



## ENVIRONMENT

BRAC Research Report

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# Environmental Compliance of BRAC Microfinance Enterprises: An Assessment

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## ABSTRACT

BRAC is concerned about environmental aspects in its development programmes. In this backdrop, a cross-sectional comparative study was designed to assess environmental performance in BRAC microfinance enterprises. Total 1200 borrowers (579 Dabi, 621 Progoti) involved in various incomes generating activities were randomly selected from 30 *sadar upazilas* (divisional capital of sub-districts). The analysis was conducted on selected environmental indicators such as use of raw materials and chemicals, waste management, environmental pollution, knowledge about key environmental aspects etc. Statistical techniques such as frequency distribution, chi-square and t-tests were used to get proportion of values and to compare the differences between indicator values. The findings revealed that above 90% respondents received information from BRAC staff about environmental pollution, tree plantation, waste management, use of safe water and latrine, keeping hand washing materials, and so on. Use of alternative fuel (79%) and raw materials (79.6%) were relatively less received information from BRAC staff. Compared to the other types, mainly degradable raw materials were used in both enterprises, while the use was higher in Dabi (187.9%) than Progoti (161%). Thus, degradable wastes were generated higher in Dabi (213.8%) than Progoti (205.8%). Disposal of different types of wastes at fixed and safe place was found higher in Progoti than Dabi enterprises (e.g., degradable solid waste: Dabi 55.8%, Progoti 71%; non-degradable waste: Dabi 34.8%, Progoti 45.8%; liquid waste: Dabi 39.6%, Progoti 52.2%). Probability of environmental pollution was observed less in both Dabi and Progoti enterprises. Majority of Dabi and Progoti enterprises used chemical materials in their business activities, but adoption of safety measures was found very less in both enterprises implying exposure to health risks. Fixed and safe disposal of wastes and adoption of safety measures during handling chemical materials are imperative to avoid environmental pollution and health risks.

# EXECUTIVE SUMMARY

## BACKGROUND

Microenterprises might cause negative impact on environment due to its wide varieties of business activities, attributed with limited resources and money. However, environmental impact of single microenterprise is often ignored, while combined impacts of some microenterprises are of significant phenomena. BRAC is concerned about the negative impacts on environment and public health. To this end, the programme staffs make borrowers conscious about a set of guidelines for improving their quality of lives at a microfinance group meeting. Environmental compliance of BRAC microfinance enterprises is assessed and presented in this report. Findings of this report will contribute to design appropriate interventions conducive to better environmental management.

## OBJECTIVE

This study aimed to assess environmental compliance of BRAC microfinance enterprises of Dabi and Progoti, and to find out areas of intervention for environmental management.

## METHODS

The study embraced a cross-sectional comparative design between Dabi and Progoti enterprises of BRAC. The survey was conducted in 30 sadar *upázilas* (divisional capital of sub-districts) where BRAC micro-finance activities are in operation. The upazilas were selected from different geographical areas in Bangladesh to represent broad image of environmental performance by BRAC micro-finance enterprises. Total 1200 borrowers (579 Dabi, 621 Progoti) involved in various income generating activities were randomly selected from 30 purposively selected *Sadar* upazilas. Structured pre-tested questionnaire was used for data collection. Sixteen enumerators grouped into eight (i.e., two enumerators in each group) were trained for data collection in two weeks. The analysis was performed on selected environmental indicators such as use of raw materials and chemicals, waste management, environmental pollution, knowledge about key environmental aspects etc. Statistical techniques such as frequency distribution, chi-square and t-tests were used to get proportion of values and to compare the differences between indicator values.

## SALIENT RESULTS

The findings reveal that above 90% respondents received information from BRAC staffs about environmental pollution, tree plantation, waste management, safe water and latrine, and keeping hand washing materials. Use of alternative fuel (79%) and raw materials (79.6%) were relatively less received information from BRAC staffs. Mainly decomposable raw materials were used in both categories of enterprises compared to the other types. The use of decomposable raw materials was higher in Dabi (187.9%) than Progoti (161%). Thus, decomposable wastes were generated higher in Dabi (213.8%) than Progoti (205.8%). Waste disposal at fixed and safe place was found higher in Progoti than Dabi enterprises (decomposable solid waste: Dabi 55.8%, Progoti 71%; non-decomposable waste: Dabi 34.8%, Progoti 45.8%; liquid

waste: Dabi 39.6%, Progoti 52.2%). Probability of environmental pollution was observed less in both Dabi and Progoti enterprises. Majority of Dabi and Progoti enterprises used chemical wastes in their business activities, but adoption of safety measures was found insignificant in both enterprises implying exposure to health risks.

