Agriculture Promotional Report

Community Based Resource Management Project (SCBRMP)

IFAD Loan # 567-BD

July 2012

1. Background

The present input is planned to detail out the proposed plan for agricultural component to be included in the revised project proposal (PP). For the purpose the consultant visited the project area from 7-12 July 2012, made discussion meeting the SMSs agriculture and livestock. Discussion also made with other relevant PMU officers and with the management consultant of the project. The financial allocation for the next two years (2012-13 and 2013-14) is detailed out following the ToR (Summary fund allocation table included in the revised PP). The proposed works are elaborated with methodology and justification in the current input report. A shorter version of the input report/document is also prepared and attached as **Annex I**. This two pages document could be attached in the revised PP as annex of the fund allocation summery table (agricultural component) already included.

Proposed Agricultural Promotional Activities under SCBRMP during 2012-14

2. Introduction

During the 1st phase (2002-03 to 2006-07), the project put importance on the adaptive trials of cereals, pulses, oilseeds and vegetables to identify the appropriate varieties/technologies for the district/project area. The technology transfer activities started in the following years on identified technologies/varieties using crop demonstrations and field training of farmers. The project adopted integrated planning methods involving BRRI, BARI and BLRI for developing its Annual Work Plan and Budget (AWPB) in each of the years for agricultural component. The project management ensured the supports of line departments of GoB (DAE and DLS) to train the project beneficiaries in adopting/uptake new production technologies. In 2nd phase (2007-08 to 2010-11), both adaptive trials and demonstration programs continued in large scale with promotional support (pilot production program by seed support) to the better suited varieties/crops/technologies for the purpose of quick extension/dissemination. By

this time many farmers of the district adopted the cultivation of new varieties of mustard, wheat, T. Aman, sweet gourd etc. by project support in the fallow land of haor immediately after recede of seasonal water. In phase III (2011-12 to 2013-14), the project has planned various technology promotional activities for crops and livestock development in the project district and elaborated in the following sections.

3. Summary of Fund Allocation

The fund gained by exchange rate of USD is planned to be used in 4 major items/heads like a) participatory demonstration trials b) technology promotional activities c) agricultural infrastructures and d) documentation of output/outcomes under the component. Of the total fund (Tk 366.78 lac) 33% allocated for participatory demonstration trials, 21% for technology promotion, 41% in agricultural infrastructures and 5% for documentation of project outcomes. Agricultural infrastructures shared major allocation as the project carefully considered to develop modern facilities for surface irrigation systems in suitable locations of the district. The livestock development shared 9% of the estimated fund to be utilized for agricultural development in the next two years. Actual item wise allocation is showed in the following summary table.

Table: Summary of agricultural Plan to use the fund of exchange gain

Sl #	Item of Activities	Allocation in 2012/13			Allocation in 2013/14			Total project cost (Lac Tk)
		Unit cost (Tk)	# Unit	Total cost (Tk)	Unit cost (Tk)	# Unit	Total cost (Tk)	
1	Participatory Demonstration Trials							
1.a	Crop Production	26117.2	273	7130000	30374	107	3250000	103.80 (28)
1.b	Livestock development	14861.1	72	1070000	13250	40	530000	16.00 (5)
2	Technology Promotion							
2.a	Crop Production	20339	236	4800000	10331	145	1498000	62.96 (17)
2.b	Livestock development	47000	20	940000	46666.7	12	560000	15.00 (4)
3	Agriculture infrastructure							
3.a	Submergible dam/Buried pipe irrigation	2157143	4	8628572	2157143	3	6471429	151.00 (41)
4	Documentation of project outcomes							
4.a	Crop/livestock production	3571	504	1800000				18.00 (5)
Total (1+2+3+4)			**1109**	**25264572**		**307**	**11411429**	**366.76 (100)**

4. Details of Fund Allocation and Planning

The agriculture component of the project consists crop and livestock sections and the budget allocation is made accordingly to crop and livestock development separately under similar line items like demonstrations trials, technology promotion etc.Details of the fund allocation against line items are showed in the following table below.

