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USAID Agricultural Extension Support Activity (AESA)

AESC-Model towards Strengthening Agricultural Extension Service in Bangladesh



Dhaka Ahsania Mission
CARE-Bangladesh and mPower

May 2017

mPower



USAID Agricultural Extension Support Activity (AESA)

AESC-Model Towards Strengthening Agricultural Extension Service in Bangladesh

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EXECUTIVE SUMMARY

In order to sustain the productivity in the agricultural sector in Bangladesh, there is a need to cope with rapid population growth, limited land base, climate change effects such as increased floods, droughts and cyclones, degradation of land, water-bodies, wetlands and forests through adoption of appropriate technologies, skills and knowledge. Hence, agricultural extension services constitute a valuable productivity factor. Accordingly, USAID-AESA project has introduced Agriculture Extension Service Centre (AESC)-Model towards strengthening country's agricultural extension service. This report provides an assessment of the performance of the AESC-Model.

This study compared agricultural extension service in 24 'blocks' under the existing system- Department of Agriculture Extension (DAE Model)) against 24 'blocks' under AESC-Model. A 'block' is the work-area of a frontline extension agent (SAAO). Data were collected through separately interviewing three classes of respondents – Class-1: senior DAE officials (N=11); Class-2: Sub Assistant Agriculture Officers (SAAOs) (N=48) and Class-3: farmers (N=192, equal number of male and female). The criteria of assessment included the design of the models and relevance, effectiveness, efficiency and impact of services, services to women farmers and use of ICT. Data were summarized as means (either percentage of responses or number by count) and their corresponding confidence intervals at 95% probability level. The statistical significance were compared between 'control' group (DAE-Model) and 'treatment' group (AESC-Model).

In the existing DAE-Model, a front line extension agent (SAAO) has no office in the work-place ('block'), no work vehicle and no official mobile phone. The AESC-Model was designed to overcome such difficulties the SAAOs had been encountering. The new design was fully endorsed by all classes of respondents. The AESC-Model intervention provided SAAOs with enhanced social status and job satisfaction, which impacted their work efficiency and work credibility. In turn, farmers received significantly more and relevant services. To the farmers and senior DAE officials, agricultural extension service in Bangladesh had already been providing benefits to farm family income, but with AESC-Model those benefits were significantly scaled. Two other benefits stemmed from the AESC-Model- increased services to women farmers and more use of ICT tools. In spite of significant benefits received from AESC-Model, individual farmers and senior DAE officials raised concerns on full effectiveness of the model. This study also observed that AESCs in all the piloted locations were not performing as effectively.

If proper implementation is ensured, AESC-Model has the potential to increase the relevancy of current extension service by over 30%, resulting in increase in crop productivity @ 0.35% for every 1% of increase in service relevancy.

1.0 INTRODUCTION

Bangladesh targets to attain middle income country status in 2021 for which the 'Perspective Plan of Bangladesh (2010-2021)' has been prepared. The plan's goals included, among others, elimination of food deficiency and attaining self-sufficiency in food production. This plan identified a number of challenges towards achieving these goals which included declining soil fertility, loss of land and water resources. Increasing emphasis on research and development was highlighted to overcome these challenges. In this respect, generation, adaptation and adoption of technologies in all sectors of agriculture could be an efficient way to march forward.



The strategies of the perspective plan were articulated through two five-year plans: Sixth Five Year Plan (2011-2015) (6thFYP) and Seventh Five Year Plan (2016-2020) (7thFYP). In the 6thFYP, emphasis was given to develop and adopt technologies, and improve agricultural practices

in ecologically vulnerable areas such as saline, flood and drought prone locations. The emphasis was placed on technology and correction of market distortion. Development of appropriate technologies, promoting their use through ICT would result in addressing 'yield gap' by reducing 'information gap', and strengthening linkages amongst research, extension and farmers community. These suggestions were further reflected in the National Agricultural Extension Policy (NAEP 2012) which pointed out the need for 'Demand Responsive Research-Extension-Farmer Linkage' towards generation, adaptation and adoption of farm technologies.

The significant development of the agricultural sector in Bangladesh over the last two decades is being sustained through a number of initiatives by different developing agencies. The USAID Agricultural Extension Support Activity (USAID-AESA) project (initiated in October 2012 under Co-operative agreement No. AID-388-A-13-00001 between USAID and Dhaka Ahsania Mission) is such an initiative working towards sustainable productivity, resilient livelihood and improved food security for smallholder and marginalized farmers. The USAID-AESA project is doing this through developing, testing and piloting of an innovative agricultural extension model. The model is currently supporting as many as 110,000 smallholder male and female farmers of central and southwest areas of Bangladesh in

increasing their farm productivity and income by changing existing production and management practices. The main objective of the USAID-AESA project is to strengthen farm support services to improve food security and nutrition for climate vulnerable smallholder farmers, especially women through capacity building of extension agents and farmers, facilitating linkages between different stakeholder groups, and promoting the use of ICT tools. Currently the project has 129 established Agricultural Extension Service Centers (AESCs) in four piloted ‘upazilas’ of Bangladesh, which facilitate these activities.

This paper presents the blueprint of the ‘AESC-Model’, evaluates and compares its performance with the existing extension service model of Bangladesh, Department of Agriculture Extension Model (DAE model).

