ON-FARM RESEARCH DIVISION

Bangladesh Agricultural Research Institute

Kishoreganj

ANNUAL RESEARCH REPORT

2023-2024

Programme Leader

Dr. Muhammad Mohiuddin

Senior Scientific Officer

www.ars.kishoreganj.gov.bd

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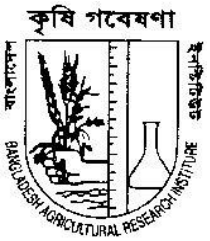
Compiled & Edited by
Dr. Muhammad Mohiuddin
Md. Yeasinul Haque Rayhan



ON-FARM RESEARCH DIVISION
BARI, KISHOREGANJ

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Preface

On-Farm Research Division (OFRD), Agricultural Research Sub-Station, Kishoreganj of Bangladesh Agricultural Research Institute (BARI) is going to publish its Annual Research Report for the experiments conducted in four Multi Location Testing (MLT) sites located at different Agro Ecological Zones (8, 9, 16, 19, 21 and 28) of Kishoreganj district during 2023-24. The mandate of OFRD is to conduct research for the improvement of existing farming system as well as test and validate the technologies developed by different NARS institutes under wide range agro-climatic conditions for the fine tuning of the technologies. Apart from testing and validation of technologies generated by different Research Institutes, development of location specific need based program to solve a problem at farmers' level of a particular area is the major concern.

The reports published here are mostly related to address some challenges like improvement of existing cropping system practiced by the farmers with introduction of new crops and varieties and technologies in haor, plain land, char land and floating ecosystems for improvement of farmers' livelihood. Different matured technologies were validated at farmers' level for maximization of farm production as well as economic return for betterment of the resource poor farmers. Our research thrust is to develop 2 to 4 crop-based cropping patterns for intensification and diversification in the environmental harsh areas, agriculture mechanization, subsistence agriculture to climate smart commercial agriculture etc. Adaptation to climate change, soil fertility management, cropping systems, floating agriculture, technology transfer of field and horticultural crops are included in this research report.

On and above BARI technology village (BARI-TV) included newly developed Guava, Mango, Malta and orange orchards established nicely. Crop museum with BARI released Brinjal, Tomato, Bottle gourd, Stem amaranth, Red amaranth, Garden pea, Mustard, Garlic, Onion, Coriander, other spices crops draw the attention of the farmers and visitors.

Two crops-based cropping patterns is a demand driven initiative for making higher production and food security in Haor areas.

Relevant information presented in the report has been collected from BBS, FAO STAT, DAE and FRG 2018.

I expressed my sincere thanks and gratitude to BARI, MOA, NATP (Phase-II), PARTNER Program and BARC for providing financial assistance to conduct different research, training, and Research-Extension linkage activities. I sincerely admire and appreciate my colleagues and SO/SSA/SA who look after the experiments at different locations. Special thanks to the co-operator farmers for their valuable cooperation and support. Last of all, I acknowledged those who worked hard to accomplish this voluminous report successfully.

Dr. Muhammad Mohiuddin
Senior Scientific Officer

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At a Glance

On-Farm Research Division, Kishoreganj

Introduction
Total

Establishment
Kishoreganj has been known as an agricultural district since pre-independence. After independence and declaration of as a full district, it can be seen that out of 13 upazilas here, 03 upazilas are fully dominated by Haor, 07 upazilas are partially Haor, 02 upazilas are dominated by Char on the banks of Brahmaputra and Meghna rivers and 03 upazillas area consists of plain land areas. The geographical location of Kishoreganj is 24°02' to 24°39' north latitude and 90°35' to 91°15' east longitude. There are different Agro-Ecological Zones in the district viz., AEZ-8, AEZ-9, AEZ-16, AEZ-19, AEZ-21 and AEZ-28. Since the establishment of Bangladesh Agricultural Research Institute, oilseed and pulses crop research activities have been started in Kishoreganj district. After that on 5 September 1983 the On-Farm Research Division started its activities and it is continuing till date. At present there are One Senior Scientific Officer, One Scientific Officer, One Assistant Scientific Officer and five Scientific Assistants working here.

