



# Study On Diverse Cropping Patterns, Post Harvest And Agriculture Marketing Technologies In Bangladesh

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## ABSTRACT

Studies were conducted post harvest losses and marketing technologies of agricultural products in Bangladesh with the major objectives to identify the major deterrents of post harvest factors and to determine the harvest needs of the products for better market profit along with its prioritization. The research works were done using structured technical investigative questionnaire and Focus Group Discussions (FGD). The areas covered were Dinajpur (AEZ 1), Natore (AEZ5), Kustia (AEZ 11), and Tangail-Modhupur (AEZ 28) in Bangladesh, considering diversity of agricultural production. The major findings show that absence of specific post harvest dependent agribusiness policy for government departments but it was a must for looking after agricultural products marketing in Bangladesh. The response in these matters of agribusiness development is similar giving emphasis on improving regulatory environments, creating a contact point for agribusiness administration within MOA, establishing Agro-export processing zones, organizing agribusiness groups and association activities, enhancing research, development of agro-technologies and participation of rural People ensuring income generation. Priority should be given to technologies suitable for small-scale agribusiness entrepreneurs and produces/ processors. The financial institutes, Banks and employment programs should give all type support for agribusiness in an integrated way. The domestic market should have more easy terms with government, giving priority to exporters for import. The contribution of Agribusiness in the national GDP/AGR and other indexes should be spelled out as needed on the basis of which the national priority/privileges should be determined. Further studies in this respect were strongly recommended.

**Key words:** *Agricultural markets, agricultural technology, farmers, livelihood.*

## INTRODUCTION

Adoption of modern technologies (use of fertilizers, HYV seed, irrigation and pesticides) has made the country near self-efficient in food grains production. Despite this tremendous success in agricultural produce, particularly in crop sub-sector, nearly 45 percent of total population lives below the poverty lines, who are mostly rural poor. Poverty thus comes to the fore as a major thrust and concern of the national government. In order to reduce the level of poverty, the Government of Bangladesh (GOB) has undertaken a number of development strategies/projects. Of them 'Poverty Reduction Strategy Paper (PRSP)' is the most important one which has been duly recognized and approved by many bilateral/international donor agencies like World Bank (WB) and Asian Development Bank (ADB) in the recent past. The GOB has set a target for reducing poverty from the present level of about 45% to 25% by 2015 in conformity to the mandate of the PRSP towards achieving the Millennium Development Goals (MDGs) of the United Nations to which Bangladesh is one of the signatories. But, again, the crucial issue of poverty reduction largely depends on the increased productivity of agriculture. Thus expanding opportunities for employment and higher farm income would, in turn, improve the level of livelihood pattern of the rural poor. Their livelihood improvement program depends, directly or indirectly, upon production, employment and income from agriculture. Importantly, there is an increasing recognition that agribusiness concept leads commercial agriculture through production processing, storage and marketing of agro-commodities for trade, industry

and export which could address the critical issues of poverty reduction and ensure higher employment and income of the poor farmers.

With one area of 147,570 sq. kilometers and situated between 20°34' degree & 26°38' degree North latitude and between 88.01 degree and 92.41 degree East longitude, Bangladesh occupies a unique geographic location spanning a stretch of land between the mighty Himalayan mountain chain on the north and the open Ocean on the south. It is virtually the only drainage outlet of a vast river basin made up of the Ganges, the Brahmaputra and the Meghna and their networks. Bangladesh has the highest population densities in the world with 847 inhabitants per sq. km. The total population is estimated at 125 million with an annual growth rate of 1.67 percent.

### AGRO-ECOLOGICAL ZONES (AEZ)

This is an output of Soil Survey done by SRDI funded by UNDP which started mid sixty's and ended by late ninety's and revision and updating of the database and its dynamic interpretation is still going on. The zoning was done computer aided mechanisms and contributed by NARS organizations. The Agro-ecological Zones of Bangladesh may be defined as the Zone classified on the of land type , soil characteristics, water or soil regime and agro-climatic factors. There are 30 AEZ identified in Bangladesh. Meanwhile the Upazila land soil utilization guide for each Upazila is ready for use which also contains the climatic parameters of the locality.

