6. Ecologically Sustainable Appropriate Technologies

Dakshin Chamuria is located in a typical floodplain. In the floodplain, the hydrological ecology or environment has a great effect on the agriculture and daily life in the village. This environment is subjected to chang with the technological interventions including the construction of roads and other artifacts. Therefore, technology should be selected considering its appropriateness ecological and social sustainability.

The change of the ecology which occurred by technological intervention must be sustainable so that farmers can adapt their technologies to the changing circumstances by themselves. Appropriateness also must be considered in terms of accessibility and applicability of the technologies.

Most of technologies available in the villages can meet the above conditions. Therefore, JSRDE borrows existing local technologies and re-designs it's improved version. We have started our task by means of learning from the experienced farmers, and we also paid continuous attention to the existing knowledge and thoughts which exist in the village.

Our attempts for this issue are as follows:

(1) Rural hydrology approach
(2) Resource development of homesteads
(3) Improvement of soil fertility
(4) Promotion of crop Diversification
(5) Introduction of new technology

In the following part, we discuss on our attempt of 'Rural Hydrology Approach' which can directly deal with hydrological ecology at first and the characteristics of ecologically sustainable appropriate technologies are discussed in the next pages.

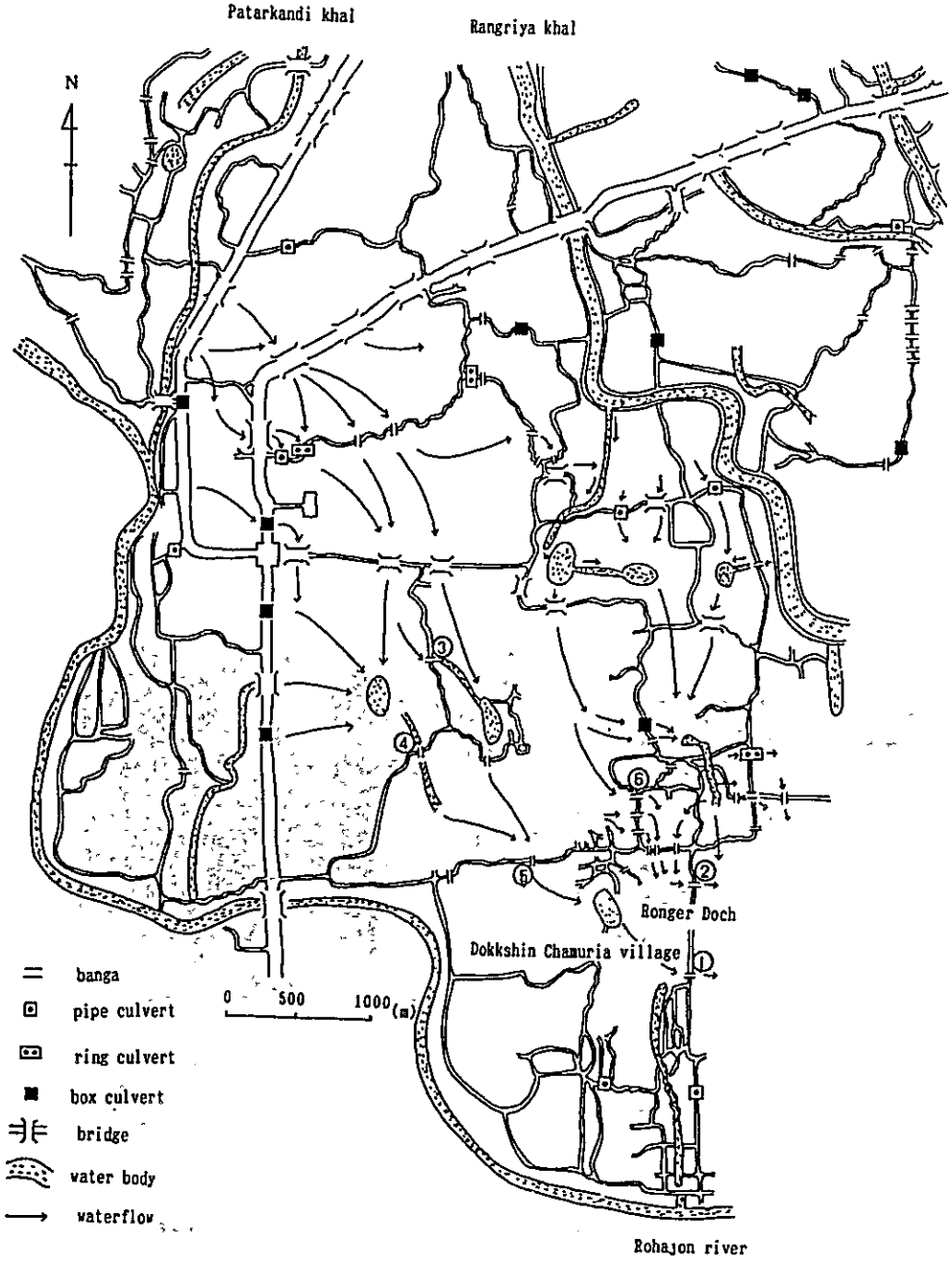

Figure 5 Dynamic Hydrological Condition in Shahadebpur Union

6.1 Rural Hydrology Approach

"Rural Hydrology Approach" has been developed as an appropriate technology for investigating the hydrological change occurred by setting the rural infrastructure like road, bridge and other structure. This technology requires a minimum set of the following items: motorcycle or bicycle, foot to walk around, an eye to see real environmental conditions, an ear to listen to those who appraise the local conditions, and have mind to think together with local people about constraints to development and real needs of the locality.

A dynamic hydrological environment of the floodplain at Shahadebpur Union was analyzed as shown in Figure 5 and the results were applied to formulate plans for building rural infrastructures including union and village roads, bridges and culverts, low cost riverbank-protection palisading, transplanting of African dhaincha (*Sesbania rostrata*) to protect deepwater rice from water hyacinth.

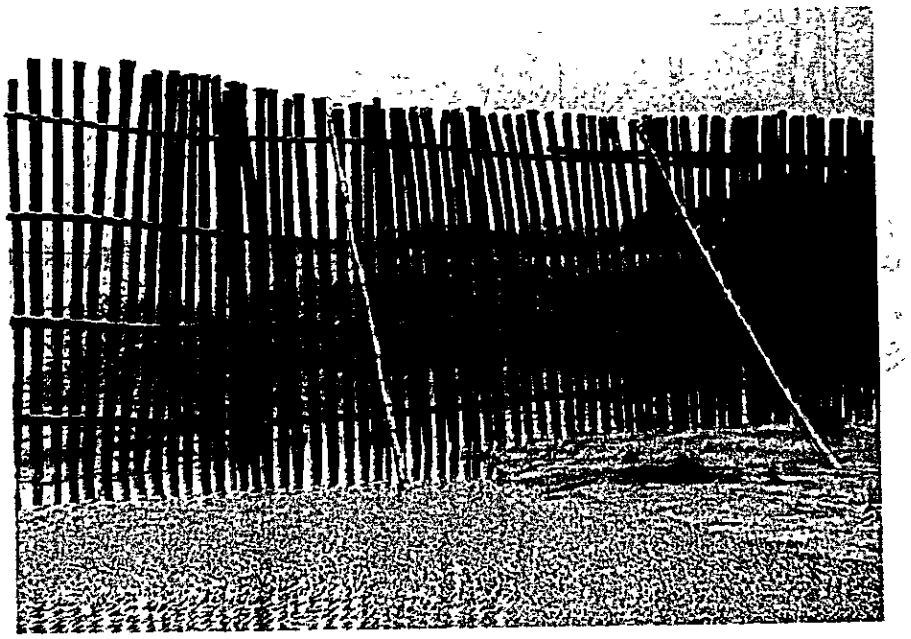

Photo 1 Palisading of Lohajang river

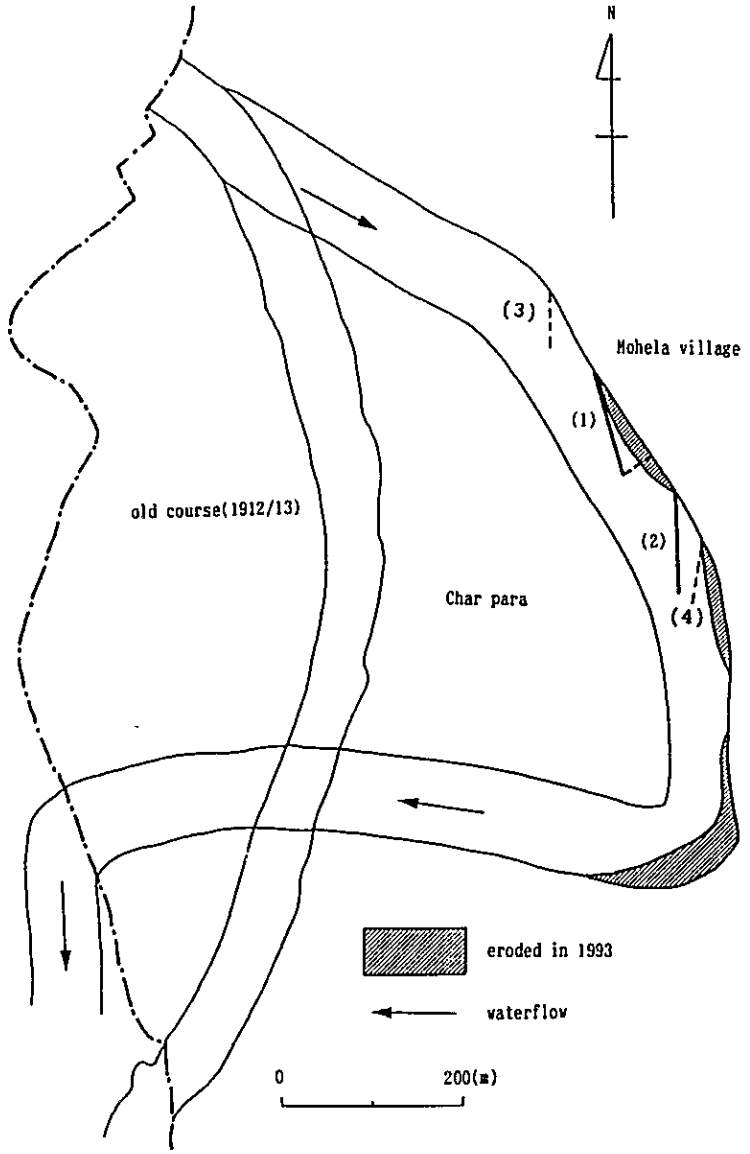

Figure 6 Course Change of the Lohajang and Location of Palisadings

As shown in Figure 6, the Lohajang river is shifting its course from the west to the east to a great extent. The problem of bank erosion along the east bank in Mahela and neighbouring village was very serious. The Village Committee of Dhakshin Chamuria after consulting with villagers of Mahela decided to construct palisadings to stop the erosion. Two main improved palisadings, with length of 70 feet and 100 feet respectively, were set in the dry season of 1993 and 1994 successively, and in addition, a pair of bamboo palisadings were set in the following dry season. In this rainy season, therefore, two main improved palisadings and two bamboo palisadings installed as shown in Figure 6 performed remarkably to stop the erosion.

The site was selected in consultation with the local people and the construction of palisadings was done by employing local contractor under direct supervision of the VC and JSRDE field staff. Locally accumulated experience and knowledge have been fully used in designing the palisading. It was made by setting bamboo poles horizontally and these were all kept well fixed with another set of bamboo poles placed vertically. Finally some pieces of strong tins of old drum were fixed at random in order to allow water to pass slowly through the empty spaces. Total cost was Tk. 45,000 for construction of two main improved palisadings.

From the dry season of 1994, seedlings of *Dhol Kalmi*(*Ipomea fistuosa* Mrt.) have been planted on the silted soil which accumulated behind and around the palisadings to reduce the velocity of the water current. A lot of seedlings were planted in the river bed nearby palisadings before the rainy season in 1995. This attempt has successfully resulted in large quantity of silt sedimentation.

Our attempt still could not get the significant institutional supports from the concerned villagers because of lack of motivation or failure in creating awareness among the villagers of Mahela village where the programme is conducted. However, many villagers have come to pay attention and to be interested in our attempt, for certain, during these three years. We are sure that the advantage of this technology has been well demonstrated and expecting that this technology will be recognized as one of the appropriate technologies for smaller river bank protection in Bangladesh.

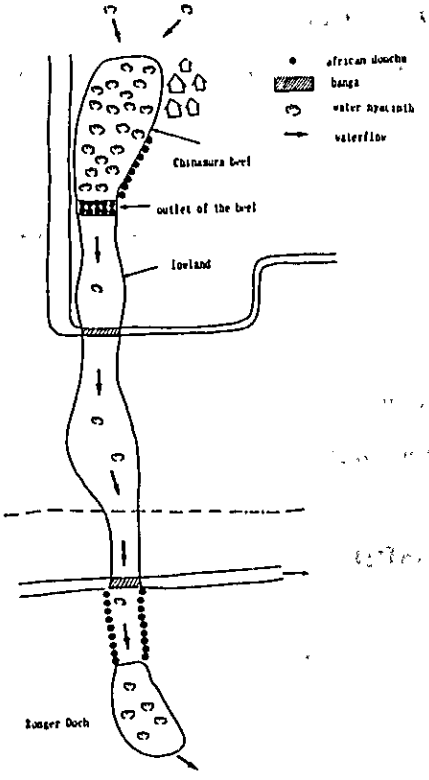

Figure 7 Water Hyacinth Control Programme by African Dhaincha

The next attempt was on 'Rural Hydrology Approach' to control water hyacinth in 1994-95 using African Dhaincha. This programme was planned to block ingression of water hyacinth which damage Aman crop. This was composed of three steps shown in Figure 7. First step was dense seeding of African *Dhaincha* in the outer skirt of rice field located at the mouth of Chinamura Doha *Beel* in neighbouring Chinamura village. The object was to reduce the wholesale migration of water hyacinth from the beel into Dakshin Chamuria. Secondly, African *Dhaincha* was planted in rows along both sides of low land to divert away quickly water hyacinth into Ronger Doha beel in Dakshin Chamuria. In the third step, African *Dhaincha* was planted at levees to stop direct movement of the water hyacinth into Aman fields.

This case could not get clear result in these two years since water hyacinth did not migrate out from Chinamura Doha because there was no flood in 1994, but in contrast to previous year, most of planted African *Dhaincha* crop was flushed out by flood in 1995. However,

wide cultivation of African *Dhaincha* covering from Chinamura village to Dakshin Chamuria had a demonstration effect and they were eager for plantation of African *Dhaincha.*

African *Dhaincha* can be planted in wet and inundated field by stem cutting, which is quite different from deshi *Dhaincha* (*S. acculeata*), and has attracted farmers' keen interest. Considering these facts, it is expected that African *Dhaincha* planting in the Aman field will be effective for controlling water hyacinth as at least a third step of our attempt. This shows the appropriateness of the technology, even if they are not planted in not so large scale, as the other two steps of our programme.

6.2 Other Attempts by JSRDE

Resource development of homestead (*Bari-Bhiti*) has been demanded by programme, such as compilation of plant resource book, fruit tree grafting, introduction of modern cooking stove and homestead gardening programme by the Department of Agriculture Extension. Plant resource book was compiled to get the idea of the villagers' knowledge and devices for making full use of limited space of homestead. Fruit tree grafting programme is to assist re-cycling of plant resources which exist within the village and there is no need to bring fruit trees from other places.

Improvement of soil fertility was first tried by introducing the modified cropping pattern including the pulses instead of Deepwater Aman rice-Boro rice(MV) pattern. The introduced pattern was Deepwater Aman rice-Pulse-Boro rice(MV) or Pulse-Aus rice(MV)-Aman rice. Then the African *Dhaincha* was introduced into the fallow land and Deepwater Aman rice growing fields.

Crop diversification has been attempted by the introduction of improved vegetable varieties namely winter vegetables, *Kankon* (*Gima Kolmi*), soyabean, garden pea etc.

As new technologies, the new breed of poultry, fish culture in new ponds and pedal pump were introduced through demonstration.

6.3 Characteristics of Appropriate Technology

For the introduction of these technologies, we have discussed about their sustainability with the experienced farmers in the Village Committee Meeting and Para Meeting. The Importance of all of these technologies except for modern cooking stove have been realised even though these were not totally new to the farmers. Out of these attempts, the African *Dhaincha* and fish culture in new ponds which have rapidly spread in the village just after introduction, and cowpea cultivation on the levees of Boro fields are quite attractive to the farmers.

From these results, we can prepare the technological intervention models to seek the ecologically sustainable appropriate technologies.

Firstly, we are discussing on the common characteristics of three programmes of African *Dhaincha*, fish culture in pond and cowpea cultivation.

These technologies are not new to the farmers at all, but the innovations are new. For instance, African *Dhaincha* has got advantages over *Deshi Dhaincha* as an innovation. The structure of the pond of Dakshin Chamuria is different from common ponds. Here the pond, using the road as embankment, has mostly shallow depth, and usually called *Doba*. The cowpea is not different from the local a cow pea variety which is familiar to villagers and seeds are available in seed stalls in Tangail, but the cultivation method is completely unique to this locality. The cowpea was never cultivated in Tangail in the levees of irrigated Boro field, but this was practised extensively in Chittagong area.

Secondly, these technologies did not demand from the farmers to abandon the existing systems such as cropping pattern, land or their own technologies. In comparison with these three programmes, other programme somehow required to modify farmers own system for the introduction of new technologies. For example, the programme of improvement of soil fertility by changing the cropping patterns was not accepted by many farmers.

A good example is African Dhaincha. *Deshi Dhaincha* (*Sesbania aculeata*) used to be cultivated in the village to provide green manure and firewood before the introduction of MV

Boro rice. *Deshi Dhaincha* is usually broadcasted in the dry field in March or April, but in this period, MV *Boro* still occupies the field. So if farmers want to cultivate *Deshi Dhaincha* in the field, they must broadcast the seed in May or June after harvest of MV *Boro* rice. In May or June, the rice fields are wet or remain inundated due to early rainfall, which is not preferable for sowing of *Deshi Daincha* seeds. Accordingly, cultivation of *Deshi Dhaincha* was disappeared gradually in the village, even though the farmers recognized the value of *Deshi Dhaincha.* In contrast to *Deshi Dhaincha,* African *Dhaincha* can be transplanted by its saplings even in wet and inundated fields. The stem cutting of African *Dhaincha* can be used as a sapling. Therefore, African *Dhaincha* is much preferred by the farmers for transplanting in the fallow land, the levees, mixed with Deepwater *Aman*, and the embankment of the pond. In the rainy season in 1994, African *Dhaincha* was newly introduced by JSRDE in cooperation with FSR (Farming System Research) of BAU. Sixty four farmers took the stem cuttings from JSRDE while 80 farmers could not get it in spite of their eagerness. In 1994, the number of seedings was in short supply.

The third common characteristics is that these three technologies make use of the relatively useless land such as fallow land, levee, *Doba* etc. Because of this characteristics, the farmers had a strong desire for their introduction. Especially in the case of fish culture in pond, the poor farmers voluntarily and jointly started this programme, because the poor farmers usually have at least small *Bari-Bhiti* and *Doba* even though they do not own any arable land. Many of them made new ponds saving the cost of construction by utilizing newly constructed *Para* roads as a part of the embankment. The *Para* Road Programme gave the poor farmers a good chance to have access to the new technologies.

The fourth common characteristics is that these technologies do not require larger expenditure. The fish culture in pond can needs only the cost of finger-lings. Cowpea in the levee of irrigated MV Boro rice can be cultivated by incurring only the cost of seed and may be by providing branches of tree as a support-stick. In comparison with cultivation of a cowpea at *Bari-Bhiti,* the cowpea at the levee grew well because of good soil moisture. For African *Dhaincha,* any cost except seed is not necessary and it produce large number of seeds which can be stored by the farmers themselves.

The common characteristics of these three technologies are summarized as follows:

(i) not new at all, but something new was needed to change the common sense,
(ii) no need to change the farmers' existing systems,
(iii) applicable to fallow land at first and,
(iv) low cost requirement.

6.4 Technological Dissemination Aspect

From the view-point of the technological dissemination, we can see the three types of the farmers as shown in Figure 8. The first one is the advanced farmers who get interested in new technologies. The number of this type of farmers is very small. The second type is moderately advanced farmers. At first, they usually follow what the advanced farmers do, and then, after they are confirmed of the results, they accept the new technologies. The third one is the general farmers who make decision by watching what the neighbors do. Usually, they do not have strong motivation to new technologies. In the village this type of farmers is dominant. In Dakshin Chamuria, the advanced farmers are called *Kutinati*, the moderate advanced farmers as *Dhekadeki* and the general farmers as *Shadharón*.

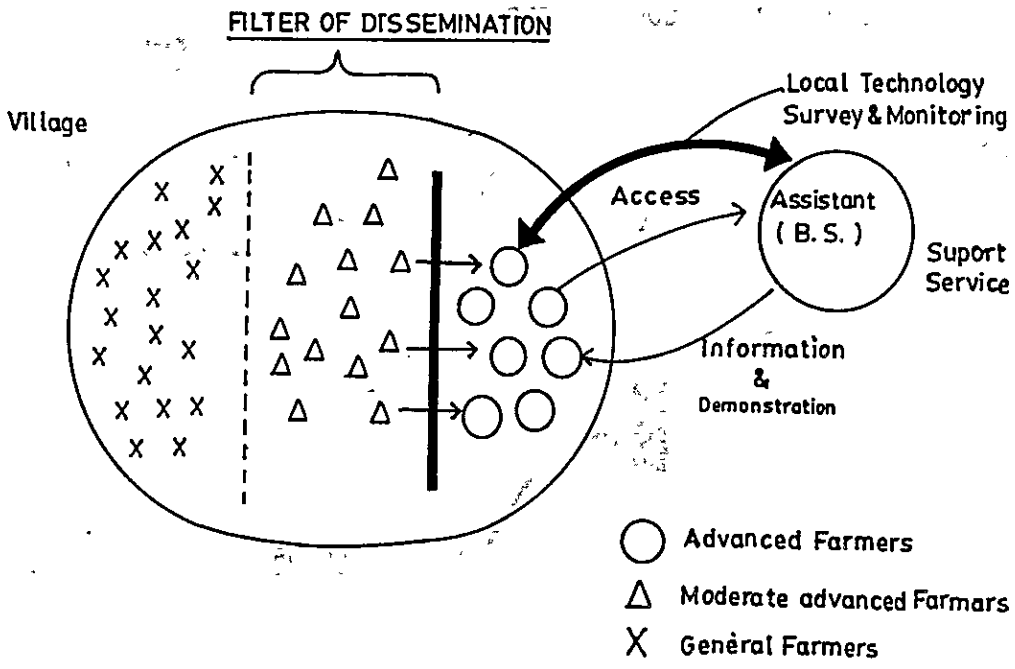

Figure 8 Dissemination of Technology in the Village

All the technologies described above except three seem to reach only to the advanced farmers. The moderate farmers are not likely to have confirmed these technologies. Some technologies namely the new MV Aus rice, variety called BR27 has been cultivated for only two years and then discontinued. But, these three promising technologies might have reached to some moderate and general farmers. Therefore, we can consider that the moderate farmers are the filter to judge the accessibility and acceptibility of the new technologies and the advanced farmers are the innovators of the technologies. We feel that this filter between the advanced farmers and the moderate farmers seems to be strong. It may be recommended that the filter function of moderate farmers should be carefully observed and identified for the technological dissemination. The opinion of the moderate farmers should be much appreciated for modification of the new technologies.

Finally we intend to draw the attention to the relation among the infrastructure development, environment (ecology) and technological intervention. As we learnt the lesson from the "fish culture in pond" programme, the infrastructure is one of the most effective technological interventions. As shown in Figure 9, the environment is changed from A to A' by intervention of infrastructure, but the changed environment A' must increase or enhance the sustainability and accessibility of the farming technologies. Otherwise, the infrastructure may be ignored in terms of maintenance. If the farmers feel the necessity to maintain the environment of A', certainly they organize themselves in their community to repair the infrastructure. This cycle is well observed in Dakshin Chamuria.

