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Microfinance and Environment: Does the Participation in the Microcredit Based Social Forestry of Proshika in Bangladesh Improve Environmental Literacy?

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1.0 Introduction

The rapid reduction of forest resources has posed a serious threat to the ecological balance in Bangladesh. There is a positive correlation between poverty and deforestation. Approximately 40% of the population live under the poverty line. People are poor because they have lack of entitlement on absolute minimum necessities of life. Absolute minimum necessities of life include food, education, clothing, housing and health. Poverty of households contributes significantly to deforestation as poor households are dependent on local forest for their livelihood and for fuelwood. Firstly, the poor do not have the purchasing power to procure firewood from market. Secondly, the local forest becomes the main source of income, for large number of poor household, due to lack of employment opportunities and lack of capital required to start an independent business. Thus, poverty becomes one of the many contributors to deforestation and consequently, to deterioration of environment. According to studies, deforestation occurs due to the use of fuelwood, fodder and other forest products by local poor people (WCED, 1987; Timberlake, 1985; Anderson and Fishwick, 1984; IUCN *et al*. 1980). Currently the coverage of natural forest is 835,000 hectares (excluding parks and sanctuaries), which accounts for 5.8 percent of the total land area of

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Bangladesh. At present, the per capita forestland is less than 0.02 hectares, which was 0.035 hectares per person in 1968-69 (Huq and Alim, 1995).

Against this backdrop, some non-government organizations (NGOs) in Bangladesh have come forward with the objective of improving the environment and alleviating poverty through social forestry programs. Some of these NGOs, for example Proshika, are using microcredit, small collateral-free loans, to motivate poor households to participate in the social forestry program. Social forestry consists of all programs and activities at the community level dealing with tree planting in farms and other categories of lands, caring for the trees and using them for economic and environmental benefits. The activities under the social forestry include tree nursery establishment, tree planting on farms and other categories of land, management and utilization of wood and non-wood forest products for a variety of goods and services. Social forestry programs are aimed primarily at helping small farmers and landless to meet their consumption and income needs. The participants receive training on environment and forestry. The main goals are to induce a large number of poor people to plant trees for their own benefits and to make them more environmentally knowledgeable.

Keeping in mind the objectives of Proshika in implementing social forestry program, this paper intends to examine whether the participation in the social forestry projects improves the environmental literacy of households. Due to time and financial constraints, the present study only looks into strip and block plantation programs to achieve its objectives. The remainder of this paper is organized as follows. Section two is a brief discussion of Proshika and its social forestry program. Section three outlines the issue of environmental literacy. Section four describes the survey design. The methodology and the estimation strategy of this paper are discussed in section five. Results are presented in section six. Conclusions follow in section seven.

2.0 Proshika and the Social Forestry Program

Proshika, one of the three largest microfinance institutions in Bangladesh, was established in the year 1976 and it envisages a society which is economically productive and equitable, socially just, environmentally sound, and genuinely democratic. The organization's mission is to conduct an

extensive, intensive, and participatory process of sustainable development through empowerment of the poor. Empowerment makes the poor functionally literate, enables them to take better care of their health, to get involved in environmental protection and regeneration, get elected in local government bodies and community institutions, and provides the poor with better access to public and common property resources. Up to December 2004, Proshika mobilized 2.6 million members through out the country and disbursed a cumulative amount of Taka 20.6 billion.

Forestry is one of the key components of the activities of Proshika from the beginning. Forestry activities are divided into two parts. The first part belongs to the Forest Management Program that supports forestry protection in degraded *sal* areas and promotes agro-forestry and woodlots in forest areas. But the size of the activities of the first part is comparatively small. It has presence in only six upazillas[2] in Bangladesh. The second part of the forestry program belongs to Social Forestry. The activities of the social forestry are comparatively larger than the activities of the Forest Management program. Currently, Proshika operates in 150 upazillas in 57 districts in Bangladesh. Under the social forestry program, Proshika promotes two types of activities: (1) Strip and Block Plantations, and (2) Institutional plantation.

