Non commodity technologies:

A short description of the improved management technologies under non commodity is given below:

1. **Soil health services to farmers:**
   Based on location specific soil analysis and fertilizer recommendation, the Institute has introduced soil health services to farmers in two upazilas of Mymensingh and Sherpur districts. The aim of the service is to obtain maximum yield by maintaining soil fertility and saving the cultivable land from degradation due to imbalance use of chemical fertilizers. The services have already started giving benefit to the farmers.
2. **Use of sewage sludge in crop production:**
   Application of radiation processed sewage sludge reduces the use of chemical fertilizers, replenishes soil organic matter content of the cultivable land and improves soil fertility and preserves the environment. Application of 400 kg/ha sewage sludge produced identical yield obtained from 100 kg nitrogen/ha from urea. This practice also increases the crop yield.
3. **Minimum tillage for wheat cultivation:**
   This is recommended for growing wheat with minimum tillage practice immediately after the harvest of T. aman rice. Seeds can be sown by opening a furrow with a country plough in between two rice rows immediately before or after harvest. It reduces the turn around time between two crops and wheat can be grown with residual soil moisture, thus, reducing the cost of cultivation. Growing one more crop in a mono crop area gives this practice an additional income.
4. **Wheat cultivation in saline soil:**
   This management practice has been developed for utilization of fallow saline land for wheat cultivation. Timely planting immediately after harvest and careful management can prevent the land from quicker drying. Planting of wheat seeds should be done immediately when 'Jo' condition of land arrives. Farmers could get additional income by growing wheat in a barren land in saline zone.
5. **Use of micronutrient for higher mungbean and mustard production:**
   This management practice is recommended for the dark grey flood plain soils of Mymensingh and Jamalpur areas, which are deficient in several micro elements, viz., boron, zinc, molybdenum. Application of these micro-elements as recommended in the'Fertilizer Recommendation Guide, 1997' increases the grain yield of mungbean and mustard in the above areas.
6. **N-fertilizer management in rice cultivation:**
   Application of half the dose of nitrogen fertilizer (as urea super granule) would give higher grain yield and thus, reduced the cost of N-fertilizer. Moreover, pollution due to application of nitrogen fertilizer is reduced.
7. **Use of press mud instead of TSP:**
   Press mud is a potential source of phosphatic fertilizer. Application of decomposed press mud @ 1200 kg/ha (equivalent of 200 kg TSP) at the time of land preparation for rice and sugarcane cultivation saves money and use of P fertilizer. Moreover, it increases the organic matter content of soil and thus, improves the soil physio-chemical properties.

8. **Phosphatic fertilizer management in rice based cropping system:**
   This practice recommends 50% of the total recommended dose of phosphatic fertilizer in an area where continuous cropping patterns are followed with wheat -T. aus-T. aman rice. In the second crop T. aus rice, no P-fertilizer is needed while 50% of recommended dose of P fertilizer may be applied in the third crop.
9. **Integrated nutrient management for three dominant cropping pattern:**
   The institute has developed a balancad use of fertilizer management practice for the 3 major rice based cropping patterns, (i) greater Mymensingh, Comilla, and a part of Chittagong, (ii) Rangpur, Bogra, Dinajpur, Pabna, Rajshahi, Faridpur and Jessore, and (iii) Brahmanbaria, Tangail, Comilla, Jamalpur and Dinajpur. The balanced fertilizer doses and the target crop yield are mentioned bellow:

Cropping System	Fertilizer doses (kg/ha)							
	Urea	TSP	MP	Gypsum	Zinc-sul Phate	Borax	Cowdung (tons/ha)	Yield (tons/ha)
i. Boro	315	175	134	110	11	9.5	-	7.0
Green Manure	-	-	-	-	-	5.6	-	-
T.aman (HYV)	115	85	68	55	-	-	-	5.5
ii. Wheat (HYV)	217	85	100	110	11	19	5	5.8
T.aus	152	45	34	55	-	-	-	4.5
T.aman	152	45	34	55	-	-	-	5.2
iii. Nustard (HYV)	260	175	134	110	11	19	5	1.5
Boro (HYV)	217	217	68	55	-	-	-	5.8
T.aman	174	174	34	55	-	-	-	5.8

