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Standardization of production technology for garlic under dry and wet land conditions

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Abstract: An extensive survey was conducted in the major garlic growing areas, namely, (i) area under wetland cultivation of garlic in 'Chalan beel' areas of Gurudashpur upazila of Natore district, as well as Tarash and Magura upazila of Sirajgonj district, and (ii) area under dry land cultivation of garlic in Dimla, Nilphamari Sadar and Jaldhaka upazila of Nilphamari district to take opinion of farmers regarding the technology used for garlic production. Attitude towards garlic production practices of the farmer's was the dependent variable of the study. The respondent age ranged from 25 to 62 years. Farmers under middle age group occupied the first place (55% Natore and 50% Nilphamary) of total respondents followed by younger (35%) and older (10%). 10% of the respondents had no education, 30% to 35% of the respondent can put signature only, 25% of the respondent had primary level of education, 20% to 25% had secondary level of education and 5% to 15% had above secondary level education. About 65%-75% of the respondent's farmers belonged to small farmers category followed by medium 20%-30% and large 5%. In Nilphamari district, in most cases, farmers adopted tillage system, 10 × 15 cm plant spacing, cowdung, urea, TSP, MP and in some cases used DAP, 20-30 days interval irrigation, flat planting system for garlic production. They used Italian variety received from local source and got 3-6 t/ha yield and few farmers got 7-8 t/ha yield. In Sirajgonj district, In most cases, farmers adopted without tillage system, 10 cm x 10 cm plant spacing, cowdung, DAP, TSP, MP and in some cases used urea, 20-30 days interval irrigation and flat system for garlic production. They used Italian variety received from local sources and got 3-6 t/ha yield and few farmers got 7-8 t/ha yield.

Key words: Standardization,production technology, garlic, dry and wet land conditions

Introduction

In Bangladesh, garlic is not only cultivated in dry land areas but also in low laying flood affected areas too. People of Bangladesh traditionally developed different kinds of flood combat mechanisms to avoid or to decrease the loss. 'Chalan beel' is one of the flood affected area. After flood farmers practiced a new technology to produce garlic in the wet land. Most of the farmers produce garlic and some farmers produce wheat. In that condition they generally use no/zero tillage. They just dibble the cloves in the muddy land. But the common practice of garlic production in the dry lands of Rajshahi, Nilphamari, Syedpur, Meherpur and Pabna areas is to make a good tilth of soil and to maintain soil moisture near field capacity, so, it is important to compare farmers practice under dry land condition and wet land condition in 'Chalan Beel' area. They cut rice panicle with a little plant parts; leaving most of plants for mulching in garlic. They give thick mulch by the rice debris after planting garlic on the muddy soil. So, weed grows very less, soil moisture was conserved properly giving good yield (Lampurlanes *et al*., 2002; Barrios *et al*., 2006; Arya, 2000; Estep,1958 and Akter *et al*., 2005). In wet land conditions, garlic produce very well by the simple management. But there is no standard technology of the zero tillage production. In the above context, this study has been conducted for the standardization of production technology for garlic under dry and wet land conditions.

Materials and Methods

For assessing the dry land garlic production practices, 5 farmers from each of Dimla, Nilphamari Sadar and Jaldhaka upazilas of Nilphamari district were selected. And for assessing the wetland garlic production practices, 14 farmers from Gurudaspur upazilas of Natore district, and 6 farmers from Tarash and Magura upazilas of Sirajgonj district were selected. The survey was conducted on 14 farmers of Natore and 6 farmers of Sirajgonj districts. All possible efforts were made to explain the purpose of the study to the respondents. Help of the leading farmers was taken in advance in order to arrange appointment with the selected farmers. The researcher administered the interview personally. Production technology; Method of cultivation (zero tillage in wetland, tillage in wetland, zero tillage in dry land and tillage in dry land), planting material (cultivar, source etc), planting time, planting density, planting system, use of manure and fertilizers, irrigation, mulch, harvesting time, yield and others of respondent was measured in terms of practices passed by him. Farmers were classified into three categories viz. small, medium and large based on their land holdings. Data were collected by using an interview schedule developed earlier considering the objectives of the study. The schedule contained both open and closed forms of questions. Simple and direct questions and a few scales were put in the questionnaire One's behavior and personalities are influenced by a variety of interrelated and constituent attributes which are integral parts of his life. It was therefore assumed that attitude towards garlic production practices of the farmers will be influenced by their various characteristics, in this study some characteristics such as age of farmers, education, occupation and farm size of the respondents were selected to find out their relationship with attitude towards garlic production practices. Data were collected during the period from November to December 2008. After collecting data it was compiling, analyzed and tabulated in accordance with the purpose of the study. Statistical measure like, number, percentage were used in describing the variables of the study.