Under the strip and block plantation program, Proshika members plant trees alongside roads, railways or canals or privately owned land. Before starting a strip and block plantation project, Proshika helps members of one or two groups to negotiate with owner of the land, who may be a government agency or a private individual. After the completion of the negotiation and legal formalities, members complete the plantation. The members of the groups that are involved in the plantation select some caretakers who are paid to protect the seedlings for the first two to three years, when the seedlings are especially at risk from grazing animals. Thereafter, the members are expected to protect the trees from the theft and carry out the required maintenance, especially periodic pruning and thinning. In return, these members are allowed to use the biomass produced from trees. At the end, when the trees reach the maturity stage, they are cut off for selling as timber and the proceeds that come from the sale are divided in agreed proportions among the parties, Proshika members, landowner and Proshika that are involved in the plantation. During the period

[2] In Bangladesh, every district is divided into several administrative proportions, each proportion is known as Thana. Currently, the word ‘Thana’ is replaced by the word ‘Upazilla’. Upazilla means sub-district.

1976 to 2002, Proshika completed 14,671 kilometres of strip (Table1) plantation with the involvement of 6,729 groups and planted 7.3 million trees. Under the block plantation programs, Proshika planted 48.9 million trees on 17,731 hectares of land during the period 1976 to 2002 (Table 2). Under this program Proshika involved 8,981 groups of their members.

Proshika implements the institutional plantation on the campuses of the educational institutions with the objective of creating a more pleasant environment for the teachers and students. Sometimes Proshika also implements this project as part of joint research into newly introduced species. During the period 1998 to 2002, Proshika brought 562 institutions into its coverage under the institutional plantation program. During the same period, Proshika planted 472, 378 seedlings in these 562 institutions.

3.0 Environmental Literacy

Environmental literacy can be defined as knowledge and understanding of individuals about the factors and issues related to environment and also about how environmental factors affect the quality of life of individuals. It can also be defined as the quality or state of being able to understand environmental issues and the consequences of the changes in the factors that constitute the environment on the quality of life of individuals. Hares et al. (2006) define environmental literacy as "peoples perception of their physical environment". They argue that the environmental literacy of a person is shaped by the personal learning process of that person and the personal leaning process depends on socio-economic, political, cultural, historical, and ecological circumstances that exist around the person. In addition to the personal leaning process, individual features, for example age and intelligence, also determine the level of environmental literacy.

It is expected that an environmentally literate person will have better perception about environment. Whyte (1977) defines environmental perception as "the human awareness and understanding of the environment in a general sense of the term". Against the backdrop of climate change and its consequences, the issue of public concern about environmental issues is getting increasingly scholarly attention. But, the majority of work on public environmental perception has been done in developed countries (Brechin and Kempton 1994; White and Hunter, 2005). Considering the

growing dependence on natural resources in developing countries, it is also important to conduct researches on environmental perception in developing countries (High and Shakleton 2000; Twine et al. 2003)

Roth (2002) identifies the following factors that environmentally literate people should know and understand: (a) The physical process that shape the patterns of the Earth's surface; (b) The characteristics and spatial distribution of ecosystems on earth's surface; (c) The characteristics, distribution, and migration of human populations on earth; (d) The patterns and networks of economic, social, and political interdependence on earth; (e) The processes, patterns, and functions of human settlement; (f) How human actions modify the physical environment; (g) How physical systems affect human systems; (h) The changes that occur in the perception, use, distribution, and importance of resources.

In the present study, the households have been asked to give their opinion on thirteen environmental issues to understand the level of environmental literacy of those households. These environmental issues are: (1) I do not believe that human being are polluting environment; (2) Dust, smoke from brick fields, and chemical wastage from factories are polluting environment; (3) Lack of environmental knowledge is causing massive climate change; (4) The use of the pesticide and fertilizer for agricultural purposes is not bed for environment; (5) A portion of the pesticide and fertilizer that we use for agricultural purposes remains in food and it is bad for health; (6) Environmental degradation, especially arsenic contamination, will create shortage of drinking water in the near future; (7) Modern agricultural activities today lead to the destruction of natural biotopes and to a reduction in wildlife as well as wild plants; (8) The incremental use of pesticide and fertilizer reduces the product quality; (9) Environmental problems resulting from agricultural activities are exaggerated by the media; (10) The use of pesticide and fertilizer in agriculture is causing water pollution; (11) In spite of limitations, farmers can protect the environment; (12) The use of pesticide and fertilizer is not harmful for the environment, rather they promote high quality production; (13) The governmental and non-governmental organizations will have to become more active in protecting environment.