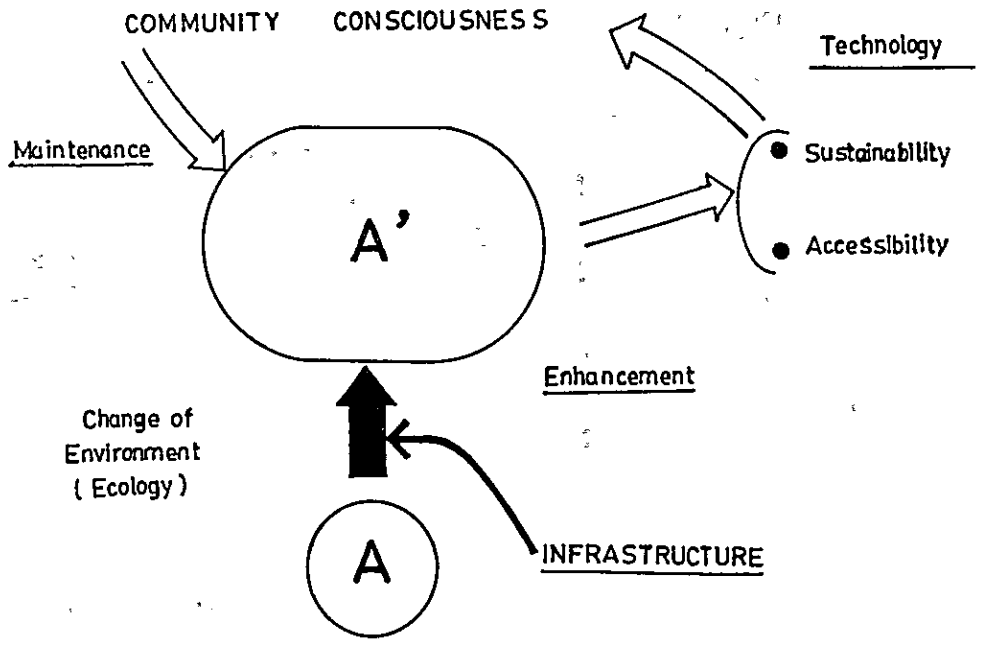

Figure 9 Relation of Environment Technology and Infrastructure

7. Off-farm Job Opportunity : Income Generation

7.1 Credit and Entrepreneurs in the Village

In Dhakshin Chamuria, small financial business is very popular among the villagers. According to Table 4, out of 125 pure lender households in the village, 104 households(83%) are landless and functionally landless. Moreover, out of 57 households in the village who lend more than Tk.2,000 not through land mortgage, 35 households(61%) are landless and functionally landless.

Table 4. Informal Credit in Dhakshin Chamuria village

	No. of house-hold	Borrower	Borrower cum Lender	Lender	Others	Borrower Lender Tk.2,000 < (non-Mortage)	
0	206	44	18	68	76	15	24
0.00-0.49	138	53	30	36	19	15	11
0.50-0.99	84	40	21	11	12	12	9
1.00-2.49	78	45	19	8	6	16	9
2.50-4.99	24	15	5	1	3	6	1
5.00-	8	2	4	1	1	1	3
Total	538	199	97	125	117	65	57

This is interesting fact that more than 80% of lenders are occupied by the poor indicates that people in the lower class have money to spare for money lending business. Their small capital is supposed to have been saved through increasing and stabilization of employment opportunities since 1980', which were induced by introduction of STW/DTW and non-agricultural activities of *Biri*[1] making and handloom factory.

Some parts of borrowed money is spent for ceremonial occasions, children's education, daily consumption and purchase of land etc.. Rest part is also used as working capital of entrepreneurs. Two-third of the entrepreneurs borrow money from informal credit market in the village, and about 30% of them borrow more than Tk.2,000. It is also observed in the village that the entrepreneur's ratio against total number of borrowers and the ratio of the

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* Biri:Indegenous cigerettes usually the wrapper is made from leaves.

borrower who is borrowing more than Tk.2,000 are larger than those of non-entrepreneurs.

On the other hand, concerning institutional credit, Grameen Bank (GB here in after) is most dominant in the village and number of its members in the village is now 108 covering 20% of total households. It is estimated that about 70% of institutional credit comes from GB. Among the total 108 members only 28 households (26%) are the entrepreneurs, and on the other hand, about one fourth of the entrepreneurs in the village are GB members. Moreover, it should be paid a special attention that there are quite a few entrepreneurs who have started their business after they became members of GB.

It may be evident from the above discussion that the rural poor do not have much scope for generating self-employment opportunities even if enough capital is available from outside sources. Most of the surplus capital of the villagers, irrespective of inside or outside origin, is made as an advance to the village entrepreneurs.

Now the real problem is how to support limited number of entrepreneurs who are the real engines for rural economic development. If they are more effectively supported, the overall economic activities would be more encouraged and there will be some 'trickle-down' effects to the poorer villagers in the form of increasing employment opportunities.

One of the necessary economic conditions to stimulate entrepreneurship among the villagers is "infrastructure" and another is "capital". If the *Hat* and road is developed, the potential entrepreneurship among the poor will be encouraged. The presence of small capitalist investing their capital to the entrepreneurs is much observed in the village, therefore, the capital formation not only by entrepreneurs themselves but also by non-entrepreneurs is of much significance in the village.

At the same time, especially from the viewpoint of those who lack in entrepreneurship, essential and direct method for making employment opportunity is to make linkage with entrepreneurs, for example, to channel the producers of clothes or embroidery etc. to the retailers.

Therefore, our approach on income generation through off-farm job is to encourage the rural entrepreneurs by resource mobilization in terms of rural infrastructure, capital formation and linking employees of NBDs with villagers. This is described in Figure 10.

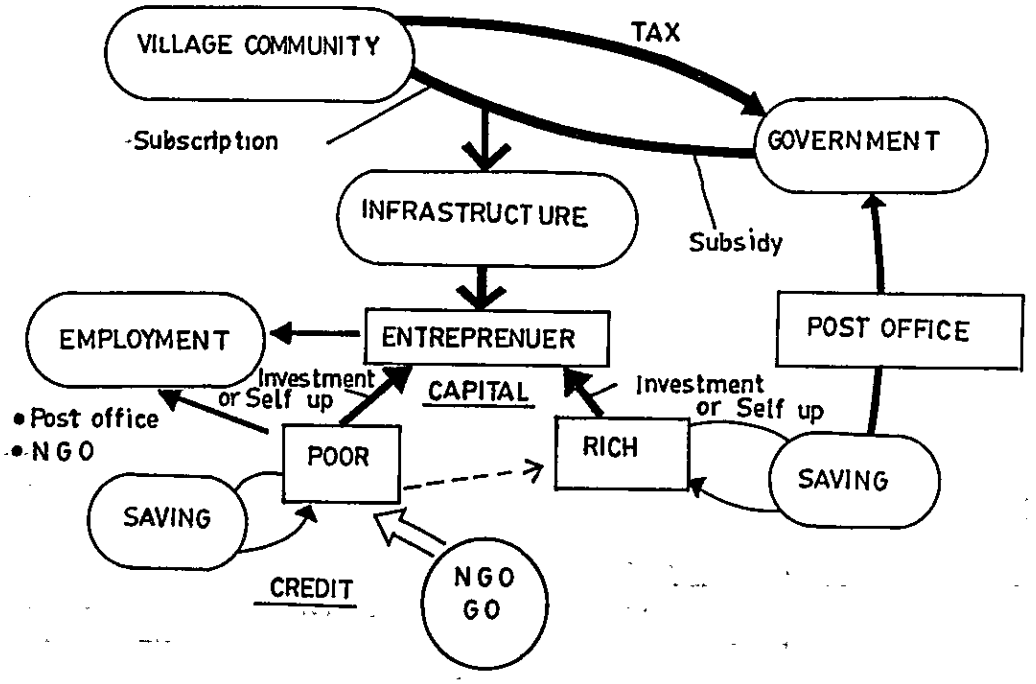

Figure 10 Off-farm Job Opportunity : Income Generation Model, JSRDE, Tangail.

7.2 Economical Impact of Road Communication Improvement

Our attempts for rural infrastructure is mainly to improve the road communication and hat development. At present, the 15 m concrete bridge and box culverts have been constructed on the road connecting Dhaka-Mymenshingh highway to the *Hat*, which used to be disconnected by the big *bhanga*, by the Local Government Engineering Department and District Parishad respectively. This programme was initiated by the Village Committee of Dakshin Chamuria and JSRDE village staff, as a villager, contributed much in negotiation and persuasion with local administration. Without their efforts, this programme would not have

been materialized.

The economic impact of these infrastructures can not be measured at present, because the programme has just completed or is still continuing and so we measure the estimated impact by *Hat* survey and the number of Van-Rickshaw between Mahela and Dakshin Chamuria. Mohela is accessible to the highway of Dhaka- Mymensingh without *Bhanga*, but Dakshin Chamuria had *Bhanga* between Mahela. The estimated direct impact of Bridge is given in Table 5.

Table 5. Estimated Direct Impect o Bridge at Chamuria *Bhanga*

1. Estimate increased number of Van-Rickshaw of Chamuria in Comparison

Increased Numbers	Mahela accessed to highway	Chamuria interreupted by *Bhanga* to highway
11	18	7

2. Cost and benefit of direct impact of bridge

Earning by van-rickshaw per month(Tk)	Total earnign in year by 11 van-rickshaw(Tk)	Total cost of bride (Tk)	Annual cost of brdge for 30 years (Tk)
1,000	1,32,000	7,50,000	25,000
1,200	1,58.400		

Table 5 explains the good prospect of investment for infrastructure development in Dakshin Chamuria. If the life of a bridge would be 30 years, the annual cost is simply calculated to be Tk. 25,000. Although this cost is seemed somewhat big, the bridge has potential to increase 11 numbers of Van-Rickshaw in Dakshin Chamuria. These Van-Rickshaw pullers can earn Tk. 1,32,000 to Tk. 1,58,400 annually. The Van-Rickshaw pullers are almost poor but they are considered as one of small entrepreneurs. This analysis indicates that the development of infrastructure for long-term perspective has good prospect for the development of small entrepreneurship among the poor. So the credit loan programmes to the poor should be implemented in accordance with the infrastructure programmes.

We think annual cost of Tk. 25,000 should be collected from the direct beneficiaries and subsidy of the central government fund. At the weekly *Hat*, about 200 small merchants gather to sell their goods and so, the 218 persons (18 Van-Rickshaw pullers + 200 small merchants) will use the bridge directly. If they would pay a subscription of only Tk. 2 for bridge per week, the total subscription per year amounts to Tk. 22,672. The rest of Tk. 2,328 is only to be supported by the subsidy of the central government, through direct tax or savings from post office.

The direct impact of infrastructures of road and bridge can be estimated in terms of the number of participants to the weekly *Hat* as shown in Table 6.

Table 6: The estimated impact of weekly *Hat* by numbers of total participants including small mechants surveyed at three times (in person)

Item Participation	Bad communication (Rainy season: August17, 1994)	Good communication (Dry season: January 7, 1995)	Highest Potential before Eid festival: February 26, 1995)
Person	1,946	2,941	4,198
Village	32	34	43
Buying capacity (Tk. 10 per person) per month	2,00 person X Tk.10 X 4 hat	3,000 person X Tk. 10 X 4 hat	4,000 person X Tk. 10 X 4 hat
	Tk. 80,000	Tk. 1,20,000	Tk. 1,60,000
1) Difference	Tk. 40,000	Tk. 40,000	
2) Per season	Tk. 4,80,000 (6 months)	Tk. 7,20,000 (6 months)	
3) Seasonal loss per year	Tk. 2,40,000		

Table 6 indicates that the potential income per season from *Hat* per year is estimated roughly at Tk. 2,40,000 due to bad road communication and poor hat facility. The maximum potential of Dakshin Chamuria *Hat* is just before Eid. If we develop the *Hat* to the maximum potential, volume of trade transacted can amount to be double than that of the rainy season. During the rainy season, the work of *Biri*, handloom, agricultural labour decrease due to the weather condition. Therefore, the *Hat* is the only facility for the poor which offers opportunity of income generation by selling something or transporting goods. Like the credit/loan programme, the hat development programme must be given top-priority for poverty alleviation in rural Bangladesh.

7.5 Village Post Office for Capital Formation

One of the necessary economic conditions to stimulate entrepreneurship among villagers is "infrastructure" and "capital". In addition, self reliant behavior to have accountability of a person for own business. According to our observation, more than half of the poor select the way of investing like "small capitalist" in the village, when they get money from credit or savings. So savings habit must be encouraged in rural development programme to support the village entrepreneurs by the own capital resources. To encourage this habit of self-savings and investment, we established the village post office in March, 1994.

The village post office has performed as a bank in the village. The banking performance of the post office is shown in Table 7.

Table 7. Deposit, withdrawal and tital saving of the villge post office in May, 1995 since March, 1994.

Number of saving account	Deposit in May	Withdrawal in May (Tk)	Total deposit (Tk)	Total withdrawal (Tk)	Total savings (Tk)
358	36,145	16,295	2,89,249	1,22,360	1,66,889

As shown in Table 7, the banking performance is quite well in comparison with other

post-offices. One reason is that the small entrepreneurs like cloth merchants regularly visit the post office to deposit and save their money for security. At present, this activity is very much popular among the villagers. So far we are informed, about 20 informal saving groups in Dakshin Chamuria and surrounding villages, which are organized by villagers themselves as well as by NGO namely G.U.S.T, have opened their group account at the village post office. The village post office seems to play a part of so called audit to these informal saving groups. The regular weekly deposit habit certainly prevents the mismanagement of their savings money. Villagers do not hesitate to visit the post office not like banks in the town because the post office staff are village- neighbours. Banks in town has the "social wall" in terms of distance and unfamiliar staff, who might behave like "officer".

The government should use the village post office as a "savings bank" and recognize the savings of the villagers as a fund to make the infrastructure in the village. This will bear full responsibility to innovate the new system in the revenue in relation to the postal department.

7.4 Training Programme to Link with Entrepreneur

Increase of the entrepreneurs may increase the opportunity of employment to extend their business. We are experimenting with this approach in the embroidery training programme for 30 poor and active women.

The training is scheduled for two and half hours in morning and afternoon of every weekdays at the office room of the Village Committee. On the request of the trainees, before starting the training, 30 minutes adult literacy programme is conducted by the trainer and female JSRDE village staff. The trainer, who comes daily from Tangail Town by bus, is a young woman who has been trained by BRDB MSS at Tangail Sadar Thana under the supervision of a JOCV female instructor.

We do not give allowances such as TA or DA to trainees. It is partly because trainees are from within Dakshin Chamuria and actually TA is not necessary, but main reason for not providing TA or DA is to encourage the eagerness and accountability of the trainees. This programme has just started in April, 1995, and the prospect is still uncertain, but JSRDE

is trying to link these 30 women to the local entrepreneurs of cloth merchant. At present, a few entrepreneurs both in the village and in Tangail Town have showed the interest and the business is about to be started.

8. Conclusion

Through the experiences from our action programmes as described in this paper so far, we obtained several important findings as follows : 1) Improvement of rural infrastructure should be more enphasized on both for facilitating individual villagers' economic activities, and for drawing community consiousness of villagers, 2) for the full participation of villagers to the rural development activities, locally existing leaders should be deeply involved, 3) locally existing technologies should be paid more attention as the important source for appropriate techonologies.

The main reason for the stagnation of rural economy in Bangladesh seems to be derived not from the insufficiency of the economic activities of private sector, but from the defficiency of the public expenditure. As mentioned in this paper, discommunication because of poor infrastructure discourages villagers' activities. So facilities of rural communication is prerequisite for activating individual economic activities.

Villagers have come to be accustomed to stay as beneficiaries rather than to become participants in the rural developemnt programmes so far, and what is worse, to get limited benefit from aid, the problem of competition and monopoly arises. To solve these problems mentioned above, improvement of rural infrastructure, whose size is managable enough by villagers, through collective participation by villagers may be very effective.

Observing process of collective decision making among local, we found the existence of their own society and leadership,so we applied existing rural society as main executive body of the programmes instead of introducing new organization such as cooperatives or target groups. The experiences through action programmes taught us that it is locally existing leaders that can draw full participation by villagers for rural development programme, but it depends on the type of programmes. The field which *Mattabors* have been contributed in the rural

development is not the encouragement of individual economic activities, but the coordination function as the representative of the village, proved by their good sense and authority which is acknowledged by villagers. It means that *Mattabors* have been leading the village in such programmes as targets of the community interest of the village like improvement of rural infrastructure, and as required representativeness for negotiation with outside organizations such as Government agencies.

Concerning appropriate technologies, locally existing technologies, which tends to be ignored or overlooked because of their apparence of plainness at a glance. Outsiders tend to regard them as for granted, or not so innovative, but in reality, their plainness is the evidence that they have been well adjusted to the natural environment and life of rural people. Such locally existing technologies whould be paid much more attention to as the source for appropriate technologies, and for realizing it, rural people's participation and attitude for learning from rural people is necessary.

We could know the local people's devices and wisdom that have been fostered through generations well adapting to socio - ecological environment from the researches and experiences from rural development work, and there may, of course, exist systems, customs, and technologies that have fostered and development unique to the locality far more than we could know so far. We think that such method of rural development as outsiders know the delight of learning villagers' wisdom, and villagers can have confidence what they have fostered and developed on the other hand. This method begins from acknowledging of villagers'"indigenous" wisdom not by denying them, and by making full use of "indigenousness" which could be extracted from it, possibility of alternative rural development can be expected. Our trial is a proposal in action for the alternative method that aims at "existenised rural development".

Acknowledgement :

We thank specially our JSRDE village staff led by Mr. Akkel Ali (Village Manager, Tangail), Shahadebpur Union Chairman and Members, Dakshin Chamuria Village Committee Chairman and Members, Government and NGO Assistants of Support Service and so many villagers of Dakshin Chamuria and Shahadebpur Union for their dedicated cooperation to our attempts.

D. REPORT ON AIRA VILLAGE

1. Introduction and Physical / Economic Background

1.1 Green Revolution of Barind Track

Barind Tract is in the boom of "Green Revolution". The reddish Barind soil in the dry season, which used to be fallow or under sparse around the *hat* [periodical market] is quite congested with farmers from the Barind villages, their bullock carts carrying rice, traders and their trucks are busy of loading the paddy. Besides, innumerable steam boilers for parboiling are being installed in the rural growth centre and considerable number of people including women are residing around them seeking job opportunities in the paddy processing and other day labourers.

Figure-1 tells us the drastic increase of steam boilers in late 1980s. This data were collected by our field observation along the Dhaka-Rangupur highway in October1995. Accumulated numbers of boilers up to 1995 come to 554.

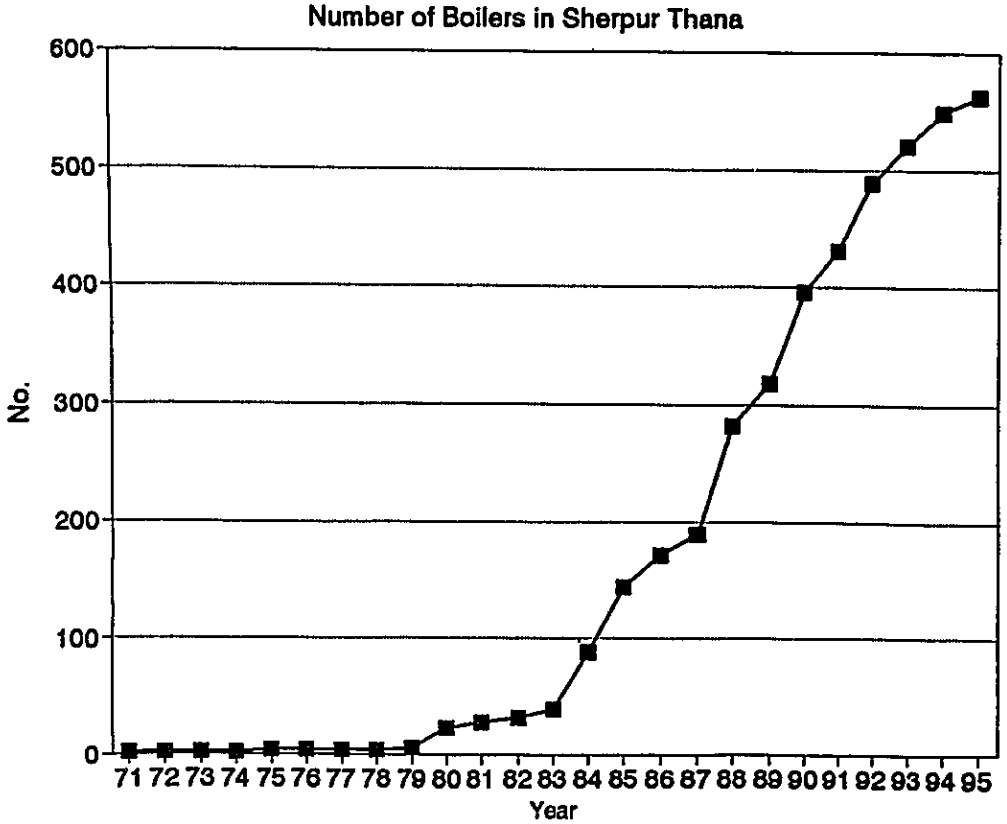

Figure-1 Increase of Steam Boilers for Parboiling Paddy in Sherpur Thana

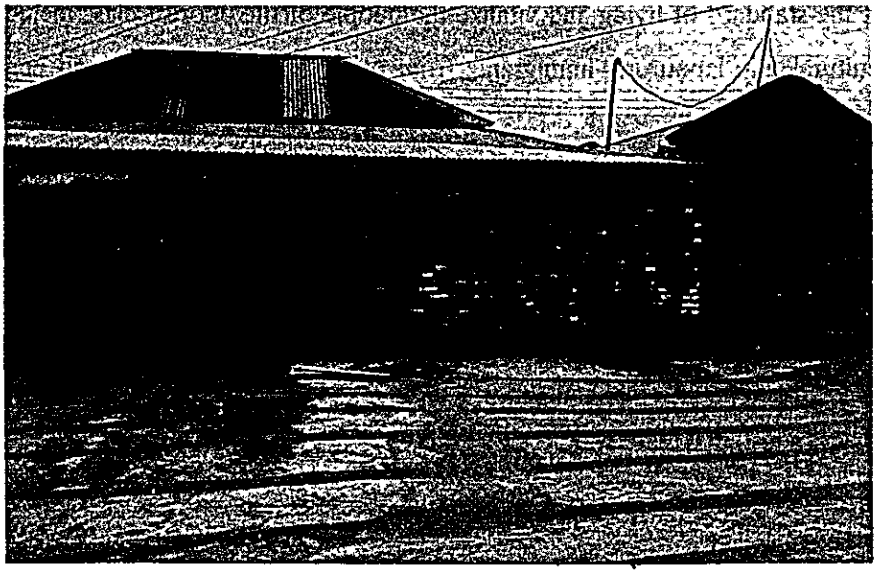

Photo - 1 The Drying-floor for Steam Parboiling and Rice Mill adjacent to Sherpur *Pourashava*

Their owners and employees are almost middle-class farmers, sometimes comparatively poor farmers who have migrated from adjacent flood prone area, i.e. Kajpur (118), Shariakandi (193), Dhunot (169) and Sherpur (48) Thana. The main reasons are that such people sought job opportunities at Barind area as an internal factor, and as an outer factor, they lost their land property owing to the recent Jumna (Brahmaputra) river erosion. On the top of that almost half of their employees (48%) are rural women. Its symptom is quit peculiar in such conservative rural area. Newly developed granary of Bangladesh, Barind Track, is surely changing not only agricultural structure but also their traditional life style and job structure.

What kind of pictures of the Barind Tract for the future can we draw in the horizon of this ubiquitous rapidly commercializing rice cultivation? In search of an answer to partially reply to this question we have implemented an action research project in Aira, a typical village in the Barind Tract.

1.2 Basic Strategy of Action Programme

In 1992 JSRDE started work in Aira with some basic strategy for action programme. The basic consideration taken in the beginning of the action research are the following :

1) Uplift the standard of living and vitalize the people of the poorest class including landless agricultural day labourers, immigrants from other villages, Hindus, and neglected rural women.
2) Institution building for effectively vitalise economic activities in this very conservative and backward village.
3) Take from very beginning of the project an external stance, or "out-reach approach" to minimise the influence of the presence of JSRDE.
4) All decision and actual implementation will be made by the Village Committee (VC) of the villagers own, and JSRDE's role or function is limited to giving them advice and some technical and financial assistance.

1.3 Physiology of Bogra District

Bogra is a low-lying plain district intersected by numerous canals and tributaries of Jumna. Both the eastern and western parts of the district marked a clear contrast in terms of their respective geomorphologic condition. The soil, locally known as *khiar,* is a hard, compact clay, resting on sand, and of reddish colour, thus presenting some of the characteristics of the old Tertiary formation of western districts of Bengal.

During the dry season it becomes a very sticky mud and during winter it becomes too hard. Such conditions hampers the traffic communication both in the rainy and dry season. In the rainy season Barind Track become completely isolated and people can reach only on foot. Even the traffic of rickshaw is impossible to ply on such a muddy and slippery road conditions. Dry season communication is fairly well for walking or rickshaw, but, in turn, the trail of unrepaired road also hampers the car and bull cart traffic. Photo-2 shows us the typical scenery of Barind road condition.

The difference can also be seen in their respective hydrological situation where the *khiar* is above flood level, on the other hand, the *poli* is sometimes overflowed by the rivers. Bogra shares the water resource from the Atrai tributary system through the Jumuna consisting of the Phulijhur, Karatoya, Nagar, and Halhala river etc.

Photo - 2 Road Condition of Barind Track in the Dry Season

1.4 Physical Characteristics of the Barind Tract

Barind Tract presents a peculiar soil formation in northern Bangladesh. Reddish Barind soil in the dry season, which used to be fallow or under extensive cattle grazing, where *aman* [winter rice] paddy was cropped.

The typical landscape typical of Level Barind in northern part of Bangladesh is as follows: there is little difference in elevation between paddy fields and the homesteads; consequently, the field never flooded during the rainy season. Rice farming is the only enterprise from time immemorial. Livestock like cattle, goat, sheep, poultry, duck are relatively minor sources of income for villagers. Single rice crop (*aman*) and subsistence peasant farming was dominant feature in the rainy season under above environmental condition before 1960s. But such a situation had abruptly changed by the introduction of small scale irrigation, i.e , STW = Shallow tubewell and DTW = Deep tubewell, just after liberation of Bangladesh. In consequence, dry season rice (*boro*) production was widely grown and the cropping intensity in this area drastically changed more than 200%.