Location and extent
On-Farm Research Division, Kishoreganj is located on the historic Pagla mosque road near sadar hospital within Kishoreganj district town. This research station is surrounded by Kishoreganj town-Pagla mosjid road in the South, Gaital Shapla Mosjid road (Shridhar Khila) in the North, 250 bedded modern sadar hospital in the East and Gaital teachers'polli in the West. The Station is situated at 24°44'35" N latitude, 90°77'49" E longitude. This research station represents different region of the Agro-Ecological Zones- 8 (Young Brahmaputra and Jamuna Floodplain), 9 (Old Brahmaputra Floodplain), 16 (Middle Meghna River Floodplain), 19 (Old Meghna Estuarine Floodplain), 21 (Sylhet Basin) and 28 (Madhupur Tract).

Land Area

(i) Total area	: 0.215 ha
(ii) Research and seed Multiplication area	: 0.082 ha
(iii) Infrastructure area	
(a) Office area	: 0.113 ha
(b) Residential area	
(c) Internal roads	: 0.02ha

Climate

(i) Rainfall (Jan.-Dec.-2023)	: 1633 mm
(ii) Temperature (°C)	
(a)Maximum	: 33.33
(b) Minimum	: 12.77

Scientific Personnel

Designation		**Existing post**
Senior Scientific Officer	**:**	**01**
Scientific Officer	**:**	**01**
Assistant Scientific Officer	**:**	**01**
Total	**:**	**03**

Scientific Staff

Designation		**Existing post**
Scientific Assistant	**:**	05
LA	**:**	01
Total	**:**	06

DEVELOPMENT OF FERTILIZER MANAGEMENT PACKAGE ON POTATO-GROUNDNUT-FALLOW CROPPING PATTERN IN NIKLI, KISHOREGANJ.

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

An experiment was executed at the MLT site Nikli during 2023-2024 to assess the fertilizer management package on potato-groundnut-fallow cropping pattern in nikli, kishoreganj. Four different treatments were taken. The highest gross return (722400Tk/ha), gross margin (461948 Tk/ha) and BCR (2.77) was calculated from T_2:Lime (1 t/ha) with 120% Soil test based recommended fertilizer dose (Potato:338-70-132-31-12-6, Groundnut:90-70-44-76-6-5 (N-P-K-S-Zn-B kg ha^{-1}) the lowest gross return (568900 Tk/ha), gross margin (329548Tk/ha) and BCR (2.37) were from treatment T_3:Lime (1 t/ha) with 80% Soil test based recommended fertilizer dose (Potato:226-46-88-21-8-4, Groundnut:60-46-30-50-4-3(N-P-K-S-Zn-B kg ha^{-1}**).**

Introduction

Bangladesh is one of the most densely populated countries of the world with population growth rate of 1.33%. The present cropping intensity of the country is 198%. Food requirement is estimated to be doubled in the next 25 years. Under such situations, it is very important to increase cropping intensity and productivity. Haor is bowl-shaped large tectonic depression and receive surface runoff water by rivers, Khals and consequently a haor becomes very extensive water body in monsoon period. In Bangladesh, 17% of the country's land covering by haor area. From the month of April-May haor get its sea like appearance and relief up to October. The land topography and soil characteristics of haor is different than plain land. The haor area of Kishoreganj belongs to low pH. Soil pH of Nikli is found 4.5 to 5.3 (Table 1) that's why SRDI, Kishoreganj recommended to apply 400kg Dolomite lime per acre (1 t/ha) during land preparation to increase soil pH for suitable crop cultivation. Considering the above issues, the present study will be undertaken.

Materials and methods

A field experiment was conducted at the MLT site Nikli, Kishoreganj during 2023-24 to develop suitable fertilizer management package for potato-groundnut-fallow cropping pattern. Three replicate plots (6 m × 5 m) with a spacing 40 cm × 15 cm for each treatment were prepared and arranged in a completely randomized block design. Groundnut variety BARI Chinabadam-9 and potato variety romana were used as planting material in this experiment. Four single treatments were, T_1= Lime (1 t/ha) with Soil test based recommended fertilizer dose (Potato:282-58-110-26-10-5, Groundnut:75-58-37-63-5-4 (N-P-K-S-Zn-B kg ha^{-1}), T_2= Lime (1 t/ha) with 120% Soil test based recommended fertilizer dose (Potato:338-70-132-31-12-6, Groundnut:90-70-44-76-6-5 (N-P-K-S-Zn-B kg ha^{-1}), T_3= Lime (1 t/ha) with 80% Soil test based recommended fertilizer dose (Potato:226-46-88-21-8-4, Groundnut:60-46-30-50-4-3 (N-P-K-S-Zn-B kg ha^{-1}), T_4= Farmers practice (No lime and fertilizer does is Potato:345-148-198, Groundnut:120-140-100 (N-P-K kg ha^{-1}). All agronomic activities including sowing and harvesting dates, seed rate, plant spacing is mentioned in table 2. The economic indices like gross return, gross margin were also calculated on the basis of prevailing market price of the inputs and outputs (produces). The data on yield and economics of all the crops were taken and stated in table 5.