The responding households have been asked to give their opinion on a 5-point scale, ranging from "strongly agree" to "strongly disagree". One the basis the responses of households related to the above mentioned 13 points, an environmental literacy score has been calculated for every household. In the case of an affirmative statement, the highest 5 points have been awarded to a household if the response is "strongly agree" and the lowest 1 point has been awarded to "strongly disagree". In contrary, 5 points have been awarded to "strongly disagree" and 1 point has been awarded to "strongly agree" in case of a negative statement. The highest achievable environmental literacy score is 65 and the lowest achievable environmental literacy score is 13 for a household. A household has been identified as an environmentally literate household if the total environmental literacy score is more than 51. On the other hand a household has been considered as an environmentally illiterate if the total environmental literacy score is less than or equal to 51.

4.0 Survey Design and Data

The analysis reported in this paper is based on a household-level survey of members of a Proshika branch carried out from February to April 2007 (*450* households). The data were collected through face-to-face interviews following a four-stage sampling design. In the first stage, a district, out of 64 districts in Bangladesh, had been selected. The name of the district is Gazipur. In the second stage, a branch from the list of the 'branches' of Proshika in Gazipur was selected. A branch usually consists of some 'centers', with each center having 30 to 40 members. The selected branch was about 60 km distant from Dhaka, the capital of Bangladesh. In the third stage, centers were selected from the selected branch. In the fourth and final stage of sampling, individual households were selected. In this randomly selected branch of Proshika, the total number of participating households was 6200. Among these 6200 households, only 2100 households participated in social forestry projects. For the data collection purpose, all the member households in the branch had been divided into three categories: (1) households that participated microcredit as well as social forestry projects (SF group); (2) households that participated in the microcredit program, but did not participate in social forestry projects (comparison group 1); and (3) households of new members who had just received their first loan, or were waiting for receiving the first loan (comparison group 2), but did not participate in social forestry projects. The list of member households was obtained from the branch office of Proshika and households were randomly selected from three categories of membership

mentioned above. The survey expected 150 questionnaires from each of three membership categories. In some centers, households from the third category were not available. In case of the non-availability of households in the third category of membership, these households had been replaced by households from the first and second categories. During the data entry and data cleaning stages, some questionnaires were dropped due to inconsistent responses and missing data. Finally, these resulted in total 420 households (Table 4) from the branch for data analysis. In total, information was collected from 152 households from the social forestry group; 174 households from the comparison group 1 and 94 households from the comparison group 2.

Besides information on social forestry and environment, the survey collected detailed information on a variety of factors. For example, demographic information (age, sex, marital status, etc.) and socio-economic information (education, employment, food consumption, expenditure on health, etc.) was collected for all household members. Detailed village-level information was also collected, such as distance to nearest primary school, secondary school, market and district headquarters, along with variables describing village infrastructure, such as the presence of schools, markets, roads, electricity, etc. Information relating to the size of loan received, date of joining and other membership characteristics was provided by branch officials and matched to the data.

5.0 Estimation Strategy

Keeping in mind the limitations of the simple comparison method, the multivariate analysis technique has been used to assess the impact of the participation in the social forestry program of Proshika on outcome variables at the household level. The main advantage of this technique, compared to the simple comparison method, is that it enables the study to control those household and village level variables that influence the outcomes.

Given the extensive geographic coverage of microcredit in Bangladesh it is difficult to find out a perfect 'control' group that could be used to estimate the impact of microcredit based social forestry on outcome variables. The choice of a household to attend a microcredit based social forestry is likely to be related to the outcomes of interest i.e. environmental literacy in this paper. Given the outcome for household i, the following equation has been estimated:

(1) $$Y_i = \beta' x_i + \gamma SF + u_i$$

where x is a vector of some control variables that are assumed to be exogenous (for example, education of the household head, the existence of electricity in the household, etc.), and SF represents the social forestry participation, and u_i is the error term.

