Original Research Article

CONSERVATION AGRICULTURE: PRESENT STATUS AND CROPPING PATTERN FOLLOWED BY THE FARMS IN THE KHULNA REGION

Abstract:

The main objectives of the study were to identify the present status of agriculture along with the problem confronted by the farmers and to determine the present cropping pattern followed by the farms under conservation agriculture. Data were collected from randomly selected 91 farmers of three upazilla under Khulna region with the help of personal interview method by using an interview schedule during January 2017 to May 2018. Data were collected on fifteen selected categories of the farmers and the problem confronted by them. Most of the respondents have small to medium sized cultivable lands. Bean, cauliflower, cabbage, potato, Indian spinach, brinjal, tomato etc, were more extensively cultivated. Maximum farmers belonged to medium practice of conservation agriculture while very few of them had low or high practice. To determine the present status of agriculture data were also collected from on the name of crop rotation, use of fertilizers and manures, intercultural operation followed by the respondents, pest and disease infestation in the field under cultivation. Out of all independent variables, only extension media contact, level of education and organizational participation of the farmers had showed positive significant relationship with conservation agriculture practice. Extension media contact and organizational participation influence the extent of CA practices at farmers' field as confirmed by the backward linear regression model. The vital problems of conservation agriculture practices were lack of seed, high price of seed, lack of fertilizers, high price of fertilizer, impurity and high price of insecticides/ pesticides, lack of irrigation water, salinity, lack of knowledge etc. To popularize the CA practices, Government should organize more training and demonstration activities on CA involving block level extension workers as well as farmers plus strengthening research-extension-farmers linkage.

Keywords: Conservation agriculture (CA), Cropping Pattern (CP), Problem of CA

I. Introduction

Feeding for the large population of the country like Bangladesh is the prime concern of Bangladeshi government. However manufacturing quality food maintaining property of soil health for future generation could be a potential future concern. Future use of chemical fertilizer and pesticides while mistreatment organic compounds resulted soil degradation and initiate decreasing trend of soil productivity (Kafiluddin and Islam 2008).

Intensified HYV of rice and other crops cultivated in the local land to feed the huge population of the country, has led to huge amount of nutrients loss from the soil (Akteruzzaman et al., 2012). The outcome of this intensified rice based agriculture on soil fertility, soil microbial activity and lastly to our environment is severe (Uddin and Dhar, 2016). An increased cropping intensity of 1.90 (BBS, 2012) with traditional rice based cropping pattern covering most of the land (Rashid et al., 2014) influence the situation further. That's why the incorporation of sustainable and conservable techniques to commercial farming is becoming popular all over the world (Johansen et al. 2012). Bangladesh is a small country in Southeast Asia and also trying to adopt Conservational Agriculture (CA) considering its positive impact on soil health and also for the environment. Already minimum tillage and other conservation techniques are practicing in the country but not on large scale (Islam et al. 2011).

Around 45.1 percent of total labor force of Bangladesh involved in Agriculture but now days, labour scarcity is increasing day by day (BBS, 2015) and labor wage is also very high (Statistical Bulletin, 2013) which create bad impact on total production budget. Already minimum tillage and other conservation techniques are practicing in the country but not on large scale (Islam et al. 2011). CA is associate degree approach that reduces agricultural operational prices whereas increasing yields utilizing natural resources properly (Roy et al., 2009). With the follow of minimum tillage solely, prices of production may be move massive extent (Miah et al., 2010). The CA research in Bangladesh are few and previous research mainly focuses on adoption of different conservation agriculture practices (Dass, 2013). Research reports available in Bangladesh (Barma et al., 2014) revealed that wheat, maize, pulses, oilseeds, jute, rice can be established and grown successfully using CA technology. Farmers are accepted the conception of CA based on mostly tillage technologies considering the benefits of upper yields, reduced value of tillage

operation, and minimum work time between the crops (Hossain et al., 2015). But, practicing conservation agriculture is not yet studied well. So, a research work will be conducted by present status and combining different cropping pattern in the farm through conservation agriculture in the Khulna region of Bangladesh. The research will be performed using different crops such as rice (BR 23, BRRI dhan30, BRRI dhan40 and BRRI dhan41), wheat, white maize, sesame, sunflower, jute, kenaf, dhaincha, mung bean, chick pea, sorghum, different vegetables etc. The soil fertility level in the south-west region (Khulna) is especially poor in organic matter. The farmers of south-western part of Bangladesh followed traditional agriculture day after day without considering modern technology such as conservation agriculture. Farmers and other stakeholders who are new or are at the initial stages of converting to CA require tangible evidence on the benefits and impacts of CA. The present study will be untaken by the following objectives. a) To investigate the present status of farming system in the Khulna region. b) To identify the existing cropping pattern in the study area. c) To identify the constraints and opportunities to adoption of CA in existing pattern in Khulna region. D) To suggest some policy guidelines for popularizing CA.