Results and discussions

The experiment indicated the treatment T_1 was found to be significantly effective by recording the Maximum no. of Plant population/m^2 for both potato (21) and groundnut(31)with minimum number of disease infection 8% and 13% respectively. But treatment T_2 =Lime 1 t/ha) with 120% Soil test based recommended fertilizer dose (Potato:338-70-132-31-12-6, Groundnut:90-70-44-76-6-5 (N-P-K-S-Zn-B kg ha^{-1}) showed highest yield for both potato (14.73 t/ha) and groundnut (2.55t/ha)**.** The highest gross return (722400Tk/ha), gross margin (461948 Tk/ha) and BCR (2.77) was calculated from T_2:Lime (1 t/ha) with 120% Soil test based recommended fertilizer dose (Potato:338-70-132-31-12-6, Groundnut:90-70-44-76-6-5 (N-P-K-S-Zn-B kg ha^{-1}) the lowest gross return (568900 Tk/ha), gross margin (329548Tk/ha) and BCR (2.37) were from treatment T_3:Lime (1 t/ha) with 80% Soil test based recommended fertilizer dose (Potato:226-46-88-21-8-4, Groundnut:60-46-30-50-4-3 (N-P-K-S-Zn-B kg ha^{-1}).

Conclusion

The climatic and soil condition of this haor land was congenial to potato and groundnut cultivation but now a days reduction of soil pH is a core problem in this area. We found a better result from T_2. Though farmer use higher amount of fertilizer than T_2 they got lower yield due to sever disease infestation. So, we can say there is a positive relationship between lime and disease infestation.

Table 1. Average nutrient status of initial soil (0-15 & 15-30 cm depth) of the experimental fields at MLT site Nikli, Kishoreganj

Item	pH	OM (%)	Total N (%)	P (µg g^{-1} soil)	K (meq $100g^{-1}$)	S (µg g^{-1} soil)	Zn (µg g^{-1} soil)	B (µg g^{-1} soil)
Value	4.5	0.48	0.02	29	0.25	23	Low	Medium
Interpretation	L	VL	VL	VH	M	N	L	M

L= Low, M=Medium, VL= Very low, VH= Very high, N= Normal

Table 2. Management practices of cropping pattern at Kishoreganj during 2023-2024

Parameters	Two crops based cropping pattern		
Crop	Potato	Groundnut	Fallow
Variety	Romana	BARI Chinabadam-9	
Date of sowing/ transplanting	24-11-2023	25-01-24	
Date of harvesting	23-01-2024	09-05-23	
Field duration (days)	62	105	

Table 3. Effect of different management practices on the Number of plant/m^2, Number of potato/m^2, Weight of potato /m^2 (gm) and % of scab infection of potato seedling during 2023-2024

Treatment	% germination	Number of plant/m^2	Number of potato/m^2	% scab infection
T_1	83	21	144	8
T_2	80	21	142	12
T_3	79	18	118	15
T_4	73	17	112	21

Table 4. Effect of different management practices on the percentage of germination, Number of plant/m^2, Number of mature nut/m^2 and % disease infection of groundnut seedling during 2023-2024

Treatment	% germination	Number of plant/m^2	Number of mature nut/m^2	% disease infection
T_1	85	31	327	13
T_2	84	29	334	23
T_3	84	28	313	17
T_4	79	26	285	29

Table 5. Yield and economic analysis of potato and groundnut during 2023-24

Treatment	Yield of potato (t/ha)	Yield of groundnut (t/ha)	PEY of groundnut (t/ha)	Total Yield of Potato (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
T_1	13.31	2.41	8.84	22.15	664400	249902	414498	2.66
T_2	14.73	2.55	9.35	24.08	722400	260452	461948	2.77
T_3	10.31	2.36	8.65	18.96	568900	239352	329548	2.37
T_4	11.93	2.27	8.32	20.25	607600	251025	356575	2.42

