USAID Agricultural Extension Support Activity (AESA)

Effectiveness of the training to the beneficiaries by adopting improved technologies provided by the USAID-AESA project and their economic benefits

Dhaka Ahsania Mission

CARE-Bangladesh and mPower

May 2017

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Submitted to

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Executive Summary

Dhaka Ahsania Mission (DAM) has been implementing the USAID Agricultural Extension Support (USAID-AESA) project in partnership with CARE Bangladesh and mPower. To materialize this aim, in addition to other approaches, the project created 3,878 village-level farmer producer groups (FPGs) around production and marketing of six prioritized value chains – jute, chili, mung bean, beef fattening, dairy and fish. These groups have been working together to demand and receive extension services and training, as well as collectively purchasing inputs at lower prices and aggregating supply to negotiate better prices for their products. Training and capacity building focuses on empowering producers to request information, skills and technologies that they can then use to improve production and marketing of their farm products. Accordingly, FPG members were trained on key technology aspects related to the six value chains. This report assesses the effectiveness of such training with respect to adoption by FPG farmers and impact to farm productivity.

Data were collected from 4 upazilas (Faridpur Sadar, Keshobpur, Goalondo and Rajbari Sadar) for evaluating jute value chain, 4 upazilas (Bhola Sadar, Char Fason, Chowgacha and Magura Sadar) for chili value chain, 3 upazilas (Amtoli, Barisal Sadar and Patuakhali Sadar) for mung bean value chain, 4 upazilas (Keshobpur, Magura Sadar, Mohommodpur and Kalia) for beef fattening, 5 upazilas (Char Bhadrason, Faridpur Sadar, Jessore Sadar, Rupsha and Terokhada) for dairy value chain, and 4 upazilas (Rupsha, Terokhada, Pirojpur Sadar and Kaliganj) for fish value chain. For each value chain, 66 farmers were randomly selected from FPG groups, on almost a 50:50 gender basis. Altogether, this study accounted for opinions of 396 farmers (197 male and 199 females). Data were gathered using semi-structured questionnaires, for each of the value chains, which included status of adoption of key improved technologies taught in the training and yield status for the enterprise during pre-training and post-training period. Data were anlayzed separately for each value chain. In the analysis, adoption of technologies and yield were compared between pre-training and post-training periods. This comparison was expressed as means and corresponding confidence intervals at 95% probability level. The relative effect of yield in the post-training was further analyzed in relation to the level of corresponding yields in the pre-training period. The relative effect of yield in the post-training between male and female farmers was also presented.

Finding shows that training provided by the USAID-AESA project to the farmers in six prioritized value chains had been effective in terms of adoption of the trained technologies. Some differences found between training material and farmers' practices in the dose of fertilizer application (muriate of potash in jute and triple superphosphate in chili) – these need to be further investigated. Farmers did not adopt all the attributes deemed to appropriate to choosing beef cattle and dairy cows – these too need to be further investigated.

Yield benefits from all the six value chains in the post-training period were significant – USAID-AESA project may claim a large part of this for the services, including the training that they had been providing the farmers in the study area. This study pointed out that the "low performing farmers" in the pre-training period, across all the six value chains, obtained higher relative yield benefits compared to the "high performing farmers". Traditionally, the "low performing farmers" are the smallholder farmers; thus the project has been successful in properly addressing its targeted beneficiaries. With respect to gender, male farmers tended to have benefitted (in term of resulted relative yield in six value chains) more than their female counterpart; however, the difference of such benefits were statistically insignificant. Therefore, USAID-AESA project may further claim that it succeeded in providing services to women beneficiaries.

Acknowledgements

Many thanks to Mr Bidyuth K. Mahalder, the Chief of the Party (COP), USAID ASEA project for engaging me in this study and providing all the facilities to get the job done as smooth as possible. Special thanks to 396 farmers, especially to the women, who participated in the interviews. I would also appreciate the officials of the USAID-ASEA project who kindly and whole-heartedly spent their time and offered enormous facilities for successfully conducting the study. The company, guidance and other services of Mohammad Abu Sayeed, Agricultural Extension Service Center Field Specialist of the USAID-ASEA project, had been essential for completion of this study.

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List of Acronyms

AESA:	Agricultural Extension Support Activity
BVC:	Beef fattening value chain
CARE:	Cooperative American Relief Everywhere
COP:	Chief of Party
CVC:	Chili value chain
DAM:	Dhaka Ahsania Mission
DVC:	Dairy value chain
FPG:	Farmer Producer Group
FVC:	Fish value chain
JVC:	Jute value chain
MVC:	Mung bean value chain
USAID:	United States Agency for International Development

Introduction

Dhaka Ahsania Mission (DAM) has been implementing the USAID Agricultural Extension Support (USAID-AESA) project under Cooperative Agreement No. AID-388-A-13-00001 in partnership with CARE Bangladesh and mPower since October 2012. The project's geographic coverage includes 26 upazilas within the 12 targeted FtF program districts in southwest and central Bangladesh (Fig. 1). To materialize this aim, in addition to other approaches, the USAID-AESA project created 3,878 village-level farmer producer groups of 20 to 30 farmers (FPGs) around production and marketing of one of six prioritized value chains – jute (JVC), chili (CVC), mung bean (MVC), beef fattening (BVC), dairy (DVC) and fish (FVC). These groups have been working together to demand and receive extension services and training, as well as collectively purchasing inputs at lower prices and aggregating supply to negotiate better prices for their products. Training and capacity building focuses on empowering producers to request information, skills and technologies that they can then use to improve production and marketing of their farm products. Accordingly, FPG members were trained on improved key technologies in aspects to the six value chains.