2.0 METHODOLOGY

2.1 The channel of agricultural extension service in Bangladesh

‘Upazilas’ (presently 487 in number, BBS 2013) are the administrative hubs of the agricultural extension activities in Bangladesh. These ‘Upazilas’ are the units of government’s 64 administrative ‘districts’ under 7 ‘divisions’. On the other hand, ‘blocks’ are the ‘nerve-centers’ of agricultural and extension information flow of the country. The Department of Agricultural Extension (DAE) is the lone public agency providing crop-based extension service in the country. An ‘upazila’ is administratively divided into several ‘unions’, and for DAE extension purposes, each ‘union’ is non-administratively sub-divided into three (3) ‘blocks’ (Figure 1). The frontline agricultural extension agents, designated as ‘Sub-Assistant Agriculture Officer’ or SAAO, are attached to the ‘blocks’ (one in each ‘block’). At present, there are 14,032 designated ‘blocks’ in the country.

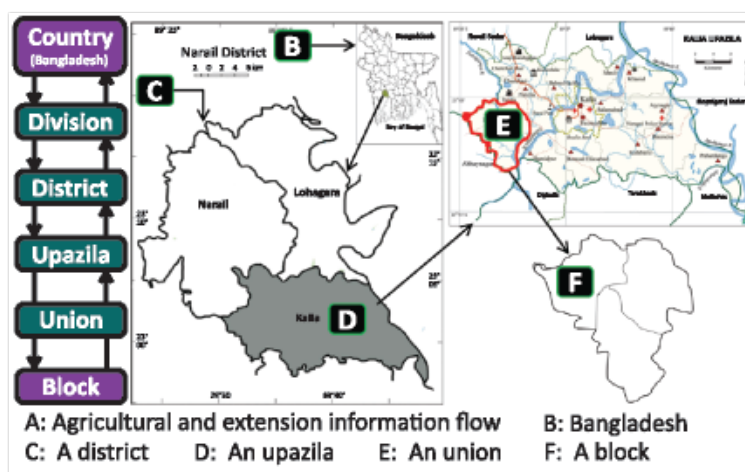


Fig. 1: Hierarchy of agricultural and extension information flow in Bangladesh showing the hierarchy through to 'blocks', the lowest level of work location of frontline agricultural extension agents (designated as 'Sub-Assistant Agriculture Officer' or SAAO).

2.2 The DAE-Model

A SAAO, responsible for a 'block', has no permanent office place. The three SAAOs attached to each 'union' (Figure 1F) have a sitting shelter in the 'Union Parishad' ('UP') building (Figure 2). The 'UP' is the lower most hierarchy in the local government system in Bangladesh, having a brief sitting performing desk-work in the sheltered room. Each SAAO is to visit the designated 'block' using self-arranged transport. Having no office space in the 'block', SAAO interacts with farmers sitting in a village tea-stall or in a rich farmer's front-yard. S/he has no office mobile phone. Therefore, s/he usually has broken communication with his/her immediate administrative officer, the 'Upazila Agriculture Officer' (UAO) stationed at 'upazila' headquarter. S/he has about 2500 farm households to work with. All these challenges combine seriously hamper their administrative and coordination capabilities resulting in poor services to farmers under their respective jurisprudence.

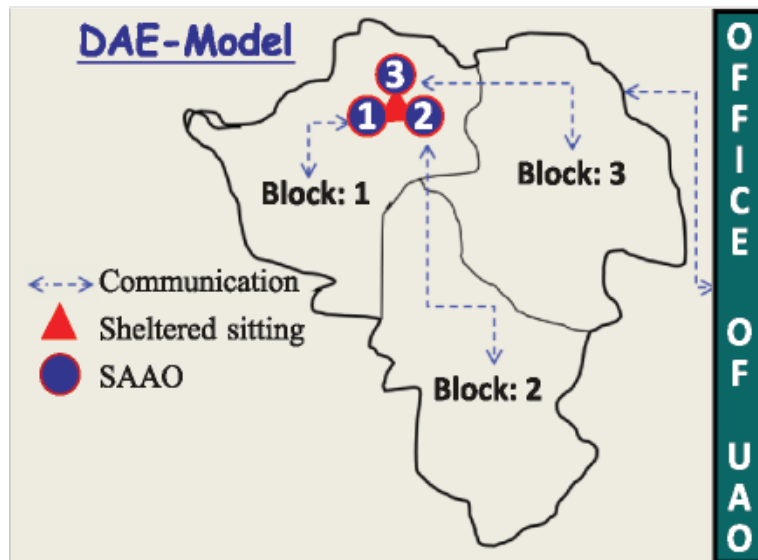


Fig. 2: The existing agricultural extension service delivery model of the Department of Agricultural Extension (DAE-Model); the numbers denote for the three Sub-Assistant Agriculture Officers (SAAOs); the location of sheltered sitting is one of the spaces in the 'Union Parishad' office premises; UAO indicates for the 'Upazila' Agriculture Officer.

