

# Environmental Assessment of the Poultry Sector of BRAC's Ultra Poor Programme

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## Environmental Assessment of the Poultry Sector of BRAC's Ultra Poor Programme

### Abstract

This study aimed to conduct an environmental assessment of the poultry sector of 'Challenging the Frontiers of Poverty Reduction/ Targeting the Ultra Poor Program (CFPR/TUP)' program of BRAC. Special focus was given to health and environmental aspects of poultry rearing including the housing and diseases of both human and poultry, surrounding environment, access to and sources of water, waste management, common property resources, and social conflicts related to the poultry programme. Data were collected through field observation, in-depth interview, and case studies during August 2003. Poultry rearing was found to be a promising income generating activity for the ultra poor. A few obstacles related to health, resource use, resource management, and social conflicts were identified. There were some innovative initiatives taken by the TUP poultry members related to waste management, alternate source of income and water access. Some steps were suggested to resolve social conflicts, health problems, poultry housing, waste marketing, increase nutritional intake, initiate intermediate income generating projects, and management issues of common property resource.

**Key words:** Ultra Poor, Poultry, Resource access, Waste management, Environmental problem, and Social conflict.

## Introduction

In Asia, rich farmers tend to own large quantities of livestock and resource whereas poor families tend to keep poultry and small ruminants. Within the farm, men often own the large livestock like cattle, camels and the women own small ruminants or poultry (FAO, 2003). According to the League for Pastoral Peoples Life (2002), livestock and poultry play a vital role for the world's poorest people. Seventy percent of the world's rural poor depend partially or totally on their animals that includes 640 million subsistence farmers in rainfed areas, 190 million pastoralists in arid or mountainous zones, and more than 100 million people who do not own land. They convert natural vegetation into meat, milk, eggs, fibre, fertilizer and fuel. But animals are more than this. For farmers and pastoralists, they also represent (League for Pastoral Peoples Life, 2002):

- A source of cash income.
- A source of draught power and transport.
- A form of savings – a “walking bank account”.
- A buffer against crop failure and other risks.
- A means of employment.
- A way to access and use common land, community forests and other common property.
- A support for community networks and culture.

There are 130 million people in Bangladesh. More than half (53%) of them are considered poor. Amongst this ‘poor’ category 36% are classified as ‘very poor’. The World Food Programme estimates that [based on Bangladesh Institute of Development Studies report in BRAC, 2002] there are 30 million ‘very poor’ and they are the poorest people in the country. The ‘very poor’ are further divided into two different sub-groups ‘destitute’ (5%) and the “ultra-poor” (31%).

BRAC recognizes that traditional development programmes will not help the ultra poor group and that a more innovative, tailor made approach is needed to effectively reach them and bring sustainable change to their lives (BRAC, 2002). Accordingly, BRAC has developed a new project titled as ‘Challenging the Frontiers of Poverty Reduction/ Targeting the Ultra Poor (CFPR/TUP)’ in 1999. There are four linked components in CFPR/TUP programme (BRAC 2001). (1) Special investment programme for the specially targeted ultra poor; (2) employment and enterprise development training for the ultra poor; (3) social development programme; and (4) essential health care programme.

Special investment programme were designed to bring sustainable improvement in the lives of rural ultra poor women. The ultra poor members were able to choose from the following seven different kinds of income generating activities.

1. Poultry (cage rearing)
2. Cow rearing
3. Goat rearing
4. Vegetable cultivation
5. Horticulture nursery
6. Wage employment in production center
7. Non-farm activities



### Poultry sub-sector of CFPR/TUP programme

The poultry sector is an important source of income for poor rural families, particularly for women. Poultry birds are mainly local, kept in a scavenging system and are fed on household waste and crop residues. In the late 1970s BRAC identified poultry rearing as a source of income for the poor particularly women. High mortality rates and the low level productivity of the local variety concerned BRAC and led to develop a more appropriate poultry model for the rural poor. In collaboration with the government's Department of Livestock services, BRAC has developed a successful approach, known as the 'Bangladesh Poultry Model', which includes high yielding variety birds, balanced poultry feed and vaccines (Saleque, 2003; Permin *et al*, 1999). Having undergone several changes this model is now applied as one of the CFPR/TUP income generating activities. The poultry sub-sector has been designed to accommodate the needs of the target group to assure a sustainable improvement in their lives. Cage rearing is introduced as poultry rearing for the ultra poor. Poultry is the largest sector of the CFPR/TUP programme and accounts for more than 32% of its total income generating activities (IGAs).

#### Poultry households under CFPR/TUP programme

Total no. of TUP households: 5,000 up to 2002  
Rangpur: 1,853(37%)  
Kurigram: 1,746(35%)  
Nilphamari: 1,401(28%)  
Total poultry household under CFPR/TUP: 1,597 (32%)  
24 new poultry households in 2003 = Total 1,621

Several studies have been done on BRAC poultry programme. These mainly looked at the increase in income, the perception of VO members about rearing and the problems they faced, as well as poultry litter disposal and management (Tareq and Akter, 1998; Rahman *et. al.*, 2000). The TUP poultry programme is a new project for BRAC and ultra poor people mostly depend on common property resource and surrounding environment. Therefore, they are vulnerable to any kind of social conflicts and environmental disasters. This study aimed to gather BRAC's experience on TUP poultry, poultry rearer's access to the resources and conflicts related to poultry rearing, water access, and waste management.

### Objectives

The broad objective of the study was to conduct an environmental assessment of the poultry sector of CFPR/TUP and outline possible suggestions to improve the status of the TUP poultry sector.

The specific objectives are:

- To assess the quality of poultry rearing
- To assess the problems associated with water access and common property use
- To identify the probable health risk associated with poultry rearing
- To assess the social conflict related to TUP poultry rearing activities
- To assess the poultry waste management situation

# Methodology

## Study area and sampling

There were 1,621 TUP poultry households (1,597 up to 2002 and 24 in 2003) in three CFPR/TUP programme regions namely Rangpur, Kurigram and Nilphamari. Out of these, 42 households were selected for this study. From each of the regions two areas were selected. Darsana and Kownia from Rangpur region, Ulipur and Kurigram sadar from Kurigram region, and Dimla and Nilphamari sadar from Nilphamari region were selected. Details of the selection of interviewees (TUP poultry rearers) are presented in Table 1.

