FIELD REPORT

INITIAL ENVIRONMENTAL EXAMINATION OF BRAC PROGRAMS

AGRICULTURE, FISHERIES, FORESTRY, SERICULTURE

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INTRODUCTION

{**PRIVATE** }The purpose of this report is to identify research areas for the Environmental Research Cell (ERC). The following programs were exmined: forestry, sericulture, agriculture, and fisheries. Each of the aforementioned sections is divided into three sections: findings, suggestions for environmental improvement and research recommendations. The research procedures will be explored upon once the exact research areas are identified. Appendices for each program provides extensive detail on objectives, description of activities, description of environment, environmental impacts, and socio economic impacts.

METHODOLOGY

Initial Environmental Examination (IEE) were conducted from mid-April to mid-May 1996, to examine the Fisheries, Agriculture, Forestry and Sericulture BRAC programs. Three areas Manikganj, Bogra and Khulna were selected to ensure a certain geographical representation of Bangladesh. All four mentioned RDP programs have to be represented in the selected areas. The principal research tools were interviews with (i) BRAC beneficiaries (ii) BRAC sector specialists (Fisheries, Agriculture, Forestry and Sericulture) and (iii) regional and area managers. When possible beneficiaries, and staff of a same program were respectively interviewed in groups. Effort were made to interview beneficiaries without staff presence to avoid that the latter influence the former. Field observations of BRAC programs were also conducted to provide first hand information on the program's environmental impacts and socio-economic consequences, and a literature review were also used to provided a basic knowledge of BRAC programs and of the environmental situation of Bangladesh.

Group interviews were semi-structured and most questions were open-ended. Four each of the programs, interviews questions were based on a checklist which strives to evaluate the environmental impacts, and socio-economic consequences of each program investigated. More precisely, the checklists focused on the following subjects (i) objectives, (ii) description of activities, (iii) description of the environment, (iv) environmental impacts, and (v) socio-economic impacts. In many instance, however, questions were omitted or added to the original questionnaire depending on the experience of the interviewee(s). The information collected and its analysis are qualitative.

The methodology used presents the following limitations which have probably biased the findings of this study (i) spatial bias: it is likely that locations more easily available in car were favored, (ii) successful bias: it is likely that the beneficiaries selected for interview by the staff were among the best ones, (iii) Deferencial/politness bias: it refers to the tendancy of interviewee to tell what they think they supposed to tell to please the audiance. This bias was particularly observed when staff were present during interviews, (iv) geographical bias: despite that effort were made to cover different geographical regions, it is likely that geographical issues were omitted/neglected, since only three regions were visited (v) Knowledge bias: availability and reliability of data, scientific knowledge about the environmental impact on ecosystem is still relatively poor, which limits the capacity to identify, and more so to quantify environmental and socio-economical changes due to anthropogenic activities.

EVALUATION OF FORESTRY PROGRAM

FINDINGS:

- Forestry projects are not well established at Manikganj and Bogra. Quite better at Khulna.
- Bogra has good mulberry tree plantation as roadside plantation, which is really doesn't fit the aim of afforestation program.
- Difference between agriculture and forestry is not clearly clarified (understanding from the interview of project staff of Bogra).
- Beneficiaries are not so interested on forestry projects. Because the income/return is not quick like other project, as well as not enough land.
- Giving little importance on local indigenous species
- Following the same species pattern for all areas selected by forestry dept.