2.3 The AESC-Model

The AESC-Model was designed to overcome the challenges of transportation, accommodation and communication of SAAOs. The model ensures that each beneficiary SAAO is decently housed and well equipped (Figure 3), facilitated with own office inside work-location (i.e. 'block'), provided fast-moving office transport such as a motorcycle, and a smartphone for mobile communication and accessing information communication technology (ICT). The model also facilitated the formation of Farmer Producer Groups (FPGs) through which farmers can collectively organize to access extension services. The model also facilitates better connectivity of SAAOs to farmers and officials.

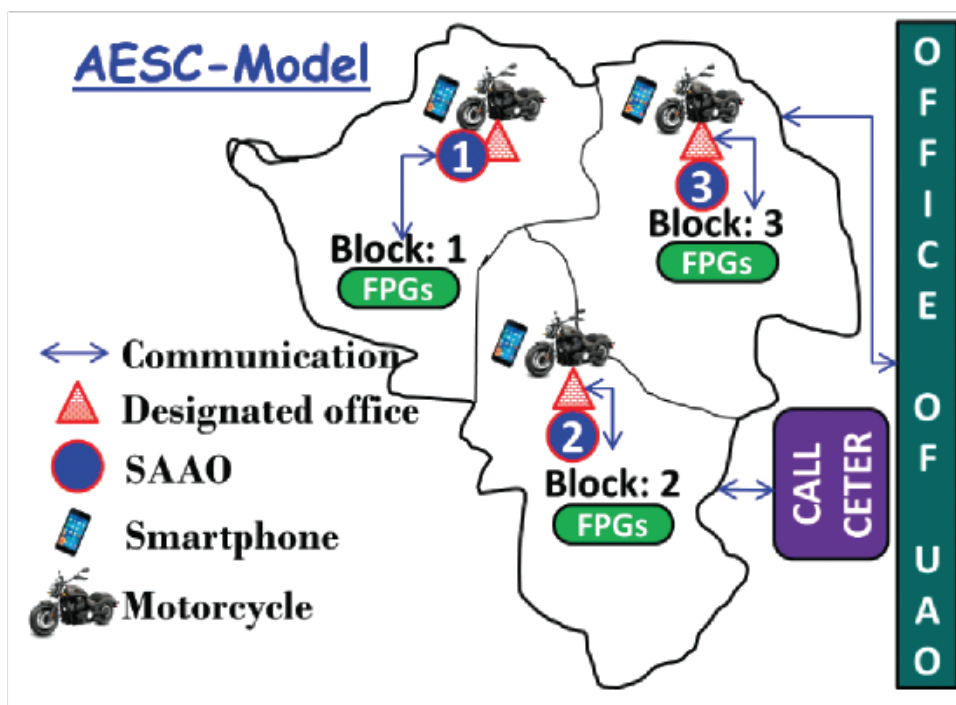


Fig. 3: The newly formulated Agricultural Extension Center model (AESC-Model) through USAID Agricultural Extension Support Activity (USAID-AESA) Project. The numbers denote for the three Sub-Assistant Agriculture Officers (SAAOs); the sitting location is newly established office at block level; UAO indicates for the 'Upazila' Agriculture Officer and FPGs for Farmer Producer Groups.

The USAID-AESA project established 129 AESCs covering all ‘blocks’ in four ‘upazilas’ – 30, 33, 34 and 32 in Barisal Sadar, Faridpur Sadar, Chowgacha and Kalia, respectively (Table 1). The ‘upazilas’ were selected as a representation of administrative status – Barisal Sadar as ‘divisional’ headquarter, Faridpur Sadar as ‘district’ headquarter, Chowgacha as outside ‘district’ headquarter and Kalia as remote locations.

Table 1. Distribution of 129 Agricultural Extension Service Centers (AESCs) in four demonstration ‘upazilas’ of Bangladesh

‘District’	‘Upazila’	Status of ‘upazila’	Number of AESC
Barisal	Barisal Sadar	‘Divisional’ center	30
Faridpur	Faridpur Sadar	‘District’ center	33
Narail	Chowgacha	Outside ‘district’ center	34
Jessore	Kalia	Remote location	32
		Total	129

2.4 Data collection

2.4.1 Data collection

Data were collected from eight (8) ‘upazilas’, two from each of the four ‘districts’ (Barisal, Faridpur, Jessore and Narail) (Table 2). Of the two sampled ‘upazilas’ within a ‘district’, one was operating under DAE system (DAE-Model, taken as ‘control’) and the other under USAID-AESA system (AESC-Model, taken as ‘treatment’). Within a sampled ‘upazila’, three (3) ‘unions’ were selected, ‘Union-1’- ‘upazila’ center based union, ‘Union-3’ the union farthest to the ‘upazila’ center and ‘Union-2’ in-between the ‘Union-1’ and ‘Union-2’. Two ‘blocks’ from each selected ‘union’ were further sampled; one belonged to the ‘UP’ office premises (‘UP-based block’) and the other outside the premises (‘Outside UP block’). ‘UP’ is ‘Union Parishad’; in the DAE-Model, ‘office opening sitting space’ for SAAOs (Sub-Assistant Agriculture Officers) of three ‘blocks’ under the ‘union’ is located in the ‘UP’ Office premises. Altogether, samples accounted for 48 ‘blocks’, 24 running under DAE-Model and 24 under AESC-Model.

