Environmental Examination of BRAC Poultry Farms and Feed Mills

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September 1998

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The study aimed to identify activities of poultry rearing that are environmentaly sensitive; to investigate waste disposal system, health risk and impacts of various poultry programme activities on environment and also identify the areas and steps for further consideration for sustainable environment.The study data were collected through a checklist and interviews of the people. The major findings of the study were categorised under health effects and environmental assessment of the programme. The poultry farms were foumd not to be environmentally hazardous. The litter as a waste bfrom the poultry was found to be managed properly by selling it as a compost to local farmers. Sometimes the rice husk and the poultry litter was found to be damped into the nearby water sources but it was observed that it was a good fish feed. It was also found that there are no health risk involved with poultry farms but too much exposure of the workers to dust may cause asthma or other bronchial diseases. The results indicate that the health and environmental problem related to the programme is not acute. Even then some recommendations and monitoring criteria were made to overcome some of the environmental / health hazards created by the poultry farmers and feed mills production.

Executive Summary

The aim of the study was to measure the environmental impacts of BRAC's poultry farm and feed mill. The specific objectives were to: (1) identify activities of poultry programme that are environmentally sensitive (2) to investigate waste disposal system, health risk and impacts of various poultry programme activities on environment (3) to identify areas and steps for further consideration for sustainable environment.

The study was done through the field visit of selected sites and the data was collected through a check list where the waste disposal, ambient vegetation, internal environmental condition of the sites, occupational health and safety, energy use, water quality and fish resource of near by water body, irrigation of close proximity and public nuisance were considered for Environmental assessment. The interviews of the people like sector specialist, manager, hatchery workers, vaccination workers, various rearers and the public living adjacent to the hatchery were also included to carry on the study.

The major findings from both of the study i.e. the poultry farm and feed mill were categorised under Environmental consideration and health risk.

The poultry farm was found not to be environmentally hazardous. The litter as a waste from the poultry was found to be managed properly there was no need of disposing it. It was observed that there was a high demand of the litter along with the rice husk in between the local farmers as a compost. The ambient vegetation was unaffected due to the poultry farming. But the consumption of energy was very high and supplied from the national grid line system. The rice husk and poultry litter generally found to be damped into the pond which was observed not to be degrading the water quality but rather found to be a good fish feed. The noise level, dust production, odor and the existence of the farm seemed not to be a problem for local community.

In poultry farming it was found that there are no health risk involved in it. But too much exposure of the workers to the dust may be prone to the development of asthma or other bronchial disease. The poultry workers took proper precautions by wearing appropriate clothing, feet wear, masks, soaps to avoid the health problems. The internal environment of the work place was also very safe.

The raw materials which is a waste of feed mills are biodegradable and using as land filling. Vegetation clearing at the site for establishing the feed mill was not much.

Based on the findings some recommendation were made to ensure the more occupational safety and to lessen the environmental degradation. The use of masks, soap and disinfectant detergents, rubber shoes and hand gloves can ensure the safe health of the workers. A chart of safety procedure, fork lift and first aid facilities can also be introduced for safe health. To avoid the environmental hazards commercial culture of oyster, use of renewable energy sources and plantation of more trees at farms and mills can be done.

Background

Development is generally thought of in simple economic terms as increase in growth but it can be better thought of as an increase in the options available to people for meeting basic needs such as food, shelter, education and health. However, these options may eventually reduce if the biological and cultural diversity of a community diminish. In other words development and growth would not sustain if the environment which provides raw materials into these is not protected and degraded. This realization by the world community has led to the development of the concept of sustainable development that advocates- the protection of environment, improvement in the quality of life and maintaining economic stability for the present and future generations as a policy guide to all developing nations.

As a reaffirmation to the policy of sustainable development, developing countries have incorporated environmental consideration into their development planning by formulating appropriate legislation, action plan and guide lines. Owing to this grave environmental concern, BRAC, a development organisation, has initiated conducting environmental research, examination and impact assessment on its all kinds of employment and income generating activities that involve air, land, water, wildlife and human health. Some important BRAC programmes on which environmental studies have been done include agriculture, fishery, forestry, sericulture, medical waste, organic farming and dairy production.

