Social And Economic Impact Of National Greening Program To Farmer Beneficiaries In Davao Occidental, Philippines

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Abstract: The degradation of forests is a worldwide phenomenon which have profound effect not only to the environment, but also other aspects like social and economic well-being of farmers. In the Philippines, the National Greening Program (NGP) has been implemented in 2011 and ended in 2016 but then expanded till 2018. This study was conducted to assess the social and economic impact of NGP to farmer-beneficiaries in Davao Occidental. Descriptive research design was employed and 979 farmer-beneficiaries were randomly selected and interviewed with the aid of a researcher made questionnaire. Results revealed that NGP have not significantly impacted the social well-being of the farmers, but rather on the economic well-being of the farmers as evident by the increased in income brought about by employment/job opportunities related to NGP activities and access to forest products and services. However, farmers noted evidence in the improvement of their social well-being in terms of cultural values and knowledge management. The implementation of NGP can be a way more successful if considerations on social impact to farmers will be integrated in the Program.

Keywords: degradation, economic impact, reforestation, social impact

1. Introduction

Deforestation in the Philippines has resulted in a major decline in forest cover for decades. Records show 3.8 million hectares of forest was lost between 1990 and 2013. If no action is done, the forest will continue to deteriorate and will have a detrimental impact on the environment, affecting human health, agricultural output, climate change, and so on, as well as the individual's social and economic well-being [1]. Accordingly, climate model, CO_2 atmospheric concentrations will rise to 735 parts per million (ppm) in 2080 from 380 parts ppm. The global mean temperature (GMT) will rise by 3.3 degrees Celsius. The average surface temperature of land regions, which would warm faster than the seas, is expected to rise by 5.3oC per land area and 4.4oC per agricultural area. All of these are harmful to the Earth's and humanity's well-being. Thus, world leaders agreed to help mitigate the effects of climate change by creating laws and regulations governing restoration, afforestation, and reforestation [2].

In the Philippines, the National Greening Program (NGP), which is the country's largest and most comprehensive reforestation project was implemented by Pres. Aquino III administration in 2011 through Executive Order 26 [3]. It targeted 1.5 million hectares reforested in 6-year period. It also wanted to address other basic issues of the country such as poverty, food security, environmental stability and biodiversity, and climate change. Unlike previous reforestation programs, the NGP is implemented at the local level specifically in rural barangays with farmers as beneficiaries. The program ended in 2016, but with the continuing challenge and threat of climate change it was extended in 2018 by Pres. Duterte.

The Province of Davao Occidental is a beneficiary of the six-year implemented NGP program. However, to date, there is no study conducted to assess its impact to farmers considering their social and economic well-being. Furthermore, empirical evidences on the impact of the program are important as they can be used as a basis for future decision making.

1.1 Objectives of the Study

The study was conducted to investigate the social and economic impact of the National Greening Program (NGP) to farmer-beneficiaries, specifically in the Province of Davao Occidental. The specific objectives of the study were as follows:

a. Determine the perception of farmer-beneficiaries on their social well-being before and after NGP.
b. Determine the economic well-being of the farmer-beneficiaries before and after NGP.
c. Find out significant difference on the perception of farmer-beneficiaries before and after NGP, in terms of their: social and economic well-being.

1.2 Significance of the Study

The Department of Environment and Natural Resources (DENR) being the key agency mandated to implement, oversee, and monitor the NGP, there is a need for relevant and reliable information on the after effects of the Program not only to the environment but also to the beneficiaries who are farmers. This study can be a rich source of data which the officials of DENR in the municipal and provincial level can use in planning and decision making.

The farmer-beneficiaries can be informed of the overall status of the Program, whether its objectives especially those concerning their social and economic welfare are achieved or not. For government programs, like the NGP, the benefits should be equitably distributed to farmer-beneficiaries.

1.3 Delimitation of the Study

The population of the study is delimited to farmer-beneficiaries of the National Greening Program (NGP) in the Province of Davao Occidental, Philippines. The study

focused on the social and economic impact of NGP to the farmer-beneficiaries.