2.4.2 Interviewing

Data were collected by separately interviewing three (3) classes of respondents – Class-1: senior DAE officials; Class-2: SAAOs and Class-3: farmers. The senior DAE officials included Additional Director of Agricultural Extension (ADAE), Deputy Director of Agricultural Extension (DDAE) and Upazila Agricultural Officer (UAO). Sample size for Class-1 interviewee was 11 for each ‘control’ (i.e. DAE-Model) and ‘treatment’ (i.e. AESC-Model); this size was one less than expected as the ADAE position of the Barisal Region was unoccupied. For Class-2 category, SAAOs for all sampled ‘blocks’ were interviewed (altogether 48, Table 2). In total 192 farmers (4 from each ‘block’) were purposively chosen for Class-3; equally (50:50) representing male and female. In the ‘treatment’ ‘blocks’, 50% farmers belonged to direct beneficiaries (members of FPG) and the rest indirect beneficiaries (non-FPG). Again, representation from FPG and non-FPG was equal gender-specific.

In addition, eight (8) Farmers’ Group Discussion (FGD) sessions were conducted in each of the sampled ‘upazilas’ attended by 24 interviewee farmers in each session.

Table 2. Sampling locations and sample numbers undertaken in the study. DAE denotes for Department of Agricultural Extension (taken as 'Control') and AESC Agriculture Extension Service Center (taken as 'Treatment'). 'Union-1' is 'upazila' center based 'union', whereas 'Union-3' is the farthest to 'upazila' center and 'Union-2' was in-between 'Union-1' and 'Union-3'. 'UP' is 'Union Parishad'; in the DAE-Model, office opening sitting space for SAAOs (Sub-Assistant Agriculture Officers) of three 'blocks' within a 'union' is located in the 'UP' Office premises.

'District'	'Upazila'	Model	'Union-1'						'Union-2'						'Union-3'							
			'UP-based block'		'Outside UP block'		'UP-based block'		'Outside UP block'		'UP-based block'		'Outside UP block'		'UP-based block'		'Outside UP block'					
			SAAO	Farmer	SAAO	Farmer	SAAO	Farmer	SAAO	Farmer	SAAO	Farmer	SAAO	Farmer	SAAO	Farmer	SAAO	Farmer	SAAO	Farmer	Total SAAO	Total Farmer
Barisal	Babuganj	DAE	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	6	24
	Barisal Sadar	AESC	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	6	24
Faridpur	Bhanga	DAE	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	6	24
	Faridpur Sadar	AESC	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	6	24
Jessore	Manirampur	DAE	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	6	24
	Chowgachha	AESC	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	6	24
Chuadanga	Lohagora	DAE	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	6	24
	Kalia	AESC	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4	6	24
																			Total	48	192	

2.4.3 Interview and its contents

Semi-structured questionnaires were used for interviewing. The questionnaires included seven aspects of extension service model (DAE-Model or AESC-Model) – the design and its relevance, effectiveness, efficiency and impact. It also included services to women farmers and use of ICT. The contents of questionnaires are briefly explained below.

Design: Adequacy of the agricultural extension service model (DAE-Model or AESC-Model) in relation to workspace and its location, and logistics to front-line extension agents for providing smoothly.

Relevance: Extent to which extension services fulfilled farmers' individual needs.

Effectiveness: Whether the extension services were good enough so that benefiting farmers.

Efficiency: To what extent the farmers received or frontline extension agents provided extension services to farmers.

Impact: Enhancement of social status and job satisfaction and in the case of SAAOs; family income from crop enterprises in the last two years in the case of other interviewees.

Services to women: Increase in services to women farmers in the last two years.

ICT use: Any use of ICT tools (FQS- Farmer Quarry System, CDA – Crop Diagnostic Apps, Call Center, Downloaded videos, Web devices such as 'Krishoker Janala' etc).

2.4.4 AESC visit by the farmers

AESCs maintain log-book on recording daily services to visiting farmers. These records on the number of visits of farmers during September 2016 to February 2017 were collected from four sampled 'upazilas' ('treatment' group)- Barisal Sadar, Faridpur Sadar, Chowgacha and Kalia.

2.5 Data analysis

Data were summarized as means (either percentage of responses or number by count) and their corresponding confidence intervals at 95% probability level. The statistical significance were compared (at 95% probability level) between 'control' group (DAE-Model) and 'treatment' group (AESC-Model). The quantity of services received by the farmers in the 'UP-based block' and 'Outside UP block' under two models was compared. Within AESC-Model, services relevant to and services received by the farmers between FPG and non-FPG groups were also compared.

The recorded visits of the farmers in the sampled AESCs were summarized as number per month with respect to regions (four 'upazilas'- Barisal Sadar, Faridpur Sadar, Chowgacha and Kalia) and proximity of 'blocks' ('UP-based block' and 'Outside UP block') to 'UP' building premises.

The comparative advantage of AESC-Model over DAE-Model was calculated using opinions from Class-1 interviewees (senior DAE officials) with respect to 'increase in relevant services' and 'increase in annual crop productivity' were calculated.