## **CONCLUSION**

Fixed and safe disposal of wastes and adoption of safety measures during handling chemical materials are imperative to avoid and overcome environmental pollution, health risks, and hazards.

## INTRODUCTION

Small and medium sized enterprises (SMEs) contribute to maximum pollution (70%) in the environment globally due to its varied characteristics (Parker et al. 2009). In addition, limited resources, knowledge, and technical capabilities of SMEs are responsible for these negative impacts on environment. Individually SMEs might have relatively low and scattered environmental impact, but collective impacts of these enterprises create great concern (Labaz and Redmond 2009). The authors also illustrated that major enterprises started to comply environmental policies to reduce environmental impacts while majority of SMEs ignored their compliance. Considering the significance of SMEs in the economy and its impact on the environment, it is necessary to assess the environmental aspects to make SMEs more environment-friendly.

In Bangladesh, communities have been facing multiple environmental challenges (Lein 2000) due to population growth, climate change, and so on. Having been most densely populated country in the world, 63% of its population engaged in agriculture, forests and fisheries (BSCAA 2010). These three livelihood options are related to the environmental condition and access to natural resources. Besides, increased frequency and intensity of natural hazards due to climate change have adverse effects on environment, thus making the livelihoods difficult (Kartiki 2011). Natural resources, which are essential for economic growth, will gradually be diminished if not properly used and managed (GreenMicrofinance and CGAP 2009). Some argued that climate change, pollution, poor waste management, and other environmental hazards should be the concerned area for intervention in terms of economic development.

The development of micro-credit programmes and micro-enterprise is considered as important strategy for poverty alleviation. Government and non-government organizations have adopted several approaches to overcome problems related to social and economic development (Chowdhury and Miyagi 2006). The strength of these programmes is to create economic opportunities by serving the poor, especially the women. However some of the challenges identified are low skill levels and illiteracy of the poor, impact from natural disasters, etc. Microfinance encompasses a wide range of business activities (Hall et al. 2008), which are often carried out by low skilled and illiterate poor. Small business activities with limited budget and staff (e.g. often run by one/two persons) are not given proper attention to measure their environmental performance, while research conducted by Hall et al. (2008) depicted that individual impact might seem small but, its cumulative environmental impact might be significant.

BRAC initiated microfinance programmes in 1974. The programme provided loan to the landless poor, marginal farmers and vulnerable small entrepreneurs. Most of the borrowers are women who use these loans to generate income in order to improve their socio-economic status. Main components of BRAC microfinance programme include i) Dabi and ii) Progoti. Loans under Dabi programme are given especially to the poor women who are serviced in a group setting. In Progoti loans are given to male and female entrepreneurs to support and expand their existing small enterprises. In terms of amount of loan, Progoti borrowers receive more than the Dabi members.

BRAC is concerned about negative impacts on environment affecting public health. To this end, the programme staffs make borrowers conscious about a set of guidelines



for improving their quality of lives at a microfinance group meeting. Village organizations (VOs) consisting 30-40 women act as platforms for poor women to exchange information and raise awareness on social and environmental issues concerning their daily lives. Environmental guidelines for rural development programme (VO-based enterprises), small and medium enterprises as-well as medical waste management have been developed as part of awareness campaign (Akter and Sarker 2008, Akter et al. 2006). Through this report, environmental compliance of BRAC microfinance enterprises is measured. Findings of this report will contribute to improve the quality of interventions conducive to better environmental management.

## RESEARCH OBJECTIVES

The study in general aimed to assess environmental compliance of BRAC microfinance enterprises. The specific objectives however envisages following:

- Assess knowledge level on environmental aspects of borrowers from Dabi and Progoti enterprises
- Assess the status of environmental indicators of Dabi and Progoti enterprises
- Find out areas of intervention for environmental management