2. Literature Review

2.1 Reforestation in the Philippines

The first Forestry School was established in Los Banos, Laguna. Students and faculty had experimented with around 600 species of trees as part of their silvicultural classes in 1916. The government appropriated funds to widely plant barren regions in the same year. Republic Act 2649 provides P10,000 for the reforestation of 4095 acres of the Talisay Minglanilla Friar Lands Estate in Cebu province. However, due to lack of funds the project was halted. Then local people planted ipil-ipil (Leucaena leucocephala) and other fast-growing tree species [4].

In 1919, the Magsaysay Reforestation Project was established in Arayat, Ilocos, and Zambales, all on Luzon. This was followed by the establishment of a Cinchona plantation in Bukidnon (Mindanao) in 1927 and three other reforestation projects until 1931. From 1910 until 1936, meagre government funds limited rehabilitation efforts generally to experimental planting, small plantations, and studies on suitable species and seed treatment to hasten germination. More extensive reforestation took place from 1937 to 1941 when the Government appropriated funds for larger-scale activities. A special office was established under the Director of Forestry to inspect new projects. The Makiling Reforestation Project was established at this time [5].

The Magsaysay Reforestation Project was launched in 1919 in Arayat, Ilocos, and Zambales, Luzon. Then a Cinchona plantation was established in Bukidnon (Mindanao) in 1927. Three more forestry initiatives were established till 1931. Limited funds restricted restoration efforts of the government to experimental planting, tiny plantations, and investigations on appropriate species and seed treatment to accelerate germination from 1910 to 1936. When the government provided finances for larger-scale efforts from 1937 through 1941, more significant reforestation occurred. A separate office was formed under the Director of Forestry. At this time, the Makiling Reforestation Project was founded [5].

At the onset of World War II, 35 projects totaling 535,000 hectares were planted with 26 projects in Luzon, 6 in Visayas, and 3 in Mindanao. Nurseries were built covering 24 hectares with an annual capacity of 17 million seedlings. From 1910 to 1941, about P3.57 million was spent on reforestation or about P134/ha, which included nursery and plantation creation and upkeep. Reforestation were primarily fund by the government and were focused on research, regreening barren lands and providing environmental services to the public. Communities were not involved in the reforestation projects and in one case they were actually evicted. During the war, established plantations in the country were destroyed and only 15% survived or around 4000 ha [5].

After the war (1946 to June 1948), relatively little money was set aside for replanting. The majority of the work was focused on restoring nurseries, retrieving looted equipment and tools, rebuilding infrastructure, creating fire lines, and cleaning plantations [4]. Reforestation efforts resumed in July 1948, when Republic Act 115 established a new and permanent funding source to restart reforestation programs abandoned during World War II, by levying taxes on timbers taken for commercial reasons from any public forest. The government has planted 55,381 acres by 1960 and invested P20,267,375 since 1916 [5].

Republic Act 2706 founded the Reforestation Administration in 1960. Since then to 1972, the number of reforestation projects climbed from 57 to 91 with a total of 182,000 ha planted [6]. Under Presidential Decree 1, the Reforestation Administration was merged with the Bureau of Forestry, Parks and Wildlife Office, and Southern Cebu Reforestation Project in 1972. Then reforestation activities were integrated under the Bureau of Forest Development. From 1973-74, DENR planted a further 10,781 ha. Due to insufficient funds, technical inefficiency, and corruption, the post war forestry efforts of the government performed poorly. Forest dwellers were often evicted since they were viewed as primary perpetrators for destruction and obstacle to rehabilitation. The government mostly failed to engage timber businesses in replanting initiatives on huge forest holdings assigned to them for logging [7], [8].

The private sector's involvement was low since there were few efforts compelling then to restore, and natural forest timber was still plentiful and inexpensive. As a result, rehabilitation attempts failed to address the fundamental causes of degradation: a) logging excesses, and b) livelihood needs and inequitable access to resources of growing upland populations. P.D. 705 issued in 1975 and ordered nationwide reforestation efforts alongside the business sector. The Program for Forest Ecosystem Management was created to promote a holistic approach to forest management that included all sectors. The following year, P.D.1153 was issued, requiring all able-bodied persons aged 10 and above to plant 12 seedlings annually for five years. In 1979, all timber license, lease and permit holders are required to plant one hectare of land to denuded or brush areas for every hectare logged to compensate for the lost. EO 725 included industrial tree plantations, tree farms, and agroforestry farms to join the cause. Then PD 1559 amended PD 705 in 1978 to stipulate incentives like low fees and taxes, credit facilities, free technical assistance, and unrestricted export of plantation products [5].

