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**MENNONITE CENTRAL COMMITTEE**



**AGRICULTURE PROGRAMME**

BANGLADESH  
REPORT No. 16  
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**MENNONITE CENTRAL COMMITTEE  
AGRICULTURE PROGRAMME**

**REPORT NO. 16**

**JULY 1989**

**1/1 Block "A", Mohammadpur  
Dhaka-1207, Bangladesh**

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## DEFINITIONS/ABBREVIATIONS

- aman - Rainy season rice crop, July - December
- aus - Spring rice crop, March - June
- bari - Bangladeshi homestead
- bigha - Area measurement, one third of an acre
- char - Newly formed land
- dal - Local pulses
- decimal - Area measurement, 1/100 of an acre
- godown - Warehouse
- ha - Hectare, 2.47 acres
- HYV - High-yielding variety
- kg/ha - Kilograms per hectare
- LIV - Locally-improved variety
- maund - Weight measurement, 82.2 pounds or 40 seers
- mds - Maunds
- MLT - Multi-location trial
- NGO - Non-government organization
- PVC - Polyvinyl choride plastic pipe
- rabi - Winter (dry) season, November - April
- seer - Weight measurement, 2.1 pounds
- T-aman - Transplanted aman rice
- t/ha - Tons/hectare
- Tk. - Taka, Bangladesh currency, current exchange rate US \$1=Tk.31

## ACRONYMS

ART	- Appropriate Rural Technologies Project, MCC
AVRDC	- Asian Vegetable Research and Development Centre
BADC	- Bangladesh Agricultural Development Corporation
BARC	- Bangladesh Agricultural Research Council
BARI	- Bangladesh Agriculture Research Institute
BAU	- Bangladesh Agricultural University
BMDC	- Bangladesh Management Development Centre
BRAC	- Bangladesh Rural Advancement Committee
BRRI	- Bangladesh Rice Research Institute
DANIDA	- Danish International Development Agency
FPDC	- Food Products Development Centre, MCC
HSP	- Homesite Programme, MCC
IDE	- International Development Enterprises
JCCIP	- Joint Caritas-CRS Irrigation Programme
LRP	- Dutch Land Reclamation Project
MAWTS	- Mirpur Agricultural Workshop and Training School
MCC	- Mennonite Central Committee
RDRS	- Rangpur Dinajpur Rural Services - a project of the Lutheran World Service
RSP	- Rural Savings Programme, MCC
VERC	- Village Education Resource Centre

## INTRODUCTION

This is the sixteenth annual report of the MCC Bangladesh Agriculture Programme, and covers programme activities from July 1, 1988 to June 30, 1989.

The Agriculture Programme has undergone many changes in the last 16 years. First begun as a five-year project to increase the cultivation of crops during the dry season, the Agriculture Programme now uses a comprehensive Farming Systems approach which encompasses year-round horticulture, agriculture, fishery and livestock activities with resource-poor farmers, work with rural women at the homesite level to improve nutrition and health, and with groups of landless women and men to improve their savings, literacy and social awareness. We are expanding the production and utilization of soybeans throughout Bangladesh, facilitating the privatization of the manufacture and wholesale of the rower and other manual pumps, and increasingly cooperating with NGOs and organizations to give and receive trainings; And as a result of the devastating flood of 1988 we are creating new approaches for improving the crop diversification and income generating activities of landless or subsistence farmer groups in other NGOs by undertaking a new Partnership in Agricultural Research and Extension (PARE) Programme.

In the Agriculture Programme we focus on understanding the needs of the poorest 40 percent of society, and then providing adaptive and responsive research and grassroots extension to help meet those needs. In this way we try to benefit the economically disadvantaged and socially disenfranchised people of rural Bangladesh. Our agriculture work falls into three broad categories: extension, marketing and research. The extension category includes the Ag Extension, Soybean, Homesite, and Rural Savings programmes, which together worked with well over 9000 families in 1989. The Appropriate Rural Technologies programme reaches out to the rural population through marketing manual irrigation

pumps and vegetable seeds. Our two research and development programmes, Farming Systems Research and Appropriate Technology Research and Development, support the MCC extension and marketing efforts. They also provide technical information and assistance to other organizations and collaborate with national research institutions.

Our Agriculture Extension Programme promotes profitable and sustainable agricultural practices to below-subsistence farmers. This year we maintained the number of field extensionists at 31, but increased the number of farmers benefitting from programme services to 1800, a 28 percent increase over last year. One of our main extension efforts is promoting the cultivation of vegetables and this year, after an early winter cyclone, vegetable projects were highly profitable. This year the profits earned by farmers were greater than our direct cost of programme delivery--a result of good vegetable prices and greater programme efficiency. The horticulture project established eight new farmer nurseries to make available seedlings in each extension area; this brings to 15 the total number of MCC-supported nurseries. Only 25 percent (450) of farmers made and used compost, but we are aiming for 50 percent 1989-90.

The Soybean Programme experienced its third consecutive year of significant growth, achieving over 1,250 acres of soybeans in MCC working areas. Our marketing efforts were very successful; demand was well above production, and interest in soybeans by non-government and government agencies continues to increase. The largest acreage increase outside of MCC's own area was in Tangail District where five hundred acres of soybeans were planted with promotion from a bilateral aid project and technical assistance from MCC.

The Homesite programme provides extension education to rural women on family nutrition, health, vegetable gardening, and poultry raising. This year we maintained a staff level of eight extensionists but increased coverage to 30 villages (from 17 last year). We met with good success when, for the first time, we handed over "graduated" groups to the Rural Savings Programme. We published the results of surveys assessing the impact of the programme on graduated villages and prepared for publication a "Homesite Programme Profile" which summarizes our experiences with the programme since its inception in 1982.

The Rural Savings Programme provides group motivation, consciousness raising and cooperative savings and investment opportunities to the landless. This year we worked in sixty villages with 782 group members. We gave twelve three-day trainings in consciousness raising, and continued to have a success rate of over 50% in the functional literacy course. Total group funds, which include both savings and returns from investment of those savings, increased by 52 percent (compared to 40% last year) and average savings per member increased 44% from 525 taka last year to 756 taka this year (compared to 38% increase last year).

The Farming Systems Research programme develops and adapts new agricultural technologies for use in Noakhali District and other similar areas. It is aimed at the constraints faced by resource-poor farmers. This year we continued research work on three land types: medium highland, medium lowland, and saline charland. We carried out research on improved animal feeding practices, tree crops, and integrated fish-rice culture in addition to the continued search for vegetable and crop production improvements. Many ideas are showing encouraging results.

We increased participation by extension programme personnel in identifying and planning suitable research trials. This year we also began research in a new area for MCC, the riverine flood-prone region. In the wake of the 1988 flood we carried out research on the farmers' post-flood responses to better target rehabilitation efforts in the event of future floods. We also began a three year "Partnership in Ag Research and Extension" programme in the flood-prone area, providing agricultural research and extension support to six local development agencies.

The Appropriate Rural Technologies Project sold a total of 854 Rower Pumps and other manual pumps (95% of target). The project moved firmly toward privatization as planned, with a local workshop in Feni producing the pumps and distributing them through the private dealer network developed by MCC in previous years. We supported these local businesses by providing management training and promotional support.

The Appropriate Technology Research and Development Project activities were similar to last year's. We published research on tubewell technologies for sweet water in saline regions. We carried out research on rodent control and began test manufacture of a low cost rat trap. We assisted the Job Creation Programme with design of machinery for its handmade paper project, and investigated in detail the feasibility of importing a soybean extruder/expeller as well as locally available soybean processing options.

The Training Programme increased its training activities in support of MCC's agriculture programmes. Regular training meetings, news bulletins and Feni Library

services continued. We conducted training needs assessments for all Agriculture Programme senior and intermediate staff, arranged with outside organizations a total of 15 week-long trainings and one four month vegetable production certificate programme, and introduced English language upgrading classes.

I hope this annual report reflects not only our many programme activities, but also gives some indication of the integrity and commitment of the staff and volunteers who make up the MCC Agriculture Programme. With these good people, working for and with the poor, our Programme can continue to be an important contributor to the grassroot development efforts of NGOs in Bangladesh.

Peter Graham,  
Agriculture Programme Administrator  
September, 1989

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## EXTENSION PROGRAMME

The Extension Programme's objectives are a) to extend new technologies to subsistence level farmers to improve their overall socio-economic conditions, b) to aid the wider effort of food production in general, and c) to provide a link between the M.C.C. Research Program and Bangladeshi farmers.

The main target group for the extension program is farmers whose food sufficiency does not exceed 8 months when first contacted by extensionists. Target group farmers are subsequently exposed to new crop varieties, rotations and alternatives, and given training and technical help in cultivating those crops.

The majority of the projects involve vegetable cultivation and this is reported on in the Horticulture Project Report.

The Extension Programme works with farmers only for four years; after this time they are expected to continue on their own. The programme worked with 1872 subsistence (target group) farmers in 1988-1989.

### Performance

Table 1 below provides an analysis of the programme's direct effect on the farmers (as measured by whole month gains in sufficiency).

Table 1.

Years in Programme	Number of farmers	Months of sufficiency brought to number of farmers												
		0	1	2	3	4	5	6	7	8	9	10	12	15
Under one year	681	463	129	56	20	9	1	2						1
One year	327	161	99	39	16	6	2	3			1			
Two years	501	224	185	42	25	9	8	3		1	2			1
Three years	310	136	91	44	17	8	9	2	2	1			1	1
Four years	53	22	19	6	4	2								
Totals	187	1006	523	187	82	34	20	10	2	2	3	1	1	1
By Percent														
Under one year	100%	68%	19%	8%	3%	1%	0%	0.3%						0.1%
One year	100%	49%	30%	12%	5%	2%	1%	0.9%		0.3%				
Two years	100%	45%	37%	8%	5%	2%	2%	0.6%		0.2%	0.4%			
Three years	100%	44%	29%	14%	5%	3%	3%	0.6%	0.6%	0.3%			0.3%	0.3%
Four years	100%	42%	36%	11%	8%	4%								
Totals	100%	53%	28%	10%	4%	2%	1%	.5%	.1%	.1%	.2%	.1%	.1%	.1%

The months of sufficiency brought to the number of farmers are only for the year being reported. They are not cumulative for the more than one year old farmers.

According to the table presented, it appears that 1006 farmers did not benefit from their involvement with the programme. This is not true as any sufficiency below 15 days is considered to be 0 and all sufficiency that is above 15 days is considered to be a full month.

It will also not be correct to read the above table with last years and look for continuity in the number of farmers in each group. The figures do not match because some extensionists were transferred from one area to another, which caused a whole batch of farmers to be lost. These farmers had been in the different programme tenure categories. The extensionists when transferred to a new area took up new farmers who were all classified as less than one year old.

Programme operational goals are to become more efficient as far as the number of farmers dealt with and the cost of earning additional income for the farmer. Table 2 shows performance according to six selected criteria.

Table 2.

	1987-88		1988-89	
	Target	Achieved	Target	Achieved
1) Percent of one year old farmers with whom projects planted	100	83	90	91
2) Percent of two year old farmers whose sufficiency was raised by at least 1 month	30	28	40	53
3) Average increase in sufficiency of all 3 year old farmer at the end of the 3rd year(days)	60	27	35	35
4) Average increase in sufficiency of all 4 year old farmer at the end of the 4th year(days)	60	20	30	36
5) Cost to the programme per farmer worked with (in takas)	-	980	800	888
6) Cost to programme per taka earned for farmer.		1.32	1.25	0.66

From Table 2 it is evident that the programme achieved all the targets except one. The cost per farmer worked with (item 5) could not be reduced as all the extensionists did not have their full complement of 100 farmers.

Discussion: There had been fears that the increase in the number of farmers per extensionist would reduce the impact the programme would have on the individual farmer. However, results show that performance has improved. The number of farmers per extensionist was increased to enable the programme to reach more farmers, and also to reduce the cost per farmer worked with.

The cost benefit ratio of programme services was also very favourable. During the preceding year this ratio was 1.32, which meant that it cost the programme Tks 1.32 to earn Tk 1.00 for the farmer. Last year the programme set a target of 1.25 but achieved a figure of 0.66. This meant that the programme was able to earn Tk 1.00 for the farmer by spending Tks 0.66 only.

#### Other Targets

To develop the programme further the Extension Programme Officers decided to begin rearing cattle at the Programme offices to demonstrate better feeding practices to farmers. This was not done last year because the Extension Programme, after discussions with the Research Programme, decided to delay this activity until the Research Programme had more information and experience with cattle and improved feeding and rearing practices.

Also, the programme planned to train one extensionist from each area in bee-keeping. This also could not be done because of difficulties in locating suitable training for the extensionists.

It is hoped that both livestock rearing and bee-keeping will be looked into next year.

The programme set a target of 90 field days last year but managed to hold only 49 field days. It was planned that farmers would be taken to research stations and other farmer homesteads to see new practices being researched or planted by researchers and other farmers. The late heavy rains in November and the severe drought during the summer destroyed many seed-beds and gardens. All extensionists were busy trying to help farmers protect their projects so they had very little time to arrange rallies or field days.

As a result of a cooperative effort with the Extension programme, the Appropriate Technology Programme developed an improved rat trap. One hundred of these traps were sold to farmers by the extensionists. Because the traps are cheaper than local ones (Tks 10/trap as against Tks 18-20/trap) and are more effective, it is hoped that farmers will benefit from these traps. Rat control within the bari and in the crop fields is a major problem farmers face.

#### Soybean Extension

This past year 1087 acres of soybeans were extended to general farmers (not necessarily subsistence farmers) in the greater Noakhali & Comilla areas. Despite the dry weather the crop did well and the yields were good.

At the beginning of the season farmers were quite cautious. As the sowing dates of mustard and wheat lapsed, a lot of farmers turned to soybeans to fill their fallow fields. Cut worms as always were a major problem in some areas. Whole fields were wiped out in a matter of days. However, farmers were successful in containing the pests by hand picking. All the soybeans were harvested in dry weather and thus the quality of the produce was excellent. The market was strong and farmers were very happy.

Many farmers are consuming soybeans as a dhal in their homes this year. This is because the price of other pulses is very high and beyond the reach of many farmers.

Extension-Research Cooperation:

During the past winter and rainy season several field tests were put out in farmers fields at the request of the agronomists. In Bordin and Dagonbhuiyan rice seed was multiplied in farmers fields for use by the researchers and the Extension Programme.

The programme officer in Bordin set up an office in the same premises as the Dhorkora Research Site. This was done to present research and extension to farmers at the same location and also to increase communications between the researcher and the extensionists. Initial results of the shared facilities and communication efforts appears very positive.

## HORTICULTURE PROJECT

The Horticulture Project is designed to assist the extension-oriented programmes within the MCC Agricultural Programme. It also serves as a link between these and the Research Programme. The Horticulture project functions from within the Extension Programme because extension relies heavily on vegetable cultivation for income generating projects. Therefore, this report is primarily a summary of the horticultural activities of the Extension Programme unless otherwise specified.

Horticulture project components include: winter, summer and rainy season vegetable cultivation; seed multiplication to provide seeds for the Agriculture Programmes; a homesite tree improvement project; and nursery establishment. All of these projects are aimed at increasing the income of the target group farmers within the Extension Programme.

### Winter Vegetables

Seed Quality and Sales. Seed sales were higher than last year for two reasons: the number of listed farmers increased by forty percent and two storms occurred which did extensive damage to seedbeds and transplants (see Table 3). The first storm occurred Oct. 19 damaging nearly fifty percent of all seedbeds, causing many farmers to reseed. The second occurred Nov. 29 and did serious damage to many newly transplanted vegetable plots. This storm occurred after the last recommended planting date for many of the winter vegetables. Damage was caused by excessive rain which flooded some fields or by high winds that broke seedlings or loosened their roots. Many farmers were not able to deal with the four inches of rain that fell.

Seed quality was good overall. An exception was one area where extensionists complained of low germination in *KK Cross*. A later maturing, larger cabbage off-type variety was seen in plantings of *Atlas 70* as was the situation last year.

Crop Performance. In spite of the rain, vegetable projects did relatively well. Cauliflower projects were most heavily damaged with cabbage and tomato following respectively. Transplants older than one month seemed to survive the best. Areas in the char were least damaged because projects are generally located in the homesite on high, well drained soil. Because damage from the rain was wide spread, vegetable prices in the market remained very high and often compensated for the damage. Furthermore, an extended period of cold weather through January increased the yield and lengthened the growing season for the cruciferous crops. This may have been especially beneficial to the farmers who planted *KK Cross* in the wake of the cyclone.

Extensionists were asked to compare the performance characteristics of the three extension varieties of cauliflower. *Early Snowball* and *Snowball A* were the preferred varieties and were given identical overall ratings. *Tropical 55* performance was good if early planting was possible, but crop duration was too long and head size often small, especially if late planted. Sulfur, boron, and molybdenum deficiencies were seen in some areas as in previous years.

Late and early blight seriously limited production of many tomato plots. Symptoms were seen in all extension areas. Early blight was particularly destructive after late February rains if the crop was near maturity. The extensionists observed that *Roma VF* is the most susceptible to late and early blight while *Manik*, *Tropic*, and *Raton* are less effected.

Tai Sai projects were a dismal failure this year as many plants flowered very early, perhaps due to the cold weather. There is also the possibility that the variety is no longer true because of low selection pressure for late bolting characteristics in our seed multiplication project. New seed is being obtained this year to test this theory.

Extensionists reported that of the 'uncommon' vegetables distributed this year carrot was the most profitable and has the most potential for establishing itself in the market. Kholrabi also is becoming more popular in a few areas.