3.0 FINDINGS

3.1 Design of agricultural extension service model

None of the SAAOs opined in support of the design of DAE-Model, whereas all thought that the AESC-Model was appropriate for smooth service provision to farmers (Table 3). Senior DAE officials fully agreed on this as of SAAOs (Table 4). Significantly larger number of farmers also recorded AESC-Model design better ($92.7\pm 5.2\%$, \pm henceforth used for 95% confidence interval) than DAE-Model ($23.2\pm 8.5\%$) (Table 3). At FGD level, the design of AESC-Model (100%) echoed as superior to DAE-Model ($8.5\pm 16.7\%$).

3.2 Relevance of agricultural extension service

The DAE-Model had been providing services relevant to farmers' individual needs in the range of 26.9 ± 3.3 to $41.1\pm 4.3\%$, according to SAAOs and individual farmers, respectively (Table 3). At FGD level, this number was recorded as $21.9\pm 5.4\%$. On the other hand, with AESC-Model significantly higher number of service relevancy was expressed by all classes of respondents ($61.7\pm 3.0\%$ by SAAOs and $68.2\pm 3.7\%$ by individual farmers).

3.3 Effectiveness of agricultural extension service

None of the SAAOs rated the DAE-Model as ‘effective enough’ for providing smooth service. On the contrary, 51.6±10.1% individual farmers found the model effective (Table 3); farmers’ individual opinions reflected at FGD level. While almost all SAAOs (82.6±15.8%) observed significantly better effectiveness of service with AESC-Model, less individual farmers (65.6±9.6%) supportive on this. In fact, both the models rated as statistically similarly effective by the individual farmers. In the FGD, the farmers, however, agreed with opinion of SAAOs. About half of the senior DAE officials thought the DAE-Model was either ‘not fully effective’ (45.5±30.9%) or ‘more or less effective’ (54.5±30.9%), whereas the AESC-Model was effective (63.6±29.8%) or ‘more or less effective’ (36.4±29.8%) (Table 4).

Table 3. Response of evaluation questions on agricultural extension service in Bangladesh under DAE-Model and AESC-Model. SAAO denotes for Sub-Assistant Agriculture Officer, the frontline public extension agents of DAE (Department of Agricultural Extension); FGD is farmers’ group discussion. AESC is Agricultural Extension Service Center (launched under USAID-AESA project. ± denote for 95% confidence interval. ‘*’ indicates statistical significance and ‘ns’ as not significant at 95% probability level.

Respondent class	Extension service model		Statistical significance
	DAE	AESC	
	Appropriateness of the model design (% respondents)		
SAAO	0.0±0.0	100.0±0.0	*
Individual farmer	23.2±8.5	92.7±5.2	*
FGD	8.5±16.7	100.0±0.0	*
	Relevance of services fulfilling farmers’ individual needs (% needs)		
SAAO	26.9±3.3	61.7±3.0	*
Individual farmer	41.1±4.3	68.2±3.7	*
FGD	21.9±5.4	55.8±14.5	*
	Effectiveness (% supporting respondents)		
SAAO	0.0±0.0	82.6±15.8	*
Individual farmer	51.6±10.1	65.6±9.6	ns
FGD	25.0±49.0	100.0±0.0	*
	Service (number / month) being provided or received		
SAAO	43.6±9.3	96.1±15.1	*
Individual farmer	2.2±0.4	3.7±0.7	*
FGD	2.6±0.9	5.3±1.7	*
	Impact (% respondents)		
SAAO	2.8±5.4	97.8±4.3	*
Individual farmer	88.4±4.6	95.8±2.8	*
FGD	89.9±9.9	100.0±0.0	*
	Increased services to women in recent years (% services)		
SAAO	6.1±1.4	11.1±2.8	*
Individual farmer	32.8±4.2	47.7±3.6	*
FGD	20.8±9.2	38.6±8.3	*
	ICT use (% respondents)		
SAAO	66.7±22.4	100.0±0.0	*
Individual farmer	15.8±7.4	74.0±8.8	*
FGD	0.0±0.0	100.0±0.0	*

Table 4. Response of senior officials of the Department of Agricultural Extension (DAE) on evaluating (crop-based) public agricultural extension services in Bangladesh under the existing DAE and piloted AESC (Agricultural Extension Service Center) model. The DAE is the public extension service providing agency of Bangladesh.

Response	Extension service model		Statistical significance
	DAE	AESC	
	Appropriateness of the model design (% respondents)		
Adequate	100.0±0.0	0.0±0.0	*
Inadequate	0.0±0.0	100.0±0.0	*
	Effectiveness ((% supporting respondents)		
Not fully effective	45.5±30.9	0.0±0.0	*
More or less effective	54.5±30.9	36.4±29.8	*
Effective	0.0±0.0	63.6±29.8	*
	Efficiency (% respondents)		
Less efficient	100.0±0.0	9.1±17.8	*
Efficient	0.0±0.0	90.9±17.8	*
	Impact (% respondents)		
More or less similar	18.2±23.9	0.0±0.0	*
Positive	81.8±23.9	18.2±23.9	*
Highly positive	0.0±0.0	81.8±23.9	*
	Comparative advantage of AESC		
Increase in relevant services (% relative to DAE-Model)	-	32.32±11.26	-
Increase in annual crop productivity (% per annum)	-	0.35±0.30	-

3.4 Efficiency in agricultural extension service

Table 3 shows that the SAAOs had been providing 82.6±15.8 number of services per month to farmers under AESC-Model, which was significantly higher than those under DAE-Model (43.6±9.3). Farmers were also in opinion that more services were received through AESC-Model (3.7±0.7 to 5.3±1.7 per farmer) compared to DAE-Model (2.4±0.4 to 2.6±0.9 per farmer). Senior DAE officials qualitatively rated efficiency, DAE-Model as 'less efficient' (100%) and the AESC-Model as efficient (90.9±17.8%) (Table 4).