In the early 1980s, The Integrated Social Forestry Program and the Community Forestry Program were instituted in 1982 and 1987, respectively, and are funded by foreign donors. These programs are under the umbrella of DENR which are basically small-scale agroforestry and social forestry projects to provide livelihood to farmers as well as mitigating upland forest degradation. The 1980s reforestation programs aimed at addressing upland poverty and promote livelihood opportunities by regreening barren lands and producing timber [9]. New changes occurred which paved way to “contract reforestation” involving families, local communities, NGOs, LGUs, and the private sector offering a fee for reforesting and maintaining an area for three years ensuring a survival rate of ≥ 80 percent and an average tree height of 0.8 m. The area had to be turned over to the DENR after the contract.

Then EO 263 was issued in 1995 that adopted the Community-Based Forest Management (CBFM) as the government's strategy for sustainable forest management and social justice in which organized communities are contracted to plant trees, were given tenure over the areas [5] and were entrusted forest rehabilitation, protection and conservation, with the promise of equitable access to forest benefits. These were funded by loans from foreign banks. In support, the 1991 Local Government Code empowered LGUs to enforce forestry laws and engage in reforestation projects in partnership with the DENR and communities.

From the literature above, the Philippines invested huge money in forest rehabilitation involving various sectors or actors with most funding coming from foreign loans (93%) while the rest from private investment. DENR recorded 5503 registered CBFM communities from 1975 to the present and around 2200 registered private initiatives (TLAs, TFs, ITPs, IFMAs, and SIFMAs). Reforestation projects were numerous in which rehabilitation was just one component in an integrated program.

2.2 Environmental Impact of Reforestation

Greenhouse gases such as carbon dioxide and methane have a vital role in climate change. To lower CO_2 levels in the atmosphere, planting trees is beneficial. Forests are excellent in absorbing large portion of carbon released by the combustion of a fossil fuel. Reversing global deforestation is a critical component of a successful global warming mitigation plan. In addition to the advantages to the environment, reforestation provides the ability to protect endangered species from extinction [10], [11]. A regenerating forest replaces habitat loss and degradation, posing hazards to the health of species. Deforestation affects and destroys ecosystems through erosion. Erosion damage can be reversed by forest regeneration. Regional watersheds harmed by deforestation can be restored by replanting. Forests help fight against global climate change [11]. Further, reforestation can help improve people's quality of life as it helps in the ecosystem's balance. It alters the environment by conserving water, providing fresh air, harboring wildlife, and moderating climate. Planting trees is essential in dry areas to attract rainfall [11].

2.3 Social Impact of Reforestation

One means of assessing the impacts of reforestation is to investigate the perception of the locals on forestry as part of their social and physical environment [12]. To know whether forests are being sustainably managed it is necessary to take into account its social impacts [13].

Forests are important for recreational, cultural and spiritual values for forest-dependent communities [14] and provide inputs to the social well-being of people and societies, which include cultural and spiritual values, quality of life, and health; and more fundamental issues related to identity, aspirations, political systems and human rights [15]. Changes in people's ways of life, culture, communities, and political systems, as well as their surrounding environment, health and well-being, rights, and fears and aspirations, are all examples of social effects or impacts [16].

2.4 Economic impact of Reforestation

Based on the Millennium Ecosystem Assessment (MEA), an estimated of over 1.6 billion people world-wide are forest-dependent populations for their livelihoods at the turn of century. The forests provide a home to almost 350 million and about 60 million indigenous people wholly depend on forests (15). The Forest Peoples Programme (FPP), on the other hand, had escalated the figures between 1.095 billion and 1.745 billion, or between 14 and 25 percent of all humanity [17].

Reforestation provides many job opportunities to people who lack the skills needed in other sectors. Planting trees can therefore generate employment, especially to the local people [11]. Households that live in and around forests are estimated to derive significant proportions of their annual income from forest resources [18] and are engaged in some form of forest-based livelihood activity [19], [20], [21] or to generate income [22]. The poor are disproportionately depended on forest resources [23], [24] to meet their basic subsistence needs [25].