New technologies. Close spacing of cabbage was tried this year because previous research had shown it to be more profitable. It was not very successful. The main problems encountered were controlling insects and regular cultivation, weeding, and irrigation; these activities were made difficult by the close spacing. The Extension Programme Officers suggested that the spacing be increased to 45/40 cm. instead of the 40/30 recommendation (previously 60/45).

Okra and borboti projects were encouraged on a larger scale than last year for the late summer season (Aug. and Sept.) of '88. These did very well with very low insect attack and disease symptoms. Market prices for these two crops were also very high. Extensionists gave this technology a very good rating.

One of the more successful farmer plots this year was an intercrop of tomato, cabbage, and snake gourd. This proved to be a good mix in the wake of the cyclone. Tomato is more tolerant to these storms while the early planted summer vegetables may be planted as insurance against damage to the winter vegetables or to fill in where plants are missing.

New Varieties. The tomato variety *Raton* was extended for the first time this year. Extensionists gave it a very high rating compared to the other extended varieties; it was second only to *Roma VF*. *Roma VF* usually is favored by the farmer because of fruit characteristics and yield. However, *Roma VF* was evaluated to be more susceptible to disease than the other extended varieties. This may be a major constraint for profitable production of *Roma VF* in the future as the incidence of disease is increasing from year to year, especially late and early blight. A small amount of *Tropic* tomato seed was also sold. Extensionists response to this variety was similar to *Marglobe* and *Manik*.

Three varieties of cauliflower were grown for observation in the Dagonbhiyan demonstration garden. *Poshali* from near Tangail produced a small amount of seed. It was very similar to *Tropical 55*, requiring early planting for good seed yield. *Magi* and *Rakushi* varieties produced no marketable heads because of late planting. *Probhati*, a cabbage variety that produces seed in some areas of Bangladesh was also grown for observation. It has a slightly longer growing season than *Atlas 70* and *KK Cross*, but head size was approximately 1.5 kg. It can produce seed but requires early planting for a good seed yield. For the seed stalk to emerge properly the head must be cut open.

Trainings. In late August two days of trainings in winter vegetable cultivation were given to Extension Programme, RSP, HSP, and Research Programme staff. A one half day session was also provided for ART staff. In January and March half day trainings were given on two separate days in disease and insect problems faced in both winter and summer seasons. Special emphasis was given to control of the fruit fly in cucurbits.

#### Summer and Rainy Season Vegetables

Seed Quality and Sales. Seed quality was good except in a few cases. The usual problems of insect infestation in borboti and low germination reports for early planted vegetables were voiced by farmers. A test of different storage methods for borboti seeds was conducted because of the difficulty of maintaining insect free seed packets. Treatments included powder of crushed neem leaves, tobacco powder, double plastic bags, mustard oil, and foil packaging. Seed germination and quality was excellent in the foil packets followed closely by the double plastic treatment. The neem treatment was ranked third. Even though the visible insect damage was higher than the tobacco treatment, Mustard oil destroyed the plastic bags and gave less protection to the seeds than the control.

Table 3: Extension Programme Seed Sales  
( For the period July 1, 1988 to June 30, 1989)

Vegetable	Variety	Pkt. Size (grams)	Programme Sales		
			1988		1987
			Number of Pkts.(kgs.)	Weight (kgs.)	Weight (kgs.)
<u>Winter Vegetables (sold Sept.to Dec.)</u>					
Cauliflower	Snowball A	2	822	1.64	2.82
Cauliflower	Early Snowball	2	454	0.91	0.00
Cauliflower	Tropical 55	2	185	0.37	0.49
Cabbage	K K Cross	2	396	0.79	0.74
Cabbage	Atlas 70	2	783	1.57	1.51
Tomato	Roma V F	2	2432	4.86	4.10
Tomato	Marglobe	2	938	1.88	1.53
Tomato	Manik	2	239	0.48	0.79
Tomato	Raton	2	181	0.36	0.00
Tomato	Tropic	2	123	0.25	0.00
Kholrabi	White Vienna	2	219	0.44	0.57
Carrot	New Kuroda	2	571	1.14	0.91
Turnip	PTWG	2	22	0.04	0.11
Palong Shak	Local	10	461	4.61	1.94
Japanese Greens	Tai Sai	2	118	0.24	0.11
Sweet Pea	Green Feast	30	19	0.57	0.27
Sweet Pumpkin	Comilla Local	5	706	3.53	1.03
Sub Totals			8669	23.68	16.91
<u>Summer and Rainy Season Vegetables (sold Dec. through Aug.)</u>					
Hyacinth Bean	Bata	30	973	29.19	19.50
Okra	Pusa Sawani	30	2280	70.89	45.27
Dorbati	Kagong Notaki	25	2594	58.78	30.90
Kangkong		30	1624	53.34	25.26
Indian Spinach	Local	10	2062	23.63	9.72
Bittergourd	Comilla local	5	1906	12.04	4.90
Snakegourd	Local	5	3302	19.91	8.47
Ridgegourd	Local	5	1709	10.38	3.95
Cucumber	Local	3	1292	4.97	4.06
Black Chilly	rainy season	2	51	0.10	0.22
Sweet Pumpkin	rainy season	5	0	0.00	0.59
Eggplant	Bolanath	2	1	0.00	0.00
Datashak	Local	2	266	0.53	0.89
Sub Total			18060	270.87	153.73
Total for Both Seasons			26729	294.55	170.64

Summer vegetable seed sales began early in an attempt to compensate for the crops lost in the November cyclone. Farmers were interested in early planting and this was encouraged. This, in addition to the increase in programme size, caused seed sales to be much higher than expected for nearly all vegetables, resulting in shortfalls in a few cases. Bitter gourd and cucumber were in short supply because of a poor harvest of seed the previous year. Kangkong seed supplies were inadequate because of higher than expected demand and of seed buy back problems during seed multiplication. Rainy season sweet pumpkin seed collection of the previous year was inadequate for all of the MCC programme needs. Because the Homesite Programme relies heavily on this vegetable for summer season extension, all available quantities were supplied to that program.

Crop performance. Drought conditions caused by very late rains were the major limiting factor for early market production. Many plots were replanted in areas where water was not available for irrigation. However, after the rains came, market prices remained very high compensating for reduced yield.

The major problem farmers confront each year is the fruit fly attack on cucurbits. This year a special emphasis was given to the control of the insect. Farmers were encouraged to destroy all fruit that was infected and to spray late in the day when fruit fly activity is at a peak. In addition, if *Dipterex* was available in the local market, the farmers were instructed in the use of the bait trap system developed by BARI and tested by the Research Programme. This trap uses a mixture of sweet pumpkin mash, water, and the insecticide *Dipterex*, and is usually hung under the trellis in half of a coconut shell. The mixture is renewed after two days. Reports from farmers and extensionists were very positive and suggest that a moderate amount of control is being achieved by the pot trap system.

Other constraints to profitable production were okra shoot and pod borer and borboti bean fly. The borboti bean fly is a very serious pest and completely destroyed several fields. This, along with virus attack, severely limits production potential in the summer season. Extensionists are generally encouraging farmers to not plant after April 1 or to wait until after the rains have come. Late planted okra and borboti perform very well in the late season.

Thrip and mite problems were prevalent this year, especially on snake gourd and okra. These problems were often identified incorrectly as virus attack. These problems were not serious and may be a secondary problem arising from the destruction of predator insects when non-specific chemicals were relied on.

A trip was made to Akhaura near Brahmanbaria to collect Kakrol tubers. Demand was very high this year and 12 maunds were sold to farmers at the cost of 4 taka /seer. A problem was encountered with rotting which destroyed more than 50 percent of the tubers planted in the Laksham area. This was due to inadequate soil moisture. Similar problems were encountered in other areas but at a much lower incidence. Even so 60 decimals were planted in that area because the land type is very favorable. It was difficult to collect male tubers in April so another trip was made in mid May and male tubers were purchased and distributed to farmers.

New Varieties. New borboti and okra varieties were grown in the Dagonbhiya office demonstration garden. Two borboti varieties, one collected from Sitakhunda and another purple variety from Ramgor, were similar to *Kagong Notaki* in yield, but bean fly attack was very high. Two varieties of okra, *Pentalish* and *Tata* were grown but neither variety exhibited more virus tolerance than *Pusa Sawani*.

### Seed Multiplication

The Horticulture Project continued to multiply seed of several indigenous varieties because of the unavailability of good quality seed or varieties. These seeds are also used by the other programmes within the Agricultural programme.

Kangkong seed multiplication did not meet its target because farmers continued to cut the crop until late into the season, reducing foliage and therefore yield. Market prices remained high and outbid the set seed price. Indian spinach (puishak) seed harvests were very good. The new practice of delaying plantings until September was initiated in one half of the plantings and was very successful.

Okra and borboti seed yields exceeded set targets by 160 percent. Both crops were produced in the late summer and early winter season concurring with last years results that these crops can be successfully multiplied in the off season.

Recommendations this year for seed multiplication of cucurbits included making sure all fruit infected with fruit fly maggots was buried or destroyed, spraying with pesticides that are of low toxicity to pollinating insects, spraying in the evening to reduce damage to pollinating insects, and using the pot trap system with the insecticide Dipterex. Seed yield per decimal of all the cucurbit crops increased over last year, a sign that the added effort was effective. However, a few of the plots were not given careful attention by either farmers or extensionists, causing a very poor yield and a reduction of the overall average. Cucumber seed production once again fell below the target for undetermined reasons; fruit yield was satisfactory but seeds produced per fruit were low resulting in a high production cost per unit of seed produced. Bitter gourd production fell below the target but not because of the fruit fly problem. One farmer sold the first cutting of fruit rather than save it for seed because the market price was very high, and a hail storm also destroyed forty percent of one planting in Laksham.

**Table 4. Vegetable Multiplication Summary**

Vegetable	Variety	Production Target(kgs.)	Actual Production	Production Cost(tk/kg)
Kangkong		100.00	71.55	97.34
Indian spinach	Local	35.00	58.62	183.39
Okra	Pusa Sawani	15.00	24.38	149.41
Borboti	Kagong Notaki	75.00	127.60	157.70
Bittergourd	Comilla	21.00	12.35	627.92
Snakegourd	Local	12.00	11.40	456.68
Ridgegourd	Local	7.50	11.62	418.87
Cucumber	Local	16.50	7.10	2209.86
Palong shak	Local	8.60	7.70	50.52
Japanese greens	Tai Sai	0.70	1.70	250.00
Tomato	Tropic	0.10	0.35	3085.65
Bush bean	June Green	4.00	3.50	63.79

Farmer Nursery Programme

As of June 1989, 15 dependent nurseries were operating within the MCC extension area. Eight new nurseries were begun this year in new areas with the confidence that the market for fruit and timber trees would not be over supplied in old areas. Four nurseries that are totally independent of MCC assistance are operating successfully. Dependent nurseries are defined as those that have an outstanding loan or are dependent on MCC for supplies such as seed and plastic bags.

Tree sales from the farmer nurseries were much less this year, mainly due to the decrease in demand for trees needed on MCC road building projects (see Table 5). Sales to MCC were 80 percent less than the 1987 total. For the sale season of 1988, which ended in September 1988, the total income for the dependant nurseries was 20,256 taka or an average of 1,688 per farmer. Total outstanding loan was 1,586, an average of 132.2 per farmer, and total profit was 13,770 taka, or an average of 1,147 taka per farmer.

Table 5: Tree Sales from Farmer Nurseries 1988

English Name	Bengali Translit.	Sales to		Remaining	Sale Price
		MCC	Other	in Nursery	
<b>FRUIT TREES</b>					
Amoloki	Amoloki		23	21	2.00-3.00
Betel nut	Shupari			50	
Butter fruit	Gab		30		2.00-2.50
Coconut	Narikel		63	1	15.00-22.00
Guava	Peara	148	781	383	2.00
Hogplum	Amra	10	138	246	1.00-3.00
Horseradish Tree	Shajna		12	8	2.00
Jackfruit	Katal		207	313	
Lemon(kagozi)	Kagogi	47	675	260	1.00-4.50
Litchu	Litchi		33		1.00-2.00
Olive	Jolopai		10	10	2.50-3.50
Orange	Komola		10		5.00
Papaya	Pepe	160	931	10	1.50
Pomegranate	Dalim			52	
Pummelo	Jamburah	20	109	271	1.00-5.00
Star fruit	Kamranga	27	40	40	2.00-3.00
Wood Apple	Bel	20	51	10	1.00-2.00
	Cou		30	25	1.50-2.00
	Monocca		3		4.00
<b>TIMBER TREES</b>					
Arjuna	Arjan		105	65	1.00
Babul	Babla	5760	150	1060	1.00
Date Palm	Kajur palm		55	50	6.00-7.00
Mahogany	Mahogoni	45	2681	406	1.00-3.5
Rain tree	Puli koroi	40	364	115	1.00
	Shil koroi		33		1.50
	Deshi koroi		10	25	-
Royal Poinciana	Krishnachura		190	40	0.75-1.00
Sissoo	Shishu		120	50	1.25
Teak	Shagun		231	11	1.00-3.50
	Minjuri		5	10	-
Totals		6277	6415	3532	

Work began on a nursery management calendar that will be used by the extensionists that are helping to plan farmer nurseries.

Farmer interest to produce seedlings of *Kazi pears* was very high due to high market demand and profit available. Nursery farmers do not have access to seed or vegetative material to propagate these seedlings. To test other methods of propagation, *Kazi pears* seedlings from BARI were planted alongside first generation seedlings of *Kazi pears* in at least one farmer nursery of each Extension Officer's area. The first generation seedlings were taken from a nursery farmer in Laksham. Comparisons will be made between the two seedlings to see if *Kazi pears* characteristics can be maintained through first generation seed propagation.

#### Homesite Improvement Project

This project has been designed to upgrade the quality of fruit trees within the homesite, either through distribution and sale of improved or locally unavailable varieties, or by upgrading the quality of existing varieties. Project components include a boroi budding project, banana sucker distribution, and coconut tree fertilization.

Approximately 592 boroi buds were set this year on 257 trees. Of those set, 366 or 62 percent were successful. A special training was given to extensionists this year in budding. In some areas this training was passed on to the subsistence farmers who can now bud their own trees. One hundred ten banana suckers were sold from subsistence farmer homesteads to other local farmers. These originated from suckers distributed by MCC to subsistence farmers in years past. Twenty five percent of these went to subsistence farmer homesites. Also, 336 coconut trees received fertilization in 107 subsistence farmer homesites.

Papaya seedlings grown from seeds collected in the Bordain area were transplanted in several locations to test the variety. This local variety is known to be a highly productive and well adapted to the extension areas, and is being observed for the future possibility of extension.

#### Seed Inventory

A new system of record keeping for seed supplies was installed and functioned well. A problem remained in that direct control could not be maintained and seeds were distributed without the approval of the Horticulturist, leading to a deficit for programmes that had first priority. This year nearly 11,000 taka worth of unsold seed was returned from extensionists to the godown. This represents nearly 30 percent wastage. Some of this seed was tested, dried, and placed in cold storage with the intent that it may be used in the event of a shortfall next year.

#### Miscellaneous Activities

Much time and effort is being given to finding pest control measures that do not rely on chemical control. For this reason some parts of the training manual are being re-written with an emphasis on non-chemical control methods for pests and diseases.

The percentage of farmers making compost dropped from last year, in part due to the large increase of new farmers taken on by the extensionists. In both the winter and summer seasons an average of 25 percent of all listed farmers prepared compost and used it on vegetable plots. The practice of seed saving also decreased slightly from the previous year, but the number of varieties saved has increased. For both summer and winter vegetable seasons an average of 25 percent of the listed farmers saved seed. The incentive to save seed actually decreased in some respects this year as vegetable prices were much higher than normal. The low price that MCC charges for seed is often accepted by farmers as a permanent situation and also encourages farmers to sell all fruit rather than save for next year's crop. However, the subsidy on vegetable seeds is gradually being removed, and particularly for the summer vegetables will be set at market price within a year.

The Horticulturist and Vegetable Specialist helped in a post flood rehabilitation effort during the month of September. In cooperation with OXFAM, MCC packaged 625,000 packets of vegetable seeds in a two week period for distribution to families in flood effected areas. Seeds packaged included lai shak, sweet pumpkin, radish, tomato, and palong shak. A follow-up survey was done completed after the growing season to evaluate the effect of the seed distribution.

Field trips were made to several outside organizations and programmes. Two visits were made to BARI at Joydepur to keep abreast of developments in vegetable production. A visit was made to the Hatazari field station of BARI to learn about current research in fruit production. In May a trip was made to Chuadunga to learn about mango production, specifically propagation through grafting.

SOYBEAN PROGRAMME

The objective of the Soybean Programme is to make available a low price, high protein, nutritious pulse to lower and middle-income consumers, while at the same time establishing the cultivation of soybeans as a viable cropping alternative for farmers in Bangladesh. Soybeans have the ability to produce two times the protein of other crops on the same land area (Table 6).

Table 6 CROP PROTEIN COMPARISON

Crop	Yield	Protein	Protein Yield
	kg/ha	%	kg/ha
Soybean	1235	43	531
Lathyrus	735	29	213
Lentil	680	27	184
Blackgram	714	25	179
Chickpea	750	21	158
Mungbean	590	26	153

Source: *Constraints to Production of Pulses in Bangladesh*, Dr. S. M. Elias, 1987.

Soybeans are also important because millions of people in Bangladesh suffer from chronic protein and calorie deficiencies. One of the best solutions to this problem is to supplement rice diets with whole soybeans. On average soybeans contain about 40 percent high quality protein. While most plant sources are deficient in several of the nine essential amino acids, soybeans are slightly deficient only in methionine. This relatively balanced amino acid pattern makes them ideal as a supplement to rice. Soybeans also contain an average of 20 percent unsaturated oil, and are rich in vitamins, minerals and calories. Therefore, soybeans are a very inexpensive source of vitamins, minerals and high quality protein

The past year July 1988 to June 1989 was very rewarding to the Soybean Programme. MCC farmers increased their acres by 150 percent over last year in rabi season. This represents above 430 hectares (1,070 acres) planted in the greater Noakhali area. In Bangladesh for a crop to be recognized it has to have over 400 hectares (1,000 acres) cultivated in one season. The Soybean Programme has been working towards this goal for the past five years. It now seems possible to substantially increase soybean acres in Bangladesh in the future.

