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A Local Initiative to Achieve Global Forest and Landscape Restoration Challenge—Lessons Learned from a Community-Based Forest Restoration Project in Biliran Province, Philippines

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Abstract: Forest and landscape restoration in the tropics is often undertaken by groups of smallholders and communities whose livelihoods are primarily agricultural and forest-based. In the Philippines, the implementation of forest restoration programs involving people's organizations showed mixed results. We present a case study of a pilot community-based forest restoration project that was undertaken in Biliran Province to understand the impediments, and pilot test interventions to improve restoration outcomes. The project was designed using systems thinking, employing smallholder-based best-practice, and applying the principles of a participatory approach. The results revealed that the initial participation of smallholders is mostly driven by short-term financial incentives. However, long-term commitment to managing the trees is attributed mainly to sustainable livelihood, land and tree rights, equitable sharing of benefits, strong leadership, effective governance and improved human and social capitals. The support of extension officers, use of high-quality seedlings, and participation of women are essential for community-based forest restoration success. Key lessons from our research could contribute to fulfilling the forest and landscape restoration commitments of developing countries in the tropics.

Keywords: forest and landscape restoration; people's organization; livelihood; communal plantation

1. Introduction

Issues of poverty and lack of food security are widely recognized as among the primary causal factors of deforestation in many developing countries [1–6]. Various initiatives have been developed to address deforestation, reduce poverty, enhance food security, and promote climate change mitigation and adaptation. In September 2011, leaders from around the world launched the Bonn Challenge aimed at restoring some 150 million hectares of the world's degraded lands by 2020 following the forest landscape restoration (FLR) approach [7]. The concept of FLR is not merely about restoring ecological integrity but also enhancing human wellbeing in deforested and degraded landscapes. In the tropics, FLR is primarily implemented by communities to fulfil restoration targets [8]. This involves devolving power from the government to community forestry groups as an incentive for sustainable forest management [9].

The community-based approach to undertaking large-scale restoration has been the national strategy of the Philippine government since the launch of the Community-Based Forest Management (CBFM) program in 1995 [10]. In this program, community groups, in the form of people's organizations (POs), are given legal access to state-owned lands for 25 years and renewable for another 25 years. The government provides financial and technical support to restore degraded landscapes, and implement livelihoods to generate food and income while managing the trees. The power to make decisions related to program implementation, identify and implement livelihoods, and to manage project funds is also devolved to the POs.

The limited success of the CBFM program is widely reported [11–16]. The objectives of the program, including poverty alleviation and sustainable management of forest resources, are far from being realized [15]. In many cases, people's organizations are disbanded, communal plantations are abandoned, and restoration sites revert to grassland or are converted to *kaingin* (slash-and-burn) farms by locals. The recent National Greening Program (NGP), which adopted CBFM as the implementation platform, is also fraught with the same suite of challenges [9,13,14,17]. The NGP is a government program that aims to restore 1.5 M ha from the period 2011 to 2016. This has been extended until 2028 to restore another 2.4 M ha of the remaining 7.2 M ha of degraded forestlands in the country [18].

A case study to investigate the root causes of the mixed results of community-based forest restoration and pilot-test a suite of interventions to improve restoration outcomes has been undertaken in Biliran Province since the second quarter of 2014. The study employed the action research approach [19]. Data were collected through participant observation [20], face-to-face interviews, workshops, and focus group discussions with stakeholder groups. Biophysical characterization of the restoration site was carried out, and measurements of seedling and tree growth parameters were also undertaken. The study was conducted as part of the research activities of the project ASEM 2010/050 *Improving Watershed Rehabilitation Outcomes in the Philippines through Systems Approach* with funding from the Australian Centre for International Agricultural Research (ACIAR). This paper discusses the key issues limiting the success of community-based forest restoration initiatives, outlines the pilot-tested interventions and corresponding results, and highlights critical lessons with implications for the global FLR aspirations.