II. Methods and Materials

This study was a survey based research and confined to three upazila (Dumuria, Paikgachha and Botiaghata) of Khulna district, Khulna, located in the south-western region in Bangladesh. Khulna is situated between 21.38' and 23.10' north latitude and 88.58 east latitude and is 12 ft. above mean sea level (http://www.khulnacity.org/). This study was conducted into 4 types of areas such as high land, medium high land, medium low land and low land (shrimp farming area). The cultivators of the selected areas were treated as population of the study. Data were collected in random sampling technique where each

89 farmer is considered as the sampling unit and each farmer was treated as active population of
90 the study. Out of all the farmers, 91 farmers were selected randomly as the sample
91 respondents. The interview schedule (IS) contained both simple and direct form of question
92 to collect data on the selected variables. The interview schedule was pre-tested before final
93 collection of data. The farmers' family was selected as respondents. Data were collected with
94 the help of the interview schedule by the researcher himself. Interviews were taken to the
95 respondents at their homes, field or market during their leisure period. Data were collected
96 from the respondents during January to May, 2015.

97 Based on the practical and theoretical knowledge, the 10 characteristics of the farmers
98 constituted the independent variables of the study. The characteristics of respondents which
99 are treated as independent variables for the study are age, occupation, education, family size,
100 experience in farming, annual income, farm size, organizational participation, Cosmo-
101 politeness, extension media contact and knowledge in vegetables cultivation. Besides, data
102 were also collected on the use of fertilizer and manures in the field, intercultural operation,
103 pest and disease attack in the cultivation area.

104 The dependent variables of the study were the problem confrontation on conservation
105 agriculture practice and cropping pattern of the Khulna region. This problem was measured
106 on the basis of their response to questions in the interview schedule.

107 In this study, problem confrontation score was computed for each respondent as ascertained
108 from his responses. Each respondent was asked to indicate his problem against selected 14
109 issues which were Lack Of seed, High Price of seed, Lack of Fertilizer, High Price of
110 Fertilizer, Impurity of Insecticides/ Pesticides, High price of Insecticides/ Pesticides, High
111 Incidence of Insect, Lack of Irrigation water, Increase salinity in soil, Lack of land due to
112 Shrimp Culture, Salinity due to Shrimp Culture, Lack of Knowledge, Activities of extension
113 worker, Natural calamities. Cropping pattern means the proportion of area under various

crops at a point of time. This portion was measured by the 4 types of different selected study area like high land, medium high land, medium low land and low land. Different crops are grown in rotation on this selected study areas are Kharif I, Kharif II, Robi.

After completion of survey all the interview schedules were compiled for its data processing. At the beginning of the data processing all the qualitative data were converted into quantitative form by means of suitable code and score whenever necessary. Local units were converted into standard units. In several instance, Indies and scales were constructed through the simple accumulation of scores assigned to individual or pattern of attributes. Indices and scales are considered the efficient instrument for data reduction and analysis. All personal traits were categorized and arranged in simple tables for interpretation and discussion. Number, frequency, percentage, mean and standard deviation were used as descriptive statistics.

III. Results and Discussions

To finding of the study and interpretation of the results with necessary discussion has been presented in this chapter. The results of this study have been presented according to the objectives. This section is conveniently divided into three sections. The first section deals with the personal and socio-economic characteristics of the respondents. The second section isolates the problem faced by the respondents and finally, the third section deals with the existing cropping pattern present in the Khulna region of Bangladesh following conservation agriculture.

1 Facts on Selected Characteristics of the Respondents

1.1 Age of the respondents

Based on age, the respondents have been classified into three categories as shown in table 1. The age of the respondents ranged from 25-75 years. It is indicate that the highest number of respondents (63%) belongs to the middle age group (31-50 years) followed by the young age group (15%) and only 22% respondents are in the old age group. The mean and standard deviation of the respondents is about 42.57 and 9.27 (Uddin et al. 2017).