4.1 Crop Sector

Under crop sector major budget allocation is made to the participatory demonstration programs (21%) with a view to assist technology transfer to the selected better adopted crops in the fallow land of haors in early rabi season immediately after receding of seasonal rain water. The fund is also allocated for technology promotional activities (17%) like application of urea super granules in rice production, use of

pheromone trap in cucurbits (vegetables) and brinjal, use of porous pipe in irrigation of boro rice etc. These activities are expected to assist in enhancing short and long term agricultural production systems in the project area.

4.1.1 Participatory demonstration trials

The present plan is made to support/strengthening the on-going technology transfer activities of the project.

Table: Detailed agricultural plan under the fund of exchange gain

Sl #	Item of Activities	Allocation in 2012/13			Allocation in 2013/14			Total project cost (Tk)
		Unit cost (Tk)	# Unit	Total cost (Tk)	Unit cost (Tk)	# Unit	Total cost (Tk)	
Crop								
1	Participatory demonstration trials							
1.a	Mustard (ac)	25000	50	1250000	25000	20	500000	1750000
1.b	Potato (ac)	40000	48	1920000	40000	20	800000	2720000
1.c	Wheat (ac)	30000	8	240000	30000	4	120000	360000
1.d	Sweet gourd (ac)	25000	60	1500000	25000	30	750000	2250000
1.e	Country bean (ac)	40000	35	1400000	40000	20	800000	2200000
1.f	Floating vegetable garden (10 beds)	25000	8	200000	25000	4	100000	300000
1.g	Exposure visit of farmers (#)	5000	44	220000				220000
1.h	BARI/BRRI honorarium (time)	20000	20	400000	20000	9	180000	580000
Sub-total			**273**	**7130000**	**29285.7**	**107**	**3250000**	**10380000**
2	Technology promotion							
2.a	Urea Super Granule (USG) Block (>5 ac)	40000	4	160000	40000	2	80000	240000
2.b	Porous pipe block (>5 ac)	40000	4	160000	40000	2	80000	240000
2.c	Pheromone trap block (1 acre)	40000	4	160000	40000	2	80000	240000
2.d	Development of ideal farm house (#)	10000	16	160000	10000	8	80000	240000
2.e	Facilitation of surface irrigation (km)	700000	6	4200000				4200000
2.f	Fruit garden (#)	10000	8	80000	10000	4	40000	120000
2.g	Extension materials (#)	6000	96	576000	6000	40	240000	816000
2.h	IPM school (#)	100000	2	200000				200000
Sub-total		**135143**	**140**	**5696000**	**20857.1**	**58**	**600000**	**6296000**
Livestock								
3	Participatory demonstration trials							
3.a	Housing and feeding of sheep farm (#)	30000	8	240000	30000	4	120000	360000
3.b	Mini hatchery unit (#)	30000	6	180000	30000	2	60000	240000
3.c	Duck breeder unit (#)	50000	8	400000	50000	4	200000	600000
3.d	Castration of goat & Sheep (castrator) (#)	5000	50	250000	5000	30	150000	400000
Sub-total		**28750**	**72**	**1070000**	**28750**	**40**	**530000**	**1600000**
4	Technology promotion							
4.a	Artificial Insemination Center (#)	50000	8	400000	50000	4	200000	600000
4.b	Chick rearing unit (#)	50000	6	300000	50000	4	200000	500000
4.c	Duck rearing unit (#)	40000	6	240000	40000	4	160000	400000
Sub-total		**46666.7**	**20**	**940000**	**46666.7**	**12**	**560000**	**1500000**
5	Documentation of project outcomes							
5.a	Project's impact study on crop sector (#)	800000	1	800000				800000
5.b	Project's impact study on livestock sector (#)	700000	1	700000				700000
5.c	Handbook for paravet (#)	300	500	150000				150000
5.d	Video (TV) program on technologies (time)	75000	2	150000				150000
Sub-total		**393825**	**504**	**1800000**		**0**	**0**	**1800000**