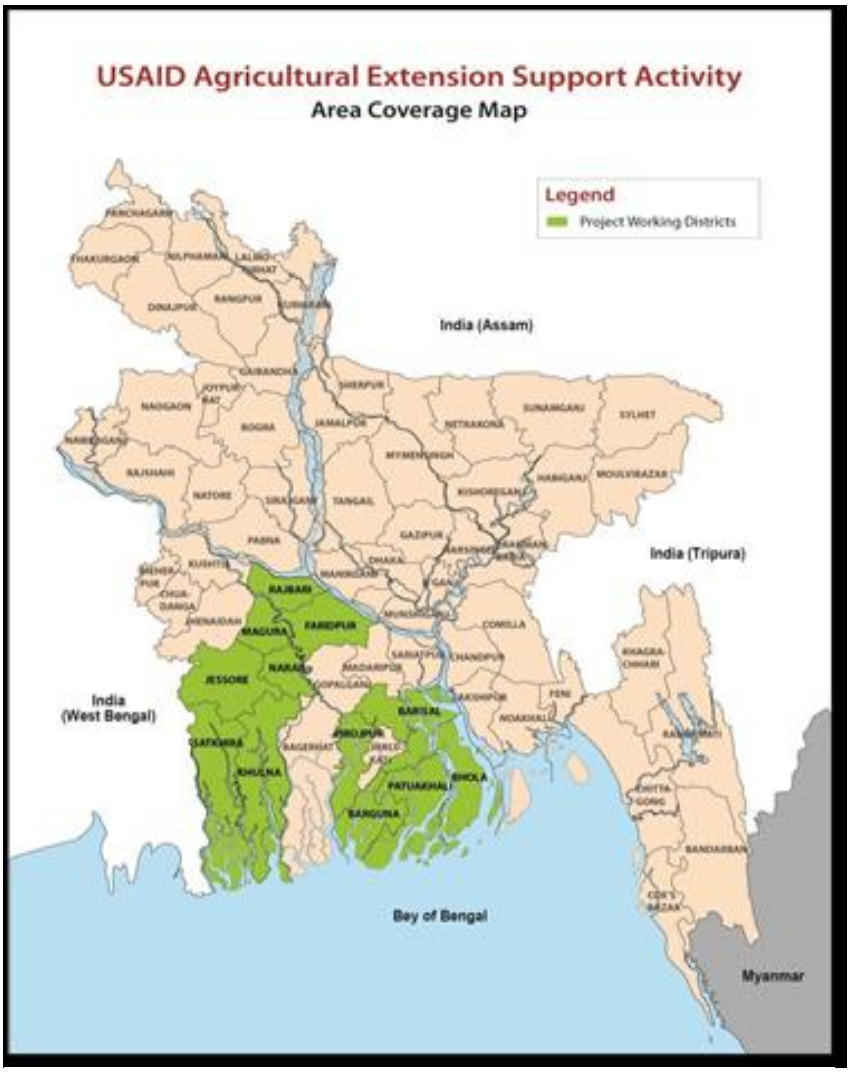

Fig. 1: Map showing the USAID-AESA project working areas

This report evaluates the effectiveness of such training with respect to adoption by FPG farmers and impact to their farm productivity.

Methodology

This study was conducted during March to May 2017. Data were collected from 4 upazilas (Faridpur Sadar, Keshobpur, Goalondo and Rajbari Sadar) for evaluating jute value chain, 4 upazilas (Bhola Sadar, Char Fason, Chowgacha and Magura Sadar) for chili value chain, 3 upazilas (Amtoli, Barisal Sadar and Patuakhali Sadar) for mung bean value chain, 4 upazilas (Keshobpur, Magura Sadar, Mohommodpur and Kalia) for beef fattening value chain, 5 upazilas (Char Bhadrason, Faridpur Sadar, Jessore Sadar, Rupsha and Terokhada) for dairy value chain, and 4 upazilas (Rupsha, Terokhada, Pirojpur Sadar and Kaliganj) for fish value chain. For each value chain, 66 farmers were randomly selected from FPG groups, on almost a 50:50 gender basis. Altogether, this study accounted for opinion of 396 farmers (197 male and 199 females). Table 1 presents sampling distribution with respect to geography and gender.

Data were gathered using semi-structured questionnaires for each of the value chains which included status of adoption of key improved technologies taught in the training and yield status for the enterprise in pre-training and post-training period. The questionnaires are attached in Appendices 1-6.

Data were anlayzed separately for each value chain. In the analysis, adoption of technologies and yield were compared between pre-training and post-training periods. This comparison was expressed as means and corresponding confidence intervals at 95% probability level. The relative effect of yield in the post-training was further analyzed in relation to the level of corresponding yields in the pre-training period. The relative effect of yield in the post-training between male and female farmers was also presented.

Table 1: Geographic and gender distribution of samples accounted for in evaluating effectiveness of the training to the beneficiaries by adopting improved technologies provided by the AESA project.

Value chain	District	Upazila	Sample size (number of farmers)		
			Male	**Female**	**Total**
Jute	Faridpur	Faridpur Sadar	12	10	22
	Jessore	Keshobpur	11	11	22
	Rajbari	Goalondo	1	7	8
	Rajbari	Rajbari Sadar	10	4	14
		Jute value chain	*34*	*32*	*66*
Chili	Bhola	Bhola Sadar	5	5	22
	Bhola	Char Fason	6	6	22
	Jessore	Chowgacha	10	12	10
	Magura	Magura Sadar	11	11	12
		Chili value chain	*32*	*34*	*66*
Mung bean	Barguna	Amtoli	11	11	22
	Barisal	Barisal Sadar	11	11	22
	Patuakhali	Patuakhali Sadar	11	11	22
		Mung bean value chain	*33*	*33*	*66*
Beef fattening	Jessore	Keshobpur	11	11	22
	Magura	Magura Sadar	4	6	10
	Magura	Mohommodpur	6	6	12
	Narail	Kalia	11	11	22
		Beef fattening value chain	*32*	*34*	*66*
Dairy	Faridpur	Char Bhadrason	6	0	6
	Faridpur	Faridpur Sadar	5	11	16
	Jessore	Jessore Sadar	11	11	22
	Khulna	Rupsha	10	5	15
	Khulna	Terokhada	1	6	7
		Dairy value chain	*33*	*33*	*66*
Fish	Khulna	Rupsha	10	6	16
	Khulna	Terokhada	1	5	6
	Pirojpur	Pirojpur Sadar	11	11	22
	Satkhira	Kaliganj	11	11	22
		Fish value chain	33	33	66
		All value chains	**197**	**199**	**396**

Findings

Jute value chain

None of the farmers properly used seed testing and seed treatment technology in jute cultivation in the pre-training period, whereas all adopted those after receiving USAID-AESA provided training (Table 2). Only 5% farmers in Keshobpur upazila (Jessore district) knew and had been practicing the harvest timing of jute at flowering stage; in the post-training period rest of the farmers across the upazilas adopted this technology. No jute farmers except 18% and 29% in Faridpur Sadar and Rajbari Sadar upazilas had applied improved retting using water hyacinth, rice straw and water herbs such as *kolmi*; full adoption of this technology had occurred after training. Overall, the rate of application of K-fertilizer increased in the post-training period (76±6 kg MP ha^{-1}) than what pre-training period (65±12 kg MP ha^{-1}). This increase did not occur in all sampled upazilas; in fact, farmers in Keshobpur (Jessore district) and Goalondo (Rajbari district) reduced K-fertilizer usage (Table 2).

Farmers obtained increased yield, on average, from 2280±110 kg ha^{-1} (pre-training period) to 3268±134 kg ha^{-1} (post-training period) (Table 3). All upazilas experienced this benefit; however, as Table 3 shows the range varied from 21±9 (Rajbari Sadar upazila of Rajbari district) to 52±11% (Keshobpur upazila of Jessore district).

All farmers, irrespective of level of yields that they were getting in the pre-training period, reported higher yields in the post-training period. However, Fig. 2 shows that farmers who were getting lower level of yields (low performing farmers) benefitted more than those getting higher levels of yield (high performing farmers).

Table 2: Rating of applied jute production technologies by farmers in four upazilas before and after USAID-AESA project provided training. 'MP' denotes for muriate of potash fertilizer. ± is 95% confidence interval.