1.2 Level of education of the respondents

The education scores of the respondents ranged from 0-17 with a mean and standard deviation of 6.81 and 3.63, respectively. On the basis of education the respondents are classified into five categories shown in table 1. It was revealed that the highest portion of the respondents (49.5%) has achieved secondary level of education followed by primary level (25.3%), higher secondary level (11%). The lowest number of respondents (2.2%) were graduate and above. Only 12% of the respondents were illiterate.

1.3 Family size

Data presented in the table 1 indicate that most of the respondent (78.02%) belonged to medium sized family category followed by small size family (18.68%) while only 3.30% belong to large family sized category. The mean and standard deviation of the family size 6.00 and 1.51 respectively (HIES, 2010)

1.4 Experience in farming

To measure the experience, the duration of involvement of the farmers in agriculture was considered. The mean and standard deviation of the experience in farming is 18.98 years and 8.42, respectively. Based on the experience in agriculture, the farmers were grouped into different categories as shown in the table 1.

It was found that the majority (47%) of the respondents had medium experienced and a very few (18%) was low experienced. And the rest (35%) of the respondents was high experienced. So, the information seeking tendency of the farmers seem to be low to medium and similar trend founded by Miah et al. (2016).

1.5 Annual income of the farmers

On the basis of the family income the respondents, family was classified into three categories as shown in table 1. It was found that majority (58.24%) of the respondents were in income range of Tk. 50001-100000 followed by (17.58%) in the income range of Tk. <50000 and the least (24.18%) of the respondents were in the income range of Tk. <100000. Findings indicate that lower income group peoples are engaged in agriculture for increasing their income. The similar findings found in the study conducted by Haq (2016).

1.6 Farm size of the respondents

The mean of farm size was 18 with the standard deviation was 17.71. On the basis of their family size, the farmers were classified into five categories as shown in Table 1. Data presented in table 1 reveal that majority (45.05%) of the respondent was small farmers, 32% marginal farmers, 12% medium farmers and 5 % was landless. Data also revealed that majority of the farmers of the study area had marginal to small farmers.

1.7 Extension media contact (year)

Respondents use various information sources and media to a different extent in order to receive agricultural information. The average and standard deviation of extension media contact score was 9.42 and 5.44. Based on computed extension media contact score, the respondent were classified into three categories as shown in table 1. So, the information seeking tendency of the farmers seem to be low to medium and similar trend founded by Miah et al. (2016). Data presented in the table 1 shows that majority of the respondents

(70.33%) had low media contact as compared to medium contact (27.47%) and had high contact (2.20%). Respondent's exposure to a variety of information sources usually guides them to identify problems in vegetable cultivation and how to solve the identified problems.

1.8 Organizational participation

Depending on the individual organizational participation scores, the respondents were grouped into the following categories as shown in table 1. It is revealed from the present study that majority of the respondents (76.93%) have low organization participation followed by medium participation (23.08%). The mean and standard deviation of organization participation was 1.97 and 2.31 respectively.

1.9 Cosmopoliteness

The mean and standard deviation of cosmopoliteness scores of the respondents was 5.64 and 2.19, respectively. Based on Cosmo-politeness score, a respondent have been classified into three categories as shown in the table 1. Data presented in Table 1 reveal that majority (58%) of the respondents had low cosmopoliteness. Only 3% of the respondents are highly cosmopolite while 39% of the respondents had medium cosmopoliteness.

1.10 Use of Conservation Agriculture (CA) for vegetable cultivation

Based on use of conservation agriculture, farmers were classified into two categories as shown in table 1. About 90% of the people use conservation agriculture for vegetable cultivation. Only 10% of the respondents cannot use conservation agriculture for vegetable cultivation. The mean and standard deviation of the use of conservation agriculture was 45.50 and 51.61. It seems that worldwide the practice of CA was on the lower side of around 10 per cent farmers only (Willer et al., 2008).