10. **A new cropping pattern for the saline soil of Feni area:**
    Cropping intensity could be increased across the saline area of Feni following the cropping pattern with early maturing Aman rice (BR-33) Binasarisha-3 or Binasarisha-4 Fallow/summer mungbean (Binamoog-2 or Binamoog-5).

11. Control of pulse beetle by plant oils:

Mixing of mungbean seeds @ 1 kg with 10 ml oil of sesame or groundnut/ mustard/castor/coconut/palm could protect the treated seeds from the attack of pulse beetle for about 5-6 months. The technique is cheap and environment friendly.

12. Irrigation scheduling for the mustard varieties (Safal and Agrani):

One irrigation of 3 cm at 35-40 days after sowing for the Mymensingh area, while two irrigation (each 4-5 cm), one at 25-30 days and the other at 65-70 days after sowing for the Jamalpur and Ishurdi areas would give 20-30 % higher seed yield.

13. Water saving in rice cultivation:

Alternate flooding and drying for 5-7 days saves more than 40% of irrigation water with insignificant yield loss. The practice reduces continuous decline of water table.

14. Waterlogging tolerance limit of sugarcane:

The sugacane variety ISD-21 is tolerant to waterlogged conditions, which is recommended for cultivation in those areas where waterlogging exists for about 60 days.

15. Supplemental irrigation for Binasail rice:

Binasail is a low input T. aman rice variety that does not require any supplemental irrigation at Mymensingh and Jamalpur areas. However, depending on natural precipitation, one irrigation may be given to grow this variety at Rangpur and Ishurdi areas.

16. Low cost irrigation:

BINA has developed a low cost irrigation channel with the pre-cast forcement. Construction cost is half compared to brick-made channel. There will be no water loss during irrigation from the low cost ferrocement channel.

17. Cultural management of diseases:

This is the preventive measure to control diseases of winter mungbean and mustard. The date of sowing is very important, which should be followed strickly as mentioned bellow in the greater Mymensingh area:

Crop	Reduce disease severity	Date of sowing	Region
Winter mungbean (Binamoog-1)	Cercospora leaf spot	10-15 September 25-3. September	Mymensingh Ishurdi
Chickpea (Hyposola)	Foot and root rot, Wilt and stem rot	1-7 December	Mymensingh
Mustard (Safal and Agrani)	Alternaria blight	15-25 December	Mymensingh

18. Varietal resistance to major diseases:

Crop variety	Level of resistance	Disease (s)
Rice:		
Binasail	Moderatly resistance (MR)	Bacterial Leaf Blight (BLB) Sheth Blight (ShB)
BinaDhan-4, 5 & 6	Tolerant (T)	BLB & ShB
Pulses:		
Binamoog-1, 2, 3, 4 & 5	T	Cercospora Leaf Spot (CLS) Yellow Mosaic (YM)
Binamash-1	MR	CLS & YM
Oilseed:		
Safal & Agrani	T	Alternaria blight
Binasarisha-3 & 4	T	Alternaria blight

Besides the above technologies/scientific information, several other promising materials/informations are under different stages of evaluation, which are expected to be transfered to the farmers soon through the National Seed Board, DAE and NGOs. At the end, it may be mentioned here that the scientists of BINA are offering their best services to the cause of nation towards attaining self suffiency in food production.