Upazila	**Seed testing (% applied)**		**Seed treatment (% applied)**		**Timing of harvest (% applied)**		**Improved retting (% applied)**		**K application (MP, kg ha^{-1})**	
	Pre-training	**Post-training**	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**
Faridpur Sadar	0	100	0	100	0	100	18	82	45±14	62±07
Keshobpur	0	100	0	100	5	95	0	100	59±19	91±12
Goalondo	0	100	0	100	0	100	0	100	126±32	90±13
Rajbari Sadar	0	100	0	100	0	100	29	71	72±26	68±11
All	**0**	**100**	**0**	**100**	**2**	**98**	**12**	**88**	**65±12**	**76±6**

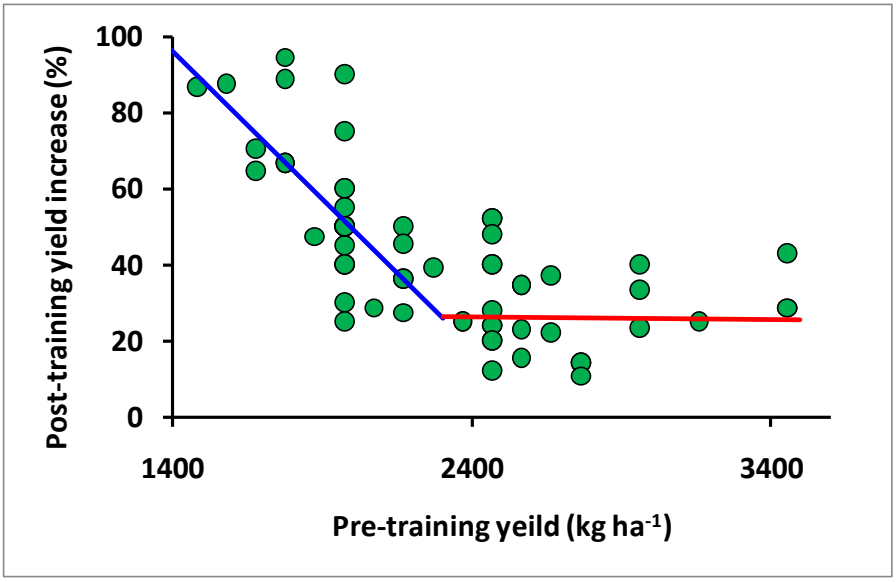

Fig. 2: Relative yield increase (filled circle) in jute in post-training phase compared to pre-training phase in individual farms in four sampled upazilas. A line indicates the trend in data.

Table 3: Yield and change in relative yield in jute productions in four upazilas before and after USAID-AESA project provided training. ± is 95% confidence interval.

Upazila	**Yield (kg ha^{-1})**		**Yield increase (%)**
	Pre-training	Post-training	
Faridpur Sadar	2192±216	3058±219	40±5
Keshobpur	2376±186	3611±265	52±11
Goalondo	2297±209	3075±77	34±8
Rajbari Sadar	2258±235	3169±190	21±9
All	**2280±110**	**3268±134**	**43±5**

Chili value chain

Seed treatment for chili cultivation was unknown to the farmers in the sampled upazilas, who fully adopted this after receiving USAID-AESA provided training (Table 4). Only 5% farmers in Chowgacha upazila (Jessore district) knew and had been practicing seed testing and destruction (either through burying into ground or burning) of diseased plants; in the post-training period rest of the farmers across the upazilas adopted this technology.

Overall, the rate of application of P-fertilizer increased in the post-training period (419±74 kg TSP ha^{-1}) than that of pre-training period (335±47 kg MP ha^{-1}). This increase occurred in all sampled upazilas, except for Char Fason, where P-fertilizer used remained unchanged. In Chowgacha (Jessore district), farmers applied very high level of P-fertilizer (673±184 kg TSP ha^{-1}) in the post training period compared to previous use (477±108 kg TSP ha^{-1}).

Farmers obtained increased yield, on average, from 3,128±2079 kg ha^{-1} (pre-training period) to 9,087±1440 kg ha^{-1} (post-training period) (Table 5); this increase was 44±9%. All upazilas experienced this benefit; however, as Table 6 shows the range varied between 33±11 (Bhola Sadar upazila of Bhola district) to 50±11% (Magura Sadar upazila of Magura district).

Table 4: Rating of applied chili production technologies by farmers in four upazilas before and after USAID-AESA project provided training. 'TSP' denotes for triple superphosphate fertilizer. ± is 95% confidence interval.

	Seed testing (% applied)		Seed treatment (% applied)		Disease destruction (% applied)		P application (TSP, kg ha^{-1})	
Upazila	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**
Chowgacha	5	95	0	100	5	95	477±108	673±184
Magura Sadar	0	100	0	100	0	100	263±51	290±7
Bhola Sadar	0	100	0	100	0	100	227±12	294±13
Char Fason	0	100	0	100	0	100	298±35	294±5
All	**2**	**98**	**0**	**100**	**2**	**98**	**335±47**	**419±74**

Table 5: Yield and change in relative yield in chili productions in four upazilas before and after USAID-AESA project provided training. ± is 95% confidence interval.

	Yield (kg ha^{-1})		
Upazila	**Pre-training**	**Post-training**	**% Yield increase**
Chowgacha	7343±1356	10172±1403	39±7
Magura Sadar	14438±2433	21669±3630	50±11
Bhola Sadar	6496±3980	8645±4593	33±11
Char Fason	4631±527	6628±487	43±11
All	**9087±1440**	**13128±2079**	**44±9**

All the sampled farmers, irrespective of level of yields they were obtaining in the pre-training period, reported higher yields in the post-training period. However, Fig. 3 shows that farmers who were getting lower level of yields (low performing farmers) benefitted more than those getting higher levels of yield (high performing farmers).

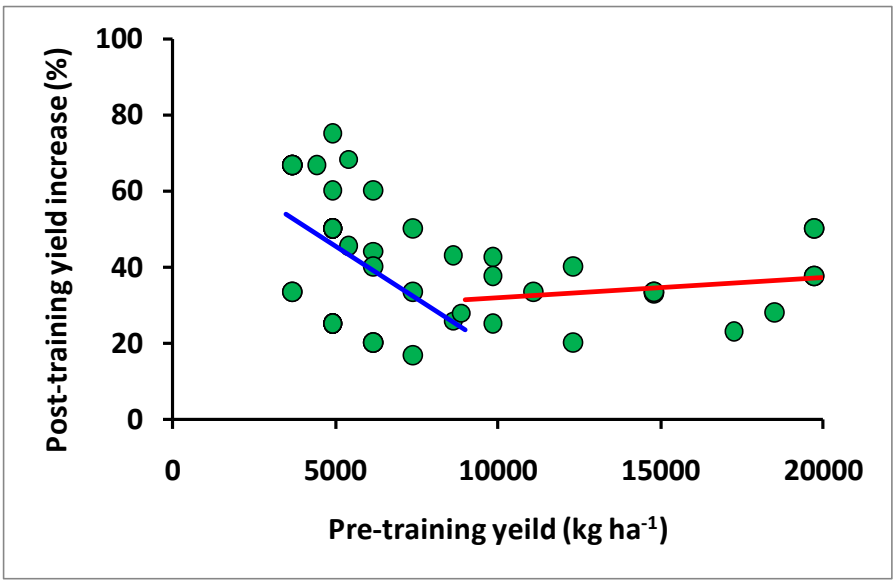

Fig. 3: Relative yield increase (filled circle) in chili in post-training phase compared to pre-training phase in individual farms in four sampled upazilas. A line indicates the trend in data.