3.5 Impact of agricultural extension service models

The SAAOs rated high impact (97.8±4.3%) of AESC-Model with respect to in enhancing social status and job satisfaction (Table 3). Individual farmers were in opinion that both models had been impacting their crop productivity, but significantly more with AESC-Model (95.8±2.8% respondents) than DAE-Model (88.4±4.6% respondents); the same was echoed at FGD level. Senior DAE officials rated the impact on three qualitative scales: 'More or less similar', 'Positive' and-

-‘Highly positive’. Mostly (81.8±23.9%) found the impact of DAE-Model ‘Positive’ on crop productivity during the last two years, whereas ‘Highly positive’ with the AESC-Model (Table 4).

3.6 Services to women

With the AESC-Model, the services to women had significantly increased in the last two years by 11.1±2.8% compared to 6.1±1.4% through DAE-Model, according to SAAOs (Table 3), which is 1.82 times higher. The individual farmer respondents indicated they experienced 1.46 time higher increase in such services with AESC-Model (32.8±4.2% under DAE-Model versus 47.7±3.6% under AESC-Model). At the FGD level, 1.86 time service increase to women was recorded with AESC-Model.

3.7 ICT use

About two-third of the SAAOs (66.7±22.4%) used some form of ICT tools under DAE-Model, which increased to 100% under AESC-Model (Table 3). With farmers, about three-quarters (74.0±8.8%) belonging to AESC-Model used ICT tools, significantly higher than those under DAE-Model (15.8±7.4%). At the FGD level, farmers thought none was using ICT with DAE-Model, whereas all were using some form of ICT with AESC-Model.

3.8 Extension service - effect of proximity of ‘blocks’ to ‘Union Parishad’ premises

Under DAE-Model, on average, farmers received 2.2±0.5 number of consultation services per month in the ‘UP-based blocks’; this number was lower (1.6±0.4 per month) in the ‘Outside UP blocks’ (Figure 4). While the number of received services in both types of ‘blocks’ raised under AESC-Model, the increase was significant in the case of ‘Outside UP blocks’ (4.0±1.1 per month).

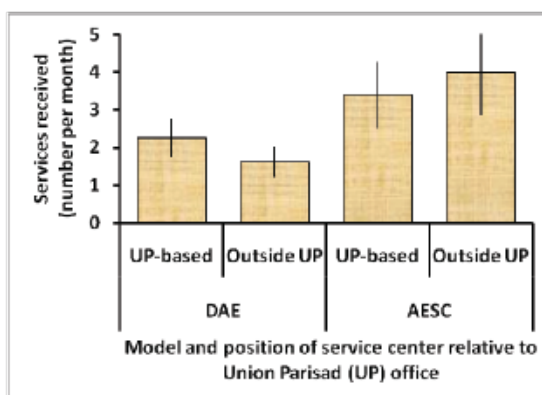


Fig. 4: Comparison of monthly consultation services received by the farmers in 'UP-based' and 'Outside UP) 'blocks' under DAE-Model and AESC-Model. Vertical bars denote for 95% confidence intervals.

3.9 Services to women

Figure 5 (A) shows, services relevant to farmers' individual needs significantly increased to the recipients who belonged to FPG ($74.0 \pm 3.6\%$ of the needs), compared to those who were not with FPG ($67.6 \pm 2.2\%$ of the needs). Similarly as shown in Figure 5 (B), consultation services received by the farmers under FPG were significantly higher (3.3 ± 0.5 per month) than those under non-FPG (2.2 ± 0.4 per month)

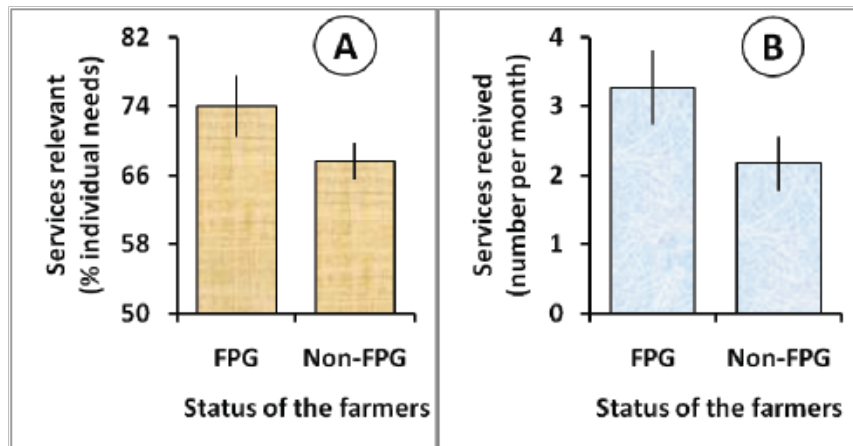


Fig. 5: Comparison of services relevant to farmers' individual needs (A), and number of monthly consultations (B) received by the farmers under AESC-Model in two categories of farmers – members of 'FPG' and those not outside FPG ('Non-FPG'). 'FPG' denotes for farmer producer group. Vertical bars denote for 95% confidence intervals.