SUGGESTIONS FOR ENVIRONMENTAL IMPROVEMENT

- Provide enough improved seed
- Provide land leasing system for homestead forest
- Reduce the use of polythene in nursery
- Facilities for seedling marketing
- More emphasis on social forestry, road side plantation other than mulberry plantation
- Maximum use of fellow land
- More emphasis on local indogenous species
- More care after tree plantation at the roadside

RESEARCH RECOMMENDED:

- Survey of the species diversity of the area to conserve biodiversity
- Selection of local indigenous species for afforestation and experimenntation (Accelerate native plant growth, increase natural resources)/ restore natural habitats or ecosystems.
- Reduce the use of polythene bag/ alternative of polythene bag
- Social forestry other than mulberry plantation to diversify species

- Agroforestry to restore soil fertility, increase income, reduce soil erosion
- Program for creation of green belt along coastal areas
- Effect of salinity on coastal biodiversity (both on plant and animal of Sundarbans)

EVALUATION OF SERICULTURE PROGRAM

FINDINGS:

- Dyes may have harmful affects on natural resources as well as beneficiaries health
- Formalin has harmful affects on beneficiaries health (skin and eye irritations)
- The primary tree specie planted for roadside planation is mulberry
- All sericulture activities are done exclusively by women

SUGGESTIONS FOR ENVIRONMENTAL IMPROVEMENT

- recycle water used during reeling process
- provide gloves for workers
- provide medical assistance for work related injuries (burns, infections, cuts, etc.)
- recycle scrap pieces of material leftover from the foundation
- try planting other types of trees (to diversify better use of soil)
- investigate the natural chemical that comes from the cocoons

RESEARCH RECOMMENDED

- Chemical dyes: effcts on environment and health hazards
- Formalin: effects on environment and health
- Natural chemical from cocoons: its uses, effects
- Waste utilization:use as fertilizer

EVALUATION OF AGRICULTURE PROGRAM

FINDINGS:

- Compost is not widely used by BRAC beneficiaries

  The use of pesticides is the main mean to eliminate pest. insects instead of using poison which is harmful for both human health and environment.
- Initiatives should have to be taken to culture different identified extinct fish
- Increas in water scarcity is a concern in Bogra and Kluna,

SUGGESTIONS FOR ENVIRONMENTAL IMPROVEMENT

- Enhance the motivation of beneficiaries and staff in using environmentally friendly technique
- Incude in the beneficiaries training information on the different impacts of pesticides on both the environment and their health.
- Promote more actively the use of alternative techniques, rather than pesticides.
- Promote aproriate care for the crop as a mean to avoid the use of pesticide. Healthy seed, and appropriate "watering" and fertilization , help to reduce the need for pest control.

RESEARCH RECOMMENDED

- Very few Integrated Pest Management (IPM) techniques are developed for the conditions of Bangladesh, research is needed to find efficient technique which are appropriate to the need of BRAC beneficiaries and which do not impact negatively the environment and the health of beneficiaries such as compagnon/antagonist crop.
- Research, experiment, the propriety and the impacts of this new "bio-fiertilizer", and other new more "environmentally friendly" fertilizers such as dry compost and liquide fertilisers.
- Measure the impacts of pesticide residues in soil and water body surronding BRAC beneficiaries field run off in water body and adacent soil , and on beneficiaries health.
- Monitor the level of the watertable -- Investigate, if it is decreasing or not, and how BRAC programs affect it.

EVALUATION OF FISHERIES PROGRAM

FINDINGS

- Pond water is often used for bathing, cooking, and washing in addition to fisheries activities
- Poisoned fish are usually eaten or sold in the markets by beneficiaries
- Beneficiaries incomes have increased substantially
- Dike cultivation is not popular among beneficiaries
- Fingerling transportation is a problem

SUGGESTION FOR ENVIRONMENTAL IMPROVEMENT

- Provide transportation for fingerlings
- Protect human interference in the fish ponds
- Provide beneficiaries with gloves for applying poisons

RESEARCH RECOMMENDED

- The following recommendations have been carried out from the study:
- Environment friendly methods should have to be identified for killing predator fish and other species like *Thai Sorputi*.
- Develop or arrangement of improved marketing facilities so that they can get (beneficiary) maximum profit from it. In the traditional marketing system it is seen that middlemen always get the maximum profit which in most cases dishearten producer.
- Residue analysis

APPENDIX 1

Forestry Program
Summary of Findings
Manikganj/Bogra/Khulna
April/May 1996

I GRAFTING NURSERY

The only project visited at Manikganj was a **mango nursery**, where grafting of high yielding mango tree were performed on local stronger species. However there is also grafting of lychee and lemon.