Poultry programme is BRAC's largest and one of its earliest programmes which is designed to increase the income of its Village Organisation (VO) members particularly women. At present around 1.2 million women are involved in poultry sector and 9.37 million day old chicks have been reared until 1997 (BRAC Report, 1997). A number of studies have been done on poultry but those mainly looked at increase in income, perception of VO members about rearing and problems faced by them but no study has yet been initiated to examine the environmental aspects of this programme. Therefore, it is important that an environmental research be carried out on this which not only will ensure better environmental management but will also help comply with the environmental guide lines laid out by the Department of Environment.

The Poultry Programme

The Poultry programme of BRAC is one of its development interventions which was designed for destitute ration receiver womenfolk to enable them earn a sustained living
after the withdrawal of the ration (Mallick, 1989). The programme was started in 1985 at Manikgonj when BRAC in cooperation with the government brought all destitute wheat receiver womenfolk of Manikgonj under a programme called 'Income Generation for Vulnerable Group Development'. Poultry rearing was thought to be a good source of income for rural women as they have some experience in this area. To make the programme more effective, BRAC designed a model for poultry development that included
technical training, poultry vaccination, supply of quality birds inputs, credit and marketing. Different cadres have been developed in accordance with the model which comprise poultry worker, chick rearer, key rearer, feed seller, egg collector and poultry hatchery operator.

Poultry workers are engaged in vaccination and treatment of birds in their respective villages. Chick rearers raise day-old chicks for a two month period. The chicks are then sold out to other women who are known as key rearers. The key rearers rear up to 11 hens and 1(HYV) cock for 64 weeks. Feed sellers are the ones who store and sell feed meal to the rearers but previously they used to process balanced food for variety of birds. BRAC has two feed meal preparation centres from where the supply of feed meal is maintained. The poultry workers also act as egg collector and collect eggs from the ordinary rearers. The poultry hatchery workers do hatching for a day old chick supply once selected eggs are brought into the hatcheries. Poultry workers, chick rearers, key rearers and feed seller- all are provided with technical training to carry out their tasks. The flow chart provides the interlink among these cadres.

As this programme involves significant number of people in different stages of poultry sector, hatching of poultry birds, vaccination and treatment of poultry birds, raw materials for feed meal preparation, therefore, an environmental research should be carried out to find out whether there are areas and steps for further improvement considering the safety of human health and sustainability of the environment. For instances, in poultry feed meal, a number of items are put together for its preparation such as maize, rice polish, wheat barn, oyster shell, protein

concentration, soybean meal, soybean fullfate, salt, vitamins & minerals, bacteriosite, coccidiosite, and other synthetic products. One such previously used item was dried fish which contains DDT and can have a detrimental effect on human health and the environment if it is exposed through various routes. In hatcheries, bulk amount of wastes- poultry faeces, are generated that has a bad odor and contains certain amount of ammonia which needs to be disposed properly. Thus a thorough and systematic investigation is required for the proposed environmental assessment of the total poultry programme. However, at this stage, the study will limit its investigation mainly on poultry hatchery and feed meal preparation centres.

Objectives

The general objective of this study is to conduct a thorough environmental examination of BRAC poultry farms and feed mills.

The specific objectives are to:

1. identify activities of poultry programme that are environmentally sensitive/significant;
2. investigate waste disposal system, health risk, and impact on environment of various activities of poultry programme and

3. identify areas and steps for further considerations for sustainable management

Methodology

Programme Sites: The poultry programme of BRAC is managed by different cadres located at various places which support each interdependent cadres. These are chick rearer, key rearer, poultry worker, poultry hatchery operator, feed seller and the egg collector. In view of identifying activities of poultry programme that may have environmental significance, sites of key cadres should be visited. The poultry hatcheries of BRAC are located at Savar, Bogra and Alladipur. The feed preparation is done at Nilphamary and Manikgonj. The vaccination and rearing are done all over the country. Hence any site can be chosen for visit.

Research Design: In order to achieve the outlined objectives of this study, all activities of poultry programme that are being carried out at different levels need to be considered. Therefore, field visit to selected sites and data collection through observation and interview of people will be included in the research design.