1.11 Use of fertilizers and manures

209 It was observed that most of the respondents used fertilizer and manures in their vegetables
210 cultivation. Among 91 respondents, 87 respondents cited that they used urea while 87, 87, 84,
211 43, 24, 13 respondents used manures, TSP, MoP, zypsum, zinc and boron, respectively. The
212 mean and standard deviation of fertilizers and manures used was 60.71 and 33.05 (Table 2)

213 **1.12 Intercultural operation**

214 Intercultural operations followed by the respondents are shown in the table 3. Among 91
215 respondents, 78 respondents cited that they used weeding while 77, 14, 75, 65, 67, 42, 34, 27
216 and 6 respondents used irrigation, mulching, spading, disease control, insect control,
217 thinning, pruning, inter-cropping and other intercultural operation for conservation
218 agriculture. For traditional agriculture (TA) 84 respondents used weeding while 84, 61, 83,
219 82, 82, 52, 53, 41 and 11 respondents used irrigation, mulching, spading, disease control,
220 insect control, thinning, pruning, inter-cropping and other intercultural operation. The mean
221 of intercultural operation for CA and TA was 48.4 and 63.3. The standard deviation of both
222 CA and TA was 27.48 and 24.53.

223 **1.13 Disease Infestation in the Vegetables Cultivation**

224 The disease infested in vegetable cultivation of the study area has been presented in table 4. It
225 was revealed from the results of the present study that leaf rot is the most occurring disease in
226 the vegetables cultivation cited by 43 respondents out of 91 respondents followed by root rot
227 (29), fruit rot (31), brown spot (11), fungi (27), black spot (6) and late blight (13).

228 **1.14 Insects infestation in vegetables cultivation**

229 The occurrence of insect infestation is shown in the table 5. Among 91 respondents, 45
230 respondents cited that most vegetables were infested greatly by rice brown plant hopper
231 (current poka) followed by stem borer (31), dragon and damsel fly (3), aphid (22), termite
232 (17) and fruit borer (11).

233 **2. Problem confrontation related to agriculture**

The respondents gave their opinion about different problems confronted by them. The study revealed that the main problems of agriculture in Khulna region are the salinity (61.54%), lack of activities of extension workers (49.45%), high incidence of insect (29.67%), lack of knowledge (28.57), natural calamities (16.48%) etc. The list of problems and the severity have been

On the basis of problem confrontation score the respondents were classified into three categories which are shown in table 7.

It was revealed from the study that total 59 (64.84%) of the respondents were under medium problem confrontation, 21.98% were under low problem confrontation and 13.19% were under high problem confrontation. The respondents gave their opinion about the probable solution of the problems which were ensuring adequate seed and seedlings, ensuring sufficient amount of insecticides and pesticides at reasonable price, ensuring high quality fertilizers, increase irrigation facilities etc. The score of problem confrontation with a mean of 30.33 and having standard deviation 25.15.

3. Cropping pattern in the Khulna region following Conservation Agriculture

This section was measured by four different types of study area such as high land area, medium high land area, medium low land area and low land area. Among 91 respondents, about 85.71% of the respondents produce crops in medium high land, 10.99% and 3.30% respondents produce crops in high and medium low land. The low land in the Khulna region was used for shrimp farming. In this four types land, crops are produce three season in a year Kharif I, Kharif II and Robi season.

3.1 High land

Among 91 respondents, only 10 respondents cited that they produce crops on high land topography. During Kharif I season, 100% (N=10) of the respondents cultivate paddy

followed by 20% brinjal, 10% cultivate papaya, pointed gourd and turmeric. The crop rotation used in high land ranged from1-10 with a mean and standard deviation 2.6 and 3.05, respectively. Based on land topography, crops were cultivated in kharif I season as shown in table 8.

In kharif II season, 40% (N=10) respondents cultivate bitter gourd where as 30% cultivate brinjal and 10% cultivate chilli. The mean and standard deviation found in kharif II season was 2.67 and 1.53. Based on land topography, crops in Kharif II season are shown in table 8.

Data presented in the table 10 revealed that the Robi crops cultivated by the respondents ranged from 1-10 with a mean and standard deviation of 2.55 and 2.77. Among 10 respondents, 100% (N=10) of the respondents cultivate tomato in robi season followed by 20% cultivate red amaranth and chilli, 50% cultivate aus paddy, 30% cultivate cabbage and 10% cultivate yard long bean, broad bean, pumpkin, bottle gourd, mustard and cauliflower in high land. Based on land topography, crops were cultivated in Robi season as shown in table 8.