2. Case Study Site, and Structure and Support of Past Restoration Projects

The Philippines is an archipelagic country composed of 7107 islands, covering a total land area of 30 million hectares [21]. Groups of islands are further divided into regions, provinces, cities municipalities, and, down to the smallest unit of government, the barangay. As of September 2014, the Philippines has 17 regions, 81 provinces, 144 cities, 1490 municipalities and 42,029 barangays [22]. In 2019, the population was estimated to be 107 million with a population density of 363 persons/km². Over half of the population (55.6%) live in rural areas, and approximately 75% depend on agriculture as their primary source of livelihood [23].

The pilot community-based forest restoration project was located in a 26-hectare upland area in barangay Kawayanon, a community in the municipality of Caibiran, Biliran Province (Figure 1). Biliran Province is one of the six provinces comprising Region 8 (Eastern Visayas). It is a volcanic island composed of eight municipalities, with Caibiran as one of the only two municipalities with vast plains that are suitable for agriculture. The climate is characterized as having no distinct dry season and heavy rains occurring in December, making it ideal for agricultural production.

Kawayanon was once densely forested but experienced severe forest loss, erosion and land degradation due to logging in the 1960s and the subsequent encroachment by slash-and-burn farmers [24]. About 90% of the natural forest was lost, and illegal smallholder logging continues to reduce the remaining patches of natural forest. The community is situated in volcanic and undulating land that mostly belongs to the state. The upland is mainly composed of grassland, dominated by cogon (*Imperata cylindrica* L.) with a mosaic of shrubs, including the invasive non-native hagonoy (*Chromolaena odorata* L.) and lantana (*Lantana camara* L.), and a few exotic mangium (*Acacia mangium*

Willd.) trees that are remnants of previous reforestation projects in the 1980s. There are patches of coconut (*Cocos nucifera* L.) plantations, smallholder kaingin (slash-and-burn) farms in which farmers have planted crops for subsistence, and a small remnant of natural forest.

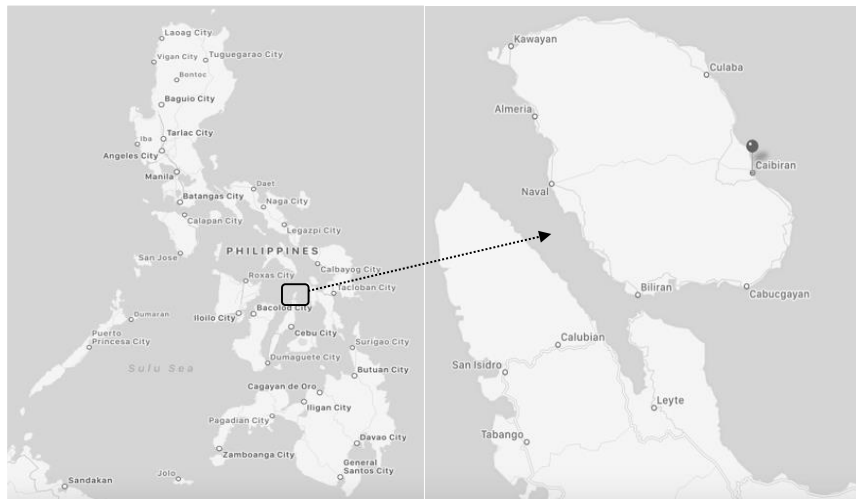


Figure 1. Location of the case study site. *Source:* Google Earth Image: Google, Maxar Technologies.

The community in the study site is impoverished, with substantial food security issues and minimal cash earning opportunities. Smallholder farming, including slash-and-burn agriculture, is the primary source of income and food for most families. Some residents earn income from selling firewood and working as labourers outside the community. The restoration site has claimants over land rights who do not possess ownership titles. A dysfunctional PO named Kawayanon Farmers Association Incorporated (KFAI) represented the community's interests in restoration initiatives, with only three active members remaining out of 118 initial members. The majority of the members (79%) have not completed secondary education, and 72% were over 50 years old. In 2013, about 83% of the members had an annual household income below the poverty threshold of Biliran Province.