A check list will be prepared for field observation that will consider-

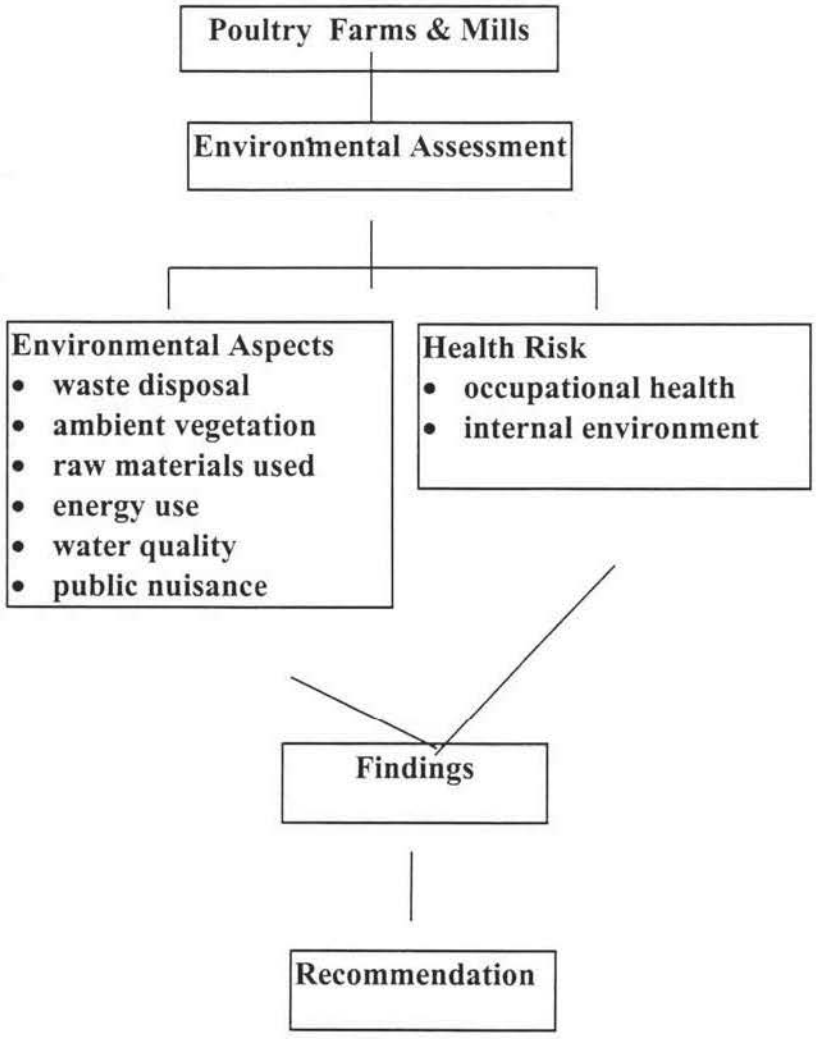
- waste disposal (management mechanism),
- ambient vegetation,
- internal environmental condition of the sites (e.g. ventilation, dust production, noise, odor etc. of feed meal and poultry farm),
- occupational health and safety
- energy use
- water quality of near by water body
- fish resource of near by water body
- irrigation at close proximity and
- public nuisance.

Interview of people in poultry sector will include-

- sector specialist
- manager
- hatchery workers,
- feed meal workers,
- vaccination workers,
- various rearers and
- the public living adjacent to the hatchery.

A semi structured questionnaire will be developed that will focus on environmental aspects related to the activities and programme, health and safety aspects of workers and people involved in this process.

Schematic Diagram of Research Design



Findings

Poultry Farm

Field investigation and intervirew with farm workers in poultry farms at Sherpur of Bogra and Savar of Dhaka district following the pre-disigned checklist for environmental assessment have revealed many facts about the different steps of farm acivities of which some are quite

satisfactory and some are not. The following illustrates the kind of activities that are normally done at farms and each item of the checklist.

Farm acivities: In poultry farms three kinds of birds-chicks, layers and brooders are reared. The hatching of poultry is now in operation only in Savar farm. In Sherpur farm one day old chicks are imported and reared for 68 weeks. There are air conditioned sheds where day old chicks are kept and rice hask is used on the floor of these sheds which are kept there for the whole 68 weeks on which chicks wander around and litter. Rice hask soaks the poultry litter and helps keep the internal environment clean. The sheds are equiped with mechanical systems through which poultry feed and water is supplied to the chicks. The internal environmental condition is manipulated mechanically with larege air conditioners and exhaust fans which keep the internal environment stable by adjusting with outside weather condition. To keep the chicks healthy and disease free, different courses of vaccination are given to them. During the day time close monitoring is done on the movement of the chicks, feeding, and internal condition-humidity, temperature, lighting and air circulation. In the night time lights are put out and chicks normally sleep. The weight of the chicks are measured every day to ensure proper growth rate. In every step strict cleaninees is observed. Poultry workers take shower before and after entering the shades. In poultry hatchery .....