6	Agriculture Infrastructure							
6.a	Submergible dam/Buried pipe irrigation (Km)	2157143	4	8628572	2157143	3	6471429	15100001
Sub-total		2157143	**4**	**8628572**	2157143	**3**	**6471429**	**15100001**
Total (1+2+3+4+5+6)								**36,676,001**

The above table showed the crops and technologies are to be supported by the project using gained fund of dollar exchange rate. Mustard, potato, wheat, sweet gourd and country bean are the most popularly growing crops in the rabi season where project made varietal intervention successfully. Under the program block demonstrations trials of the mentioned crops (following table) with tested and accepted varieties will be implemented in 8 Upazilas. The size of the block will vary from 1 acre to 5 acres based on availability of the farmer's plots. In field crops (mustard, potato, wheat, sweet gourd, country bean) one acre of land would be considered as unit while in floating vegetable 5 beds (3 ft wide with variable lengths based on availability) are considered as unit. During setting of demonstrations preferences will be given to utilize the fallow lands in upper haors, which otherwise remain fallow in dry season. The project will provide the seeds and fertilizers for the crops to ensure planting of identified varieties and have better yield for the beneficiaries.

From last couple of years CBRMP is working to extend the areas of HYVs of potato, which is in a better shape now (sell of HYV potato seeds in local markets has enormously increased by last couple of years), the present program/support would certainly add value on it. Considering the popularity of mustard in the locality, project started to introduce the best released BARI varieties from the beginning of the project intervention. Immediately after water recede from haor, farmers started to cultivate mustard before growing rice-the innovation contributed by the CBRMP. Considering the advantage of mustard production in the locality the present plan has allocated fund for growing different varieties in 50 acres of lands in 8 Upazilas. Commercial cultivation of country bean in Sunamgonj is not as popular as of Habigonj and Chittagonj, though the elevated areas are extremely suitable for country bean cultivation.
The project started to introduce BARI varieties from 2007 in DoaraBazzar,Sadar and Biswamberpur. The present plan is made to support the cultivation using low cost trellis with nylon rope and under single or multiple stick support/plant.

In case of mustard the varieties to be considered are: BARI Sharisha 9, BARI Sharisha 11, BARI Sharisha 14 and BARI Sharisha 15. The varieties for potato would be: diamond, cardinal and granular. In wheat shatapdi, BARI Gam 25 and BARI Gam26 varieties will preferably be used. Hybrid and local varieties will be used in sweet gourd. In country bean, the varieties to be used are: BARI Sheem 4, BARI Sheem 6 and IPSA 2 will be used.

Details of the fund allocation against each of the crop and technologies in the next two successive years are shown in the following table.

Sunamgonj is one of the haor districtsof the country with high rainfall area so, is almost non-suitable for summer vegetable cultivation. On the other hand there is large and small water bodies are available everywhere (roadsides and crop fields) in rainy season that provides scope of practicing cultivation of summer vegetables in floating beds made by mainly water hyacinth. The project started to demonstrate

floating vegetable (mainly leafy) beds since 2010. The present fund is planned to utilize in popularizing the vegetable cultivation in floating beds, the prospect of this cultivation method is positive in the area. The size of the bed to be prepared is 3 ft wide with variable lengths. The length of the bed generally depends upon the available length of the water body. The vegetables to be cultivated in the floating beds are: red amaranth (Lalshak), kangkong (gimakalmi), Chinese cabbage (Battishak), stem amaranth etc. The productions of the beds are still not found profitable due to labour cost in bed preparation. However with popularity the service people will develop and bed preparation cost will minimize, so some support is to be provided from the project to make the system popular and profitable in the areas.

In all cases (demo blocks) yield data are to be collected separately for each of the varieties from demo and non-demo adjacent farmer's field to compare the benefits.