Mung bean value chain

During the pre-training period, farmers across the sampled upazilas did not use any other varieties of mung bean than "*Shona moog*". Farmers continued using this traditional variety, but, side by side, accepted a number of modern varieties in the post-training period. These varieties include BARI Mug-5, BARI Mug-6, BARI Mug-7, BINA Moog-6, BINA Moog-7 and BINA Moog- 8 are being cultivated (Table 6). Among them, adoption of BARI Mug-6 was the highest, followed by BARI Mug-7.

In the pre-training period, the practices such as use of fertilizer, weeding and destruction of diseased plants were absent; those had been fully adopted in the post-training period. At present, farmers have been applying about two weeding for mung bean cultivation (Table 7).

Farmers obtained increased yield, on average, from 504±28 kg ha^{-1} (pre-training period) to 1084±67 kg ha^{-1} (post-training period) (Table 8); the increase was 115±12%. All upazilas experienced this benefit; however, as Table 9 shows the range varied from 96±19 (Amtoli upazila of Barguna district) to 134±10% (Patuakhali Sadar upazila of Patuakhali district).

All the sampled farmers, irrespective of level of yields that they were obtaining in the pre-training period, reported higher yields in the post-training period. However, Fig. 4 shows that farmers who were getting lower level of yields (low performing farmers) benefitted more than those getting higher levels of yield (high performing farmers).

Table 6: Adoption of varieties of mung bean by farmers in three upazilas before and after USAID-AESA project provided training.

	Pre-training (% used)				Post-training (% used)			
Variety	**Amtoli**	**Barisal Sadar**	**Patuakhali Sadar**	**All**	**Amtoli**	**Barisal Sadar**	**Patuakhali Sadar**	**All**
Shona moog	100	100	100	**100**	100	91	82	**91**
BARI Mug-5	-	-	-	**-**	91	0	0	**30**
BARI Mug-6	-	-	-	**-**	100	100	100	**100**
BARI Mug-7	-	-	-	**-**	86	45	0	**44**
BINA Moog-6	-	-	-	**-**	5	0	0	**2**
BINA Moog-7	-	-	-	**-**	18	0	0	**6**
BINA Moog-8	-	-	-	**-**	45	100	9	**52**

Table 7: Rating of applied mung bean production technologies by farmers in three upazilas before and after USAID-AESA project provided training. ± is 95% confidence interval.

	Fertilizer application (% applied)		Weeding frequency (Number)		Disease destruction (% applied)	
Upazila	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**
Amtoli	0	100	0	1.7±0.2	0	100
Barisal Sadar	14	86	0	1.8±0.2	0	100
Patuakhali Sadar	0	100	0	1.8±0.2	0	100
All	**5**	**95**	**0**	**1.8±0.1**	**0**	**100**

Table 8: Yield and change in relative yield in mung bean productions in three upazilas before and after USAID-AESA project provided training. ± is 95% confidence interval.

	Yield (kg ha^{-1})		
Upazila	**Pre-training**	**Post-training**	**% Yield increase**
Amtoli	427±35	836±101	96±19
Barisal Sadar	592±60	1260±108	113±21
Patuakhali Sadar	494±0	1156±49	134±10
All	**504±28**	**1084±67**	**115±12**

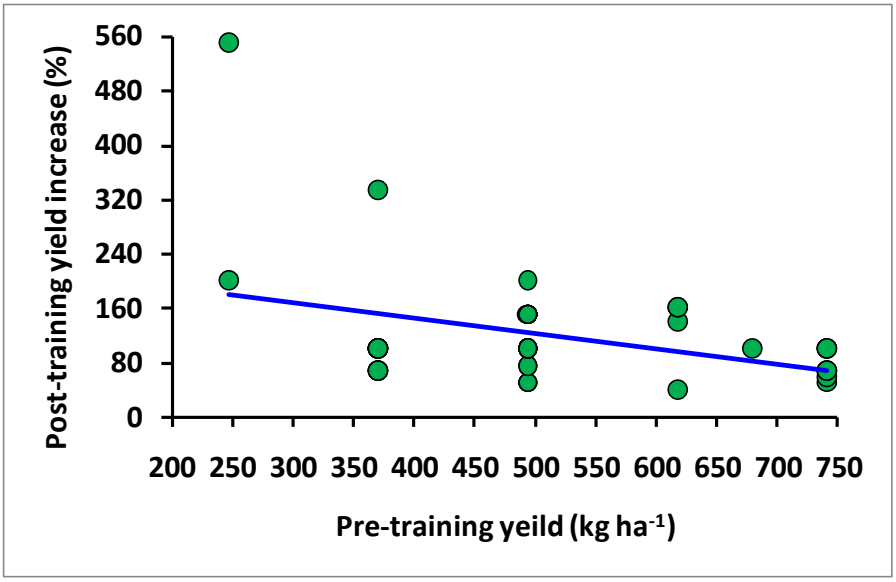

Fig. 4: Relative yield increase (filled circle) in mung bean in post-training phase compared to pre-training phase in individual farms in four sampled upazilas. The line indicates the trend in data.

Beef fattening value chain

During the pre-training period, farmers (except few in Kalia of Narail district) across the sampled upazilas hardly practiced improved housing and regular vaccination for beef cattle. Adoption of those two technologies had fully occurred in the post-training period (Table 9).

Table 9: Rating of applied beef fattening production technologies by farmers in four upazilas before and after USAID-AESA project provided training.

	Improved housing (% adopted)		Regular vaccination (% practiced)	
Upazila	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**
Kalia	18	81.8	5	95.5
Keshobpur	0	100.0	0	100.0
Magura Sadar	0	100.0	0	100.0
Mohommodpur	0	100.0	0	100.0
All	**6**	**93.9**	**2**	**98.5**

The USAID-AESA project trained farmers on physical attributes of beef cattle fattening for achieving better productivity. Those included head, skin, age, hip, leg, neck, back, structure and colour. Very few farmers were fully aware of the impact of such attributes on meat productivity and/or profitability. In the post-training period, head, skin, age and colour attributes were widely adopted, (Table 10).

Farmers obtained increased meat yield, on average, from 100±7 kg cattle^{-1} (pre-training period) to 182±12 kg cattle^{-1} (post-training period) (Table 11); this increase was 83±8%. All upazilas experienced this benefit; however, Table 11 shows the range varied from 57±13 (Kalia upazila, Narail district) to 136±18% (Mohommodpur upazila, Magura district).

All the sampled farmers, irrespective of level of cattle yields that they were obtaining in the pre-training period, reported higher yields in the post-training period. However, Fig. 5 shows that farmers who were getting lower level of yields (low performing farmers) benefitted more than those getting higher levels of yield (high performing farmers).