Environemtnal considerations

Waste disposal: Waste in farms primarily refers to poultey faeces produced by chicks and layers. In farms waste disposal is not a matter of concern at all because of the waste collection system of the shades. In the ground of the shades, rice hasks are put on to provides rather a warm and soft wandering ground for chicks and this takes care of the litter excreeted by the chicks. The litter is soaked and thus become dry due to the rice hask and the controlled humid condition inside the shade. The bad odor is eliminated by the fresh air supplied through the large air conditioners. As a result of this mechanism, waste is properly managed and there is no need of disposing it. The rice hask along with the litter is changed after 68 weeks when chicks are removed form the shades. It is then collected into jute bags and sold out to farmers as a compost.

Ambient vegetation: The site selection of Bogra farm was appropriate as there was no need of clearing trees and other vegetation cover. The site for Savar farm is also good and a number of old trees were seen at the farm site. In both the farms, ambient vegetation is not affected due to the confined nature of activity of the farm. In farm at Bogra arofestation programme can be taken around the perifery of the farm which is clear at present.

Energy use: Energy consumption of poultry farm is high. Energy is needed for running air conditioner and exhaust fan for 24 hours a day, for mechanical feeding system, for running

incubator and for lighting the shade and other residential purposes. The electricity consumption in Savar farm on average is worth Tk. 20,000 a month. In Bogra it is also quite high. The energy is supplied form the national gird line system. Alternative source of energy for meeting the energy requirement of farm should be explored.

Water quality: The possibility of affecting the water quality of water body near both the poultry farms was one of the prime concerns of the study. Firstly, waste water is generated in the farms because of the use of water as a coolant in the air conditioner. This water is collected in an under ground tank and then used in the air conditioner for the second time. This reused water is let off pass under ground. The water quality of this waste water is not bad as there is no chemical mixed in it and hence it's possibility of contaminating ground water is none. Secondly, the rice hask mixed with poultry litter that is abandoned from the shades, is dumped in to nearby pond. Rice hask and litter decomposes and turns into fish feed. The decomposed rice hask settles down at the bottom of the pond and does not affect the colour and quality of the pond water. Therefore, both the ground water and surface water have minimal possibility of getting affected by the volume kind and of poulty work that currently take place at the farms.

Fish resource: Fish resource of nearby pond are not at stake as water quality is not affected due to activities performed at poultry farm. The rice hask and poultry litter that are being dumped in to the pond are rather found to be a good fish feed and local farmes buy this feed from the farms for fish cultivation.

Public nuisance: Visibly there was no element of poultry activity found that was causing inconvenience to public living adjacent to the farm. In the case of farm at Bogra, the location of the farm is a little away from public houses and it is made inaccessible to unauthorised people by a high rise brick fence. The location of Savar farm is also suitable for establishing farm and has high rise brick wall around its boundary. All aspects of farm activity were confined inside the shades and the noise level, dust production, odor and the very existance of the farm seemed not to be a problem for local community. On the contrary, both the farms created limited employments for local people.

Health Risk

Occupational health: In occupational health and safety, risk factors associated with the daily work of the poultry workers were considered. The daily work of a worker included observing strict cleaniness before and after entering the shades, nurturing chicks, measuring weights of chicks, feeding, and checking on the performance of the instrumrents. In performing each kind of

task, apprppriate clothing, feet wear, masks, soaps, disinfectants were made available to the workers and the work procedure were also made known to them. However, in none of these elements of work, risk factor related to the activity was discerned.

Internal environment: Internal environmental conditions such as brightness of light, niose, dust and ventilation were checked to ensure a safe work place for the workers. The air circulation inside the shade is very good due to the air cooler and exhaust fans which autometically adjusts with outside weather. The shade is well illuminated and the noise level is well beyond the tolerable limit. However, dust which is produced due to the wandering of chicken on the rice hask inside the shade is identified to be problem. Workers is exposed to this dust for long period may be prone to development of asthma or other bronchial diseases. As a safety measure, poultry workers are provided with dust protection mask and are supposed to use the masls but during our visit workers were seen at work without mask.