**Table 1: The AEZ and its current crops necessitating changes in the varieties**

AEZ	AEZ name	Major field crops
1	Old Himal Piedplain	Boro, T Aman, Wheat, Scane, Jute, Cotton
2	Active Tista FP	T. Aman, Wheat Boro, Jute, BA T. Aus,
3	Tista Meander FP	Boro, T Aman, Tob, Whe, Scane, must, Jut
4	Korotoa- Bangali FP	Blackgram, Lentil, T. Aman, Jute, Mustard
5	Lower Atrai Basin	B. Aman, Grasspea, Boro
6	Lower Purnarbh FP	Boro, DW rice
7	Active Brah- Jam FP	T Aman, Aus, Jut, Aus + Aman, Whe
8	Young Brah Jam FP	T Aman, Boro, Spot, Scane, Tob, Jut, Must
9	Old Brah FP	T Aman, Boro, Jut, Puls, Mustard, S potato,
10	Active Ganges FP	T Aman, Bgram, Whe, Boro, Jut, Puls, Must
11	High Ganges Riv FP	Whe, T Am, Boro, Ch.pea, Aus+ scane, Cot
12	Low Ganges River FP	T Am, Boro, Lent +, Jute, Graspea, BAm
13	Ganges Tidal FP	BAus, T Aman, Mbean, Must, Boro, cowpea
14	Gopal Khulna Beels	T Am, Jut, sesame, Boro, Aus + Aman
15	Arial Beel	Pulse, Aus + Aman, Boro, Mustard
16	Middle Meg River FP	Boro, T. Aman, Aus + Aman , Mustard
17	Lower Meg River FP	T. Aman, T. Aus, Mustard, Wheat
18	Young Meg Estu FP	Boro, Whe, T Aman, Must, B. Aus, T Aus,
19	Old Meghna Estua FP	Boro, Aus , Jute, Wheat, T. Aman, T. Aus,
20	Eastern Sur-Kush FP	Boro, , B. Aman, T. Aman, Mustard, T. Aus,
21	Sylhet Basin	Boro, T. Aus, B. Aman Grasspea
22	NorthEast pied Plains	Aus, jut, Blackgram, T Aman, Potato, Must,
23	ChittCoastal plain	T. Aman, Aus, Potato, Mustard,
24	Saint Martin Coral Is	T. Aman veg
25	Level Barind Tract	T. Aman, Boro, Potato, Scane, T. Aman,
26	High Barind Tract	T. Aman, Boro, Chickpea, Mustard
27	North east Barind	T Am, Boro, Pot, Scane, Mustard
28	Madhupur Tract	Aus, jut, Scane, Bgram, T. Aman, Pot,
29	North Eastern hills	Aus (Mix), T Aman, Cowpea, Scane, Cotton,
30	Akhaura terrace	T. Aus, Mustard, Scane,

## OBJECTIVES OF THE STUDY

In the context the research program was undertaken with the following main objectives:

1. To identify the major deterrents of cropping pattern diversification as per Agro-Ecological Zones (AEZ) of Bangladesh.
2. To determine the harvest needs of the products for better market profit.
3. To prioritize the main aspects of marketing agribusiness systems.

## METHODOLOGY OF THE STUDY

### Study Methods

Exploratory interactive Survey methods having direct multi-sector interview with intensive discussion and uniform standard scoring.

**Variables:** The major variables were:

#### A. Site:

1. Dinajpur: AEZ 1. Old Himalayan Piedmont Plain
2. Natore: AEZ 5. Atrai Basin
3. Kustia: AEZ 11: Ganges Floodplain
4. Tangail: AEZ 28: Madhupur Tract

#### B. Respondents

1. Farmer
2. Agricultural Officers
3. Agri-businessman
4. Public representatives

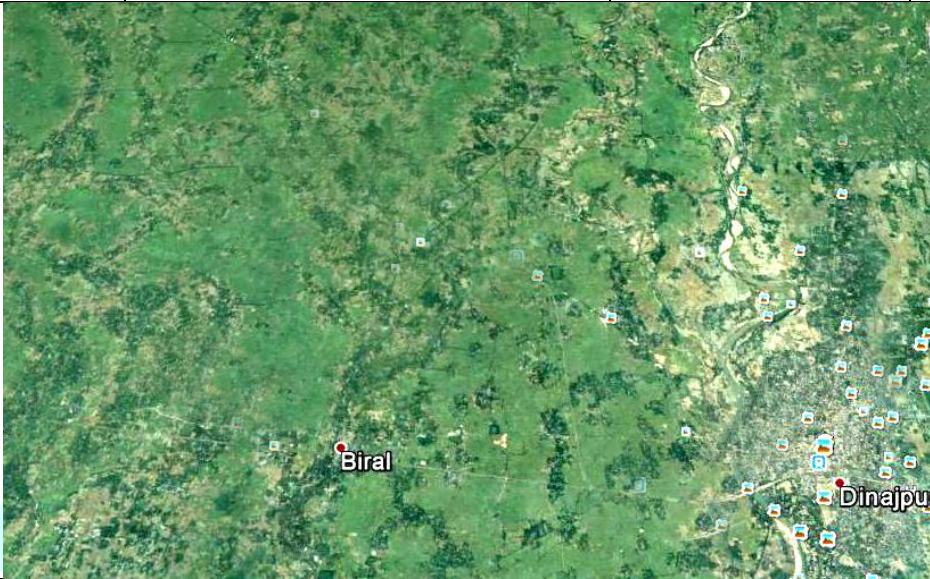

#### C. Crops



1. Fruits
2. Vegetables
3. Cereals
4. Industrial Crops

### Study Areas

The areas selected for the study are given below. It may be seen from the Table that the study was conducted 20 Upazila of 4 Districts. The total number farmers involved in the study were kept 1000. The participation was higher in the Dinajpur and Rangpur. This is due to the fact that the North West Crop Diversification Program (NCDP) with an agribusiness component was working in the area under the administration of Department of Agricultural Extension, Ministry of Agriculture. Some more information in this regard is given in the appendices and also in the Methods and Material.

