SOCIAL IMPACT SURVEY AT THE EX-POST MONITORING PHASE

of the project titled

"Energy-saving, Environmental Protection and Improvement of On-stream Factor of Ghorasal Urea Fertilizer Factory"

Submitted to:

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1. BACKGROUND

The accompanying report is the result of a survey conducted in September-October 2009 to find out the social impact at the ex-post monitoring phase of a project titled "Energy-saving, Environmental Protection and Improvement of On-stream Factor of Ghorasal Urea Fertilizer Factory" in Bangladesh, funded by JBIC/JICA during 1999-2003. As required by the OECD Rules- the project, on conclusion of its implementation, was evaluated ex-post in the year 2003. The completed survey under reference follows the 2003-evaluation ex-post.

The survey and the accompanying report, as a part of a more comprehensive ex-post monitoring of the said project, was has been completed by HDRC (Human Development Research Centre)- established in 1999 and located at House 5, Road 8, Mohammadia Housing Society, Mohammadpur, Dhaka-1205, Bangladesh.

2. OBJECTIVES OF THE SURVEY

The Terms of Reference for accomplishment of the survey documents the following as the objectives of the survey:

(a) OECD/DAC Evaluation Criteria (**effectiveness, impact** and **sustainability)**, out of the five criteria of the JICA's original criteria for ex-post evaluation

(b) JICA's original criteria for ex-post evaluation, that is, in particular- the evaluation of impact (statistical and social impact assessment of project beneficiaries) and that of sustainability (financial sustainability of executing governmental agency, etc.) were to be the key concerns.

3. SCOPE OF WORK

As per the JICA Guidelines, the five evaluation criteria are (a) Relevance, (b) Efficiency, (c) Effectiveness, (d) Impact, and (e) Sustainability. Out of these five, three criteria to be considered under coverage of ex-post monitoring survey, such as effectiveness, Impact, and Sustainability. Furthermore, elements to be covered under respective ex-post monitoring criteria are those shown in the matrix below.

Evaluation Criteria	Activity
Effectiveness	Compare planned and actual figures using operational and effect indicators and internal rates of return (IRR) to examine the extent to which project objectives have been achieved
Impact	Examine the direct and indirect effects of the project set as an overall goal from macro-economic, social and environmental perspectives
Sustainability	Examine the medium and long-term sustainability of project effects, and consider what countermeasures are required to resolve them if problems exist

Following the requirements of JICA as shown in the foregoing matrix, the detailed tasks were identified and carried out in this social impact survey.

4. METHODOLOGY FOLLOWED

Based on the questionnaires and with other useful methodologies and tools selected by HDRC, interview/questionnaire survey for project beneficiaries was conducted. The sample size was 100.[1]

It is to be noted that the **target beneficiaries** were those who lived within 2-3 km from the Ghorasal Fertilizer Factory. The interviewees included in this **household survey** were:

- ✓ Business workers
- ✓ Agricultural workers
- ✓ Service workers
- ✓ Industry workers
- ✓ Housewives
- ✓ Students, etc.

In order to study the fertilizer demand, quality, domestic market, distribution route- including the superiority and convenience of the Urea fertilizers- were also examined. Target beneficiaries for this purpose were those who were engaged in sale of the fertilizer (that is, urea dealers) and those who were using the fertilizers (that is, farmers), targeted as the ex-post evaluation's questionnaire survey.

An Independent Consultant from JICA HQ joined with the HDRC's survey team in this questionnaire/interview-based social impact survey.

On completion of the interview/questionnaire-based survey for the target project beneficiaries, the survey results were statistically summarized and reported to the Independent Consultant. The overall survey results were visually presented in the wrap-up session of BCIC (Bangladesh Chemical Industries Corporation) HQ, Dhaka in the presence of the Independent Consultant of JICA HQ, Chairman and a number of departmental heads of BCIC, Managing Director and other high officials from the Ghorasal Urea Fertilizer Factory, and the Study Team Members from HDRC.

[1] The sample size ensured the desired level of statistical significance. Finalization of sample size has been done in consultation with independent consultant.

5. MAJOR FINDINGS

This section of the report contains data and information obtained from the interview/ questionnaire-based survey on the project beneficiaries.