**Table 1: Distribution of total no. of interviewees taken in different region**

Region	Name of the Area	Total number of interviews (42)
Rangpur	Darsana	8
	Kownia	5
Kurigram	Kurigram sadar	8
	Ulipur	8
Nilphamary	Nilphamary sadar	6
	Dimla	7
Total		42

## Selection criteria

Criteria for selection of the poultry rearers: respondents were selected based on their savings (high and low), farm size (i.e. number of chicks e.g. 36 and 54), the phase (1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup>)<sup>1</sup> and lot (1<sup>st</sup> or 2<sup>nd</sup> lot)<sup>2</sup> of the poultry farm were considered. Some respondents from higher savings group and some from lower savings group were selected for interview. They were also selected as 36 chicks rearer and 54 chicks rearer. Some rearers from first phase, some from other phases, similarly some were selected who received chicks in first lot and some who received chicks in second lot after completing first lot.

## Data collection

The data were collected through field observation, in-depth interview and case studies. A checklist was followed for interviews as well as for observation.

The study was conducted during 11 to 15 August 2003.

## Limitation of this study

The study period was insufficient to formulate a precise conclusion regarding specific aspects such as health-related risks. Nevertheless, this study will provide an overall idea about environmental concerns related to poultry sector under TUP programme and the coping mechanism of poultry rearers in adverse socio-environmental conditions.

<sup>1</sup> 1<sup>st</sup> Phage: April, 2001-May, 2002; 2<sup>nd</sup> Phage: June, 2001- July, 2002; 3<sup>rd</sup> Phage: August, 2001-September, 2002

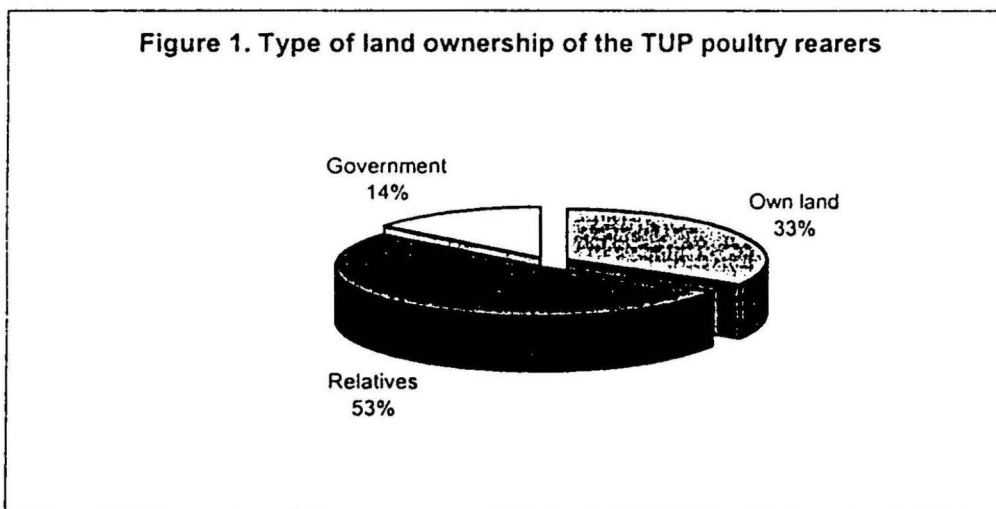
<sup>2</sup> 1<sup>st</sup> lot means the TUP poultry rearer received chicks for the first time; 2<sup>nd</sup> lot means they got chicks for the second time after completing the first cycle of poultry rearing.

# Findings

## Socio-economic status

### **Land ownership**

Land ownership plays a significant role in respect to social conflicts related to water access, bad odor, and waste management. Among the sample population only 14 respondents have own their own land. The land ranges from 2-7 decimals. The remaining respondents are living on land belonging to others. It was observed that none of the respondents were paying any rent to live in other's land. They were found to live either on government *khas* land or on relative's<sup>3</sup> land. In a few cases neighbours asked the respondents to live in their place. Almost all of the respondents are living with their husbands and/or children. Only one elderly respondent is living with her grandson and another respondent with her nephew. Figure 1 shows the land ownership. Some respondents who are living on other's land used to work free of cost for the landowners. After joining the TUP programme they no longer had time to work as free labourers, which in some cases resulted in conflict with the landowners. Through 'Gram Shohayok Committee' tubewells as well as latrines are distributed to the TUP members. This distribution becomes problematic when the TUP members live on *khas* land or on land belonging to others.



### **Farm status**

**Chicks:** All TUP poultry farms got layers. Out of 42 farms visited seven were 54 chick farms. Others were 36 chick farms. All the 54 chicks were given in the 2<sup>nd</sup> phase of the programme.

There were cases of chicken mortality during egg hatching due to excess bleeding and hot weather. Chickens also died due to *jhimuni*<sup>4</sup> disease. Some chickens died due to liver infection or burning of the liver. However, in most farms at least 30 chickens survived. Only in one farm 11 of 36 chickens died of liver infection. The BRAC staff helped the

<sup>3</sup> 1. brother or brother-in-law 2. uncle or uncle-in-law 3. daughters husband's land 4. Son in law's land 5. niece's land

<sup>4</sup> *Jhimuni* (local name) disease causes drowsiness and limits the movement of chicks.

rearer to sell all the remaining chickens and replaced them with a new set of 36 chicks. In one case it was found that at the 7 month age of poultry rearing the whole lot burnt due to a fire in the house. BRAC and the Gram Shohayok Committee helped rebuild her house and gave her a new set of chicks.

