sector (First Gen Corporation) have developed their own standards and protocols which serve as their monitoring tool for validating the accomplishments of their reforestation activities. Ocular

inspections are also conducted by SIFMA respondents with the submission of a quarterly accomplishment report to the PENRO. One of the items monitored is to determine the actual area planted compared to the target area. Castillo (1986) identified factors that affect the actual planted area compared to target area namely site preparation, number of seedlings planted, frequency of cleaning and weeding, percentage of seedlings selected, number of seedlings replanted, kind of planting stock used (cuttings, potted seedlings or bareroot seedlings) which are some of the bases for the success of the reforestation project. There is also a need for a long-term M&E framework and plan to assess and adjust project implementation (Experts' Consultation 2021).

Fires and Natural Calamities Occurrence. It has been reported that occurrence of calamities occurrences (e.g., typhoon, drought, floods, etc.) and fires are the major causes for the low survival rates of planted seedlings. Fire incidences top the list of calamities that destroy NGP sites. Forest and grass fires which are highly flammable are common in reforestation areas due to the extreme heat especially during dry season. Also, the cultural practice of *kaingin* (slash and burn) of upland communities destroy the planted the planted seedling.

Aside from fire incidence, frequent occurrence of strong typhoons also affected the survival of seedlings planted.

Socio-Economic Component

For achieving long-term reforestation success, local people must receive benefits exceeding those from alternative land uses, otherwise reforested areas will continue to be cleared (Ramakrishnan 1994 as cited in Le 2011). Employment generation is one of the incentives provided by reforestation projects through employment in seedling production, hauling, planting, and maintenance and protection activities. These activities are participated in by men, women and families. Livelihood-enhancing activities must be part of reforestation plans. The CBFM reforestation projects have incorporated livelihood components to provide additional income to members and wean them away from destructive forest practices. Agroforestry strategy ensures that POs will have something to harvest for the succeeding years. The respondents from the private sector have likewise adopted the agroforestry scheme to provide livelihood to local communities.

One of the socio-economic indicators is increased income through involvement in reforestation activities while at the same time harvesting of crops from agroforestry farms specially for PO members. Through their income from the reforestation projects, the PO members were able to improve their houses and helped in the educational expenses of their children. Involvement in reforestation projects have given the local communities/POs with livelihood opportunities. These include livestock raising from CBFM-CARP, selling of crops from agroforestry farms, and other alternative livelihood such as basket and mat weaving, production of honey and processing of agricultural crops into chips. Priority is given to communities living adjacent to the reforestation sites.

The socio-economic benefits of reforestation do not necessarily have to be direct. It can include "avoided negative impacts" such as landslide, soil erosion, or preservation of timber reserves (Le *et al.* 2011). The reforestation projects have improved the ecosystem services as observed by the respondents in terms of water quality and quantity, climate amelioration, increased biodiversity. Carbon stocks assessment is also measured in the reforestation sites managed by one of the private sectors, First Gen Hydropower Corporation (FGHPC).

Socio-Cultural Component

Capacity Building and Technical Assistance. Capacity building and community empowerment are important factors contributing to the success of reforestation projects. These are done through skills training, seminars and dissemination of information provided by assisting professionals, extension officers or NGOs. The frequency with which farmers have contact with extension agents is important in the acquisition of skills and knowledge (Salam et al. 2000). The POs have received various skills training related to nursery and plantation management, product development and marketing, agroforestry, among others. They have attended seminars and orientations to enhance their knowledge about NGP and on topics related to forest conservation. First Gen Corporation provides values training and education to their farmer associations to instill good stewardship. These activities are important in building their capacities and help them to become active partners in forest development.

Technical Assistance. The technical capability of reforestation project implementors affects both the short and long-term survival of planted areas, and also tree growth and the quality of tree products. Chokkalingam et al. (2006a) found that many Philippine non-government agencies felt that they had inadequate technical capability to manage reforestation projects. Therefore, effective and timely technical assistance and training is required to lift reforestation success, particularly when projects are managed by non-government agencies (CIFOR Rehab Team, 2004).

Availing of technical assistance from assisting professionals (APs), assisting organizations (AOs) or extension officers (EOs) or even the academe can contribute to reforestation success by strengthening the PO in managing their organization, and in assisting them in the more technical aspect of reforestation.

The PO farmers have availed of the technical assistance of extension officers in agroforestry related matters and in problems related to their plantations e.g. pest and disease control, planting techniques, recommended spacing for agroforestry crops among others. Assisting professionals (APs), assisting organizations (AOs) and non-government organizations (NGOs) also provided assistance to the POs in the conduct of Community Organizing (CO) activities and Comprehensive Site Development (CSD). Trainings on seed collection, seedling production, plantation establishment and maintenance, leadership, book keeping, accounting, and financial management) were also conducted to enhance POs' knowledge and skills.