The primary extension efforts are concentrated in and around Lakshmipur, Noakhali and Comilla districts, where farmers planted 433 hectares (1,071 acres) in the 1988-89 rabi season. Seed for this crop is produced in and around Chuadanga district where farmers planted 62 hectares (152 acres) in the 1988 kharif season. The vast increase in acreage is credited to good performance of the variety Pb-1 and an increase in market demand. With an increased effort to provide a ready market for their soybeans, farmers seem eager and able to increase soybean production.

#### Kharif Season

Kharif season production has been promoted by MCC primarily for high quality seed. Seed quality tends to be better than that of rabi season soybeans due to cooler and drier weather at harvest time. The kharif crop was planted from June 15 thru August 28, 1988, with seed rates averaging 45kg/ha. The kharif crop was harvested in early November 1988. The average yield was 0.77 tonne/ha. MCC bought back 33.5 tonne from dealers in Darsona, Amjupi, Jibannagar and the main MCC office in Chuadanga. 27 tonne was cleaned and tested for germination, then transported to Noakhali for rabi season planting. 1 tonne was kept for the following kharif season planting and 5.5 tonne was sent to Dhaka for food soybean marketing.

This season's estimated area to be planted is 121 hectares (300 acres). Already in June 1989, 28 hectares (70 acres) have been planted. This season marks the first time that MCC did not make contracts with farmers to grow seed soybeans in the greater Chuadanga area. Instead, MCC extensionists made lists of farmers that are interested in growing soybeans.

There is a strong demand for soybean seed this year, due to scarce rains in April and May 1989 that prevented Aus planting. The seed for this season kharif planting came from the May 1989 harvest in greater Noakhali. The seed is being sold through private dealers and the MCC Chuadanga office in the growing areas.

The 1989 kharif season will also see increase in areas from other NGOs. MCC working with Tangail Agricultural Development Project will plant 182 hectares (450 acres) in the Tangail district. Also, MCC will help Rangpur Dinajpur Rural Service plant 4 hectares (10 acres) as an observation trial in their extension area.

#### Rabi Season

Demand for seed was very high and, by January 1989, the seed stock of all dealers, farmers and MCC offices was depleted. This was due to the high price of food soybeans in the market place around October and November 1988. The rabi crop was planted from December 15 thru January 29, 1989, with seed rates averaging 60kg/ha.

The Rabi crop was harvested in late April and early May 1989. The average yield was 1.7 tonne/ha. Total seed sold through dealer and MCC offices was 19,354kg and 6,729 respectively, and farmers planted 685kg of their own seed. This represents 433 hectares (1071 acres) of soybeans planted. Compare this with last years area of 176 hectares (438 acres) and it is 150 percent increase! A total of 6,573 farmers, 2,429 old and 4,144 new, grew soybeans this year. For an area-wise break down of rabi season's MCC office seed sales, Dealers seed sales, hectares in 1988 and 1989 season and percent increases in hectares see Table 7.

Table 7 Rabi Season Soybean Information

Location	Office	Dealer	Area 1988	Area 1989	Increase in Area
	Seed Sales	Seed Sales			
	kgs	kgs	Hect	Hect	%
Hydergonj	2918	9815	68	209	210
Lakshmipur	609	3875	50	74	60
Laksham	1034	3441	30	72	160
Sonapur	968	1248	28	43	49
Char Bata	1200	975	2	35	1700
TOTAL	6729	19354	178	433	150

Source: MCC Soybean Programme.

The estimated production for this rabi season soybean crop is over 735 tonnes. About 40 percent of this will stay in the bari for home consumption. Another 40 percent will be sold locally to food dokans, chana-chur and biscuit factories. The remaining 20 percent will be sold to the urban markets in Dhaka, Chittagong and Sylhet.

Insect Damage: 32 hectares (80 acres) of rabi soybeans in Laksham were infested by cutworm (*Agrotis ipsilon*) in late February. Extensionist helped farmers by demonstrating different control measures. By the end of March, 50 percent of the cutworm damaged fields had grown back.

#### Utilization and Marketing

The Soybean Programme has changed its urban utilization strategies from cooking demonstration (CD) to working on an Overall Marketing Plan. This plan is targeted at intermediate factory users, i.e. biscuit, chana-chur, baby food, noodle and other factories, institutional users, i.e. hospitals and orphanages, and household users.

The promotion programme for these various user-groups is in the initial phases. The Soybean Marketing Officer is working with FPDC to identify foods that can be used by institutions. He is working with factories and local urban dokans to use and carry soybean products. For promotion to households the Soybean Programme has been working on creating recorded music with soya song to be broadcasted at dokans, by rickshaws and radio station. Soya advertising work is being done on billboard and leaflet design and production. Also, private wholesale dealers have been located in Chittagong, Dhaka and Sylhet to distribute whole soybeans and soya products.

In Greater Noakhali the Soybean Programme is continuing rural cooking demonstrations to introduce soya cooking methods to farmers' bari. At present 15 cooking demonstrators are working in 8 villages in Lakshmipur, Comilla and Noakhali districts. To better facilitate the explanation of soybeans, Voluntary Health Services Society helped MCC to create a Flip-Chart of soybeans "do's and don'ts" in the bari to be used by CD. They are being distributed to MCC's CD and other NGOs working with soybeans.

Sales of soybeans from the 1987-88 rabi season were slow until September after the flooding was over. A couple of truckloads went to OXFAM for relief in the form of flour. Also, biscuit and chana-chur factories started purchasing large quantities of soybeans. By the end of November 1988 there were no soybeans available for market demands. The severe drought of spring 1989 has caused high prices for pulses. Soybeans harvested in May 1989 have been kept in the farmers house for home level consumption, due to the high prices of other dals. Some soybeans are being sold in local markets and urban areas. Once again market demand is greater than supply.

In April Dr. Wijeratne from International Soybean Programme met with Micro Industries Development Assistance Society (MIDAS) and MCC personal to discuss the Soybean Extruder/Expeller Project's (SEEP) feasibility study that MIDAS had prepared. MIDAS has made revisions, from questions raised at the meeting and completed the feasibility study. Also, MCC is currently investigating alternative technologies that might be implemented instead of SEEP or certain parts of the Project. MCC is reviewing the completed feasibility study and deciding whether further action is warranted.

In conclusion, the 1988-89 marketing year was a year of preparations and information gathering in the marketing aspect of soybeans. With substantial production increases predicted for the future, the soybeans' marketing component is well prepared to handle the marketing of soybeans.

#### Agronomic Research

The primary objective of the research on soybeans is to adapt the crop to the agro-climatic conditions of Bangladesh. For this reason, research is conducted in both Chuadanga and Noakhali districts, for both kharif and rabi seasons. Research is centred on selection of varieties from genotypes imported from India, Taiwan, Vietnam, USA and other countries. Varieties are screened for seed quality, duration, yield and other agronomic traits in as many different growing situations as possible using Pb-1 as the check variety. In addition to varietal selection, research is also conducted on cultivation practices, storage methods and utilization possibilities.

Chuadanga (Kharif season). Although some riverine flooding was experienced during the month of September, plant growth in the soybean research trials was not badly affected. Two varieties, Sao Luiz and Santa Rosa R., gave higher yields than Pb-1. The varieties JS-2 and Shilajeet showed potential as short duration varieties. A screening trial of 55 varieties showed distinct differences in resistance to weathering damage of seed quality. Only 17 of these varieties were equal to Pb-1 in weathering damage resistance. A plant density trial resulted in a new recommendation for Pb-1 seed rates according to date of planting. A trial of *Rhizobium* inoculant strains showed significant differences in nodule number and fresh weight, but no effect on grain yield. On-farm trials on insecticide use and inoculant rate were conducted, and confirmed present recommendations.

Noakhali (Rabi season). A yield trial of short-duration varieties showed that the variety JS-2 could yield almost as much as Pb-1, while maturing one week earlier. The *Rhizobium* inoculant trial done in the *kharif* season was repeated in the *rabi* season, but results were quite different due to poor overall nodulation.

An experiment was done to test the feasibility of irrigated saturated soil culture of soybean, a technique originating in Australia. Plant growth of soybean was very vigorous with this technique, but grain yields were lower for the soybeans in the saturated soil treatment. The trial did demonstrate, however, that soybeans can be grown in fields adjacent to irrigated rice production areas, and utilize the higher soil moisture resulting from rise in the water tables in these areas.

The 55 soybean genotypes were grown in a screening trial to further test their resistance to weathering damage of seed quality. Seed from both the *kharif* and *rabi* seasons was tested for storability in ambient conditions, and large differences were observed among the genotypes. Only fifteen genotypes had storability equal to or better than Pb-1.

This season marks the completion of screening of the 55 genotypes in MCC's collection. Other than Pb-1, a few possible varieties have been identified. These varieties may help to diversify the cultivation of soybean in Bangladesh, but are not likely to be as widely adopted as Pb-1. Future varietal research should include importation of new germplasm, and, if possible, plant breeding.

A multilocation on-farm demonstration of early planting with the variety G2120(M7)69-1 (also known as AGS-313) was unfortunately delayed in planting. Nevertheless, potential was indicated for its adoption, especially in the medium lowland area near Laksam.

## RESEARCH PROGRAMME

### STATION RESEARCH

At MCC research stations, new varieties, management practices and initial economic considerations can be tested under conditions controlled by the researcher. Research is directed towards the perceived constraints faced by our target group farm families, and includes cooperative efforts with other research organizations.

Three stations are operated in conjunction with farming systems research (FSR) in three distinct land types. These land types are coastal saline charland, medium lowland (deep-water rice) and medium highland. The charland station is located in Noakhali district, and the other two stations are located in Comilla district.

Two other research stations are also operated in conjunction with the MCC Soybean Project in Lakshmipur and Chuadanga districts. Results of soybean research conducted at these stations are summarized in the Soybean Project section of this report.

The following section presents the major highlights of the trials conducted at each station in conjunction with FSR. For more specific results, including site descriptions, consult the 1989 MCC Research Results, available on request.

#### Charland Research Station (Char Bata and Char Matua)

Until December 1988, charland station research was conducted in Khaser Hat, Char Bata union, Sudharam upazila. Subsequently the research station was moved to Char Matua union of the same upazila, in order to move the station research activities closer to the farming systems research site. Therefore, *aus* and *aman* season trials were conducted in Char Bata whereas *rabi* season trials were carried out in Char Matua. Both of these locations are salt-affected charland. The research was centered on the adaptation of new cropping patterns to the constraints imposed by this land type.

Field days for area farmers were held in November and February in Char Matua, and a farewell farmers' rally was held in Char Bata in November. These events were organized in cooperation with local MCC extensionists. The February field day in Char Matua was organized jointly with the local union council, and Noakhali district government extension and research officers participated as well.

Aus Season Highlights: Testing of *aus* varieties adaptable to direct seeded cultivation was continued. Results indicated that BR20 can produce yields superior to the local variety Boilam, but only if adequate levels of fertilizer are applied. The yield response to fertilizer, however, gave a rather low benefit:cost ratio. Two other "IRRI-type" varieties selected from local farmers showed good yield performance but took three weeks longer to mature.

Aman Season Highlights: Cooperation with the Adaptive Research and Training Division of BRRI continued, with an ALART trial of eight advanced lines with photoperiod sensitivity. Four of these lines showed good performance relative to BR11. Continued testing of BR22 and BR23 showed that BR23 seedlings were more tolerant of flooding than those of BR11 and confirmed that BR23 could perform well in extremely late planted conditions.

Early maturing *aman* lines obtained in previous years from BRRI were again tested. Two of these lines performed well but had small kernel size which would limit their acceptability in the charland area.

In a trial of the super-granulated form of urea on local *aman* varieties, there was no response to either conventional or super-granulated urea. A green manure trial using *dhancia* (*Sesbania*) and cowpea showed no effect of the green manure on subsequent *aman* crop yields. This was likely due to poor stands of the green manures.

**Rabi Season Highlights:** Heavy rainfall associated with the late November cyclone caused a delay in planting of tomato and wheat research trials. A tomato salinity screening trial was very badly affected by the delayed planting. As a result, salinity tolerance could not be evaluated, but the fruit quality and type were noted. Of the six varieties of tomato received from the University of California for this purpose, three were rated highly for fruit quality and taste. Seed was saved for continued testing next year.

Wheat salinity screening trials were done in cooperation with the Wheat Research Centre of BARI. A screening trial of 226 lines showed a few lines with possible tolerance. A preliminary trial of four advanced lines did not show any line superior to check varieties, likely due to late planting and only moderate levels of salinity.

A screening trial of mungbean varieties was done in cooperation with the Pulses Programme of BARI. Several lines gave yields significantly higher than those of the check variety. Performance of promising lines should be further tested in yield trials in the coming year.

A forage production observation was conducted using several tropical and temperate forage legumes. Many of the tropical species had poor emergence under the early *rabi* season planting conditions. Egyptian clover emerged well but failed to nodulate. Alfalfa nodulated and produced surprisingly good amounts of forage, although probably not enough to meet its cost of production. Further forage legume screening is to be continued next year, with the inclusion of forage tree species.

Soybean, sweet potato, sesame and safflower were grown for observation. With the exception of sesame, these all yielded well.

Medium Lowland Research Station (Chitosi Station)

Chitosi Station is located on the Chandpur rail line, 13 km west of Laksam, in Mudafarganj #5 Union, Laksam Upazila, Comilla District. It is in a medium lowland area with flooding from 0.75 to 1.75m. The depth and duration of flooding, and potential for flash floods are major constraints affecting the cropping pattern. Flooding usually starts in June and ends in November.

The main cropping patterns are deepwater *aman* - fallow and mixed *aus/aman* - fallow. About 60 percent of all fields are fallow in the *rabi* season. The major research emphases include introducing new *rabi* crops without putting the deepwater *aman* crop at risk, developing reduced-input methods of growing accepted *rabi* crops, and increasing deepwater *aman* yields.

**Aman Season Highlights:** In a follow-up to a 1987 observation of 36 varieties, seven of those varieties were again tested along with the local variety Gorcha. Gorcha outyielded all seven new varieties.

Okra, Indian spinach and kangkong were broadcast in an intercrop with deepwater *aman* in an attempt to produce a summer vegetable crop before the flood. Indian spinach and kangkong showed some promise and are being tested again this year with earlier planting.

**Rabi Season Highlights:** Winter vegetables were again grown on the medium lowland with fair success. Farmers were especially interested in high value crops such as cabbage, tomato, watermelon, *bangi*, and onion; several farmers near the station grew these and other vegetables. Fast growing crops such as *lal shak* and radish also have potential.

Soybean and deepwater *aman* were planted together on four planting dates starting 11 January 1989. Soybeans yielded well, with the best yields from the first planting date. Despite the dry summer, rice stands in all plots appeared adequate.

#### Medium Highland Research Station (Dhorkora)

The station research was conducted on 0.65 hectares of rented land located near Dhorkora Bazar in Cheora Union, Chauddogram Upazila, Comilla District. The site is about five kilometers west of the Dhaka-Chittagong highway. About 0.32 hectares is on highland (no flooding) and 0.33 hectares is on medium highland (flooding to a maximum of about 30 cm in the monsoon). The soil is of the Tippera series, a gray silt loam flood plain with soil pH around 6.5. The major cropping pattern is direct seeded *aus* - transplanted *aman* - fallow. In medium high land about 0.06 hectares is covered by minipond for fish research.

A farmers' field day was held in January with the participation of farmers from the Dagonbhuiyan and Bordain MCC extension areas.

**Aus Season Highlights:** A trial compared the performance of BR21 and Purbachi *aus* varieties under transplanted and broadcast conditions, with low and high fertilizer input levels. Under all combinations BR21 outperformed Purbachi. In the coming season, BR21 is being recommended as an *aus* variety in the medium high land area. The BR21 yields were the most stable across the two fertilizer levels and the results indicate that BR21 would be considerably more profitable for subsistence farmers.

**Aman Season Highlights:** Two trials were conducted in cooperation with BRRI to test *aman* ALART lines. BR1725-13-7-1-6 was the highest yielding photo-insensitive line (5 t/ha). BR850-22-1-4 also performed favourably relative to BR11 and Pajam. These two new lines will be further evaluated in this coming year through on-farm trials.

The photoperiod sensitive *aman* lines gave less than one half the yield of the best photo-insensitive lines in the other ALART trial, due to late planting (Aug. 20, 1988). The lines BR1185-2B-16-1, BR1840--2B-21 and BR1870-67-1-3 appeared promising, yielding more than BR22 and BR11.

The *aman* variety Binasail was developed at the Bangladesh Institute of Nuclear Agriculture (BINA). Under high fertilizer inputs Binasail was the highest yielding of four varieties. Binasail will be tested in MLT's in the next *aman* season.

BR23, a new BIRRI photoperiod sensitive release showed potential to replace BR11 in late planted *aman* production.

Summer Season Vegetable Highlights: Each year yellow vein mosaic (YVM) virus causes serious damage to the current okra varieties of Bangladesh. Two virus resistant lines were obtained from Chittagong University. In summer season the two lines CU1 and CU2 yielded considerably higher than Pusa Sawani and showed high resistance to the virus.