The participation in the social forestry is defined by the equation given below:

(2) $$SF = \delta' x_i + \nu_i$$

Where x_i represent some control variables and ν_i represent the error term of the model. While the impact of SF is estimated using the equation (1), it is assumed that the error terms of equations (1) and (2), i.e. u_i and ν_i, are not correlated. But, these two error terms become correlated, if the characteristics of households that influence the social forestry program participation decision also determine the outcome variable, i.e. Y_i in equation (1). In such a situation, the OLS estimation of equation (1) yields a biased estimate of the parameter of interest γ. Keeping this in mind, the instrumental variable (IV) technique has been used. In the IV technique, at least one variable that is likely to affect the decision to participate in the social forestry program but is unlikely to affect directly the outcomes of interest, i.e. environmental literacy, has been identified (Heckman 1997). Under the instrumental variable approach, the equation (2) is rewritten as below:

(3) $$SF = \delta' x_i + \lambda z + \nu_i$$

where z is the instrumental variable. In order to obtain consistent estimates, we assume that $\lambda \neq 0$ and that z_i is uncorrelated with u_i. Considering the geographical locations of social forestry projects and participating households, it is believed that the distance of the household from the nearest social forestry project is going to be a good instrument. Because it is considered that the nearest households get priority in terms of joining the project when Proshika decides to implement a social forestry project on a road in an area, and that this distance does not influence environmental literacy of households. Some may confuse the distance of a household from the nearest social forestry

project with the distance of that household from the nearest paved road. The distance of the household from the nearest social forestry project is different from the distance of the household from the nearest paved road. Table 1 shows that the households that participate (SF households) in the social forestry projects are on an average of 0.7 kilometers away from the nearest projects. On the other hand, the households that do not participate in the social forestry projects (Non-SF households) are 1.7 kilometers away from the nearest social forestry projects. It is evident from the t-test that non-SF households are significantly away from the nearest social forestry projects compared to SF households.

On top of applying the IV technique, a comparison has been done between those who participate in the microcredit based social forestry program of Proshika (Program households) and those who are the members of the microcredit program of Proshika, but have not participated in the social forestry program (comparison group). Although, all non-social forestry households were divided into two groups, CG1 and CG2, during the period of data collection, these households have been combined together (CG households) during data analysis and have been compared with social forestry households. The reason behind combining these two groups is that both the groups do not participate in the social forestry projects. Since they did not receive any training from Proshika regarding planting trees and environment, the environmental literacy is expected to be the same for both the groups. The impact of social forestry has been assessed though comparing means and distributions of outcome variables of program and comparison groups. The differences in the means and the distributions of outcome variables of these two groups capture the impact of the participation in the social forestry program at the household level.

Considering the endogeneity in the participation of households in microcredit based social forestry projects, the assessment of the impact of microcredit based social forestry participation on the environmental literacy has been done through using two stages of regression analysis. The first stage regression (equation 3) models the participation decision of households in the social forestry projects. In this model, some variables (x_i) have been put on the right hand side of the model as control variables that influence the participation decision of households along with the instrumental variable (z). After running the first stage regression, the participation in the social forestry projects has been predicted. The predicted participation and the residual of the model have been used as

independent variables along with other control variables in the second stage regression that model (equation 1) environmental literacy score.

In the first stage regression, apart from the instrumental variable, the variables that have been used as control variables are: four dummy variables that are related to the employment status of the household head (empdl, empbu, empag and empsr); one variable which is related to land ownership of households (land); eight variables on the size of a household in different age groups (tmm6b, tfm6b, tmm625, tfm625, tmm2660, tfm2660, tmm60a, and tfm60a), two variables related to the demographic information of the households head (hhage, and hhsex,), and finally two variables that are associated with the education level of the household head and other members (hhedu and xhhtedu)[3].

In the second stage regression, the predicted value (psf) of the participation of a household in a social forestry project which has been generated from the first stage regression has been used as a control variable. The residual from the first stage regression (resid) has also been included in the model as an independent variable. All variables of the first stage regression except the distance of the household from the nearest social forestry project (sfdis) and total area of land (land) have been used as control variables in the second stage regression. It is expected that the area of land of a household does not influence the label of environmental literacy of that household. This is the reason behind dropping the area of agricultural land as an independent variable is the second stage regression. In addition, a dummy variable that represents the existence of electricity (elec) in the household has been included in the model. The reason behind this inclusion is that the existence of electricity in the household indicates the better access of the household to information on environment through radio and television. It is assumed that the existence of electricity in a household increases the probability of owning radio and television by that household.

5.0 Results

Table 3 presents the distribution of the responses of households regarding thirteen environmental issues. It shows that the higher number of social forestry (SF) households give environmentally

[3] Please see the detailed labels of these variables in Table 5.

logical responses compared to non-social forestry (CG) households. The chi-square test results indicate that the distribution of the responses of SF households is significantly different from that of non-social forestry households. All together, these results indicate that the participation in the SF program enhances environmental knowledge of households and it enables households to give more environmentally logical responses in response to the questions related to environment.