However, it was learned that some hired Forest Extension Officers are lacking in experience and not technically equipped. Some have attended trainings but these were not extensive and sufficient. Some FEOs are also performing other tasks in their respective offices. This affected the frequency of their field visits, provision of technical assistance to project implementers, and monitoring of various reforestation activities. In addition, DENR is still short of FEOs. It was reported that the ratio of FEOs to NGP sites ranges from 1:443 to 1:736 and is considered too big for them to manage. This is one of the causes in the delay in the validation of NGP sites, which affects the release of payments to POs. It was also learned that FEOs are hired as job orders and their salary is very low as compared to the many roles and responsibilities they have to perform.

Community Involvement and Participation. In order to succeed, restoration and rehabilitation should have the strong support and participation of local stakeholders in the planning, management, implementation, protection and monitoring activities. The involvement

of the community in the planning activities builds confidence and creates ownership of the work and outputs and thus enhance participation.

Most of the respondents acknowledged the importance of local community participation to the success of their reforestation efforts. For DENR, LGUs, private companies, academe and other implementors, consultation and orientation with POs and stakeholders was conducted and they were involved in planning and decision making. The major involvement of POs and local communities are as hired labor during the implementation phase which includes seedling production, site preparation, planting, maintenance and protection. However, these activities are conducted within the contract period only. Planning should also consider activities to be conducted beyond the contract period to ensure that the planted seedlings are successfully established. In most cases, reforestation fails when maintenance and protection is not sustained.

The DENR respondents also mentioned that organizational development through community organizing is essential in the past reforestation programs and projects which involved the participation among local community, local barangay officials, women and others.

Measures of Successful Reforestation Projects

The respondents were asked their perception on which of the indicators under the biophysical, technical, institutional, socio-economic and cultural parameters do they consider important measures of reforestation performance. The results show the yardstick or gauge by which the respondents determine performance of their reforestation projects. There are a total of 94 respondents across the regions (Table 1).

Among the biophysical parameters, percent of total area planted (actual vs target) was considered by 91% of the respondents as an important indicator. This is one of the indicators used by the respondents for assessing if their reforestation project has achieved its target. This was followed by biomass and litter production (87%), which is an indicator of the productivity and growth of the trees in the plantations. Eighty-four percent of the responded that site accessibility was an important measure of success. Reforestation sites that are more accessible can be easier to monitor and protect. Although fire occurrence is identified as one of the causes of low survival in the plantations only 65% of the respondents considered this as an indicator of reforestation success. In Region 5, the respondents mentioned that fire occurrence is not a problem in their reforestation sites which could be due to the climate and weather conditions. In some studies conducted, reforestation activity was deemed successful by CSC holders due to the following: biomass and litter production increased that enhanced soil fertility, water yield of the community significantly improved due to watershed rehabilitation; and reduction of harvest losses due to minimized flooding and soil erosion.

Technical factors contributing to successful reforestation performance are adequate site characterization, frequency of maintenance activities, intensive guarding and patrolling, quality of planting materials, site-species matching, use of indigenous/native species in the area, infrastructure development and formulation of management plan. A great majority of the respondents across all sectors considered all the indicators under the technical factors as good measurements for reforestation performance. Foremost of these is quality of planting materials as mentioned by 98% of the respondents followed by frequency of maintenance activities and formulated management plans (97% each). The least number of respondents (90%) mentioned use of indigenous species as an indicator of performance.

There are nine institutional factors relevant to reforestation success. Among these, 98% of the respondents each mentioned that the presence of formal collaborative mechanisms and adequate manpower are good indicators of successful reforestation. This is followed by the indicators of prioritization of local communities (97%), security of tenure (96%), stable policies and financial assistance (95% each), timing of release of funds and presence of support agencies (93% each), and peace and order (89%).

Among the socio-economic indicators, community participation, livelihood opportunities, continuous extension services were given equal importance by the respondents (96% each) as measures of reforestation performance. On the cultural indicator, adoption of existing indigenous knowledge and practices, received 87% mention among the respondents.

Appendix Table 1. Performance of reforestation programs, all regions (n=94).

Parameters/ Factors	Sector																		Total	Total					
	DENR (n=40)			PO (n=31)			Academe (n=7)			LGU (n=6)			Private (SIFMA & CTPO) (n=7)			NGO (n=3)				Yes		No		NA	
	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*		No.	%	No.	%	No.	%
Biophysical																									
Biomass and litter production	37	2	1	26	5		6	0	1	5	1		6	1		2	1		94	82	87	10	11	2	2
Fire Occurrence	29	10	1	18	13		4	2	1	4	2		4	3		2	1		94	61	65	31	33	2	2
Natural calamities occurrences	28	11	1	26	5		5	1	1	4	2		6	1		2	1		94	71	76	21	22	2	2
Site accessibility	33	6	1	31	0		5	1	1	4	2		4	3		2	1		94	79	84	13	14	2	2
Percent of total area planted (actual vs target)	37	2	1	29	2		5	1	1	5	1		7	0		3			94	86	91	6	6	2	2
Technical																									
Adequate characterization of site intended for reforestation	37	1	2	31			6		1	6	0		6	1		3			94	89	95	2	2	3	3
Frequency of maintenance activities (fertilizer application, weeding, brushing)	38	1	1	31			6		1	6	0		7	0		3			94	91	97	1	1	2	2