Project started in 1994.

1.Objectives

* Increase resistance and strength of good variety of mango

2.Description of Activities

No beneficiaries are involved in BRAC nurseries
* for the young plant, polythene bag is used to contain each little plant (maybe only normal nurseries)
* plough the soil
* fertilizers before planting (cow dung and urea??)
* planting mango three
* cover the soil with water lily plant to reduce lost of humidity
* use of pesticides (summithium) when required
* use of fertilizers after planting
* watering every day
* Grafting branch when ready
* sell to anyone interested
* source of income for BRAC.

3. Environmental Impacts

Pesticides application (sumithium) when pests are found
Water availability does not appear to be an issue, the water is taken from a nearby pond. There is plan to use tubewell water in the future.

Fertilizers runoff was not discussed.

4. Socio-Economic Impacts

No direct income for beneficiaries

Better opportunity for quality mango tree to cultivate

II.ROAD SIDE PLANTATION

This project was visited only at Khulna, the information is from the interview with the new sector specialist at Manikganj and Bogra and field worker at Khulna

1. Description of Activities

* 14 km of road side planted (Manikganj), 53 km planted at Khulna
* Timber species: Mehgoni, Shishu , Rain tree, Boka rain, Eucalyptus (Manikganj), Babla, EpiEpil, Shishu, Raintree and Mehgoni at Khulna
* Fruit tree species: jack fruit, mango, papaya, guava, olive

2. Experience with tree planting and management (Khulna)

* Road are owned by WAPDA, UP
* Seedlings provided by BADC
* 65% of the income for benefficiaries, 10% for BRAC, rest for forestry and road owner

3. Problem related to roadside plantation

* People from Gher (Shrimp culture pond) cut the plant
* Goat can eat the bark of Epilipil
* Tree fall due to erosion during rainfall
* Effect of salinity (plant are not healthy)
* Cancer from Babla pollen (?)

4. Environmental Impacts (source: sector specialist)

Because timber create shade they create a shelter for other crop like vegetable or climber plants. Reduce soilerosion, give stability of the road.

5. Socio-Economic Impacts (source: Env Cell)

* Income generation
* Fuel wood and timber tree available

III. "BRAC NORMAL NURSERY"

The following information was provided by the Agriculture/Forestry program specialist. Some information were collected from Bogra.
"BRAC normal nursery" are managed by beneficiaries

1. Objectives (Source: Env. cell)

* Produce tree for road side plantation and forestry
* Increase beneficiaries skill
* Increase beneficiaries incomes

2. Description of Activities

* There is 126 units of 7-10 decimal each
* Activities are similar to a grafting nursery except that there is not grafting process.
* Buy seed from local people, some timber seed supplied by BRAC (Bogra).
* Tree species: Depterocarp, Acashmony with 60% survival rate, Arjuna with 30% survival rate, other fruit trees with 95% survival rate (Bogra).

Use of products (Bogra)

* The trees are sold to the market and BRAC buy some for social forestry and road side plantation.
* Timber, Fruit tree

Experience tree planting and management (Bogra)

* Problem with seed limitation, not enough land, insufficient technical knowledge
* Soil preparation: cowdung +compost +soil
* Often in a small polythene bag
* Urea & TSP also used when needed

3. Environmental Impacts

* See grafting nursery: fertilizers, pesticides and water usage
* Use of polythene bag is not environmentally sustainable (Bogra)

4. Socio-economic Impacts

* Seedling production can be larger than the demand, and it can be difficult for the beneficiaries to sell all his/her seedling.
* Production: 15000 seedling/nursery/year
* Potential health hazard from pesticides' manipulation (source: Env. Cell)

No serious health problem observed/identified

APPENDIX 2

Sericulture Program
Summary of Findings
Manikganj/Bogra
Apri/Mayl 1996

1.Objectives

The purpose of the sericulture program is to promote employment and income generating activities for poor, landless rural women through sericulture.