Since the 1990s, the site has been subjected to several layers of government-funded reforestation projects including the Contract Reforestation Program (CRP), the Community-Based Forest Management Program (CBFMP), the Upland Development Program (UDP) and, most recently, the National Greening Program (NGP). The community holds a Community-Based Forest Management Agreement (CBFMA), a tenurial instrument providing the right to develop, use and manage 100 hectares timberland for 25 years and with the possibility of renewal for another 25 years subject to appropriate management. Despite the multiple restoration attempts, tree stocking remains less than 10%. Fruit trees were planted as part of the reforestation projects, but seedling survival was very low. Fire, grazing, lack of post-planting silviculture, and the conversion of plantations to smallholder agricultural farms by land claimants were among the reasons for the poor outcomes of the restoration projects.

The provision of financial support for nursery seedling production and plantation establishment and maintenance for three years was common to all restoration projects in the community. The land and tree tenure was included in all programs except for the CRP. Technical support in nursery seedling production, plantation establishment, and post-planting silviculture were also provided. Livelihood projects were included in CBFM and NGP.

3. Design and Implementation of the Pilot Community-Based Restoration Project

The pilot community-based forest restoration project was designed using the findings from preliminary surveys through personal interviews and workshops with stakeholders, and participant observation. The design also draws on the literature relevant to community-based forestry programs in the country [11,13,15,16,25] and informed with findings of the series of smallholder forestry research

projects of ACIAR in the Philippines. A systems approach [26] was employed to understand the complexity of the community-based forest restoration system. Identifying the problems and potential solutions, implementing interventions, and monitoring the results were carried out, following the participatory process involving relevant stakeholder groups.

The preliminary surveys revealed the lack of internal PO policies and weak governance, failed livelihood projects, limited social preparation, inadequate criteria of DENR for restoration success, and prevalence of low-quality seedlings as primary factors for the poor results of past restoration initiatives in the community. These factors were interconnected and also influenced by other factors. For example, livelihood projects failed as a result of the absence of local policies on the management and sharing of benefits, which in turn was a result of a lack of social preparation to improve the capacity of the PO to develop and implement local policies. The failure of livelihood projects was also a function of corruption by PO leaders, mismatch with PO circumstance and preference, and lack of technical skills. The use of low-quality seedlings in the restoration was not only attributed to the lack of technical skills but also influenced by the less effective governance regulating the seedling quality and limited seedling production period. The limited seedling production schedule was caused by delayed processing of seedling production contract. The influence diagram in Figure 2 shows the links of factors that impacted the less favourable outcomes of past restoration programs in the community.

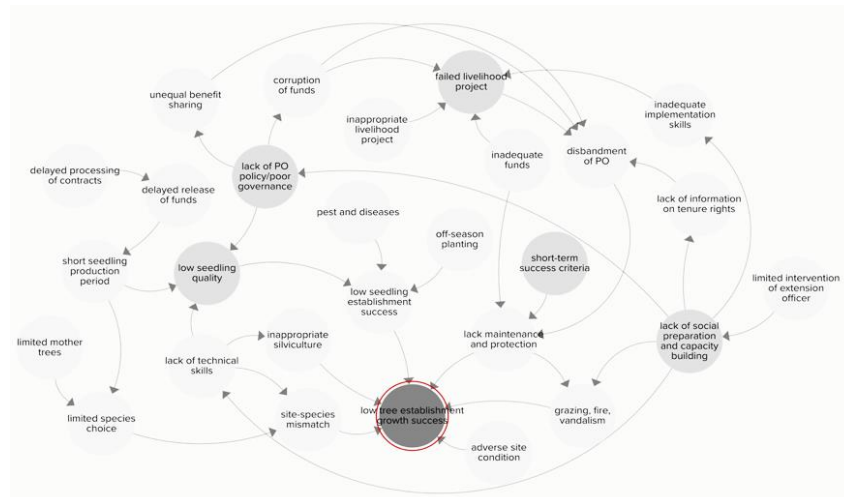


Figure 2. The influence diagram of issues contributing to the low survival of trees in past community-based forest restoration projects of Kawayanon Farmer's Association Incorporated (KFAI).