4.1.2 Technology promotion

The project started to support extension of pheromone trap in vegetable cultivation (there is some good pockets for vegetable production in Sadar, Biswamberpur, DowaraBazzar and Jamalgonj Upazilas), and extension of USG application in boro rice from 2010. The present additional funds are planned to support those technologies in a large scale under block concept (not less than 5 acres per unit for USG and porous pipe and one acre for pheromone trap). Establishment of ideal farm house is one of the GoB's priority areas for rural development, so the project provided funds for developing unique homesteads in different Upazilas, which is one of the on-going activities of the project too. The technologies are elaborated below.

a) **Use of Urea Super Granule (USG)**: Urea Super Granule is the granular form of urea made from prilledurea with the help of briquette machine. The recovery of traditional broadcasted urea in rice field is only 30% whereas in case of USG the nitrogen recovery is said to be around 70%. USG released NH_4-nitrogen under reduced condition (6 inches deeper). This is unique because it reduces urea application by more than 30% that ultimately helps to reduce soil-acidity and improves soil environment. The application is bit difficult than the broadcasting as it needs to place 1.7 or 1.9 gm urea ball to the root zone of rice plant in the mud. So, placement of USG to the reduced soil zone in irrigated rice field is comparatively laborious and uncomfortable. Still the USG is not readily available in every store in the rural areas but GoB and many private service providers have taken initiative to make it available in the country side. BARI/BRRIand other private sectors have produced various types of devices for placement of USG in deeper irrigated soil zone (6 inches).This technology (use of USG) is to be applied in 4 STW blocks in 2012-13 and 2 blocks in 2013-14 to make the materials popular to the local farmers. The area of each of the blocks will not be less than 5 acres in rabi (boro) season. BARI produced USG planter will be used for USG application and the project will make some service people to operate the machine. The USG and other fertilizers will be provided by the project for the demo blocks.

The supervisors are to collect amount of USG/urea used and yield data from the demo blocks and the adjacent non-demo blocks to compare the benefits.

b) **Porous pipe irrigation:** Rice plant has ability to intake sufficient water through its root systems if the soil is under saturated condition. Porous pipe is a simple plastic or bamboo made device (30 cm length). Of the 30 cm, 15 cm perforated portion inserted in the soil to measure the water level inside the pipe. The rest 50% of the pipe is left above the soil surface, so that someone can easily recognize the location. Flag marking may also be done in its position. Irrigation will be applied when there will be no water inside the pipe. Some sorts of technique is to be applied in placing the pipe so that mud cannot pass inside the pipe to raise the pipe-bed. Results showed that someone can save up to 30% irrigation water by proper placement of these unique pipes in rice field with proper care and monitoring. 15-18 porous pipes are enough to cover I acre of rice field, and pipes are preferably be placed in comparatively raised areas of the plot to protect dryness of higher elevated zones. The pump owner would irrigate the plots assessing the needs of water for rice by monitoring the water level of porous pipes in his blocks.

The project would ensure the supply of porous pipes for the demo blocks and provide the seed and urea preferably USG to ensure higher yield. The supervisors are to collect number of irrigations during the season and yield data from the demo blocks and the adjacent non-demo blocks to compare the benefits.

c) **Pheromone Trap:** Pheromone trap is a simple device/plastic pot with soap water inside and a sex-pheromone tablet hanging in middle place from the top of the pot. The pot is open (making triangular cut) in both sides (horizontal) with top and bottom closed. The male insects attracted by the female pheromone (artificial) in the pot and fly into the pot and die within seconds. Generally fruit flies are the common insects trapped by the pheromone and soap water. This trap is more effective in killing harmful insects, even pesticide resistant ones instead of applying insecticides injurious to the human health and environment as well. The system is user friendly and very much cost effective compare to pesticides. The project will set the demo in vegetable blocks especially on sweet gourd, cucumber, bitter gourd and brinjal. Traps and fertilizers are to be provided to the demo farmers. Yield data and costing is to be collected from demo and non-demo blocks to facilitate benefit calculation.