Forest products directly contribute to local lives as agricultural inputs, as items to consume and sell locally [26], [27], and as inputs to larger production value chains [28]. Locals value forest for their management of water flows to agriculture and fisheries [29]. Jobs, local growth and investment, forest product markets, and ecosystem restoration are indicators of the economic benefit of restoration, afforestation, and reforestation. However, the participants of the RP- German Community- Based Forest Management (CBFM) Project in Quirino Province had economic losses as a result of the reforestation project [30].

3. Conceptual Framework of the Study

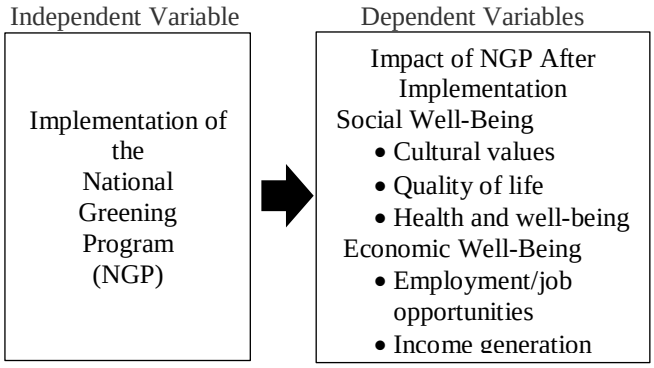

Figure 1: The conceptual framework showing the relationships of the variables of the study

4. Hypotheses of the Study

The following are the hypotheses set in the study:

Ho_1: There is no significant difference in the perception of farmer-beneficiaries before and after the National Greening Program in terms of social well-being.

Ho_2: There is no significant difference in the perception of farmer-beneficiaries before and after the National Greening Program in terms of economic well-being.

5. Methodology

5.1 Research Locale
The study was conducted in the Province of Davao Occidental, Philippines covering its five municipalities, namely: Malita, Sta. Maria, Don Marcelino, and Jose Abad Santos.

5.2 Research Design
Descriptive research design was employed in this study. It aimed to gather data in order to describe the social and economic impact of NGP to the farmer-beneficiaries.

5.3 Sampling Design
The respondents were chosen using simple random sampling technique to ensure equal chances of the samples to be chosen. The sample size of NGP farmer-beneficiaries was computed using the Slovin formula. The list of barangays and farmer-beneficiaries per municipality was asked from the office of the DENR. Overall, there were 949 farmer-beneficiaries that served as respondents of the study.

5.4 Research Instrument
A researcher made questionnaire was used in gathering data. It is divided into the following parts: Part I – Personal Profile; Part II – Farm Profile; Part III – Social Impact; and Part IV – Economic Impact. Questions for Part III and Part IV were scaled from 1- Not Evident to 5- Highly Evident. The questionnaire was piloted twice to 15 farmers and data were statistically analyzed. Cronbach alpha of 0.82 indicates that the questionnaire was reliable. Further, the questionnaire was subjected to validation by three experts.

5.5 Respondents of the Study
The farmer-beneficiaries of the NGP of the selected four (4) municipalities of the Province of Davao Occidental were the respondents of the study.

5.6 Data Gathering Procedure
The mayors and barangay captains are informed of the study and their support by allowing the researcher to conduct interview to some of their constituents were requested formally through writing. The study was explained to the respondents and confidentiality of data and their anonymity were assured to them. Right after, their willingness to participate in the interview were sought. Interview was done at the respective houses of the respondents.

5.7 Statistical Tools
Gathered data were tabulated, collated, analyzed, and interpreted. Data were analyzed using arithmetic mean, percentage, and t-test to guide the researcher in formulating a generalization of the results.

6. Results and Discussion

6.1 Personal Profile of NGP Farmer-Beneficiaries
The average age of the NGP farmer-beneficiaries is 40.47 years old. Majority of them were male, had elementary education, belong to the Tagakaolo and Manobo tribe. The average household size is 5.56 members while the average number of children is 3.10. Their livelihood and main source of income relied much on farming. Results of the study almost attuned to previous study wherein the farmers' average aged is 42 years old, mostly males, reached or finished elementary education, and had a household size of 4 to 5 members [30].