Table 10: Attributes of animals for beef fattening taken into account by farmers (%) in four upazilas before and after USAID-AESA project provided training.

Attribute	Training period	Kalia	Keshobpur	Magura Sadar	Mohommodpur	All
Head	Pre-training	18.2	4.5	10.0	0.0	**9.1**
	Post-training	77.3	100.0	100.0	100.0	**92.4**
Skin	Pre-training	18.2	0.0	0.0	0.0	**6.1**
	Post-training	81.8	100.0	100.0	100.0	**93.9**
Age	Pre-training	0.0	4.5	40.0	0.0	**7.6**
	Post-training	54.5	95.5	100.0	100.0	**83.3**
Hip	Pre-training	0.0	0.0	0.0	0.0	**0.0**
	Post-training	14.3	4.5	0.0	33.3	**12.3**
Leg	Pre-training	4.5	0.0	0.0	0.0	**1.5**
	Post-training	27.3	77.3	10.0	0.0	**36.4**
Neck	Pre-training	0.0	0.0	0.0	0.0	**0.0**
	Post-training	36.4	9.1	0.0	91.7	**31.8**
Back	Pre-training	0.0	0.0	0.0	0.0	**0.0**
	Post-training	18.2	4.5	0.0	0.0	**7.6**
Structure	Pre-training	0.0	0.0	0.0	0.0	**0.0**
	Post-training	0.0	0.0	0.0	0.0	**0.0**
Colour	Pre-training	9.1	0.0	0.0	0.0	**3.0**
	Post-training	27.3	81.8	80.0	100.0	**66.7**

Table 11: Meat yield and change in relative meat yield in beef fattening in four upazilas before and after USAID-AESA project provided training. ± is 95% confidence interval.

	Yield (kg cattle^{-1})		
Upazila	**Pre-training**	**Post-training**	**% Yield increase**
Kalia	100±11	157±20	57±13
Keshobpur	124±5	229±7	85±8
Magura Sadar	83±16	159±30	92±24
Mohommodpur	69±9	163±18	136±18
All	**100±7**	**182±12**	**83±8**

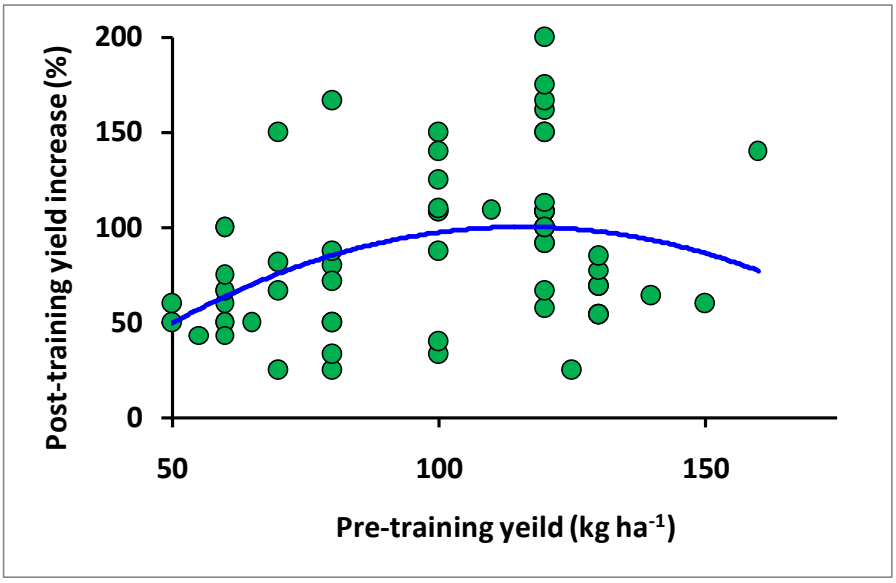

Fig. 5: Relative yield increase (filled circle) in meat in post-training phase compared to pre-training phase in individual farms in four sampled upazilas. The line indicates the trend in data.

Dairy value chain

During the pre-training period, farmers across the sampled upazilas hardly practiced improved housing, regular deworming, regular vaccination and grain feeding for milch cows. Adoption of those four technologies had fully occurred in the post-training period (Table 12).

The USAID-AESA project trained farmers on physical attributes of milch cows for achieving better productivity. Those included head, body, hip, skin, udder, milk vein and age. Very few farmers were fully aware of the impact of such attributes on milk productivity and/or profitability. In the post-training period, head, udder, skin and milk vein attributes were widely adopted (Table 13).

Farmers obtained increased milk yield, on average, from 3.6±0.5 kg cow^{-1} (pre-training period) to 6.8±0.9 kg cow^{-1} (post-training period) (Table 15); this increase was 91±14%. All upazilas experienced the benefit; however, Table 14 shows the range varied from 59±13 (Faridpur Sadar upazila, Faridpur district) to 108±30% (Jessore Sadar upazila, Jessore district).

All the sampled farmers, irrespective of level of milk yields that they were obtaining in the pre-training period, reported higher yields in the post-training period. However, Fig. 6 shows that farmers who were getting lower level of milk yields (low performing farmers) benefitted more than those getting higher levels of the yields (high performing farmers).

Table 12: Rating of applied milk production technologies by farmers in five upazilas before and after USAID-AESA project provided training.

	Regular deworming (% adopted)		Improved housing (% adopted)		Grain feeding (% adopted)		Regular vaccination (% adopted)	
Upazila	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**	**Pre-training**	**Post-training**
Char Bhadrason	0	100	0	100	0	100	0	100
Faridpur Sadar	0	100	0	100	0	100	0	100
Jessore Sadar	0	100	0	100	0	100	0	100
Rupsha	0	100	0	100	0	100	0	100
Terokhada	0	100	14	86	0	100	0	100
All	**0**	**100**	**2**	**98**	**0**	**100**	**0**	**100**

Table 13: Attributes of animals for milk production taken into account by farmers (% adopted) in five upazilas before and after USAID-AESA project provided training.

Attribute	Training period	Char Bhadrason	Faridpur Sadar	Jessore Sadar	Rupsha	Terokhada	All
Head	Pre-training	0	13	0	20	0	**8**
	Post-training	100	63	100	60	86	**80**
Body	Pre-training	0	0	0	0	0	**0**
	Post-training	0	25	86	13	57	**44**
Hip	Pre-training	0	0	0	0	0	**0**
	Post-training	17	75	9	0	0	**23**
Skin	Pre-training	0	0	0	27	0	**6**
	Post-training	83	94	41	93	100	**76**
Udder	Pre-training	50	88	0	13	0	**29**
	Post-training	67	100	100	60	14	**79**
Milk vein	Pre-training	0	19	0	7	0	**6**
	Post-training	0	69	95	100	0	**71**
Age	Pre-training	0	38	0	0	14	**11**
	Post-training	0	75	0	20	29	**26**

Table 14: Milk yield and change in relative milk yield in milk productions in five upazilas before and after USAID-AESA project provided training. ± is 95% confidence interval.