**Savings:** Out of 42 respondents, 16 were found to have savings of more than Tk. 6,500. Three had savings between Tk. 2,800 and 4,000. Others had average savings of Tk. 5,879. The reported reasons behind this broad gap in savings are listed below:

- large family-size and only one earning member,
- no other income source other than poultry,
- respondents who had sick husbands could not save much,
- having just started their second lot (set) of chick rearing (they are paying for poultry feed and medicine from the savings but not generating an income),
- during the off- pick period most respondents could not manage to pay their savings, and
- expenses for health services during sickness.

**Marketing:** Most of the poultry rearers sell eggs from their homes. Buyers came to their homes to purchase eggs. The price was Tk.13-14 per eggs in most places.

#### **Previous and current occupational status**

Before joining the TUP poultry-rearing programme many respondents were working in the neighbouring households as cleaners, rice huskers, floor mopper (*ghar lepa*) and cooks. Others were stitching 'Kantha' on commission basis. These activities were hard to get and provided the women with sporadic and insufficient income to support their families.

After completing the first lot of chick rearing there was a gap of one month or 21 days before getting the new lot of chicks (2<sup>nd</sup> lot). This time is needed to disinfect, clean and prepare the poultry houses for the new lot. During this gap and for the following 3 months gestation period the poultry rearing activity is not prolific. As a result, most of the respondents try to return to their previous jobs to feed themselves and their families. However, this proves difficult because during the gestation period the chicks need intensive care, calling for a fulltime engagement of the poultry rearers.

Some respondents have large families with husbands and children. It was reported that the husbands and older sons work as labourers. Working mainly on neighbouring farms in vegetable cultivation, weeding, harvesting and soil digging. As this kind of work is conditioned by seasonal constraints and does not provide a substantial income the men are involved in any other income generating activities they can find. Activities such as fishing, nut selling, tea stalls, selling tea in flasks, rickshaw pulling, and begging. Nevertheless, few younger children of the ultra poor family are now encouraged to go to local schools after joining the TUP programme.

The Brahmaputra and Tista rivers often flooded and affected surrounded areas by erosion and loss of crops, land and homes. During the dry season most of the arable lands remain empty due to drought. Therefore, many of the affected villagers suffer from an uneven income throughout the year.

## Environmental concerns related to TUP poultry sector

### Use of resources

#### *Lighting*

Kerosene of Tk. 2.50-3.00 per day and hurricanes are required for lighting the poultry rooms. Few members use electricity for the chickens at a cost of taka 20-45 per month. According to Carter (2003), use of artificial light can be beneficial to all types of poultry birds. One 40-watt bulb will provide adequate light to cover 200 sqft. of floor space. A combination of natural and artificial light resulting in 14 hours of light per day is effective in maintaining egg production throughout the year.

#### *Housing*

A poultry house should be tight, well-ventilated and well-insulated (ceiling insulation is particularly helpful). It is important to provide ventilation that is adjustable to keep the house warm during the cooler months yet provide free air movement during the hot summer months. Use of 1/2-inch mesh hardware cloth over windows should keep out birds, rodents, and varmints (Carter, 2003) from chick houses. BRAC provides three tins, six fences, two cages with three trays in case of 36 birds and three cages with trays in case of 54 birds. It was observed that some TUP poultry owners had planted creepers on the roofs of the poultry house to provide the chickens with shade. Others used hand-fans during the hot weather to fan the chickens.

#### *Poultry bedding*

Out of the respondents who answered the question regarding use of bedding, five in the Nilphamari region used sand collected free of cost from roadside. Six respondents used ash mostly purchased from the nearest rice mill (on average Tk. 8 for 70kg). Others used ash either from their own households or received from their neighbours. In the Rangpur region four respondents were found to use nothing as bedding in their trays. Five respondents in the Kurigram region used wood dust/ sawdust (an average of 25tk per bag of 60kg which lasts up to a month or more). Bedding is used to reduce the bad odor. It also helps keep poultry litters dry. A survey (Ward and Wohlt, 2002) carried out in New Jersey in 1995 showed that 83% of the poultry industries using bedding and spread to the crop fields afterwards as fertilizer. This study also found that hay, straw, bagged wood shavings and sawdust can be used as bedding material for many species of large and small animals.

#### *Poultry hygiene*

Lack of cleanliness often causes poultry diseases that may seriously affect the growth of chickens. All the respondents used potash to disinfect their hands and feet before entering into the poultry rooms. In addition potash is also used once a week for washing the poultry cages and water containers. Subsidized potash is provided by BRAC for the first seven months. Subsequently the respondents use their savings to buy potash.

#### *Poultry nutrition*

Poultry feed is subsidized by BRAC for the first seven months. Then the respondents use their savings to buy feed. Poultry feed costs Tk 360 per week. It is important that chicks should have easy access to water to avoid dehydration. According to Carter (2003), a one-gallon chick fountain is adequate for one hundred chicks. Moreover, a 10 inches long water container providing 20 inches of waterer space would support 20 mature birds. We

found that the tubewell water was used for chicks. The waterer was usually placed in front of the cages, and provided water 2 to 3 times daily and even more frequently during the hot weather.

### *Poultry health*

All medications including antiseptic, saline, vitamins, antibiotics and vaccines are provided by BRAC and subsidized for the first seven months. Subsequently the respondents use their own savings to buy medicines and vaccines. Many common poultry diseases could be controlled by vaccination. BRAC health workers give vaccines for TUP poultry free of cost.

Some disease symptoms were reported about TUP poultry chicks. Most of these diseases could not be identified. There were few incidents of chicken mortality. Relevant literature also showed some diseases in poultry (some are discussed under 'health and nutrition' section). As Agriculture Canada (1991), describes 'coccidiosis' as a parasitic infection (protozoan) common to birds, which have access to their own litter. Once 'coccidiosis' is present on the farm it is difficult to eradicate. Less infection will occur if litter is kept reasonably dry. The infection can cause a reduction in bird growth or production because the parasite invades intestinal tissue and interferes with nutrient digestion and absorption. Diarrhoea and/or bloody droppings may be seen, depending upon the organism. However, these symptoms may also be related to other diseases. Severe infections can kill birds.