Recognizing the relationships of the factors affecting the restoration outcomes, and taking into account the suggested interventions during stakeholder consultations, a suite of intervention measures to improve the restoration outcomes were pilot-tested. The following summarizes the interventions.

3.1. Adequate Social Preparation

The details of the project, including land and tree rights, benefits and responsibilities, and the type and duration of support were explained to the PO and other stakeholder groups. Training on smallholder-based best practice in nursery seedling production, plantation establishment, and post-planting silviculture was undertaken. Appropriate record-keeping and financial management, producing minutes of meetings, and developing intra-PO policies were also demonstrated. An extension officer from the ACIAR Project provided the training and necessary follow-up activities to promote the adoption of technologies demonstrated in training events.

3.2. Improved Supply of High-Quality Germplasm

With the assistance of the extension officer of the ACIAR Project, PO members inventoried mother trees in the natural forest of the community. Some 300 phenotypically superior trees of 15 premium native species were identified. Locations were mapped, and trees were marked for easy identification. A mother tree protection program was developed in partnership with the local government unit at the community level to protect the mother trees from illegal harvesting.

3.3. Participatory Site Zoning and Species Selection

The restoration site was divided into planting zones (i.e., production, protection, and agroforestry) to satisfy the production and conservation functions of restoration. The production zone is intended for timber production, the protection zone for ecological function, and the agroforestry zone mainly for food production and source of income in short and medium terms. The PO members were consulted on their tree and crop species preference. Their options were further guided by the research team to match the species to the planting site and plantation objectives.

3.4. Adopting Smallholder-Based Best-Practice in Seedling Production Site Preparation, Plantation Establishment, and Post-Planting Silviculture

Through the technical support of the extension officer, the PO produced high-quality seedlings using low-cost and simple techniques. Large planting holes were used to facilitate root system development and water capture during rain events. An optimum amount of fertilizer was applied, and weeds around the base of seedlings were removed. The PO members conducted regular patrol works to guard the plantation from fire and stray animals, and for the timely detection and control of pests and diseases.

3.5. Livelihood Projects Promoting Food Security and Income

Nursery enterprise, furniture making, abaca (*Musa textilis* Nee) fiber production, charcoal production, and fruit, vegetable, and crop production were the preferred livelihood options of the PO. With the guidance of the extension officer, the PO applied for nursery accreditation, a requirement for making the communal nursery seedling production a commercial enterprise. Rows of ipil-ipil (*Leucaena leucocephala* Lam.) and auri (*Acacia auriculiformis* Cunn.) for charcoal production were established along the boundary of the restoration site. The PO applied for a timber-harvesting permit to utilize *Acacia mangium* trees that were remnants of the past reforestation projects in the community. The timber would be used for furniture making. An agroforestry system was jointly designed and established by the PO and technical experts from the research team. The PO was provided with planting stock of fruit trees and crops, which were chosen based on their preference, suitability to the planting site, and market opportunity of products.

3.6. Transparency in Handling Financial Resources

A regular group meeting in the presence of an extension officer of the ACIAR project and personnel of the local DENR office was conducted to update the members on financial matters relevant to the project implementation. Copies of financial reports were displayed on the bulletin board inside the multipurpose shed of the PO for ready access by all members of the organization.

3.7. Development of Local Policies

The PO, with the support of the local DENR, has developed internal policies, including membership arrangements, project management and sharing of benefits, and legal agreements with land claimants. With the support of local community leaders, a community ordinance was also developed to protect the trees and crops from fire and grazing animals by restricting pasturing to designated community

pasture areas. A community ordinance was also crafted by community leaders, imposing penalties for cutting or damaging the mother trees identified by the organization.