	Yield (L cow^{-1})		
Upazila	**Pre-training**	**Post-training**	**% Yield increase**
Char Bhadrason	3.9±0.6	7.8±1.7	100±32
Faridpur Sadar	4.3±0.6	6.9±1.0	59±13
Jessore Sadar	3.6±1.3	7.5±2.2	108±30
Rupsha	3.2±1.0	6.4±1.9	101±39
Terokhada	2.4±0.5	4.7±0.9	100±27
All	**3.6±0.5**	**6.8±0.9**	**91±14**

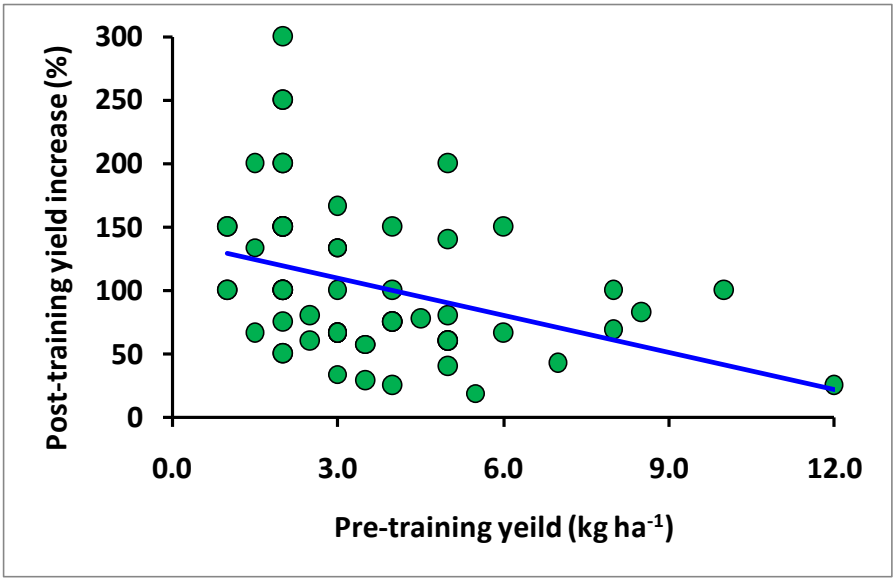

Fig. 6: Relative yield increase (filled circle) in milk in post-training phase compared to pre-training phase in individual farms in five sampled upazilas. The line indicates the trend in data.

Fish value chain

During the pre-training period, small number of farmers (21%) practiced “Black soil, predators and unwanted fish removing technology”, whereas none used “Area specific pre-larvae stocking”. Adoption of those four technologies had fully occurred in the post-training period (Table 15). The number of time liming and fertilizer application increased in the post-training period (2.02±0.21), compared to the pre-training period (0.42±0.15). Table 16 shows the feeding frequency of cultured fish had also significantly increased in the post-training period (9.95±1.29), compared to the pre-training period (4.22±1.00).

Farmers obtained increased fish yield, on average, from 1279.5±184.0 kg ha^{-1} (pre-training period) to 2187.1±292.9 kg ha^{-1} (post-training period) (Table 16); this increase was 71±11%. All upazilas experienced this benefit; however, Table 16 shows the range varied from 44±6 (Terokhada upazila, Khulna district) to 88±13% (Kaligani upazila, Satkhira district).

All the sampled farmers, irrespective of level of fish yields that they were obtaining in the pre-training period, reported higher yields in the post-training period. However, Fig. 7 shows that farmers who were getting lower level of fish yields (low performing farmers) benefitted more than those getting higher levels of the yields (high performing farmers).

Table 15: Rating of applied fish production technologies by farmers in four upazilas before and after USAID-AESA project provided training. ± is 95% confidence interval.

Upazila	Black soil, predators and unwanted fish removing (% adopted)		Area specific pre-larvae stocking (% adopted)		Number of liming and fertilizer application		Feed (Number per week)	
	Pre-training	Post-training	Pre-training	Post-training	Pre-training	Post-training	Pre-training	Post-training
Kaliganj	0	100.0	0	100.0	0.05±0.09	1.73±0.19	0.61±0.68	4.41±2.16
Pirojpur Sadar	18	81.8	0	100.0	0.45±0.21	2.00±0.22	4.27±0.98	12.55±0.82
Rupsha	50	50.0	0	100.0	0.44±0.25	2.00±0.67	6.75±2.01	12.50±1.77
Terokhada	33	66.7	0	100.0	1.67±0.41	3.17±0.33	10.50±3.07	14.00±0.00
All	**21**	**78.8**	**0**	**100.0**	**0.42±0.15**	**2.02±0.21**	**4.22±1.00**	**9.95±1.29**

Table 16: Fish yield and change in relative fish yield in fish farming in four upazilas before and after USAID-AESA project provided training. ± is 95% confidence interval.

Upazila	Yield (kg/ha)		% Yield increase
	Pre-training	Post-training	
Kaliganj	306.5±24.7	577.1±40.6	88±13
Pirojpur Sadar	1515.7±143.5	2840.5±262.2	87±15
Rupsha	1931.2±91.6	3110.7±99.4	61±5
Terokhada	2243.6±201.7	3231.6±131.3	44±6
All	**1279.5±184.0**	**2187.1±292.9**	**71±11**

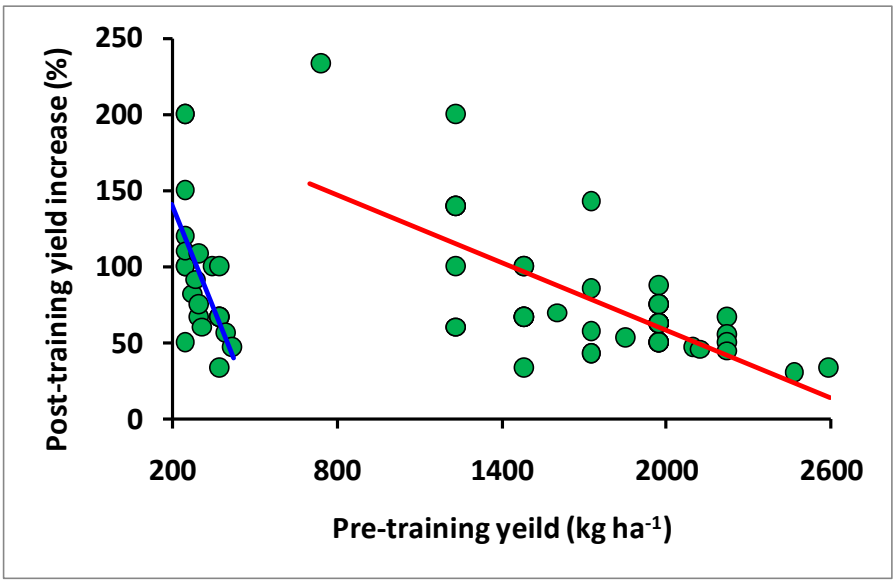

Fig. 7: Relative yield increase (filled circle) in fish farming in post-training phase compared to pre-training phase in individual farms in four sampled upazilas. A line indicates the trend in data.