### *Water use and access*

Since water use in poultry rearing is found to be an important issue in terms of demand, quantity, availability, access and conflict it is discussed in detailed in this section.

### *Source of Water*

Of the respondents who answered this question, 28 owned tubewells. Out of all the respondents, 14% had their own tubewell installed before joining the TUP programme; BRAC and the 'Shohayok Committee' provided 58% of the tubewells. Other respondents used tubewells belonging to relatives (18%), neighbours, local schools and madrasha (10%) (Figure 2). Very few respondents used to collect water from ponds or lakes to clean poultry and watering waterers. Most of them used water from the tubewells of neighbours or nearby schools.

### *How much water is needed*

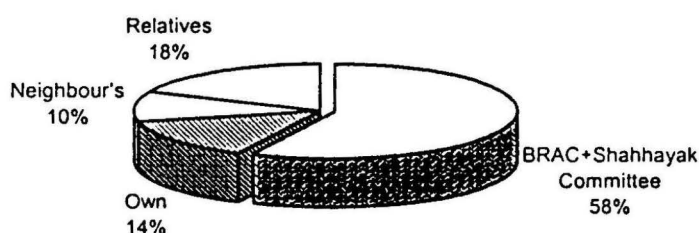
Most women washed the cages everyday, and gave water to the poultry 2 to 3 times daily using an average of 4-6 buckets/pots containing 5-6 liters of water each. As some respondents mention at least 10 liters of water is needed for every day cleaning of cage.

### *Time needed to collect water*

All tubewells and other water sources were within 10 to 100 meters radius from the homes of the interviewees. Only one respondent reported that some times her neighbor removed the head of the tubewell to impede any access to the water. On such occasions the respondent had to walk half a kilometer to the nearest Mosque or Bazaar to fetch water for the poultry.



Figure 2. Tubewell ownership by TUP poultry member



## Health and nutrition

### *Disease, epidemics*

Respondents were interviewed to find out their health problems. The most common illnesses (symptoms) recorded were fever, flu, loose motion, and headaches. These were taking place both before and after the introduction of poultry in the home. Several respondents claimed that since the beginning of the TUP poultry programme the health of their family members had improved.

The most common symptoms associated with the arrival of poultry in the homestead were body aches; weakness and loss of appetite often leading to weight loss. Some other reported illnesses were earache, cough, rheumatic pain, itching eyes, impeded vision, chest burning, dysentery, cholera, boil and skull infection, fits of tension and muscle pain (Figure 3). It was also noted that during floods BRAC provided saline packets to the flood victims with free of cost.

Several human diseases reported in the relevant literature related to poultry rearing. Some of the disease/symptoms found in TUP respondents may be similar to these diseases according to Hammond (1994) that '*Psittacosis*' (*Ornithosis*)-a disease of the wild birds and poultry is transmitted to humans by inhaling an infectious aerosol containing the agent *Chlamydia psittaci* (a microorganism). Infections in humans manifests itself in the form of non-specific flu-like symptoms, fever, chills, headache, muscle aches, dry cough, muscle and chest pain, loss of appetite, nausea, vomiting and diarrhea. Pneumonia is often evident from chest x-ray. Humans may be infected with *Chlamydia psittaci* through breathing when the urine, respiratory secretion, or dried feces of infected birds is aerosolized (i.e., dispersed in the air as very fine droplets or dust particles). Risk groups are bird owners, pet shop employees, and veterinarians (Schachter and Dawson 1979).

Mutations in the Norrie disease (ND) gene give rise to a variety of eye diseases including the classic form of ND (congenital blindness, deafness and mental retardation. ND is one of the most important viral diseases of poultry. ND is regarded as endemic or epidemic almost all over the world ([www.research-projects.unizh.ch/med/unit42200/area847/p3606.htm](http://www.research-projects.unizh.ch/med/unit42200/area847/p3606.htm)).

'Pfiesteria' a pesticide is a one-celled microbe that has been linked to the abundant excess of poultry and hog manure. Humans exposed to the toxic aerosol released by pfiesteria have experienced neurological injury, headaches, skin sores, memory loss, stomach cramps, respiratory restriction, and violent moods (Barker, 1997).

Climatic factors can have a major effect on the rate of transmission of any infectious diseases. Microbial agents and their vector organisms are sensitive to factors such as temperature, humidity, precipitation, surface water, wind and changes in vegetation. In general, increased temperature and moisture will enhance transmission (FAO, 2002).

Some of these symptoms were reported amongst the TUP poultry rearers. Nevertheless, clinical evidence is needed to prove that there exists a relationship between these symptoms and poultry rearing activities.

#### *Housing system*

Most of the respondents were found to live in a single house with two partitions, one poultry rearing unit and one living area and in some cases room for cattle. In most cases bamboo sheets acted as curtains or doors separating the poultry units from the living area. It was found in one case that an old respondent was living in the same room with her goat without any partition.

The only furniture found in the respondent's homes were 'chowki' (wooded platform use as bed). Many are using mosquito nets and some also buy new bed covers with the money earned from selling eggs. In general the homes are extremely small barely fitting a bed and a small cooking area. None of the homes have any ventilation except broken fences and doors. It was found that many respondents also kept firewood inside their homes.

Most respondents did not have any kind of plants at their homesteads, because many of them live on other's land. They were reluctant to cultivate other's land. Others felt that they did not have sufficient land for plantations.

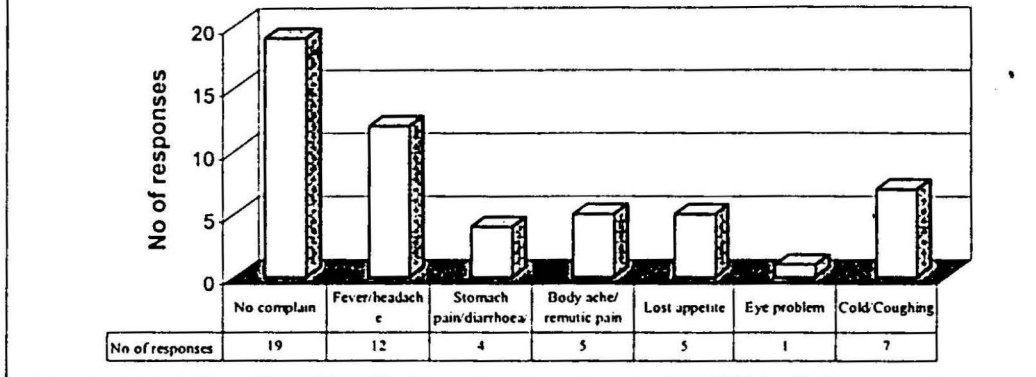
#### *Sanitation*

It was noticed that comparatively cleaner households had better health condition. In some households the members used sandals at homes. Some houses were cleaned and mopped everyday.