## METHODS

### STUDY DESIGN AND AREA

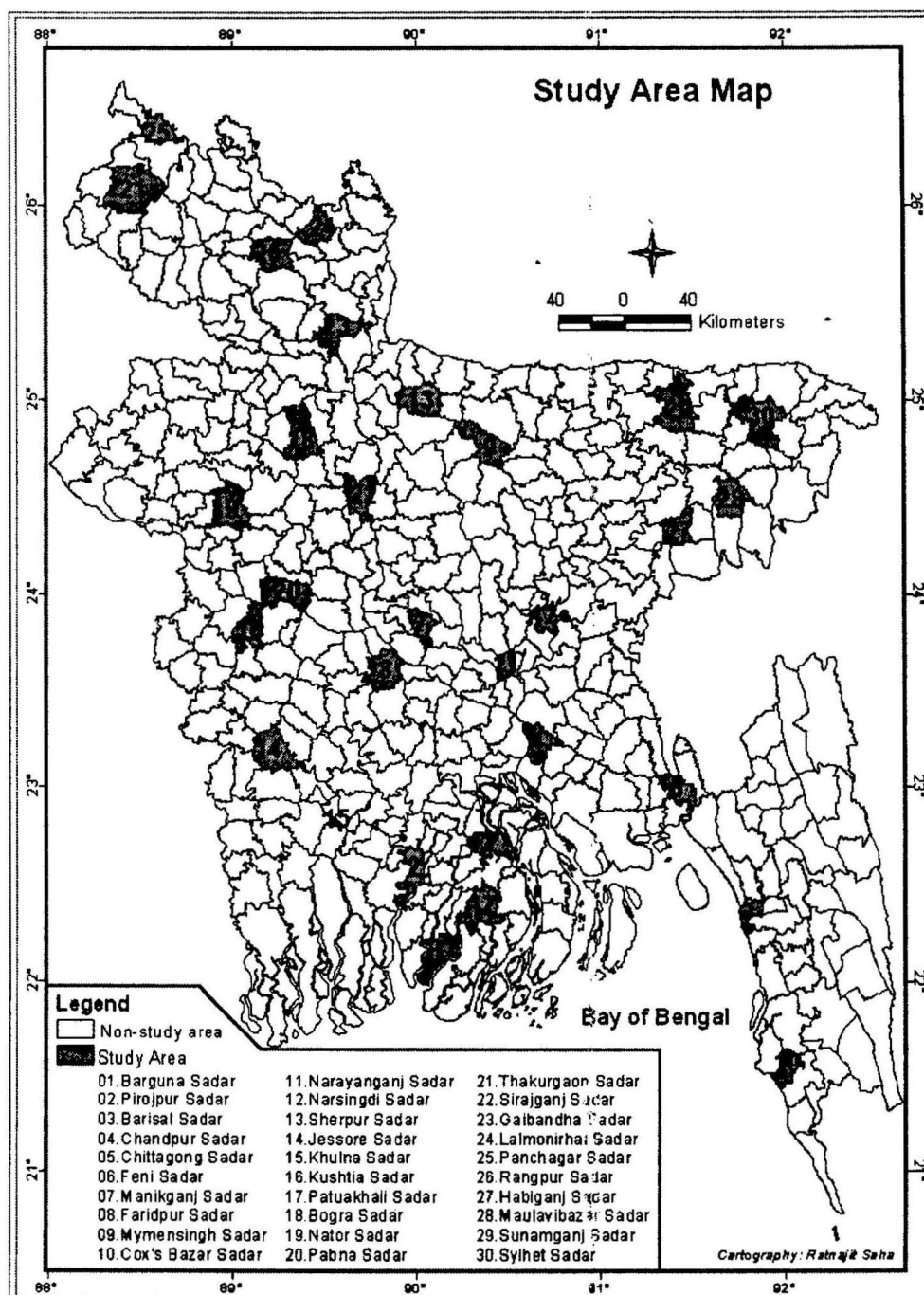
The study embraced a cross-sectional comparative design between Dabi and Progoti enterprises of BRAC. The survey was conducted in 30 *sadar upazilas* where BRAC micro-finance activities are in operation. The *upazilas* were selected from different geographical areas in Bangladesh to represent broad image of environmental performance by BRAC micro-finance enterprises (Figure 1). The study was conducted during April -August 2012.

### SAMPLE SIZE AND SAMPLING STRATEGY

The purposive sampling was applied in selecting *sadar upazilas*. From each *sadar upazila*, *sadar* branch of micro-finance office was selected to get the list of Dabi and Progoti borrowers for data collection. Total 1200 borrowers (579 in Dabi, 621 in Progoti) were selected randomly. Forty borrowers (20 from Dabi and 20 from Progoti) were selected randomly from each *sadar upazila*. The borrowers involved in different income generating activities with the financial assistance of BRAC were selected to assess environmental performance. The borrowers who did not utilize money in income generating activities were replaced with other available borrower.