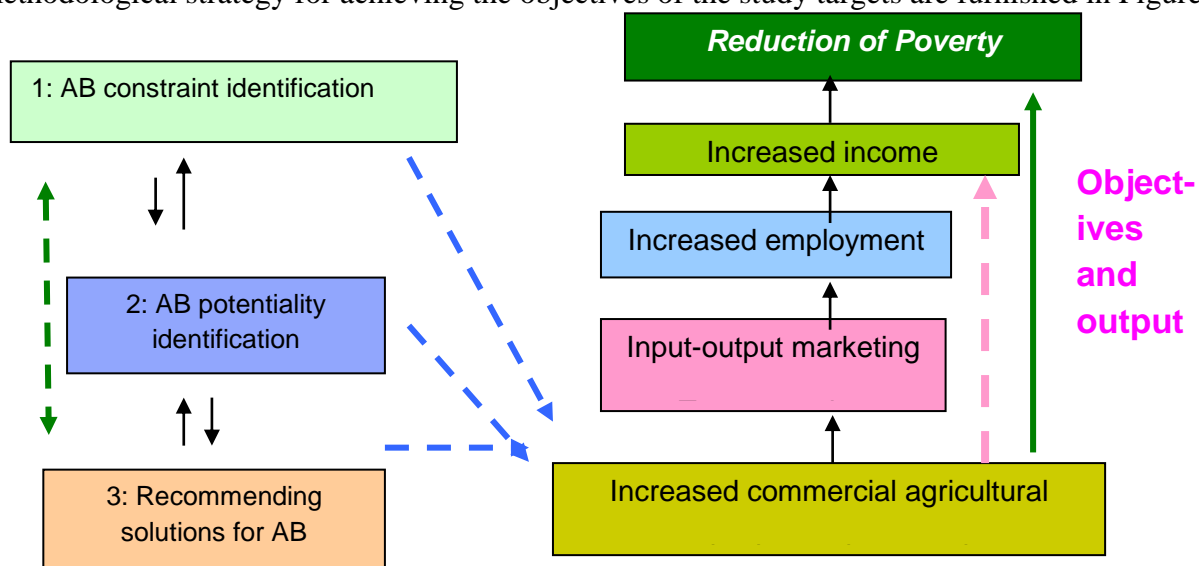
**Table 2: The agribusiness constraint study areas involving farmers**

Division	Districts	Upazila	AEZ
Rangpur	Panchgarh	Atwari	1
	Panchgarh	Panchgarh Sadar	1
	Tahukurgaon	Haripur	1
	Dinajpur	Birganj	1
	Dinajpur	Khanshama	1
			
Rajshahi	Natore	Natore Sadar	5
	Natore	GurudSpur	5
	Natore	Singra	5
	Sirajganj	Tarash	5
	Nogaon	Atrai	5
			
Dhaka	Tangail	Modhupur	28
	Tangail	Ghatail	28
	Tangail	Sokhipur	28
	Gazipur	Kaliakoir	28
	Gazipur	Sripur	28

				
<p>Khulna</p>		Kustia	Kumakhali	11
		Kustia	Khoksa	11
		Meherpur	Meherpur Sadar	11
		Chuadanga	Jibannagor	11
		Jhenaida	Kotchandpur	11
				

### Crop Diversification and agribusiness model outline

The methodological strategy for achieving the objectives of the study targets are furnished in Figure below:



### Research implementation themes and strategic outlines

**Statistical Analysis:** Statistical Analysis was done by using Microsoft Excel and others as needed.

### RESULTS AND DISCUSSION

**Table 3: The agribusiness constraint study areas involving farmers**

Division	Districts	Upazila	AEZ
Rangpur	Panchagarh	Atwari	1
	Panchagarh	Panchagarh Sadar	1
	Thakurgaon	Haripur	1
	Dinajpur	Birganj	1
	Dinajpur	Khanshama	1
Rajshahi	Natore	Natore Sadar	5
	Natore	GurudSpur	5
	Natore	Singra	5
	Sirajganj	Tarash	5
	Nogaon	Atrai	5
Dhaka	Tangail	Modhupur	28
	Tangail	Ghatail	28
	Tangail	Sokhipur	28
	Gazipur	Kaliakoir	28
	Gazipur	Sripur	28
Khulna	Kustia	Kumakhali	11
	Kustia	Khoksa	11
	Meherpur	Meherpur Sadar	11
	Chuadanga	Jibannagor	11
	Jhenaida	Kotchandpur	11