2. Description of activities

* mulberry plantations
* silkworm rearing
* silk reeling

Division of labor: All women workers in every phase of sericulture.

The room is kept wet during the dry season, charcoal,is used during the wet season.

3. Environmental impacts

Mulberry trees:
Plantations have very positive impacts on environment. For example, mulberry trees reduce soil erosion, it is food for silkworms, it is used as a fuel source. Mulberry trees can only be used as food for silkworms.

Chemical dyes:
The dyes are discarded and may have harmful effects on natural resources.

Cocoons:
Cocoons are dried outside instead of using dryers. This saves energy, all sericulture programs should dry cocoons outside.

Second quality silk:
The old cocoons are recycled and spun on the paddle wheel. This is known as second quality silk. No wastage of cocoon.

Formolin:
Formolin is used during the egg rearing and worm rearing stages. Rearers must spread formolin in the house and wash the eggs in it. This has harmful effects on the rearers due to the smell, skin

and eye irritations. Formulin also emits a foul odor, but beneficiaries are used to it and don;t have a problem with it.

4. Socio-economic impacts

Generates income for women beneficiaries. Women sometimes purchase land, animals, food for families with earnings. Salary is approximately 1,000-1200 taka monthly affter silk has been reeled. (Bogra). Women are not given a salary for their services, they receive money once coocoons have been reeled. They also receive wheat and creidt during the egg rearing stage. In Bogra women formalin said they spend money on children's needs. Beneficiaries in Bogra have worked in sericulture for 3 years and have received 22 days of training. In addition, sericulture does not require land, less capital is needed, no problems during rainy season.

Health hazards are mainly related to the unsafe use of chemicals and silk reeling.

* infections
* burns
* bad odor
* stinging skin

APPENDIX 3

Agriculture Program
Summary of Findings
Manikganj/Bogra/Khulna
April/May 1996

1. Objectives

* Raise income (quick return)
* Increase employment opportunity
* Increase technical knowledge (3 days of training + firewood experience, with P.A. assistance)

2. Description of Activities

Vegetable: 3 crops/year -- Maize: 2 crops/year (pattern: maize -->T Amman --> maize)
Fellow lands are transformed in cultivable land
In Bogra: BRAC technical support cost 5 tk/ decimal of land to beneficiaries

Homestead Garden
No homestead garden have been visited, however, as staff and a few beneficiaries mentioned this activities is increasingly popular because (I) it need little skill, (ii) close to the home, (iii) increase income, (iv) food supply.

Maize Cultivation
* "plough" the land with the use of cow and make row
* fertilizers application before planting(urea, TSP., MP)
* planting seed (BRAC supplies)
* insecticide application, once or twice a year
* fertilizer application after planting
* watering (sandy soil: 4 to 5 times/month, less sandy soil: 2 to 3 times/ per harvesting period)

Beneficiaries interviewed also mentioned the cultivation of potato, spinach and other various vegetable such as okra, pumpkin, "jinga", "rip gold".
There is two seasons: summer and winter. The winter season is the most productive.

Maize Seed Production (Bogra)
* BRAC initiative, income generation for BRAC in collaboration with CIDA by producing hybrid maize plants.
* The hybrid plants needs more fertilizers and more water application of malathium and sumithium

Transformation of Maize
* grain are separated from the stick
* grain are dried
* maize grain are used as food supply or as source of income (sold to the market

* marketing is done by BRAC (Bogra)
* stick and dry leaves are used as fuel for cooking
* fresh leaves are used as food for livestock
* waste are used for compost (Bogra staff)
* waste are used as food for poultry (Bogra staff)
* waste are used as duck and goat food (Khulna)