Establishing ideal farm houses and fruit gardens (mango, litchi, jujube, guava etc.) are on-going supportive activities in agriculture component of the project. More supports are to be ensured in next two years using the exchange gain of dollar funds (Table above)

5. Livestock Development

Livestock is one of the least household resources for the poor inhabitants in haor areas, and the project started to work with the beneficiaries to improve their livestock resources from the beginning. Certain programs of livestock and poultry have designed under the fund to improve the local breeds. Duck is popular in haors so programs also planned to be supported by the present fund.

5.1 Housing, medication and feed management of small scale sheep farming

Sheep is comparatively popular than goat in the project area due to their a) adaptability in haor areas, b) low cost of rearing, c) easy marketing facility (water way) and d) low incidence of diseases. Local farm households are practicing the indigenous methods of sheep rearing and as a result productivity is unsatisfactory. The project support is to be provided to improve the housing, disease and feed management. The farmers who have 10 sheep including male and female would be selected for demonstration unit. The project will bear the cost of ideal sheep shed and ration & medical expenses for three months to show them the benefits of improve management practices. Orientation and spot training will be arranged for the sheep rear farms.

5.2 Mini Hatchery Unit

The households are comparatively poorerin the project area (haor affected households) and mini hatchery is a low cost technology for improving the local breed of chicks/ducks with minimum investment. The great advantage is that it is feasible in areas without electricity supply/connection and road networks. The operation system of the unit is easy and it results employment of unemployed rural women. Project started to demonstrate mini hatchery technology in the project area from 2010,the fund will enhance the support. Small unit with 1000 egg capacity would be assisted to establish in suitable locations and household. The on-spot training will be provided for the households who establish the mini-hatchery unit. The allocation and numbers of units to be supported is shown in the table above.

5.3 Duck/hen breeder farm

The breeder farm is found essential to maintain the supply chain of duck/poultry production. The farm provides fertile/hatching eggs to the mini hatchery and local egg (fertile) users. The experience showed that local duck/hen farm owners are reluctant to produce fertile eggs as it adds extra costs per egg due to feed costs of male ducks. Another consideration is that generally fertile eggs are more susceptible to perish than table (non-fertile) eggs. The project supports to establish 12 breed units are expected to increase the supply of fertile eggs in the area and would encourage potential entrepreneurs to establish breeder farms in the locality.

5.4 Chicks/ducklings rearing unit

The chicks/ducklings rearing unit is essential to maintain the supply chain of duck/poultry production. The farm owners often faced low price of chicks/ducklings due to non-availability of rearing facility by their own arrangement or with other entrepreneurs. The project allocated funds to assist in establishing 10 ducks and 10 chicks rearing units in 8 Upazilas so that people may come forward to establish similar farms by their own initiative. The project support towards rearing units is expected to assist in maintaining market price of chicks to protect the benefits of farm owners as well.

5.5 Artificial Insemination Center (AI Center)

The intensity of AI centers operated by GoB or BRAC or other private sectors in the district is comparatively fewer in the district. The road networks in the districts are very poor due to haor and as a

result many potential (livestock production) villages are still inaccessible that demands more intensity of AI centers than the other locations of the country. The AI is most essential system for breed up gradation of large animals. The local cattle breed is very poor in respect of meat and milk production. The project has developed more than 100 paravets who are capable in medication and some of them are skilled in artificial insemination of cows. The semen of good quality bull is mostly available throughout the year due to the facility under DLS and BRAC. So the project support to establish 12 AI centers would reduce the burden of DLS and also open the business for the paravets.And it is expected that the project support is to be effective in breed development of local cattle resources in Sunamgonj.

5.6 Castration

The indigenous method of castration for sheep/goat is very traditional and rude, which is generally done by locally available used blades by the local untrained people. The system is found highly susceptible to infectious diseases and often risky for animal death. The castrator machine is one of the modern techniques for castration of small/large animals to protect them from diseases and prevent from unusual death. The machines are comparatively cheaper and easy to use for the local people after few hours of orientation. To introduce the improved castration system for large animal the project has taken initiative to distribute certain numbers of castration machines. The project's livestock experts will provide necessary training to the selected paravets (service providers) to operate the machine and on post castration measures. Once people will know the operation of castration machine it is expected that they will continue the use and will expand the method in nearby areas.