1.5 Development of Sherpur

Sherpur, located beside the Karotoya River, occupies an important position in the history of medieval period. Sher Shah (1539-1545.), the Afgan ruler, built some forts around here. Ac-

cording to Ain-I-Akbari Raja Mansingha(1594-1606), the Mughal Governor of Bengal, built a mud fort at Sherpur which he called Salimnagar is honour of Salim. Later Sherpur continued to be so important that it appeared in the Map of Bengal prepared by Van den Broucke, a Dutch trader who visited Bengal in 1660. But this fort is not traceable now. The numerous brickbats and pot-shads on the bank of the Karatoya River reminds the once-busy life of Sherpur. Historical relics may also be traced in several mosques built in 16th and 17th centuries by local people though they are in a dilapidated condition.

Sherpur underwent important changes during the colonial rule. Under the operation of the Permanent Settlement it became exclusive property of the Rajas of Natore. During this period some principal landlords' family were found to have been living there, of whom, the Giri Gosains, the Sandyals and the Munshi families are worth mentioning.

The implication of the location of Sherpur is that, first of all, is situated on the boundary of two types of physiographic tracts, the eastern portion is the floodplain of Karatoya-Jumuna, and western portion is the Barind Track. In addition, when the Karatoya River was more mighty in old times, it flourished as one of the important river port. Paddy, jute, mustard and some *rabi* crops were shipped to Dacca (Dhaka) by country boats. But its priority was lost by the shrinking the width of Karatoya River. Furthermore, the Dhalk-Rangpur highway construction and the development of car transportation deprived the function of river port almost completely. In the course of 1970s to early 1980s, Sherpur remained stagnant and was known as a mere crossing point of highway.

The population data of Sherpur are available from 1888 to the present by every Census (Table-1). In 1876 municipality was first created in the centre of old Sherpur. It is very old in such small towns. Though the old tract of Sherpur is not so active now, Hindu population are still comparatively dominant, who were direct descendants of big landlords, merchants, goldsmiths and pottery or yoghurt makers. On the other hand, Muslim population are mainly newly migrants from neighbourhood, flood-prone Thanas and India etc. They reside along the highway and do their various businesses related agriculture and miscellaneous services. Rapid population increase is seen in the last ten years, specially late 1980 onward to present. Such a situa-

tion indicates clear contrast with Bogra *pourashava* which developed along with the construction of railway and the administrative cum commercial centre of Bogra district.

Table - 1 Population Change of Sherpur and Bogra *Pourashava*

Year	Sherpur	Bogra
1872		5,872
1881	3,967	6,179
1891	3,937	6,584
1901	4,104	7,094
1911	4,088	9,113
1921	3,984	12,322
1931	4,279	14,319
1941	5,145	21,681
1951	4,267	25,302
1961	4,812	33,784
1974	7,233	47,154
1981	10,987	62,105
1987	11,754	125,000
1991	17,000*	130,000*

N.B. * indicates the last three numbers are round figures.

1.6. Characteristics of Village (*Mouza*) in Barind Track

Both the Barind and the floodplain areas of Sherpur Thana present some interesting feature of the size and number of village and population settlement in terms of their respective location. Table-1 indicates such interesting development.

In the Unions of Barind Track the aggregation of village is relatively higher than the floodplain area, but the number of household residing in the Barind area is lower than the floodplain. On the other hand, the size of population is smaller than the villages of Barind area. This may be mainly attributed to low fertility and few organic matter of Barind soil induced by special historical geomorphologic condition. In Barind area source of water is limited to seasonal rainfall and ground water lifted by using tubewell, while the floodplain area is easily subjected to occasional flood. Probably in the floodplain area people slowly inhabited along with the Jumuna reclamation process. As a result, the outrun of field provided lucrative allurement to the population there by fresh impetus to congenial human settlement.

Table - 2 Population and Area per *Mouza* in Sherpur Union

Union, *Paurashava*	No. of *Mouza*	Area / *Mouza*	No. of H.H./*Mouza*	No. of population/ *Mouza*
Bhabanipur	28	323	98	525
Bishalpur	38	346	81	458
Kusumbi	35	285	93	488
Mirzapur	36	274	111	594
Barind average	***34.25***	***307***	***95.75***	***516.25***
Khanpur	10	729	326	1976
Garidaha*	23	284	156	890
Khamarkand	5	1,094	531	3115
Shimabari	21	149	135	773
Sughat	26	232	127	637
Floodplain average	***17***	***497.6***	***255***	***1478.2***
Sherpur *pourashava*	(3 ward)	759(253)	1,869(623)	11,161(3720)
Rural(*mouza*) total	222	72,451	28,869	161,075
Grand total	**222(3 ward)**	**73,210**	**30,738**	**172,236**

N.B. 1) Bhabanipur to Mirzapur Unions (fine mesh portion) and Sherpur *pourashava* are exclusively located on Level Barind, but, on the other hand, Khanpur to Sugaht Unions are almost located on Jumuna floodplain.

2) Garidaha Thana is mainly involved in floodplain, partly in Barind.

2. Aira Village at a Glance

2.1 Physical Setting of the Village

The village Aira is located in Mirzapur Union of Sherpur Thana under Bogra district. It is 7 km southwest from Sherpur and 27 km to the south of Bogra town (Figure-2). From Sherpur to Aira it takes about one and a half hour on foot and 40 minutes by rickshaw in the dry season, but in the rainy season muddy and slippery earth roads make the inter-village or village to town commutation very difficult even by any means of transportation.

There is no formal school in Aira, so that children were compelled to go to Uchrang primary / high school 4 km away. The nearest *hat* from Aira is Uchrang *hat*. Electric lines have not been installed yet in Aira. Considering these situation, it might be said that Aira villagers have got very few public services before JSRDE project

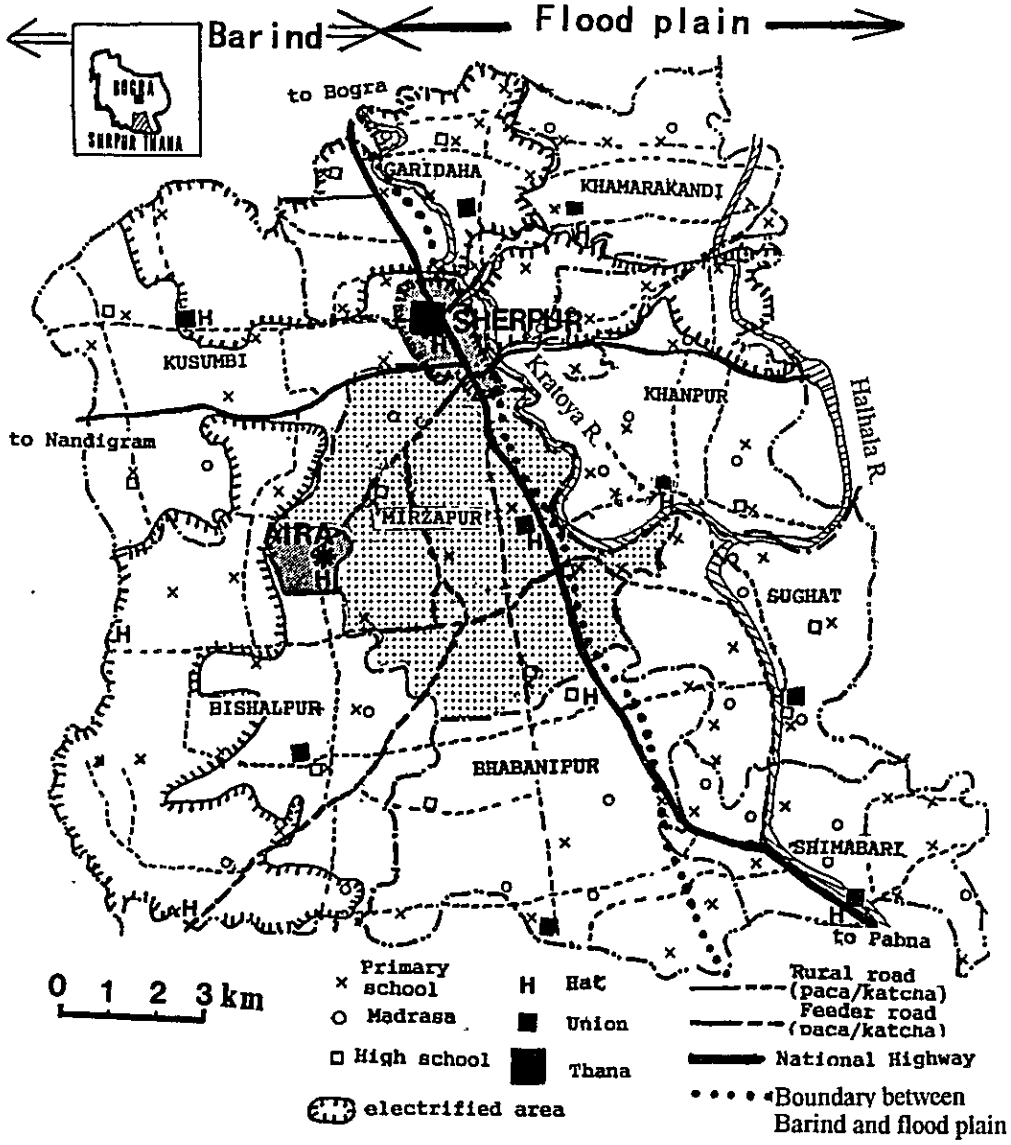

Figure - 2 Sherpur Thana and its Infrastructure

The bounded on the north by village Belta, on the east by village Knotta *para* and Bhair, on the west by village Panishara and on the south by Talta village. The only *kaccha* [earthen] road passes through the village straight on the north-western part near Shampur and ended at the south-western part of the village. Reaching inside the village we find many lanes and paths which connect *para* to *para* across households and areas of arable land.

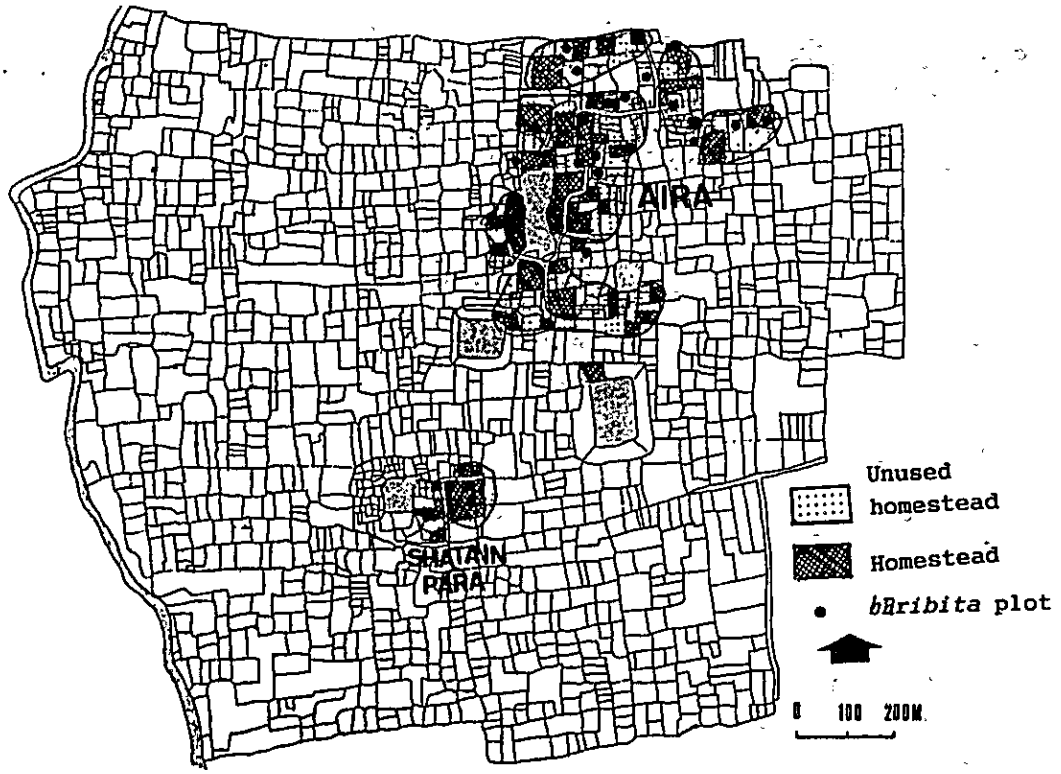

Figure - 3 Aira Village, its Homestead and Kitchen Garden (*Baribita*) Programme

This village is on the typical Level Barind Track called *khiar*. The village homesteads (*ghar bhiti*) lie about 50 cm higher on the average than the surrounding arable land. Invariably they are separable and well marked with the paddy/upland fields. On the homestead the houses are clearly noticeable as an independent identify of the households (Figure-3).

Bamboo groves are most common in the village. A few tanks of various sizes disperse in the elevated plain. In the middle of the village, there is a large size *dighi* constructed long ago by the local *zamindar*. The villages considered the *dighi* as a big fish treasury. Besides this *dighi*, there are two ponds of medium sizes in the *uttar* [north] *para*. The other two *paras* called Shatain and Kajlai *paras* are also surrounded each by middle-size old ponds.

2.2 Settlement and Residential Pattern

No reliable information about the early history of the growth and expansion of Aira village is available. The Revenue Survey done in the mid-19th century provides some lights on the characteristics of the village. It was proved by the Revenue Survey Map. Initially Aira and Shatain

para formed two different village, but later they were incorporated in a single village with the name of Aira.

The earlier history of the village may be evidently traced *Thakbast* Survey of 1860. It seems that Aira and Shatain villages flourished in the beginning of 19th century. The village is now divided into some areas which derived name mostly from occupational status. Some of the name of the *para* changed with the change of residential pattern. The Shaha *para* which was mostly inhabited by the Shahas [business caste], now called as *uttar para* (North *para*) and similarly earlier *mondal para* became Middle *para*. Besides this, *chamers bhita*, Kajlai and Shatain *para*, are present local divisions of the village. The residents of Hindu communities along with few Muslims used to reside in the *mondal para*, now middle *para*, and the *dighi para*.

Some hamlets are undoubtedly old, however, a large number of hamlets are 80-100 years old. The village is inhabited by heterogeneous population including small peasants, and landless labourers and majority of them are *matials, dhuli* [*palki gari* in bearers], *goala* [milkman] bamboo and cane workers and *chamars* [cobblers] of schedule caste and low caste Hindus.

After the partition of India in 1947 and consequent abolition of *zamindari* system in 1950, quite a good number of Hindu families e.g. the Shahs of Aira, a few families of Shatain *para* left the village for India leaving behind their landed property. These lands were later owned by local influential Muslims and gradually they became the proprietor under the operation of the East Bengal Tenancy Act of 1956. Among them the *pramanik* family of north *para* and *fakir* family of *dighi para* are noteworthy. Only the Hindu ryots of Kajlai *para* managed to maintain their position, yet they fell in an adverse situation. The deserted foundation of the Shahs and many of Shatain *para*'s Hindu families still visible, even though the earth heaps has been transformed into agricultural land called *bhiti* or *kachla* and used for growing transplanted *aman* paddy, potato, and other winter and summer vegetables in the village.

The village is predominantly inhabited by the Muslims (81.3%). The percentage of household by religion shows nearly the similar nature of distribution alike other parts of the country as a

whole to us (Table-3). However, the population of Hindu are a little bit more than the average of other neighbouring villages.

Table - 3 Number of Households by Religion

Religious group	Households	Percent (%)
Muslim	175	81.4
Hindu	40	18.6
Total	215	100.0

Source. JSRDE Census Survey 1995.

The residential area of the village are expanding every year, because almost every year new houses for dwelling were built due to the increasing population and it is followed resultant decrease of cultivable land available in the village. At present Aira is locally subdivided into seven *paras*, a kind of hamlet, and every *para* has somewhat a boundary of its own. The *para* may be described as a combination or clustered of houses, located in a particular place of one particular *paribar* [family] *gusti* [patrilineal] groups on the basis of occupation, though sometimes such families are absent.

Gustis are the most dominant social groups. In Aira 25 *gustis* in all are identified. Although only *Digi para* consists of one *gusti*, other *paras* consist several *gustis*. East *para* households are all migrants from neighbouring villages, so that they do not consist of *gusti*.. The number of houses per *para* varies 1 to 17, but its average is 5.5. Almost one *gusti* group resides within one or two *para*s. Five dominant Muslim *gustis*, three occupy in Middle *para*, the others respectively in North and *Dhigi para* (Figure-4).

The population settlement in *paras* in this village shows an exclusively homogenous pattern. The Muslims and the Hindus live completely separate in different *paras*, thereby manifesting some short of socio-religious seclusion in the rural areas. Both the Shatain *para* and Kajlai *para* are inhabited by the Hindus, while the rest of 5 *para*s are inhabited by the Muslims. The population in Shatain *para* are constituted mostly from the schedule and low castes Hindus. The highest concentration of population by religion is in Middle *para* where settlers are all Mus-

lims and the next largest population concentration is Shatain *para* where settlers are all Hindus. The reason for such a homogenous concentration of people in two different *paras* lies in fact that the Hindus were the original settlers and their settlement is relatively older than the Muslim settlement. Muslim settlement in this village is comparatively new and later increased their number of population owing to out-migration and natural increase. The location of the Mosque and temple in two different *paras* also resembles the traditional ideas of religious seclusion of the Hindus and the Muslims.

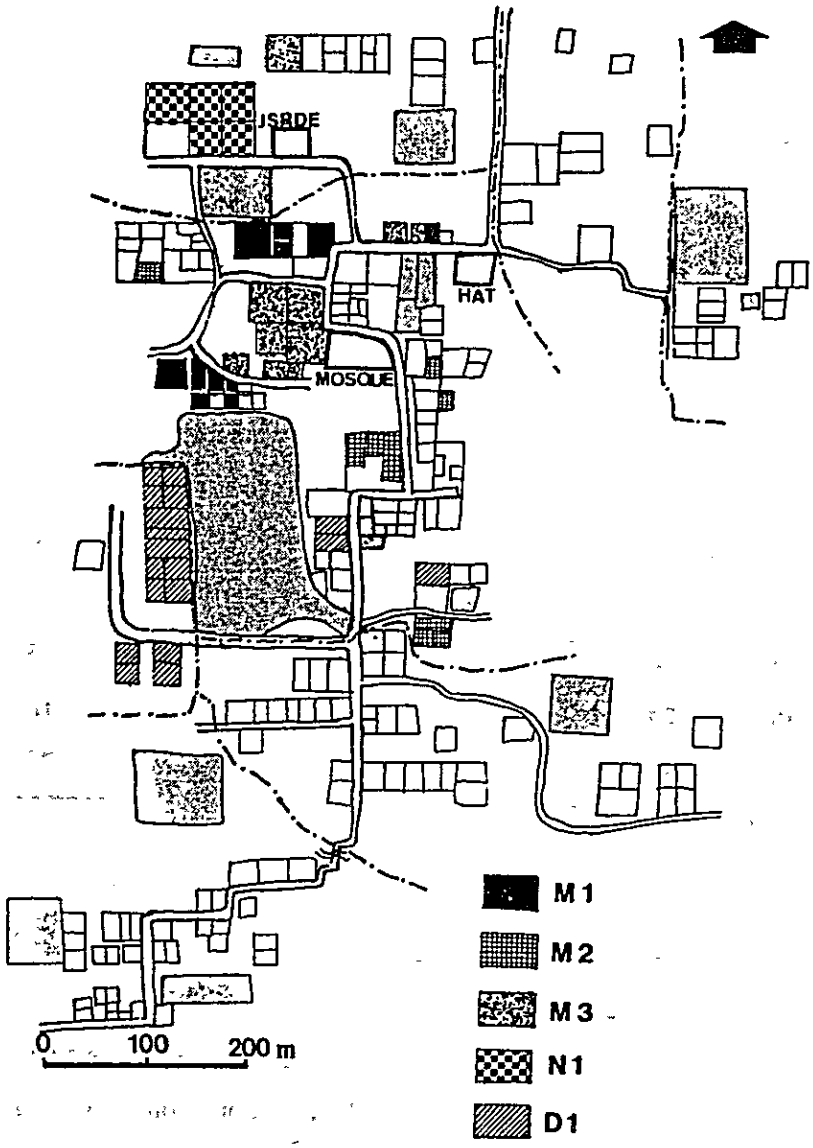

Figure - 4 Dominant *Gusti* Households

Table - 4 Distribution of Households by *Para* and *Gusti*

Para, gusti	Middle (M)	South (S)	*Digi* (D)	North (N)	East (E)	Kajlai (K)	Shatain (SH)	Total
Religion	Muslim	Muslim	Muslim	Muslim	Muslim	Hindu	Hindu	
M1	17							17
M2	7							7
M3	7		1					8
M4	8							8
M5	6							6
M7	8				1			9
M8	4							4
M9	5							5
M10	9							9
S1		12						12
S2		3	1					4
D1	2	1	14					17
E1								0
N1				5				5
K1						1		1
K2						3		3
K3						1		1
K4						2		2
K5						1		1
K6						1		1
SH1							2	2
SH2							3	3
SH3							5	5
SH4							1	1
SH5							2	2
Gusti	**73**	**16**	**15**	**6**	**1**	**9**	**13**	**133**
Non-*gusti*	**19**	**24**	**0**	**12**	**7**	**2**	**18**	**82**
Total	**91**	**40**	**12**	**18**	**8**	**11**	**29**	**215**

Source. JSRDE Census Survey 1995
N.B. M6 *gusti* disappeared because of out-migration.

2.3 Population and Occupation Structure

There is serious dearth of rural demographic data. The Census of 1951 only provides village level data, but all other censuses preceding and succeeding 1951 have maintained no such system. According to the East Pakistan Census of 1951 total population of Aira was 290 with a total household of 70 families.

The population distribution on the basis of age and sex in 1995 Survey is shown in the Figure-5. The total number of population is 902 which reflects high fertility rate. 25% of the total population are below 10 years old and 7% above 51 years old. Both are not expected as potential work force. The rest 68% are economic work force who are contributing directly or indirectly to rice production or processing due to the extension of HYV *boro* cultivation accompanied by STW & DTW irrigation system.

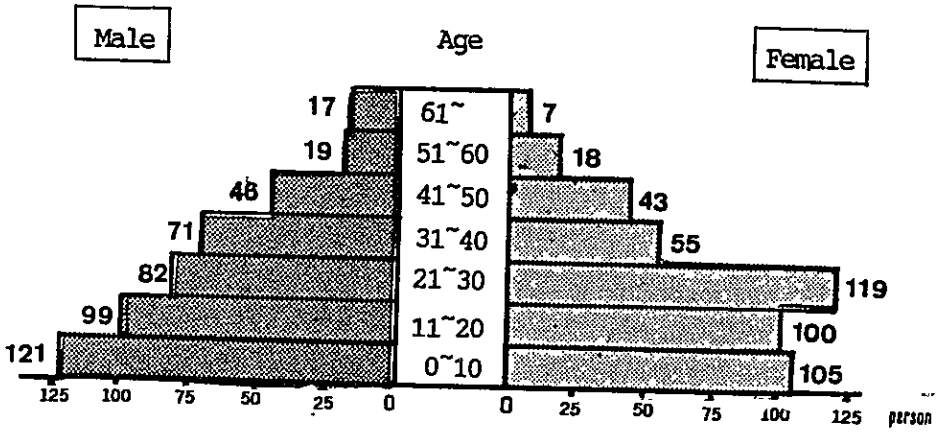

Figure - 5 Population Pyramid of Aira Village

Table - 5 Landholding Pattern in 1995

Land holding class (acre)	No. of household (%)	Landholding (acre)	Average land / household (acre)
0	34 (49)	-	-
0.01 - 0.49	98 (16)	12.9	0.13
0.50 - 0.99	20 (7)	15.3	0.76
1.00 - 2.49	29 (12)	49.2	1.59
2.50 - 9.99	15 (8)	54.2	3.61
Total	21.5 (100.0)	291.3	1.35

Source. JSRDE Census Survey 1995.

Rapid increase of households in turn decreases land-man ratio. It also led to drastic increase of agricultural labourers .Increase of population may be attributed to two important factors, first the trend of nuclear family organisation and second is the migration of population mainly from the Jumuna eroded floodplain area in search for job opportunities and shelter.

Most of the household heads are basically agriculturists. Nearly 65 (30%) households are engaged in agriculture, and 85 (40%) in day labourers (mainly agricultural labour). Business including self-employed jobs such as shop-keeping, rickshaw- and van-pulling and STW owner etc. also noticeable occupation. Professions like teaching, low-grade official persons who commute to town(s) , petty business, bamboo-work (Hindu) and beggars indicate interesting characteristics in the formation of demographic pattern. "No work" category includes women's or aged households (Table-6).

The total land of Aira *mouza* is 493 acres, out of which 291 acres are held by Aira villagers and rest 201 acres are owned by the adjacent villagers. It may be mentioned here that only 63(29%) households occupy 262 acres of land out of 291 acres.