Rabi Season Highlights: Certain treatments of summer vegetable seeds resulted in significantly better germination than other treatments in cold season, early plantings of bittergourd, okra, *pui shak* and ridgegourd. The plots were planted in January with eleven treatments. The best treatments for each vegetable were:

- 1) ridgegourd - soak seed 24 hours in water; 2) *pui shak* - hot water soak overnight; 3) bittergourd Naogaon method;
- 4) okra - scarification of seed coats by rubbing in sand for five minutes.

In cooperative research with Chittagong University, promising results across two years of kharif testing were obtained with one of the two advanced lines of yellow vein mosaic virus-resistant okra. A *rabi* season trial was conducted to test these two lines against the local (Pusa Sawani) in that season. Both lines had excellent virus resistance, but yields were not better than the local, and durations to maturity were significantly longer for the virus-resistant lines.

Multiple cropping trials were conducted with many different winter-season vegetables. A trial with an intercrop composed of tomato, cauliflower and cabbage, compared to sole croppings of these vegetables, indicated that the intercrop may have promise to reduce risk against damaging, late, heavy rains (like in late November, as happened last year). This is due to very high survival rates for tomato plants compared to cabbage and cauliflower.

In another multiple cropping trial, a *lal shak*, radish *shak*, egg-plant intercrop gave the highest range of return of four intercrop treatments; this indicates that farmers can increase returns with three crops intercropped together, versus either two species intercropped (*lal shak* and radish *shak*; or, *lal shak* and sweet pumpkin) or sole egg-plant.

In the second year of testing early maturing hyacinth (lab lab) bean lines in cooperation with BARI Vegetable Section, two lines (HCO024 and HCO010) showed promise for the highland plantings. Further testing should be done in farmers' fields only.

In cooperation with BAU, the overall agronomic performance of three advanced lines of tomato were compared with Manik, Ratan and Roma VF, three released varieties. Cyclonic rains in November, poor nutrient status of the soil, and a heavy attack of late blight disease led to poor yields (mean = 27 t/ha); no differences for yield were observed.

Trials were also conducted with winter vegetables. Cabbage and tomato seeds were planted in leafpots made out of rolled up banyan leaves. It was hoped that transplanting shock could be reduced but this effect was not seen. Unusually heavy rains in mid October and late November might well have obscured the results.

#### FARMING SYSTEMS RESEARCH

Farming systems research sites in each land type are staffed by research scientists, site managers and data collectors. Work at the sites includes monitoring of farmers' fields and other farm enterprises. This provides a source of information on local farm management practices. In addition, research trials are done in farmers' fields and homesites to test new technologies against local conditions, including socio-economic evaluation in the testing process. Periodically, field days are held for farmers at each site, to discuss research results and future plans.

In addition to the FSR sites, MCC also has extension offices located in each land type. Personnel at the extension offices conduct multi-location trials (MLT's) and extend technologies originating from the FSR sites. The frequent contact maintained between people at the FSR site and the extension offices facilitates feedback from the extension programme to the research programme.

The highlights of the past year's work at each site are presented below. Detailed reports from the surveys and trials can be found in the 1988 MCC Research Results, available on request.

In the past year, livestock and fisheries research components were commenced. Now the Research Programme has the potential to examine and research these other important components of Bangladesh farm families' resources.

### Charland Farming Systems Research Site (Char Matua)

On-farm research in the char was conducted at the MCC FSR site in Char Matua union, Sudharam upazila, Noakhali. Due to salinity constraints in this area, crop cultivation during the *aus* and *rabi* seasons is severely restricted. Although MCC has conducted research for many years in the saline environment, very few crop varieties and technologies have shown any potential to address the salinity problem. On the other hand, rice variety testing has indicated a number of possible new varieties that could be introduced into the present cropping pattern. Livestock, especially cattle and goats, are an important part of the charland farming system. For this reason, the livestock research is based at the charland FSR site.

**Aus season highlights:** Monitoring of farmers agronomic practices showed that local varieties of *aus* were most widely grown. Average yield was 1.5 tonne per hectare for medium duration varieties and 1.3 tonne per hectare for short duration varieties. The survey showed that soil salinity and excess flooding were the major yield constraints.

**Aman Season Highlights:** A multilocation trial was conducted in twelve farmers fields, comparing the new varieties BR22 and BR23 to the local aman variety Kajalsail. Good potential for extension of BR23 was shown. With moderate levels of fertilizer, BR23 gave 27 percent higher yield than Kajalsail. Farmers were pleased with the large grain size and with the straw quality of BR23. Widespread demonstration of BR23 as a replacement for Kajalsail was recommended for the 1989 aman season.

This recommendation has resulted from several years of MCC testing of BR23 in various char areas. The variety was obtained prior to release with the cooperation of BRRI. This recommendation is significant in that a large area exists for its potential adoption. The area of Kajalsail in the greater Noakhali area is about 72,000 hectares.

Also evaluated in this MLT was the use of urea supergranules (USG) as a source of nitrogen. The yield increase observed was significant statistically, but only marginally acceptable for economic return. Further testing of USG for one more year was recommended.

Rabi Season Highlights: A sweet potato MLT confirmed last year's positive results with the variety Tripti. A newly released variety Daulatpuri was less preferred by the participating farmers.

#### Medium Lowland Farming Systems Research Site (Chitosi)

Aman Season Highlights: BR224-2B--2-5, Pathkola HR-16, and Sadapankaish were tested against local varieties. The local varieties were highest yielding, but were not significantly higher yielding than BR224-2B-2-5.

Intercropping soybeans and deepwater *aman* by sowing them together in late January or early February was further tested. Rice yields were not depressed by the intercrop. Grazing of the soybeans is a problem. However, the intercrop offers the potential of a soybean crop for the price of the seed.

Rabi Season Highlights: Soybeans and wheat were grown using four planting methods: cutting and removing rice straw, broadcasting seed, and replacing straw; same procedure replacing only half of the straw; *asra* minimum tillage; and conventional tillage. Armyworms were a problem for all but conventional tillage. Intensity of attack varied from field to field.

Medium Highland Farming Systems Research Site (Dhorkora)

The Dhorkora Farming Systems Research Site is located in Cheora Union, Chauddogram Upazila, Comilla District. It is in a large area of medium highland and has a maximum flooding depth of around 60 cm. The major cropping pattern is direct seeded *aus* - transplanted *aman* - fallow. Some *rabi* season crops are grown, such as mustard, lentil, *khesari*, wheat and cowpea. Other crops which are grown on highland areas within or near the villages include *aman* seedbeds, sweet potato, blackgram, groundnut, radish, chilli, eggplant, and sweet pumpkin. Two-thirds of the families in the area cannot provide a 12-month supply of rice each year from their landholdings.

**Aus Season Highlights:** BR21, an improved *aus* variety, performed favorably in an *aus* variety MLT, yielding more and having a shorter time to maturity than Purbachi, the most popular local variety. This variety has great promise in the medium highland areas and will be extended in the 1990 *aus* season. BR20 also performed well, and will be extended in the Dhaganbhuiyan area.

**Aman Season Highlights:** BR22 and BR23 performed well in an early and late planted *aman* variety trial. However, they both matured significantly later which would make it difficult to fit them into the local cropping pattern. They may fit into a cropping pattern where late-transplanting of *aman* is desirable.

**Rabi Season Highlights:** A number of trials were conducted with fruits and vegetables. A Papaya variety trial conducted in 40 homesites over the last two years showed locally selected papayas to be the most suitable for extension purposes. It also confirmed the sides of village houses as ideal planting sites.

A summer vegetable trial was performed with early planted vegetables in irrigated plots and later planted vegetables in non-irrigated plots. The previous years results were confirmed. Okra was profitable and appeared to be the least risky of the summer vegetables. Kang Kong and Indian spinach were also very profitable. Returns from cucumber, bittergourd, and snakegourd were minimal or non-existent and the cultivation of these crops is risky. Yardlong bean was again unprofitable. The Dhorkora local hyacinth bean performed well in a variety trial and an improved cultivar remains to be found.

Data from other trials was inconclusive due to freak climatic conditions. Among them were a mustard variety MLT and a lentil inoculation trial. In a tomato variety MLT in cooperation with BAU, Tusdi performed well and could become an alternative to Roma VF since it seems to be more wilt resistant. Bikash did not perform as well. Finally, a bait trap trial with a pumpkin/Dipterex insecticide mixture successfully reduced damage to snakegourd by cucurbit fruit flies. The farmers seemed interested to continue to use this technique in the coming year. Further research will continue.

#### Socio-economic Research

Two evaluation studies were done this year, one looking at the Rural Savings Programme's non-economic and secondary economic impact on its target group, and a second looking at the way beneficiaries of MCC's Extension Programme used their increased income from vegetable cultivation.

Several studies were done relating to vegetables. A vegetable/fruit tree sondeo was undertaken by a multidisciplinary group on December 5 and 6, 1988. A second study relating to vegetables involved price monitoring at several locations. A third study relating to vegetables looked at the current highland practices of farmers in our three landtypes. In addition, one study looked at goat rearing practices in the char. A final study looked at the income and expenditure patterns of several landless and subsistence farm households in MCC's three landtypes.

Evaluation of RSP's Non-economic Impact: In this study, it appeared that RSP's impact in terms of raising the political consciousness of its beneficiaries is primarily at a practical level. Most respondents indicated their political activities involved giving loans to fellow group members at low interest rates, or explaining RSP to the outside community. At the practical level of getting people together in groups to cooperate for a common goal RSP appears to have been very successful. Of those who had taken the RSP functional education course, 62 percent had actually read a book, newspaper, or letter, or written a letter in the previous month. Forty-five percent of the survey respondents actually received loans from the group fund, at roughly moneylender's interest rate. The loans represent around 50 percent of the individual's investment, and rates-of-return for agricultural investments were quite good.

Evaluation of Extension Programme Beneficiaries Utilization of Increased Income. Over 70 percent of the respondents indicated that increased income went towards the purchase of rice, pulses, fish, clothes, and medicine.

Extension Programme farmers were also asked to recall their vegetable cultivation practices before working with MCC. In some areas, vegetables were grown to a large extent; however, farmers in general added the vegetables instead of replacing existing vegetable cultivation practices. Thus, there would appear to be little opportunity cost for the land used in cultivation of the MCC-extended vegetables.

Farmers were also asked what types of services they would like to receive from the MCC Extension Programme. 82 percent said livestock-rearing training, 75 percent said nutrition education, 70 percent said training on fruit and spice tree cultivation, 68 percent asked for fish training, 67 percent asked for health and sanitation education, and 54 percent asked for literacy training.

SONDEO on vegetables and fruit trees. The objective of the study was to look at what subsistence farmers, extensionists, and researchers are currently doing with vegetables and fruit trees and discuss and prioritize new directions. The sondeo was conducted soon after the cyclone had hit the area and destroyed many vegetables.

Our group saw, first hand, the importance of crop diversification to reduce risk. Other constraints listed included: insects (bean fly on *borboti*, fruit borer on cucurbits, etc.) and availability of high-quality seed. Vegetable research ideas include developing good vegetable intercropping practices which lower risk. It was suggested researchers should survey how farmers respond to a problem like a cyclone. Another idea involved deciding on the latest date for which

planting (or replanting) winter vegetables is more profitable to planting summer vegetables. It was also suggested we look into year-round cultivation of kang kong, and the possible research/extension of onions. An idea relating to rainy season vegetables involved seeing whether vegetables could be first grown in a seedbed and later transplanted. Other ideas included research into the cultivation of some summer vegetables in the winter, insect control research, and the possibility of intercropping rice and vegetables. It was also suggested we look into using house roofs, ponds and trees for vegetable cultivation, and look into the idea of using ipil ipil (*Leuceana sp.*) and *dhancia* as fence material.

The second day was devoted to ideas relating to fruit tree research/extension. Research ideas included developing effective, yield-improving top-working techniques for mango, lemon, guava, litchu, and pomelo. Other ideas included finding insect control methods for the mango fruit fly, looking at the costs and returns of higher management practices for fruit trees, variety trials, undergrowth plants, and finding alternative places to plant papaya trees (other than next to the house).

Vegetable price monitoring. It was found in the first year of monitoring, that both winter and summer vegetables follow the expected pattern of high initial price, followed by a decline in price; then later in the season, sometimes the price again rises. Thus, assuming constant costs, we should aim for winter vegetable harvest as early as possible, and late (i.e. April) for some vegetables. For most summer vegetables we should try for harvest before May, or after July to take advantage of high market prices.

**Highland Vegetable Cropping Practices Survey.** This study found that small farmers own some highland in all three landtypes. Even in the mediumlowland landtype (Chitosi), average highland holdings were found to be 4.3 decimals per family. Char Matua crops generally have both lower cash costs and profit. Cash costs were often higher in Chitosi than in Dhorkora (the medium-highland location), but profit was higher in Dhorkora. In general, profit received from surveyed farmers for their vegetables was significantly lower than what farmers within MCC's Extension Programme receive. The greatest diversity of cropping patterns was found in the medium-highland location. Twenty percent of Chitosi highland lies fallow year-round, while 60 percent of highland in the *rabi* season in Char Matua lies fallow. It was found that *rabi* crop cultivation did not depend significantly on either cropping pattern or socio-economic category, and a negative relationship was seen between percentage of holdings fallow and socio-economic category.

**Study on Goat Rearing Practices.** It appeared that goats are a good investment for rural households, with the rate-of-return being close to the opportunity cost of capital. Goat ownership was popular among the small, medium, and large farm categories, but not landless. Goat supervision time is minimal; not much more than one-half hour each day is required. Cash costs are low, usually involving only the purchase of the goat, and its breeding. Thus, higher management practices will have to compensate the household with a significantly higher return.

**Farm Household Income and Expenditure Study.** This study was done to get a better idea of the socio-economic characteristics of our target group. Average annual income was found to be Tk. 18363. Income per month, per adult-equivalent was Tk. 314, which if all was spent on food, would not allow the family to meet its nutritional needs. Labour was the primary income source for landless, and Char Matua and Chitosi subsistence farm

families. Net non-crop agricultural income averaged about 5 percent of net income. Net income patterns followed cropping seasons in each area. Income generally peaks during turnaround periods, and troughs between crop establishment and harvest. Loans, and cattail mat construction (in the char) took up some of this slack in the pre-*aman* period. Crop income variability was negatively related with cropping intensity, while labour income for landless households was less variable than for those of subsistence level. Food and non-food expenditure was also less variable for landless households.

### Livestock Research

This was the first year for the research programme to do work with the livestock/poultry component of Bangladesh farms. This work began in August 1988 with the hiring of one national research scientist, who unfortunately resigned in November. Currently, one expatriate livestock scientist has been working since October and one national livestock scientist since May. The main center for MCC livestock research is at the Char Matua research station, but activities are conducted at other MCC sites as well. The main goal has been to assess and prioritize the research needs of our extension target groups.

Time was spent with MCC extension programmes (including HSP and RSP) on field visits. This was done to gain an understanding of how the extension programmes function and to determine what livestock/poultry research they were interested in. Since the livestock research personnel were new, time was spent becoming familiar with other NGOs and government institutions, and working towards developing cooperative ties with them.

**SONDEO** on livestock and fishery production was conducted in January. The survey team was multidisciplinary with participants from the FSR team, HSP, RSP and Extension Programme. The purpose was to determine priorities for research. Each day participants formed small groups to interview farm households. As a result the following directions for livestock and fisheries research were proposed:

Livestock and Poultry:

1. Nutrition - forage production and feed supplements
2. Health - information gathering on vaccinations
3. Improved breeds of poultry

Fisheries:

1. Monitor present technologies and determine costs and returns
2. Evaluation of fish species at the farm level
3. Feasibility of integrated fish systems (duck-cum-fish, Paddy-cum-fish, etc.)

Research work was initiated to address the problem of free-roaming goats damaging crops. Poor farm households are interested in a system of raising goats even if landholdings are small and if free grazing is not possible. An experiment with different goat breeds and sheep under a partial confinement system was initiated. Station forage research was started as well to find suitable forages for the charland farming system.

An on-farm experiment was started on calf protein supplementation. We are interested in finding simple and low-input ways that farmers can increase the growth of calves shortly after weaning.

### Fisheries Research

Fisheries research was begun in August 1988 with the hiring of a fish research scientist. One project involving catfish and *Nilotica* culture in mini-ponds was completed at Chitosi Station, and new mini-ponds have been set up at the Dhorkora research station. The fish research scientist has been actively involved with all of MCC's extension programmes and with the Job Creation Programme. A fisheries resource survey has been completed at each of the three FSR sites.

Projects underway include a study of baiting methods of wild fish in Chitosi, an experiment on *Kochu*-cum-fish culture in Bordain, an experiment on paddy-cum-fish culture in Dhorkora, a *koi* fish trial at the RSP Korosmunschi training center, prawn culture in Dagonbhuiyan and experiments on composite culture of local fish species at Dhorkora.

## RURAL SAVINGS PROGRAMME

### Objectives

The Rural Savings Programme (RSP) works to promote the social and economic development of landless men and women in the rural area. One of our basic assumptions in the RSP is that working with groups is more efficient than working with individuals when attempting to promote a lasting social change.

We are trying to help individuals understand why group based saving and investing is an important way to overcome many of the difficulties and injustices they face in their lives, not the least of which is a chance for an improved or steady source of income. Many circumstances surround people's inability to have good incomes, and the formation of groups to learn about savings allows them to improve their understanding about how access to resources, education, numeracy, health, etc. all combine to create opportunities for change.

There are several benefits in working with groups:

1. For the RSP it is a cost effective method of affecting a larger target population than we could if we were working with individuals;
2. Individuals within the group can rely on other group members for social support rather than relying on outsiders who may wish to exploit them;
3. The group fund (which is developed by group members contributing their savings to a common fund) is larger than it would be if based only on the individuals savings, and this large fund is more useful to undertake Income Generating Activities (IGAs) than a smaller individual fund would be; and,
4. Group members can use the group fund as a capital base from which they can take loans rather than relying on local money lenders who charge an extremely high rate of interest.