Results and Discussion

In fulfilling the objective of the study required data were collected through questionnaire survey from two selected villages of Nilphamari and Sirajgonj/Natore district. Among the total samples collected 50% were from

Nilphamari district and the rest were from Serajgonj/ Natore district.

Age of farmers: The age of the farmers was ranged from 25 to 62 years the farmers were classified into three categories on the basis of their age.

In Nilphamari district, data presented in table indicated that majority (55%) of the respondents belong to young age while nearly one third (35%) of them being middle aged and slightly more than one tenth (10%) of the farmers were under old age category.

In Sirajgonj/Natore districts, data presented in table indicated that majority (70%) of the respondents belong to young age while nearly one third (25%) of them being middle aged and slightly more than one tenth (5%) of the farmers were under old age category (Table 1).

Education: The education status of the farmers was ranged from o to 14 years of schooling. Data presented in table 86b indicated that 10% of the respondents had no education, 30% to 35% of the respondent can put their signature only, 25% of the respondent had primary level of education, 20% to 25% had secondary level of education and 5% to 15% had above secondary level education (Table 2).

Farm size: Finding reveals that majority (65% - 75%) of the respondents belonged to small farmers category. Slightly less than one third to one fifth (20% - 30%) of the respondent belonged to medium farmer's category. A few of them (5%) were large farmers (Table 3).

Method of cultivation: Survey was done on randomly selected 20 farmers who produced garlic with tillage or without tillage system. In Nilphamari district, data presented in the table 86d. Indicated that where all of the 20 farmers produced garlic with tillage system. In Sirajgonj/Nator districts, 18 farmers produced garlic without tillage under wetland condition and 2 farmers with and without tillage system (Table 4).

Planting material: Survey at Nilphamary found 20 people using Italian garlic variety and their source of garlic seed was exotic in case of four and local in case of 16. In Sirajgon/Natore districts, 18 farmers used Italian variety and 2 used Ausha variety. All of them used garlic seed from the local sources (Table 5).

Table 1. Distribution of farmers according to their age

Categories	Nilphamary		Sirajgonj/Natore	
	Number	%	Number	%
Young (up to 35 years)	7	35	5	25
Middle (36 to 50 years)	11	55	14	70
Old (>50 years)	2	10	1	5
Total	20	100	20	100

Table 2. Distribution of the farmers according to their educational status

Categories	Nilphamary		Sirajgonj/Natore	
	Number	%	Number	%
Illiterate	2	10	2	10
Can sign only	7	35	6	30
Primary	5	25	5	25
Secondary	5	25	4	20
Above Secondary	1	5	3	15
Total	20	100	20	100

Table 3. Distribution of farmers according to their farm size

Categories	Nilphamary		Sirajgonj/Natore	
	Number	%	Number	%
Small Farmers (> 1 ha)	15	75	13	65
Medium farmers (1-3 ha)	4	20	6	30
Large farmers (< 3 ha)	1	5	1	5
Total	20	100	20	100

Table 4. Method of cultivation

Districts	Number	Method of cultivations				Both dry and wetland
		Dry land		Wetland		
		With tillage	Without tillage	With tillage	Without tillage	
Nilphamary	20	20	-	-	-	-
Sirajgonj/Natore	20	-	-	-	18	2

Table 5. Distribution of farmers according to garlic variety used and source of seed bulb

Districts	Respondent	Cultivar		Source of seed bulb		Any other
		Italian	Ausha	Local	Imported	
Nilphamary	20	20	-	16	4	-
Sirajgonj/ Natore	20	18	2	20	-	-

Plant spacing; In Nilphamari district, 16 farmers adopted 10 cm x 15 cm plant spacing and 4 farmers did 20 cm x 10 cm spacing. On the other hand, in Sirajgonj/Natore districts out of 20 farmers, 10 farmers used 10 cm x 10 cm, 8 farmers used 10 cm x 15 cm and 4 farmers used 20 x 10 cm spacing (Table 6).