Most of the TUP members visited had access to latrines either to their own ones or to those belonged to their relatives or neighbours. BRAC provided seven respondents with latrines through the 'Shohayok Committee'. A few respondents didn't have latrine. Two had just received slabs from BRAC and were in the process of building their own latrine. In the absence of a latrine, some respondents used the bush adjacent to their house for defecation.



**Figure 3. Health problems reported by the respondents**



***Nutritional intake***

**Difference in nutritional intake before and after joining the TUP poultry rearing programme:** It was noted that since their involvement in poultry rearing the respondents' food intake has increased. They used to eat once a day before, now they are able to eat three times a day with few exceptions. BRAC advises the TUP members to eat one egg a week to ensure a continuous protein intake, but it was found in most cases that the respondents and their family members only eat the broken eggs that could not be sold.

To increase the amount of protein and calories in the diet of TUP members, BRAC is trying to promote the consumption of fish and potatoes. It was found that all the members ate rice at every meal. Many ate vegetables that they bought from the market or from neighboring cultivations or collected from the roadside and fallow lands. Some eat fish that they caught from the local lakes or bought from the market. Only one or two were found growing fish in their own ponds or ditches.

**Difference in nutritional intake between two lots (set) of chicks:** The respondents faced problems generating an income and eating between the first and second lot of poultry rearing. During the first 3 months gestation period of the second lot TUP poultry activity are no longer subsidized by BRAC and the chickens are too young to hatch. In most cases respondents faced a severe shortage of food since they could not manage time to go out for alternative income generating activities while they were fully engaged in poultry rearing. One respondent was found to buy vegetables and rice from the local grocery on credit. So far she had already owed Tk.1000 without interest.

**Social conflict**

***Conflict with neighbouring houses regarding use of water***

Conflicts commonly arouse when the respondents were using tubewells belong to neighbouring or distant relatives households. The neighbours or relatives often became jealous to see the new socio-economic developments that the BRAC poultry initiative had brought to the respondent. In most cases this lead to moderate complaints and compromises, for example water in exchange for poultry waste or water in exchange for free labour. In more extreme cases one relative removed the head of the tubewell thus impeding the TUP member from accessing the water. Another neighbour locked her

tubewell refusing the respondent access to water. This was accompanied by frequent verbal abuse in the form of curses and complaints. One neighbour driven by jealousy destroyed the respondent's latrine shed forcing her to go back to bush. She also blocked the side exit of the poultry room, which was used for ventilation and tried to obstruct the respondent's exit from her home.

A common characteristic noted amongst most tubewell owners was a strong sense of possession over the source of water. The general feeling was that the more people used the tube well the shorter life span it would have. In trying to preserve their own source of water, the tubewell owners tended to limit the access of others to it. It is also a common mentality to believe that the more people use the tubewell the more it will become run down and the more maintenance it will require. Maintenance is costly. The owners are not willing to pay for it entirely if others have also used the tubewell.

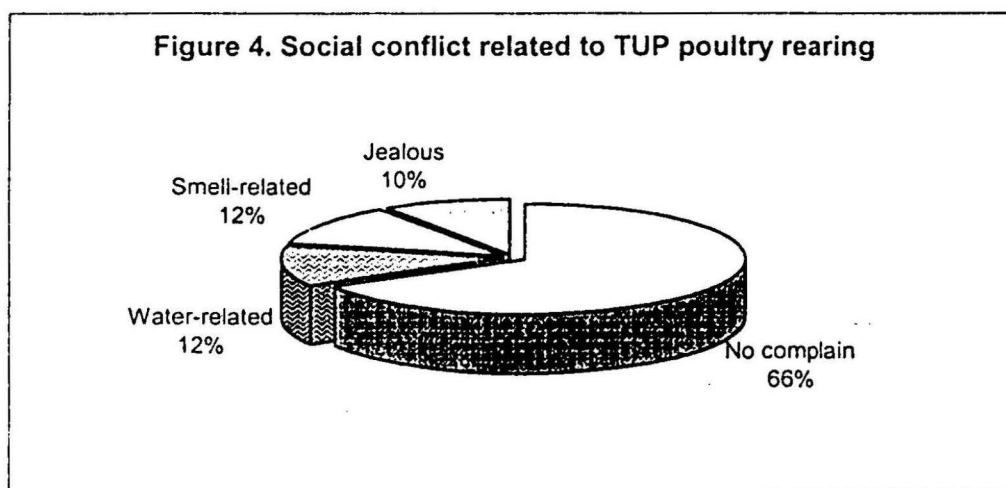
***Conflict with neighbouring houses regarding bad odors caused by poultry rearing***

Although conflict was seldom encountered, complaints by neighbours were numerous. One respondent reported that her neighbours no longer visited her because of the bad odor spreads from her poultry farm. Another respondent was criticized by her landowner for the bad odors coming from her farm. One respondent asked BRAC to take part in some other enterprise as she found it hard to withstand the bad odor of the poultry in her home. BRAC staff said she should take the poultry regardless of her request.

***Common conflict***

Although moderate forms of conflict were found in most areas, TUP members in Kaunia seemed to be exposed to more sever conflict. Some members of the local elites were trying to impede their poultry activities by propagating false information about BRAC. Fabricated stories varied from BRAC's involvement in the trafficking of women to them wanting to convert village members to Christianity. Their propaganda did not work as the Gram Shohayok Committee and BRAC staff worked together to make the village members understand the reality of the TUP programme. Some members of the elite tried to obstruct houses and fracture fences. However, this did not stop the villagers who opted to become part of the TUP programme.