After we form the individuals into their own savings group we guide them through a sequential series of stages which eventually leads the group to graduation. These graduated groups then function independently of MCC.

The RSP has a very strict rule that we provide no credit to any of our groups--all group projects must be self financed. We have found that this rule makes the groups much more careful when they undertake and operate an IGA because it is their money which is being invested. This is also very encouraging for our group members because this way all of the profits from an IGA can be added to the group fund, and then more and/or larger projects may be undertaken.

### Staffing

Although the RSP experienced several staff changes this reporting year, there was minimal programme disruption because all staffing changes were pre-planned. And primarily because of the high quality of programme staff, the RSP experienced another year of smooth operation.

Upper level staff (including a newly arrived expatriate advisor for the Women's Sector) were able to concentrate their work on RSP long term plans and objectives, rather than having to concentrate on the day-to-day operations of the programme as had occurred in past years.

### Group Members Trainings

The RSP provides trainings for its group members in order to increase their awareness of their situation, to strengthen group leadership, and to teach skills which can be used for IGAs.

In the Men's Sector, two trainings and one study tour were conducted; one training on Consciousness Raising and Leadership Development with 20 members from two groups participating; one training on Fish Culture with 20 members from seven groups participating; and one Study Tour with 13 members from seven newer groups going to look at some of RSPs more successful older groups.

The Women's Sector had 11 Consciousness Raising trainings with 186 women from 18 groups participating. There was also a visit by members of the "Uttaron" NGO to the women's sector. This visit included a day-long workshop on women's rights in Bangladesh which was attended by 24 women from 24 of our women's groups.

#### Functional Education

The RSP promotes Functional Education (FE) because so many of our group members are illiterate and innumerate. Those who pass the FE course are then literate and numerate to a class two level. If literacy and numeracy skills of an entire group are increased, the chance of independent group functioning is much greater. This also reduces the chance of internal corruption, because more of the group members have at least some understanding of the work which the group's book keeper is doing.

In the '88-'89 reporting year 84 members from six groups participated in the three month FE course. RSP uses the Bangladesh Rural Advancement Committee (BRAC) method and materials for our course. Forty four of the 69 group members who wrote the final exam achieved a passing grade, so for the second year running we have had over 50% of the participants pass the exam.

Before the FE course started, RSP's Functional Education Field Supervisor gave training to the 12 teachers who actually taught the BRAC course to the group members. The training was three days in length and it taught the teachers how to use the BRAC FE material and teaching methodology.

#### Accounts Keeping Training

Possibly the single greatest obstacle which we in the RSP encounter while trying to graduate our groups is that very few of the group members can maintain the group account books. To compensate, they rely on the RSP Group Facilitator to do the work.

In an attempt to deal with this problem the upper level Bangladeshi staff of the RSP designed and implemented a one month Accounts Keeping course. The course is given to three or four members from each of the groups who have just finished the three month FE course. The same teachers who taught the FE course also teach the accounts keeping course.

This year, 16 members from three groups completed the Accounts Keeping course. As the course has only recently been completed we have yet to measure the success or failure of this project.

#### Vegetable Seeds and Gardening

The RSP encourages group members to grow gardens because the sale of the produce will increase their income, and the consumption of the remaining produce will improve their nutritional intake.

In closer keeping with RSP's philosophy, we stopped subsidizing the sale price of the vegetable seeds we extend to our group members. We felt we should not sell seeds at a loss when the group members were making money from their resulting gardens. In spite of the increase in price, but also due in large part to the RSP staff encouraging more group members to grow gardens, we sold just over 2,300 packets of seeds to our group members this year. There were seven "Group Gardens" and 117 "Individual Gardens" as a result

The RSP did almost no extension of tree seedlings this year because of high seedling mortality rates in past years. Transportation shock was cited as probable cause for the death of the seedlings.

Recognizing the value of fruit, spice, and lumber trees the RSP Vegetable Cultivation Specialist is encouraging one of our group members who has some expertise in horticultural work to start his own tree nursery as an individual IGA. RSP group members could then buy their seedlings directly from the nursery owner, and because he is in the same area, the transportation shock would be greatly reduced.

### Rower Pump Sales

Even before the MCC Rower Pump Credit programme was drawn to a close this year, RSP sold no more of those pumps to its group members. The main problem was that some of the pumps which were sold to group members were not being paid for on time. RSP is not designed to be a collection agency, so unless the group member could pay for the pump in a short time, we did not encourage them to purchase one.

### Credit and Banking

There were no new developments in the credit and banking operations of the RSP this year. All of our groups continue to use their bank accounts, but only in the most minimal way. The bank accounts are generally used as a safe place to put the group's money when that money is not being used in an IGA. Compared to what most groups can make on even the simplest IGA, the standard interest rate which banks pay is very low.

The men's group which got the bank loan, as reported in last year's annual report, is paying that loan back in regular installments over the longest term possible. The group is paying back the loan as slowly as they can because the interest rate which the bank charges is much lower than the rate of profit that the group is making with its IGAs.

### Health Component for the RSP

The health education component intended primarily for the women's sector of the RSP was put on hold this year. This is the third year in a row that this aspect of the RSP has been postponed due to budgetary constraints.

This delay allowed us to ask a much larger question about the direction and goal of the RSP: Should we offer more services to our group members, or should we offer fewer but more specialized services? And, should the men's and women's sectors be affected equally by our answer to this question?

As yet we have no response to our self-imposed question. Perhaps by the next annual report we will be able to outline a newer, more concrete plan for the RSP.

#### Extension Programme-RSP Cooperation

The Vegetable Cultivation Specialist (VCS) of the RSP continued to consult with members of the extension programme on a formal basis. Extension programme officers also paid regular visits with our VCS to winter and summer vegetable gardens grown by group members. This cooperation has helped our group members to grow better gardens than what they had previously.

#### Home Site Programme-RSP Cooperation

The RSP is continuing to pick up and work with the groups which are graduating from the HSP. We have found these graduated HSP groups to be very easy to work with and most enthusiastic as savings groups.

Most of the groups decided themselves to save at the rate of Tk. 5.00 per person per week. This is a very high rate of savings for poor rural village women, but clearly demonstrates their understanding of the value of a savings group.

One unenthusiastic graduated HSP group left the RSP to join with another NGO which promised loans to their groups. Oddly enough, as that group left, another women's savings group which had formed spontaneously in one of the other new RSP areas, asked us to work with them. This "spontaneous" group had used one of the new RSP groups operating in their area as their model.

This "spontaneous" group as well as the other new RSP groups are working together well, and promise to be most successful savings groups.

### Job Creation Program-RSP Cooperation

Late this reporting year the RSP was handed over the Job Creation Program's (JCP) fish pond groups operating in the Feni area. The groups included numerous small fish pond groups whose pond leases had already expired, and two large fish pond groups with many years remaining on their pond leases.

Previous to the RSP taking over, JCP had provided these groups with all of the operating capital required to run the fish ponds. Also JCP did not require that group members contribute any of their own money to the fish pond projects, neither did any of the large pond groups pay back much of the loans which the JCP was giving them to finance fish production.

When the RSP wanted the groups to contribute their own savings to the projects, and start repaying their loans, the group members resisted. After much patient work on the part of the RSP staff, the groups were brought together for some of their first meetings since the projects were started. During these meetings RSP staff explained how RSP works to help groups build up their own group fund by saving their own money, and eventually this money could be used to finance the fish production, or whatever kind of IGA they wanted to try.

Although this was not as simple a way of working as what the groups had with JCP, they eventually saw the long term viability of the self-financing project. They also saw that MCC was not willing to work with them indefinitely. These two factors were made clear to the groups by RSP staff over a period of several months, and eventually the groups decided to continue with RSP.

Currently the groups are operating much the same as any other RSP group operates, with the exception that MCC is helping to finance fish production. This time, however, the group is contributing their own money, and following a strict loan repayment schedule. If the group can develop sufficiently to manage their own resources it will lead to a happy ending on this story.

WORKING AREA	GROUPS	MEMBERS	SAVINGS	GROUP FUND	IN HAND	IN BANK	INVESTED
(Women's groups)							
Shindurpur	7	73	34,917	56,967	906	10,845	45,218
Rajapur	7	77	42,575	73,461	604	16,609	56,868
Koroshmunshi	7	87	45,865	66,135	1,991	16,664	47,460
Panchgachia	3	28	16,509	24,884	548	2,082	16,254
Maijdi	6	80	12,183	13,099	3,799	700	8,600
Totals	30	345	135,540	234,566	7,848	52,318	174,400
Women's group average		12	4,518	7,819	262	1,744	5,813
(Men's groups)							
Dharmapur	5	88	253,694	382,609	16,355	5,156	361,098
Domuria	8	101	49,441	82,725	11,128	11,395	60,202
Sindurpur	5	63	26,744	38,367	5,636	7,044	25,627
Rajapur	5	70	115,534	264,240	25,795	1,555	236,894
Dholia	5	58	31,713	59,859	3,738	5,797	50,324
Md. Ali	4	115	6,305	8,469		8,469	
Totals	32	495	483,431	836,209	62,650	39,414	734,145
Men's group average		15	15,107	26,132	1,958	1,232	22,942
TOTALS							
	62	840	635,480	1,070,775	70,498	91,732	908,545
	56	696	365,598	761,841	64,800	131,904	510,136
	55	681	257,762	499,980	33,186	60,612	40,182
	51	607	N/A	209,569	32,679	46,344	209,546

## HOMESITE PROGRAMME

### Introduction

The Homesite Programme (HSP) continues to work toward improving the health and nutrition status, and indirectly, the socio-economic status of selected families through motivation and training of village women. Programme activities designed to meet this objective include homestead gardening, fruit tree cultivation, poultry vaccinations, women's awareness workshops, and training in health and nutrition.

HSP works with the women of selected families who own or sharecrop some land from which they produce only enough rice to feed themselves four to six months of the year, and whose wage earners are employed as small traders, rickshaw-pullers, day laborers, or at similar occupations. In addition, the women must be willing to come outside of their homes for training, and to participate in programme activities.

Programme activities are implemented in three stages. During Stage I, the entire lesson series and corresponding programme activities are offered (please see Agriculture, Health and Nutrition, and Women's Awareness sections for a description of activities). In Stage II, the entire lesson series with accompanying activities is offered again as a review. The content of the review series is modified to meet specific needs identified during Stage I. Stages I and II take from two and a half to three years to complete.

At the end of Stage II, the HSP extensionists begin to motivate the women for group formation, functional education, savings, and income-generating projects which they will begin in Stage III. At this point, the villages can "graduate" from HSP and be handed over to the Rural Savings Programme (RSP), another MCC component, to begin the activities of Stage III. During the past year, HSP phased out of two villages and handed them over to the RSP.

The expatriate in the HSP agriculture advisor position changed roles to become the Homesite programme leader, while a new expatriate came in as agriculture advisor in October 1988. HSP expanded its working area by adding 14 villages, bringing the total number of villages to 30.

Area of work: Sudharam Upazila, Noakhali District

No. of villages: 30

No. of target women: 425

No. of national staff: 1 Programme Coordinator  
2 Supervisors  
1 Health Promoter  
8 Extensionists

### Agriculture

HSP's agriculture section continued to be involved in vegetable, fruit, and poultry activities. Agriculture activities include lessons on garden, tree, and poultry care, extension of information, selling of vegetable seeds and fruit seedlings, and providing vaccination equipment and/or services against Raniket (Newcastle's) disease in chickens. See Table 8 on lesson attendance.

Table 8: Percent of Selected Women Attending Agriculture Lessons  
(Based on those villages in which lessons were given and data received)

	Summer Gardening March-Apr. 1988 (3 lessons)	Winter Gardening Oct.-Dec. 1988 (3 lessons)
Number of villages in which* data were collected	8	10
Number of selected women in those villages	122	148
Average no. of selected women per village	14.8	14.8
Average attendance at total series of lesson Average % Average No. Women	62.75% (highest 93% lowest 39%)	59.1% (highest 74% lowest 37%)
Average No. women attending every lessons in the series Average % Average No. Women	44.25 (highest 86% lowest 19%)	43.7 (highest 62% lowest 27%)

\* Data was not collected from all the same villages during each lesson series.

HSP hired a woman as an ag. assistant in May 1989. She compiled data from surveys and monitoring forms, and assisted in poultry vaccinations and fruit seedling delivery.

HSP worked with the Ag Research programme to develop potential trials for HSP target women using the HSP working area and/or separate research plots. The agriculture advisor and some HSP extensionists were involved in a few days of "sondeos."

Changes occurred in the poultry lessons and the poultry vaccination programme (see vaccination section of this report). An interest survey on village women's preferences of ducks and chickens was conducted in March and April.

**Gardens.** Activities were carried out as usual-- garden care lessons, seed extension, and problem solving. The weather was a big factor in the women's gardens this year because water from the September 1988 floods stayed in some garden areas until late October and early November. Then, a strong wind and hail storm touched the Noakhali area in late November, flattening many plants. During the dry winter season and into the summer, some areas were lacking water, and many gardens dried up because of it.

In April 1989, HSP extended kakrul tubers, bought by MCC's Extension Programme (EP). These were sold to women in five different HSP villages. HSP received the tubers from EP quite suddenly, and thus had little time to do any advance planning. HSP staff did not even know what the best way would be to plant these tubers, and many village women did not know, either. Before the tubers could be distributed in the villages, many of them began to get fungus on them. Extensionists monitored these plants, and very few have come up.

Also in April, working in cooperation with the Research Programme, two varieties of data shak were planted by three women in each of two HSP villages in order to observe the varieties in the homesite area. The extensionists were asked to observe the progress of these trials.

**Fruit tree extension.** HSP continued its extension of fruit trees, selling to village women at a subsidized rate. HSP was not able to get many of the seedlings women wanted to buy (such as olive, lemon, kamranga, amra, pomegranate, and lichee) because many seedlings did not germinate well this year. Also, HSP usually buys after seedlings are on the market and supplies are quickly exhausted. Another factor is that HSP does not order seedlings a year in advance. Thus, this year, an order form will be given to HSP extensionists to be filled out by August. By the 1990 fruit seedling transplanting time, HSP hopes to supply its women with all the seedlings they requested.

A year-long fruit tree monitoring form is being completed during the month of July and August. This form will help HSP see the growth of the fruit trees extended during the previous year.

**Poultry** Several monitoring forms were completed this year, as well as an interest survey intended to give HSP personnel some ideas for future programme activities. In March 1989, poultry lessons were modified to better fit with what extensionists had learned in previous trainings, to take out unneeded information, and to include visuals in hopes that the village women would pay more attention to the lessons. The vaccination programme also continued about every four months, though some changes were made.

**Poultry Interest Survey.** HSP surveyed to what extent women own poultry, which breeds of ducks and chickens are preferred, and how much women would be willing to pay for these poultry. Many women with whom HSP works own or are interested in owning chickens and ducks. However, some women do not own poultry, some are not interested in rearing them, and others lack of money, space or the ability to care for poultry properly.

Of 280 families surveyed in 23 HSP villages, 79 percent owned indigenous (deshi) chickens, with an average of 4.7 chickens per family that owns deshi chickens. The duck population is less: 40.4 percent of families own ducks and rear an average of 3.6 ducks each. Because the survey was taken during the dry winter season, the number of ducks owned may be less than a yearly average because of many women's practice of raising ducks mainly during the monsoon time. The best time for ducks' food availability (snails, insects in water) is during the monsoon periods. Very few foreign breeds are owned by the women.

More women own foreign ducks than foreign chickens (only one family said they had foreign breeds of chicken), perhaps because of HSP's earlier efforts at extending the Khaki Campbell duck breed.

An interesting result is that of the 282 women asked, 237 wanted to buy foreign breeds of chickens, 180 wanted to buy foreign ducks, and only mentioned interest in deshi varieties. On average, the women wanted to get two to three chickens and one to two ducks. Given a choice between one-day and one-month olds, all women wanted to get one-month-olds, most likely due to the high mortality of one-day-olds.

While some foreign breeds have the potential to produce more eggs or more meat, they must be able to be acclimatized to the Noakhali village situation in order to survive. Why women have such a strong interest in foreign breeds is not certain.

Several problems were mentioned in the rearing of poultry. Over 50 percent of the women said disease is a problem, followed by predation. Poultry damage to gardens is also a problem.

Village women clearly remember the survey and often ask extensionists when they will receive chicks or ducklings. HSP hopes to act on the survey's findings to benefit the women, but HSP is not yet certain in which direction to proceed.

**Vaccination Programme.** Every four months during the 1988-89 year, HSP provided services and equipment for the vaccination of village poultry flocks against Raniket (Newcastle's) disease. See Table 9.

Table 9 . 1988-89 Vaccination Programme in Villages HSP Is Currently Working in or Has Phased Out Of.

Vaccination period	Number of villages	Number of vaccinations given	
		RDV (adult)	BCRDV (chick)
August 1988	18	1955	289
January 1989	24	2300	1765
May/June 1989	26	2360	1060

When HSP first began a regular vaccination programme for poultry, it was working in just a few villages. As HSP expanded, it put some of the duties of vaccinating into the village women's hands by training them. These women are willing to inject the birds every four months, not only because they help prevent disease outbreaks, but also

because they are paid by their neighbors for every bird they inject. Yet, they have not been going to the District Livestock Office to pick up the vaccine and ice--this delivery service has continued to be given by HSP staff. Because of HSP's expansion into more villages, the amount of time it takes every four months to deliver vaccines has become strenuous and not a good use of time for staff trained for other work.

So, in April 1989, HSP staff members planned a "participatory approach" for our village vaccinators. Twelve village women trained by HSP, three HSP extensionists, and five HSP office staff met to discuss the vaccination programme. HSP staff explained to the vaccinators that HSP cannot continue to provide all the services as has been done--that HSP wants the vaccinators to become independent of MCC.