4. Project Outcomes, Impacts and Monitoring

The project interventions resulted in considerable improvement of restoration outcomes when compared with the past forest restoration projects in the community. The operational effectiveness and tree establishment success were notably better than in most government reforestation sites in Biliran Province [24,27,28]. On his visit in 2017, the former DENR Undersecretary Marlo Mendoza commended the project for the evident tree establishment and growth success [29]. The International Union for the Conservation of Nature (IUCN) also chose the project as one of the seven case studies around the world featured in Enhancing Food Security through Forest and Landscape Restoration [30].

Regular meetings and consultations with PO members were carried out by project researchers and DENR staff to monitor the progress, identify issues, and design interventions. Face-to-face interviews of PO members were conducted after the third and fifth years of the project implementation to determine the social and economic impacts. Ten permanent plots were established in the production and protection zones to monitor tree establishment and growth success. Tree parameters, including height and diameters, were measured quarterly for the first three years and every six months after the third year. The following outlines the successful outcomes of the pilot-tested project:

Tree and crop establishment and growth success. Fast-growing exotics and native trees including mahogany (*Swietenia macrophylla* L., Jacq.), *Acacia mangium*, narra (*Pterocarpus indicus* Willd.), and white lauan (*Shorea contorta* Vidal.) have been planted in the production zone. A mixture of native species was also planted in the protection zone. Several species of fruit trees and crops were established in the agroforestry zone. Less combustible crops, including pineapple, cassava, taro, and sweet potato were also planted in the firebreak to further food security measures and help reduce the cost of firebreak maintenance. The application of research-informed smallholder-based best practices resulted in a high seedling survival rate (78% in year 3 with the replanting of only 18% in year 1 and 15% in year 2). *A. mangium* showed impressive growth, reaching an average height of seven meters over four years after establishment. The site has never been burned since the project inception, and damage to trees and crops caused by grazing was not pronounced. This could be attributed to adequate social preparation and effective policy measures in implementing and monitoring the project. The participation of land claimants in the project could be another reason for this. Anecdotal evidence revealed that disgruntled land claimants were among the culprits of past reforestation failures in the community, setting fires and allowing domesticated ruminants to graze inside the plantation.

Enhanced food security and the provision of additional income. The PO started harvesting the crops, which helped to satisfy their household food needs. Farm produce beyond the consumption of members were sold to generate extra income. The group has been selling cassava, sweet potato and pineapple in the community.

Improved human and social capitals. With the rejuvenation of the PO, the number of active members increased from three individuals to 36 families, including new membership of land claimants. 'Active membership' denotes participation in implementing project activities, involvement in meetings and contributions in decision-making. The PO passed the seedling quality assessment performed by DENR, indicating the improved technical knowledge in high-quality seedling production. The PO has also developed local policies about project management, including membership rules and the sharing of responsibilities and benefits. The organization has established a meeting centre in the community using their resources.

Increased bridging capital. The success of the project increased the PO's access to financial and material support from other government agencies. In 2015, the local DENR granted PhP520,000 (USD 10,000) to support the group in expanding the communal agricultural farm from 6 to 35 ha. This provided the opportunity to diversify the crops to include coffee, banana, and cacao. The Department of Agriculture also provided a generator and hose for farm irrigation, and funds for

the PO to venture into peanut production. Financial support of PhP 100,000 (USD 2000) for constructing potting sheds and purchasing seeds of corn and fertilizers were also provided. The Philippine Coconut authority distributed inorganic fertilizer to the PO. A free crop insurance application was also provided by the Crop Insurance Office of Biliran Province. In 2017, the DENR granted a new NGP project with funds of PhP 1.3 M (USD 25,000) to rehabilitate over 60 ha of timberland in the adjacent community. While the PO officials initiated the solicitations from government agencies, the extension officer of the ACIAR Project assisted the group in developing the funding proposals.

5. Challenges to Achieving Favourable Restoration Outcomes

The project monitoring shows that most of the project interventions resulted in improved restoration outcomes. However, problems that hindered some of the interventions from exhibiting favourable results were also experienced. The following is a summary of the challenges.

Illegal harvesting of mother trees by the locals. The policy of the community to protect and conserve the mother trees was ineffective. The absence of community funds to undertake regular forest patrolling, limited support to the community to apprehend illegal loggers and fear of conflict with perpetrators were the main reasons for the less effective implementation of the policy. Anecdotal information revealed that those who illegally harvested the mother trees were community residents who were relatives of some of the leaders.