**Table 4: Factors Determining Cropping Pattern – Percent Response in Favor**

Parameters	AEZ 1; Old Himalayan Piedmont Dinajpur areas	AEZ 5: Natore : Atrai Basin Areas	AEZ 11: Kustia High Ganges Floodplain Areas	AEZ 28: Tangai Modhupur Trct Areas	Total
AEZ and Climate	124	77	122	123	446
Marketing Facilities	78	51	68	113	310
Post harvest and Processing facilities	75	57	62	66	260
Government purchase programs	79	61	87	126	353
Non-hazardous production period	86	52	63	89	290
Export suitability	79	82	68	112	341
<b>Total</b>	<b>521</b>	<b>380</b>	<b>470</b>	<b>629</b>	<b>2000</b>

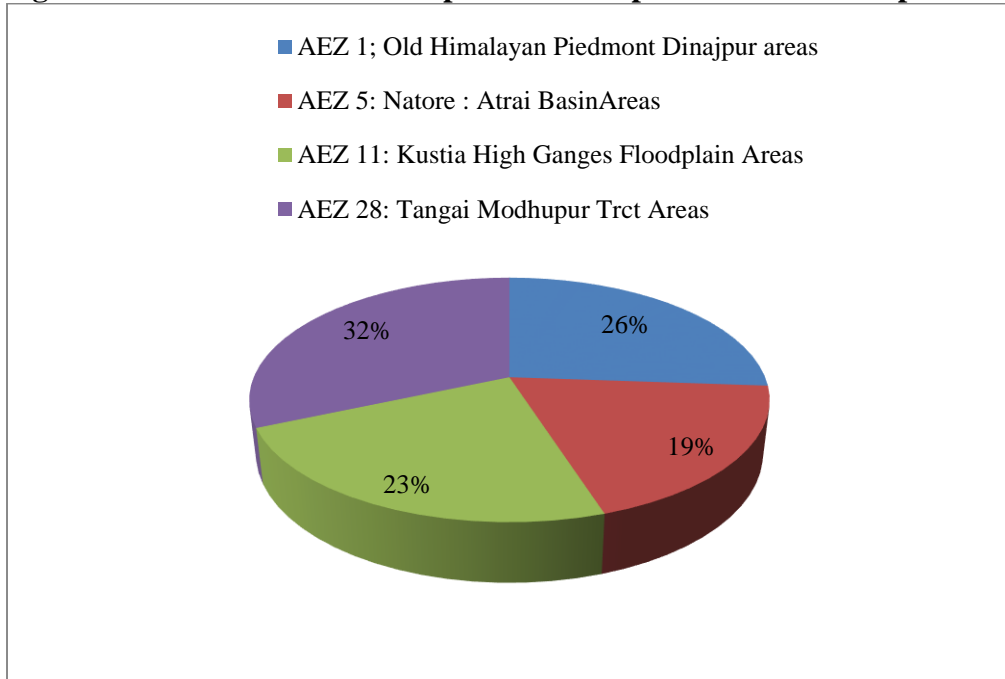
AEZ and Climate was highest in determining the cropping pattern. Diversified cropping was highest in the Madhupur AEZ.

**Table 5: Factors Determining Cropping Pattern – Mean**

Parameters	AEZ 1; Old Himalayan Piedmont Dinajpur areas	AEZ 5: Natore : Atrai Basin Areas	AEZ 11: Kustia High Ganges Floodplain Areas	AEZ 28: Tangai Modhupur Trct Areas	Mean
AEZ and Climate	124	77	122	123	112
Marketing Facilities	78	51	68	113	78
Post harvest and Processing facilities	75	57	62	66	65
Government purchase programs	79	61	87	126	88
Non-hazardous production period	86	52	63	89	73
Export suitability	79	82	68	112	85
Mean	87	63	78	105	83

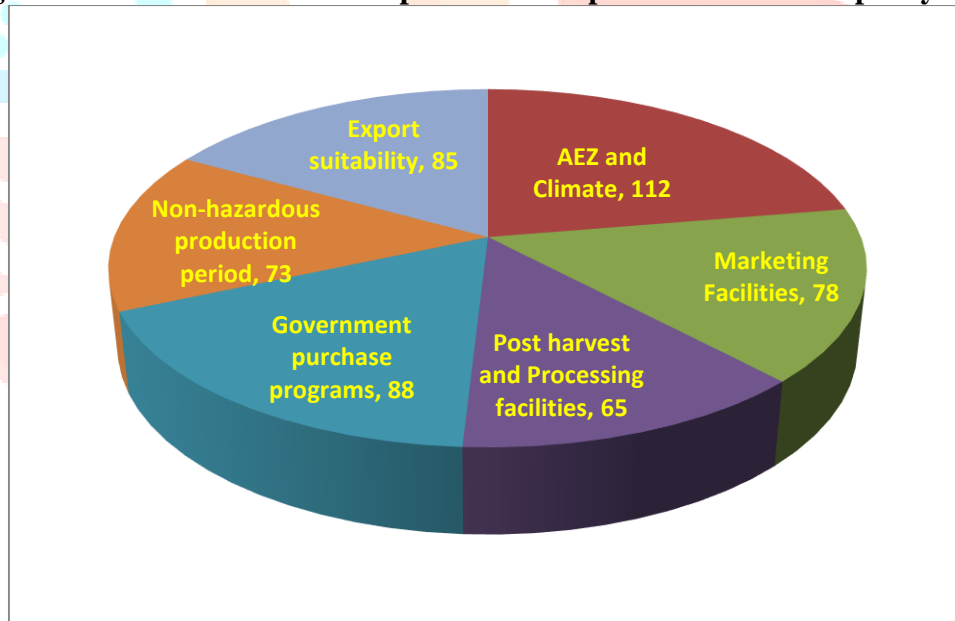
Post harvest and processing was less considered in determining the cropping pattern. Lack Post harvest processing decreased Diversified cropping in the Natore AEZ 5.