After much discussion and explanations, the women seemed to be willing to try this on their own, as long as HSP gradually turns over the responsibilities, introduces them to local livestock officers, shows them where to buy equipment needed, and provides them training on vaccinating for other diseases. HSP has started gradually during the May-June 1989 vaccination time by introducing a few of the women to their local livestock officer, and expecting other women to clean and boil the equipment HSP had supplied. Additional training and a system for supplying equipment are being worked on and HSP hopes to implement the new approach by the September-October 1989 vaccination period.

Khaki Campbell Duck Distribution This section is to be briefly summarized, with details in KP report.

HSP has been aware of the potential nutritional benefits of raising ducks for home consumption of meat and eggs. Many of the village women with whom HSP works have often expressed interest in improving and/or increasing their duck flocks. HSP has tried several methods over the years for extending an improved duck variety. Most effort has been made using the Khaki Campbell breed, which has the potential to lay twice as many eggs as the native local breeds.

The most recent K.C. duck distribution occurred in October 1987 in eight HSP villages. These ducks were monitored for one year, ending in October 1988. Within that year, over 200 of the 224 ducks distributed were either sold, eaten, killed by disease or predators, or stolen. More information on this extension attempt is available from HSP.

HSP may work more with increasing/improving village women's duck flocks. Before that happens, ways of minimizing subsidies, risk, and death (by disease and predators) need to be considered.

### Health and Nutrition

Introduction This component of HSP involves motivating the women not only to be involved in certain activities, but also to change some of their daily habits and even some traditions that relate to the health status of the women and their families. The emphasis of the health/nutrition motivation is on prevention of ill health, and the mode is training given by the Rural Health Promoter and follow-up by the local HSP extensionist.

Lessons Over the past year health/nutrition lessons were given in nine villages. These lessons include a series of seven lessons on common illnesses (prevention and treatment), four lessons on maternal/child health, and five on nutrition. Some women are not able to come to any lessons for various reasons yet participate in the more individual activities and are visited by the extensionist.

Review lessons in two villages were completed in December. Eighty percent of the selected women attended 69 percent of the lessons. Seven villages received lessons for the first time. Of these, one group of four villages completed the series of lessons in April with 80 percent of the women attending 58 percent of the lessons. The other three villages began lessons in January and at the time of writing there are a total of four lessons remaining. Attendance until now has been 81 percent by 80 percent of the women.

Immunization One of the main health activities in which the women are motivated to participate is immunization for themselves and their children. The government-run Expanded Programme for Immunization (EPI) has set up camps in or near most of the HSP villages. The women are taught about the importance of immunizations in the HSP health lessons, and the extensionists go with them to the center. This is also a good chance to build an understanding and working relationship with these government staff, as they appreciate the work that is brought them and the help that HSP extensionists provide while immunizations are being given.

Women who have worked with HSP for more than one and a half years have had these lessons and much opportunity to attend the clinics. Of these, 88 percent of the child-bearing-aged women have had their Tetanus Toxoid (TT) injection and 43 percent of their children under five years have had immunizations against six common diseases. Women who have been in HSP for a shorter amount of time and have not had the lessons are willing to take immunizations, but the number actually receiving injections is less. Of these, 50 percent of child-bearing aged women have had their TT injection and 37 percent of their children have had their immunizations.

Cooking Demonstrations The objective of the agricultural activity of growing a garden is to increase the availability of vegetables to the family and thus improve the quality of the diet. At the harvest time of each growing season (winter and summer) cooking demonstrations are done in each village to show: 1) how new vegetables can be eaten, 2) that vegetables cooked together without fish can taste good (the tradition being that vegetables are cooked with fish and if there is no fish vegetables are not eaten), and 3) ways of cooking vegetables that will retain the maximum quantity of vitamins.

During the course of HSP's work in a village, one winter and one summer cooking demonstration are given by the field supervisor. The winter demonstration was given during January-February 1989 in 14 villages and the summer demonstration in June 1989 in 17 villages. The attendance at these activities is usually close to 100 percent of selected women, with neighboring women also attending.

School Programme This programme takes HSP away from the usual target group of women to the primary school-going children of the same area, and usually includes some of the children of the selected women. The programme includes four lessons: 1) What is Food 2) Balanced Diet 3) Fruits and Vegetables and 4) Garden. With each lesson is an activity to enforce the objective of the lesson, including the planting of a garden in the school yard. Students are also encouraged to plant a garden in their home areas, and seeds are available for purchase from the extensionist.

This year the programme was held in November-December 1988 with six of the extensionists giving the lessons in a primary school in their working area. The students (class IV) were very interested in the lessons and especially in growing a garden. For minimal risk and care, they were shown only the planting of direct seeded vegetables (radish, carrot, and pumpkin) although the students expressed a desire to also know how to plant vegetables that require a seedbed.

### Women's Awareness

Introduction Awareness training is an important component of HSP. Village women in Bangladesh are generally unaware of their status in society or of their contribution to society. Consequently, they often experience feelings of inferiority and powerlessness. HSP addresses this problem by providing awareness training, and uses the flip chart series entitled "An Expanded World for Women" produced by Save the Children Foundation (U.S.A.).

Training and village workshops In December 1988, all HSP staff participated in a training on the use of the women's awareness materials. This training was new for some of the staff and review for the rest of the staff.

Through this material, women learn that their contributions are valuable, and also that their labor benefits their family, their society, and their country. They also learn that they are victims of exploitation, both by men and by their society. Additionally, they learn that they have the potential to change their situation, but that this potential needs to be developed, and can best be developed through cooperation with others.

After receiving training, extensionists arranged a three-day workshop in each of their villages for providing this same training to selected village women. During the past year, these workshops were held in a total of 21 villages. An average of 80 percent of selected women were present in these workshops.

The responses of village women to this training were very positive. They felt that the material presented a true picture of their lives. They also expressed an interest in implementing some of the new concepts that they had learned in the training, and asked for help in doing so. HSP is challenged by their request, and is looking for ways to provide follow-up to this material.

#### Other Activities

Quarterly Women's Meetings The objective of the Quarterly Women's Meetings remained to provide a forum for MCC female staff to meet together regularly for receiving training usually on non-agriculture related topics, for discussing work concerns, and for identifying needs and problems encountered in working with women. Originally, meeting participants were female staff from HSP and RSP programmes. Now, however, participants from many MCC programmes are involved--HSP, RSP, the Food Products Development Center, Research Programme, and Job Creation-Saidpur. Other MCC expatriate staff are also invited to attend.

July 1988--Justice Kazi M. Shobhan spoke on 'The Status and Development of Women in Bangladesh'.

October 1988--tour of BARD (Bangladesh Academy for Rural Development), Kotbari visited a DEEDA Cooperative Society.

January 1989--visit to DANIDA's (Danish International Development Agency) health component, Lakshmipur.

May 1989--demonstration of work being done by MCC's Food Products Development Center. Soybean foods luncheon and anecdote sharing.

**Training** Several HSP staff received specialized training during the past year. The Health Promoter attended a "Trainers Course for Training Health Workers," sponsored by Worldview International Foundation. One Field Supervisor participated in "Human Resource Management and Human Relations" training sponsored by Bangladesh Management Development Center. Extensionists and Field Supervisors received training from Save the Children Foundation-U.S.A. on the use of the flipchart series "An Expanded World for Women." In addition, four extensionists received training on Winter Vegetable Cultivation from MCC's Horticulture Programme.

**HSP Publication** Last August, HSP staff began working on a publication entitled *Homesite Programme Profile 1982-1989*. In this book, HSP history, structure, implementation, evaluation, and experiences in working with village women are presented. *The agricultural advisor has taken over editorial responsibilities.* HSP Profile will be published near the end of 1989.

**Initial and Follow-up Surveys** HSP completes initial and follow-up surveys, before beginning work in a village and when the village is to be phased out of the programme, respectively. The two sets of data are then compared to determine HSP's impact in that village. In February 1989, HSP phased out of two villages, Masimpur and Ramnathpur, after working in them for two and a half years. Initial and follow-up surveys have been completed and the data analyzed, which is presented in MCC's research Programme Research Results for 1988-89.

## APPROPRIATE RURAL TECHNOLOGIES PROJECT

The Appropriate Rural Technologies (ART) Project was established to facilitate mass acceptance and distribution in the Greater Noakhali region of manual pumps that are locally produced, labor-intensive (capital-saving), and low cost; to increase farmers' income with small-scale irrigation; and to improve family health with safe drinking water supply. The project is indigenizing the marketing network.

### Long-range Direction and Workshop Development

As a guideline for future programme direction, the following plan was established in 1987 for developing a local independent sustainable marketing network for manual pumps:

- Phase 1: Increase business efficiency of the programme and consumer awareness of manual pump benefits.
- Phase 2: Establish a semi-independent organization receiving funding and consulting assistance from MCC.
- Phase 3: Move to an independent, self-funded, -owned and -operated Noakhali-based organization, which would market and possibly produce manual pumps and other ARTs.

During the 1987-88 season, ART shifted the project into Phase 2 by negotiating a contract with a local workshop in Feni, Nipun Shilpa Karkhana (NSK), to work cooperatively over a two year period to develop the workshop's capacity to effectively service the Greater Noakhali region and phase out MCC's involvement in manual pump extension by August 1990.

During the 1988-89 season, the period covered by this report, ART assisted NSK's development in the following ways:

- a/ referred all ART manual pump dealers to the workshop as MCC's authorized channel of distribution. Expanded dealerships into eastern Sudharam, Companyganj, and Sonagazi char areas.
- b/ gave guidance and consultation for establishment of sales projections, production schedules, price lists, cash flow analysis, and working capital requirements.
- c/ improved workshop's inventory records and control.
- d/ assisted NSK to analysis their financial situation and gave recommendations for product/service diversification.
- e/ provided training on conducting dealer meetings, farmer's rallies, and on dealer relations and marketing.
- f/ assisted to design and develop two low-cost PVC pumps for field testing in the saline coastal area.
- g/ emphasised importance of quality control and provided timely feedback from the field on instances of inappropriate quality.
- h/ supplied credit for inventory working capital (60,000 Tk) and MPG Credit Programme (40,000 Tk).

NSK Workshop performance and evaluation.

Some indicators of performance for the period July 1,1988- June 30,1989 are:

# pumps produced/assembled and sold (pcs)	=	775
Workshop revenue (Tk)	=	773,000
Workshop Gross Profit (Tk)	=	92,000
Workshop Profit (Tk)	=	6,000
Credit still owed to MCC (Tk)	=	40,000
# of Dealerships in operation	=	47

Promotional and interest expenses are currently covered by MAWTS and MCC.

It is apparent that the financial viability of NSK is borderline. Prices could be raised marginally next season, but with current severe competition amongst private workshops in Bangladesh for market share, this may have the adverse result of promoting Noakhali market invasion by competitor's products. Another option suggested to NSK by ART, is the addition of other products and/or services which could assist in covering some of the workshop's overhead and contribute additional profit. Also the workshop could exert more effort to increase their efficiency of production. Current product quality and spare parts supply is satisfactory.

It is believed that the NSK owners are industrious and sincere in their efforts to make the workshop a success. Unfortunately MAWTS matched two technically trained persons as co-owners, rather than a technical and a business person. Next season IDE will offer a course for manual pump workshops on management and marketing, which combined with continuing MCC tutoring and experience, should improve the management capacity of NSK.

A workshop evaluation process has been developed to monitor workshop performance following ART project completion. A questionnaire will be completed by the Ag.Administrator or designate during August of 1990, 1991, and 1992, and the results interpreted with the assistance of prespecified guidelines provided with the questionnaire. If workshop performance is rated as good then MCC will consider its withdrawal a success. If performance is unsatisfactory, MCC Ag.Programme will need to consider whether additional assistance is warranted (for workshop or other method of distribution such as regional wholesalers), what form any assistance should take, and what MCC's role should be. One possibility for any necessary future assistance, is to request the involvement of IDE who has as its specific mandate the development of manual pump markets in Bangladesh and who is developing a project component for workshop development.

#### Staff Management

Early in the season, two field staff were released from the project, keeping with the objective of reducing MCC's marketing support. Training was not a priority, given phase-out of the project, so only two training sessions on vegetable cultivation were held. The bonus system was continued to provide additional staff incentive for sales effort.

#### Research and Distribution

Approximately 50 local retailers and two wholesalers, worked with NSK and ART for selling manual pump materials in 18 upazilas of Noakhali, Feni, Lakshmipur, Southern Comilla and Northern Chittagong districts of southeastern Bangladesh. Retailers who showed inadequate marketing effort and/or lack of financial capital to hold sufficient stock were replaced. Some areas dealerships were discontinued due to poor market sales and low future potential in those areas.

For increasing the supply of quality drinking water to saline coastal areas, three new initiatives were undertaken by ART:

- a/ Distribution was expanded this season with the addition of 10 new dealerships in the eastern Sudharam, Companyganj, and Sonagazi char.
- b/ In conjunction with NSK, ART designed, developed, and is currently field testing a new RDRS-style drinking pump with PVC cylinder. The goal is to provide a low cost corrosion-resistant pump for saline areas. Initial results appear promising, with pump cost reduction of about 50% (tubewell reduction 30%). However additional work needs to be undertaken including development of the spout.
- c/ A proposal was researched and submitted for a three year Drinking Water Project (DWP) under the Vulnerability Reduction Programme. The project would continue Very Shallow Shrouded Tubewell (VSST) extension in the Noakhali char after ART withdrawal, and possibly conduct extension in the western Bangladesh saline coastal belt north of the Sundarbans. Twenty VSSTs are being installed in western Bangladesh by MCC, and will be monitored over a one year period to determine area suitability for extension of VSSTs during the second and third year of the project.

Corrugated PVC (CPVC) pipe has been tested technically by the ATRD Project and test marketed for four years by ART. In 1987, MAWTS, JCCIP, and IDE received free samples for testing. They were asked to submit reports on pipe performance. Unfortunately delays in submission will result in the final report to the Netherlands Embassy and the Dutch Land Reclamation Project (LRP) being compiled next season.

An ART Promotional Materials Comparative Evaluation Survey was conducted during April to June 1989. Seventeen of ART's dealers were requested to ask all pump purchasers the following questions upon purchase of a manual pump:

- a/ How did you first see/or hear of the Rower or Treadle Pump?  
 b/ Who or what convinced you to purchase a Rower or Treadle Pump?

The response to the first question in order of frequency was as follows:

Dealer's pump	19	Rallies	3
MCC Field Staff	15	Calendar/poster	3
Observed in field	15	Handbill	1
Neighbour/relative	14	Slideshow	1
Dealer	10	Other	1
Mistery	7	Pamplet	0
Signboard	4		

The response to the second question in order of frequency was as follows:

Dealer	17	Signboard	3	Rallies	4
Dealer's pump	16	Handbill	1		
MCC Field Staff	15	Other	1		
Neighbour/relative	13	Slideshow	0		
Observed in field	11	Pamplet	0		
Mistery	10	Calendar/poster	0		

The results seem to indicate the primary importance of maintaining the quality of pumps sold, dealerships and misteries. In terms of extra expenditure specifically for marketing, of first priority should be provision of demonstration pumps and dealer signboards. Rallies are a costly means of promotion and do not seem to warrant the investment, unless they can be substantially improved in terms of effectiveness.

Pamphlets, handbills, calendars/posters can be utilized, but only as secondary means, with anticipated results being marginal.

It needs to be added however that the results should be used cautiously as the study was quite simplistic in design. Also the photonovel was not in the field for a sufficient time period, so was not included in the study.

### Products and Sales

#### **Manual Pumps**

This season ART/NSK products included the treadle (Dheki) pump as well as the regular 2" Rower pump and the 3" Rower Lowlift pump. The Treadle pump was developed in 1980 by RDRS as a low-cost foot-operated irrigation pump. It became quite popular with farmers in northern and central Bangladesh, and since market introduction its sales have far exceeded Rower's. Treadle operation is easier and output higher than Rower pump at water table depths of less than 15 ft. Interest in the pump has spread into ART marketing area and, with preliminary study showing in excess of 33% of ART marketing area having acceptable water table for installation of Treadle, ART decided to support NSK's production and sale of this highly popular manual pump.

ART marketed 854 manual pumps (95% of target) this season; 513 Rower pumps, 289 Treadle pumps, and 52 lowlift pumps. Total pump sales were about 113% of last two seasons sales levels and 84% of 1985-86 sales. In non-saline areas Rower, Treadle and lowlift constituted 45,47 and 8% of sales respectively. It is apparent that Treadle's performance has resulted in it making significant inroads into the Rower market. In saline areas Rower constituted virtually 100% of sales (251 pump sets) since ART policy stipulated that only the less corrosive Rower was to be supplied by dealers to those areas.

Exponential growth in Treadle pump sales this season in numerous areas of Bangladesh (esp. northern and central regions), has made evident the belief held by ART that the Greater Noakhali compared to those areas has less potential for manual pump sales growth. Poor layer conditions, substantially higher capital costs (ave. depth of tubewell is 60 ft versus 20 ft in northern Bangladesh), and higher availability of alternative means of irrigation (esp. surface methods), has led ART to acknowledge lower levels of adoption in its working area.

### Seed

Sales of winter vegetable seed were 6100 packages (122% of target and 183% of last season). The two major reasons for success in reaching target this season can be attributed to a more realistic target for current market development of ART seed, and substantially reduced prices, closer to local market levels. The latter resulted in a loss of about 6000 Tk, since prices did not cover cost of packaged and returned, nonreusable seed. Contrary to the annual plan, seed unsold by dealers was bought back at the end of the season in order not to discourage dealer participation in the seed programme. Seed life under the current packaging system is too short for the current system to compete economically with the "tin system". Development of low cost packaging which has at least a two season seed life is required.