Division of Labor

Men

* field activities ("plough", fertilizers and pesticides applications, watering)
* sell product to the market
* in charge of the money earned

Women

* transformation of product
* BRAC beneficiaries

Ownership

-50% owner and 50% least (source: agriculture sector specialist)

3. Description of the Environment

Manikganj

* rural area
* mostly cultivated land
* Sandy soil, described as fertile by beneficiaries and BRAC staff.
* Flood prone area
* Erosion in Monsoon

Bogra

* soil fertility have increase because of compost use (sector specialist)
* red soil is not good for all kind of vegetable
* sandy and clay loam

Khulna

* sandy and sandy loam soil
* coastal ecosystem, salt water intrusion

4. Environmental Impacts

Fertilizers used are cow dung (organic) TSP., Urea, MP (inorganic). Compost is not used (one of the reason I think it is because their is little to compost, but it as to be verify)
In Bogra, beneficiaries mostly depend on chemical fertilizers, bio-fertilizers and cow dung (ask Nasima) are not so available

* Agricultural runoff as been identified as a problem regarding the river water quality (source: beneficiaries and staff). It is not so much a problem in Bogra (staff).
* Inorganic fertilizers uses deteriorate the long term quality of the soil, thus the production of the land (source: P.A.)
* In Bogra they use a new fertilizers called "bio-fertilizer", which is supposed to fix nitrogen. This fertilizer is more environmentally friendly and less costly, however is not widely used by farmers. t is still under "demonstration". There is a need to motivate the beneficiaries to change there behavior in regard to fertilizers application.
* In Bogra, they apply zinc and sulfur to the land.
* No conflict around cow dung, beneficiaries prefer to use cow dung (Bogra staff)
* Urea and phosphate are the main fertilizers used in Khulna, compost is rarely utilized.

Water source are in order of importance: shallow tubewell, river and pond water (source: beneficiaries)

* There is a seasonal variation, however no annual trend regarding the surface or ground water level have been observed. (source: beneficiaries)
* The use of water increase every year (source: beneficiaries).
* Shallow tubewell and pond are the main sources (Bogra staff)
* Increased salinity in water supply cause problem in Khulna . the main source of water of this region is shallow and deep tubewell.

Pesticides are applied once or twice a year to eliminate certain pest. The poison used are Furadan and Ripcord (source: beneficiaries)-- in Bogra Logos, Furadan and savin.

In Bogra, staff appears to know many different mechanical ways to control pest such as collecting the "infected plant", killing by hand the harmful pest, using trap light with kerosene, at nigh to attract pest and kill them, or attract insect and kill them in a trap with pesticides but away from the crops. However beneficiaries still prefer the use of pesticides it is easier to eliminate pest and faster. In addition, even the staff, in its field of hybrid maize, was thinking using pesticide to prevent the infection of the plant by the maize crop nearby.

* Potential destruction of non-harmful insects (not mentioned by beneficiaries nor BRAC staff)
* BRAC does not provide gloves of any protection for the use of chemical

Hybrid plant
Sector specialist in Bogra was in favor of hybrid plants, because even though these plants needed more fertilizers and water, they also produced a lot more fruit/vegetable.

5. Socio-Economic Impacts

Increase in income for the beneficiaries families, the woman-beneficiaries had no control over the income, the husband was responsible for spending it.

* In presence of men, the woman say that it was find that the men were in charge of the income resulting of BRAC agriculture project.

* Money is used to buy land or build house.

Heath hazard are mainly related to the unsafe use of insecticides and to the agricultural runoff polluting the nearby river.

* Bad odor, skin and eyes irritation from the unprotected used of pesticides.
* The degradation of the river water quality, partly due to the agricultural runoff.
* No gloves are usually used, however beneficiaries put clothes on their mouth

Conflict use of land (before & after)

There appears to be no conflict since land were already used for cultivation, however very little investigation has been done on that topic (source: beneficiaries).