Table 4 shows the total environmental literacy score by household groups. It indicates that the average literacy score of non-social forestry households (CG households) is 40. On the other hand, the average literacy score of SF households is 49. On an average, the SF households have 25% higher literacy score compared to CG households. The t test results indicate that SF households have significantly higher environmental score compared to CG households.

Table 5 shows the distribution of environmental literacy status by household groups. The environmental literacy status of a household has been determined on the basis of the methodology that has already been explained in section 3. It shows that 36% of the households that participate in the SF program of Proshika are environmentally literate. On the other hand, only 6% households that do not participate in the SF program of Proshika are environmentally literate. These results indicate that the environmental literacy rate is 30% higher among SF households compared to non-social forestry households. This reveals that the participation in the SF program enhances environmental knowledge of households and thus, it makes these households more environmentally literate.

5.1 Determinants of Social Forestry Participation and Environmental Literacy

In the first stage regression, the probit model has been used since the dependent variable is a dummy variable where a household has been assigned 1 if it participates in a social forestry project and assigned 0 otherwise. The results on Table 7 show that the distance of the household from the nearest social forestry project significantly determines the decision of a household to participate in a social forestry project. The relationship between the distance of the household (sfdis) and the participation in a social forestry project (sf) is negative. These results indicate that an increase in the distance of the household from the nearest social forestry project reduces the probability of joining

of a household in a social forestry project. Apart from this distance, five other variables have come out as statistically significant. These five variables are: the employment status of the household head – labor, the employment status of the household head – agriculture, the total number of female members in the age category of 6 to 25 (tfm625) in the household, and the total education score of all household members except household head (xhhtedu).

All variables that are related to the employment status of the household head are positively related to the participation decision of a household. But out of these four variables two variables are statistically significant. The households which heads are engaged in agriculture (empag) and daily labour (empdl) have higher statistically significant probability of joining social forestry projects. In the rural areas of Bangladesh, the majority of daily labourers work for rich farmers in the agriculture sector. These household heads are more knowledgeable environmentally and economically about the importance of planting trees compared to the households which heads are engaged in businesses and services. For this reason, the households which heads are engaged in agriculture and daily labour are more likely to join social forestry projects.

The number of female members in the age category of 6-25 (tfm625) of a household positively influences the participation decision of that household in a social forestry project. It means that an increase in the number of female members in the age category of 6-25 increases the probability of joining of a household in a social forestry project. In Bangladesh, usually in the rural areas, the young school and college going female members are responsible for doing household works and also for looking after the cultivation on those pieces of land that are very close to their home. Since the distance of social forestry projects is usually very close to participating households, that is why the responsibility of looking after the seedlings in the initial years of plantation in the social forestry projects usually goes to household young female members. This reason might have made the number of female members in the age category of 6-25 a significant positive determinant of the participation decision of households in social forestry projects.

The variables that are related to the level of education of the household head and other members (hhedu and xhhtedu) show mixed results. The education level of the household head is positively related to the participation decision. But the education level of other members is negatively related

to the participation decision. Among the microcredit member households that have more educated household heads are more likely join a social forestry project. It is expected that more educated heads are more knowledgeable about the importance of forestry in environment. That is why households with more educated heads are more likely to join social forestry projects. But the education level of the household head is not statistically significant. On the other hand, the education level of other members in the household significantly negatively determines the participation decision of households in social forestry projects. It means that the households that have more educated members are less likely to join a social forestry project. The reason might be that these households are better off in terms of employment opportunities and the income level and the participation in social forestry projects is not economically attractive to them. For these reasons, the households with the better education of members other than the head prepare not to join social forestry projects.

Since the dependent variable in the second stage regression, the environmental literacy score of households, has count data characteristics, poisson regression and negative binomial regression techniques have been applied for determining the determinants of the household environmental literacy. Table 8 shows the results of the second stage regression. The test of the over dispersion parameter alpha has been conducted to examine whether negative binomial regression is a better technique compared to poisson regression for this model. The test result shows that alpha is significantly different from zero and thus indicates that the poisson distribution is not an appropriate technique for this model. For this reason, finally, the negative binomial regression technique has been applied for this model.