5.1 Impact on Local Natural Environmental (Control of Ammonia Leakage)

The source of information for this Section and Section 5.2 ('Changes in Health Status of the Local Population') was the questionnaire administered on the target households residing within a distance of 2-3 km from the Ghorasal Fertilizer Factory. The 100 households were distributed at various pockets in the project area potentially at risk of being affected by environmentally by the Factory proportionately in consideration of the residences in particular directions from the Factory. The geographical distribution of the target households were as shown in the matrix below.

Target Respondents of the Survey

Target Area	Characteristics	Number of Interviewees
North of Ghorasal Fertilizer Factory	Estimated Population in 2003: 3,000 This area is most likely to be affected directly by the ammonia discharge from the factory because of the south-north wind blowing throughout the year. It is closest to the artificial lagoon (reservoir).	35
Northeast of Ghorasal Fertilizer Factory	Estimated Population in 2003: 7,000	35
South of Ghorasal Fertilizer Factory	Estimated Population in 2003: 10,000 Houses for employees of the Ghorasal Fertilizer Factory and the adjacent Ghorasal Power Station, Polash Fertilizer Factory and jute factories (2) are concentrated in this area.	20
West of Ghorashal Fertilizer Factory	Estimated Population in 2003: 2,500 This area is on the opposite side of the Shitalakhya River from the Ghorasal Fertilizer Factory.	10
Total	**Estimated Population in 2003: 22,500**	**100**

The questions relevant to this section asked to the target respondents were based on the following issues:

Degree of environmental pollution; damage to livestock (animal and fish) and vegetation; and water pollution in the adjacent water-bodies.

In these questions, the respondents were asked to mention the changes in degrees of various environmental damages and pollution inflicted since the year 2003 to date.

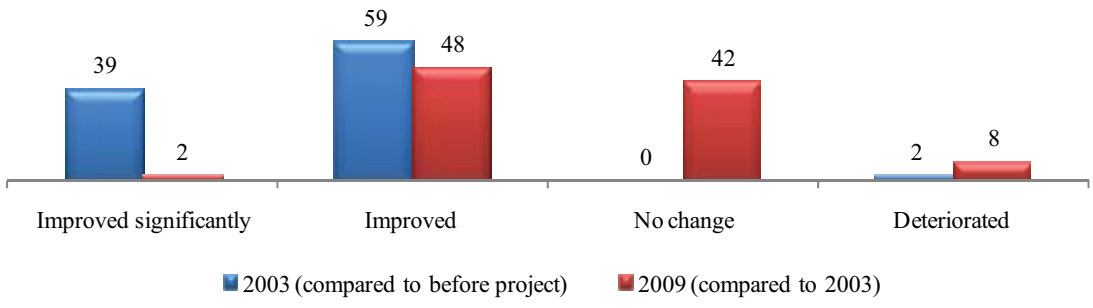
Matrix 1: Results from Case Study/Household survey					
A. Impact on the Environment					
Issues	**Scale: Before completion of project**	**%**	**Scale**	**2003**	**2009 (compared to 2003)**
				%	
1. Degree of environmental pollution	Serious/considerable	62	Improved significantly	39	2
	Some/ A little	34	Improved to some extent	59	48
	None	4	Deteriorated to some extent	0	8
			No change	2	42
2. Damage to livestock (animal and fish) (multiple responses)	Cattle	20	Cattle	3	13
	Dogs	0	Dogs	0	0
	Horses	0	Horses	0	0
	Cats	0	Cats	0	0
	Fowl/wild ducks/ domestic ducks	66	Fowl/wild ducks/ domestic ducks	22	22
	Fish	95	Fish	20	18
3. Damage to fish in the Shitalakhya river and the surrounding area	Serious/considerable	65	Serious/considerable	9	17
	Some/ A little	19	Some/ A little	39	52
	None	16	None	52	31
4. Water pollution in the Shitalakhya river and the surrounding area	Serious/considerable	69	Serious/considerable	45	14
	Some/ A little	11	Some/ A little	47	41
	None	20	None	8	45
5. Damage to vegetation	Serious/considerable	70	Improved significantly	42	17
	Some/ A little	17	Improved to some extent	39	49
	None	13	No improvement	19	34
B. Impact on Human Health					
1. Degree of ammonia odor	Serious/considerable	57	Serious/considerable	3	26
	Some/ A little	41	Some/ A little	67	55
	None	2	None	30	19
2. Did the ammonia odor cause any damage to your health?	Serious/considerable	35	Serious/considerable	4	6
	To some extent/ A little	65	To some extent	43	49
	No	0	Little	51	45
			No	2	0