19. Shallow tubewell installation to lift arsenic free water:

It has been observed arsenic contamination above recommended limit in shallow tubewells water at Gosta Uttar Para of Dapunia Union under Mymensingh Sadar Upazilla, Mymensingh district. A research project was initiated to solve the problem. Soil and water samples at the time of boring was collected and arsenic source layer was detected. After that, deeper boring continued upto 250-270 feet depth having sand layer without arsenic source. Tara shallow tubewell was installed. Analytical procedures as explained must be used to install shallow tubewell in arsenic contaminated area to lift arsenic free water.

20. Development of new cropping pattern for Baind area through soil water conservation:

In Barind area, farmers usually grow rainfed aman rice during kharif-II season. Most of the cultivated land remains fallow during rabi and kharif-I season either due to unavailability of irrigation water or high cost of irrigation water. Early maturing rainfeed aman rice (Binadhan-4) during kharif-II provides ample scope to conserve rainwater in soil profile, which is enough to grow crops like chickpea (Hyprosola/ Binasola-2) in Barind area during Rabi season.

After harvest of chickpea, drought tolerant mungbean (Binamoog-2) can be grown during kharif-I providing only pre-sowing irrigation to ensure germination of mungbean.

21. **Development of new cropping pattern for salt affected soils through water management practices:**

In southern saline part of the country, farmers usually grow rainfed aman rice during kharif-II season. Most of the cultivated land remains fallow during rabi and kharif-I seasons due to salinity. It that area, additional two crops like tomato/chickpea/mustard and mungbean can be grown during rabi and kharif-I seasons, respectively, providing excess saline water (as per availability) through fulfilling irrigation and leaching requirement of crop and soil.

22. **Farmers' Reasons for cultivating local varieties of T. aman Rice:**

Farmers' reasons for cultivating local varieties of T. aman rice at Gurpur upazila of Mymensingh district were identified which were; (1) high level of stagnant water due to moderately low land and poor drainage facilities in certain areas of the locality (14.69% area), (2) lack of adequate water due to high land in some other areas (9.17% area), (3) Late transplanting due to occurrence of flood (8.76% area), (4) less water holding capacity due to sany soil (8.58% area), (5) low cost of cultivation (3.91% area), (6) good taste (3.35% area), (7) deep water (3.30% area), high straw production (0.63% area), early maturity (0.59% area), observation for adoption (0.48% area), and lack of seedlings of MV (0.11%), Based on ,, above information farmers' need based extension could be done.

23. **Factors contributing to communication effectiveness:**

Some of the factors played a very significant role in contributing to communication effectiveness. These factors were: (1) suitability of messages, (2) profitability of messages, (3) receivers' credit received, (4) print media use, (5) communicatiors' credibility, (6) electronic media use and (7) receivers' family size. All of these above factors except receiver' family size contributed positiverly and significantly to the communication effectiveness. Receivers' family size contributed negatively to the communication effectiveness. Hence, it can be inferred that the communication Effectiveness in relation MV of T. aman rice production programme in the Gouripur upazila of Mymensingh district and for similar other areas is the function of independent factors captioned above. These factors could be called as keys tothe success of any communication / extension effort.

24. **Homestead gardening model for round year's fruit harvest:**

With a view to get round fruit supply a model of homestead gardening was developed. This model was designed based on fruiting and harvesting period of different fruits available in the country. It was observed that about 12 fruit plants with regular bearing habit and fruiting in diversified season can supply year round fruit for family consumption. These are Plum, Coconut, Papaya, Guava, Banana, Pumelo, Lemon, Sapota, Carambola, Hog-Plum, Jackfruit, and Litchi.

25. **Profitability of Binasail cultivation:**

Comparative economic study on Binasail, Pajam and Nizersail cultivation reveal that profitablity of Binasail is closer to Pajam and 1.76 times higher than that of Nizersail. Pajam is not suitable for late transplanting whereas Binasail and Nizersail are suitable for late transplanting. Due to some

unavoidable constraint farmers have to cultivate local T. aman varieties. In that case cultivation of Binasail replacing other local varieties, farmers may get 1.76 times higher economic return.