6. Agriculture Infrastructures

Since 2008-09 the project is allocating large amount resources in each year to re-excavatethe natural canals for expanding surface irrigations in possible locations and constructed submergible dams in 2010-11 to reserve rainwater and upstream flows. The water is being using for producing vegetables and boro rice cultivation in some locations. In addition supports have been extended to establishing several LLP units in the river Surma to expand boro rice cultivation in the dry season to ensure food security. To reduce the seepage losses in open kacha drain, project started to establish buried pipe irrigation systems in the STW blocks. Considering the advantages and its long term effect fund has also been allocated to extend the buried pipe irrigation systems in some more STW blocks in different Upazilas to show the benefit to the rice growers.

7. Documentation of project outcomes

Documentation of project outcomes is especially important at the later stage of the project, as such certain amount of fund (table above) has been allocated to measure the impact of agricultural interventions on the livelihoods of local farm households (target population of the project). Food security status of marginal farm households and utilization of fallow lands in the upper haors are two major elements to be measured to show project impact. Technology hand book for the paravets is considered very important for continuation their services in the locality. The project would support two TV telecast on production technologies/interventions in the year 20112-13. Fund allocation is made accordingly in the plan.

Annex I

Details of Fund Allocation and Planning

Crop Sector

Under the section 21% fund has allocated in a) **participatory demonstration trials** and 17% in b) **technology promotion**.

Table: Detailed agricultural plan under the fund of exchange gain

Sl #	Item of Activities	Allocation in 2012/13			Allocation in 2013/14			Total project cost (Tk)
		Unit cost (Tk)	# Unit	Total cost (Tk)	Unit cost (Tk)	# Unit	Total cost (Tk)	
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1.d	Sweet gourd (ac)	25000	60	1500000	25000	30	750000	2250000
1.e	Country bean (ac)	40000	35	1400000	40000	20	800000	2200000
1.f	Floating vegetable garden (10 beds)	25000	8	200000	25000	4	100000	300000
1.g	Exposure visit of farmers (#)	5000	44	220000				220000
1.h	BARI/BRRI honorarium (time)	20000	20	400000	20000	9	180000	580000
Sub-total			**273**	**7130000**	**29285.7**	**107**	**3250000**	**10380000**
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2.a	Urea Super Granule (USG) Block (>5 ac)	40000	4	160000	40000	2	80000	240000
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2.c	Pheromone trap block (1 acre)	40000	4	160000	40000	2	80000	240000
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3.c	Duck breeder unit (#)	50000	8	400000	50000	4	200000	600000
3.d	Castration of goat & Sheep (castrator) (#)	5000	50	250000	5000	30	150000	400000
Sub-total		**28750**	**72**	**1070000**	**28750**	**40**	**530000**	**1600000**
4	Technology promotion							
4.a	Artificial Insemination Center (#)	50000	8	400000	50000	4	200000	600000
4.b	Chick rearing unit (#)	50000	6	300000	50000	4	200000	500000
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Sub-total		**46666.7**	**20**	**940000**	**46666.7**	**12**	**560000**	**1500000**
5	Documentation of project outcomes							
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5.c	Handbook for paravet (#)	300	500	150000				150000
5.d	Video (TV) program on technologies (time)	75000	2	150000				150000
Sub-total		**393825**	**504**	**1800000**		**0**	**0**	**1800000**
6	Agriculture Infrastructure							
6.a	Submergible dam/Buried pipe irrigation (Km)	2157143	4	8628572	2157143	3	6471429	15100001
Sub-total		2157143	**4**	**8628572**	2157143	**3**	**6471429**	**15100001**
Total (1+2+3+4+5+6)								**36,676,001**