As can be seen in Matrix 1, the respondents maintained that there has been a general improvement in the natural environment in and around the Ghorasal Fertilizer Factory. The conclusive findings from these set responses are:

- There has been a positive change in the neighbouring natural environment since 2003
- Since completion of project implementation at end of 2003, there remains relatively less to be achieved regarding improvement in this environment compared to the positive change that took place during 1999-2003
- Rapid industrialization in the neighbourhood after especially 2003 ironically as a result of the Ghorasal Fertilizer Factory itself and its spill-over development effects may have given rise to minor counteracting effects on the previously improved natural environment.

To detail further on the responses obtained- only 2% of respondents in the 2009-survey said that the environment had improved significantly since 2003 as against 39% of their counterpart respondents in 2003, and 48% said that the situation had improved to some extent since 2003 while 59% respondents in 2003 had said that the situation had improved similarly since the year 1999. A total of 42% respondents opined that there had been no change in the environment since 2003, apparently because much of the improvement needed have already been achieved. This refers to the sustainability of the benefits being drawn from the Project (Figure 1).

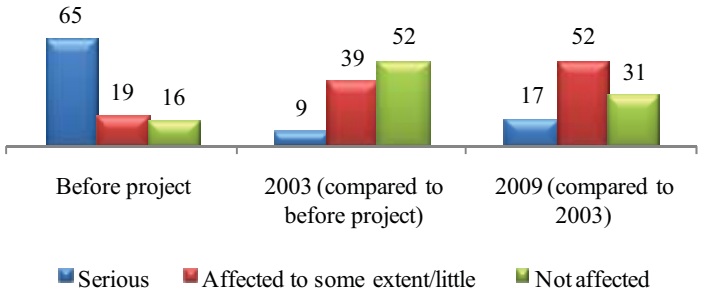
Figure 1: Environmental improvemnet (%)



With regard to damage to livestock (animals and fish), it was gathered that the situation was almost stagnant as the one in 2003, but there was an increase (from 3% to 13%) in the number of respondents who believed that damage to livestock was persistent since 2003.

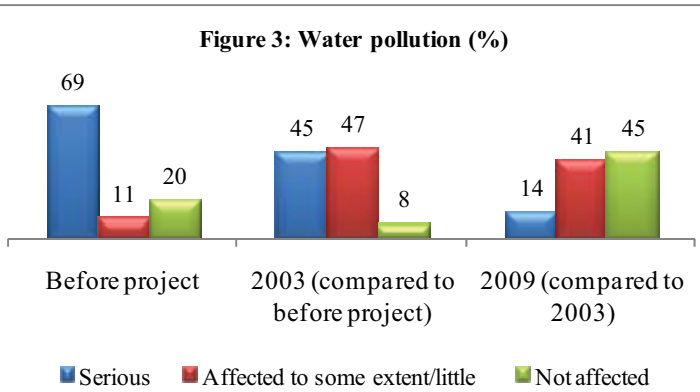
There was some increase in the number of respondents mentioning that there had been damage since 2003 to fish in the neighbouring river (Shitalakshya). A 17% of them believed that the damage inflicted to the fish was serious/considerable, while only 9% of them believed so in 2003. As of date, 52% say that the damage done is moderate and a 31% 'none' (Figure 2).

Figure 2: Damage to inhabitation and migration of fish (%)



The responses to question as to the degree of water pollution in the adjacent river were moderately uniform, that is, there had been improvement in the river water. Only 14% as against 45% for the year 2003 said that the water had been seriously polluted, as many as 45% (against 8% for 2003) believed that the water had not been polluted- which is rather a positive change (Figure 3).