Most of the respondents (66%) did not face any complaints or conflict, a small number of respondents faced severe conflicts in respect to water use/access and jealousy (Fig.4).



## Common property resource use

Common property implies that goods are essentially available for taking away or use. No property rights are involved. The common property identified in TUP programme areas are government *khas* land, roadside resources (sand, plants, leaves, vegetables), *beel* (wetlands for fishing), forests and fallow land. Ponds, ditches, trees, bamboo bushes, croplands and other properties belonging to neighbors are also considered as common property. Usually the villagers do not complain about TUP members, farmers or any other poor people using their property unless the owner needs that property for personal use. They allow others to graze cattle in their fields, to collect fodder, fuel, hay and sand from their places. The sand for poultry bedding is usually collected from local roads, ditches, dried ponds and government land. Grass from the roadsides, fields, fallow land and other croplands are used to feed cows and goats. Firewood, bamboo leaves and other leaves are collected from neighbouring trees and roadside tree. It was found that the TUP goat and cow rearers mostly depended on common property resources. These animals are associate enterprises along with TUP poultry.

No unpleasant incidents were found regarding use of common property. Nevertheless, problem may arise in future when the demand for bedding material and fodder will increase. Since TUP members do not have their own resources they have to rely on common property or on resources belonging to others. Therefore, common property use needs to be considered to be made available without harming the environment.

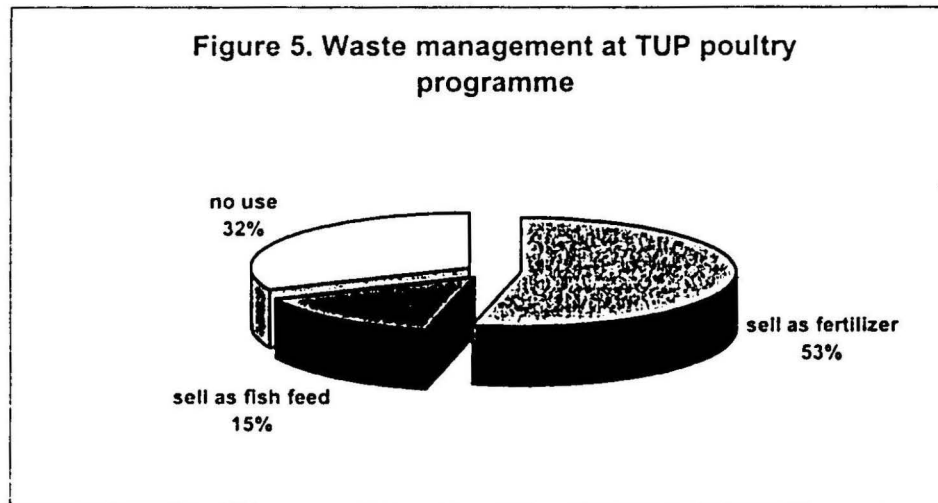
## Waste management

Only the poultry litters, animal excreta and carcasses were considered as waste to be managed in TUP poultry rearing activities. All the respondents kept the poultry litters in a pit behind their houses. Sometimes it was mixed with cow dung or goat litter. In case of dead birds almost everybody buried the carcasses in the soil. Some respondents used cow dung as fuel and goat litter to make seed beds for plantations.

Poultry manure contains large amounts of nitrogen, phosphorous, and potassium. These could be applied to the cropland to enrich the soil fertility. Most of the respondents sell their waste as fertilizer. Almost all of the respondents knew the use of litters as fertilizer and/or fish feed. Very few said that there was no demand for poultry litter. Lack of demand were observed in the flood prone region of Kurigram where people are extremely poor. They avoid buying poultry litter.

Very few respondents could use poultry litter. Most of them did not have their own plantations for lack of own land. Some of the respondents were asked to wash the poultry trays with the poultry litter into their neighbour's ponds. In most cases the respondents sell the litter. The selling price varies from area to area. Some said that they sell one '*veri*' or *basta* (jute bag around 80 kg capacity) litters for Tk.30-50. Those who mixed cow dung or goat litters with poultry litter were selling at higher price. Mixed waste is considered a far richer organic fertilizer due to its higher nutrient content. It was found that many respondents used the money received from selling poultry litter to buy clothing, mosquito net and other necessities. It was found that two respondents were using tubewell wastewater drained to a small ditch to cultivate fish.

Different methods of waste usage/recycling are shown in Figure 5. A large portion of waste is sold as fertilizer (53%). Use of sand and other bedding materials may reduce the quality of litter as fish feed since fish do not take ash or sawdust as feed. Nevertheless, ash and sawdust have the potential to be used as fertilizer. Having realized the potentials of waste management BRAC is trying to create a market for litter and waste that will benefit the TUP members



## Discussion

The TUP poultry rearing programme run by ultra poor women was found to be a relatively environment friendly income generating activity. Some of the advantages of poultry programme are as follow: the required inputs are (mostly) locally available; low cost technology; no extra land is needed; empowerment of women (women influence on household decisions); employment opportunities, income generation for the poor and improved nutritional status of the households. Experiences in several countries point out a number of reasons why poultry rearing can be used as an excellent tool for poverty alleviation. According to Bangladesh Bureau of Statistics (BBS) 19.6% of the population has no cultivable land, own a homestead only. Poultry rearing activities play a vital role for income generation amongst this group, since it requires minimum land, small capital, and no specific skills (Todd, 1998; Fattah, 2003). This study also reveals similar findings. Nevertheless, the initial cost of the TUP poultry programme is comparatively high in comparison to other TUP programmes.