Feed Mill

Activity of feed mill: The major activity of feed mill is the production of poultry feed by using a number of raw (natural and synthetic) materials. The feed production follows certain procedure and is done with great precaution. There are about 21 items that are used in the feed production. These raw materials are received in the mill, weighed and stacked in the storing centre of the mills. Mill workers unload the bags of raw materials from trucks and measure the weight of the bags manually by putting them on the weigh machine and also manually stack them. Some items of these raw materials are grinded such as oyster shell with machine to make smaller grain. Then each item with proportionate amount is put into the mixing machine for preparing the feed. The prepared feed is collected in to poly pythine? bags and weighed to ensure standard weight. Mill workers observe cleaniness before and after work and are provided with clothing appropriate for work and are advised to follow safety procedures.

Environmental Considerations:

Waste disposal: In mills normally there is no such waste produced. However, residues of raw materials that are not used or raw materials whose quality for any reason have deteriorated are disposed off. In Manikgonj mill, previously, rotten oil cakes were dumped on the backyard which produced bad odor. Later with the request from neighbouging house it was land filled. The present practice of Manikgonj mill for dioposing waste is land filling. In Nilphamary no such incident was heard. The possibility of ground water pollution by leaching from land filling is also considered. But in the case of mills, land fill is still a safe practice for waste disposal because firstly small quantities of waste are land filled and secondly these raw materials are biodegradable.

Ambient vegetation: Vegetation clearing at Manikgonj site for establishing the feed mill was not much. However, there is a good possibility of planting trees around the perifery and inside the boundary of the mill. Some friut tree plantation have already been done there. In Nilphamary site, there are a number of valuable old trees which are still well kept. Mill activity as a whole does not affect the ambient vegetation in both the mill sites.

Raw meterials use: In feed preparation various kinds of natural and synthetic raw materials are used. The type of raw materials used, their monthly and yearly consumptions for one mill are as follows:

Sl. No.	Material Used	Monthly Quantity in ton	Yearly quantity in ton
1.	Maize	250	3000
2.	Rice Polish	100	1200
3.	Tiloil cake	75	900
4.	Soya Cake	50	600
5.	Soya F/F	25	300
6.	Soyabean Oil	0.43	5.14
7.	Protein Concent.	15	180
8.	Chick Premix	0.92	11
9.	Layer Premix	0.12	2.50
10.	BR. Premix	0.13	1.50
11.	B. Premix	0.11	1.30
12.	Vitamin -C	0.02	0.25
13.	L-Lysine	0.03	0.40
14.	Methionine	0.02	0.25
15.	Choline	0.02	0.2
16.	Oyster Shell	11.67	140
17.	Salt	0.23	2.75
18.	Toxin Binder	0.30	3.50
19.	Bactriocide	0.02	0.2
20.	Coccidiostate	0.02	0.2

21.	Meat & Bone	7.08	85
22.	*P P Woven Bag	10000 Number	120000 Number

* P P woven bags are used for packgaing the feed.

The quantity of oyster shell consumption in feed preparation is noteworthy (11.67 ton/month). Oyster shell is a naturally occuring resource and is procured for mill from a professional group who collect it from haor areas of Bangladesh. If the amount of oyster sheel consumed is not let refilled/ reoccured in the nature then this may lead to the depletion/extinction of oyster shell from certain areas. Therefore, use of oyster shell should be supplimented by either oyster culture for commercial basis or using alternative material such as lime. The use of other natural resources in the feed production are refillable and would not pose any threat to any specis. The synthetic products used in the feed preparation were found to be non toxic and non hazardous as these are recommendded for poultry's ingestion and no detrimental element was noticed in their composition lebel. Apart from this, these synthetic materials are stored with cautions and could not be exposed to other flora and fauna. However, the bio-chemical effect of these synthetic materials on the tissue or the flesh of chicken could not be known as it was not part of this study.

In mills P P woven bags are used for packaging feeds. It can be noted that about 120000 bags are needed in a year for each mill. The reason for the use of this bags was told to be its cheap price compared to the jute ones. But ideally jute bags are recommedable as jute is bio degrable and has no possibility of creating any environmental hazard. Use of jute bag may also help grow small jute industries.

Water quality: Mill activitiy in both the mills do not have any possibility of contaminating water sources. But as alluded in the waste disposal system, residual raw materials or rejected raw materials are landfilled within mill boundary which is small in quantity and thus would not contaminate ground water.