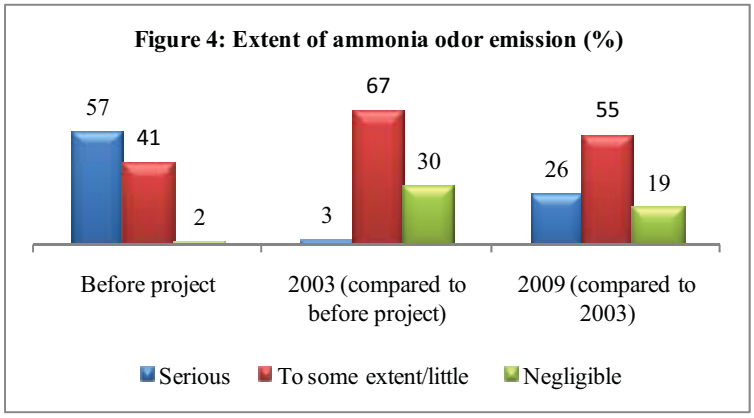
Figure 3: Water pollution (%)



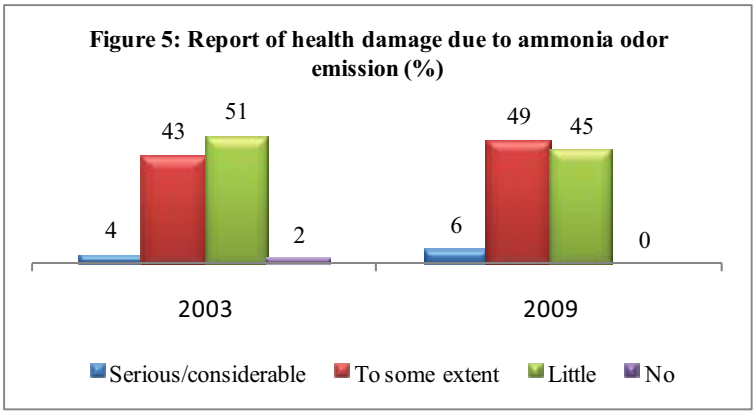
Reduction of damage to vegetation showed significant improvement during 1999-2003, but showed relatively little improvement since then to date. A total of 70% respondents in 2003 believed that damage to vegetation was serious/considerable in 1999 and 42% of them said that the situation improved significantly by 2003. Against this backdrop, a total of 17% respondents in this current survey still believe that the situation has improved still further since 2003. Besides, another 49% respondents in the 2009-survey also believed that the reduction of damage to vegetation has improved to some extent since 2003.

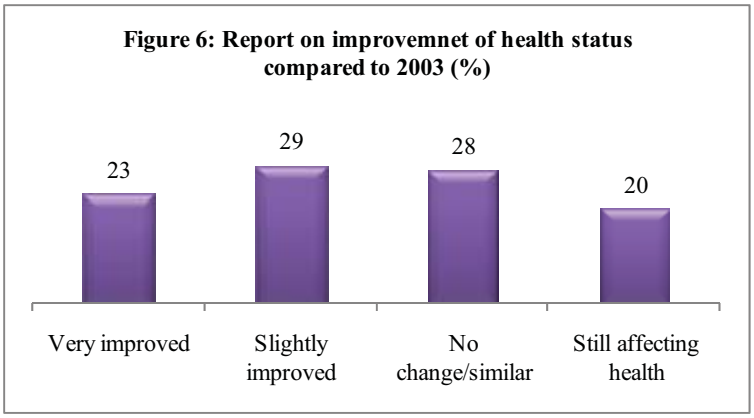
5.2 Changes in Health Status of the Local Population

The information obtained on the health status of the surveyed population, despite a marginal deterioration since 2003, portrays a generally positive trend of the impact of the Project. Though the survey lacks a bio-chemic or pathogenic test on the surveyed population, it was learnt straight from the beneficiaries of the JBIC/JICA Project that there was a general reduction in ammonia odor. The rise in the number of respondents (from 3% of 2003 to 26% to date) believing that the degree of ammonia was serious/considerable may be hypothetically attributed to the odor from other fast-growing industrial units in the project's vicinity (Figure 4). The other industrial units that are contributing to environmentally hazardous emissions are the gigantic Ghorasal Power Station, Polash Fertilizer Factory (emitting ammonia) adjacent to the Ghorasal Fertilizer Factory, two large jute factories and other numerous smaller industrial plants.