The plan is made to support/strengthening on-going technology transfer activities of the project. Mustard, potato, wheat, sweet gourd and country bean are the most popularly growing crops in the rabi season where project made varietal intervention successfully. Under the program block demonstrations trials of the mentioned crops (Table) with tested and accepted varieties will be implemented in 8 Upazilas. The size of the block will vary from 1 acre to 5 acres based on availability of the farmer's plots. In field crops (mustard, potato, wheat, sweet gourd, country bean) one acre of land would be considered as unit while in floating vegetable 5 beds (3 ft wide with variable lengths based on availability) are considered as unit. During setting of demonstrations preferences will be given to utilize the fallow lands in upper haors, which otherwise remain fallow in dry season. The project will provide the seeds and fertilizers for the crops to ensure planting of identified varieties and have better yield for the beneficiaries.

The project started to support extension of pheromone trap in vegetable cultivation (there is some good pockets for vegetable production in Sadar, Biswamberpur, DowaraBazzar and Jamalgonj Upazilas), and extension of USG application in boro rice from 2010. The funds are planned to support those technologies in a large scale under block concept (not less than 5 acres per unit for USG and porous pipe and one acre for pheromone trap). The technologies are:

Use of Urea Super Granule (USG): Urea Super Granule is the granular form of urea made from prilled urea with the help of briquette machine. BARI/BRRI and other private sectors have produced various types of devices for placement of USG in deeper irrigated soil zone (6 inches). This technology (use of USG) is to be applied in 4 STW blocks in 2012-13 and 2 blocks in 2013-14 to make the materials popular to the local farmers. The area of each of the blocks will not be less than 5 acres in rabi (boro) season. BARI produced USG planter will be used for USG application and the project will make some service people to operate the machine. The USG and other fertilizers will be provided by the project for the demo blocks.

Porous pipe irrigation: Porous pipe is a simple plastic or bamboo made device (30 cm length). Of the 30 cm, 15 cm perforated portion inserted in the soil to measure the water level inside the pipe. The rest 50% of the pipe is left above the soil surface to recognize it easily. Results showed that someone can save up to 30% irrigation water by proper placement of these unique pipes in rice field with proper care and monitoring. 15-18 porous pipes are enough to cover I acre of rice field, and pipes are preferably be placed in comparatively raised areas of the plot to protect dryness of higher elevated zones. The pump owner would irrigate the plots assessing the needs of water for rice by monitoring the water level of porous pipes in his blocks. The project would ensure the supply of porous pipes for the demo blocks and provide the seed and urea preferably USG to ensure higher yield.

Pheromone Trap: Pheromone trap is a simple device/plastic pot with soap water/other chemical inside and a sex-pheromone tablet hanging in middle place from the top of the pot. The pot is open (making triangular cut) in both sides (horizontal) with top and bottom closed. The male insects attracted by the female pheromone (artificial) in the pot and fly into the pot and die within seconds. Generally fruit flies are the common insects trapped by the pheromone and soap water. The system is user friendly and very much cost effective compare to pesticides. The project will set demo in vegetable blocks especially on sweet gourd, cucumber, bitter gourd and brinjal. Traps and fertilizers are to be provided to the demo farmers. Yield data and costing is to be collected from demo and non-demo blocks to facilitate benefit calculation.

Establishing ideal farm houses and fruit gardens (mango, litchi, jujube, guava etc.) are on-going supportive activities in agriculture component of the project. More supports are to be ensured in next two years using the exchange gain of dollar funds (Table above)

Livestock Development

Housing, medication and feed management of small scale sheep farming: Sheep is comparatively popular than goat in the project area due to their a) adaptability in haor areas, b) low cost of rearing, c) easy marketing facility (water way) and d) low incidence of diseases. Local farm households are practicing the indigenous methods of sheep rearing and as a result productivity is unsatisfactory. The project support is to be provided to improve the housing, disease and feed management. The farmers who have 10 sheep including male and female would be selected for demonstration unit. The project will bear the cost of ideal sheep shed and ration & medical expenses

for three months to show them the benefits of improve management practices. Orientation and spot training will be arranged for the sheep rear farms.