3.10 Farmers' visit in the AESCs

3.10 Farmers' visit in the AESCs

On average, 24.6 ± 5.3 farmers visited every month in 24 sampled AESCs across the regions. Those visits occurred almost in similar frequencies in the 'UP-based' (25.3 ± 6.7) and 'Outside UP' (25.9 ± 8.6) centers (Figure 6).

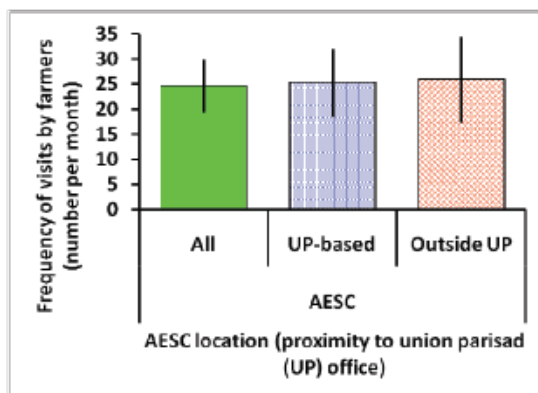


Fig. 6: Frequency of farmers' visit across eight sampled AEscs and comparison of those visits between 'UP-based' and 'Outside UP' AEscs. Vertical bars denote for 95% confidence intervals.

In the Chowgacha 'upazila' under Jessore region, significantly higher number of farmers visited the centers (41.9 ± 5.6 per month) than rest of the 'upazilas' (Figure 7). Farmers in Kalia 'upazila' made the lowest number visits (18.3 ± 5.3 per month), which was statistically similar to the visits in Faridpur Sadar (21.0 ± 6.9 per month) and Barisal Sadar (21.3 ± 11.8 per month) centers. The high variability in Barisal Sadar resulted due to comparatively low number of visits in three AEscs.

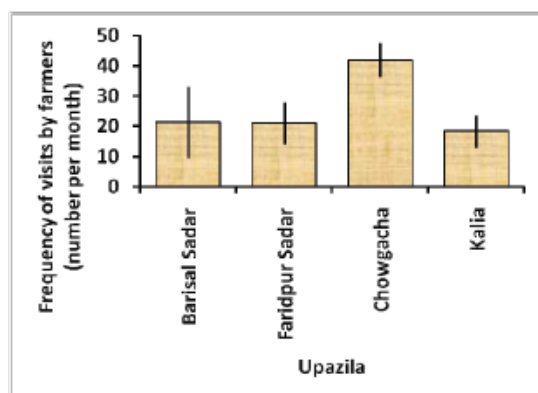


Fig. 7: Regional difference in the frequency of farmers' visit in the AEscs. Vertical bars denote for 95% confidence intervals. Relatively greater number of farmers visited AEscs located 'Outside UP' than 'UP-based' in Faridpur Sadar and Chowgacha 'upazilas', but lower number in Barisal Sadar (Figure 8). Farmers' visit in 'UP-based' and 'Outside UP' AEscs in Kalia 'upazila' was almost similar.

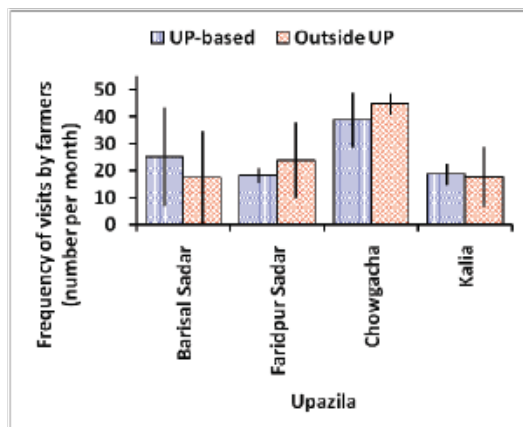


Fig. 8: Comparison of farmers' visit between 'UP-based' and 'Outside UP' AEscs in four regions. Vertical bars denote for 95% confidence intervals.

3.11 Comparative advantage of AEsc

Extension service relevant to individual farmers' needs could be increased by $32.32 \pm 11.26\%$ with AEsc-Model compared to DAE-Model. Senior DAE officials came up with this figure as recorded during interview. They further estimated that for every 1% of increase in service relevancy, $0.35 \pm 0.30\%$ increase in crop productivity could be achieved (Table 4).