Though insignificant, the number of respondents saying that the ammonia odor caused damage to their health rose from only 4% in 2003 to 6%- still meager- to date (Figure 5). It may be possible that certain health complications due to environmental degradation in the distant past may have been caused through a moderate time-lag for the damage to practically act on the body and as a result of gradual senility through ageing. Despite this, it apparently holds true that the trend of improvement in the surveyed population's health status has been generally and moderately positive.





It can be seen in Figure 5 and Figure 6 that there have been changes in both (a) extent of damage to health and (b) improvement of health status. To detail further, the percentage of population saying that their health status has ranged between 'slightly improved' and 'no change/similar' is 57% (i.e., 29% 'slightly improved' and 28% 'no change/similar/). On the other hand, the number of respondents reporting on the damage to health due to ammonia odor being 'to some extent' to 'little' is 94 (i.e., 49% and 45% respectively).

It is noteworthy that the proportion of population reporting on damage to health between 'to some extent' to 'little' is the highest in Figure 5 Similarly, the proportion of population reporting on improvement on health between 'slightly improved' to 'no change/similar' is also the highest in Figure 6. Though the responses from these two blocks of population on the impact of ammonia on the population's health are consequentially similar, the sizes of the two populations are not the same. The reasons are that once a person's health is damaged, it takes a relatively longer time to heal or get cured than the time required to get damaged. Thus, in conclusion, it can be commented that the impact of the Project has been relatively positive- and with further passage of time when the Project is on, further benefits will flow from there.

Awareness about the health hazards caused by environmental pollution is relatively more prominent among the residents in areas located on the north and northeast of the Ghorasal Fertilizer Factory. The reasons for increased environment-awareness among them are three-fold:

(a) Some of the people of these areas worked in the Ghorasal Fertilizer Factory in the past, which taught them how hazardous ammonia can be for human health
(b) The habitation is at such directions from the Factory toward which directions the typical summer monsoon (south-westerly) and winter monsoon (northerly) blows carrying strong odor of ammonia from the Factory
(c) With gradual growth of roads and academic institutions in these localities, these people have attained wider access to growth centres and education resulting to overall general awareness (including environment-awareness).

5.3 Changes in Demand-Supply Situation in the Local Urea Market

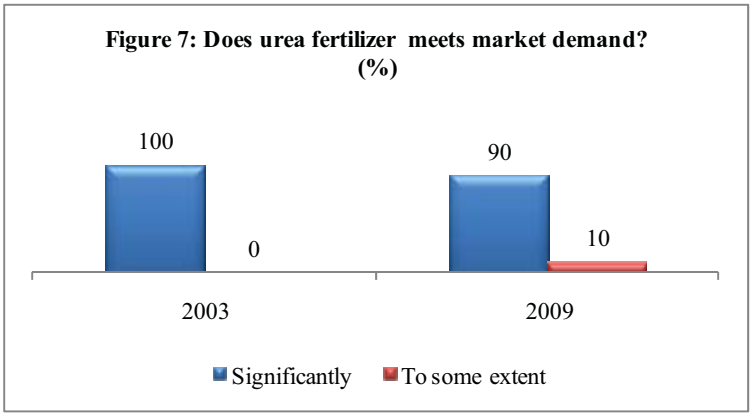
The questions for obtaining data/information pertaining to this section were asked to a total number of 10 dealers (as against 5 in the 2003-survey) in sale of fertilizer in and around the project locality. Questions asked dwelt on both demand and sales at the local (Ghorasal) market (as a proxy indicator of urea supply) of urea/fertilizer.

Matrix 2: Results of the interviews with fertilizer distribution (%)

Question	Scale	2003	2009 (compared to 2003)
1. Does GFF urea fertilizer meet demands of the market?	Yes, very much	100	90
	Yes, to some extent	0	10
	No	0	0
2. Have sales of GFF urea fertilizer increased since the completion of project?	Yes, significantly	0	10
	Yes, to some extent	100	30
	No	0	60
3. Has the number of employees increased since the completion of project?	Yes, significantly	0	10
	Yes, to some extent	0	30
	No	100	60
4. What is your view of the future trend in fertilizer use in Bangladesh?	Promising	100	100
	Sceptical	0	0
	Pessimistic	0	0
5. What is your view of the future trend in fertilizer use overseas?	Promising	20	100
	Sceptical	0	0
	Pessimistic	0	0
	Unknown	80	0
6. Has there been any change in the quality of GFF urea fertilizer since the completion of project?	Improved	0	0
	No change	100	100
7. What do you think about the quality of GFF urea fertilizer?	Good	100	100
	Moderate	0	0
	Bad	0	0
8. Has there been any change in the price of GFF urea fertilizer since the completion of project?	Increased	0	100
	No change	100	0
	Decreased	0	0
9. What do you think of the price level of GFF urea fertilizer?	High	0	10
	Reasonable	100	90
	Low	0	0
10. Do you think that the application of fertilizer is effective in increasing agricultural production?	Yes, very much	66	100
	Yes, to some extent	34	0
	No	0	0
	N (sample size)	**5**	**10**