Table - 6 Occupational Structure by Household Head and Landholding

《1992》

Land holding (acre)	Agriculture (%)	Day-labourer (%)	Business (%)	Service (%)	Others (%)	No work (%)	Total HH (%)
0	18 (18)	68 (66)	6 (6)	6 (6)	1 (1)	3 (3)	102 *(49)*
0.01-0.49	15 (44)	9 (26)	4 (12)	- (0)	1 (3)	5 (15)	34 *(16)*
0.50-0.99	8 (57)	4 (29)	- (0)	- (0)	- (0)	2 (14)	14 *(7)*
1.00-2.49	18 (72)	1 (4)	1 (4)	2 (8)	- (0)	3 (12)	25 *(12)*
2.50-4.99	13 (76)	- (0)	- (0)	3 (18)	- (0)	1 (6)	17 *(8)*
5.00-	14 (82)	- (0)	- (0)	2 (12)	- (0)	1 (6)	17 *(8)*
Total	86 *(41)*	82 *(39)*	11 *(15)*	8 *(4)*	7 *(4)*	15 *(7)*	209 *(100)*

《1995》

Land holding (acre)	Agriculture (%)	Day-labourer (%)	Business (%)	Service (%)	Others (%)	No work (%)	Total HH (%)
0	21 (62)	2 (6)	- (0)	6 (17)	5 (15)	- (0)	34 *(16)*
0.01-0.49	15 (15)	57 (58)	8 (8)	- (0)	9 (9)	9 (9)	98 *(46)*
0.50-0.99	5 (25)	6 (30)	2 (10)	1 (5)	2 (10)	4 (20)	20 *(9)*
1.00-2.49	20 (69)	1 (3)	3 (10)	2 (7)	3 (10)	- (0)	29 *(13)*
2.50-4.99	10 (67)	- (0)	- (0)	5 (33)	- (0)	- (0)	15 *(7)*
5.00-	15 *(79)*	- *(0)*	1 *(5)*	3 *(16)*	- *(0)*	- *(0)*	19 *(9)*
Total	65 *(30)*	85 *(40)*	18 *(8)*	11 *(5)*	20 *(9)*	18 *(8)*	215 *(10)*

Sources. JSRDE Census Survey 1992 and 1995
N.B. H.H. : Household head

2.4 Social Organisation

Looked at from sociological and development view point, the social organisation of the Aira village may be the focal point of discussion. The position of *gusti*, the kinship, status consciousness, the existence of factional groupings based on kinship lineage and its relation to the development of village community present a complex character of the rural sociology of Bangladesh.

The village influential e.g., the *matabbor*, the members of the union *parishad*, co-operatives, village level committees are invariably belonged to a close relationship of dominant *gustis* and maintained a good relations among themselves. The concept of *gustis* exists in the villagers which helps the *gusti* members to keep social integrity, reciprocal obligation and greater degree of psychological security. In maintaining such relations, sometimes the *gusti* relations go beyond the village itself by having migrated or on marriage with other distinct *gustis* of the nearby villages by which inter-village link developed. However, the inter-village organisation serves an important function in some cases of socio-economic matters of Aira as well.

2.5 Irrigation and New Economy

Hydrology played a very important factor in shaping the agricultural condition of Aira. The Barind Tract is well known for low rainfall and clayey condition and remained long under traditional agricultural operation. Being forced by natural soil condition, single cropping pattern became an important feature of the whole agricultural operation of Aira village. Now *aman* rice occupied 97 % of net cultivated area with some minor cropping of *aus*, *rabi* crops and jute *boro* was not at all practiced by the farmers. Such situation remained unaltered even during 1920s to 1940s.

Significant change in the cropping pattern occurred after the introduction of new technology in irrigation. Spectacular change begun to commence in the 1970s with the introduction of STW along with modern variety of rice, insecticides and fertilisers. In 1980s the traditional cropping pattern abruptly changed and *boro* rice became the most prominent crop which in earlier time was completely antiquated. The availability of water helped farmers to apply their own wisdom and in consequence earlier fallow lands were brought under cultivation.

Table - 7 Changes of Major Crops in Acreage and their Percentage in the Cropping Systems of Aira Village during 1920, 1983-84 and 1992-93

Year	Paddy			Jute	*Rabi* crop			
	Aman	*Boro*	*Aus*		*Khira*	Mustard	Wheat	Vegetable
1920-29	430	0	3	0	0	11	0	0
%[1]	(91)	(0)	(1)	(0)	(0)	(3)	(0)	(0)
1983-84	227	94	81	5	0	0	1	9
%[1]	(95)	(39)	(34)	(2)	(0)	(0)	(1)	(9)
1992-93	424	389	29	0	14	2	1	8
%[1]	(97)	(89)	(7)	(0)	(3)	(0.5)	(0.2)	(2)

Notes. 1) Percentage = Cropped acreage / net cultivated acreage in the village.
2) Figures in the parenthesis represents the percentage of the particular crop.

Sources.
1. Abdul Muyeed Chowdhury & Nasimul Ghani. *Land and Agricultural Statistics of Bogra District, 1920- 28*, (Published by Bogra Rural Development Academy, 1990).
2. Bangladesh Bureau of Statistics. *The Bangladesh Census of Agriculture and Livestock 1983-84, Zila Series, Bogra.*
3. Household Survey on Cropping Systems in Aira Village in 1992-93.

Replacement of *aman* and prominence of *boro* became an interesting phenomenon in this area during the period under review. In 1983-84, *boro* emerged as a new crop in Sherpur as well as in Aira. The installation of STW provided easy availability of water and being reinforced by this the farmers made most intensive use of land available to them. In addition to these, some HYV and modern variety of rice crop were practised by the farmers. In consequence, the traditional and stabilised cropping system underwent basic changes and thereby allowing a metamorphosis of the whole cropping system.

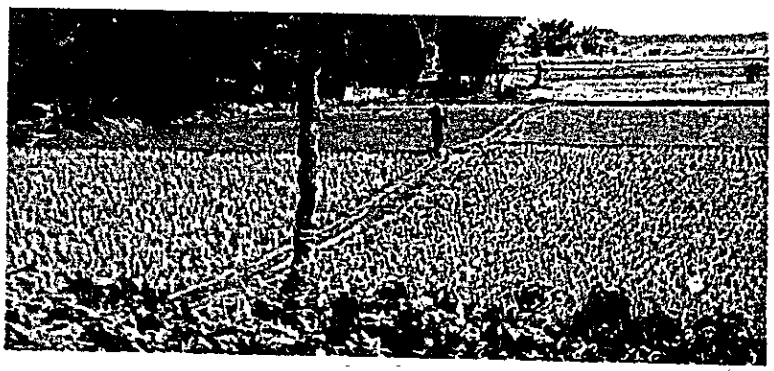

Photo - 3 STW Irrigation Creek and *Boro* Nursery Bed

Later both the demand of extensive and intensive water facility ultimately led to the rise of a new class of 'waterlords' in this area. Such situation, in fact, paved way to the introduction of new local tenancy system hitherto unknown to people. The new tenancy system operated as a localised form under old titles e.g., *Chaunia*, *Korani*, *Badli*, *Khaikhalashi* were re-introduced centering round modern irrigation facility through STW. Table-5 shows the chronological development of the new tenancy system in Aira village.

Figure-6 indicates the location of STWs and their command area in 1995. Though south-east portion of Aira is not command area, it is mainly owned by other villagers, who irrigate by their STWs. Considering all situation, almost all area of farmland except homestead (*baribita*) is irrigated by ground water and there *boro* is planted annually.

Table - 8 Increase Number of STW and Transformation of Land Tenancy System

Year	No. of STW	Type of land tenancy (acre)					Total (acre)
		Own	*Cnaunia*	*Korani*	*Badli*	*Khaikhalashi*	
1979	1		20.2				20.2
1980	3	8.8	39.2				48.0
1981	1	2.6	14.4				17.0
1982	1	2.3	7.7				10.0
1983	1	2.3	7.7	4.0			14.0
1984	4	8.4	28.5	30.1			67.0
1985	6	12.6	47.0	28.3			87.9
1986	6	12.6	47.0	28.3			87.9
1987	9	26.3	66.3	29.3			121.9
1988	12	40.4	69.0	36.0	1.6		147.0
1989	18	46.3	98.8	51.7	2.6	0.7	200.1
1990	25	83.9	126.8	58.6	3.7	2.8	275.8
1991	29	91.7	138.0	61.5	12.0	5.8	309.0
1992	37	100.0	142.5	78.8	20.6	8.8	350.7
Average	10.9	31.3	60.9	29.9	2.9	1.3	125.7
1995	43	-	-	-	-	-	-

Source. 1. Md. Rashid. *Development of Rice-Based Traditional Cropping Systems and Performance of Boro Rice Cultivation under STW Irrigation in Two Different Agro-Ecological Setting of North-West Bangladesh*, Unpublished M.A. Thesis, Kyoto University, 1994, p. 139.

2. Data of 1995 were collected by JSRDE field survey.

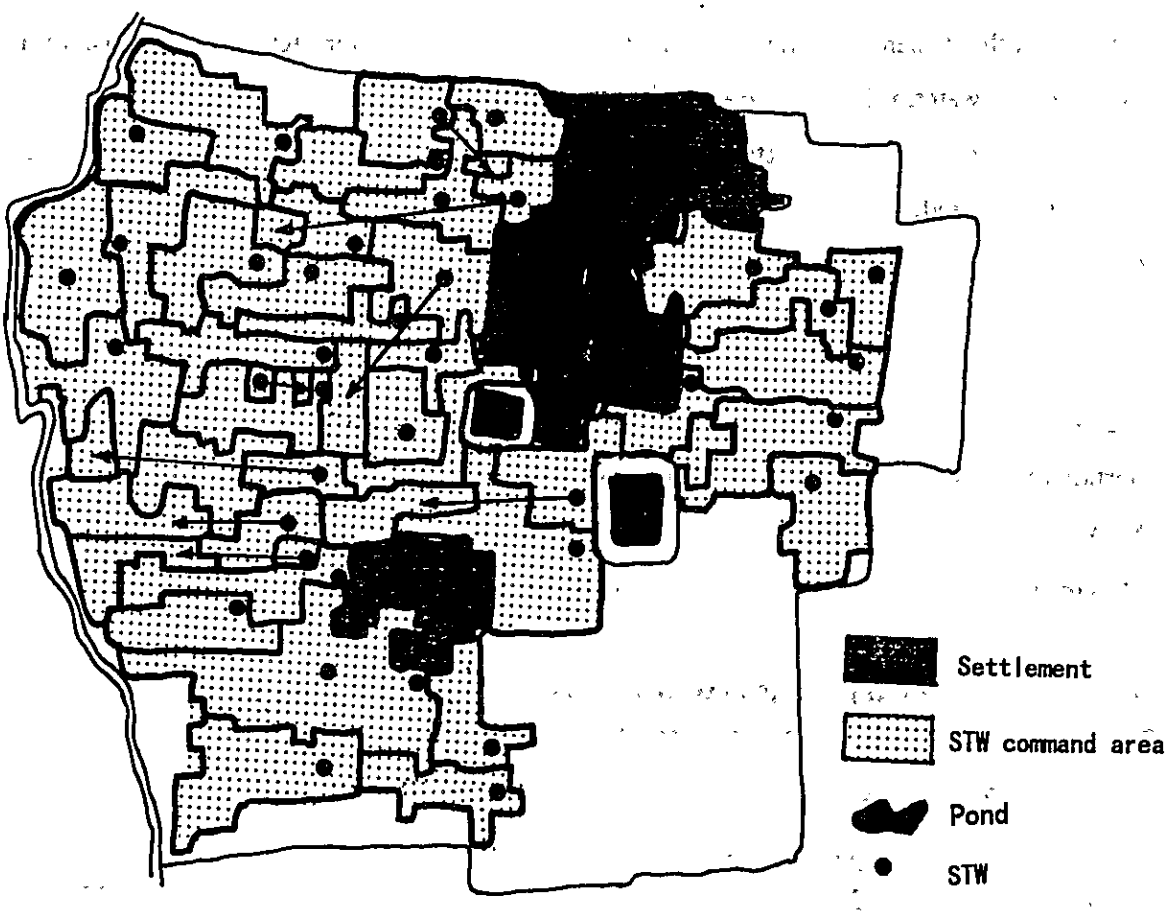

Figure -6 Shallow Tubewell Irrigation and its Command Area by Aira Villagers

2.6 Development Associations and its Loan Function

Compared with other villages, the Public and NGO associations at Aira are new in origin and few in number. All of them developed after the emergence of Bangladesh. Several self-prompted and NGO associations can be noticed in the village, though they are not strong enough to serve the community as a whole. Most of these institutions were sprung up by the encouragement of the NGO. The associations still active in Aira are Shapla V.D.P Club, Aira K.S.S., *Gramin* Bank, BRAC, RSEP. Curiously enough among them only Shapla V.D.P. Club is GO

The Aira *Ansar* V.D.P. Club was established in 1972 by the several young villagers who were members of the Village Defence party known as *Ansars*. The main function of this club is to

encourage development of sports and culture and thereby strengthen the unity of the villagers to face outside intrusion. The Aira *Ansar* V.D.P. Club faced some set-back by the sudden demise of its founder, but later it was rejuvenated by some village youths who changed its original name and renamed it as Aira Shapla V.D.P Club. The club has now 32 members with a savings Taka 5500 of their own mostly collected from their monthly subscription.

Aira *Krishak Samabaya Samiti* (Aira K.S.S.) was established in 1972 by the villagers as co-operative association. It encouraged savings, but it could made it no remarkable progress owing to dispute over the leadership in the association.

Gramin Bank was established in 1990 with objective of rural savings and under it encouragement an association of landless women was also established later. Loans have been given to the landless women by the *Gramin*. But loans became outstanding owing to the weak repaying capacity of the borrowers.

A similar association was also established in 1991 at Aira by the initiative of RESP representative taking 80 members of which 15 were males. The members joined in collective saving account. They have purchased a rickshaw-van out of their saving which is now being rented out to its members. The RESP donated a hand Tube-well for fetching drinking water of the villagers.

Among the NGO, the BRAC came at last. In response to public requirement it has opened up a school in the Aira village which adds new impetus for imparting education among the rural people.

One of important functions of these development associations is loan supplier. Table-9 shows us villagers' loan sources. Importance of Gramin Bank as loan sources has not changed for poor rulal women, however, villagers of ordinary or medium economic classes are inclined to loan from local money lenders steadily for agricultural purpose such as buying fertiliser and STW. Its interest is almost 10% to 18% monthly / yearly.

Table - 9 Villagers' Loan From Various Kinds of Sources

Unit. above: Taka; below:( )%

Year	Money lender	Gramin bank	Commercial bank	Youth club	Total	No. of debtor
1992	49,100	95,500	79,500	0	224,100	63
	(21.9)	(42.6)	(35.5)	(0)	(100.0)	(30%)
1993	62,900	276,500	38,000	500	377,900	44
	(16.6)	(73.2)	(10.1)	(0.1)	(100.0)	
1994	36,350	173,500	21,000	0	230,850	50
	(15.7)	(75.2)	(9.1)	(0.0)	(100.0)	
1995	150,900	58,000	16,500	11,500	236,900	44
	(28.0)	(24.5)	(700)	(4.8)	(100.0)	(20%)
Total	299,250	603,500	155,000	12,000	10,69,750	
	(28.0)	(56.4)	(14.5)	(1.1)	(100.0)	

2.7 Education and Family Planning

The literacy level of Aira is comparatively lower than some other neighbouring village. It is found to be 23% in 1992 based on the bench-mark survey of JSRDE, but recent survey(1995) shows an upward trend of about 28%, which is still below than the national average(35%). The important factors are as follows: Firstly, there is no mass educational institution and the children go to school nearby village, Uchrang 4km distance from Aira. Moreover, the villagers are traditionally conservative in nature and seldom they inspire their children to go to the school. Poor villagers are more prone to engage their children in economic purpose .

Under this circumstances, a BRAC school has started its function by the VC's endeavor in July 1993, which is not enough to cover the village. Besides Dhakhil *madrasha* is now under construction by the donation of villagers. The VC expects that the *madrasha* is going to start in January 1996 in spite of budget shortage. It may be fairly said that both local situation and economic condition are responsible for the weak educational progress in Aira village.

Though the villagers are aware of the family planning, but the services from the relevant departments in this regard are negligible and inadequate. There are 174 eligible couples of whom 138% are currently practising family planning. Out of these eligible couples, 8 have adopted permanent methods, namely tubectomy (5) and vasectomy (3).

3. Village Institution

3.1 Action Research Programmes

One of the important objectives the JSRDE project is to establish a village institution and a linkage system between a village and the local administration i.e. Union and Thana. Under this basic framework, encouragement of sustainable and environment-friendly farming technologies, and creation of off-farm job opportunities has been tired to implement by the VC. Table-10 summarises it with emphasis on inter-relationship.

Table - 10 List of the Action Programmes in Aira

Programme	Institution	Linkage	Technology	Off-farm	Period (M/Y)
Establishment of Village Committee	●●●	●●	●	●●	10.92-12.95
Village road repairing	●●●	●●		●	10.93-95.12
Construction of community room	●●●				4.92-12.95
Management of the VC	●●●	●●	●●	●●	11.92-12.95
Distribution of sanitary latrine	●				2.95- 6.95
Training of cooking and nutrition	●		●●		8.95- 10.95
Establishment informal school	●●				10.92- 6.93
Electrification	●	●●●	●●	●●	12.94-12.95
Editing Thana resource guide book	●●	●●	●	●●	7.93- 3.94
Holding Union co-ordination meeting	●●	●●●	●	●	8.95-12.95
Notice board announcement	●	●●	●	●	8.95-12.95
Diversification of crops	●		●●●		4.92-12.95
Introduction of indigenous potato variety	●		●●●		9.94-12.95
Kitchen gardening by poor women			●●●	●●●	4.92-12.95
Grafting useful tree plants			●●●	●	10.92-12.95
Innovation of good nurseries			●●●	●	10.92-12.95
Distribution of saplings			●●●	●	10.92-6.94
Pond pisciculture	●		●●	●●	7.94-12.95
Chicken rearing	●	●	●	●●	1.95-12.95
Duck rearing	●	●	●	●●	1.95-12.95
Sheep rearing	●	●	●	●●	4.94-12.95
Calf rearing	●	●	●	●●	1.95-12.95
Hat establishment	●●	●●	●	●●●	4.92-12.95
Madrasha construction	●●	●			4.92-12.95
Post office establishment	●	●●		●●	4.93-12.95
Loan and credit to poor villagers	●	●		●●●	9.95-12.95

N.B. ●: Limited relation; ●●: Medium relation; ●●●:Close relation

3.2 Rural Leadership

The elected members of the Union Council are the formal leaders of the village. Besides, there are some other categories of informal leaders who have command over some socio-economic affairs of the village. Traditional and local leader, *matabbor*, may be mentioned as such.. The members of the Union Councils are directly involved with any formal or informal affairs in the village, and they have some capacity to influence the villagers as well as other local leaders. These *matabbor* in some cases inherit leadership (*matabbor*) from their father.

But such a trend underwent changes keeping pace with time. At present informal leaders are mostly drawn from the young generation whose economic strength and opulence are the main factors which gave them command over the rural society. In Aira village some of them are not the original inhabitants, they migrated from other areas of Sherpur.

With the dismemberment of the *zamindary* system, rural leadership based on aristocracy, tended to decline. Now, rural leadership is based on individual ability. This might indicate that the villagers select their leaders on the basis of the ability of the leaders.

3.3. Organisation and Characteristics of the Village Committee

No definite principle was followed in the organisation of VC and the whole subject was left to villagers' option.. In November 1992, VC was formed in Aira to organise the villagers' self-help activities for rural development. It was hoped that the village committee would work as the main body for decision making and implementation of rural development activities.

Being the informal institution with formal membership system in a normal village setting it was supposed that the village committee members would act as the representatives of all the villagers. But the VC had neither any capital nor any credit facilities at that moment. Moreover, at the initial stage, the villagers were given neither conceptual nor operational guidance by the JSRDE project.

Leaving them in such a situation it was expected that an experimental village institution would be evolved representing all the villagers who belong to different socio-economic strata. Thus

the VC became an exclusively autonomous body and free from any operational controlled of the JSRDE project.

The VC is comprised of 19 members including 4 female members, who are all selected by the villagers. These female members do not attend meetings with their male counterparts but they hold separate meetings. The decisions of their meetings are communicated to the male members endorsed for further discussion and proper action by the VC. The meetings remain open of participation and any villagers have right to attend the meetings and join discussion.

Table - 11 Characteristics of Male Village Leaders

No.	Age	Education	*Gusti*	Land holding (acre)	Occupation	Village Committee
1	58	B.A.	N1	6.00	High school headmaster	Chairman
2	41	*Kamel*	M3	5.00	*Moulana* [muslim leader]	Vice-chairman
3	63	S.S.C.	N1	8.00	Agriculture, former primary school teacher	Secretary
4	36	H.S.C.	D1	0.55	Agriculture,. village doctor	Secretary
5	38	S.S.C.	K1	8.00	Agriculture	Member
6	38	B.A.	N1	1.00	High school teacher	Member
7	48	S.S.C.	M2	5.00	Agriculture	Member
8	68	-	S1	6.35	Agriculture	Member
9	52	Class-VI	M4	2.00	Agriculture	Member
10	53	S.S.C.	M1	7.00	Agriculture	Member
11	41	H.S.C.	D1	0.16	Agriculture	Member
12	38	Class-X	M1	8.00	Agriculture	Member
13	50	Class-V	D1	12.00	Agriculture	Member
14	50	-	M5	6.00	Agriculture	Member
15	39	Class-III	M2	0.00	Fishery	Member (died)
16	68	Class-VIII	H1	1.16	Agricultural labour	Member
17	32	Class-IX	M1	3.00	Agriculture	-
18	45	Class-V	D1	5.00	Agriculture	-
19	35	Class-X	M5	1.00	Agriculture	-
20	60	Class-IV	H1	4.00	Agriculture	-
21	35	-	H1	0.02	Agricultural labour	-
22	42	H.S.C.	K5	2.00	Agriculture	-

N.B. *Kamel* is equivalent to M.A.

S.S.C.: Secondary School Certificate; H.S.C.: Higher Secondary Certificate.

Curiously enough, the composition of Village Committee is very interesting and it exhibits villagers attitude towards state of things in the rural area. Most of the members of VC are selected from the so-called traditional village leaders, *matabbor*, who fall in at least two categories in the following five; (a) comparatively big land holder, (b) educated, (c) pious in religion, (d) belonging to dominant *gusti* and (e) eloquent. The chairman of the VC is high school headmaster in the adjacent village, Uchrang. A real nature of the organisation of Village Committee may be seen from Table-11 which shows the list of village leaders.

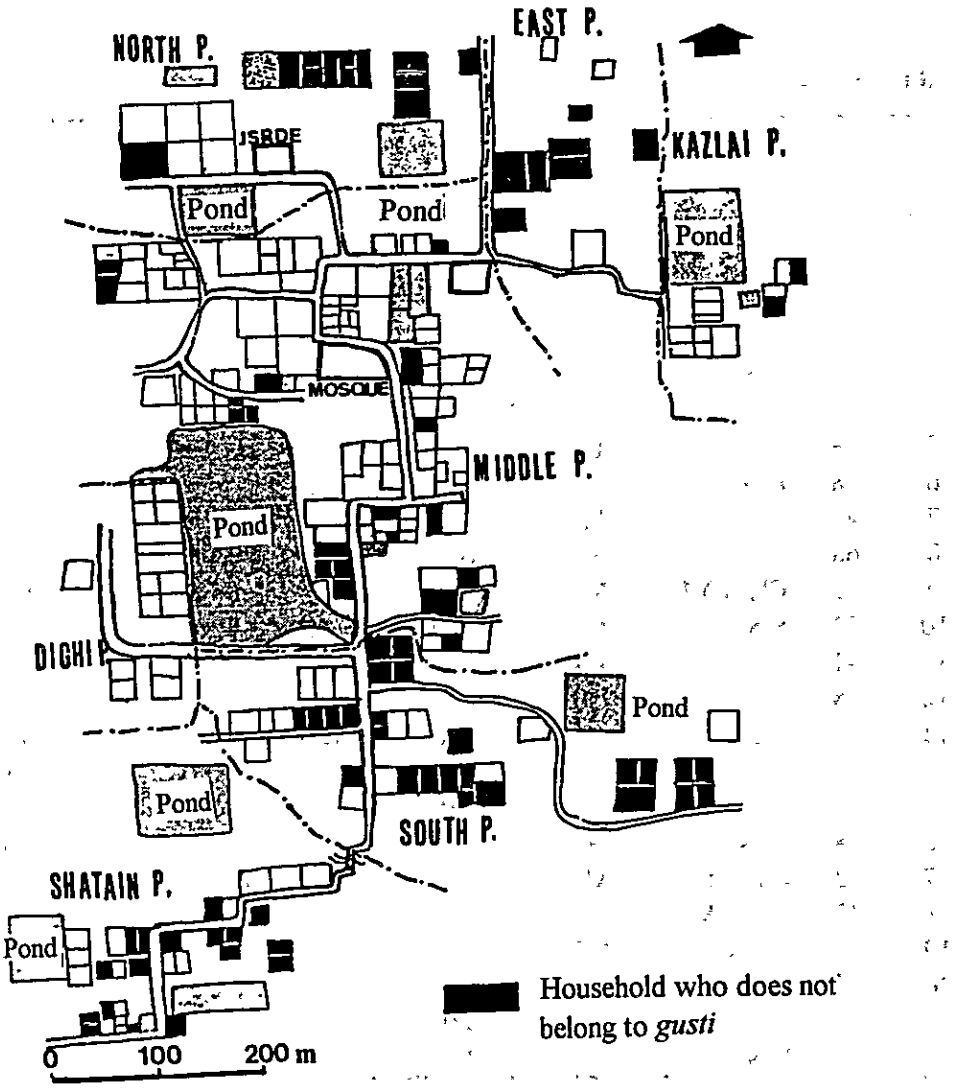

Figure - 7 Non-*gusti* Households

Unlike the floodplain villages of Bangladesh, house-yard compound groups (*bari*) are not well recognized at Aira. Because there is no clear physical boundary such as raised ground homestead. Although dominant gusti members generally form *matabbor,* recent conspicuous trend is the increase of non-gusti members (Figure-7) in the village and their power structure within the village can not be neglected. The immigrant initially occupied the vacant space in the periphery of the village located mainly around of Middle *para* or *Dhigi para,* particularly in South *para,* East *para* and North *para.*. Table-12 indicates the condition of migrants by the former/new resident place.