Chick rearing and related activities are done by the TUP member herself. Generally the member does not get time to do other income generating activities along with poultry rearing. Usually the rearer does not do other job while she is busy rearing the chicks. In most cases there are no other employment opportunities for the ultra poor women, which is why they join the TUP programmes. Sometimes, the TUP members get support from their family members (i.e. son, husband, father, brother) during the off-pick period of poultry rearing (i.e. transitional period between two lots and gestation period). Almost all the respondents said that they did not use their savings between the first and second lot and before selling the eggs from the second lot. Normally single women and women with small children suffer from acute hunger during the off-pick period. However, a few

poultry rearers were found to practice homestead vegetable cultivation, plantation (fruits and timber), nursery, rearing local chicken and duck as additional activities. These activities supported them during the off- pick period.

Environmental concerns related to poultry rearing identified in this study are poultry health; human health; conflicts regarding water, bad odor, land ownership; and waste management.

Common problems related to poultry, as is the case with other animals, are their susceptibility to disease, theft, and predators. They can also cause tensions between neighbours and/or within the family between men and women, for example who feeds the chickens. Fortunately many diseases can be overcome by using the remedial measures.

There were some symptoms found amongst the respondents that could not be identified as already existing diseases. These diseases could be explained from the literature as discussed previously. There are also several human diseases directly related to poultry rearing. Infected chicks may have been responsible for the transmission of some symptoms found amongst TUP respondents. These are flu, coughing, loss of appetite, dysentery, loose motion, etc. These infections could be related to chick's droplets, dust particles coming out from poultry rooms and contact with infected chicks. Housing, sanitation, nutrition and climate also have an impact on human or poultry diseases. Insufficient water access and sanitation leads to unhygienic living conditions that are responsible for many types of health problems for both humans and poultry.

Although BRAC's training suggests that the TUP and their families should eat one egg per person per week, TUP members think of increasing savings by eating only broken or soft shelled eggs. BRAC also advised poultry rearers to eat one chicken when they are in the process of selling all layers after completing egg hatching. Even in times of acute hunger the TUP refuse to eat their chickens. As one respondent said "These chickens are like my children." Mostly the respondents realized the long-term beneficial effects of chickens, thus were dedicated to look after them. They feel more empowered if they can generate money. So, they wait for the egg hatching period. It was noticed that since their involvement in poultry rearing the respondents' nutritional status increased. They could afford to buy fish and vegetables.

Persons directly handling the poultry have become accustomed to its odor. Their family members, however, often could not stand the odor though they did not complain. The respondents encountered complaints from neighbours and villagers. If there is any rumor against BRAC in a specific area, it becomes difficult for the staff to perform their duty.

Free seedlings or plantlets are supplied by BRAC to the TUP members to have homestead plantation. Some TUP farmers grow their own vegetables like pumpkin, cucumber, papaya, yam, lemon, chilly, winter vegetables and trees like beetle nut, banana, mango and neem.

Poultry rearing caused some unpleasant situation to some poultry rearers because allergies, bad odour or they do not like full time engagement. Those who have chosen to take part have experienced an overall improvement in their standard of living. Their diets have improved in terms of calorie intake. They were able to send their young children to school, and providing them with cloths, books and pens.



Increased concentration of poultry production may cause severe environmental problems such as bad odour, flies, dust, and declining water quality. Non-point source pollution from poultry and animal waste runoff can reduce surface and groundwater quality by introducing excessive levels of nutrients such as nitrogen and phosphorus, organic matter, and pathogens into the environment (Regional Research Project. 2001).

The poultry rearers under TUP programme have taken some innovative initiatives regarding waste management, alternate source of income and water access. Some of these are small scale fish culture using the drainage water mixed with poultry waste, resource exchange (waste for water, waste for fish, labour exchange for land use), local animal breed culture (chicken, duck, goat, cow), small scale nursery, rice husking, sharing of tubewell maintenance cost, growing creeper on top of the poultry house, etc.

Several animal species were found in some TUP houses (e.g. duck, hens, goat, and cow), each of them played a role in providing income for the family. They provided meat, milk, eggs, and savings as well as readily available cash when necessary.

## Conclusion and recommendation

Poultry rearing plays a very important role for income generation and poverty alleviation, particularly for people who are landless, under privileged, have no access to education or formal job market.

Poultry rearing was found to be a promising income generating activity for the CFPR/TUP programme. Besides the environmental and economic benefits of this programme, there have been a few obstacles identified during the study. These can be categories under health, use of resources, resource management, and social conflicts. Some poultry diseases were found during the field visit, which could not be diagnosed. It is important to diagnose these diseases and treat appropriately to improve the health conditions of the respondents. Some symptoms/diseases identified among the respondents seems to be common among people involved in poultry rearing (evidence from literature mentioned before). The difficulties reported were not related to resources used for poultry bedding, housing or lighting, but often centered on water availability and access to water. Use of common property resource were not causing any conflict. However, problems may arise in future when the programmes will require more resources. Social conflicts were mainly due to use of water, bad odour of poultry farm, and jealousy towards the development of TUP members. The overall nutritional status of TUP poultry members has improved. Nevertheless, it was found that during the 4-month interim period between the 1<sup>st</sup> lot of chicken and the second, the respondents faced a sever financial crisis. To cope with the existing situation the initiatives taken by the TUP poultry member using their indigenous knowledge should be promoted.

Following recommendations are made to resolve the social conflicts, poultry and human health problems, poultry housing, waste marketing, increase nutritional intake, intermediate income generating projects, and management of common property resources (Table 2).