6.2 Farm Profile of NGP Farmer-Beneficiaries
All farmer-beneficiaries surveyed had a total of 521.60 ha of which 330.50 ha or 63.36% were subjected to National Greening Program (NGP) or reforestation project of the national government through the Department of Environment and Natural Resources (DENR). Further, each farmer-beneficiaries own an average of 3.06 hectares. Crops planted by farmers are coffee, cacao, falcata, mahogany, and mango. Other crops planted are abaca, coconut, banana, and corn.

6.3 Social Impact of National Greening Program
Table 1 shows the impact of NGP to farmer-beneficiaries in terms of their social well-being. Overall results showed that the impact of NGP to cultural values of farmers were noticeable. Before NGP, their cultural values were somewhat evident (2.58). However, this became evident (3.71) after the implementation of NGP. The impact was highly evident in terms of cultural values and evident in terms of knowledge management. But the impact was fair in terms of quality of life as well as in health and well-being of farmers. Previous study concluded that reforestation has failing on most of its measures including the social benefits of the Program [31].

Moreover, the cultural values of the farmers are way better than before NGP. After the NGP, the farmers valued more the importance of hard work, preserved more their indigenous beliefs or knowledge on farming, regarded more the importance of helping the community, and the importance of family self-reliance or self-sufficiency. They are exposed to the culture of community help and were incentivized upon engagement or participation to NGP.

Meanwhile, the impact of NGP to quality of life of the farmer-beneficiaries was fairly evident (3.17) among farmers which only showed little improvement as they perceived it before as somewhat evident (2.22). The NGP sites are located in upland areas. The NGP fairly impacted in terms of improvement on the connectivity of NGP sites to town services which also relates to maintenance of road networks. It also fairly impacted in terms of security of land of farmers against thieves and provision of basic household appliances that would contribute to a more comfortable life. The only evident impact of NGP to quality of life of farmers was the provision of the subsistence needs of the family as they received remunerations while planting and taking care of trees planted. The income received by the farmers are appropriated and prioritized to basic needs like food rather than buying household luxuries like appliances.

Further, the NGP fairly impacted on the health and well-being of the farmers because provision of health care of farmers engaged in NGP was not integrated in the program. Of course, the NGP's focused was on mitigating the effect of climate change which may adversely affect the quality of life of the people. The farmers attested that NGP evidently had impacted in controlling soil erosion, reducing fire hazards and kaingin, and controlling of incidence of flooding in the NGP sites brought about by tree planting in the area.

Finally, the NGP positively impact on knowledge management as positive effects are evident. The NGP resulted to reduction of illegal farming activities of the farmers like the practice of kaingin. It raised their awareness of the community on the importance of tree planting, awareness on forest conservation among farmers, and know-how on climate change mitigation. These were attributed to frequent campaigns and conduct of meetings with farmer-beneficiaries as well as other members of the community. The results above can be linked to the statement of [13] that forests generate social values, or be connected with people's lives, in ways that contribute to, or deduct from, social well-being.

Table 1: Impact of NGP to farmer-beneficiaries in terms of social well-being

	Particulars	Before NGP		After NGP	
1.	Cultural Values	3.88	E	4.46	HE
2.	Quality of Life	2.22	SE	3.17	FE
3.	Health and Well-Being	2.18	SE	3.38	FE
4.	Knowledge Management	2.05	SE	3.82	E
	Grand Mean	**2.58**	**SE**	**3.71**	**E**

6.4 Economic Impact of National Greening Program

The farmers felt a fair impact of NGP in terms of their economic well-being with a mean of 3.29. This implies an increase or improvement of farmer-beneficiaries' income brought about by employment or job opportunities created by the program. Moreover, farmers observed more creation of jobs or employment related to NGP that benefitted their family, friends and relatives. It also resulted to better access to forest products like fuelwoods, etc. and improvement in farmland yield.

Forest restorations provided fuelwood and other forest products for farmers as well as to local communities [32] like crops and better fodder and benefited from carbon sequestration [33]. Moreover, forest products contributed directly to local livelihoods [27] and inputs to wider production value chains [28]. Households that live in and around forests derived more of their income from forest resources [18]. Reforestation provided many job opportunities to people. Planting trees can therefore generate employment, especially to the local people [11].