Table-12 Non-gusti Households Migration

In-migration (1992-95)

Place from where people came	Total No.	%		*Para*-wise No.					
			N	E	K	M	D	S	SH
Bogra District	**45**	**57**	**10**	**2**	**2**	**15**	**0**	**7**	**8**
Sherpur Thana	*37*	*45*	*9*	*2*	*2*	*12*	*0*	*4*	*8*
Dhunat Thana	*6*	*7*	*1*	*0*	*0*	*0*	*0*	*2*	*0*
Sadar Thana	*4*	*5*	*0*	*0*	*0*	*3*	*0*	*1*	*0*
Sirajganj District	**31**	**37**	**1**	**4**	**0**	**3**	**0**	**15**	**8**
Kajipur Thana	*20*	*24*	*0*	*3*	*0*	*3*	*0*	*13*	*1*
Other Thanas	*11*	*13*	*1*	*1*	*0*	*0*	*0*	*2*	*7*
Kurigram District	**2**	**2**	**1**	**0**	**0**	**1**	**0**	**0**	**0**
Unknown	3	4	0	1	0	1	0	1	0
Total	83	100	12	7	2	20	0	23	19

Out-migration (1992-95)

Place to where people went	Total No.	%		Para-wise No.					
			N	E	K	M	D	S	SH
India	3	30	0	0	0	0	0	0	3
Bogra District	1	10	0	0	0	1	0	0	0
Sirajganj District	3	30	0	1	0	0	0	1	1
Rangpur District	2	20	0	0	0	2	0	0	0
Unknown	1	10	0	0	0	0	0	1	0
Total	10	100	0	1	0	3	0	2	4

The interesting feature of this migration is that more than 45% immigrants come from flood-prone area, such as Kazipur Thana (Sirajganj District), Dhunat Thana (Bogra District) etc. River erosion of the Jumuna and job opportunity of Aira (mainly they start as agricultural labourers) are the two important factors of immigration. They are almost Muslims, but some are Hindus

who came there in search for *gusti* connections. In contrast, out-migration is done by Hindus, who sometimes go to India for better living condition.

3.3 Activities of the Village Committee

The committee members used to hold regular meetings on every alternate Friday afternoon and later the date was changed to every alternate Sunday. Of all 73 meetings were held up to November 1995. Table-13 indicates the results of monitoring the VC meetings.

Table - 13 Village Committee Member's Attendance and their Performance

No.	Designation	*Gusti*	Frequency of VC attendance		Frequency of opinion talked at VC	
			No.	%	No.	%
1	Chairman	N1	65	89	65	100
2	Vice-chairman	M3	73	59	37	86
3	Secretary	N1	58	79	42	87
4	Vice-Secretary	D1	48	67	42	87
5	Member	H1	17	23	9	52
6	Member	K1	28	38	6	21
7	Member	N1	42	57	16	38
8	Member	M2	54	74	41	76
9	Member	S1	23	31	6	26
10	Member	M4	47	64	19	40
11	Member	M1	46	64	29	63
12	Member	D1	59	81	32	54
13	Member	D1	18	24	4	22
14	Member	M1	42	57	16	38
15	Member *	M2	12	55	3	25
16	Member *	D1	42	81	34	81
(15+16)			54	74	37	68
Accumulated / average frequency of VC members (1)			663	9.1	438	6.0
Accumulated / average frequency of other than VC members (2)			888	12.1	64	0.9
Total (1) + (2)			1551	21.2	502	6.9
Total numbers of meeting			73	100.0	73	100.0

Source. Minutes of VC from the 1st to 73th meeting.
N.B. * No.16 replaced No.15 as VC member owing to his death in 1994.

Average numbers of VC member's attendance are 8.9 persons per meeting among total 15 member. Besides, average attendants of non-VC members are 12.1 per meeting. Therefore,

number of attendants in a meeting is 20 on an average including both VC and common villagers. It was observed by the impartial and non-participatory JSRDE members that in most cases the chairman, secretaries and two other members of the VC (No.8 and No.12) played an important role in generating opinion and also in taking final decision. In contrast, the participant other than VC members were not enough influential to comment and command over the meeting.

In order to have comprehensive view over the activities of VC and the proceedings of its meetings it is necessary to mention that some of the action plan formulated and accepted for administration in the village. Land procurement for *madrasha*, repair of village roads, establishment of local *hat*, improvement of livestock, distribution of livestock and poultry like calves, sheep, chicken and duck to the landless villagers as loan formed to be the most important objectives of development programmes undertaken by the VC in the beginning. It appears from the proceedings of the VC how they monitor all these development schemes.

Later the VC started distribution of loan from their own income, which is generated mostly from the sale of their cattle and poultry given as loan to the villagers. In order to subsidies on-farm and off-farm activities, specially petty shop business, the VC distributed loan of an amount 15,000 Taka to 17 persons with 5% monthly interest. In addition to this, the VC contemplates to buy a rickshaw and a rickshaw-van and further to give them as loan to rural poor, who will return the capital by instalments from their own income.

3.4 The Basic Characters of Village Committee

1) The VC was comprised mostly with the traditional village leaders and its membership was more or less evenly distributed over *gustis* which in turn made the informal body more effective.

2) Topics discussed in the VC meeting encompass two areas of life e.g., community and private concern.

The topics on their community interest include the followings: electrification, repair and construction of roads, construction of sanitary latrine, setting up a BRAC school, establishment

post office, purchase of a sports-ground of *madrasha*, establishment of a *hat*, utilisation of Union tax for village development works, construction of community room etc.

Issues of more or less private economic interest concern include: income generating activities, e.g., livestock improvement, kitchen garden vegetable production (*baribita* programme), tree plantation, poultry, duck rearing, calf rearing, sheep and goat rearing, pisciculture, nursery distribution, improvement of existing wild trees, banana & mango orchards, etc. for poor households.

3) Decisions were taken after general consultation of all the attendants in the meeting ,where, consent of members of the VC was always essential in all matters.

4) Income generation programmes always became the keen concern for the poor villagers. Being instituted as the villagers' own organisation for the welfare, the Village Committee tried its best to distribute such opportunities to the poor villagers, though it was insufficient as to the needs.

5) Women were not so active in meeting that and it was gradually suspended. Many factors were responsible for such situation. Neither rural women accustomed to hold frequent meetings and nor they are allowed to hold meetings regularly. The main reason is that they are so conservative in terms of their religious restriction to expose themselves to outside world.

6) The involvement of the VC in religious matter was a crucial because it affected every villagers. But it was found that the VC successfully handled the matter and purchased sports ground for *madrasha* by raising subscriptions in cash and in kind (land donation) from the villagers including the Hindus and even from Muslim patrons outside Aira. The VC tried its utmost to strengthen the linkage among the village, Union and Thana for various support and services from the Nation Building Departments(NBD). Representatives of the VC visited relevant departments of Thana and district level as shown Table-14.

Table - 14 Performance of Villager's Contact with Thana, Union, NGO and Others

No.	Month/ Year	No. of Villag-ers	Purpose	Place visited	Result
1.	1/94	2	Village road repairing	Union *parishad*	Not accepted
2.	1/94	1	Village road repairing	Union *parishad*	Accepted
3.	4/94	2	Cock exchange	Thana livestock Office , Sherpur	Failed
4.	8/94	2	Poultry vaccination	Thana livestock Office , Sherpur	Done
5.	8/94	1	Road repairing	Road and Highway Office, Sherpur	Considered
6.	1/95	4	Electrification, road construction	Member of parliament, met at Sherpur	Accepted
7.	2/95	3	Community room of VC construction	Sherpur pourashava	Brick price discounted
8.	3/95	2	Hand tube-well free distribution	Mirzapur Union *parishad*	Accepted
9.	3/95	1	Fertiliser purchase for *boro*	Mirzapur Union *parishad*	Failed
10.	3/95	1	Fertiliser purchase for *boro*	Mirzapur Union *parishad*	Done
11.	3/95	1	Fertiliser purchase for *boro*	Mirzapur Union *parishad*	Done
12.	3/95	1	Fertiliser purchase for *boro*	Mirzapur Union *parishad*	Done
13.	3/95	2	Electrification	Rural Electrification Board, Bogra	Given priority
14.	4/95	3	Electrification	Rural Electrification Board, Bogra	Given priority
15.	5/95	9	Electrification, road construction	State Minister of Finance, met at Sherpur	Accepted

3.5 Improvement of Hygienic and Sanitary Condition

The hygienic and sanitary condition in Aira was quite frustrating. According to JSRDE survey, only 31% of total households had *kaccha* [well built] latrines. To improve this situation, the VC took initiatives to create awareness among the villagers, especially to prevent infectious disease like dysentery, diarrhoea, skin diseases etc. The VC tried to make link with the Department of Public Health Engineering for installing rings and slabs in their own yard. As a result , 37 sets were distributed among the interested households during May 1995. The condition of distribution is that rings and slabs would be recovered by several instalments.

4. Linkage Mechanism between Aira Village and Local Administration

It is well known that the village is not a recognised unit in Bangladesh officially. Services of NBD(Nation Building Department) are provided in many cases at the Union level and sometimes at ward level created artificially by the Government at different times. Thus, at present the linkage established between the Aira village and the Union *parishad* and Thana *parishad* is poor owing to disadvantageous communication system. Because, the existing communication

system is not well enough to maintain strong linkage with different service delivery agencies of both NGOs and NBDs. The existing service delivery system of NBD is neither uniform, nor a net-work of such system is possible to develop in the given administrative and economic situation of the country.

Aira is poorly connected with the Mirzapur Union Parishad where some of the services are available (Table-15). Health, veterinary, education, co-operative and the like some other Government departmental services are available at the Union level. The road communication system with Sherpur is not sufficient for easy connection. Many of the personnel of the Nation Building Departments whose working fields are located at different wards of the Mirzapur Union, maintain contact with the people by daily commuting from Sherpur. The list given below may provide some hints about the availability of service delivery system of the NBD at the Union level.

Table - 15 List of NBD Field Workers of Mirzapur Union

	Designation	Sex	Department	Jurisdiction	Residence	Education	Assigned activity
1	Block Supervisor	M	Agriculture	Ward-1	Mirzapur*	S.S.C.,Dip	ASSP, advised consultation to farmers, survey report & demonstration
2	Block Supervisor	M	Agriculture	Ward-2	Mirzapur*	S.S.C.,Dip	
3	Block Supervisor	M	Agriculture	Ward-3	Mirzapur*	H.SC.,Dip	
4	Field Assistant Vaccination	M	Livestock	2 Unions	Gabtori, Bogra	H.S.C.	Branch office, vaccination, treatment, advice and consultation
5	Field Assistant AI	M	Livestock	6 Unions	Sherpur	H.SC.	AI centre AI advice & consultation Sherpur and Simabari Thana
6	Assistant FO	M	Fishery	Thana	Sherpur	B.Sc.	Loan advice, survey and inspection of fishing
7	Field Assistant	M	Health	Thana	Sherpur	B.A.	
8	Assistant HI	M	Health	Union	Sherpur	S.S.C.	Inspection UP's work co-ordination H.S C. & H.A.
9	Health Assistant	M	Health	Ward-1	Sherpur	H.S.C.	FPI, primary health care, advice & co-ordination
10	Health Assistant	M	Health	Ward-I &2	Sherpur	S.S.C	
11	Health Assistant	N	Health	Ward-2	Sherpur	H.S.C.	

(continued)

(continued)

12	Health Assistant	F	Health	Ward-2	Sherpur	H.S.C.	FPI, primary health care, advice & co-ordination
13	Health Assistant	M	Health	Ward-3	Sherpur	H.S C.	
14	FPI	M	Family Planning	Union	Bogra	B.A.	Inspection & Co-ordination
15	FWV	F	Family Planning	Union	Sherpur	S.S.C.	Satellite clinic, jig-gasha [question] promotion of family planning
16	FWV	F	Family Planning	Ward-1(6)	W-1		
17	FWV	F	Family Planning	Ward-1A(10)	W-1		
18	FWV	F	Family Planning	Ward-2A(3)	W-2		
19	FWV	F	Family Planning	Ward-2B(3)	W-2		
20	FWV	F	Family Planning	Ward-2C(5)	W-2		
21	FWV	F	Family Planning	Ward-3A(4)	W-3	Class-VIII	
22	FWV	F	Family Planning	Ward-3B(4)	W-3	Class-IX	
23	Union Social Worker	M	Social Welfare	2 Unions	Mirzapur	H.S.C.	Supervision of group loan(distribution & realisation)
24	Assistant Education Officer	M	Education	2 Unions	Sherpur	B A./ B.Ed.	School, school committee supervising
25	Mechanics	M	PHE	2 Unions	Sherpur	S.S.C.	Hand tubewell repairing, survey & consulting
26	Assistant Co-operative	F	Co-operative	5 Unions	Sherpur	B.A.	Auditing of government registered co-operative
27	Inspector	M	TCCA	Union	Mirzapur	S.S.C.	Supervision of co-operative loan (distribution & realisation)
28	Union Leader	M	VDP	Union	Mirzapur U.	S.S.C.	Tree plantation, FP, group forming, livestock, PHE, etc.
29	Union Leader	F	VDP	Union	Mirzapur U	Class-VIII	

N.B. Abbreviation of each columns are as follows:

1) Designation. FO: Fishery Officer; AI: Artificial Insemination; HI: Health Inspector; FPI: Family Planning Inspector; FWA: Family Welfare Visitor; FWA: Family Welfare Assistant
2) Sex. M: Male; F: Female
3) Department. PHE: Public Health Department
4) Residence. *indicates Union office quarter
5) Education. S S.C.: Secondary School Certificate; H.S.C.. Higher Secondary Certificate; Dip. Diploma course
6) Activity. UP: Union *parishad*; FPI: Family Planning Inspector

In such situation a few villagers have access to government service delivery system since the activities of the NBD at the local are confined to union. Services of NBD, as a rule, cannot infiltrate beyond that level. In the absence of adequate communication the Field Assistants of NBD find serious difficulty to work in the rural areas during the rains.

The VC emphasised the urgent need of greater co-operation and help from NBD's Field Assistants while implementing different development activities of JSRDE. They made several approaches to the Union *parishad* and also to the NBD at the Thana level but it failed no any tangible result.

To create public awareness in the village a "*Thana Resource Guide*" was prepared by the JSRDE in which facts regarding NBD's local service delivery system and its nature were included. Prepared in a brochure form it was distributed among the *matabbor* and the teachers of Aira and also to literate people of some surrounding villages. To ensure further progress in this line a co-ordination meeting was held at the Mirzapur union where members of NBD, a member of National Assembly and chief of RDA were present. The local heads of NBD assured more co-operation in service delivery system in future.

Photo - 4 Lecture on Food Nutrition and Hygiene by the Doctor of Thana Health Complex

5. Environmental Sustainable Farming Technologies

5.1 Sustainable Cropping Pattern

The soil of Aira is a typical Level Barind Tract and its fertility is relatively poor due to the low organic matter content (less than 1%) and cropping system is quite simple in comparison with floodplain one. For improving the cropping systems under such a condition, the JSRDE project has tested on the following two kinds of new patterns:

(a) Green manure (*Dhaincha*) — Transplant *aman* rice(MV) —*Boro* rice (MV)

(b) Pulse (chickpea) —Transplant *aus* rice—Transplant *aman* rice (LV)

These cropping patterns have been designed to improve soil fertility as well as to increase crop productivity. The beneficial effect of *Dhaincha* as green manure had been proved for a long time but due attention was not given to popularise the effect. These cropping patterns were also meant to utilise rainfall more efficiently and thus reducing groundwater extraction by STWs.

The former pattern brought about higher yield by 16% and higher gross return (29,795 Taka) than the prevailing cropping patterns. The net return was 22,740 Taka and benefit-cost ratio was found to be 4.22. The latter cropping pattern was designed for rainfed farming with only supplementary irrigation, so that it could reduce irrigation cost. Consequently farmer's net profit became 1.5 times larger than before.

These new trials challenge the prevailing cropping systems in the Barind Tract, which are so much commercialized and single-cropped to rice. The prevailing cropping pattern has become so simple and uniform that it is very vulnerable to abnormal climate and fluctuating rice price. On the contrary traditional cropping system in the floodplain was complicated, environment-adaptive, and sustainable so that risks could be avoided and minimised though the yield was relatively small as compared with modern systems. Such ambitious trial tried to reassess the advantage of the indigenous floodplain farming technologies in the Barind Tract. It also aims at improving daily food habit of the Barind villagers.

5.2 Kitchen Gardening (*Baribita* Programme)

There is comparatively large homestead land amounting to 9.15 decimal in Aira in 1992, of which 95% remain unused. On the other hand there is no land left fallow to allow vegetable cultivation in the main cultivable field as they are all occupied by rice throughout the year. Moreover, clayey soil of Level Barind is not suitable for growing vegetable because of poor drainage in the wet season and of scarce soil moisture available in the dry season. Consequently, villagers of Barind Track suffer from shortage of vegetable intake all year round.

In this connection, a kitchen garden programme in under-utilised homesteads was implemented as a means of providing nutritional balance to the villagers and of supplementing additional income for landless poor families. To utilise the homestead areas profitably seven demonstration plots were established during *kharif* and *rabi* seasons in 1993-94. Six kinds of vegetables were chosen to be cultivated in each plot in consultation with respective participating women, etc.

a) *lalshak, brinjal*, okra, data, Indian spinach and yard-long been.
b) radish, spinach, cabbage, carrot, tomato, cauliflower.

A plot was divided into six rows to plant the above vegetables. Adequate care to selected plots were taken by the respective beneficiaries. An appropriate amount of manure and cow-dung were dressed and mixed well with top soil at the time of land preparation and some additional organic manure were added to maintain proper soil physical properties and fertility.

No pesticide was used, however, indigenous and local vegetable strains were adopted as they are relatively pest resistant. Multiple and mixed cropping was applied partially for preventing pest outbreak. Related data including yield, amount of the products consumed at home, distributed to neighbours as gifts, and sold were recorded by the participant women with the help of JSRDE field assistants (Table-16).

Production in the both seasons was encouraging, with twice higher yield in the *kharif* season than the *rabi* season. Net economic return was found to be about 670 Taka per year per landless family on an average. Most of the products were so consumed at home that vegetable

Table - 16 Vegetable Production, Consumption and Sale from Kitchen Garden 1993-94)

Farm No.	Plot size (dec.)	*Karif* vegetable (kg)	*Robi* vegetable (kg)	Net consumption per day/head before project (g)	Net consumption per day/head after project (g)	Total consumption (kg)	Total gift (kg)	Total sale (kg)	Net income (Taka)
1	1.27	207	83	21	53	97	14	233	923
2	1.48	129	154	23	61	89	18	175	574
3	1.64	124	46	24	45	65	17	97	253
4	2.05	417	96	38	86	125	13	376	1856
5	1.15	104	19	15	28	41	8	75	325
6	1.43	292	0	29	149	190	70	32	78
7	1.50	221	79	25	70	101	23	165	668
Total	10.52	1494	477	175	492	708	163	1153	4677

intake per head daily increased from 24.6 grams to 70.2 grams, indicating significant improvement in nutritional intake, especially of vitamin and minerals. Moreover, considerable amount were given to neighbours free and close relations by the producers. Such reciprocal behaviour also contributes to alleviate subsistent poverty level.

Aira kitchen gardeners faced the following problems:

a) lack of water for irrigation during the dry season;

b) lack of availability of quality seeds in the local *hat*;

c) limited marketability of some vegetables;

d) damages by poultry birds, goats and sheep.

A short training course was given to the participants by a RDA staff prior to the implementation of this programme which proved to be very useful for them to gain confidence in this undertaking and to combat the above problems. The services of Block Supervisor could also be employed for giving a proper training at the initial stage in this type of programme.

Reinforced by the success of kitchen-gardening programme operated over a period of one year, 16 new kitchen gardens have started in the village spontaneously by the villagers, though the demonstration has provided strong encouragement.

Quite a large amount of vegetables were sold in the village, and were marketed at the newly established Aira *hat* by the participating women (Figure-8). Considering the conditions under which women's economic activities are discouraged, their active participation in the vegetable marketing should be patronised. This was indeed a break-through of the women's role in rural development in this village.

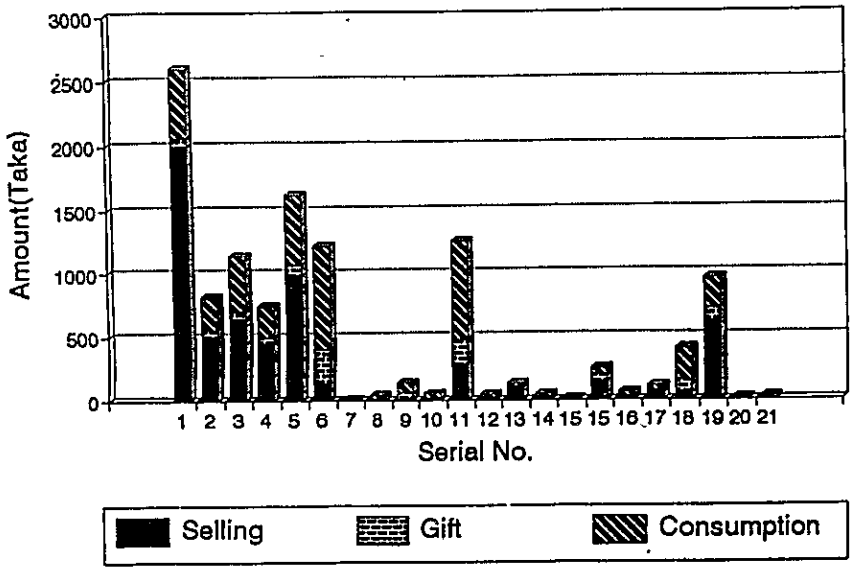

Figure - 8 Kitchen Gardening Performance by Twenty-two Rural Women

Photo - 5 Kitchen Gardening by Rural Poor Women

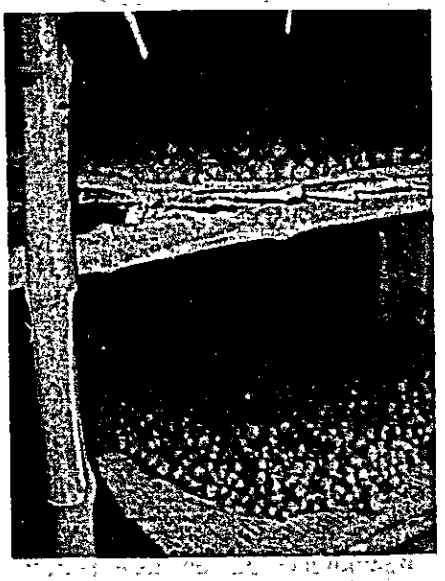

Photo-6 Preservation of Indigenous Potato

5.3 Pisciculture

From the beginning the VC emphasised on pisciculture through improved methods in order to utilise important potential food resources. Initially some young men of the village tried practised previously. The lease-holders participated in a week long training on modern pisciculture held in Bogra and they disseminated this techniques to other interested pond owners of the village and also to adjacent villagers

Photo - 7 Pisciculture in *Dighi* pond

Table - 17 Cost-Benefit of the Pisciculture in Village Ponds

Name of pond	Area (acre)	Expenditure(TK)		Income(TK)		Net income(TK)		Two-year net income*
		1994	1995	1994	1995	1994	1995	
1. *Dighi* pond	2.25	8,347	9,900	69,163	70,000	60,816	60,100	1,20,916
2. *Puran* pond	1.25	2,000	8,200	4,300	33,000	2,300	24,800	27,110
Total	3.5	10,347	18,100	73,473	1,03,00	63,126	84,900	1,48,026

N.B. * Taka

The result was more than they expected (Table-17). The success of commercial pisciculture has, in fact, not only encouraged individual pond holders of Aira, but also it inspired adjacent villagers to start fish culture by their own initiatives. Finally it helped the unemployed youth forces to generate new income for themselves.