**Figure 1: Mean% Favorable response for Crop diversification as per AEZ**



Mean% Favorable responses for Crop diversification as per AEZ have shown in the above pie chart. From the result it was found that AEZ 28 was 32% which was the maximum and AEZ 5 was 19% which was the minimum. On the other hand AEZ 1 was 26% and AEZ 11 was 23%.

**Figure 2: Mean% Favorable response for Crop diversification as per systems**



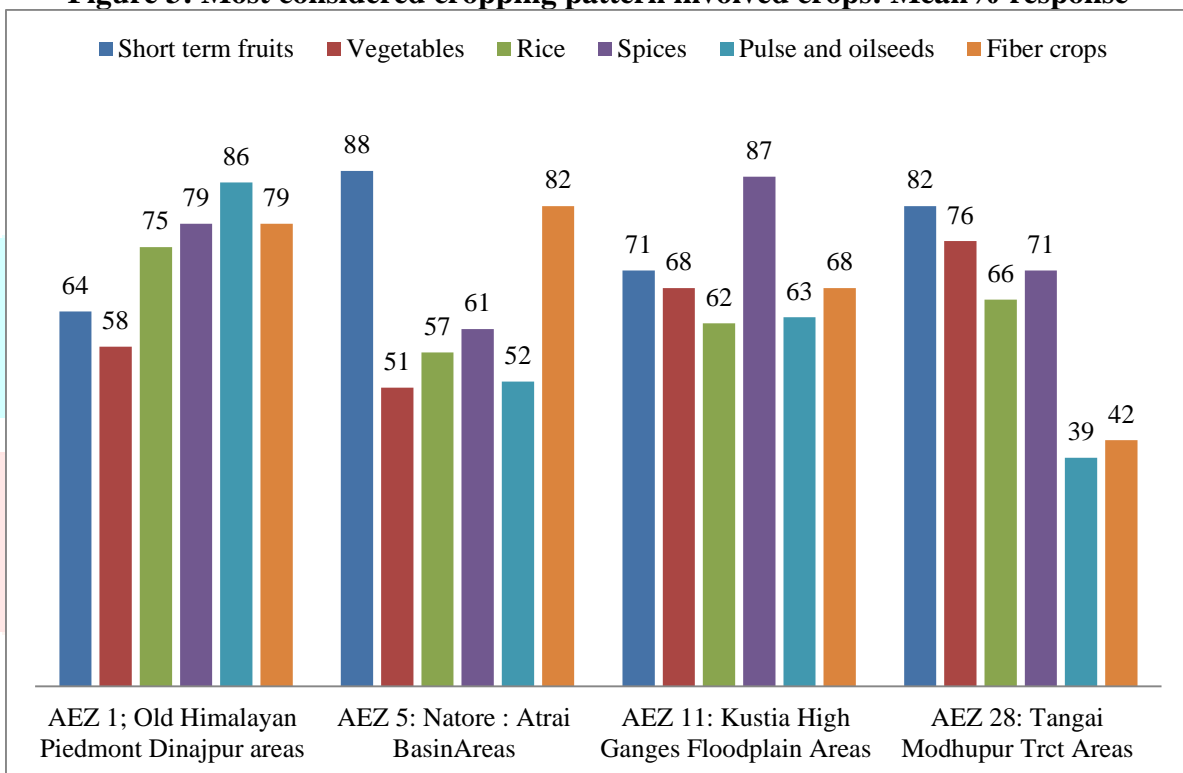
Mean% Favorable response for Crop diversification as per systems have shown in the above pie chart.



**Table 6: Most considered cropping pattern involved crops: Mean% response**

Parameters	AEZ 1; Old Himalayan Piedmont Dinajpur areas	AEZ 5: Natore: Atrai Basin Areas	AEZ 11: Kustia High Ganges Floodplain Areas	AEZ 28: Tangai Modhupur Trct Areas
Short term fruits	64	88	71	82
Vegetables	58	51	68	76
Rice	75	57	62	66
Spices	79	61	87	71
Pulse and oilseeds	86	52	63	39
Fiber crops	79	82	68	42

Most considered cropping pattern involved crops included short term fruits as highest. But as AEZ Natore Atrai Basin was found to be most potential for the purpose.

**Figure 3: Most considered cropping pattern involved crops: Mean% response**

Most considered cropping pattern involved crops included short term fruits as highest. But as AEZ Natore Atrai Basin was found to be most potential for the purpose.