The two-fold purpose of the ART seed programme is to establish the marketing of high-quality seed in the Noakhali region, and to test the viability of high-quality seed distribution for a larger scale multi-NGO project. As of yet, no significant progress has been made on addressing the long range structural development of quality seed supply to the Greater Noakhali.

### Price

Prices of manual pump materials were established jointly with the NSK Workshop. To benefit the farmers, ART encouraged NSK to use cost-plus pricing with reasonable workshop profit added. All NSK pump material prices were based on cost of materials, production labor cost, transport cost, etc., plus an NSK production margin of 14%, and a distribution margin of 10% to Feni region retailers, 0% to Noakhali wholesaler. The wholesaler added 10% to the NSK price and sold to Noakhali region retailers. All local retailers in turn added 14% margin before selling to the final user.

To summarize:

Farmer price = NSK production cost + production margin(14%) +  
distribution margins(10%) + retailer margin(14%).

Total margin above production cost was 43%.

### Promotion and Training Extension

Twenty-five new shop signboards, ten seed signboards and 21 demonstration pumps were installed at dealers shops. Calendars, leaflets and a photonovel were developed, produced and distributed to increase consumer awareness. Twenty-four farmer rallies were conducted in local villages and field visits by staff added personal sales impact. NSK provided dealer awards as incentive for the dealers.

A manual on *Rower, Treadle and Hand Tubewell Installation and Maintenance* was completed. The manual should serve to facilitate dealer and installer training and inform major organizations involved in irrigation, of the benefits of Rower and Treadle Pumps, and of installation and maintenance procedures for the pumps.

ART once again organized two one-day training sessions for retailers at the Feni and Maijdi MCC offices. Besides ART staff explaining technical aspects of tubewell materials, repair and maintenance, this year a special guest from CIBA-GEIGY discussed "Salesmanship and Service". For tubewell installers, nine field

trainings on proper installation and maintenance procedures for hand tubewell, Rower and Treadle pumps were arranged.

### Credit Schemes

#### MCC Rower Credit Study

MCC's small scale credit effort was initiated to make the Rower pump affordable for small and marginal farmers participating in other MCC programmes such as Extension, RSP and Homesite, and to test the recovery rate of loans extended to poorer farmers/households under intense programme supervision. This season the programme was discontinued because sufficient pumps had been fielded to complete the study and credit was made available through a Manual Pump Group (MPG) credit programme. The recovery rate has slipped since last season; from 90% to 78% of amount due (as of April 1, 1989).

#### MPG Credit Programme

It has been clear for years that farmer lack of capital and lack of consumer awareness have been the two major constraints on manual pump sales expansion which can and should be addressed by manual pump promotion organizations. (Constraints such as layer problems cannot be solved and alternative sources of irrigation are for the most part desirable). As a result of failure by the National Bank Programme to provide a workable system for manual pump credit, and a World Bank request in late 1987, the MPG (comprised of MAWTS, IDE, RDRS, JCCIP and MCC) developed a scheme for manual pump credit extension which would utilize dealer-purchaser relationships for motivation of loan repayment. The scheme (described in *Bangladesh Hand Tubewell II Project: Recommendations of the Manual Pump Group*, 22 March 1988, and available at MCC Dhaka Office) was presented by the World Bank to the government under its Hand Tubewell II Project but failed to receive approval. The MPG decided to proceed with pretesting of the basic farmer credit mechanism to determine its viability for use in future projects funded either by the World Bank or other funding agency.

The test study was implemented on a small scale this season, with MCC allocated security funds for about 130 pump sets and extending 88. The shortfall in pump sets extended, was due to BKB's insistence that funds as security for its loans should be deposited at the central BKB Bank. Local BKB banks would not cooperate under such conditions, whereas other banks with funds deposited locally cooperated.

Some other problems encountered during MPG Credit Programme implementation were:

- a/ Considerable time and effort was required of ART Marketing Officer and field staff for motivating the banks to conduct their responsibilities under the scheme. Bank managers often did not want to exert the effort to process such small loans.
- b/ Some bank managers asked farmers to show documents of their land, tax, etc., which for privacy reasons farmers were very reluctant to show for such a small loan.
- c/ Application processing was delayed while banks received clearance concerning non-defaulter status from local BKB bank, and bank payment to supplier was delayed because farmers didn't have any motivation to come to the bank immediately after installation for giving signature verifying supply.
- d/ Dealers were not satisfied with having to pay numerous visits to the bank, and want the programme modified to bypass the inefficiencies of bank bureaucracy. Some were not willingly interested to be involved in the programme because they perceived more risk involved for them than gain.

The loan repayment schedule is for four equal installments to be paid over two years with 16% interest charged by the bank on outstanding amounts. (For additional details on programme procedures, see the booklet *Manual Pump Group 1988-89 Credit Programme* available from ART.) ART has commenced the process of submitting appropriate field data/feedback to IDE (the MPG coordinating agency), for analysis and construction of periodic reports on MPG Study progress and evaluation.

## APPROPRIATE TECHNOLOGY RESEARCH AND DEVELOPMENT

The purpose of the Appropriate Technology Research and Development (ATRD) project is to serve as a technical resource for other MCC agricultural programmes and other organizations. The ultimate target group is the rural poor (lowest 40 percent) in Bangladesh. Other MCC programmes and other organizations serve as intermediaries which request ATRD assistance, and which carry out the dissemination of developed technologies to the target group. The ARTD project consists of an engineer, who is responsible for supervising field testing, and a workshop supervisor, who maintains the Maijdi workshop.

Next year, the administration of this programme will move to the MCC Job Creation Programme. Reporting on 1989 activities will therefore be done with Job Creation Annual Report.

In the past year research with rower pumps and tubewells was phased out. Work on rat control demanded a major portion of ATRD time. Low cost, durable vaccine carriers were investigated for the MCC Extension, RSP and Homesite programmes. Research into soybean processing was begun.

A low-cost honey extractor was built for the Dagonbuiya extension office and the engineer also helped when computers were installed in MCC facilities, two in Dhaka and one each in Maijdi and Feni.

In the absence of a Job Creation (JC) engineer, the ATRD engineer assisted with work at Shuktara Handmade Paper project. Upon the arrival of a JC engineer, the ATRD engineer oversaw the JC engineer's orientation.

### FUMP/Rower Pump Research

During this year research on rower pumps and tubewells was phased out. The ATRD Technical Officer was transferred to the ART project to market rower pumps in the eastern Noakhali char area, to provide

training for ART mistries and dealers, to conclude testing of tubewell technologies, and to provide training for other organizations who want to install tubewells next to ponds in saline areas. A comprehensive report on the FUMP (filter under the middle of the pond) experiment, "Installation of Tubewells Next to Ponds in the Saline Coastal Area of the Noakhali District of Bangladesh", was written to summarize the results and recommendations of the experiment. The report was distributed to other organizations interested in tubewell installation in saline areas. With the ART programme leader, a proposal for a coastal drinking water programme was drawn up. This programme would extend beside the pond drinking water technologies to saline areas. A feasibility study for this programme is being conducted.

#### Rat Control

Rat control work was initiated with a survey of farmers in the MCC Extension Programme working area. Farmers perceived the greatest rat damage in the bari, followed by rice field damage and fruit tree damage. Over 80% have tried poisons; over 80% have tried keeping cats; less than 50% have tried traps.

A low-cost rat trap was developed and tested. Tools for producing the trap were developed and training given to two men in Feni. Job Creation in Feni is starting a project to produce the traps, with initial marketing assistance from the Extension project.

Poison use was investigated. Zinc phosphide sold in tin cans, was found to be the only available rat poison suitable for extension to farmers. Racumin was found to be too expensive (1-3 Tk/rat), and would require greater management skills to ensure effective use. Quality and quantity of Zinc phosphide sold in paper packets is unreliable or unknown. Packets are sold without proper instructions for use or safety precautions. Licensed pesticide dealers were encouraged by Extension Programme Officers to stock with Zinc phosphide in 20g tin cans. Information on the use and marketing of Zinc phosphide rat poison was given to the Extension project for the training of ag programme staff and farmers.

### Vaccine Carriers

Local vaccinators in the MCC Extension and Homesite programmes use an insulated carrier with an ice pack supplied by FAO to transport vaccines as recommended by the Bangladesh Agricultural Extension Department which supplies the vaccines. These carriers are too expensive (200-300 Tk.), while thermal flasks although cheaper (70-200 Tk.), are still too expensive for local vaccinators and break easily. Due to these problems, the Extension and Homesite programmes asked ATRD to look into inexpensive, durable alternatives for vaccine transport.

Cold storage requirements vary with the specific vaccine. Scientists producing vaccine at the Livestock Research Institute and at the Bangladesh Agricultural University claim that room temperature storage of vaccines for 48 hours will not affect the efficacy of the vaccines. Recommendations for cold transport are given as a safety precaution to ensure that vaccines are not exposed to excessive heat. No documented evidence has been found to back their claims.

Experiments were devised to compare the insulative capacity of several different vaccine carriers to find an inexpensive durable container for transport of vaccine from district livestock offices to villages by local vaccinators. The use of a jar packed with ice and holding the vaccines and enclosed in sawdust as an insulating material was compared to conventional carriers, such as the Homesite carrier (insulated box with ice pack) and two different thermal flasks. In all trials, it appears that flask performance is highly dependant on the quality of the flask construction. The carrier using sawdust performed satisfactorily, but was still outperformed by the regular Homesite vaccine carrier and one of the thermal flasks. As a very low cost vaccine carrier the carrier using sawdust appears to have potential. Further tests were made with the sawdust carrier, varying the amount of storage ice and the thickness of the sawdust insulation. Based on these experiments, a jute bag was designed for carrying vaccines using sawdust

as an insulating material. Presently this bag is being sewn and will be tested. The final test is by the vaccinators and their acceptance of the carrier.

### Soybean Processing Research

The MCC Soybean Project began investigating the feasibility of using an extrusion-expelling process to process soybeans into oil and flour. MIDAS, a management consultants group, was commissioned to carry out a feasibility study on the proposed project, based on work done by INTSOY at the University of Illinois (U.S.A.).

Initially work focused on sourcing local equipment and equipment fabrication for the project. Drafts of MIDAS's feasibility report were reviewed and suggestions given concerning equipment and processing details. In April, meetings were held with Dr. Wijeratne, from INTSOY, and MIDAS, to review MIDAS's study and address issues that it raised.

While reviewing the study, MCC Ag programme staff determined that research on alternative soybean processing methods was needed. This work is providing information to allow comparisons between soybean processing methods. Work is underway to study production of full fat soyflour using rice parboiling methods and low fat soyflour using oil expellers. Soyflour quality will be evaluated on the basis of trypsin inhibitor inactivation and storage life, while commercial viability will be measured by product marketability and production cost per kg of product.

At the time of writing this report, no firm decisions have been taken on whether to proceed with the SEEP proposal as outlined in the MIDAS study. The study suggests that SEEP would be a good investment opportunity for a local entrepreneur, but much uncertainty remains concerning some of the fundamental factors contributing to the profitability and success of the venture.

### Job Creation Projects

In the absence of a Job Creation (JC) engineer, the ATRD engineer assisted with JC projects. The major work was with the Shyuktara Handmade Paper project. With the assistance of the JC appropriate technology technician, a small Hollendar type beater was constructed locally and drawings for a calendaring machine were made at MAWTS. Upon arrival of two JC engineers, the ATRD engineer oversaw their orientation and also conferred with the JC engineer assigned to the Shuktara Handmade Paper project.

Other work involved the design and testing of honey extracting equipment. Various types of extractors were tested, but a low cost centrifugal extractor, driven by a hand drill, was found to work best. Presently several different types of beehive boxes are being made for testing by the Extension Project.

## AGRICULTURE TRAINING PROGRAMME

### Introduction

The Mennonite Central Committee (MCC) is concerned with the development of people. Each of the different programmes within MCC's Agriculture Programme work at improving the knowledge, skills, capabilities, attitudes and motivation of their target groups with the underlying belief that if the people of Bangladesh are developed, Bangladesh will develop.

In it's ongoing effort to develop the Bangladeshi people, MCC tries to utilize it's resources to the fullest level possible. Of it's four major resources - human, financial, organizational and time, MCC recognizes it's human resource-it's personnel, as it's most important resource. Thus MCC is committed to the continual development of it's personnel in a never ending effort to improve MCC's capability to do high quality development work and to improve the knowledge, skills, attitudes and capabilities of it's employees. Within the Agriculture Programme much of the responsibility for staff development lies primarily with the Agriculture Training Programme.

To carry out the responsibility of staff training and development the Agriculture Training Programme uses a variety of training methods to provide the best training for each specific situation in the most efficient way possible. These methods include the organization of monthly Ag-Meetings, the organization of special trainings and seminars on timely and relevant topics, sending selected individuals to training institutions either in or outside Bangladesh in response to special training needs, study tours and sponsoring staff for advanced degree earning academic trainings at institutions of higher learning.

In addition to its training responsibilities the Agriculture Training Programme is responsible for providing information and communication support services. Information and communication services naturally come under a training programme since in its most basic form training is the communication of information, knowledge, ideas, skills and attitudes. Under its responsibility for communication support services the Training Programme manages the Feni Library and Information Center (FLIC), publishes the monthly *MCC Agriculture Newsletter*, and organizes and chairs the Research-Extension Coordination Committee (RECC) and Research Programme Internal Reviews (RPIR).

The July 1988 - June 1989 programme year was a year of tremendous increase in Agriculture Training Programme activities. This was due to an increase in both the number and quality of staff within the Training Programme, without whom much of this work would not have been possible. A summary of last years Agriculture Training Programme activities follow.

### Results and Discussion

During the past year ten regularly scheduled Ag-Meetings were held (Table 1). The September Ag-Meeting was cancelled due to a hartal (public strike) which prevented employees from traveling to the meeting, and for February the Research Programme Internal Review was substituted for the Ag-Meeting. In the Ag-Meetings a total of 15 days of training was organized for MCC staff. Most of the Ag-Meeting topics were presented by MCC Agriculture Programme staff. However for selected topics the Training Programme invited experts from other organizations to give lectures and training. For the July Ag-Meeting on "The Status and Development of Women in Bangladesh", Supreme Court Justice (retired) Kazi M. Sobhan presented lectures on several important topics. In

August Quazi Tafazzal Hossain and Santosh Kumar Sarkar from the Plant Protection Wing, Department of Agricultural Extension gave a training on "Rat Control". In November Dr. M. Saadullah, Professor of Animal Science, Bangladesh Agricultural University, Mymensingh gave a training on "Livestock Nutrition, Feeds and Feeding", and in January Dr. B. N. Chatterjee, Professor of Agronomy, Bidhan Chandra Agricultural University, Kalyani, West Bengal, India presented a series of talks on "Agricultural Development in West Bengal, India". The Agriculture Training Programme is grateful to all these men for their assistance.

To improve the quality of the Ag-Meetings, the Training Programme implemented two evaluation techniques last year. To evaluate the level of learning and retention of the Ag-Meeting participants, monthly tests were given after each Ag-Meeting covering topics presented in the previous Ag-Meeting, and to evaluate the quality of training presentations and the Ag-Meeting trainer's skills, a 'Post Ag-Meeting Evaluation Questionnaire' was implemented. The participants scores on the Ag-Meeting test have been in general disappointingly low, perhaps partially due to the participants not being used to routine testing and their study habits were weak. Efforts are being made to improve the level of learning, retention and test scores of Ag-Meeting participants in the future. In addition, the Agriculture Training Programme increased the number and quality of staff which should also improve the quality of future Ag-Meetings.

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 Table 1: Ag-Meetings held with duration and topics discussed during the July 1988-June 1989 programme year.  
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Month	Duration	Ag-Meeting Topic
July	2 days	The Status and Development of Women in Bangladesh
August	2 days	Rat Control
September		CANCELLED DUE TO HARTAL
October	1 day	The Role of Socio-Economics in Agricultural Development
November	2 days	Livestock Nutrition, Feeds and Feeding
December	1 day	Review on Cultivation of Soybeans and Winter and Summer Vegetables
January	2 days	Agricultural Development in West Bengal, India
February		Research Programme Interval Review
March	1 day	Summer Vegetable Cultivation, Soybean Storage Methods and Boroi Grafting
April	1 day	Identification and Control of Vegetable Insect Pest, Soybean Harvesting and Dealer and Farmer Management and Crop Cuts: Importance and Methods
May	1 day	Soybean Nutrition, Utilization and Marketing
June	2 days	Rice Production Methodology

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In addition to the ten Ag-Meetings, the Agriculture Training Programme organized seven special trainings or seminars (Table 2). These special trainings provided a total of 17 days of training and were participated in total by over 100 people. Each of the programmes within the Agriculture Programme benefited by one or more of these trainings. Other beneficiaries included MCC's household staff in Feni and Maijdi who participated in a "Food Handler's Training", and dealer's cooperating with MCC's Appropriate Rural Technology Programme in marketing the rower and treadle pump in the Greater Noakhali area, who benefited from a seminar on "Salesmanship and Customer Relations."

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Table 2: Dates, participating programmes and trainers for special trainings or seminars organized by the Agriculture Training Programme during the July 1988 - June 1989 programme year.

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July 3-4: "Treadle Pump Installation and Maintenance" for ART, ARTD, and Agricultural Extension staff, given by staff from RDRS.

September 4-5: "ART's "Dealer's Salesmanship and Customer Relations Seminar" in Feni and Maijdi, given by Ciba-Geigy staff.

September 7-8: "Basic Book Keeping and Accounting" for staff in RSP, Administrative Services, and Job Creation, given MCC staff.