The methodological problem in terms of selecting equal number of Dabi and Progoti borrowers was faced only in two *upazilas* during data collection. It was observed that data collection from Dabi borrowers took much time. Due to the time limitations, the deficiency in required number of Dabi borrowers for interview was filled up by taking Progoti borrowers who were available at that time.

Figure 1. Sadar upazilas selected as study area



## DATA COLLECTION TOOLS AND TECHNIQUES

Structured pre-tested questionnaire was used for data collection. The borrowers, at nearby urban slums under Gulshan branch of Dhaka, were interviewed to test the questionnaire. After field test, necessary corrections were made with questionnaire for actual field survey.

Sixteen enumerators grouped into eight (i.e. two enumerators in each group) collected data in two weeks. The enumerators were trained for three days and they were acquainted with the content of questionnaire before going to the field for data collection. Six groups while each of them visited four *upazilas* and in each *upazila*, they spent two days to collect data. Each of the rest two groups visited 3 *upazilas* and spent 2 days in each *upazila* for data collection. Data was collected through face to face interview with borrowers. It was necessary to mention that some portions of the

questionnaire were required to be filled up with the help of actual loan user who was borrowers' husband or other household members. Use and application of some environmental indicators were observed at work place.

## **DATA PROCESSING AND ANALYSIS PLAN**

The filled in questionnaires were edited for completeness and consistency at BRAC's Data Management Office by a group of trained field interviewers. These were entered in computer, and cleaned using the SPSS software version 14 under the supervision of the senior researchers to perform the task of data quality and validation of the obtained field data. The analysis was performed on the environmental indicators such as knowledge on environmental aspects, source of knowledge, types of wastes generated, waste management, use of raw materials, use of chemicals, availability of environmental aspects (e.g. safe water, safe latrine, hand washing materials, first aid, drainage facility, etc.), adoption of safety measures, and possibility of environmental pollution. Statistical techniques of: a) Frequency Distribution; b) Chi-square; and c) T-tests were used to obtain proportion of values and to compare the differences between indicator values.

## **QUALITY CONTROL**

For quality data, different measures were taken at various stages of the study: i) the team leaders acted as immediate monitors. They closely monitored the daily activities of the teams, ii) the interviewers of groups cross-checked each other questionnaire on the same day after their data collection, iii) Managers from Head Office routinely visited and checked the field team activities, and iv) The Senior Researcher from the Head Office visited field on a regular basis to supervise the activities. Informed verbal consent was obtained verbally from the respondents before data collection. They were assured that any refusal would not affect them in receipt of BRAC services. Strict confidentiality was maintained in data handling.

# **RESULTS**

## **RESPONDENTS' CHARACTERISTICS**

Table 1 on profile of the borrowers reports the analyzed data across age, education, profession, and loan size, use and purpose. Higher percentage of borrowers in Dabi (39.6%) belonged to age group 21-30 years. In Progoti, 41% borrowers were in age group 31-40 years. In Dabi, 34.5% borrowers had primary education, followed by 20.9% higher secondary, and 13.6% lower secondary education respectively. About 30 percent had no education among Dabi borrowers. In Progoti, more than half of the borrowers had higher secondary education, while only 5% had no education. Main professions of borrowers in Dabi were household work (69.4%) and business (21.4%). In Progoti, majority of them were business persons (93.4%). In Dabi, about 85% borrowers' took loan Tk. 50,000 or less (average Tk. 36,711). In Progoti, average loan size was Tk. 2, 11,882. More than half of the loan users were borrowers' husband in Dabi, while 90.7% loan users in Progoti were borrowers themselves. Over 95% and 98% borrowers in Dabi and Progoti used loan for proposed enterprises. Significant number of borrowers in Dabi was involved with BRAC's credit programme for more than 6 years. In Progoti 22% borrowers were involved with credit programme since last

one year, while 18% for over 6 years. The major loan purpose was business in Dabi (70%) and Progoti (88.4%) respectively.