5.4 Poultry and Duck Rearing

Traditionally, villagers rear hen, duck of local varieties in a small backyard space made of soil, wood and tin-plate. They usually feed chipped rice to poultry. But the production of egg was not satisfactory both in terms of size and number due to careless rearing, unbalanced feeding and local low-yielding varieties.

In this situation the VC collected improved varieties of poultry *(Fahomi* and *White Leghorn)*, duck (*Khaki Cambel*) from Bogra Livestock Office and BRAC in Bogra (Table-18). The VC distributed hen and cock to 40 landless farm households at reasonable price. They constitutes 18 % of total households, and their average landholding size is only 0.36 acre. Among them seven recipients overlap with sanitary latrine distribution programme (cf. **3.5**), no overlap can be noticed with kitchen gardening. It seemed that poultry/duck rearing programme is easier than kitchen gardening programme in terms of maintenance. From these remarks one general point becomes clear that such recipient's nature is different from innovative active women of kitchen gardening though they are in most case conservative and ordinary women but interested in income generation activities.

Table - 17 Characteristics of Chicken Rearing Households

Programme	No. of household who joined other than chicken rearing	Percentage(%)
Total of chicken rearing	40	17.9
Kitchen gardening	6	27.2
Sanitary latrine	7	19.4

Sources. Field Survey in 1995

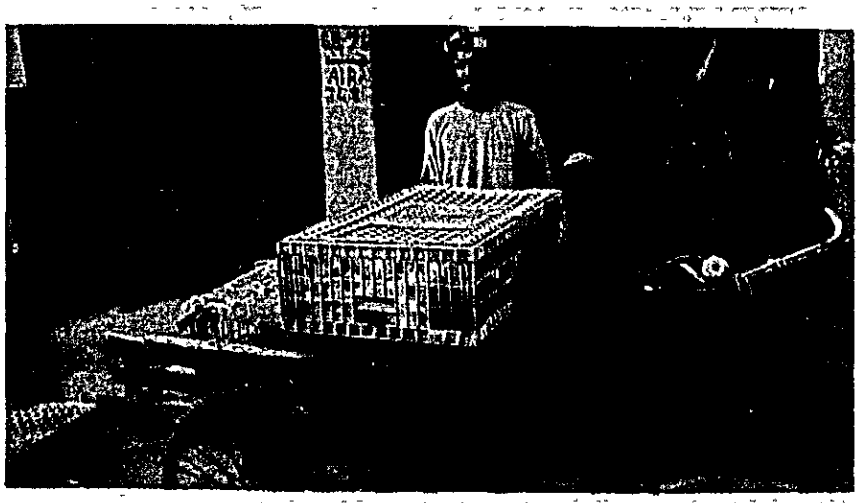

Photo -8 Distributing White Leghorn to Landless Families by theVC members

The VC distributed birds at 1/4 of purchased price as a down payment. It is hoped that the remaining 3/4 of price will be paid by the recipients during the period of egg laying by instalments . Most of the hens have already started to lay eggs. Considering the demands of other villagers, the VC is planning to buy more hens of improved varieties for distribution after the recovery of capital so invested.

In the same way the VC collected and distributed 86 duck of 3 month age to 15 landless farm families in March 1995. For this purpose, one day's training was organised in the village which was attended by the Poultry Development Officer of Bogra. The performance of *Khaki Cambel* (Thai variety) is quite satisfactory in respect of egg laying, diseases resistant and good free-rearing habits. However, the overall poultry and duck performances are shown in Table-18

Table - 19 Performance of Chicken and Duck Rearing by Landless Households

Variety of Chicken/ Duck	No. of recipient	Feeding status <1> (%)	<2> (%)	No. of distri-bution	No. of poultry laying eggs	Total eggs laid	Disease resistant status	Mortality rate (%)	Re-marks
White leghorn	15	90	10	107	18	378	poor	60	not suitable
Fahomi	25	98	2	140	62	930	good	25	suitable
Khaki Cambel	15	92	8	85	38	684	excellent	15	quite suitable

N.B. <1>: Free rearing, <2>:partial supplementary fed.

5.5 Sheep Rearing

To increase the income of the indigent families of Aira, the VC also started to rear sheep. An agreement was signed between the VC and the individual beneficiary. The condition of this agreement was that each recipient would return one sheep of the same age of the first birth. Accordingly 10 she-sheep of six-month-old were distributed among 10 impoverished women. The VC also arranged one day training on improved sheep rearing system for them. Later the recipients of sheep contacted the livestock department of Sherpur Thana for treatment and other usual services.

The sheep rearing programme initiated by the VC brought remarkable progress within one and a half year. The total number of sheep became 36 out of 10 original sheep so far distributed.

The recipients also returned 8 sheep (6 month old) to the VC. Subsequently the VC redistributed them to the another 7 indigent families which, in fact, popularized the idea of ship rearing.

5.6 Calf Rearing

Similarly 5 calves (local variety) also distributed to other 5 impoverished farm families for rearing and milking purpose in May 1995. Production of milk is a prospective job for poor women in this area. Sherpur is locally so famous for milk and *Doi* (yoghurt) by Hindu caste that vendors and hawkers walk around the neighbouring villages in search of fresh milk. This project will hopefully bring some economic help to the rural poor of Aira.

5.7 Tree Plantation Programme

Useful tree plantation programme was considered to be the prime importance both in national and global context since Barind Tract is facing with desertification. In this connection tree plantation was regarded essential as follows: firstly, natural vegetation conservation; secondly, a part of poverty alleviation through intensive fruit tree plantation around homestead settlement areas.

During 1994-95 Aira villagers grafted 485 seedlings in total, out of which 84% seedlings survived. This achievement was remarkable and it attained success from the point of planting and successive nursing.. On the contrary community tree plantation did not succeed due to lack of sufficient co-operation among villagers, shortage of enough space and reckless grazing of cattle.

Most of the planted fruit trees were grafted and hence started bearing fruits, such as mango, guava, pomegranate, jujube lemon, etc. Women earned some cash income by selling excess fruits after home-consumption. Additionally most of seedlings were purchased from two village nurseries maintained by active farmers (Photo-9). This success induced neighbouring villagers who expressed keen interest for collecting seedlings from the Aira nurseries. Figure-10 shows a typical sample of tree plantation and the layout of homestead. This space was used exclusively by one *bari* group. Even conservative rural women can make themselves at home here.

Photo -9 Nursery Bed of Useful Trees and Vegetables by Active Farmer

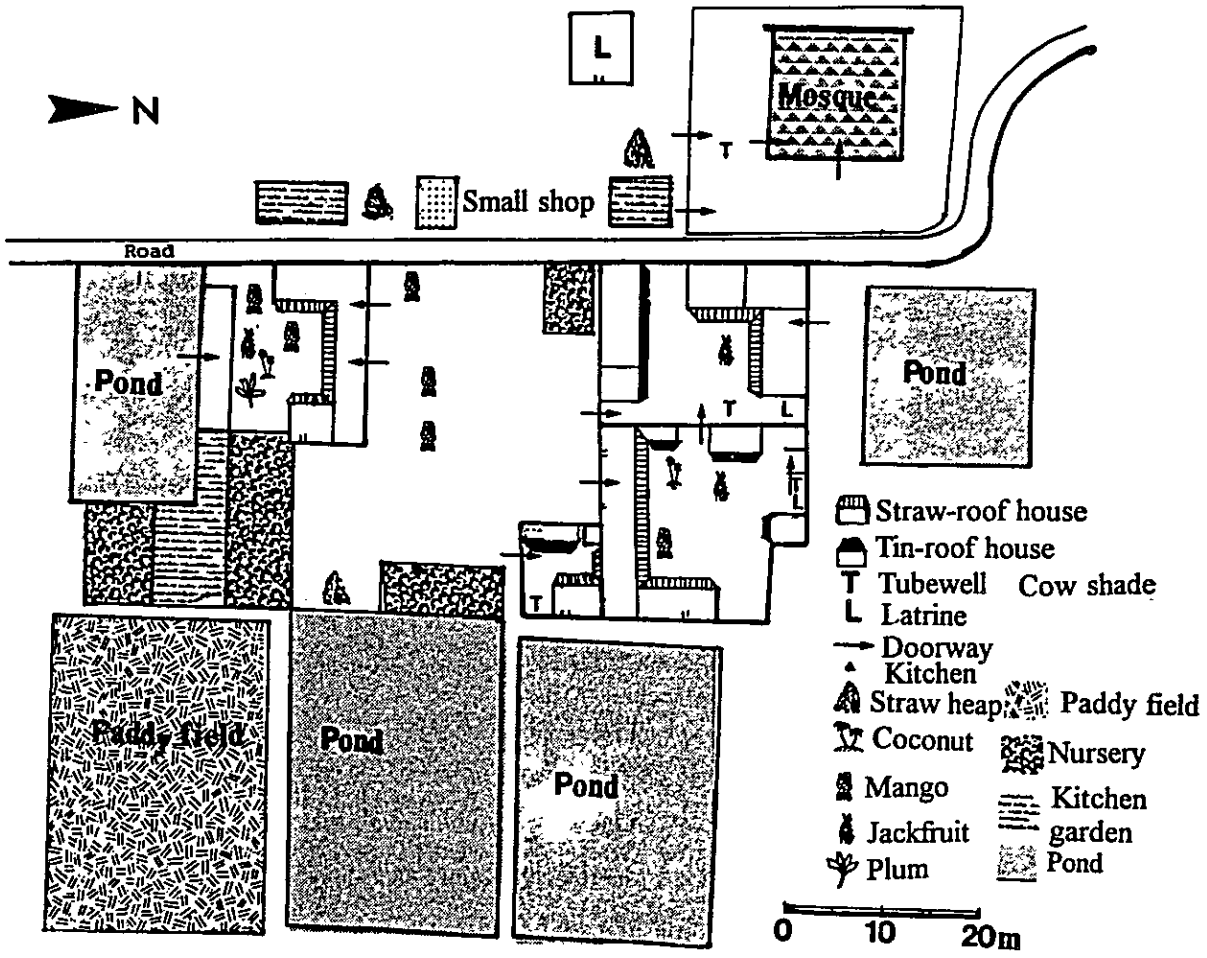

Figure - 9 Typical Layout of Homestead and Tree Plantation at Middle *Para*

5.8 Agricultural Technology Training and Transfer Mechanism

Several training courses for the villagers were arranged by JSRDE project, where Thana Agricultural Office and in co-operation with Bangladesh Research Institute, Bogra and RDA (Table-20).

Table - 20 Group Training and its Impact Organised by the VC

Date	Name of training	Participant	Cost (Taka)	Lecturer	Impact
13-04-93	HYV *aus* (BR-12, BR-14) cultivation	36	1500	2	Most farmers cultivated this rice.
09-11-93	Kitchen gardening	41	2000	2	First started 7 women, then increased to 13.
29-04-94	HYV *aus* (BR-7, BR-26) cultivation	40	2000	2	Many villagers cultivated this varieties. BR-26 brought a satisfactory result.
11-05-94	Sheep rearing	12	500	2	Some people started indivisually.
06-06-94	Kitchen gardening	34	1700	2	First started 7 women, then increased to 13.
07-06-94	Kitchen gardening	36	1000	2	
19-10-94	Potato cultivation	48	2100	2	Many people tried potato cultivation.
05-02-95	Poultry rearing	35	1200	1	Improved to rearing technique.
12-03-95	Potato harvesting	53	2100	3	Learnt modern method.
26-03-95	Kitchen gardening and nutrition	55	2050	2	The Number of Participants increased 13 to 22.
26-09-95	Food nutrition and hygiene	90	3500	2	Women showed keen interest and gave their children vermifuges.

The VC provided stationery and some other logistic help. The training courses on potato and HYV *aus* cultivation were restricted only to male participants, but all the other courses were opened to all villagers. In addition to this training, two men were to sent to RDA through the VC for training on grafting, livestock and poultry rearing.

Agricultural extension services should play an important role. The ultimate goal is to motivate, educate and encourage farmers to adopt improved farming practices and to increase agricultural production and income. The dissemination of new technology also requires development of village level institutions and economically motivated groups.

Local institutions, particularly Union level are the essential vehicle because most of the farmers are small and individually unable to obtain services and support necessary for sustained agricultural development. Besides this, active farmers can easily procure support and services from NBD and they can play an important role in disseminating ideas among disadvantaged small farmers who form the majority of the whole farming community. It is not possible to establish any appreciable impact on production and income without the active of these small farmers.

Moreover, there exists a big gap between small farmers and the NBD. The small farmers need quick solution of their problems and supply of innovation by NBD. In this connection it is wise to work together with farmers, scientists and extension staff at the field level. Because farmers have much more knowledge of their environment and practical solutions. However, in addition to public sector, NGO's and private sector such as dealers of insecticides, fertiliser and seed, etc., can also play a vital role in spreading agricultural technology, particularly among small farmers. Nevertheless, the contributions of the NGO and individuals were not yet recognized properly. The JSRDE proposed priority of the private sector in dissemination of agricultural technology (Figure-10). Besides, NGO's are now engaged in rural development activities and a well coordinated extension of services seems to be very essential at this moment.

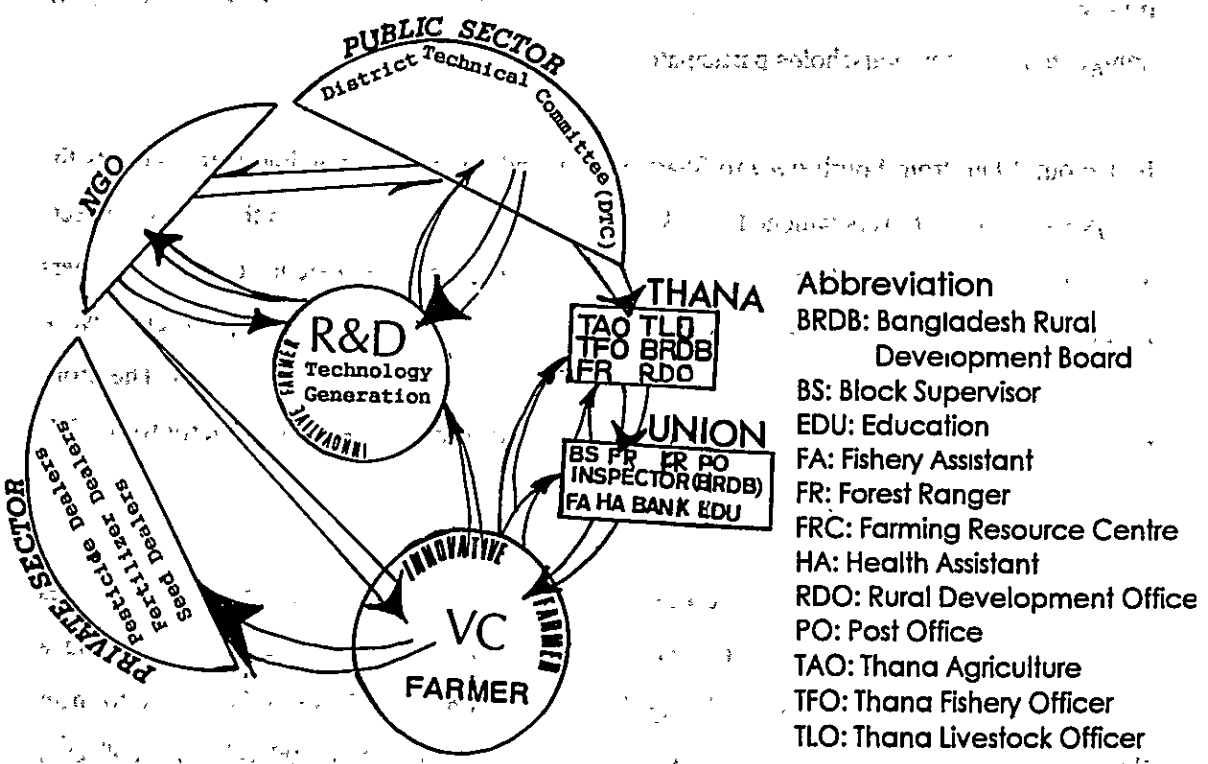

Figure -10 Integrated Farming Technology Transfer Mechanism

6. Small Infrastructure Development

6.1 Repairing of Village Roads

Most of the internal roads and foot paths of Aira were damaged due to poor maintenance. In the beginning the VC tried to utilize the Union *parishad* fund for repairing roads and paths which Later, the VC members decided to do the earthwork by themselves during the dry season from January to April 1994. Figure-11 shows the performance of road repairing. A total of 18 days were spent to do the earthwork involving the adjacent villagers. JSRDE provided 2 sets of culvert-rings and more than 20,000 cubic feet earthwork was done by the villagers' voluntary work. Total man-days spent amounted to 156, or 1,250 man-hours.

These voluntary earthwork, however, did not go so much smoothly as planned. Nearly two months elapsed without any noticeable progress after the starting of earth-filling at the end of January. This delay was partly due to *boro* harvesting. By early April only about 40% of the earthwork had been done, leaving a lot of work still to be done before the rainy season.

The VC tried to encourage the villagers to participate voluntary earthwork, but active participation remained limited. Although 84% of dominant *gusti* households participated, only 60% of non-*gusti* and Hindu households participated.

It is about 300m from South *para* to Shatain *para*, and one narrow winding path connects the two *para*s. If the path was widened, a rickshaw or a rickshaw-van could go through and miserable living condition communication will be improved to a great extent. The VC members proposed to construct a new wider road. Unfortunately at this moment the construction work has not started yet, mainly because the dispute over the property to be used for this. The property belongs to absentee landowners and they are disinclined to give their property to the VC voluntarily free of charge.

In contrast to this, the villagers were keen to express their solidarity for religious activities such as buying land for building *madrasha* and attached sports-ground, and building a new mosque. This issue was raised during the construction of *madrasa* in the village to meet the requirements for registration. For this purpose subscriptions of 20,000 Taka was collected

from 86 households and 0.52 acres of land was donated by 21 households (Table-20).

Table - 21 Donation for Construction of Madrasha Field

Religion, kinship group (*gusti*)	No. of HH	Money			Land		
		No. of HH	Amount (TK)	%	No. of HH	Area (acre)	Average amount on case base(TK)
Muslim	164	71	20,270	43	17	0.42	1,003
Non-gusti	*71*	*37*	*5,360*	*52*	-	-	*145*
Gusti	*93*	*34*	*15,360*	*37*	*17*	*0.42*	*1,318*
Hindu	39	13	796	33	-	-	61

N.B. 1) Modified K. Fjujita and K. Itagaki 's thesis. 'Rural Society and Development Administration in Bangladesh: With Special Reference to the Construction and Maintenance of Public Assets ', (in Japanese) . *Azia Keizai*,1996(in printing).
2) Price of 0.01 acre land is calculated @972 Taka.

It is certain that such voluntary earthwork is still non-existent in many villages of Bangladesh. The VC was requested to encourage such voluntary activities more and more in the village, though management, leadership, unity and allocation of works are important factors for any such successful work.

6.2 Establishment of Village *Hat*

In January 1993, about two months after of the organisation of VC, the possibility of establishment a hat in the village was discussed in a meeting and informal communication with the people of adjacent villagers was also started. At the end of April 1993 the committee decided to establish a hat in the village.

As the result, proposed *hat* was set up at the end of May 1993 semi-weekly . The *hat* is located in front of the sports-field of the *madrasha* in Aira village, which was donated by villagers. The location is not comparatively good and ideal, however, it serves villagers' primary needs. Because, there is no other *hat* within the radius of 5 km (see Figure-2).

6.3 Village Post Office

A local post office started at Middle *para* on 24th of May 1993. One influential man, who is Deputy Director of Water Development Board, the native house of his wife is located in Aira,

encouraged to the VC to establish in order to provide convenience of postal communication and increase villagers' savings. Three post office staff were appointed, i.e., one post master, one delivery runner, one peon. They are all villagers residing in Aira.

Up to October 1955, ten villagers are depositing, total amount 1681 Taka, average amount of deposit is 168 Taka. Though four women are included among ten depositors, postal savings is alleged to be inactive. The main obstacle are as follows: Firstly, it takes at least ten to twelve days to draw money after applying. Secondly, the educated and rich villagers are inclined to deposit at commercial banks in Sherpur because of convenience and reliability irrespective of lower interest compared with village postal savings.

7. Off-farm Activity

7.1. Impact of Village *Hat*

As for action programmes of Aira, direct off-farm income-generating activity is only the establishment of a *hat*. Nevertheless its impact on household economy is not very small. A large number of sellers appears in the *hat* as is shown in Figure-12 and -13. During the period from June 1993 to May 1994 the *hat* sat 41 times. A total of 1,588 persons came and sold vegetables and other daily necessities. Among them 59% were Aira villagers and 34% from neighbouring villages and the remaining 7% from other areas. It is interesting to note that 42% sellers sold their home-grown vegetables and other self-made products in the *hat*.

Initially, average number of sellers in the hat was more than 15. The *hat* is one of the smallest in size around Sherpur Thana. Later it is found that the number sellers and buyers decreased gradually and the following reasons may be attributed for this:

1) Easy access road to *hat* (and to village Aira) have not yet been improved.
2) The *hat* has not yet gained popularity among merchants and vendors in major growth centre, i.e., Sherpur.

However, in November 1994, a permanent tin-shade was built by the initiative of the VC. Voluntary labour was provided by villagers and some input such as timber, tin roofs and bricks

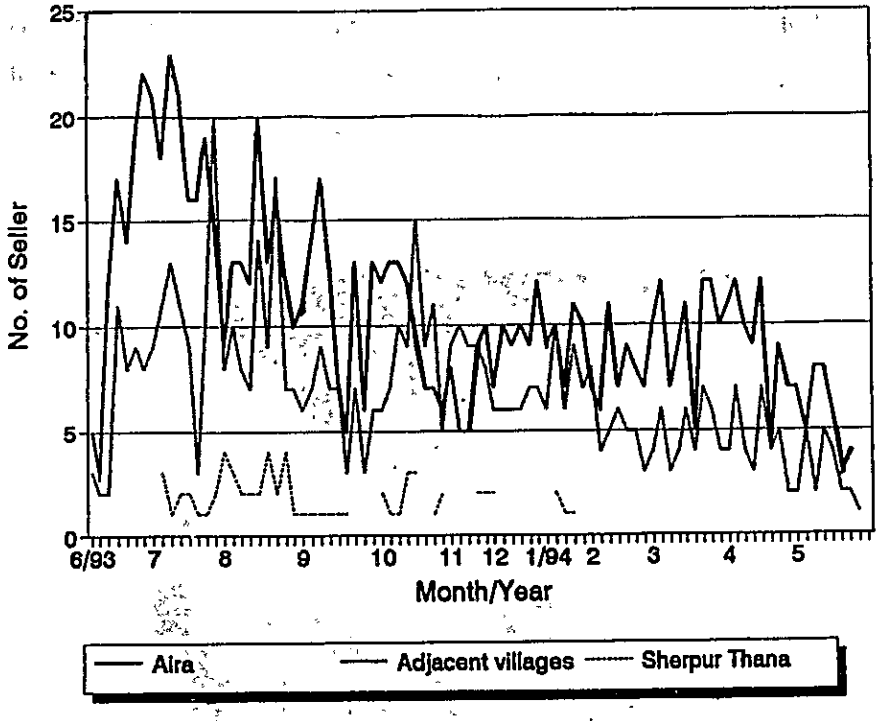

Figure - 12 The Number of Sellers from Aira and its Adjacent Areas

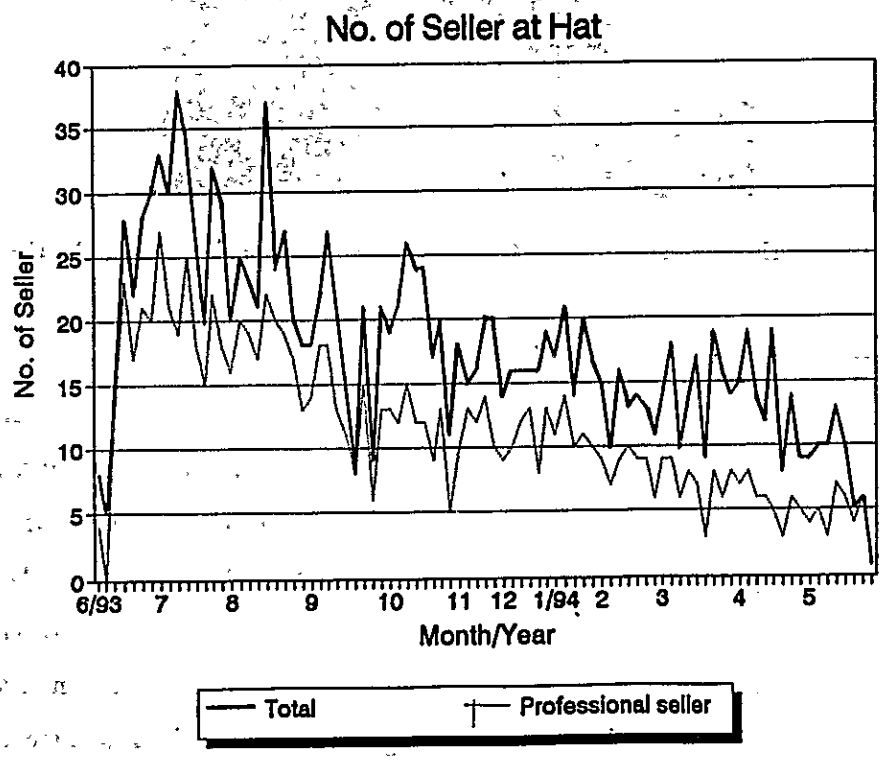

Figure - 13 The Number of Sellers at Aira *Hat* by their Attributes

supplied by JSRDE project. Beside hat place Community Room with tin roof was also constructed in November 1995 by the VC. These facilities will contribute not only to do off-farm activities like marketing but also to integrate villagers' solidarity in the future.