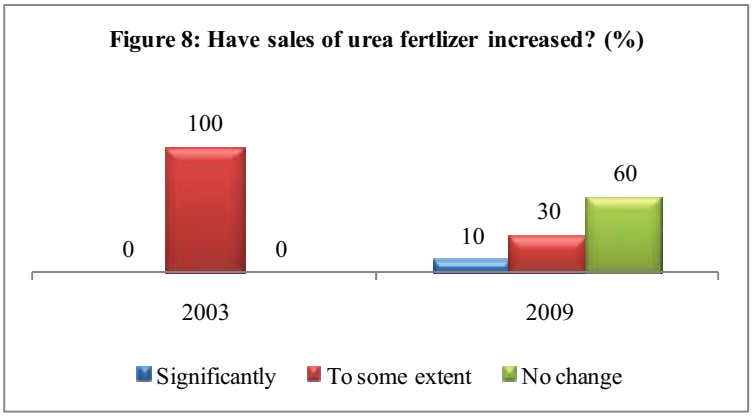
A 90% of the fertilizer dealers (as against 100% in the year 2003) under the survey responded saying that the urea from the Ghorasal Fertilizer Factory significantly met the demand for fertilizer in their locality (Figure 7). This slight decrease in demand met probably hints to the fact that the Factory remained technically shut down for around two years during the ex-post monitoring period due to want of natural gas (the basic raw materials) and other technical reasons.

Figure 7: Does urea fertilizer meets market demand? (%)



While the above apparently indicates an absolute increase in cumulative supply/sale of urea based on local production as well as imports, it is evident that the total supply in the local market increased as a result of increased demand. This apparent fact is also validated by a 30 percent of the respondents of this survey saying that sale of urea has increased since 2003, against a 100% respondents having said in 2003 that the sale had increased since completion of the project (Figure 8).

Figure 8: Have sales of urea fertlizer increased? (%)

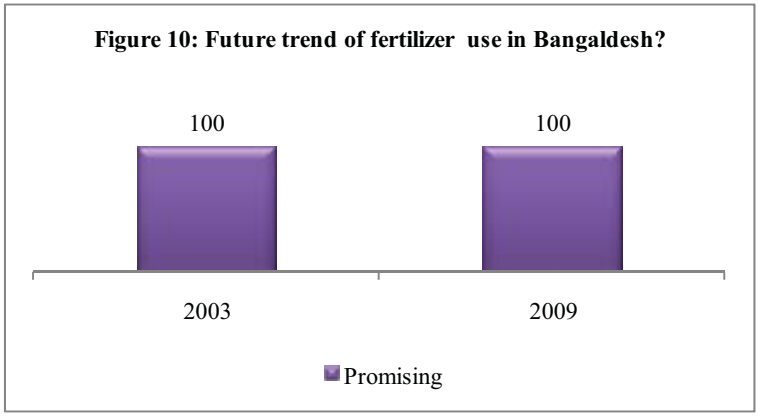


Consequently, it is evident that the Project implemented for the Factory has, given all odds, led to increased supply of urea in the local market to cater to the prevailing demand pattern. As a proxy indicator of growth in supply/business in fertilizer has, it may also be mentioned that 10% of the respondents in this survey, against none in the year 2003, said that the number of employees in their respective shops has increased significantly since completion of the project. Besides, another 30% feel that the number of employees in their shops has increased to some extent (Figure 9).