**Table 7: Types of supports most important for Agribusiness development**

Parameters	AEZ 1; Old Himalayan Piedmont Dinajpur areas	AEZ 5: Natore : Atrai Basin Areas	AEZ 11: Kustia High Ganges Floodplain Areas	AEZ 28: Tangai Modhupur Trct Areas	Mean
Integrated agri-business education	81	47	52	63	61
Eximport legislation	38	31	48	53	43
Agribusiness federations	75	47	82	66	68
Commercial agri-policies	59	41	87	56	61
Financial Facilities	76	72	93	89	83
Business risk mitigation insurance support	59	42	68	62	58
Mean	65	47	72	65	62

Types of supports most important for Agribusiness development included financial facilities as highest. But as AEZ Kustia High Ganges Floodplain was found to be most potential for the purpose.

**Table 8: Types of supports are the most important for Market development in Bangladesh**

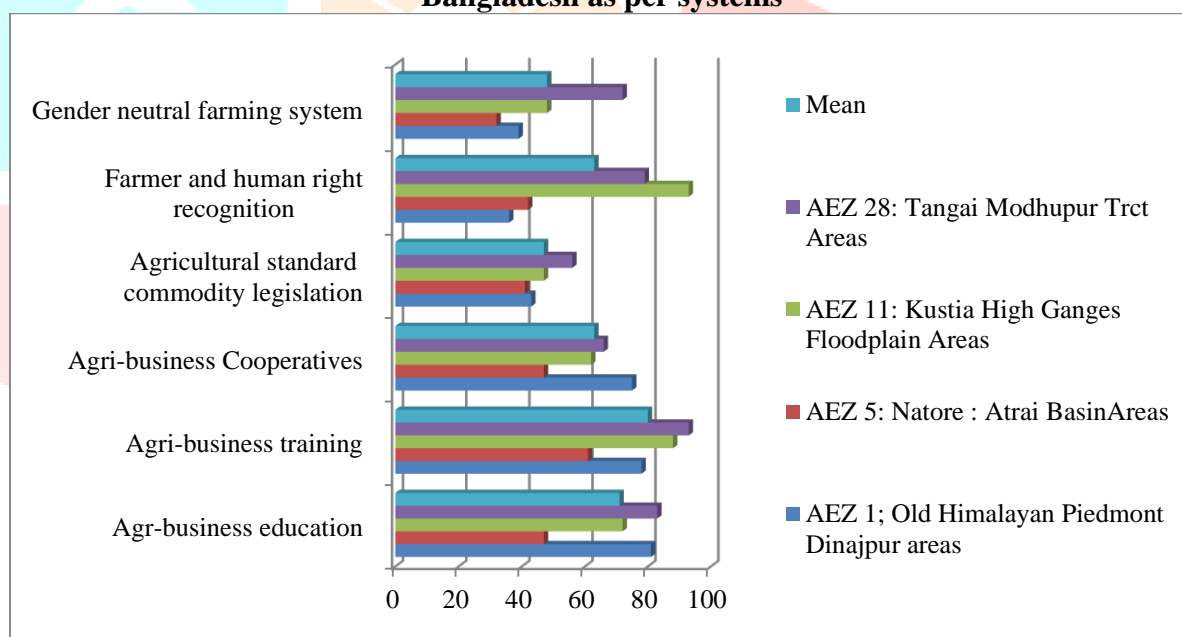
Parameters	AEZ 1; Old Himalayan Piedmont Dinajpur areas	AEZ 5: Natore: Atrai Basin Areas	AEZ 11: Kustia High Ganges Floodplain Areas	AEZ 28: Tangai Modhupur Trct Areas	Mean
Homestead storage	81	87	92	63	81
Product chain values	78	81	88	53	75
Banking and instant loan facilities	75	47	62	66	63
Costing and pricing control	59	41	87	56	61
Localized processing	36	42	93	39	53
Market federations	59	42	48	52	50
Mean	65	57	78	55	64

Types of supports most important for Market development included Homestead storage as highest. But as AEZ Kustia High Ganges Floodplain was found to be most potential for the purpose.