**Table 1. Profile of the borrowers (%)**

Indicators	Enterprise	
	Dabi	Progoti
<b>Age</b>		
<=20	1.9	0.2
21-30	39.6	20.7
31-40	34.7	41.7
41-50	17.4	23.8
51-60	5.9	11.8
61+	0.5	1.8
<b>Education</b>		
No education	29.8	5
Primary (1-5 class)	34.5	12
Lower secondary (6-8 class)	13.6	18.4
Higher secondary (9-12 class)	20.9	52.2
University	1	11.3
Madrasa	0.2	1.1
<b>Main profession</b>		
Business	21.4	93.4
Household work	69.4	3.7
Service	5.4	2.7
Agriculture	1.4	0.2
Day labour	1.9	-
Others	0.5	-
<b>Loan size (Tk.)</b>		
<=50,000	84.8	6.8
50,001-1,00,000	12.4	28.3
1,00,001-5,00,000	2.4	62
5,00,001-10,00,000	0.4	2.6
10,00,001+	-	0.3
Average loan size (Tk.)	36,711	2,11,882
<b>Involvement with credit programme (in year)</b>		
1	21.1	22.2
2	9	16.6
3	11	14.8
4	14	16.9
5	10.4	11.3
6+	34.5	18.2
<b>Loan user</b>		
Borrower (self)	22.1	90.7
Husband	54.1	3
Other HH members	23.8	6.3
<b>Loan used in the proposed enterprises</b>	95.9	98.6
<b>Purpose of loan</b>		
Business	70.1	88.5
Agriculture	8.6	-
Livestock	8.5	4
Transport	10.2	1.9
Others	2.6	5.6
<b>Total</b>	<b>579</b>	<b>621</b>

## KNOWLEDGE AND SOURCE OF INFORMATION ON ENVIRONMENTAL ASPECTS

Environmental messages were provided in intervention areas through BRAC staff of different programmes such as WASH (Water, Sanitation and Hygiene), health, and microfinance. The borrowers were asked about the knowledge on environmental messages (Table 2). Above 84% borrowers were aware about safe water and latrine. Knowledge on tree plantation and hand washing materials was reported by 74.8% and 71.5% borrowers. Fifty-six percent and 53.2% borrowers knew about environmental pollution and waste management respectively. The least known messages were about biodiversity conservation (22.8%); proper use of raw materials and chemicals (24%), loss of soil fertility (26.6%) and alternative fuel use (27%) respectively.

**Table 2. Knowledge about environmental aspects (%)**

Indicators	Dabi		Progoti	
	Yes	No	Yes	No
Environmental pollution	56	44	28.8	71.2
Tree plantation	74.8	25.2	35.3	64.7
Waste management	53.2	46.8	25.3	74.7
Safe latrine	84.5	15.5	43.2	56.8
Safe water	84.6	15.4	43	57
Hand washing materials	71.5	28.5	33	67
Ideal working environment	37.1	62.9	20	80
Alternative fuel use	27.1	72.9	12.7	87.3
Proper air circulation	43.2	56.8	23.7	76.3
First aid	66.1	33.9	37	63
Proper use of chemicals	24.4	75.6	10.3	89.7
Child labour	41.3	58.7	26.1	73.9
Biodiversity conservation	22.8	77.2	9.5	90.5
Loss of soil fertility	26.6	73.4	12.7	87.3
Use of raw materials	24.5	75.5	2.7	87.3
Water logging	39.7	60.3	14.3	85.7
N	579		621	

Those who had knowledge on above listed messages among them, the proportions of borrowers knowing environmental messages from BRAC staff and other sources are presented in Table 3. In Dabi, above 90% borrowers reported that they received information about environmental pollution, tree plantation, waste management, safe water and latrine, and keeping hand washing materials. Use of alternative fuel (79%) and raw materials (79.6%), and ideal working environment (77.7%) were the relatively less received information from BRAC staff.

In Progoti, most received information from BRAC staffs was on use of safe water (91%), hygienic latrine (92.9%) and availability of hand washing materials (93.7%). On the other hand, 62.5%, 62.3% and 63% of respondents respectively reported that proper use of chemicals, child labor, and alternative fuel use were less received information (Table 3).

**Table 3. Source of knowledge about environmental aspects (%)**

Indicators	Dabi		Progoti	
	BRAC staff	Others	BRAC staff	Others
Environmental pollution	92	8	86	14
Tree plantation	93.1	6.9	81.7	18.3
Waste management	90.9	9.1	85.4	14.6
Safe latrine	93.7	6.3	92.9	7.1
Safe water	92.4	7.6	91	9
Hand washing materials	90.8	9.2	93.7	6.3
Ideal working environment	77.7	22.3	83.1	16.9
Alternative fuel use	79	21	63.3	36.7
Proper air circulation	90	10	84.9	15.1
First aid	88.8	11.2	83.9	16.1
Proper use of chemicals	83	17	62.5	37.5
Child labor	82.4	17.6	62.3	37.7
Biodiversity conservation	84.1	15.9	59.3	40.7
Loss of soil fertility	87.7	12.3	73.4	26.6
Use of raw materials	79.6	20.4	78.5	21.5
Water logging	87	13	79.8	20.2
N	579		621	