The results in Table 8 indicate that five variables significantly determine the household environmental score. The participation in the social forestry program of Proshika (sf) appears as significant and positive for the environmental literacy score. It means that participating households are more environmentally literate compared to non-participating households and the reason is that participating households receive training from Proshika on social forestry and environmental issues which makes them more environmentally literate. The membership duration in the Proshika's social forestry program (sfd and ssfd) has significant impact on environmental literacy. The membership duration increases environmental literacy score at a declining rate. The reason might be that the

older social forestry member households received lesser training compared to newer households and that might have made them less literate about environment. These results illustrate that the participation of households in social forestry projects of Proshika significantly enhances the environmental literacy of households.

The existence of electricity (elec) in a household is a significant positive determinant of the environmental literacy score of that household. The existence of electricity in a household increases the probability of owning radio and television by that household. The ownership of radio and television gives the household access to better information on environment. In Bangladesh, national radio stations and television channels broadcast programs on environmental to make people more aware of environmental issues. For this reason, the existence of electricity in the household significantly increases the environmental score of the household.

The level of the education of the household head (hhedu) is very significant for the environmental literacy score of households. It influences the environmental literacy score positively and significantly. The higher the education level of the household head, the more environmentally literate the household is. Like the education level of the household head, the education level of all members in the household except the household head positively influences the environmental literacy score of households. But it is not statistically significant. These results are very much logical and expected, as it is considered that education enhances awareness of people about environment.

7.0 Conclusion

The rapid reduction of forest resources has posed a serious threat to the ecological balance in Bangladesh. At present, the per capita forestland is less than 0.02 hectares, which was 0.035 hectares per person in 1968-69. Against this backdrop, some non-government organizations (NGOs) have come forward with the objective of improving the environment and alleviating poverty through social forestry programs. The activities under the social forestry include tree nursery establishment, tree planting on farms and other categories of land, management and utilization of wood and non-wood forest products for a variety of goods and services. Social forestry programs

are aimed primarily at helping small farmers and landless to meet their consumption and income needs. The main goal is to induce a large number of poor people to plant trees for their own benefits. The participating households receive training on environment and forestry. So, it is expected that the participating households have better knowledge on environment. Keeping this in mind, the study attempts to assess the impact of the participation in the SF program of Proshika on the environmental literacy of households.

Proshika, one of the three largest microfinance institutions in Bangladesh, was established in the year 1976 and it visualizes a society which is economically productive and equitable, socially just, environmentally sound, and genuinely democratic. During the period 1976 to 2002, Proshika completed 14,671 kilometres of strip plantation with the involvement of 6,729 groups and planted 7.3 million trees. Under the block plantation programs, Proshika planted 48.9 million trees on 17,731 hectares of land during the period 1976 to 2002. Under this program Proshika involved 8,981 groups of their members. During the period 1998 to 2002, Proshika brought 562 institutions into its coverage under the institutional plantation program. During the same period, Proshika planted 472, 378 seedlings in these 562 institutions.

Environmental literacy can be defined as knowledge and understanding of individuals about the factors and issues related to environment and also about how environmental factors affect the quality of life of individuals. An environmental literacy score has been calculated on the basis of the responses of households on 13 environmental issues on a 5-point scale ranging from "strongly agree" to "strongly disagree" for every responding household. The highest achievable environmental literacy score is 65 and the lowest achievable environmental literacy score is 13 for a household. A household has been identified as an environmentally literate if the total environmental literacy score is more than 51.

The analysis is based on a household-level survey of 450 households. Considering the endogeneity in the program participation, the instrumental variable (IV) technique has been used to assess the impact of the participation of households in the social forestry program of Proshika on the environmental literacy. The results indicate that the participation in the social forestry program of Proshika significantly enhances the environmental literacy of participating households.