3.2 Medium high land

It was observed that majority of the respondents (N=78) used medium high land for cultivation of crops. Among the 78 respondents, 32 respondents cultivate paddy while 13, 10, 8, 6, 5, 4, 3, 2 and 1 respondents cultivate brinjal, turmeric, lady's finger, jute, Indian spinach, wheat, cucumber, pumpkin etc. respectively during kharif I season on medium high land. Data presented in the table 4 indicate that the Kharif I crops cultivated by the respondents ranged from 1-32 with a mean and standard deviation of 6.06 and 7.72. Based on land topography, crops were cultivated in Kharif I season as shown in table 9.

At the time of Kharif II season, almost 32 respondents cultivate dhan (paddy) followed by 11 respondents cultivate BRRI Dhan-28, 7 respondents cultivate indian spinach. The data table8

indicate the crops that are cultivated by the respondents in Kharif II season on medium high land with a mean and standard deviation of 5.83 and 8.81.

During Robi season, farmers were cultivating winter crops for local demand. Among 78 respondents, about 43.59% respondents cultivate tomato, 29.48% produce red amaranth, 33.33% produce chilli, 26.92% produce cauliflower, 28.21% produce potato, 21.79% produce cauliflower etc. Data presented in the table 9 indicate the crops that were cultivated in robi season on medium high land topography.

3.3 Medium low land

Among 91 respondent, it was observed that only three respondents (N=3) used medium low land for cultivation of crops. Among 3 respondents, 100% (N=3) of the respondents cultivate paddy in kharif I season. They also produce indian spinach, banana, dhan (aus), lady's finger in kharif I season. Data presented in the table 10 indicate that the crops cultivated by the respondents ranged from 1-3 with a mean and standard deviation of 1.6 and 0.89.

In kharif II season, 2 respondents cultivate aman-30, 1 respondent cultivate BRRI dhan-28 and 1 respondent cultivate lady's finger. Data presented in the table 10 indicate that the crops cultivated by the respondents ranged from 1-3 with a mean and standard deviation of 1.33 and 0.58.

During robi season, majority (100%) of the respondents cultivate tomato, potato followed by spinach (66.67%), red amaranth (66.67%) and mustard (33.33%) respectively. Based on medium low land topography, crops were cultivated in Robi season as shown in table 10.

IV. Conclusion

Findings of the study and the logical interoperations of their meaning in the light of other relevant facts prompted to draw the conclusions that the highest portion of the farmers was

middle aged having small family and small farm sized with low cosmopoliteness and low organization participation. About half of the respondents possessed with secondary level of education. Majority of the respondents were in high income range and medium experience in farming. Maximum number of the respondents uses fertilizers and manure and different intercultural operations and takes control measures against disease and insect infestation. Different cropping pattern found in the study areas like high land, medium high land, medium low land and low land. Most of the respondents were cultivated their land on medium high land topography. The vital problems found in the study area in case of conservation agriculture were salinity, lack of knowledge, lack of seed, high price of seed, lack of fertilizers etc. and farmers gave their opinion to solve those problems.

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371

372 **Table 1: Facts on selected characteristics of the respondents**

Selected Characteristics	Categories	Score	Respondents-91		Range	Mean	Standard Deviation
			No.	Percentage			
Age (Year)	Young aged	Up to 30	14	15.00	25-75	42.57	9.27
	Middle aged	31-50	57	**63.00**			
	Old aged	>50	20	22.00			
Education (Class)	Illiterate	0	11	12.00	0-17	6.81	3.63
	Primary	1-5	23	25.30			
	Secondary	6-10	45	**49.50**			
	Higher secondary	11-12	10	11.00			
	Above higher secondary	>12	2	2.20			
Family Size	Small	<4	17	18.68	3-12	6.00	1.51
	Medium	5-8	71	**78.02**			
	Large	>8	3	3.30			
Experience in Farming	Low experience	<10	16	18.00	3-42	18.98	8.42
	Medium experience	11-20	43	47.00			
	High experience	>20	32	35.00			
Annual Income (Tk.)	Low income	<50000	16	17.58	34000-215000	92417.5	46372.66
	Medium income	50001-100000	53	58.24			
	High income	>100000	22	24.18			
Extension Media Contact	Low contact	<10	64	70.33	2-24	9.42	5.44
	Medium contact	11-20	25	27.47			
	High contact	>20	2	2.20			
Organizational participation	Low participation	>5	70	76.92	0-7	1.97	2.31
	Medium participation	6-10	21	23.08			
	High participation	<10	0	0.00			
Cosmopoliteness	**Low cosmopoliteness**	< 5	53	58.00	3-13	5.64	2.19
	Medium cosmopoliteness	6-10	36	39.00			
	High cosmopoliteness	>10	2	3.00			
Use of CA	**Don't Use CA**		82	90.00		45.50	51.61
	Use CA		9	10.00			