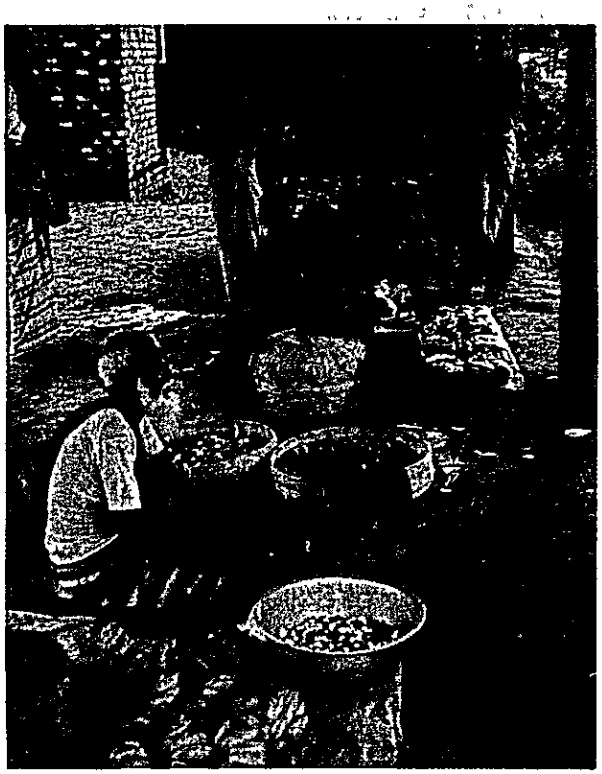

Photo -10 Village *Hat* and Petty Commodities Sellers in the *Madrasha* Ground

8. Observations and Conclusion

The project has assisted to develop a sense of mutual understanding among the villagers. The meeting of the Village Committee has created a forum for the villagers to interact regularly through identification of various problems and to think about their solutions. Some of the activities initiated through the project have created an urge among the villagers to solve various problems through joint efforts. They encompass from issues on environmentally sustainable farming technologies to creating off-farm activities for the poor. The interests can be sustained with necessary backup services and supports to bring about positive changes in the life of the villagers.

For sustainable developmental work, a sense of unity among the villagers is essentially required and the villagers should be encouraged to explore and exploit their own resources. In addition to mobilisation and utilisation of available local resources, the VC needs to provide more financial and technical support to take up feasible socio-economic activities specially for the poor. Though small loan programme to poor villagers by VC fund has just started at the end of project, is seemed to supplement bank, co-operative or informal loan popular in Aira village.

Among all other villages taken under JSRDE project, Aira offers some different experience in the context of project administration. The main object of this project is to help villagers to identify their problems and solve them in their way. The project tried economic development of landless villagers through the VC by generating new income from the resources of the village. It is found that poor women of Aira are keen and active on income generation for their own interest, but they have no sympathy to any common interest of the village. To ensure the participation of women the VC needs to look into the problems of women with deeper perspectives and to help them plan their programmes according to their needs and capabilities.

The dissemination of agricultural technologies are helpful to innovative farmers, and they are ready to contact with not only Government sector but also private sector including active NGO under such commercialised agriculture. The Village Committee can encourage these innovative farmers in their entrepreneurship.

Viewing the successful service delivery mechanism developed at Payagaich Union of Barura Thana, Comilla District, the same approach is now decided to implement at Mirzapur Union of Sherpur Thana. On 6th of November 1995, the first co-ordination meeting was inaugurated by the local member of Parliament (MP) Mr. Golam Mahammad Seroj as a chief guest, and Director General, RDA, Dr. Md. Solaiman was also present as special guest. Local Union Chairman chaired and relevant head of NBD attended. This meeting is planned be held once a month at Mirzapur Union. Since the number of village per Union in Barind area are more than other floodplain districts, so the trial of linkage seems to take more time. Nevertheless, Union chairman and all members of Aira VC feel positive way.

CHAPTER 4

JSRDE'S ALTERNATIVE APPROACH TO BANGLADESH RURAL DEVELOPMENT

In this Chapter we will summarize major findings from the respective villages and try to figure out our alternative approach to rural development in Bangladesh. First, major findings will be summarized according to, and in order of the four basic concepts of our studies. These are - village institution, the link between village community and local government, and our unique ideas regarding the use of indigenous technologies, and the promotion of job and income generation through infrastructure build-up to link villages with non-farm and off-farm sectors.

1. Village Committee: An Old but New Self-Governing Body Empowered to Lead Village Development

1.1. Two Village Institutions

"The village community in Bangladesh is elusive and invisible". Our basic concern is to make this notion opposite, that is, to make the village community visible and active in rural development.

Seeking the 'visible' village institution, the JSRDE tried to formulate firm village institutions in the respective experimental villages. Two different types of village institutions were actually formulated according to prevailing and antecedent conditions as well as preferences of the local people, which are as follows:

a) Village Committee consisting of *Gramer Matabbors* in three villages (Aira, Dakshin Chamuria and Panchkitta)

b) Village Cooperative with membership covering all households in two villages (Austodona and Phanishair)

1.2 The Village Committee

A *Gram*, which is normally recognized as a village, consists of several *Paras*, which is the

smallest and neighbourhood social unit and entity. In a *Gram*, an informal council of plural leaders, known as *Gramer Matabbor*s, exerts authority and leadership. The *Matabbor*s normally represent the respective *Para*s.

When an executive committee of Dakshin Chamuria village community was elected by popular selection of the villagers, it has proved to be no other than an informal council of *Gramer Matabbor*s. We have named it the Village Committee, a vehicle for village development.

At the beginning, the *Gramer Matabbor*s of Dakshin Chamuria, and also Aira, proposed to undertake such programmes (shown below) in cooperation with the JSRDE:

a) Infrastructure:	Road, school, Hat, bazar and bank, electrification, clinic, post office, etc.
b) GOB services:	Agricultural extension, veterinary service, improved fishery, family planning, sanitary latrine, HTW, vocational and skill training.
c) Capital formation:	Loan programme, postal savings, etc.
d) Joint business:	Cottage industries, joint operation of power tiller, etc.

The proposals were discussed and examined critically at General Village Meeting, Para Meeting, and at Village Coordination Meeting where some relevant field assistants of Nation Building Departments (NBDs) were present along with the JSRDE staff working in the villages. After evaluation the following programmes were squeezed out and put to actual implementation.

a) Village infrastructure building including roads, hat, etc.
b) Linkage with GOB services through Coordination Meetings.

Only two categories of programmes were approved viz : (a) the small rural infrastructure to facilitate improved rural-urban communications, (b) to streamline the existing service delivery of the NBDs operating at the Union-level. The above process indicates that the *Gramer*

Matabbors have successfully integrated villagers' individual and common needs into a set of community interest for the benefit of the entire community.

1.3 JSRDE Cooperatives

The Village Cooperatives in the JSRDE villages have the following characteristics:

a) Informal, but its structure is the same as BRDB cooperative,
b) Full autonomous management,
c) 9-member Managing Committee,
d) 1 Chairman, 1 Manager,
e) Institutional rules also follow those of BRDB cooperatives,
f) To become a member one is to pay an admission fee of 5 taka and thrift savings (10 taka/month).

Some typical programmes implemented by the Cooperatives include, among others, the following components:

a) Credit operation among the members using their own savings and shares
b) Income generation by joint fish culture and marketing, joint vegetable marketing, power-tiller lease, etc.

We have learned a lot of lessons through operating the above credit and income generating programmes. These are as follows:

a) The performance of a village cooperative totally depends on the manager's personality, discipline and competence in handling business,
b) Money scandal and mismanagement by the manager can easily erode the enthusiasms in the cooperative society,
c) As a result to avoid possible mismanagement, Austodona Cooperative society took decision in the annual meeting not to take up any more programmes that would bear direct economic benefits and to limit its activities in own-credit operation alone.

1.4 Village Community or Cooperative Society?

Matabbors are not always qualified to manage cooperatives. Many of the *Matabbors* lack entrepreneurial competence which is required to manage business and consequently the cooperatives. On the other hand, apparently they think that they are more competent in exerting leadership in the village community. They are more active and successful in organizing villagers in negotiating with the outside world including local government institutions. This may be partly because the *Matabbors* are entrusted by common villagers to guide social norm in the village and to represent the village in case of external negotiations with the outside world. They are not necessarily entrusted to manage programmes that bear direct individual benefit of the villagers.

Functions of the village *Matabbors* expected by their fellow villagers may be listed as below:

a) Opinion leaders,

b) Organizer of development programmes for community interest,

c) Mediator of confrontation and dispute among village factions, and

d) Representatives of the village in the event of external negotiations and bargaining.

What Village Committee (*Matabbors*) and Cooperatives (managers) can do and cannot do, may be summarized as follows:

Table 1 What Village Committee and Cooperatives Can Do and Cannot Do

	Suitability of Two Village Institutions	
	Village Committee	Cooperative
Community interest	O	X
Government services	O	X
Credit & saving	X	O
Leadership of Matabbors	O	X

O: Suitable X: Not suitable

It may not be always wise to have the village *Matabbors* manage development activities as the manager of a cooperative society, because the cooperative society is not a proper place for them to exert leadership. Through the cooperative, any programmes of villagers' common interest could be hardly channeled to JSRDE Project, or to local government institutions. The programmes with common interests such as building rural infrastructures and access to local government's service delivery systems were not properly managed by the cooperatives. They were more easily managed by loosely-structured, informal council of *Matabbors*, that is the Village Committee, where *Matabbors* took leadership to realize community interest of the village.

1.5 Village Meetings

Under the leadership of the Village Committee, two types of meetings were organized in Dakshin Chamuria.

a) Village Coordination Meeting, and

b) Para Meeting.

The Village Coordination Meeting has the following three objectives:

a) To integrate, through discussions among *Matabbors*, villagers' individual and common interests into community needs and interest. So that the mechanism of the feasible programmes can be figured out and finally implemented.

b) To ensure linkage with NBDs' field assistants working at Union, Ward and village-levels.

c) To maintain transparency in decision making and information flow by publicizing them by news and notice bulletins.

Attendants of the Village Coordination Meeting were:

a) TRDO of BRDB, Block Supervisor, Health Assistant, Family Planning Assistant, BRDB Inspectors, Livestock Assistant, Fishery Assistant from NBDs.

b) Union Members, Union Secretary and *Swanirvar* worker at Union- level.

c) Members of the Village Committee.

Chairman of this meeting was also the Chairman of the Village Committee. The meetings

were held regularly on first Thursday of every month. Every one of the field assistants was assigned to report respective activities in the past month and announce their respective time schedule of field visits in the coming month. Every one had to be prepared to respond to questions and demands raised by the Village Committee Members.

In a recent meeting in November 1995, for example, a heated discussion took place between UP Members and Village Committee Members regarding UP's programme of distributing chemical fertilizers, that were given as relief materials to combat acute fertilizer crisis. They were going to be distributed as usual through UP and UP Members. The VC demanded to change the system of relief operations and proposed to have them delivered through VC, so that really needy recipients have better access to the relief services.

Important decisions and the time schedule of field assistants' activities in the coming month announced at the Village Coordination Meetings were summarized in an one-A4-page '*Shandobat*' and was put up on the notice boards placed at 8 conspicuous corners in the village.

The *Para* Meeting was organized to ensure popular participation to village development and maintain transparency in disseminating information and decisions taken at the Village Coordination Meeting. The '*Shandobat*' was reported in the Para Meetings too, where their own development programmes were also discussed among participants. The information that had been monopolized by village power-elites in the past was made public and open through notice bulletins and Para Meeting.

1.6 Infrastructure Build-Up with the Initiative of Village Committee

It has been proved, as mentioned earlier, that the mainstay of community interest is in improving rural infrastructure to support rural-urban linkage. This is because the villagers recognize that this provides for the conditions thereby individual persons can increase job and income generating opportunities in non-farm and off-farm sectors.

The implementation of the rural infrastructure with the initiative of the Village Committee took the following processes:

a) A plan is brought up from a *Para* Meeting to be discussed at a Village Committee. The VC takes decision after serious discussions and examination.

b) Projects beyond their capacity are brought either to JSRDE or Union Parishad.

c) JSRDE bears a part of the cost when the following conditions are met:

--Unanimous consensus of the village

--Participation of common villagers in the planning stage

--Provision of voluntary labour

--Subscription in case of declining voluntary labour (30 taka/day)

d) Example: Village road repair in Aira Village

--Length: 150m, Earth moved: 20,000 cft.

--Project period: 18 days

--Voluntary labour: 156 man-days

--JSRDE expenditures: Two sets of culvert-rings

1.7 Conclusion

To sum up, required functions and managerial resources for smooth operations of rural development programmes are:

a) To plan and implement programmes of common interest, mainly rural infrastructure build-up.

b) To channel public services of NBDs, ensuring fair distribution to common villagers through establishing liberal information flow system.

Yet, the shortcomings were found in the following areas:

a) Own resources,

b) Cooperation of local GOs in liberalizing information channel,

c) Managerial support for establishment of VCM, PM, Notice Board, and

d) Venues for Village Committee Meetings, etc.

2 THE LINKAGE OF VILLAGE WITH UNION

2.1 Introduction

The following two basic ideas were made clear in the foregoing section:

a) The villagers want to participate in planning and implementation of the infrastructure

development programmes as a member of their village community in cooperation with Union Parishad.

b) They expect fair and smooth delivery of the services of relevant NBDs and NGOs to meet their individual and common needs.

Apparently these desires cannot be realized by the villagers themselves. The proper linkage with local government institutions is much required at grassroot levels in order to ensure community participation in infrastructure development and service delivery. In this connection, Union, the lowest and nearest unit of the local government to the villagers, is considered as a link-pin between the Government and the village community. Furthermore the Union is also the appropriate and optimum administration unit rather than Thana with respect to population size and distance from the village. To strengthen the functions of Union Parishad in this regard, JSRDE has conducted two major programmes on experimental basis as follows.

a) To coordinate and integrate service delivery of relevant NBDs and NGOs and to link the Union with village communities by Union Coordination Meeting, and

b) To develop rural infrastructure with community participation under the leadership of Village and Union Coordination Meetings.

We have tried these programmes more or less in all the villages. The above two programmes were, however, more visible in Dakshin Chamuria and Austodona.

2.2. Present Situation of Service Delivery from Thana

At Barura Thana HQs, Thana Development Coordination Committee (TDCC) is held regularly with attendance of Member of Parliament (MP), all officers of NBDs at Thana-level and Chairmen of all Union Parishads in the first week of every month. Each NBD holds weekly or monthly meeting with attendance of all its staff at Thana HQs. It seems that coordination between NBDs and UP has been well established.

In South Payalgacha Union, 24 personnels of 11 NBDs are discharging their duties under direct control of the officer of each department at Thana HQs. The number of NBDs staff posted in the union seems to be sufficient to carry out their duties and service delivery.

It is interesting to note that the NBDs field staff can be grouped into two types, one is 'seeking type' and the other is 'waiting type' with regard to their style of delivering services and supplies. The staff of 'seeking' type such as Block Supervisor and Veterinary Field Assistant visit villagers under their jurisdiction to give services and supplies. On the other hand, the staff of 'waiting' type, i.e., EPI of Health, Satellite Clinic, Family Welfare Centre of Family Planing and Artificial Insemination Centre of Livestock, wait for those who need their services at fixed place and time.

It seems to us that the 'waiting' type is more efficient than the `seeking' type considering limited staffing of the NBDs.

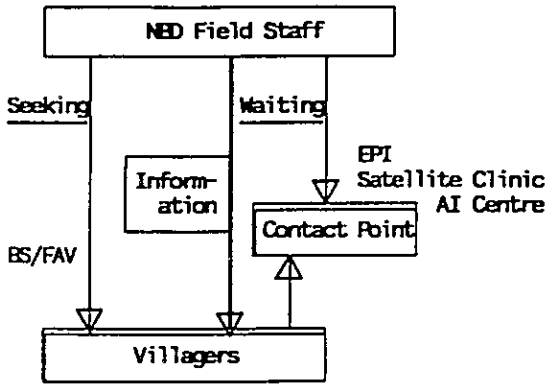

Figure 1 Working Styles of NBDs Field Staff: Waiting vs. Seeking

UP Chairman of South Payalgacha Union regularly attends the TDCC meeting and it seems that he gets in touch with the Thana administration. Sometimes, UP members bring information on some activities of Thana, however, only to limited villagers.

NBDs officers of Barura Thana HQs face some difficulties in supervising their staff who are working at Union-level. In the village, not only NBDs' performances but also NBDs' field assistants are almost invisible and their accountability seems almost absent. Reality is that most of the villagers stay out of information network of NBDs. Only a few villagers can get some limited services, but others may not receive anything from the local government and NBDs.

As indicated in Figure 1, it can be said that lack of horizontal and vertical linkage of both

coordination and information flow of the local administrative system is the main cause of `information poverty' which prevents villagers from participating in development activities.

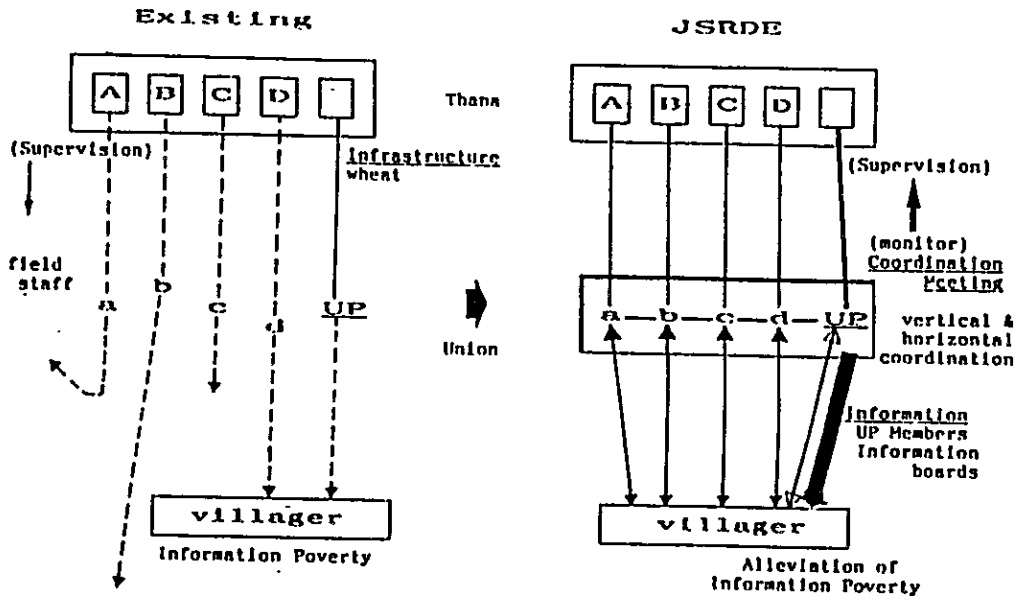

Figure 2 Existing and JSRDE Coordination System at Union-level

2.3 Linkage Programme of JSRDE

As shown in Figure 1, main components of the `linkage' introduced and experimented by the JSRDE are `coordination' meetings both at UP (Union Coordination Meeting, here-in-after UCM) and at Austodona (Village Coordination Meeting, here-in-after VCM) and `information dissemination' to the villagers through bulletin and notice boards.

UCM and VCM are held twice and once a month, respectively. TRDO and ARDO of BRDB coordinate UCM and VCM, respectively. Participants of UCM are NBDs Union-level personnels, UP Members and a few village representatives, and the participants at VCM are NBDs field staff assigned to Austodona and representatives of Village Committee.

Procedures of both the meetings are as follows:

a) Review of the minutes of the last meeting and follow-up,

b) NBD staffs' presentation of performance report and tour and work programmes in the coming month and any other information relevant to rural development, and

c) Discussion on any problems deemed necessary by the participants.

BRDB is assigned to collect all information related to rural development from Thana-level and to present before the members of UCM and VCM. Proceedings of both the meetings are written by BRDB-TCCA Inspector with assistance from JSRDE and typed and cyclostyled by the TCCA to be distributed among the attendants of each meeting.

UP Members of concerned Ward convey the schedule of field visits and work programmes of NBDs staff and other information to the villagers. At the same time a Shangbat containing the schedule of field visits compiled by BRDB and JSRDE Staff are put up on 18 notice boards by UP Chowkidars.

Through practicing the `linkage' model, information dissemination through the coordination meetings and notice boards, communication among NBDs staff, as well as UP and villagers, have been improved. Number of visits and quality of work done by the NBDs staff have already been improved and become more visible than before. Consciousness about importance of information channeling and coordination among all those concerned in development activities has gradually been developing among participants of the coordination meetings.

Results of the `linkage' programme seem to be positive and encouraging. Some NBDs staff already inform his or her advance tour programmes and negotiate the programmes with UP Members at the UCM and VCM. UP Members have begun to convey information to the villagers. The `information poverty' has been reduced to a considerable extent.

Union Parishad will play an important role in rural development as a crossroad of information about support service and infrastructure development. UP Members can work as a conveyer of information to the villagers. In future, local village leaders may be involved in information delivery system as informers.

2. 4. Infrastructure Development with Villagers' Participation

On the basis of successful *Para* road programme carried out in Dakshin Chamuria, an extended programme was proposed involving three neighbouring villages at a Union Coordination Meeting in March 1994. The following conditions were shown to implement the programme:

a) the plan is fully agreed upon by the respective *Para* people,

b) one day voluntary labour or equivalent subscription is paid, and

c) all the *Para* households have already paid all Union taxes (including arear).

This programme was implemented by members of the *Para* Road Committee formed by respective *Gramer Matabbors* including Union Parishad Members in three villages. A sketch map was prepared to determine routes and necessary ancillary structures on a consensus basis. About 15% of total construction cost of ca.100,000 taka was shared by the villagers in the form of either voluntary labour or subscription. Their contribution by labour and in cash was closely monitored by Committee members and also by JSRDE Staff on the basis of check list covering all households. All the progress was monitored closely by village people. They have completed the 1.86 km section (in three separate sections) successfully in about 3 months since inception.

This experience illustrates that rural infrastructure building of real need and of community interest attracts voluntary participation of local people.

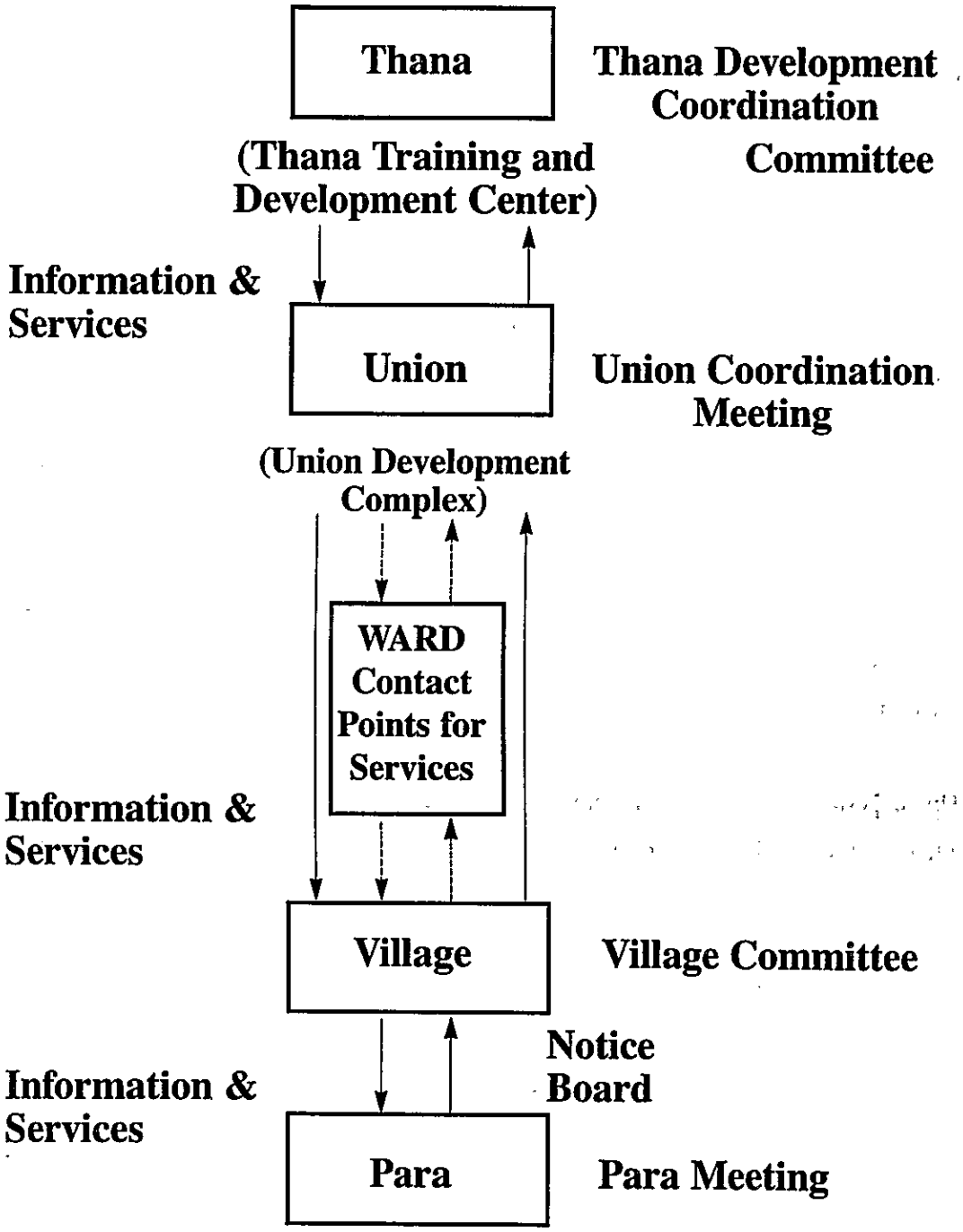

Figure-3 The Linkage Model Proposed by JSRDE

2.5. Conclusion

Through our experimentation it was observed that linkage system could ensure more efficient delivery of NBDs' services within existing mechanism and resource and increase their accountability to the people.