The observed data revealed that over 91% loan users in Dabi and 83.3% in Progoti had adequate air circulation at their working place. Besides, 82% loan users in Dabi and 84.9% in Progoti used safe water, while use of hygienic latrine was found among 63.9% and 70.7% in Dabi and Progoti groups respectively. Hand washing materials were found available higher in Progoti (73.3%) than Dabi (64.8%). Involvement of child labor was found less in both enterprises (15.2% in Dabi and 16.4% in Progoti). Availability of first aid was found higher in Dabi than Progoti enterprises (41.5% in Dabi and 38.3% in Progoti). The Progoti enterprises (67.3%) had better drainage facility than Dabi (62.2%) (Table 4).

**Table 4. Maintenance of key environmental factors (%)**

Indicators	Dabi	Progoti	p-value
Safe water	82	84.9	0.19
Safe latrine	63.9	70.7	0.01
Air circulation	91.2	83.3	0.001
Hand washing equipments	64.8	73.3	0.001
First aid	41.5	38.3	0.269
Child labour	15.2	16.4	0.561
Green belt	40.9	28.3	0.001
Chimney	6	5	0.424
Drainage facility	62.2	67.3	0.063
N	579	621	

### USE OF RAW MATERIALS

Mainly degradable raw materials were used in both enterprises. The proportion of using degradable raw materials was higher in Dabi (187.9%) than Progoti enterprises (161%). Other types of raw materials used were non-degradable waste (Dabi 45.3%,

Progoti 43.8%), liquid waste (Dabi 30.4%, Progoti 32.5%), and gaseous (Dabi 2.4%, Progoti 1.8%) (Table 5).

**Table 5. Use of raw materials (%)\***

Types	Dabi	Progoti
Degradable	187.9	161
Non-degradable	45.3	43.8
Liquid	30.4	32.5
Gaseous	2.4	1.8
None	8.8	11.8
N	579	621

\*Multiple responses considered

Various types of chemicals were used as input in business activities in Dabi and Progoti enterprises. Soap was used mostly by both Dabi (30.5%) and Progoti (33.3%) groups followed by machine oil (Dabi 11.9%, Progoti 9.7%). However, chemical materials were not used in 27% Dabi and 36.8% Progoti enterprises (Table 6).

**Table 6. Types of chemicals used (%)**

Types of chemicals used	Dabi	Progoti
Machine oil	11.9	9.7
Soap	30.5	33.3
Color	5.1	4.8
Medicine	5.1	3.1
Fertilizer	6	0.7
Kerosene	4.9	1.5
Gas	1.8	2.5
Pesticides	1.8	0.8
Various chemicals	4.6	6.1
Don't know	1.4	0.7
Don't use chemical	27.1	36.8
N	579	621

## WASTE MANAGEMENT

Table 7 shows types of wastes generated from both Dabi and Progoti enterprises. The generated wastes from Dabi and Progoti were categorized as degradable wastes (e.g. pieces of clothes, household wastes, remains of food items, wood, etc.), non-degradable wastes (polythene, plastic/rubber bag, glass pieces etc.), liquid wastes (e.g. waste water, mobil, oil, kerosene etc.). Mainly degradable wastes were generated in both Dabi (213.8%) and Progoti (205.8%) enterprises compared to the other types of wastes. Non-degradable wastes were generated higher in Progoti (52.8%) than in Dabi (48.5%). Other waste types generated were liquid (34.9% in Dabi, 23.2% in Progoti) and gaseous (10.2% in Dabi and 4.2% in Progoti).

**Table 7. Types of waste generated (%)\***

Types	Dabi	Progoti
Degradable	213.8	205.8
Non-degradable	48.5	52.8
Liquid	34.9	23.2
Gaseous	10.2	4.2
None of above	0.7	-
N	579	621

\*Multiple responses considered

Table 8 illustrates different options of solid and liquid waste management which were followed by the loan users. Most of the degradable solid wastes were disposed at fixed and safe place (Dabi 55.8%, Progoti 71%). However, waste disposal at fixed but unsafe place was made by 16.9% Dabi and 15.2% Progoti enterprises. The practice of disposing wastes at any place was higher in Dabi (11.5%) than Progoti (5.2%) groups. Selling wastes was higher in Progoti (10.8%) than Dabi (7.4%).