Gender-specific benefits

Overall, male farmers had slightly higher relative yield benefits over their female counterparts in all the six value chains: jute (47±9% male and 45±8% female), chili ((54±8% male and 40±7% female), mung bean (129±32% male and 113±14% female), cattle (89±15% with male and 86±13% with female), dairy (113±21% with male and (95±19% with female) and fish (83±14% with male and 80±16% with female) (Table 17). However, in the value chain the difference in yield benefits between male and female farmers was statistically insignificant.

Table 17: Relative yield increase (% between pre- and post-training period) received by male and female farmers in six value chains. ± is 95% confidence interval.

Value chain	**Relative yield increase (% between pre- and post-training period)**	
	Male farmer	Female farmer
Jute	47±9	45±8
Chili	54±8	40±7
Mung bean	129±32	113±14
Beef fattening	89±15	86±13
Dairy	113±21	95±19
Fish	83±14	80±16

Key points

- Training provided by the USAID-AESA project to the farmers in six (6) prioritized value chains – jute, chili, mung bean, beef fattening, dairy and fish – had been effective in terms of adoption of the trained technologies.

- Some differences found between training materials and farmers' practice in the dose of fertilizer application (muriate of potash in Jute and triple superphosphate in chili) – these need to be further investigated.

- Farmers did not adopt all the attributes deemed to appropriate to beef cattle fattening and dairy cows - these need to be further investigated.

- Yield benefits from all the six value chains in the post-training period were significant - USAID-AESA project may claim a large part of this for the services, including the training, they had been providing the farmers in the study area.

- An important point to note that the "low performing farmers" in the pre-training period, across all the six value chains, obtained higher relative yield benefits compared to the "high performing farmers". Traditionally, the "low performing farmers" are the smallholder farmers; thus the project has been successful in properly addressing its targeted beneficiaries.

- With respect to gender, male farmers tended to have benefitted (in term of resulted relative yield in six value chains) more than their female counterpart; however, the difference of such benefits were statistically insignificant. Therefore, USAID-AESA project may further claim that it succeeded in providing services to women beneficiaries.

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Appendix-1: Questionnaires used in evaluating effectiveness of the training to the beneficiaries by adopting technologies provided by the USAID-AESA project – Jute Value Chain.

ইউএসআইডি কৃষি সম্প্রসারণ সহযোগিতা কার্যক্রম

ঢাকা আহছানিয়া মিশন

পাট বিষয়ক প্রশিক্ষণ মূল্যায়ণ প্রশ্নমালা

কৃষকের নামঃ বয়সঃ-------- বছর। লিঙ্গঃ পুরুষ/নারী এফপিজির নামঃ

ইউনিয়নের নামঃ উপজেলার নামঃ জেলার নামঃ

১. আপনার শিক্ষাগত যোগ্যতাঃ

২. আপনি কত বছর যাবৎ কৃষি কাজের সাথে জড়িত -------বছর।

৩. আপনি পাটের বীজের অংকুরদগম পরীক্ষা করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৪. আপনি পাট চাষে পটাশ সমৃদ্ধ সার ব্যবহারের পরিমান (কেজি/একর) বলুন-

ক. গত ০৫ বছর আগে ---------- কেজি করতাম খ. এখন ----------কেজি করি।

৫. আপনি পাট বীজ বপনের আগে বীজ শোধন করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৬. আপনি পাটের ফুলের কুড়ি আসলেই কর্তন করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৭. আপনি পাটের জাগ তৈরীতে কুচুরীপানা/ধানের খড়/জলজ উদ্ভিদ ব্যবহার করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৮. পাটের ফলন (মন/একর)

ক. গত ০৫ বছর আগে ------- মন খ. এখন--------মন।

৯. পাটের বিক্রয় মূল্য (টাকা/মন)

ক. গত ০৫ বছর আগে ------- টাকা খ. এখন--------টাকা।

তথ্য সংগ্রহকারী (নাম ও পদবী) ঃ যাচাইকারী (নাম ও পদবী) ঃ

Appendix-2: Questionnaires used in evaluating effectiveness of the training to the beneficiaries by adopting technologies provided by the USAID-AESA project – Chili Value Chain.

ইউএসআইডি কৃষি সম্প্রসারণ সহযোগিতা কার্যক্রম

ঢাকা আহছানিয়া মিশন

মরিচ বিষয়ক প্রশিক্ষণ মূল্যায়ণ প্রশ্নমালা

কৃষকের নামঃ বয়সঃ-------- বছর। লিঙ্গঃ পুরুষ/নারী এফপিজির নামঃ

ইউনিয়নের নামঃ উপজেলার নামঃ জেলার নামঃ

১. আপনার শিক্ষাগত যোগ্যতাঃ
২. আপনি কত বছর যাবৎ কৃষি কাজের সাথে জড়িত -------বছর।
৩. আপনি মচিের বীজের অংকুরদগম পরীক্ষা করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৪. আপনি মরিচ চাষে ফসফরাস সমৃদ্ধ সার ব্যবহারের পরিমান (কেজি/একর) বলুন-

ক. গত ০৫ বছর আগে ---------- কেজি করতাম খ. এখন ----------কেজি করি।

৫. আপনি মরিচ চাষে বীজ বপনের আগে বীজ শোধন করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৬. আপনি রোগাক্রান্ত মরিচ গাছ পুড়িয়ে/মাটিতে পুতেঁ ফেলেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৮. কাচা মরিচের ফলন (কেজি/শতাংশ)

ক. গত ০৫ বছর আগে ------- কেজি খ. এখন-------- কেজি।

৯. কাচা মরিচের বিক্রয় মূল্য (টাকা/কেজি)

ক. গত ০৫ বছর আগে ------- টাকা খ. এখন-------- টাকা।

তথ্য সংগ্রহকারী (নাম ও পদবী) ঃ যাচাইকারী (নাম ও পদবী) ঃ

Appendix-3: Questionnaires used in evaluating effectiveness of the training to the beneficiaries by adopting technologies provided by the USAID-AESA project – Mung bean Value Chain.

ইউএসআইডি কৃষি সম্প্রসারণ সহযোগিতা কার্যক্রম

ঢাকা আহছানিয়া মিশন

মুগডাল বিষয়ক প্রশিক্ষণ মূল্যায়ণ প্রশ্নমালা

কৃষকের নামঃ বয়সঃ-------- বছর। লিঙ্গঃ পুরুষ/নারী এফপিজির নামঃ

ইউনিয়নের নামঃ উপজেলার নামঃ জেলার নামঃ

১.আপনার শিক্ষাগত যোগ্যতাঃ
২.আপনি কত বছর যাবৎ কৃষি কাজের সাথে জড়িত -------বছর।
৩.আপনি মুগডালের জাতের নাম বলুন -

গত ০৫ বছর আগে	এখন
ক.	ক.
খ	খ
গ.	গ.
ঘ.	ঘ.
ঙ.	ঙ.