Mini Hatchery Unit: The households are comparatively poorer in the project area (haor affected households) and mini hatchery is a low cost technology for improving the local breed of chicks/ducks with minimum investment. The great advantage is that it is feasible in areas without electricity supply/connection and road networks. The operation system of the unit is easy and it results employment of unemployed rural women. Project started to demonstrate mini hatchery technology in the project area from 2010, the fund will enhance the support. Small unit with 1000 egg capacity would be assisted to establish in suitable locations and household. The on-spot training will be provided for the households who establish the mini-hatchery unit. The allocation and numbers of units to be supported is shown in the table above.

Duck/hen breeder farm: The breeder farm is found essential to maintain the supply chain of duck/poultry production. The farm provides fertile/hatching eggs to the mini hatchery and local egg (fertile) users. The experience showed that local duck/hen farm owners are reluctant to produce fertile eggs as it adds extra costs per egg due to feed costs of male ducks. Another consideration is that generally fertile eggs are more susceptible to perish than table (non-fertile) eggs. The project supports to establish 12 breed units are expected to increase the supply of fertile eggs in the area and would encourage potential entrepreneurs to establish breeder farms in the locality.

Chicks/ducklings rearing unit: The chicks/ducklings rearing unit is essential to maintain the supply chain of duck/poultry production. The farm owners often faced low price of chicks/ducklings due to non-availability of rearing facility by their own arrangement or with other entrepreneurs. The project allocated funds to assist in establishing 10 ducks and 10 chicks rearing units in 8 Upazilas so that people may come forward to establish similar farms by their own initiative. The project support towards rearing units is expected to assist in maintaining market price of chicks to protect the benefits of farm owners as well.

Artificial Insemination Center (AI Center): The intensity of AI centers operated by GoB or BRAC or other private sectors in the district is comparatively fewer. The poor road networks and inaccessible villages demand more intensity of AI centers in the district. The AI is most essential system for breed up gradation of large animals. The local cattle breed is very poor in respect of meat and milk production. The project has developed more than 100 paravets who are capable in medication and some of them are skilled in artificial insemination of cows. The semen of good quality bull is mostly available throughout the year by the facility of DLS and BRAC. The project will support to establish 12 AI centers that is expected to reduce the burden of DLS and also open the business for the paravets.

Castration: The indigenous method of castration for sheep/goat is very traditional and rude, which is generally done by locally available used blades by the local untrained people. The castration/operation is highly susceptible to infectious diseases and often risky for animal health/death. Use of castrator machine is one of the modern techniques for castration of small/large animals to protect them from diseases and prevent from unusual death. The machines are comparatively cheaper and easy to use for the local people after few hours of orientation. To introduce the improved castration method for large animal the project has taken initiative to distribute certain numbers of castration machines. The project's livestock experts will provide necessary training to the selected paravets (service providers) to operate the machine and on post castration measures. Once people will know the operation of castration machine it is expected that they will continue the use and will expand the method in nearby areas.

Agriculture Infrastructures: Since 2008-09 the project is allocating resources to re-excavate the natural canals for expanding surface irrigations in possible locations and constructed submergible dams in 2010-11 to reserve rainwater/upstream flows. The water is being using for producing vegetables and boro rice cultivation in some locations. In addition supports have been extended to establishing several LLP units in the river Surma to expand boro rice cultivation in the dry season to ensure food security. To reduce the seepage losses in open kacha drain, project started to establish buried pipe irrigation systems in the STW blocks. Considering the advantages and its long term effect fund has been allocated to extend the buried pipe irrigation systems in some more STW blocks.

Documentation of project outcomes: The project is its in last phase (evaluation) so fund (table above) has been allocated to measure the impact of agricultural interventions on livelihoods of farm households/ target population. Food security status of marginal farm households and utilization of fallow lands in the upper haors are two major elements to be measured to show project impact. Technology hand book for the paravets is considered very important for continuation their services in the locality. The project would support two TV telecast on production technologies/interventions in the year 20112-13. Fund allocation is made accordingly in the plan.