Integration of the services of relevant field assistants of different NBDs is effective and workable at Union-level rather than among officers at Thana-level. The Union should be considered as a unit of integration of government efforts in rural development.

Bottom-up planning and implementation of rural infrastructure with people's participation was proved to be not only feasible but also efficient under the leadership of UCM and VCM.

3 Need-based Appropriate Technologies

3.1 Introduction

Over generations villagers have developed and continuously improved appropriate technologies for farming as well as health care and nutrition that are adaptive to ecological and socio-economic circumstances. Assuming this innovative capability of villagers, we were always trying to identify and use locally available, indigenous technologies when we implemented technology and infrastructure components of the JSRDE programmes. The procedures we took were as follows:

(1) As villagers' need arose and brought to attention of the JSRDE, we tried to confirm the needs till popular consensus is reached among those concerned in the community by calling meetings.

(2) Next step was to try to look for locally available and transferable technologies to possibly meet the needs in collaborating with the community.

(3) The third step was to design procedures for implementation in consultation with relevant NBD's field assistants taking into account available technologies in the community and the locality.

(4) Only after full consensus was reached in the community through repeated discussions, the programmes were proceeded to demonstration and experimentation.

We realized that this lengthy procedure ensures voluntary participation of the villagers.

3.2 Some Experiments

Four cases of our experimental trials regarding 'technology' issue will be presented here to show our typical approach.

3.2.1 Crop Diversification in Rabi Season in Austodona

Due mainly to shortage of both surface water and shallow ground water in quantity and quality respectively, agricultural production in the area has been so unstable that vast farmland remained fallow in the dry season. The improvement of land use in the dry season was one of the most acute and common needs of the villagers. When the JSRDE initiated its development activities in this village in 1992, the villagers proposed a DTW sinking to secure water for Boro rice cultivation. It was obvious, however, that the villagers could not afford to bear the large cost outlay for a DTW, probably more or less 6 lac taka at that time.

In one of the meetings of their cooperative to discuss possible alternative land uses other than Boro rice cultivation with DTW irrigation, some farmers pointed out that the villagers had cultivated Keshari till late 1980s in a large area that remained fallow at that time. This information inspired us to test and demonstrate a new Rabi cropping patterns including winter vegetables, soybeans, etc. that require much less amount of water and consequently less cost. The JSRDE and the village cooperative society have reached a consensus, through subsequent discussions, to launch a demonstration farm of *Rabi* crops cultivation in 1993/94. Newly introduced crops at Austodona were soybean, HYV rice, banana, pumpkin, *Kakrol*, Arum, watermelon, potato, peas, tomato, *Pakchoy*, cauliflower, cabbage, radish, etc.

The various *Rabi* crops tested in 1993/94 have been partly replaced by wheat in 1994/95 dry season. This was because the preference of villagers was increasingly shifting to rain-fed wheat from irrigated *Boro* rice on which all the villagers had insisted earlier.

Before the JSRDE intervened, most of the land had remained fallow during *Rabi* season. The 1994/95 *Rabi* season saw 18 types of *Rabi* crops and vegetables in 19.75 acres of land and

600 HYV banana saplings. Out of the coverage of 19.75 acres, HYV wheat and rice were 9.67 and 1.90 acres respectively. The rest 8.18 acres were under other 16 kinds of crops and vegetables. This success of *Rabi* crops cultivation indicates that the experiments have rightly turned up a latent need and demand of the community.

3.2.2 Plant Book

After observing apparent failure of a "home garden development programme" [1] which was introduced to one of our study villages by a BS (Block Supervisor), a female member of our group tried an alternative approach to improving vegetative resources utilization in her own way. She investigated the style and contrivance of their use of vegetative resources developed by villagers through time-tested interaction with the environment, which resulted in a Plant Book that contains a full inventory of plants and their utilization found in the bari-biti.

On the basis of these findings, the JSRDE has been testing on a programme of propagating good strains of fruit trees available in the village by grafting method. This was proved to attract a number of villagers, especially women who work mainly in *bari-biti*.

3.2.3 River Bank Protection by Rural Hydrology Approach at Dakshin Chamuria Village

The technology that can be named as "rural hydrology" was developed and applied in planning and designing rural infrastructure such as road, embankment, bridge, culvert and drain in the floodplain of Tangail. This peculiar "engineering" requires the following set of goods and knowledge: a motor-cycle or a bicycle, and foot to run and walk around, eyes to see real environmental conditions, ears to listen to people talk about the local conditions, and flexible mind to share with local people insight into local land and water conditions, constraints to development and real needs of the locality and local people.

This was applied to analyse dynamic hydrologic environment of the floodplain at Shahadebpur Union and the results were applied to formulate plans for building rural infrastructures including Union and village roads, bridges and culverts, low cost river-bank protection in

[1] Also known as "Kitchen garden or Homestead garden

palisading, planting African *Dhaincha (Sesbania rostrata)* for protection of deep-water rice from onrushing water hyacinth.

The incessant shift of the Lowhajan river course had been devouring a zone of farmland and homesteads on the river bank of a neighboring village of Dakshin Chamuria at the rate of six meters annually. The villagers of Dakshin Chamuria feared the violent river would someday encroach into their own village and brought some possible protection measures to the attention of JSRDE staff.

In the upper reach of the *Lowhajan* the government constructed expensive palisadings made of hard wood. But JSRDE looked for inexpensive, small structure that can be made with readily available materials in the community. Looking at substantial accumulation of sand and silt behind fish catching fences used locally by the villagers, a JSRDE staff designed a simple palisading made with bamboo lattice-work on which drum-iron-sheets were attached in cross stripes. This was innovated in close collaboration with the villagers, a local public works contractor and a Thana Engineer. The Village Committee accepted this design and negotiated with *Matabbors* of the nearby villages for joint construction. This palisading was constructed by the local contractor who showed keen interest in this technology from the beginning.

When the palisading was erected in swiftly flowing Lowhajan river, it proved to work dramatically by trapping substantial sand and silt deposit at bank side of the structure. Subsequently *dhol kalmi* was planted on the silt deposit following the suggestions of some villagers, which also was proved to be effective to stabilize the silt deposit.

This simple bank protection palisading illustrates a typical product made available by rural hydrological approach.

3.2.4 Fish Culture with Local Available Technology in Fanishair Village

Villagers of deep-flooded Fanishair village in Chandpur wanted to make better use of a large open water body in the rainy season that was kept almost "fallow" because of too deep water. The JSRDE staff working in the village made an extensive observation in the adjacent Chandpur Irrigation Project area and found that a local available technology, namely

"medium-size ring-levee fish culture", was practiced popularly under similar water conditions as Fanishair village. JSRDE considered that the technology is transferable to the village.

The JSRDE staff developed a programme to experimenting fish culture in a 200-acre ring-levee which encompasses three villages. He found, however, winning a consensus among the farmers was a formidable problem because there were as many as 238 landowners in the 200-acre tract. Union Committee was formulated to negotiate the landowners and to carry out the programme. It made careful preparation for mediating conflicts among landowners and among different villages and for compensation for loss of deep-water aman rice that was discouraged to sow in this experimentation programme.

The JSRDE implemented the demonstration fish culture in collaboration with the Union Committee and with technical assistance rendered by a Thana Fishery Assistant. The first year's (1994) outcome proved to be poorer than expected due to scarce rainfall before the harvest of fish and partly to poor management. Nevertheless, neighbouring three villages volunteered to duplicate similar programmes in 1995 under the leadership of the Union Committee.

3.3. Conclusion

The success in promoting Rabi season multiple cropping in Austodona village is attributable to the fact that the villagers rightly turned up their real needs by readily available and familiar technology that had been hidden under blind enthusiasm to introduce modern technology, i.e., DTW irrigation.

The "rural hydrology" represents an cheap, appropriate and adaptive technology that can be used in planning and designing rural infrastructure. It can ensure people's voluntary and active participation in infrastructure build-up in its planning stage, as it is designed to make maximum use of knowledge and wisdom of local people.

Locally available technologies that have been developed and improved over generations are principally appropriate, environment-adaptive, environment-friendly and much less costly.

Further improvement and extension of the appropriate technology to meet the needs of the villagers requires close collaboration between scientists and local people. Due attention should be paid to community needs and interest in the process.

4 Off-farm Employment Opportunities for Income Generation

4.1 Introduction

The present paradigm of increasing self-employed villagers through the provision of training and credit may be a promising approach in the context of present macro-economic policy and strategy of Bangladesh which advocates for market economy. However, the villagers cannot properly utilize such training and credit because of many external factors surrounding them. Those external factors are, lack of market facility (roads, bridges, culverts, hats, bazars), banking, electricity, etc.

There are thousands of beneficiaries of training and credit programmes since not only various GOs institutions but also numerous NGOs are equally adopting the 'credit and training' strategy in rural development and rural poverty alleviation. How many of these beneficiaries could come out as the 'self employed'? Of course, we don't have exact statistics on that. But, field experience shows that number of self-employed villagers grown through these training and credit programmes is very insignificant. The credit and training package may provide the necessary conditions but it does not necessarily bring the sufficient conditions.

We presume that physical and socio-economic infrastructure provides the sufficient conditions for increasing self-employed villagers. In this context, as complementary to the credit and training approach, JSRDE has planned and experimented various programmes with the objectives as follows:

a) How market facilities (infrastructure) can be developed ?

b) How the people who lack capability become self-employed or linked up with local enterprises through skill training ?, and

c) How to promote own capital formation of the villagers ?

4.2 JSRDE Experiences

4.2.1 Building Hat and Access Road with Community Initiative

In Daskhin Chamuria and Aira, Village Committee initiated market facility development. The *Hats* and access roads were improved by the villagers' donation of land, money and voluntary labour, with financial assistance of JSRDE. In the case of Dakshin Chamuria, the overall economic effects from the improved *Hat* facility were estimated at about additional 2.4 lac taka cash transaction in the rainy season 1994.

The above case has well illustrated that the village community leaders know about the potential of market facilities and how to motivate and ensure participation of the general villagers for such development schemes. People have the heritage of such initiatives in Bangladesh for the well-being of the community. This heritage can easily be mobilized in rural infrastructure building through bottom-up planning and implementation.

4.2.2 Link Village Production with Local Enterprises

In Daskhin Chamuria, 30 disadvantaged women were organized in an informal group by JSRDE Village Staff. Training on the skill of embroidery was given to this group in cooperation with BRDB and the Village Committee. As these women have no capability to be self- employed, they have been linked up with local enterprises by the JSRDE Village Staff.

In Panchkitta, the Village Committee in collaboration with JSRDE initiated joint marketing of vegetables. Under this action programme vegetable growers in the village gather their vegetable and send in bulk to some wholesale markets in the region. In this way the vegetable growers have been linked up with market enterprises in urban area.

In Austodona, the villagers, in collaboration with the Mennonite Central Committee (MCC, an NGO), have been cultivating soybean since 1992. MCC provided HYV seeds, technical know-how and marketing services of the product. Austodona cooperative collects and sell the seeds to the villagers charging a minimum margin, which helps the cultivators get good seeds at right time in right quantity at a reasonable price. Now soybean cultivation of Austodona has been linked up with the enterprises through the village development cooperative and

MCC.

Who will take the role of our village staff in absence of JSRDE ? In the era of privatization, performance of governmental organizations and joint business of cooperatives may not be appropriate for such functions. For this reason JSRDE proposes such roles to be shouldered by thousands of NGOs. JSRDE would appreciate the NGOs if they themselves become local enterprises.

4.2.3 Own Capital Formation and Credit Service

Villagers have a good habit of informal saving and many small informal saving and credit associations are functioning in rural Bangladesh. However, formal cooperatives of BRDB do not use their own share and savings money for credit services to the members. They depend on external credit sources through Central Co-operative Association (TCCA) Ltd. But, Austodona village development co-operative, by consensus, started to practice credit disbursement to the members from their own share and savings money. Panchkitta cooperative also used own capital partially for giving credit to the members. Cooperative at Fanishair also disbursed two lac taka among the members as credit out of their own capital and recovered the loan successfully under the self-auditing of village community.

Performance of their own credit programme was remarkable. For example, in Austodona, in the present magnitude of economic activities the village is self-reliant in investable capital. The rate of recovery is 100% at present because of the involvement of the village community in planning and execution of the credit programme. The interest rate is between 10 and 50 percent/year, which is rather high. The villagers do not bother it because they get back part of the payment against their shares in the cooperative as dividend every year. The rest of the interest money remains in the cooperative as addition to the own capital of the villagers.

It is providing credit to all kinds of rural economic activities, i.e., crop agriculture, poultry rearing, small trading, rickshaw pulling, handicraft manufacturing, job seeking in abroad, etc. In such a situation, the villagers of Austodona do not care for loan from banks. Traditional money lenders have failed to operate their business in the village who charge very high

interest rate, 100-200 percent.

Nevertheless, it should be mentioned here that informal banking activity is sustainable only when it is subjective to proper auditing by external authority. Otherwise, mismanagement and corruption by say, a cooperative manager, can easily destroy the institution itself.

In two experimental villages, Dakshin Chamuria and Aira, JSRDE has helped the respective Village Committee introduce a post office. At Dakshin Chamuria post office, which started since March 1994, a total of about 360 households have opened savings account and the total cumulative balance in May stood at about 1.7 lac taka, on an average 470 taka per household. Although the amount of savings is not particularly significant, the post office is being used as an intimate bank and safety box, and it will provide a good potential of own capital formation in the future.

4.3. Conclusion

Development programmes of infrastructure such as Hat, bazar, rural road, bridge, culvert, electricity, etc. must be given top priority for the creation of self-employment opportunities by connecting village with non-farm and off-farm sectors. Planning of such programmes should be made bottom-up, with popular consensus, and by the village community approach.

Villagers who lack capability to be self-employed should be linked up with enterprises in local business centres. Skill development training to such villagers should be provided according to the needs of the local enterprises. In this sense the urban facilities and the villagers must be interlinked by any means.

Own capital formation should be encouraged to accelerate self-reliant income-generating activities. For this purpose informal or formal banking institutions such as mutual financing cooperative, informal association, village post office, etc. must be established in villages.

The development of infrastructure, own capital formation and linkage of skilled workers with local enterprises should be complementary to the training and credit approach to rural development and poverty alleviation. These have been materialized in the project villages by

the village community in collaboration with Union Parishad and the Nation Building Departments. Bottom-up planning and participation of the villagers in the true sense are the fundamental clues to success.

5 The JSRDE Model to Rural Development in Bangladesh

Our model, if this can be called a model, is comprised of two major facets. They are: (a) to enhance indigenous and traditional social organization as a recipient as well as self-help entity for village development, (b) to link the village institution with the local government administration with having Union as a pivotal tier. There are two more additional facets, they are, (c) to use locally available and time-tested technologies in rural development programmes, and (d) to increase job and income-generating opportunities in the villages, in an indirect way, by developing rural infrastructure.

5.1 The Village Committee

We encouraged villagers of our respective project villages to organize a Village Committee on the basis of popular selection. Most of the Committee members selected by consensus of the villagers were found to be *Gramer Matabbors* representing respective *Para, Salish* or sometimes *Gusti*. They are "natural" leaders of the village who receive high esteem by their fellow villagers for their religious piety and capability of managing intra- and extra-village social affairs. Some of them may exert political and economic power over the villagers.

Unlike the agricultural cooperative as an economic institution, we considered the Committee a social institution. We have encouraged the Village Committee to represent the village in case of encountering the outside world including neighbouring villages and local governments and to handle all related activities to their village development. I recall that even Akhter Hamid Khan, the founder of BARD and the Comilla Model, avoided the council of *Matabbors* to lead the village cooperatives for fear of its overwhelming power in political, economic and social scenes.

Our assumption was that possible monopoly of fruit of development by the *Matabbors* could be averted by a simple mechanism, that is "opening information channels to public". It is a reliable leadership that is really awaited in Bangladesh's village development. It is in the

Village Committee where the *Matabbors* can give full play to their good capacity. The Village Committee is expected to integrate villagers' common desires into "community interest" in the process of development planning at the grass roots.

5.2. The Linkage

At present, delivery of rural services is administered by various concerned Nation Building Departments (NBDs) at Thana-level which has a population size of about one quarter of a million. Our idea is to delegate day to day administration of rural development to Union-level whose population size is about 25 thousand, a proper and governable size, by way of the following administrative set-up.

(1) A Thana Coordination Meeting will be held regularly to coordinate activities of different Thana-level NBDs' officials by the leadership of public representatives.

(2) Union Coordination Meeting (UCM) will be held monthly to coordinate and integrate activities of different NBDs' field assistants working at Union-level by the leadership of Assistant Rural Development Officer (ARDO) of BRDB, who will be appointed to exclusively conduct this coordination work. A Union Development Organizer (UDO) will be recruited to handle day-to-day operations of the UCM.

(3) The following personnels will attend the UCM:

ARDO and UDO of BRDB,

All relevant NBDs' field assistants working at Union-level, Chairman, all Members and Secretary of Union Parishad, and Representatives of each concerned Village Committee.

(4) Union Chairman assumes chairmanship of the UCM.

(5) A small office-house, which may be named as Union Development Centre (UDC) will be built in or in the vicinity of Union Parishad compound. This is the mini-copy of Thana Complex. The UDO and relevant NBDs' field assistants are accommodated here to ensure day-to-day coordination among themselves and with Union Parishad as well as relevant NGO workers.

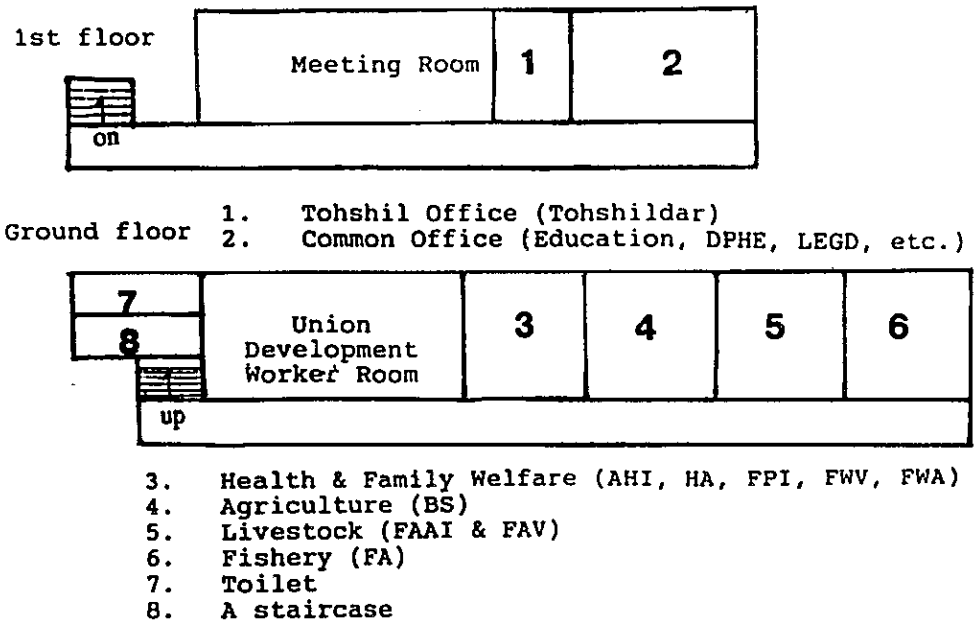

Figure 4 A Proposed Union Development Centre

(6) A small out-reach station, which may be named as Union Service Centre (USC), will be provided in each Ward to facilitate a contact point for concerned villagers and NBDs' field assistants. Relevant field assistants are posted here on fixed time and day of the week.

(7) One-page news bulletin, containing NBDs information, time schedule of field visits of NBDs' field assistants and minutes of the monthly UCM, is prepared by the UDO and made public to the villagers by putting it up on notice boards to be placed at conspicuous corners of concerned villages.

(8) The UCM will be the center pivot for rural development where all activities of Village Committee, NBDs, Union Parishad, other local institutions and relevant NGOs

are coordinated and integrated.

It may not be necessary to appoint any more field assistants except a few needy departments such as livestock, fishery and engineering, as substantial services of concerned NBDs are already available. Their activities can easily be made more efficient and streamlined by simply having their individual work properly coordinated and integrated.

When the "information" is channeled through to the villages, two major changes must take place. Activities of government officials, especially of field assistants working at Union-level, will be placed under surveillance of common villagers, and possible monopoly of the benefits of governments' services by influential *Matabbors*, or they are sometimes whispered as *touts*, will be checked to a large extent.

We hope that through this channel of linkage interested Village Committees will bring up, through the bottom-up channel, their own projects of community-need and interest.

5.3 People's Participation in Development Planning Process

It is not very difficult to have people mobilized but very difficult to let them participate in rural development programmes. There seem to be good reasons for this deficiency. One reason is that planning and implementation procedures are more-or-less top-down in modern rural development projects which is suited only for mobilizing people. Second reason is that a programme given top-down seldom meets their felt-needs not to speak of the community-needs thus discouraging their voluntary participation. The third reason is that technologies adopted tend to be foreign, alien, expensive and, in short, out of local people's reach. The fourth reason is that some programmes that aim at enhancing villagers' economic life tend to induce rivalry and conflict among beneficiaries thus discouraging them to cooperate with fellow villagers.

In normal procedures, more expensive, standard engineering procedures are followed starting from land survey, water gauging, soil survey to determine land and soil suitability classification to make planning on the map, designing earth works and structures on the basis of these "scientific" data set.

They are not only unnecessary but also even harmful because the engineering procedure would preclude villagers from participation.

Simple observation, consultation with local people for identifying the local conditions and problems should be the "standard" method in project planning in rural development. People's participation is ensured in the build-up of rural infrastructure when local knowledge and wisdom are consulted and accommodated in the planning processes.

We have learned that many useful technologies in farming, health care, nutrition and earth works for building rural infrastructure have been inherited through generations and maintained in rural Bangladesh. Most of these locally available and indigenous technologies are appropriate, environment-adaptive, environment-friendly and much less costly than foreign technologies.

Voluntary participation of villagers can be ensured when these appropriate technologies are employed in rural development programmes both in planning and implementation stages. A key clue to ensure their active participation is for the two parties, planners and villagers, to jointly make action programmes in the bottom-up manner.

5.4 Enhancing Jobs and Income through Infra-Build-Up

We did not adopt so-called "credit and training" approach for generating income and job opportunities to target groups. Instead, we tried to provide villagers with similar opportunities of self-employment in an indirect manner, that was by way of building rural infrastructure to link-up villages with non-farm sectors.

The infrastructure that can induce rural-urban interaction includes: improvement of Hat grounds and access roads thereto, improvement of village and Union roads, culverts and bridges, intra-village alleys and trails, rural electrification, village post offices for mail service as well as postal savings. These can facilitate very basic clues with which villagers can increase, by their own efforts, opportunities of self-employment.

Own capital formation is encouraged to promote self-reliant income-generating activities. For

this purpose informal or formal banking institutions such as mutual financing cooperative, informal association, village post office are neccssary.

5.5 Conclusion

We have identified a number of causes of rural poverty. A proper approach to alleviating it can include among others such measures as rural infrastructure development, fairer delivery of local government services and enhancement of locally available technologies in farming, health care, nutrition and infrastructure build-up. We have tried to accommodate community interest, rather than individual economic interest, of villagers to assist their own development efforts.

To realize this goal both the villagers and GOB are equally responsible. The community interest can be cultivated and channeled through to its realization by a Village Committee under reliable leadership of informal council of *Matabbors*. The government's assistance can be improved by coordinating and integrating their efforts of respective NBDs at Union-level. Both the parties can meet and interact to each other and among respective parties at monthly Union Coordination Meeting which will be newly installed. Supervising authorities of TRDO, ARDO, and UP Chairman would be sought for sustained functioning of the UCM. The involvement of NGOs is also welcome.

In order to carve out a workable guideline for Bangladesh rural development on the basis of this "alternative approach", we wish to suggest this "integrated link system" of Village Committee with local governments especially at Union-level would be tested on a pilot project scale involving all Unions in a few Thanas.