Marketing problem (Bogra)

The market can be too far from the beneficiary home, and there is no adequate means of transportation to bring vegetable to Dhaka -- it is very expensive.

APPENDIX 4

Fisheries project{PRIVATE }
Summary of Findings
Site: Manikganj
Date: April 3-4, 1996

0. Objectives:

- income generation among the poor
- employment opportunity
- introduction of new technology of fish cultivation
- protein supply
- utilize unused water/pond

1. Description of the project:

Studied site is Manikganj. There are 171 beneficiaries are working for 88 ponds. Project started from 1989.

Activities involved with this project

- Carp polyculture
- Sharputi culture (seasonal)
- Carp Nursery
- Hatchery
- utilize unused pond

No conflict with villagers using pond for fish cultivation (source: beneficiaries).
(one beneficiary (men) interviewed from Hatchery + Nursery with 8 years experience)

Hatchery

- fish become mature by 6-8 month and ready for spond
- One fish can give eggs 2-3 times in its life, and it is about 250 gm in each time
- production rate of one pond is ~15-20 Kg per season.
- fish eggs sell to the fisherman
- shallow tube-well water is needed for hatchery to get clean water.
- water level of the pond varied from 5-16 ft between dry to rainy season.

One of the problem related to fisheries are fingerlings transportation (source: Sector specialist).

Division of Labour

- normally women work with men though women can not work as much as the men do
- women sell their fish/egg in the pond side and a little bit at market
- sometimes women also own pond for fish culture. Comparatively less women beneficiaries are working here then other projects.

2. Environmental Description:

- there are villages around the pond, though most of land is being used for agriculture.

- main water source is flood water and rainfall
- they don't use ground water
- water level is lower specially in dry season
- no problem regards to water availability (source: beneficiary)

3. Potential Impacts of the project:

Fish diversity

- fishes before this project: Boal, Chital, Lata, Magur, Mola, Dela, Chanda, Rhui, Catla, Mrigel, Shrimp (source: beneficiaries)
- cultivated fish for the project are Silver carp, Carp as well as Rhui, Catla, Mrigel
- other fishes disappeared from the pond due to maintenance activities. Because those are unwanted fish for fish culture pond
- There is no recorded vegetation along the pond bank and water (except Dike cultivation)

Maintenance activities

- they use poison (Phostoxin, Rotenone) to kill those unwanted fish. residual time for phostoxin is 48 hours.
- poison is used every two years to eliminate competitor (unwanted and predator fish)

No residual effect on fish or human. Never have problem with predator (source: staff and beneficiary).

- unwanted fishes are checked every two years
- to clean the pond water they apply lime in to the water (they keep lime in a pot with water to make it cool before applying to the pond).

Impacts of human activities

- the people around the pond are using this water in their daily activities, this way polluting the water
- household runoff are entering in to the pond which is increasing the nutrient for fish according to beneficiaries.

Health (fish and human)

- some people are using gloves some are not. There is no serious problem regarding human health.
- fish disease controlled by screening, if there is any infected fish in the pond they throw away that fish (source: Sector specialist)

4. Evaluation of findings:

Information

- information is inadequate regarding physical and biological environment.
- socio-cultural information are not enough for concrete evaluation.

Positive impacts

- it has positive socio-economic impact on beneficiaries. They are getting money, improving their living standard. They are working together, sharing job between men and women and with others
- the knowledge among beneficiaries/involved people about environment is quite narrow.

Negative impacts

- negative impacts are as impact from poisoning, liming to the fish/human health (no record of impact, source: beneficiary)
- destruction of biodiversity around the pond (during site preparation)
- there is no activity to improve the water quality of the pond for the better management and production (except liming).

Suggestions

- training to the beneficiaries and staff about environment and management
- residue analysis to see the long-term effect of using poison and lime
- provide enough transportation for marketing
- protect human interference in to the fish pond