**Table 9: Types of supports are the most important for sustainable agro- market development in Bangladesh**

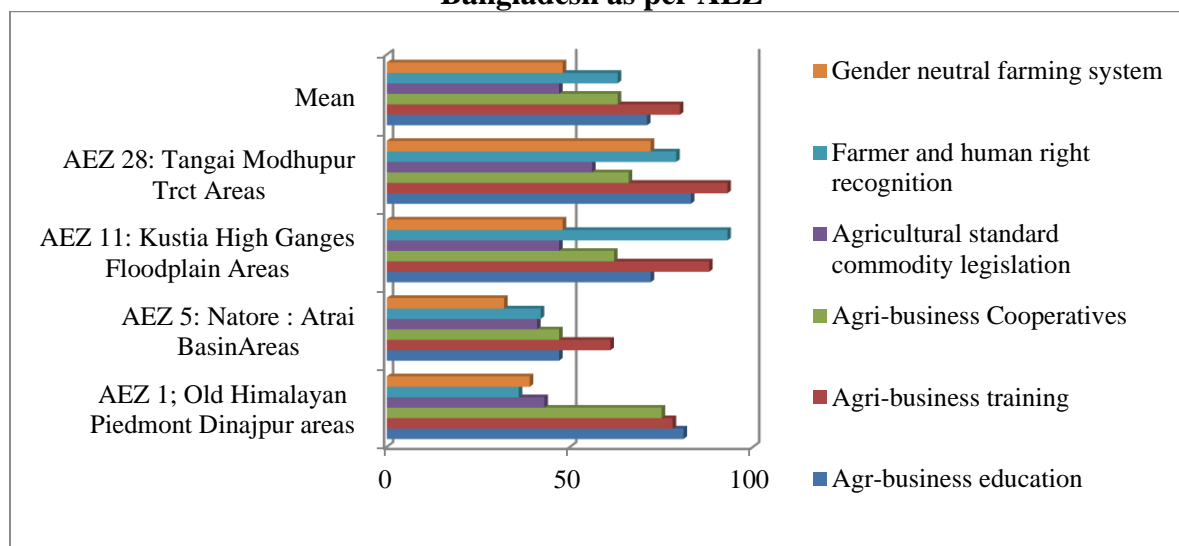
Parameters	AEZ 1; Old Himalayan Piedmont Dinajpur areas	AEZ 5: Natore: Atrai Basin Areas	AEZ 11: Kustia High Ganges Floodplain Areas	AEZ 28: Tangai Modhupur Trct Areas	Mean
Agri-business education	81	47	72	83	71
Agri-business training	78	61	88	93	80
Agri-business Cooperatives	75	47	62	66	63
Agricultural standard commodity legislation	43	41	47	56	47
Farmer and human right recognition	36	42	93	79	63
Gender neutral farming system	39	32	48	72	48
Mean	59	45	68	75	62

Types of supports most important for Sustainable Agro-Market development included Agri-business training as highest. But as AEZ Kustia High Ganges Floodplain was found to be most potential for the purpose.

**Figure 4: Types of supports are the most important for sustainable agro- market development in Bangladesh as per systems**

Types of supports most important for Sustainable Agro-Market development included Agri-business training as highest. But as AEZ Kustia High Ganges Floodplain was found to be most potential for the purpose.

**Figure 5: Types of supports are the most important for sustainable agro- market development in Bangladesh as per AEZ**



Types of supports are the most important for sustainable agro- market development in Bangladesh as per AEZ has shown in the above graph in details.

**Table 10: AEZ Problems**

AEZ	AEZ name	Soil	Climatic	Disaster
1	Old Himalayan Piedmont plain	Acidy	Cold wave	Drought
2	Active Tista Floodplain	Low fertility	Cold wave	Flood
3	Tista Meander Floodplain	Acidity	Cold wave	Flood
4	Korotoa- Bangali Floodplain	Low fertility	Hot wave	Flood
5	Lower Atrai Basin	Imperfect drainage	Cold wave	Flood
6	Lower Purnarbhava floodplain	Imperfect drainage	Extreme	Flood
7	Active Brahmaputra- Jam FP	Erosion	Excess rainfall	Flash flood
8	Young Brahmaputra Jam FL	Degraded fertility	Excess rainfall	Flash flood
9	Old Brahmaputra Floodplain	Degraded fertility		
10	Active Ganges Floodplain	Soil erosion	Cold hot wave	River flood
11	High Ganges River FP	Degraded fertility	Cold hot	Drought
12	Low Ganges River FP	Poor drainage.	Cold hot	waves
13	Ganges Tidal Floodplain	Salinity	High humidity	Tornado
14	Gopalganj Khulna Beel	Water logging	High humidity	River
15	Arial Beel	Water logging	High humidity	River
16	Middle Meghna River FP	Water logging	High humidity	River
17	Lower Megh River FP	Salinity	High humidity	Tornado
18	Young Megh Estua FP	Salinity	High humidity	River
19	Old Meghna Estua FP	Water logging	High humidity	River
20	Eastern Surma-Kushi FP	Water logging	High humidity	Flash
21	Sylhet Basin	Water logging	High humidity	Flash
22	Northern and Eastern Pied	Skeletal soils	High humidity	Flash
23	Chitt Coastal plain	Salinity	High humidity	Flash
24	Saint Martin Coral Island	Salinity	High humidity	Tornado
25	Level Barind Tract	Acidity	Cold wave	Drought
26	High Barind Tract	Acidity	Cold wave	Drought
27	North eastern Barind Tract	Acidity	Cold wave	Drought
28	Madhupur Tract	Acidity	Excess rainfall	Drought
29	Northern and Eastern hills	Skeletal soils	Excess rainfall	Drought
30	Akhaura terrace	Skeletal soils	Excess rainfall	Drought

AEZ Problems have shown in the above table. From the result it was found that in case of soil the problems are acidity, low fertility, imperfect drainage, erosion, degraded fertility, poor drainage, salinity, water logging

and skeletal soils. In case of climatic the problems are cold wave, hot wave, extreme wave, excess rainfall and high humidity. In case of disaster the problems are drought, flood, flash flood, river flood, waves, tornado and river.