December 11-15: "An Expanded World for Women" for Homesite Programme staff on the use of Save the Children's flipchart series given by Jahanara Begum from Save the Children (USA).

December 21: "Motorcycle Policy, Maintenance and Emergency Repair" for MCC's motorcycle drivers, given by MCC staff.

January 8: "Use of Soybean Flipcharts and Audiovisuals" for MCC's Soybean Cooking Demonstrators, given by Shamsunnahar, Assistant Programme Officer, Voluntary Health Services Society (VHSS).

March 11-14: "Food Handler's Training" for MCC's household staff in Feni, Maijdi and Saidpur, given by Peter Corraya.

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Seventeen MCC employees attended a total of 17 advanced training organized by different training organizations either in or outside Bangladesh (Table 3). Through these trainings MCC staff received a total of 246 days of training. However, 140 days or 56 percent of this total was accounted for by a single training attended by Mofizul Islam on "Comparative Technology" (Vegetable Production) by the Asian Vegetable Research and Development Centre (AVRDC) in Taiwan, Republic of China. Excluding this single training, 16 MCC Agriculture Programme employees received 106 days of training or an average of 6.6 training days per trainee.

Of trainings organized within Bangladesh, the Extension Programme received the most benefit in terms of total number of trainees sent to trainings in which six employees received training, accounting for 38 percent of the total. The Research Programme was the second highest beneficiary in which four employees were sent to trainings or 25 percent of the total. However, in terms of total training days received, the Homesite Programme benefited the most in which they received 33 training days from outside organizations for 31 percent of the total, and the Extension Programme was the second highest beneficiary, receiving 30 days of training for 28 percent of the total training days.

Two programmes failed to receive any benefit from outside trainings last year. These were the Rural Savings Programme and Appropriate Rural Technology. The Training Programme tried to send several participants from the the Rural Savings Programme to trainings organized by the Bangladesh Rural Advancement Council (BRAC), but due various reasons these trainings were cancelled by BRAC and never rescheduled. The Appropriate Rural Technology is in the process of phasing out and reducing staff, and made no training requests for it's staff last year.

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 Table 3: Name, position, training title, date and name of training institution of trainings participated in by MCC staff during the July 1988 - June 1989 programme year.  
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Umesh Kumar Bhowmic, Field Extensionist, Extension Programme  
 Integrated Farm Management, 16-20 October 1989  
 Development Service Center, Bangladesh Mission.

John Brejda, Agriculture Training Programme Leader  
 Training of Trainer's Workshop on Training Methodology  
 29 March 1989, Rapport Bangladesh Limited

Nanu Chanda, Motorcycle Mechanic, Administrative Services  
 Honda XL185 Introduction and Servicing Training  
 5-6 December 1988, Honda Servicing Center, Dhaka.

Noren Kumar (Khokon) Dey, Workshop Supervisor, Appropriate Technology  
 Research and Development  
 Honda XL185 Introduction and Servicing Training  
 5-6 December 1988, Honda Servicing Center, Dhaka

Moses Hazra, Training Assistant, Agriculture Training Programme,  
 Training Development Training:  
 Module I: Training Methodology, 4-9 February 1989  
 Module II: Course Development, 1-6 April 1989  
 Module III: Training Management, 13-18 May 1989  
 Communication and Training Unit, NRDP/DANIDA Training Center, Maijdi

Delwar Hossain, Data Collector, Research Programme  
 Integrated Farm Management, 16-20 October 1988  
 Development Service Center, Bangladesh Mission

Mofizul Islam, Programme Officer, Extension Programme  
 Comparative Technology (Vegetable Production)  
 13 February - 29 June 1989, Asian Vegetable Research and Development  
 Centre (AVRDC).

Abul Khair, Field Extensionist, Extension Programme  
 Integrated Farm Management, 16-20 October 1988  
 Development Service Center, Bangladesh Mission

Manik Chandra Kuri, Programme Officer, Extension Programme Integrated  
 Farm Management, 16-20 October 1988  
 Development Service Center, Bangladesh Mission

Babul Chandra Majumder, Field Extensionist, Extension Programme,  
 Integrated Farm Management, 16-20 October 1988  
 Development Service Center, Bangladesh Mission

Tapan Chandra Majumder Field Extensionist, Extension Programme,  
Integrated Farm Management, 16-20 October 1988  
Development Service Center, Bangladesh Mission

Abdul Malek, Research Gardener, Research Programme  
Integrated Farm Management, 16-20 October 1988  
Development Service Center, Bangladesh Mission

Zakrina Mursheda, Rural Health Promoter, Homesite Programme  
Training Course on Training Health Workers  
30 October - 17 November 1988, Worldview International Foundation (WIF).

Shahnaz Noor, Field Supervisor, Homesite Programme Human Resource  
Management and Human Relations 3-15 September 1988, BMDC-Chittagong

Zillur Rahman, Gardener Supervisor, Research Programme  
Integrated Farm Management, 16-20 October 1988  
Development Service Center, Bangladesh Mission

Shajahan Siraj, Field Extensionist, Extension Programme  
Integrated Farm Management, 16-20 October 1988  
Development Service Center, Bangladesh Mission

Abul Taher, Data Collector, Research Programme  
Integrated Farm Management, 16-20 October 1988  
Development Service Center, Bangladesh Mission

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Two employees from the Agriculture Programme participated in study tours last year. John Brejda, the Agriculture Training Programme Leader attended the "Third International Rangeland Congress" during 5-11 November 1988 in New Delhi India, and Bruce Syvret, Appropriate Rural Technologies Programme Leader visited the Small Business Promotion Project (SBPP) during 2-6 April 1989 in and around Kathmandu, Nepal. Reports on these study tours are on file with the Agriculture Training Programme Leader.

To assist in inter-programme communication, the Agriculture Training Programme organized two Research Internal Reviews in September 1988 and February 1989, and chaired two Research-Extension Coordination Committee meetings. The objective of the Internal Review was to provide

an opportunity for the Research Programme to present their research results from the previous season to the extension programmes, and give the extension programmes the opportunity to critique and provide the Research Programme input on their new research plans and proposal. The Internal Review is considered a very good forum for communication between MCC's research and extension programmes and will be continued during the next programme year.

The objective of the Research-Extension Coordination Committee (RECC) was also to facilitate research-extension communication by addressing problems as a large group. The committee has made some important contributions to inter-programme communication but decided it has outlived its usefulness. Research-extension communication has improved during the past year, and although there is still more room for improvement, there are more efficient ways to address problems in inter-programme communication than the RECC meeting. Therefore, at their last meeting the committee voted to disband.

Another forum through which the Agriculture Training Programme tries to facilitate inter-programme communication is through publishing the monthly *MCC Agriculture Newsletter*. Twelve such newsletters were published last year. The format of the *MCC Agriculture Newsletter* was revised last year in an effort to make it more useful to the audience.

As an information service, the Agriculture Training Programme manages the Feni Library and Information Center (FLIC). The Agriculture Training Programme devoted considerable time and resources to improving FLIC last year. Old and out of date publications were disposed of and new and relevant publications were acquired. The Center subscribed to twelve periodicals and journals for the Agriculture Programme staff last year (Table 4). To provide easier access to the periodicals and journals in FLIC, a periodical catalog was prepared and circulated listing all issues in the FLIC collection of periodicals received, both past and present.

Table 4: Periodicals subscribed to by the Feni Library and Information Center for Agriculture Programme staff during the July 1988 - June 1989 programme year.

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ADAB News (both English and Bangla)  
 Agronomy Journal  
 Bangladesh Journal of Training and Development  
 CERES  
 Krishi Katha (Bangla)  
 International Agricultural Development  
 Proshikkyan  
 REPORTS  
 Soil Science Society of America Journal  
 The Indian Journal of Agricultural Science  
 The Indian Journal of Animal Science

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The FLIC book collection was also expanded during the past year. Over 100 books were added to the collection. At the end of the year FLIC had a total collection of 1,216 books and publications of which 16 percent were in Bangla. The collection expanded to 54 subject matter categories. Categories containing the largest number of publications included General Development (83), Cropping Systems and Farming Systems (57), Livestock and Animal Husbandry (50), Economics (45), Rice (43) and Appropriate Technology (41). Among the publications in Bangla the subject matter categories with the largest number of publications were fisheries (41), Rice (23) and General Agriculture (16).

Excluding periodicals and journals, the FLIC collection expanding by about eight percent in total number of publications over last year. Unfortunately, about seven percent of the collection is missing or unaccounted for.

**Summary**

To be effective a development organization must have a continuous and efficient programme for staff training and development. Trainings true potential is not merely as job preparation but rather as a powerful tool capable of returning benefits to MCC that far exceed the cost of the training.

In the past the Agriculture Training Programme has followed the practice of relying on outside institutions for the specialized training it needs. Unfortunately this has not always been very efficient since most of these organizations were not able to vary their programme contents to meet the specific needs of MCC. Therefore, during the last programme year the Agriculture Training Programme revised its training philosophy. Greater emphasis was placed on using in-house training resources to provide for staff training needs. The Training Programme continued to send staff to outside training institutions when high quality trainings were found and it was felt most appropriate, but first tried to determine if that need could be met in-house.

A comparison of total number of training days and total number of staff receiving training from outside institutions for the last two programme years will at first suggest a decline in staff train during the past programme year. However, the decreased emphasis on training from outside institutions was offset by the large increase in trainings and seminars organized in-house this past year. In-house trainings are more efficient in terms of cost, and in that MCC can design the training to its specific staff needs.

The maintenance of a relevant and up-to-date library is a very efficient way to keep an organizations staff up-to-date on the information need to do high quality development work. The Agriculture Training Programme continued to put a great deal of emphasis on upgrading FLIC for the benefit of the Agriculture Programme staff. Considerable progress has been made, but based on the level of use during the last programme year, there is still room for improvement.

Many of the changes that took place in the Agriculture Training Programme during the last programme year were designed to build a firm foundation for the programme to build on. The Agriculture Training Programme has made tremendous progress during the last two years; progress that will make it stronger and more capable for providing for the training needs of MCC's staff, and the staff of other yorganizations who request assistance.

## POST FLOOD AGRICULTURAL RESEARCH PROGRAMME

### Introduction

The year 1988 will be remembered as the year when the worst ever flood hit Bangladesh. Many people were affected and no doubt the development of the country suffered a severe setback. MCC responded to the flood in several ways but because our Agriculture Programme area was relatively unaffected we did not undertake rehabilitation work in Noakhali.

However, in response to requests for information from other NGOs, a project was designed to study the farming systems of the flood-prone area and to discuss with farmers their concerns and problems. The study will be used in the event of other similiar disasters in future years or to help in evaluations of current rehabilitation programmes. A comprehensive report is being published separately so only a brief discussion is given here.

We conducted the study in nine areas of Bangladesh covering three major flood-affected landtypes. These landtypes are lowlands, beels, and riverine chars. Two study methods were used to help understand the problems: a formal questionnaire in each of the three landtypes, and informal discussions with an open-ended format which were held throughout the flood-affected area.

### Flood Damage Assessment

The floods of 1988 covered most of Bangladesh. Reports published since the flood indicate that 60 to 80 percent of the country was under water. Every component of farming systems was affected: all field crops grown during the mon-

soon season were affected but the greatest damage was to the aman rice crop. Most of this crop was ruined and, since it is their primary source of food and income, many farmers suffered. Aus and jute, homesite gardens, trees, poultry, livestock and fish ponds were also affected by the flood to varying degrees.

#### Post-Flood Land Utilization

Farmers attempted to recover their losses by planting new crops after the flood. In some areas they were able to transplant aman seedlings but this was not common. Other post-flood crops were blackgram, sunnhemp, khesari and *parangi* (a local, broadcast, upland rice). These seeds were provided by government offices, NGOs or from the farmers' own resources.

These alternative crops are all early maturing, low input crops which have some value as cattle fodder in addition to their grain. The pulses are commonly grown after aman crops during normal years but in 1988 more was grown. These crops can also be harvested early enough that other rabi crops such as HYV boro, wheat or mungbeans can be planted.

The most important recovery crop after the flood was HYV boro. Both the government and NGOs facilitated the purchase and supply of tubewells, pumps and seed and the acreage of boro rice increased dramatically. HYV boro was considered by farmers as their first crop choice for recovery from the disaster. The main appeal of boro rice is: 1) it is a low risk crop which matures before the monsoon season; 2) it has very high yield and profit potential; 3) it is a crop which most closely replaces the grain and straw from the aman lost during the flooding. The major constraints are high input costs and irrigation.

In areas where farmers did not gain access to irrigation and HYV boro, they said they did not change their rabi cropping patterns from normal years. Since the flood waters receded in October, normal post-aman cropping patterns were possible including pulses, mustard, wheat and vegetables. Many of these crops were, unfortunately, affected by the cyclones which hit in October and November.

#### Constraints to Crop Production

The main constraint confronting farmers in cultivating post-flood crops was a shortage of cash and credit. This influenced their choices and the inputs given. Some farmers did not plant higher input crops such as wheat, potatoes, or vegetables because they could not obtain sufficient credit. In some cases they reduced seeding rates or the amount of fertilizer, tillage or labor to keep costs low. Credit, however, was usually available for HYV boro production.

Farmers generally did not report a shortage of seed. Since seed stored by farmers was lost or ruined there was a greater market demand. They then had to purchase more seed than usual at higher than normal prices and this became a constraint. It is believed that the seed distribution programme of the government of Bangladesh under the Ministry of Agriculture helped to prevent seed shortages and larger price increases. There were some problems in the distribution of this seed, as could be expected, but it is known that some farmers received seed and this helped in reducing seed constraints.

Draft animals and cultivation were a major constraint for boro and rabi crops. The death of cattle during the floods, the weakness and disease due to poor feed and the selling of cattle after the flood for cash caused a severe shortage of draft animals in all areas. Many farmers who

previously plowed their own land had to hire plowing this year at substantial expense. Many farmers said they reduced the number of plowings before planting to reduce costs.

There was no shortage of labor this year. The poor economic situation forced many small farmers to seek additional income by working as laborers. Although it was available at a low price, many farmers perceived labor as a constraint simply because they could not pay for it. More farm labor was done by the farmers themselves and their children in order to reduce hired labor costs.

Irrigation was a frequently mentioned constraint. While the irrigated area expanded significantly, many farmers were not able to participate. Everyone having suitable land expressed the desire to grow HYV boro as their first choice of recovery crops. Many tried more traditional methods such as swing baskets and shallow canals from their own ponds.

### Economic Adjustment

Four options that people have in raising money for food and crop expenses were observed . These are: the sale of assets, sale of their own labor, borrowing money and the sale or mortgage of their land.

The assets most commonly sold by farmers were livestock, poultry, trees, bamboo and jewelry. The most important of these are cattle and goats. The severe shortage of cattle feed was one reason for the large number of cattle sold but as important was the relatively large amount of money that could be raised by the sale of a cow or bullock.

Even so, the price farmers received for cattle was low, perhaps 50 to 70 percent of normal. Many goats and poultry were also sold. Their price was also lower at first but improved as the supply dropped and the demand for them remained high. Trees and bamboo were less often sold unless they were damaged during the flood. Essential assets such as furniture, housewares and CI sheets were not often sold.

The sale of labor was the next option farmers had. After the flood many people were searching for work to earn money. During the immediate post-flood period this was hard to find because so much of the aman crop was ruined and so many were looking for work. Later, when rabi or boro crops were being planted there was more work available. In addition to agricultural labor, some people also found work with rickshaws, wood cutting, brickfields and food-for-work projects. In the surveys 25 percent of the farmers said that a family member had left home to look for work. Many of these people came to Dhaka.

Many people in the survey were forced to take loans of some kind. Low interest loans were sought from family members or friends with jobs. Bank loans were also attempted but usually not received. Most people had to rely on private moneylenders who usually charged ten percent per month interest. Standard repayment was generally one maund of rice at harvest for each 100 taka loan.

If farmers still needed money after selling assets, daily labor and taking loans, they were forced to sell or mortgage their land. Not many people admitted that they themselves sold land because the price was very low and there were few buyers. There were more mortgages taken but the price on these was also low.

### Relief and Rehabilitation

Much relief was distributed during and after the flood by both the government and by NGOs. The most common items received were rice and wheat. There was some disagreement among survey respondents on what their needs were after the flood. Landless, poor and marginal farmers said their greatest need was for food and money. These people often had very little to live on during this critical time and were dependent on relief. They were also often participating in Food-for-Work programmes.

Medium and small farmers said their greatest need was for agricultural assistance such as good seed, irrigation equipment and credit. These people lost their own seed stocks and cattle during the flood. They often already have loans and mortgages which make further credit difficult to get.

Vegetable seed was received by many people in the flooded area but the response was mixed. Some gardens were lost or ruined by the cyclones which came in October and November. Others were not properly cared for by people who were not trained in vegetable cultivation. Some did appreciate the seed and benefited from it.

The government of Bangladesh's rehabilitation programme consisted of four phases. The survey was not designed to monitor this programme but farmers were observed participating in several aspects of it. The four phases were: 1) transplant aman rice seedlings; 2) seed for post-aman crops such as blackgram, maize and *parangi*; 3) rabi season seed such as HYV boro rice, wheat, maize, potatoes and vegetables; and 4) rehabilitation of irrigation equipment for rabi crop production.

**Summary and Recommendations**

In general it can be said that all sections of the farming systems of Bangladeshi farmers were affected by the flood of 1988. Crops were destroyed, animals died, and employment opportunities lost. Farmers tried to recover the best way they could with their own resources or through relief and rehabilitation programmes. Planting HYV boro was the preferred method of recovery for many farmers; however, not all could participate. Most farmers said they did not make changes in their cropping patterns because of the flood and will continue to plant the same aus, aman and rabi season crops, if they can. They see this as being the lowest risk choice they have.

More detailed recommendations are provided in the comprehensive report.