Ambiguity of the forest nursery accreditation process. The PO has not completed the application for nursery accreditation despite passing the seedling quality evaluation. The slow processing of the application for accreditation and ambiguity of the accreditation application process contributed to the delay in obtaining the accreditation.

Lack of resources to effectively manage the expanded agroforestry farm. The expanded communal agroforestry farm was beyond the capability of the PO to manage effectively. Lack of human resources and material inputs to maintain the 41 ha plantation (6 ha of the pilot project plus 35 ha established using funds provided by DENR) resulted in a low survival rate of the planted crops. The management of crops and fruit trees by the PO was a counterpart required to secure financial aid from DENR to purchase the planting materials.

Limited timeframe to implement best practice in community-based forest restoration. The NGP project of the PO that commenced in 2017 was a separate undertaking from the pilot community-based restoration project and entirely administered by DENR. Being part of the national government program, project activities were in orchestration with DENR's annual restoration target. However, the delayed approval of the project contract resulted in practices that contributed to less desirable project outcomes. The seedling production schedule was shortened, which undermined the seedling quality. Site-species matching was neglected, and planting proceeded despite weather conditions being adverse, to satisfy the target size of land to restore. These poor practices resulted in low seedling survival rate. The social preparation phase was not given substantial attention. Part of the plantation was burned in 2018, and it was surmised that a disgruntled land claimant intentionally set the fire.

Competing opportunity for income outside the project. Off-farm income opportunities posed a negative impact on the implementation of the restoration project. These opportunities include working as labourers in infrastructure development projects, mostly attracting the male members of the PO. While off-farm employment can be considered a positive factor to enhance the financial capacity of the PO members, it reduced workforce availability, which was especially crucial during the early phase of the project, when labour input was high. With husbands employed in off-farm jobs, the wives filled the labour shortage and implemented most project activities including seedling production, tree plantation establishment and the development of the communal agroforestry farm.

6. Critical Reflections, Lessons Learned, and Implications for Other FLR Projects

The pilot community-based restoration project in Biliran provided some lessons that have implications for the design and implementation of successful FLR projects in other regions of the Philippines and many developing countries. These lessons are outlined below.

Appropriate project design. The project was designed following the participatory process, adopting the systems approach and incorporating lessons from past reforestation programs. The scope was developed to match the needs and interests of the community and provide both short and long-term benefits, particularly on economic and food security. The project has a long-term focus that goes beyond satisfying merely the target area for planting and the volume of seedlings to produce, which is a commonly used parameter for assessing restoration success. Production, protection and agroforestry zones were identified to satisfy the multiple objectives of restoration. These were carefully selected at the early phase of the project, which guided the species selection and management regimes. Our experience emphasized the importance of matching the size of the restoration area to the capability of the PO to manage the restoration project effectively.

Adequate social and educational preparation. We found that effective community-organizing and proper knowledge of the project, including the benefits and responsibilities of the PO and other stakeholders, are instrumental in promoting the long-term engagement of communities in forest restoration. We also learned that community organizing is not a short-term project activity, but a long-term process without a definite temporal endpoint. Implementing need-based training with adequate support is necessary for capacity building.

Good leadership. The PO officials practiced the participative style of leadership, exercised transparency, especially in the management of project funds, and promoted the equal sharing of benefits among the members. Strong leadership was also essential in the effective implementation of internal policies. These leadership attributes were crucial in motivating, mobilizing and guiding the organization to achieve the objectives of the project. We found that support of extension officers was instrumental in promoting good leadership practice.

Transparency in handling project funds. The timely reporting of financial transactions was instrumental in fostering trust and building a stronger relationship between members and officers of the group. The transparency prevented the misuse of financial resources of the PO.