**Table 2. Environmental issues related to the TUP poultry rearing program and possible recommendations**

<b>Identified Environmental concern</b>	<b>Possible recommendations</b>
Conflict	<ul style="list-style-type: none"> <li>- Cooperation between TUP and neighbors or relatives.</li> <li>- Sharing the costs of maintenance of tubewells.</li> <li>- Exchanging one resource for another (e.g. Eggs for water or chicken waste for water or vegetables for water).</li> <li>- Raise awareness about TUP programmes with relatives and neighbours.</li> <li>- BRAC staff should be aware of possible situations that could lead to conflict and try to avoid them. They should be trained to deal with emergency situations arising from conflict and act as a unbiased mediator looking at the interest of the community as a whole instead of just the interest of the TUP member.</li> <li>- Relatives and neighbors should be included in social development programs.</li> <li>- Awareness building about TUP programmes should be given to the community as a whole. All social groups should be included even local elites not involved with the 'Gram Shohayok Committee'. This would create a more balanced and harmonious environment perhaps reducing the outbreaks of jealousy.</li> <li>- Strengthen the capacity of 'Gram Shohayok Committee'.</li> </ul>
Poultry housing (Bedding)	<ul style="list-style-type: none"> <li>- Use of bedding can reduce the odor and keep litter dry.</li> <li>- Using sand bedding for poultry may reduce the quality of litter as fertilizer.</li> <li>- Sawdust and ash is useful bedding for poultry and could be used in the crop field.</li> <li>- Hay and straw would be reliable bedding for cattle depending upon its availability, abundance, and potential cost effectiveness.</li> </ul>
Poultry housing (Heat)	<ul style="list-style-type: none"> <li>- BRAC staff should encourage and educate poultry rearers on how to shade their poultry rooms. This would lower chicken mortality rates.</li> <li>- By growing creeper plants over the roofs of the poultry rooms shade is created.</li> <li>- Tree plantation could create shade.</li> <li>- Straw can be used under asbestos roofs to limit the amount of heat that enters the poultry room.</li> </ul>

Poultry diseases	<ul style="list-style-type: none"> <li>- The chicken house and equipment should be cleaned completely and disinfected before starting baby chicks or housing layers.</li> <li>- Waterers should be cleaned daily.</li> <li>- Litter should be kept dry and clean. Some kind of bedding should be used.</li> <li>- Dead chickens should be buried.</li> <li>- Practice good housekeeping and rodent control (may use nylon mesh on the window).</li> <li>- Roundworms can be controlled with commercially available poultry wormers, which are placed in the chickens' water of feed. Lice and mites can be controlled with insecticides.</li> <li>- Good housing overcomes problems of predators and thieves, while the tension in the family and between neighbors can be a stepping-stone for social development programmes.</li> </ul>
Human Health	<ul style="list-style-type: none"> <li>- Strengthen education on health and hygiene.</li> <li>- Monitoring of daily activities of TUP poultry rearers related to poultry and health and hygiene.</li> <li>- An in depth study of poultry related health risks could lead to a set of regulations that the poultry rearer could follow to avoid falling ill.</li> <li>- In the same way as vitamins and medication are provided for the poultry they could be provided as part of the subsidized goods to the TUP member.</li> </ul>
Nutritional intake	<ul style="list-style-type: none"> <li>- A loan (like a first step to micro credit financing) could be given to TUP members during off pick period to avoid them resuming their previous state of poverty and malnourishment.</li> <li>- These loans could then be paid back over the course of the second phase with the savings gained from selling eggs.</li> <li>- These loans could gradually prepare the TUP members to become viable for micro credit financing.</li> <li>- Encourage innovative initiative taken by the rearers.</li> <li>- Encourage local animal mix farming, small nursery, plantation, fruit and vegetable cultivation.</li> <li>- Provide small income generating activities.</li> <li>- Education and awareness building on nutrition and health.</li> <li>- Alternatively instead of buying 36 young chickens, the TUP members could buy 35 young ones and 1 that is already hatching. This one chicken would assure the TUP member and their family a constant source of protein in between phases and sustain the increase in nutritional intake until the other hens start to hatch.</li> <li>- One chicken would not make much of an overall difference to the poultry rearing activity.</li> </ul>



Intermediate activities	<ul style="list-style-type: none"> <li>- Poultry rearers or other farmers can rear traditional/local breed (animal, chicks, duck) during off-pick period.</li> <li>- In some areas where crops cannot be grown, keeping livestock is the only way people can survive. The disappearance of locally adapted breeds directly threatens the livelihoods of people in these areas.</li> <li>- Local breeds may carry genetic material of immense value. When a breed becomes extinct, the whole world loses some of its ability to react to changing environmental conditions, resist unforeseen diseases, and respond to changes in human dietary preferences. This undermines the food security of the poor.</li> <li>- Develop policies, which support the sustainable use of indigenous breeds.</li> <li>- The traditional breeds kept by TUP farmers in marginal areas are well-adapted to climatic extremes.</li> <li>- They are resistant to many of the diseases that plague "modern" breeds.</li> <li>- They can survive without expensive feeds and inputs. They can live and reproduce under harsh conditions.</li> <li>- These are the resources of the natural genetic pool.</li> </ul>
Waste management	<ul style="list-style-type: none"> <li>- Create a market for waste selling.</li> <li>- Waste can be sold to local farmers as fertilizer.</li> <li>- Waste can be sold to local fishermen as fish feed.</li> <li>- Waste can be used as an asset and can be exchanged for water or food.</li> <li>- Wood dust and ash is useful bedding to use as fertilizer.</li> <li>- Mortality compost can be used as a nutrient source for crops just as fresh poultry litter or manures (Carter <i>et al.</i>, 2003).</li> </ul>
Drainage	<ul style="list-style-type: none"> <li>- Fishponds are a clever way of recycling tube well water. Every time the tube well is used any lost water can be channeled and reused to cultivate pond fish.</li> <li>- Fish cultivation can lead to an additional income and an additional food intake.</li> <li>- Local fish species should be encouraged to grow in the ditch.</li> <li>- BRAC staff could encourage this kind of environmentally friendly and financially advantageous activity.</li> </ul>
Common resources	<ul style="list-style-type: none"> <li>- Roadside plantation.</li> <li>- Afforestation at <i>khas</i> land.</li> <li>- The practice of planting fodder on land.</li> <li>- Identify the role of common property feed resources and identify ways of better management of those resources.</li> <li>- Secure access for the poor to pasture, water and other key resources by <ul style="list-style-type: none"> <li>o Preserving forest, land and wetlands.</li> <li>o Testing, developing and using relevant appropriate technologies.</li> <li>o Building a village center to provide a wide range of services for villagers and creating awareness.</li> </ul> </li> </ul>

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