5.4 Impact on Quality of Locally Available Urea

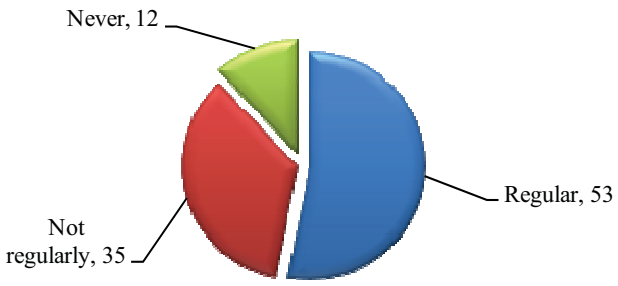
The fertilizer dealers were asked as to if the quality of urea had changed/improved since the completion of the Project and what was their experience about the quality of the urea made by the Ghorasal Fertilizer Factory. As in the year 2003, none in this survey believed that the quality of urea had improved since the completion of the Project. Besides, all (100%) of the respondent dealers in 2009 said that the quality of urea made by the Ghorasal Fertilizer Factory was good.

In order to check into the relative/net worth of urea from Ghorasal Fertilizer Factory, the respondents were also asked (a) if there had been any change in the price of the urea made by the Ghorasal Fertilizer Factory, and (b) what was their perception about the price level of the urea made by the Ghorasal Fertilizer Factory. In response, it was learnt that all (100%) respondents believed the price of urea from Ghaorasal Fertilizer Factory had increased since 2003, and a 90% of the respondents said that the price of this brand of urea (Ghorasal) was reasonable. This indicates that the increase in the price of urea from Ghorasal Fertilizer factory is considered unavoidable and natural, which may enable the factory to have the potential to avoid financial loss and/or to make profit on a longer span of time. A logical coincidence exists between this positive scenario about the future trend of urea market in Bangladesh and the perception of the fertilizer dealers about the possible future scenario of the urea market in Bangladesh, as reflected in Figure 10.



The prospect of business in urea and consequently the prospect of a factory like the Ghorasal Fertilizer Factory were confirmed by the fact that a number of farmers responded in the affirmative when the field enumerators wanted to know their perception about the contribution of fertilizer to increase of agricultural production. This, other things remaining the same, likely ensures a prolonged or sustainable market for the business in fertilizer in the project locality. Prospective sustainability of such a urea market in the locality was further c`onfirmed by the reported extent of use of urea by the respondent farmers. It was found that the number of farmers using urea on their croplands is around 88% (i.e., 53 regularly and the other 35% irregularly) as against a 12% never using urea (Figure 11).

Figure 11: Intensity of use of urea by local farmer (%) (sample size=17)



5.5 Profitability of Local Urea Business

An analysis of the apparent trend of demand and that of supply of urea in the local market in Ghorasal indicates prospect of this business in future. On the other hand, the acceptable and reasonable increase in the selling price of urea and the prevailing interest of businesspersons to deal in urea- both contribute to the fact that the dealers in urea are operating profitably. It was learnt that the selling price of urea controlled by the Government, which was stagnant (±USD 69) for a long period between 1997 and 2008, soared up to ±USD 143 since June 2008 (Both prices are calculated at the current rate of exchange which is USD 1 = ± BDT 70j. This indicates both current and future prospect of business in production and sale of fertilizer in general in Bangladesh.

6. RECOMMENDATIONS

(1) ***The executing agency*** should take up a long-term plan aimed at the following:

- Take necessary steps to ensure further compliance with the requirements of the project
- Carry out thorough assessment of how long further the age-old plant (Ghorasal Fertilizer Factory) should operate effectively/profitably considered all of (a) engineering depreciation, (b) accounting depreciation, and (c) financial/economic depreciation
- Study into the total demand and supply situation of urea in the country as well as in the Ghoarasal locality
- Assess the contribution of import of urea as against production of the same
- Analyze comparative advantage(s)/disadvantage(s) between further augmenting production as against import
- If viable, launch the long-term scheme to establish the required number and types of urea factories at appropriate locations in the country, and/or compare the effectiveness of going for massive overhauling in order to install modern technology toward reducing expenses on basic raw material (natural gas) and/or increasing urea production
- Coordinate/Consult the whole process of the above steps with the Government.

(2) In between or on conclusion of the above steps by the executing agency, ***the JICA/JBIC*** should take the following initiatives:

- Assess their long-term potentials for entering into an economic cooperation framework with the Bangladesh Government for materialization of plans in line with the above suggested steps by the executing agency.