Planting system; In Niphamari district, out the 20 farmers, 17 farmers used flat system and 3 farmers used ridge system, while in Sirajgonj/Natore districts, out of 20 farmers all of the 20 farmers used flat system for garlic production (Table 7).

Use of Manure and Fertilizers: In Niphamari district, all the 20 farmers used cowdung, TSP, MP and 15 farmers used urea and 5 used DAP. In Sirajgonj/Natore districts, all of 20 farmers used cowdung, TSP, MP and 4 farmers used urea and 16 farmers used DAP (Table 8).

Use of Irrigation: In Niphamari district, out of 20 farmers, 4 farmers adopted 15-20 days interval irrigation and 16 farmers adopted 20-30 days interval irrigation, while in Sirajgonj/Natore districts out of 20 farmers all of the 20 farmers adopted 20 – 30 days interval irrigation for garlic production (Table 9).

Use of mulch: In Niphamari district, out of 20 farmers, 2 farmers adopted rice debri, one water hyacinth, 8 ash and 9 farmers adopted no mulch technique, while in Sirajgonj/Natore districts out of 20 farmers, 19 farmers adopted rice debri, and one adopted water hyacinth (Table 10).

Harvesting time and yield: In case of Nilphamari and Sirajgonj/Natore districts, in most cases farmers harvested the garlic in last March to April. In Niphamari district, out of 20 farmers, 19 farmers got 3-6 t/ha yield and 1 farmer got 7-8t/ha yield. On other hand, in Sirajgonj/Natore districts, 15 out of 20 farmers got 3-6 t/ha and 5 farmers got 7-8 t/ha (Table 11).

Table 6. Distribution of farmers according to plant spacing used for garlic

Districts	Respondent	Plant spacing (cm)				Any other
		10 × 10	10 × 15	15 × 15	20 × 10	
Nilphamary	20	-	16	-	4	-
Sirajgonj/ Natore	20	10	8	-	2	-

Table7. Distribution of farmers according to use of planting system in garlic production

Districts	Respondent	Planting system		Any other
		Flat	Ridage	
Nilphamary	20	17	3	-
Sirajgonj/ Natore	20	20	-	-

Table 8. Distribution of farmers according to use of manures and fertilizers in garlic production

Districts	Respondent	Manures & Fertilizer					Any other
		Cowdung	Urea	TSP	MP	DAP	
Nilphamari	20	20	15	20	20	5	-
Sirajgonj/ Natore	20	20	4	20	20	16	-

Table 9. Distribution of farmers according to use of irrigation in garlic production

Districts	Respondent	Irrigation interval (days)				Any other
		7-10	10-15	15-20	20-30	
Nilphamari	20	-	2	4	14	-
Sirajgonj/ Natore	20	-	-	-	20	-

Table 10. Distribution of farmers according to use of mulch in garlic production

Districts	Respondent	Cover mulch				No mulch
		Rice debri	Water hyacinth	Sotty mould	Ash	
Nilphamari	20	2	1	-	8	9
Sirajgonj/ Natore	20	19	1	-	-	-

Table 11. Distribution of farmers according to their yield of garlic per hectare

Districts	Respondent	Yield of garlic (t/ha)				Any other
		3-6	7-8	8-10	10-12	
Nilphamari	20	19	1	-	-	-
Sirajgonj/ Natore	20	15	5	-	-	-

Existing production practices in different garlic growing areas of Bangladesh indicated that most of the garlic growers were small farmers (75% in Nilphamari and 65% in Sirajgonj/Natore areas). However, in most of the areas of Bangladesh, including Nilphamari, garlic is produced under dry land condition. An introduced variety, locally known, as Italian, is produced by most of the selected growers of both Nilphamari and Sirajgonj/Natore areas. Plant spacing used in both areas is mostly either 15cm x 10cm or 10cm x 10cm. Flat system of planting is most

common in both the areas. Most of the growers of Nilphamari area use cowdung, urea, TSP and MP; while most of the growers of Sirajgonj/Natore areas use DAP instead of urea. Most of the growers of both areas use irrigation at 20-30 days interval. Almost all growers of Sirajgonj/Natore areas use rice debri as cover mulch, whereas 45% of the growers of Nilphamari use no cover mulch and 40% of the growers of the area (Nilphamari) use ash. Almost all growers of Nilphamari area get yields in the range of 3-6 t/ha, whereas 75% of the growers of Sirajgonj/Natore area get yields in the range of 3-6 t/ha, and 25% of the growers get yield in the range of 7-8 t/ha.

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