373

374 **Table 2: Use of fertilizers and manures by the respondents**

Fertilizer Name	Frequency	Percentage (%)	Mean	Standard Deviation
Manure	87	96		

Urea	87	96	60.71	33.05
TSP	87	96		
MOP	84	92		
Gypsum	43	47		
Zinc	24	26		
Boron	13	14		

Table 3: Intercultural operation practices followed by the respondents

Name of Intercultural operation	Frequency				Mean		Standard Deviation	
	Conservational Agriculture (CA)	Percentage (%)	Traditional Agriculture (TA)	Percentage (%)	CA	TA	CA	TA
Wedding	78	85.71	84	92.31	48.4	63.3	27.48	24.53
Irrigation	77	84.62	84	92.31				
Mulching	14	15.38	61	62.03				
Spading	75	82.42	83	91.21				
Disease control	65	71.43	82	90.11				
Insect Control	67	73.63	82	90.11				
Thinning	42	46.15	52	57.14				
Pruning	34	37.36	53	58.24				
Inter-cropping	27	29.67	41	45.05				
Others	5	5.9	11	12.09				

Table 4: Status of disease infestation in vegetables cultivation

Disease Name	Frequency	Percentage (%)	Mean	Standard Deviation
Leaf Rot	43	47	22.86	12.22
Root Rot	29	21		
Fruit Rot	31	34		
Brown Spot	11	12		
Fungi	27	30		
Black Spot	6	7		
Late Blight	13	3		

Table 5: Status of insect infestation

Disease Name	Frequency	Percentage (%)	Mean	Standard Deviation
Stem Borer	31	34	21.5	14.94
Rice brown plant hopper	45	49		
Dragon and Damsel Fly	3	3		
Aphid	22	24		
Termite	17	19		
Fruit Borer	11	12		

Table 6: Types of problems faced by the respondents

Sl. No	Name Of the Problem	Types of Problem						Total Percentage (%)
		Very Severe	Severe	Moderately Severe	Less Severe	Very less	No Problem	
1	Lack Of seed	6.59 (6)*	71.4 (65)*	21.98 (20)*				100 (91)*
2	High Price of seed	9.89 (9)*	62.64 (57)*	23.07 (21)*	4.39 (4)*			100 (91)*
3	Lack of Fertilizer	4.39 (4)*	63.74 (58)*	27.47 (25)*	2.20 (2)*	2.20 (2)*		100 (91)*
4	High Price of Fertilizer	18.68 (17)*	52.74 (48)*	20.88 (19)*	5.49 (5)*	2.20 (2)*		100 (91)*
5	Impurity of Insecticides/ Pesticides	2.20 (2)*	25.27 (23)*	57.14 (52)*	12.09 (11)*	3.30 (3)*		100 (91)*
6	High price of Insecticides/ Pesticides	6.59 (6)*	25.27 (23)*	37.36 (34)*	18.68 (17)*	12.09 (11)*		100 (91)*
7	High Incidence of Insect	29.67 (27)*	51.65 (47)*	9.89 (9)*	6.59 (6)*	2.20 (2)*		100 (91)*
8	Lack of Irrigation water	9.89 (9)*	57.14 (52)*	18.68 (17)*	12.09 (11)*	4.40 (4)*		100 (91)*
9	Salinity	61.54 (56)*	29.67 (27)*	8.79 (8)*				100 (91)*
10	Lack of land due to Shrimp Culture	5.49 (5)*	47.25 (43)*	19.78 (18)*	17.58 (16)*	3.30 (3)*	6.59 (6)*	100 (91)*
11	Salinity due to Shrimp Culture	8.79 (8)*	16.48 (15)*	28.57 (26)*	35.16 (32)*	7.69 (7)*	3.30 (3)*	100 (91)*
12	Lack of Knowledge	28.57 (26)*	36.26 (33)*	15.38 (14)*	17.58 (16)*	2.20 (2)*		100 (91)*
13	Activities of extension worker	49.45 (45)*	31.87 (29)*	16.48 (15)*	2.20 (2)*			100 (91)*
14	Land become dry	14.29 (13)*	39.56 (36)*	25.27 (23)*	20.88 (19)*			100 (91)*
15	Natural calamities	16.48 (15)*	34.07 (31)*	30.77 (28)*	14.29 (13)*	4.40 (4)*		100 (91)*
16	Others							
	Mean	16.53	39.13	21.93	11.85	4	4.5	
	Standard Deviation	15.79	14.96	10.82	8.45	2.91	2.12	