In case of non-degradable solid waste, waste disposal at fixed and safe place was found more frequent in Progoti (45.8%) than Dabi (34.8%) enterprises. Waste disposal at fixed but unsafe place was higher in Dabi (13.8%) than Progoti (10.9%). Another important alternative of waste management was selling made by 37.7% in Dabi and 34.8% in Progoti enterprises.

Fifty-two percent Progoti enterprises disposed liquid wastes at fixed and safe place which was higher than Dabi (39.6%). Waste disposal at fixed but unsafe place was found higher in Dabi (24%) than Progoti (8.6%) enterprises.

**Table 8. Waste management (%)**

Waste type	Waste management options	Dabi	Progoti
Solid (degradable)	Fixed and safe dumping	55.8	71
	Fixed and unsafe dumping	16.9	15.2
	Dumping at anywhere	11.5	5.2
	Burn	6.7	3.7
	Sell	7.4	10.8
	Others	8.3	2.5
	n		539
Solid (Non-degradable)	Fixed and safe dumping	34.8	45.8
	Fixed and unsafe dumping	13.8	10.9
	Dumping at anywhere	12.3	6
	Burn	3.6	3.1
	Sell	37.7	34.8
	Others	1.4	2.7
	n		276
Liquid	Fixed and safe dumping	39.6	52.2
	Fixed and unsafe dumping	24	8.6
	Dumping at anywhere	9.6	12.9
	others	28.8	29.7
	n		250

Multiple responses considered



## ADOPTION OF SAFETY MEASURES

To avoid the work-related hazards or risks, adoption of safety measures such as apron, mask, gloves glasses, shoes, etc. were investigated. Observed data revealed that majority of loan users in Dabi (over 85%) and Progoti (over 81%) did not use safety measures. The proportions of using safety measures were apron (Dabi 4%, Progoti 2.6%), mask (Dabi 12.8%, Progoti 18.8%), gloves (Dabi 5.5%, Progoti 9.5%), glasses (Dabi 7.8%, Progoti 12.9%), shoes (Dabi 3.5%, Progoti 2.9%), head cap (Dabi 5.5%, Progoti 2.7%), and spray using towel (Dabi 13.1%, Progoti 8.4%) (Table 9).

**Table 9. Status of safety measures (%)**

Types of safety measures taken	Dabi		Progoti	
	Yes	No	Yes	No
Apron	4	96	2.6	97.4
Mask	12.8	87.2	18.8	81.2
Gloves	5.5	94.5	9.5	90.5
Glasses	7.8	92.2	12.9	87.1
Shoes	3.5	96.5	2.9	97.1
Ear pad	0.5	99.5	0.5	99.5
Head cap	5.5	94.5	2.7	97.3
Spray using towel	13.1	86.9	8.4	91.6
N	579		621	

## ENVIRONMENTAL DEGRADATION

Probability of having negative impact on environment was measured by observed data. Table 10 shows that majority of enterprises (over 70% in Dabi and 81% in Progoti) had no probability of negative impact on environment. However the probability of water pollution was found 29.4% in Dabi and 18.4% in Progoti enterprises. Besides, 25.7% Dabi and 17.7% Progoti enterprises might cause air pollution. Other probable environmental problems by enterprises as observed were soil degradation (Dabi 9.5%, Progoti 8.4%), damage in biodiversity (Dabi 10%, Progoti 6.6%), and natural drainage system (Dabi 10.2%, Progoti 8.5%).

**Table 10. Possibility of having negative impact on the environment (%)**

Indicators	Dabi		Progoti	
	Yes	No	Yes	No
Soil degradation	9.5	90.5	8.4	91.6
Water pollution	29.4	70.6	18.4	81.6
Air pollution	25.7	74.3	17.7	82.3
Damage in biodiversity	10	90	6.6	93.4
Hamper in natural drainage system	10.2	89.8	8.5	91.5
N	579		621	

## DISCUSSION

Findings revealed that most of the borrowers of Dabi and Progoti groups were aware of environmental messages from BRAC staff. Borrowers from Progoti were found more compliant than Dabi in terms of fixed and safe waste disposal. Therefore, the possibility of environmental pollution was found less in Progoti than Dabi. Though majority of Dabi and Progoti enterprises were less likely to impact environment negatively, a few had possibility of water and air pollution. Majority of them did not take safety measures during handling hazardous materials. Low performing areas of environmental management and inadequate safety measures indicate necessity of strategic implications.