4.0 DISCUSSION AND CONCLUSION

The importance of enhancing agricultural productivity in Bangladesh does not need to be re-emphasized as the country requires feeding around 163.65 million people from merely 8.75 million hectares of agricultural land (Salam et al. 2014). However, the production is likely to be severely challenged by two broad categories of constraints: (i) decreasing resources (e.g. land, labour, soil health and water), and (ii) increasing climate vulnerability (e.g., drought, salinity, flood, heat and cold) (Kabir et al., 2016). Although agriculture has achieved significant productivity, ensuring its sustainability will be the key to securing food security in Bangladesh. Taking rice, the staple food of the country as an example, a recent study shows that minimizing yield gap and curtailing adoption lag of potential varieties are the two potential avenues of increasing productivity in the sector to meet the demand leading to 2050 (Kabir *et al.* 2016). In this respect, the value of effective agricultural extension service in the country is enormous. With this backdrop, the AESC-Model intervention through the USAID-AESA project towards strengthening the country's agricultural extension services is a smart and timely step.

While the AESC-Model is new, it is fully relevant to Bangladesh government's policy and planning, UN SDG, and USAID Bangladesh Country Development Cooperation Strategy. The AESA project is a pioneering initiative and a first step towards implementation of the revised National Agricultural Extension Policy of Bangladesh (NAEP 2012). It has created significant momentum in highly urged 'Demand Responsive Extension-Farmer Linkage' towards generation, adaptation and adoption of farm technologies, documented in the NAEP. The project has geared up extension services under the theme "Food security, social protection and health" articulated in Bangladesh's 6th Five Year Plan (2011-2015). The goal of the project is also in line with the country's recently launched 7th Five Year Plan (2016-2020)- "Farm level productivity gain through technological change and minimization of yield gap through effective extension services". The USAID-AESA project has enhanced cooperation in strengthening overall agricultural extension services in the country (UN SGD Goal 2a). Besides, it has rightly addressed the provision for assistance of the farmers and extension agents (USAID Bangladesh Country Development Cooperation Strategy FY2011-FY2016).

The Department of Agricultural Extension (DAE), as the lone crop-based public agency, has been playing the most significant role in agricultural technology dissemination in Bangladesh. However, the organization has limitations in providing smooth service to farmers especially in relation to 'setting up' its frontline-

extension agents, the Sub-Assistant Agriculture Officers (SAAOs). A proper setting up is necessary so that SAAOs and farmers can get closer to each other facilitating service providing and receiving. The AESC-Model particularly has met this purpose. The design of the model has been endorsed fully by the SAAOs and senior DAE officials and by the farmers, against the existing DAE-Model. Few farmers who located into the 'UP-based blocks', however, were satisfied with the DAE-Model as travelling distance for them for visiting SAAOs was short. Due to appropriateness of the design, the service providing (by SAAOs) and receiving (by farmers) as well as service-relevancy had significantly increased under AESC-Model.

The impact from SAAOs' perspective was huge. In the DAE-Model, SAAOs have been mentally suffering from 'inferiority complex', as they are designated 'officers' without any 'offices' and other logistic support. The AESC-Model intervention provided them with enhanced social status and job satisfaction, work efficiency and work credibility. To the farmers and senior DAE officials, agricultural extension service in Bangladesh had already been providing benefits to farm family income, but with AESC-Model this benefits were significantly scaled.

Two other benefits stem from the AESC-Model; one is increasing services to women farmers and more use of ICT. Through bringing extension service centers into door-step (within 'blocks'), women had the opportunity to visit the AESCs as opposed to travelling longer distances under DAE-Model. This study clearly detected that facilitating service centers within 'blocks' positively impacted service increase not only for women members but for the community as a whole. This study reveals that service relevancy and service receiving significantly increased to farmers who belonged to FPGs compared to those not under FPGs. It may be noted that FPGs comprised at least 50% women members. The other advantage of forming FPGs was that the SAAOs could meet the farmers in a group and provide services to more in number as opposed to individual meetings. Furthermore, SAAOs could address more relevant issues with FPG farmers as the group had definitive agenda to be consulted.

Bangladesh has significantly improved its ICT application in the agricultural sector. There is a 'Call Center' run by Agriculture Information Service under the Ministry of Agriculture where high-tech services are available on no-cost. The DAE also has web-based applications (e.g., 'Krishoker Janala') providing information related to agriculture. The AESC-Model had succeeded in connecting SAAOs and farmers to the government ICT arena.

In spite of significant benefits received from AESC-Model, individual farmers and senior DAE officials raised concerns on full effectiveness of the model. The differences in the effectiveness of the services between the models rated insignificant by individual farmers. On the other hand, $63.8 \pm 29.8\%$ of senior DAE officials found the AESC-Model as fully effective. This was due to lack of knowledge-skill of the SAAOs. Therefore, skill development of SAAOs would be an issue to fully realize the effectiveness of the AESC-Model. This study also observed that AESCs in all the piloted locations were not performing equally in terms of effectiveness. The centers under Jessore 'district' significantly outperformed the centers in other location, as the district is highly advanced in agriculture and the farmers in the region are very progressive. Another reason for the variance in performance was that the position of SAAOs were vacant or staff were on long-leaves, hence these centers were run by SAAOs of adjacent 'blocks' as part of their "additional duty". Furthermore, in some centers, SAAOs adoption to the new AESC- Model took more time due to work culture and attitude adjustment.

If proper implementation is ensured, AESC-Model has the potential to increase the relevancy of the current extension service by over 30%, resulting in increase in crop productivity @ 0.35% for every 1% of increase in service relevancy.

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