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Table 1
Social Forestry Program of Proshika

Types of Plantation	Period	No. of Seedlings Planted	Area	No. of Groups / Institutions Involved
Strip	1976 - 2002	7, 346, 269	14, 671 kilometres	6,729 Groups
Block	1976 - 2002	48,915,016	17,731 hectares	8,981 Groups
Institutional	1998 - 2002	472,378	-	552 Institutions

Table 2
Sample Distribution

Sample Group	Frequency	Percent	Cumulative Percent
SFG	152	36.19	36.19
CG1	174	41.43	77.62
CG2	94	22.38	100.00
Total	420	100.00	

SFG = Social Forestry Group; CG1 = Comparison Group 1, Households (HHs) with Proshika membership more than 1 year belong to this group; CG2 = Comparison Group 2, New member households belong to this group;

Table 3
Distribution of the Responses of Households on Environmental Related Issues (in %)

Statement SL Num.	Household Group	Strongly Agree	Agree (%)	Indifferent (%)	Disagree (%)	Strongly Disagree	Chi Square
1	SF	16.56	21.85	1.99	25.83	33.71	144.29*
	Non SF	36.02	9.96	39.85	9..58	4.60	
2	SF	58.94	36.42	1.32	2.65	0.66	65.26*
	Non SF	25.29	42.91	1.15	11.88	18.77	
3	SF	42.38	37.09	13.25	6.64	2.65	65.68*
	Non SF	16.48	23.75	28.35	13.41	18.01	
4	SF	10.60	16.56	11.92	21.85	39.07	75.89*
	Non SF	29.12	16.86	26.82	19.92	7.28	
5	SF	49.67	38.41	5.30	5.30	1.32	76.60*
	Non SF	16.86	33.72	16.48	13.41	19.54	
6	SF	56.95	32.45	4.64	4.64	1.32	56.39*
	Non SF	29.12	28.35	5.75	16.86	19.92	
7	SF	54.30	33.77	1.32	7.28	3.31	96.03*
	Non SF	16.48	26.82	16.09	21.46	19.16	
8	SF	44.37	33.77	6.62	11.92	3.31	56.93*
	Non SF	19.16	24.90	20.69	14.56	20.69	
9	SF	11.26	15.89	25.17	14.57	33.11	94.17*
	Non SF	32.18	35.25	18.77	10.73	3.07	
10	SF	52.32	35.76	5.30	3.97	2.65	78.86*
	Non SF	16.48	36.40	9.58	17.24	20.31	
11	SF	48.34	29.14	12.58	7.95	1.99	68.14*
	Non SF	15.71	29.89	16.86	16.09	21.46	
12	SF	9.27	24.50	12.58	18.54	35.10	76.55*
	Non SF	28.35	38.31	15.33	12.64	5.36	
13	SF	68.21	27.81	0.00	3.31	0.66	67.54*
	Non SF	37.55	22.22	8.43	14.56	17.24	

* Significant at 1% level.

Table 4
Environmental Literacy Score

Sample Group	Mean	SD	Min	Max
SF	49.49	6.75	34	58
CG	39.72	9.64	22	56

Table 5
Environmentally literate Household

Environmentally Literate	Participation in the Social Forestry Program		Total
	No	Yes	
No	251	98	349
	(93.66%)	(64.47%)	(83.10%)
Yes	17	54	71
	(6.34%)	(35.53%)	(16.90%)
Total	100%	100%	100%

Table 6
Variables Used in the Analysis

Variable	Definition	Mean	Standard Deviation
sf	Social Forestry (SF) Participation, 1 if the household participates in the SF project, 0 otherwise	0.36	-
sfdis	Distance of the household from the nearest social forestry project (kilometres)	1.28	0.96
tnvs	Total environmental literacy score	43.29	9.88
elec	The existence of electricity in the village; 1 if the village has electricity, 0 otherwise	0.83	-
land	Total area of land (in decimal)	59.99	490.14
empdl	Employment of the household head, 1 if head is a daily labourer, 0 otherwise	0.14	-
empbu	Employment of the household head, 1 if head is a businessmen, 0 otherwise	0.23	-
empag	Employment of the household head, 1 if head is a farmer, 0 otherwise	0.35	-
empsr	Employment of the household head, 1 if head is a service holder, 0 otherwise	0.12	-
tmm6b	Total male household members in the age category of 6 and below	0.17	0.42
tfm6b	Total female household members in the age category of 6 and below	0.14	0.38
tmm625	Total household male members in the age category of 6 to 25	1.07	0.95
tfm625	Total household female members in the age category of 6 to 25	1.02	0.95
tmm2660	Total household male members in the age category of 26 to 60	1.02	0.72
tfm2660	Total household female members in the age category of 26 to 60	0.79	0.62
tmm60a	Total household male members in the age category of 60 and above	0.06	0.24
tfm60a	Total household female members in the age category of 60 and above	0.01	0.11
hhsex	Sex of the household head; 0 if head is a male, 0 otherwise	0.95	0.23
hhage	Age of the household head (in months)	543.08	150.55
hhedu	Total years of schooling of the household head	3.75	4.19
xhhtedu	Total years of schooling of all household members except the household head	14.13	11.74
sfd	Duration of the membership in the social forestry program (in months)	42.21	81.13