Table 2: Impact of NGP to farmer-beneficiaries in terms of economic well-being

		Before NGP		After NGP	
1.	Provision of income for myself and family	1.00	NE	3.69	E
2.	Provision of income to relatives and friends	1.00	NE	2.69	FE
3.	Provision of wood products, like firewood, etc.	1.00	NE	3.37	FE
4.	Reduction of dependency on forest products	1.00	NE	2.67	FE
5.	Improvement of the yield of farmland	1.00	NE	4.03	E
	Grand Mean	**1.00**	**NE**	**3.29**	**FE**

Legend: NE – not evident FE- fairly evident E- evident

Furthermore, before NGP, more than half of the farmer-beneficiaries had monthly income less than P3000 (51.99%), 18.39% had income P3001-P6000, 10.01% had income P6001-P9000, 6.84% had income P9001-P12000, and 6.44% had income P12001-P15000. These figures, however, improved after the implementation of NGP in their locality. The number of farmers who were in the lowest income bracket was dramatically reduced from 51.99% to 8.68%. This implies that most farmers landed to higher income brackets after the implementation of NGP. The most notable increase of farmers was in income bracket P6001 to P9000 from 10.01% to 50.77% which comprised half of the number of farmer-beneficiaries. This connotes improvement of income of farmers but the rate of increase is still considered minimal by the farmers. Results are supported by statements of other authors that NGP reduces poverty, promotes food security, and creates alternative livelihoods. The program generated over 4,736,195 jobs and employed over 670, 489 personnel [34]. Further, the average real household monthly income of NGP household beneficiaries in Zambales and Negros was Php 7,341 compared to Php 4,988 among non-NGP households [35].

Table 3: Income of farmer-beneficiaries before and after NGP

Income Bracket	Before NGP		After NGP	
	N	%	N	%
<P3000	509	51.99	85	8.68
P3001-P6000	180	18.39	61	6.23
P6001-P9000	98	10.01	497	50.77
P9001-P12000	67	6.84	156	15.93
P12001-P15000	63	6.44	105	10.73
P15001-P18000	0	0	23	2.35
P18001-P21000	18	1.84	27	2.76
Above P21000	14	1.43	25	2.55

6.5 Test of Difference Before and After NGP

As shown in table 4, no significant difference was found in the social well-being of farmer-beneficiaries before and after the implementation of NGP. This implies that the social well-being of the farmers was just as the same when there was no NGP implemented in their locality, specifically in terms of cultural values, quality of life, health and well-being, and knowledge management and after NGP.

On the other hand, significant difference was found in the economic well-being of the farmer-beneficiaries before and after the implementation of NGP. This means that, indeed, the implementation of NGP had brought changes and/or improvement in the economic well-being of the farmers. This is evident in the increase of the number of farmers that belong to higher income bracket after the implementation of NGP in their locality. Same results were noted in previous study among certain households in Zambales and Negros where statistically significant increase in income was found [36].

Table 4: Results of t-test before and after NGP on social and economic well-being of the farmer-beneficiaries

Particulars	T	df	Sig.	Dec.
Social well-being	-2.310	3	.104	Accept Ho
Economic well-being	-5.540*	2	.031	Reject Ho

7. Conclusion

Farmer-beneficiaries generally considered that the National Greening Program (NGP) has no impact to their social well-being, though evidences of changes and improvement are notable in terms of cultural values and knowledge management. Moreover, the NGP has impact on the economic well-being of farmer-beneficiaries as evident in the increase of their income.

The National Greening Program (NGP) instituted in the Province of Davao Occidental, Philippines may to a certain extent have achieved its purpose of mitigating forest degradation and helps control forest fire, practice of kaingin, soil erosion, and flooding. However, it contributed less to the social well-being of the farmer-beneficiaries, especially on their health and well-being and quality of life of the farmers. These areas of concern have to be incorporated in future reforestation programs to make it more holistic.

8. Other recommendations

Empirical studies on the survival rate of trees planted under the National Greening Program (NGP) in the Province of Davao Occidental can be conducted to account the success of the project aside from areas covered to reforestation and studies on social and economic impact of the Program.

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