Assessment on the Performance of Reforestation Programs and Projects

Parameters/ Factors	Sector																		Total	Total					
	DENR (n=40)			PO (n=31)			Academe (n=7)			LGU (n=6)			Private (SIFMA & CTPO) (n=7)			NGO (n=3)				Yes		No		NA	
	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*		No.	%	No.	%	No.	%
Intensive guarding and patrolling	38	1	1	31			6		1	6	0		6	1		3			94	90	96	2	2	2	2
Quality of planting materials	39		1	31			6		1	6	0		7	0		3			94	92	98	0	0	2	2
Site-species matching	39		1	30	1		6		1	5	1		6	1		3			94	89	95	3	3	2	2
Use of indigenous/native species in the area	38	1	1	27	4		6		1	5	1		6	1		3			94	85	90	7	7	2	2
Infrastructure development	33	6	1	28	3		5	1	1	5	1		6	1		3			94	80	85	12	13	2	2
Formulated management plan	39		1	31			6		1	5	1		7	0		3			94	91	97	1	1	2	2
Institutional																									
Prioritization of local communities	39		1	30	1		6		1	6			7			3			94	91	97	1	1	2	2
Security of tenure	39		1	30	1		6		1	6			6	1		3			94	90	96	2	2	2	2
Stable policies	38	1	1	31			6		1	6			5	2		3			94	89	95	3	3	2	2

Assessment on the Performance of Reforestation Programs and Projects

Parameters/ Factors	Sector																		Total	Total					
	DENR (n=40)			PO (n=31)			Academe (n=7)			LGU (n=6)			Private (SIFMA & CTPO) (n=7)			NGO (n=3)				Yes		No		NA	
	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*		No.	%	No.	%	No.	%
Financial assistance	38	1	1	29	2		6		1	6			7			3			94	89	95	3	3	2	2
Timing of release of funds	38	1	1	29	2		6		1	5	1		6	1		3			94	87	93	5	5	2	2
Presence of formal collaborative mechanisms	39		1	31			6		1	6			7			3			94	92	98	0	0	2	2
Adequate manpower	39		1	31			6		1	6			7			3			94	92	98	0	0	2	2
Peace and order condition	36	3	1	29	2		6		1	4	2		6	1		3			94	84	89	8	9	2	2
Presence of support agencies	37	2	1	31			5	1	1	5	1		6	1		3			94	87	93	5	5	2	2

Assessment on the Performance of Reforestation Programs and Projects

Parameters/ Factors	Sector																		Total	Total					
	DENR (n=40)			PO (n=31)			Academe (n=7)			LGU (n= 6)			Private (SIFMA & CTPO) (n=7)			NGO (n-3)				Yes		No		NA	
	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*	Yes	No	NA*		No.	%	No.	%	No.	%
Socio-economic																									
Community involvement and participation	38		2	31			6		1	5	1		7			3			94	90	96	1	1	3	3
Livelihood opportunities	38		2	30	1		6		1	6			7			3			94	90	96	1	1	3	3
Prevailing wage rate in the area	35	4	1	29	2		5	1	1	4	2		6	1		3			94	82	87	10	11	2	2
Continuous extension services	38	1	1	30	1		6		1	6			7			3			94	90	96	2	2	2	2
Market availability	38	1	1	29	2		6		1	5	1		7			3			94	88	94	4	4	2	2
Perceived benefits	38	1	1	30	1		5	1	1	4	2		7			3			94	87	93	5	5	2	2
Cultural																									
Adoption of existing indigenous knowledge and practices	34	5	1	27	4		6		1	6			6	1		3			94	82	87	10	11	2	2

CONCLUSION AND RECOMMENDATIONS

The above discussion identified the important factors that influence successful reforestation performance taking into consideration the various institutional, biophysical/technical, economic and socio-cultural components. Project implementors have to consider these factors in coming up with future strategies and interventions for reforestation projects to succeed. There is a need to understand that reforestation performance is the result of the interaction of these factors. Reforestation should therefore be viewed in a holistic manner. Planning for reforestation has to ensure that the critical elements or factors needed for reforestation to succeed are already in place e.g. organized community, management plan, sufficient budget, technical support, livelihood and economic incentives, and others. There is a need for long-term planning that should go beyond the contract period (for NGP) until the plantations are well-established. Finally, these factors/parameters and indicators can be used in coming up with a suitable monitoring and evaluation framework for identifying the areas that need to be addressed to achieve a successful reforestation performance.

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