Sustainable livelihood and food security measures. The case study revealed that financial returns and food security are prime motivating factors of smallholders to engage in forest restoration. The communal agroforestry livelihood, which helped in promoting food sufficiency and provided additional income, has profoundly improved the motivation of the PO members to participate in the project. We found that for livelihood projects to succeed, they should match the interests and circumstances of the community, and be implemented with adequate financial, technical and marketing support.

Adequate financing and timely disbursement of project funds. The pilot restoration project was implemented with sufficient funds, which were disbursed following the project plan. This was imperative for the application of desirable practices, including the production of high-quality seedlings, planting during the wet season, and applying an adequate post-planting silviculture. Delayed disbursement of funds adversely affects the restoration success, as shown in the government-funded NGP project of the PO that commenced in 2017.

Security of land and tree tenure. Security of land and tree tenure and a clear understanding of land and tree rights were factors that motivated the early engagement of PO members in the pilot restoration project. However, we noted that tenurial security might not necessarily result in long-term engagement. Tree plantations during the previous CBFM project of the PO were abandoned despite their ownership rights.

Effective governance. The participatory and consensus-oriented style of leadership, implementation of project activities following established internal and external policies, and adequate institutional and stakeholder arrangements were the driving factors for improved outcomes of the pilot restoration project when compared with previous restoration projects in the community. Our experience revealed

that when the PO was at the stage of subsistence, and could not control unapproved activities including the misuse of funds and cutting of mother trees, the organization required interventions from supporting groups, including government agencies, in developing policies and promoting effective governance.

Support from extension officers. The support of the extension officer from the ACIAR project was significant in rejuvenating the organization, building the capacity to implement best practice, and guiding the group to achieve the objectives of the restoration project. The extension officer was also instrumental in linking the PO to government agencies, and promoting good governance both within and external to the group.

Women are essential restoration agents. Recognizing the limited financial benefits particularly at the early stage of the project, husbands engaged in off-farm jobs, leaving the wives to lead the implementation of restoration activities, including nursery seedling production, tree plantation establishment, and management of the communal agroforestry farm. Women were mainly responsible for tree and crop species selection. They also assumed leadership roles in the group and represented in meetings because of their availability.

7. Conclusions

Our case study proved that the complex interactions of many factors, including biophysical, technical, socio-economic, and governance affecting the success of community-based forest restoration, require the application of an integrative systems approach. The use of a genuine participatory process at all levels of the project, and the integration of evidence and learning from past FLR interventions and research undertakings is also paramount. Our experience suggests that the initial participation of smallholders in community-based forest restoration projects is mostly driven by short-term financial incentives. The long-term commitment to manage the trees is attributed mainly to a combination of factors, namely sustainable livelihood, land and tree rights, equitable sharing of benefits, strong leadership, effective governance and improved human and social capitals. Further, we found that the adequate and timely support of extension officers, use of high-quality seedlings and participation of women are essential.

The pilot restoration project in Biliran showed evidence of tree establishment and growth success, and positive social and economic impacts, which are essential indicators for the long-term forest restoration success. Although the design of the project can be applied across various regions, the specific approach and activities may vary in different locations. Our follow-on project, ACIAR ASEM/2016/103 'Enhancing Livelihoods through Forest and Landscape Restoration', which operates from the period 2017 to 2022, investigates how to best scale-out the pilot restoration project in Biliran Province to nine communities in Leyte, Cebu, and Iloilo Provinces in the Visayas region of the country. This project also provides the opportunity to monitor the progress of the pilot restoration project in Biliran. Key lessons from this project are envisaged to assist in designing and implementing FLR initiatives in other regions of the Philippines, and developing countries in the tropics.

Author Contributions: N.G. was responsible for conceptualizing the study and designing the methodology. He also led the research activity planning and execution, data collection and analysis, writing the original draft and editing following the comments of reviewers. J.H. was mainly responsible for funding acquisition and had a significant contribution in conceptualizing the research, writing the first draft and critical reviewing of the article. R.T. primarily contributed in the investigation process, particularly in data collection. A.P. contributed in the project administration and writing the original draft. All authors have read and agreed to the published version of the manuscript.

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