Table 7
Determinants of the Participation in Social Forestry Project

Variables	Labels	Coef.	Srd. Err.	dy/dx
sfdis	Social Forestry Project Distance	-1.81***	(0.15)	-0.478
empdl	Dummy for Employment – Labor	0.725*	(0.34)	0.232
empbu	Dummy for Employment – Business	0.224	(0.29)	0.065
empag	Dummy for Employment – Agriculture	0.717**	(0.28)	0.206
empsr	Dummy for Employment – Service	0.305	(0.36)	0.089
land	Total Area of Land	-0.00079	(0.0016)	-0.0002
tmm6b	Household Total Male Members Between 0 to 6	-0.128	(0.21)	-0.034
tfm6b	Household Total Female Members Between 0 to 6	0.116	(0.23)	0.031
tmm625	Household Total Male Members Between 6 to 25	0.079	(0.11)	0.021
tfm625	Household Total Female Members Between 6 to 25	0.359***	(0.12)	0.095
tmm2660	Household Total Male Members Between 26 to 60	0.063	(0.15)	0.017
tfm2660	Household Total Female Members Between 26 to 60	0.145	(0.19)	0.038
tmm60a	Household Total Male Members Between 60 & Above	0.097	(0.43)	0.025
tfm60a	Household Total Female Members Between 60 & Above	0.605	(0.79)	0.198
hhsex	Household Head Sex	-0.617	(0.47)	-0.199
hhage	Household Head Age	0.004	(0.004)	0.0009
shhage	Square Age of the Household Head	-9.39e-07	3.53e-06	-248e-07
hhedu	Household Head Education	0.030	(0.026)	0.008
xhhtedu	Household Total Education Score Except Household	-0.0237*	(0.012)	-0.006
Constant		-0.426	(1.25)	
Obs.		420		
LR chi2(21)		288.69		
Prob > chi2		0.0000		
Pseudo R2		0.5251		

*** p<0.01, ** p<0.05, * p<0.1

Table 8
Determinants of the Environmental Literacy Score

Variables	Labels	Coef.	Std. Err.
psf	Predicted Social Forestry (SF) Participation	0.115***	(0.041)
resid	Residuals	0.112***	(0.041)
sfdis	Membership Duration in SF Projects	0.0015***	(0.0005)
ssfdis	Square of sfd	-0.00000256	(0.0000019)
elec	Existence of Electricity in the Household	0.0467*	(0.028)
empdl	Dummy for Employment – Labor	-0.0026	(0.038)
empbu	Dummy for Employment – Business	0.0178	(0.033)
empag	Dummy for Employment – Agriculture	-0.0049	(0.033)
empsr	Dummy for Employment – Service	-0.0097	(0.039)
tmm6b	Household Total Male Members Between 0 to 6	0.0328	(0.025)
tfm6b	Household Total Female Members Between 0 to 6	0.0037	(0.027)
tmm625	Household Total Male Members Between 6 to 25	-0.0025	(0.013)
tfm625	Household Total Female Members Between 6 to 25	0.0122	(0.013)
tmm2660	Household Total Male Members Between 26 to 60	-0.0193	(0.017)
tfm2660	Household Total Female Members Between 26 to 60	-0.0099	(0.020)
tmm60a	Household Total Male Members Between 60 & Above	0.0124	(0.050)
tfm60a	Household Total Female Members Between 60 & Above	-0.0818	(0.089)
hhsex	Household Head Sex	-0.0568	(0.050)
hhage	Household Head Age	-0.00047	(0.00044)
shhage	Square Age of the Household Head	0.000000403	(0.00000039)
hhedu	Household Head Education	0.007**	(0.0030)
xhhtedu	Household Total Education Score Except Household	0.0012	(0.0014)
Constant		3.79***	(0.14)
Observations		410	
LR chi2(24)		139.55	
Prob > chi2		0.0000	
Pseudo R2		0.0452	

*** p<0.01, ** p<0.05, * p<0.1