৪. আপনি মুগডাল চাষে সার ব্যবহার করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৫. আপনি মুগডাল চাষে কতবার আগাছা দমন করেন-

ক. গত ০৫ বছর আগে ---------- বার করতাম খ. এখন ----------বার করি।

৬. আপনি রোগাক্রান্ত মুগডাল গাছ পুড়িয়ে/মাটিতে পুতেঁ ফেলেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৮. মুগডালের ফলন (কেজি/শতাংশ)

ক. গত ০৫ বছর আগে ------- কেজি খ. এখন-------- কেজি।

৯. মুগডালের বিক্রয় মূল্য (টাকা/কেজি)

ক. গত ০৫ বছর আগে ------- টাকা খ. এখন-------- টাকা ।

তথ্য সংগ্রহকারী (নাম ও পদবী) ঃ যাচাইকারী (নাম ও পদবী) ঃ

Appendix-4: Questionnaires used in evaluating effectiveness of the training to the beneficiaries by adopting technologies provided by the USAID-AESA project – Beef fattening Value Chain.

ইউএসআইডি কৃষি সম্প্রসারণ সহযোগিতা কার্যক্রম

ঢাকা আহছানিয়া মিশন

গরুমোটাতাজাকরণ বিষয়ক প্রশিক্ষণ মূল্যায়ণ প্রশ্নমালা

কৃষকের নামঃ বয়সঃ.-------- বছর। লিঙ্গঃ পুরুষ/নারী এফপিজির নামঃ

ইউনিয়নের নামঃ উপজেলার নামঃ জেলার নামঃ

১.আপনার শিক্ষাগত যোগ্যতাঃ

২.আপনি কত বছর যাবৎ গরুমোটাতাজাকরণ কাজের সাথে জড়িত -------বছর।

৩.আপনি মোটাতাজাকরণের জন্য গরুর বৈশিষ্য বলুন -

গত ০৫ বছর আগে	এখন
ক.	ক.
খ	খ
গ.	গ.
ঘ.	ঘ.
ঙ.	ঙ.

৪. আপনি মোটাতাজাকরণকৃত গরুর জন্য উন্নত বাসস্থান ব্যবহার করেন-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৫. আপনি নিয়মিতভাবে মোটাতাজাকরণকৃত গরুর ভ্যাকসিনেশন করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৬. মোটাতাজাকরণকৃত গরুর মাংসের পরিমান (কেজি/গরু)

ক. গত ০৫ বছর আগে ------- কেজি খ. এখন-------- কেজি ।

৭ মোটাতাজাকরণকৃত গরুর মাংসের পরিমান (টাকা/কেজি)

ক. গত ০৫ বছর আগে ------- টাকা খ. এখন-------- টাকা ।

তথ্য সংগ্রহকারী (নাম ও পদবী) ঃ যাচাইকারী (নাম ও পদবী) ঃ

Appendix-5: Questionnaires used in evaluating effectiveness of the training to the beneficiaries by adopting technologies provided by the USAID-AESA project – Dairy Value Chain.

ইউএসআইডি কৃষি সম্প্রসারণ সহযোগিতা কার্যক্রম

ঢাকা আহছানিয়া মিশন

গাভীপালন বিষয়ক প্রশিক্ষণ মূল্যায়ণ প্রশ্নমালা

কৃষকের নামঃ বয়সঃ-------- বছর। লিঙ্গঃ পুরুষ/নারী এফপিজির নামঃ

ইউনিয়নের নামঃ উপজেলার নামঃ জেলার নামঃ

১. আপনার শিক্ষাগত যোগ্যতাঃ
২. আপনি কত বছর যাবৎ গাভীপালন কাজের সাথে জড়িত -------বছর।
৩. আপনি অধিক দুগ্ধ উৎপাদনশীল গাভীর বৈশিষ্য বলুন -

গত ০৫ বছর আগে	এখন
ক.	ক.
খ	খ
গ.	গ.
ঘ.	ঘ.
ঙ.	ঙ.

৪. আপনি নিয়মিতভাবে গাভীর কৃমিমুক্ত করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৫. আপনি গাভীপালনের জন্য উন্নত বাসস্থান ব্যবহার করেন-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৬. আপনি গাভীর জন্য নিয়মিতভাবে পরিমিত মাত্রায় দানাদার প্রদান করেন (টিক দিন)--

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৭. আপনি নিয়মিতভাবে গাভীর ভ্যাকসিনেশন করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৮. উৎপাদিত দুধের পরিমান (লিটার/গাভী)

ক. গত ০৫ বছর আগে ------- লিটার খ. এখন-------- লিটার ।

৯. উৎপাদিত দুধের বিক্রয় মূল্য (টাকা/লিটার/দিন) এবং দুধ প্রদানের সময় কাল(মাস উলেস্নখ করুন)

ক. গত ০৫ বছর আগে ------- টাকা খ. এখন-------- টাকা ।

তথ্য সংগ্রহকারী (নাম ও পদবী) ঃ যাচাইকারী (নাম ও পদবী) ঃ

Appendix-6: Questionnaires used in evaluating effectiveness of the training to the beneficiaries by adopting technologies provided by the USAID-AESA project – Fish Value Chain.

ইউএসআইডি কৃষি সম্প্রসারণ সহযোগিতা কার্যক্রম

ঢাকা আহছানিয়া মিশন

মাছচাষ বিষয়ক প্রশিক্ষণ মূল্যায়ণ প্রশ্নমালা

কৃষকের নামঃ বয়সঃ-------- বছর। লিঙ্গঃ পুরুষ/নারী এফপিজির নামঃ

ইউনিয়নের নামঃ উপজেলার নামঃ জেলার নামঃ

১. আপনার শিক্ষাগত যোগ্যতাঃ
২. আপনি কত বছর যাবৎ মাছচাষ কাজের সাথে জড়িত -------বছর।
৩. আপনি পুকুর/ঘের থেকে কালোকাদা ও রাক্ষুসে প্রাণি/মাছ অপসারণ করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই খ. এখন করি।

৪. আপনি পুকুর/ঘেরে মাসে কতবার চুন ও সার প্রয়োগ করেন -

ক. গত ০৫ বছর আগে -------বার করতাম খ. এখন -------বার করি।

৫. আপনি পুকুর/ঘেরে সপ্তাহে কতবার খাদ্য প্রদান করেন -

ক. গত ০৫ বছর আগে -------বার করতাম খ. এখন -------বার করি।

৬. আপনি পুকুর/ঘেরের আয়তন অনুসারে পোনা মজুদ করেন (টিক দিন)-

ক. গত ০৫ বছর আগে থেকেই করেন খ. এখন করি।

৭. শতাংশ/হেক্টর প্রতি------মাছের উৎপাদনের পরিমান (কেজি)।

ক. গত ০৫ বছর আগে ------- কেজি খ. এখন-------- কেজি ।

৮. চাষকৃত ------- উৎপাদিত মাছের বিক্রয় মূল্য (টাকা/কেজি)

ক. গত ০৫ বছর আগে ------- টাকা খ. এখন-------- টাকা ।

তথ্য সংগ্রহকারী (নাম ও পদবী) ঃ যাচাইকারী (নাম ও পদবী) ঃ