## CONCLUSION

While Bangladesh has a wide range of but a specific agribusiness policy for government departments is a must for looking after agribusiness for the, by the end of the agriculturist's. Policies that have specific relevance to agribusiness development include the National Agriculture Policy (NAP), land and soil policies, input-output policies, and eximport policies. The import of commodities essentially required and correct supplement to domestic agriculture and agribusiness may be free of Value Added Tax (VAT), which provides a further incentive to the sector. The response in these matters of agribusiness development is similar giving emphasis on improving regulatory environments, creating a contact point for agribusiness administration within MOA, establishing Agro-export processing zones, organizing agribusiness groups and association activities, enhancing research, development of agro-technologies and participation of rural People ensuring income generation. Considering all the findings obtained from the appraisal from different groups, sectors, levels and professionals, the following points will be tried to reflect in the research activities and methodologies.

## RECOMMENDING

### A. Controlling prices of commodities

1. Agribusiness entrepreneurs need to be linked as per price of commodities at different tiers.
2. The financial institutes and Banks should have mechanisms as regards their multidimensional capabilities so that they can control the market price and give support for sustainable agribusiness.
3. Information on commodity price and availability of business services should fit the local needs.
4. Grouping of agribusiness promoter/service providers to give common effort for price sustainability should to be strengthened keeping in mind the market chain management segments.
5. The policy environments for agribusiness development in the country should thoroughly work commodity grades or standards.
6. Education and training facilities for agri-marketing profession should be linked in curricular forms to government and University agencies, so that most people understand things in an integrated but similar way.
7. The number and type of business with price sensitive commodities should have provisions for regional review and revision in scheduled time.

### B. Transferring Agro-Technologies.

1. Small-scale agro-technologies need more attention of the policy makers.
2. The employment promoters should priorities labor intensive technologies.
3. Information on agro technologies and availability of experts services need to be circulated in Medias those are within the reach of the first line user beneficiaries.
4. Grouping of agro technologies with agribusiness items should give common effort for its transfer.
5. Creating favorable policy, legal and enabling environments for adoption of improved agro-technologies in the country.
6. Research and applied training facilities for technology transfer profession need to be strengthened.
7. The recommendation domain for agro-technologies and related commodities and potential areas should be identified regionally for Agro- Processing Zones need to be established.
8. Traders post harvest loss massive capacity building is a requirement among the actors of the food value chain.

### C. Supporting Agribusiness through Media

1. Media should give priority to technologies suitable for small-scale agribusiness entrepreneurs and produces/processors.
2. The information stated media for a commodity promotion should include the financial involvements: its scopes and solutions.
3. Information on agribusiness scopes, systems, facilities, and availability of technical services should state and broadcasted.
4. Grouping of agribusiness associations should have scope for giving common effort for advertisements.
5. The favorable media environments through policy and legal reforms should be made integrated considering the technical knowledge of the farmer beneficiaries.

6. Training for media professionals by the Government, Universities and its agencies need to be done under the care of Agribusiness associations/foundations.

#### **D. Recommended National Agribusiness Model Guidelines**

1. All agribusiness entrepreneurs need to be linked functionally.
2. The financial institutes, Banks and employment programs should give all type support for agribusiness in an integrated way.
3. Information on agribusiness scopes, systems, facilities, and availability of expert's services for an agro-technology should be included in the recommendation patent or package.
4. Grouping of agribusiness associations to give common effort for agribusiness development.
5. The favorable policy and legal environments creation for agribusiness development in the country should be thoroughly reformed with the direct participation of agriculturists and producers.
6. Education, research and training programs must include the agribusiness model development guidelines in the curriculum and syllabus.
7. Prices of Agro-commodities should controlled by a national level techno legal committee bearing in mind national democratic commitment.
8. Price of commodities should not vary more than 10% within a period of 3-5 years.
9. Agro technologies released by the research system for field adoption must have a to z patent information including risks issues and contingency options.
10. Subsidies should be friendly with agribusiness state policies.
11. Agribusiness should deal mostly with defined and categorized farmer's /beneficiaries/ businessman of all stairs.
12. Agribusiness should be linked to agro-clinic services by practitioners as per the respective national acts, regulations, SROs, notifications, statutes, constitutions, policies, principles, conventions and by laws (s).
13. The role ad responsibilities of all-stair members should be understood as a group concept on the basis of which the market chain management will be founded.
14. The Agribusiness associations, foundations, federations, clubs and similar organization must be well structured.
15. The domestic market should have more easy terms with government, giving priority to exporters for import.
16. The contribution of Agribusiness in the national GDP/AGR and other indexes should be spelled out as needed on the basis of which the national priority/privileges should be determined.

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