Environmental consciousness is considered as the step of behavior change towards environmental conservation (Hall and Lal 2006). Larger awareness and compliance with some key environmental factors by BRAC beneficiaries imply less exposure to environmental pollution. Information flow through multiple channels of BRAC programmes such as 18 promises stated by Microfinance programme staff before loan disbursement, health, and WASH programme etc., provided knowledge on various social and environmental aspects to the beneficiaries. As a result, behavior change improved in terms of use of safe water, sanitation, and hand washing from baseline to end line (Akter and Dey, 2012, Dey et al. 2012, Rabbi SE and Dey 2012). Research conducted by Oghojafor et al. (2011) reported that understanding and adjustment with environment is assumed to be the continuous existence of enterprises (small and medium) in Nigeria. The same holds true for Bangladesh upon adaptation.

Issues of possible exposures to risk are considered imperative for microfinance enterprises ((Hall and Lal 2006). Some of the loan users of Dabi and Progoti enterprises needed to deal with toxic substances such as fertilizer, pesticides, oil/Mobil, detergents, gas, color, etc. to run their business activities. A large group of them did not adopt safety measures during handling toxic substances indicating exposure to associated health risks. Activities of some business sectors such as agriculture, painting, wood processing and metal finishing, automobile and motor repairing are harmful to environment because of types of inputs used for production (e.g., inorganic fertilizer, pesticides), production method (e.g., burning), types of output and wastes (Hall et al. 2008). The authors also mentioned that lack of knowledge; unsafe practices contributed to low compliance of health and safety norms, which expose to health risks associated with smoke, solvents, chemicals, toxic gases, acids.

Majority of enterprises of Dabi and Progoti had no probability of negative impact on environment. Environment-friendly practices such as degradable waste generation and waste disposal at fixed and safe place might lessen environmental impacts. BRAC microfinance enterprises generated degradable wastes which were about four times higher than non-degradable wastes. Use of non-degradable wastes is discouraged by environmentalists because of its harmful effects on soil, plants and animals. On the other hand, the compost made from degradable waste can be used in agriculture or for biofuels. BSS report (2010) mentioned that soil nutrient decreased in northern areas of Bangladesh due to use of inorganic fertilizers and pesticides. Waste-based fertilizer products in agriculture were proposed as waste management alternative in Finland to ensure quality environment (Ministry of Environment 2009). Previous research by

Rana and Islam (2010) mentioned about improvement of soil fertility through organic fertilizer which is a by-product from degradable wastes.

Waste disposal, emissions to air and effluence to water, use of natural resource, impacts on nature and ecosystems are identified as SMEs direct environmental impacts (Meyer-Stamer, 2002; Hillary 2000; Schaper 2002). In our study, probability of negative impact on environment was found for few enterprises, while inappropriate waste disposal might contribute to such environmental degradation. Research shows that improper use and disposal of chemicals can result in loss of soil fertility, water runoff, soil erosion, contamination of drinking water and loss of aquatic life (Hall et al. 2008).

## **CONCLUSION AND RECOMMENDATIONS**

Environmental consciousness contributed to maintenance of key environmental aspects by majority of Dabi and Progoti members. However, some of the issues such as biodiversity conservation, proper use of chemicals and raw materials, loss of soil fertility were relatively less known by the borrowers. Use of degradable raw materials and safe waste disposal at fixed place imply less environmental degradation. However, Dabi was found less compliant than Progoti enterprises about fixed and safe waste disposal. Moreover, lower adoption of safety measures during handling chemicals might expose them to health risks and hazards.

The following low performing areas need to be considered to avoid environmental and health risks:

- The borrowers were provided with environmental messages before loan disbursement, but a large portion of Dabi enterprises were carried out by borrowers' husbands or other family members. These members are required to be conscious about environmental aspects by BRAC.
- Some of the environmental indicators were reported less known to the borrowers. These indicators were biodiversity conservation, proper use of chemical and raw materials.
- Majority of Dabi and Progoti enterprises used different types of chemicals, while adoption of safety measures was found insignificant.
- In case of waste management, loan users of Dabi were found less compliant than Progoti enterprises about fixed and safe waste disposal. Majority of loan users in Dabi were other family members, not the borrowers' themselves. Moreover poor educational background might be another factor of less environmental compliance.

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