* indicate the number of respondents

385 **Table 7: Distribution of respondents according to their problem confrontation score**

Categories	Score	No of farmers	Percentage (%)	Mean	Standard Deviation
Low problem confrontation	<20	20	21.98	30.33	25.15
Medium problem confrontation	20-30	59	64.84		
High problem confrontation	>30	12	13.19		
Total		91	100		

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387 **Table 8: Distribution of crops in kharif I, Kharif II and Robi season on high land**

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Season	Crop Name	Frequency (N=10)	Percentage (%)	Mean	Standard Deviation
Kharif 1	Papaya	1	10	2.6	3.05
	Pointed Gourd	1	10		
	Turmeric	1	10		
	Dhan(Paddy)	8	80		
	Brinjal	2	20		
Kharif 2	Bitter gourd	4	40	2.67	1.53
	Brinjal	3	30		
	Chilli	1	10		
Robi	Tomato	10	100	2.55	2.77
	Red Amaranth	2	20		
	Chilli	2	20		
	Yard Long Bean	1	10		
	Aus(paddy)	5	50		
	Broad bean	1	10		
	Cabbage	3	30		
	Pumpkin	1	10		
	Bottle gourd	1	10		
	Mustard	1	10		
	Cauliflower	1	10		

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391 **Table 9: Distribution of crops in kharif I, Kharif II and Robi season on medium high land**

Season	Crop Name	Frequency (N=78)	Percentage (%)	Mean	Standard Deviation
Kharif 1	Dhan(paddy)	32	41.03	6.06	7.72
	Cucumber	3	3.85		
	Chilli	3	3.85		
	Indian Spinach	5	6.41		
	Brinjal	13	16.67		
	Onion	2	2.56		
	Yam	3	3.85		
	Turmeric	10	12.82		
	Lady's Finger	8	10.26		
	Shak	1	1.28		
	Potato	2	2.56		
	Till	1	1.28		
	Jute	6	7.69		
	Bitter gourd	3	3.85		
	Wheat	4	5.12		
	Pumpkin	1	1.28		
Kharif 2	BRRI Dhan- 28	11	14.10	5.83	8.81
	Dhan(paddy)	32	41.03		
	Lady's Finger	1	1.28		
	BRRI Dhan-52	1	1.28		
	Shak	6	7.69		
	Long yard Bean	2	2.56		
	Broad Bean	2	2.56		
	Indian Spinach	7	8.97		
	Sunflower	1	1.28		
	Chilli	1	1.28		
	Jute	2	2.56		
	Bitter gourd	4	5.12		
Robi	Broad Bean	4	5.12	14.75	8.64
	Indian Spinach	7	8.97		
	Khesarie	16	20.51		
	Cauliflower	21	26.92		
	Red amaranth	23	29.48		
	Sunflower	11	14.10		
	Tomato	34	43.59		
	Chilli	26	33.33		
	Brinjal	16	20.51		
	Potato	22	28.21		
	Cabbage	17	21.79		
	Till	6	7.69		

	Bitter gourd	6	7.69		
	Turnip	6	7.69		
	Bottle gourd	11	14.10		
	Pumpkin	10	12.82		

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393 **Table 10: Distribution of crops in kharif I, Kharif II and Robi season on medium low land**

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Season	Crop Name	Frequency (N=03)	Percentage (%)	Mean	Standard Deviation
Kharif 1	Dhan(paddy)	3	100	1.6	0.89
	Indian Spinach	1	33.33		
	Banana	2	66.67		
	Dhan(Aus)	1	33.33		
	Lady's Finger	1	33.33		
Kharif 2	BRRI dhan 28	1	33.33	1.33	0.58
	Aman-30	2	66.67		
	Lady's Finger	1	33.33		
Robi	Mustard	1	33.33		
	Tomato	3	100	2.2	0.84
	Potato	3	100		
	Spinach	2	66.67		
	Red Amaranth	2	66.67		

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