Energy use: Energy consumption in both the mills is high. In Manikgonj mill the average monthly electricity bill is around Tk. 5000 and in Nilphamary it is Tk. 10-12000 a month. The introduction of various options of alternative/renewable energy may be considered for the mills to make them more cost effective and energy efficient.

Public nuisance: Public nuisance in terms of aspects related to mill such as loud noise, bad odor, dust production, litter generation, infestation of flies and insects, distortion of any aesthetic view and traffic congestion were considered. But none of these apply to the mill activity and hence create no public inconvenience. Mill activity has generated limited number of local employment.

Health Risks

Occupational safety: In terms of occupational safety, a risk factor was identified in handling heavy bags manually by the mill workers. Mill workers carry load upto 90 kgs while loading and unloading and while stacking the bags. In carrying such heavy loads there is a possibility of having physical injury and therefore alternative methods should be arranged for carrying heavy loads. In Manikgonj there was an incedent of physical injury where a worker fell on the ground while stacking bags at high level. Mill workers are provided with rubber shoes, gloves and masks by the authorities. But during cleaining the oyster shell female workers were seen to have taken no precaution. The hands and feet of these workers can be cut by the sharp edges of oyster shell. The hands amd feet of some women workers were found seriously affected due to cleaning of oyster. As a general safety measure all workers are required to take shower before and after work. In view of this shower rooms both for male and female have been built in the mills. For winter season the provision of hot water is now under consideration. In other activities generally workers follow safe working procedure as recommeded by the authority.

Internal environment: A few aspects of internal environment of the mills need further consideration. The present height of the Manikgonj mill is about 16 feet. But according to the opinion of the mechanical engineer in-charge there, the height of the mill especially right at the top of the machine should have been 10 feet more inorder to minimise the dust and heat effectively. However, the span and width of the mill are told to be OK. Due to the nature of work performed at the mill, huge dust is produced from the variuos raw materials. The number of exhaust fans in the mill are insufficient. A few more exhaust fans are needed for the mill and the store. A large exhaust fan at the top of the mill is also recommended by the mechanical engineer to suck the dust out. As a protective measure from dust mill workers are provided with masks to perform their tasks but during the visit most of the workers were found working without masks. Inhailation of such huge dust for prolong period may lead to the development of asthma and other lung diseases to the workers. The noise level in the mill seemed relatively high and the decibel of noise could not be determined with bare year. An instrumental test for determining the decibel of noise can be done. The number of lights to provide brightness at night time were found adequate. The most important aspect among all the mill activites is the grinding of oyster shell. During its grinding massive quantity of oyster dust is produced. This dust is composed of very

hard particles and once inhailed causes body aching and fever as complained by the workers. A draft fan in the grinding area is recommended by the mechanical engineer. High protective measure at the time of oyster shell grinding must be ensured.

In Nilphamary mill the situation is very similar to that of Manikgong. The height of this mill is 14 feet. Huge quantity of dust is seen there and workers were found with out masks. The ventilation of Nilphamary mill needs to be improved by inslatting more exhaust fans and one draft fan at the oyster grinding site.

Policy implications

Occupation Safety and Health

1. Use of masks while working at grinding and mixing area should be made compulsory and be srtickly monitored
2. Comfortable and user friendly masks should be provided. Two masks to each worker are recommended to be given
3. A chart describing the safety procedures/rules should be hanged at work place
4. Fork lift (lifting vehicle) should be introduced in order to stop manual lifting and handling of heavy bags and to avoid physical injury
5. A short orientation/training should be conducted to make the workers known and aware of what they are doing
6. Workers must be provided with soaps and disinfectant detergents to observe cleainess
7. Use of rubber shoes and hand gloves at work should be encouraged more
8. The provision of hot water for winter season should be made available
9. Mills and farms should have first aid facility
10. Quaterly health check up for workers

Infrastructure development

1. Height of the mill should be increased for the existing and future mills

2. More exhaust fans are required in the godown and mill particularly draft fans at the top of the shade where the mechine is placed. The room for grinding oyster shell at Manikgong should widened and also a draft fan should be installed.

3. Use of jute bags should be encouraged in the mill

4. The noise level at mills should be checked for determining the decibels

Environmental issues

1. Oyster shell use must be compensated by commercial oyster culture and production and finding suitable alternative

2. Plantation of more trees at farms and mills can be done

3. Renewable energy sources are recommended as an alternative source of enery in the mills and farms to minize conventional energy use

4. Waste should be land filled

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