Here, T_1= Lime (1 t/ha) with Soil test based recommended fertilizer dose (Potato:282-58-110-26-10-5, Groundnut:75-58-37-63-5-4 (N-P-K-S-Zn-B kg ha^{-1}), T_2= Lime (1 t/ha) with 120% Soil test based recommended fertilizer dose (Potato:338-70-132-31-12-6, Groundnut:90-70-44-76-6-5 (N-P-K-S-Zn-B kg ha^{-1}), T_3= Lime (1 t/ha) with 80% Soil test based recommended fertilizer dose (Potato:226-46-88-21-8-4, Groundnut:60-46-30-50-4-3 (N-P-K-S-Zn-B kg ha^{-1}), T_4= Farmers practice (No lime and fertilizer does is Potato:345-148-198, Groundnut:120-140-100 (N-P-K kg ha^{-1})

Price of Potato= 30 Tk/kg and Price of Groundnut= 110 Tk/kg, TVC= Total Variable cost, PEY= Potato equivalent Yield

DEVELOPMENT OF POTATO-JUTE LEAF-CUCUMBER-T. AMAN CROPPING PATTERN AGAINST EXISTING MAIZE-FALLOW-T. AMAN CROPPING PATTERN

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

An experiment was executed at the MLT site Hossainpur during 2021-2022 and 2022-23 to improve the existing cropping pattern, increase cropping intensity, yields and economic return through incorporating of modern crop varieties and improved management practices. It was laid out in RCBD with six dispersed replications. The results revealed that the mean rice equivalent yield of improved cropping pattern was 51.38 t/ha which was 231% higher than that of existing cropping pattern (15.54 t/ha).The improved cropping pattern gave the higher gross margin (471267 Tk/ha) compared to existing pattern (139914 Tk/ha. Higher mean gross return (Tk. 1191239 ha^{-1}) and gross margin (Tk. 471267 ha^{-1}) were recorded in improved cropping pattern. Therefore, farmers in Kishoreganj could follow improved cropping pattern for higher crop productivity and profitability where lands remain fallow before transplanting of Aman rice.

Introduction

Many Farmers of Kishoreganj district usually cultivate maize after T. Aman rice harvest. All these two crops land can easily be cultivated with jute leafs as vegetables and cucumbers by cultivating short duration high yielding BARI released potatoes after cultivating T. Aman paddy. Jute leafs can be grown easily under moisture stressed condition in high to medium low land (BJRI, 1990). In case of potato crops, the farmers have been using overdoses of chemical fertilizer, which affected the subsequent crop as residues. As a result, jute leaf grown after potato affected significantly (Khan et al, 1998). Potato-Jute leaf-Cucumber-T. Aman is a newly developed cropping pattern which is suitable in Kishoreganj. Normally harvesting time of potato is in the month of February. We can prepare land and sown BJRI deshi pat shak-1 at mid February. It can be harvested during mid to last March. Therefore, the present study was designed to evaluate the feasibility and profitability of four crops based cropping pattern in Kishoreganj.

Materials and methods

The improved/alternate cropping pattern Potato-Jute leaf-Cucumber-T. Aman was conducted against Maize-Fallow-T. Aman at the MLT site, Hossainpur, Kishoreganj during 2021-22 and 2022-23. The experiment was laid out in RCBD with six (six farmers' field) replications. Unit plot size was 10 decimal. All agronomic activities including sowing and harvesting dates, seed rate, plant spacing, fertilizer management (FRG, 2018) etc. are mentioned in table 1. For comparison between crop sequences, the yields of all crops were converted into rice equivalent yield on the basis of prevailing market price of individual crops (Verma and Modgal, 1983).

The economic indices like gross return and gross margin were also calculated on the basis of prevailing market price of the inputs and outputs (produces). Crop cut was done from an area of $1m^2$ at three spots from each plot for yield samples in all cases. The data on yield and economics of all the crops were taken plot wise and stated in table 1.

Results and discussions

On an average, the higher rice equivalent yield (51.38 t/ha) was obtained from Potato-Jute leaf-Cucumber-T. Aman cropping pattern (IP) than the farmers existing pattern (15.54 t/ha) due to inclusion of high yielding potato and cucumber variety and improved management practices (Table 1). Results indicated that farmer's pattern Maize- Fallow- T. Aman gave lower yield due to imbalance use of fertilizer and poor management practices etc. The rice equivalent yield of Cucumber was the highest (23.79 t/ha) followed by Potato (20.05 t/ha) in improved cropping pattern. The total rice equivalent yield was 231% higher than the existing cropping pattern (Table 2).

Farmers' opinion

Farmers are interested to grow BARI released variety of potato in this area. They opined that the potato (BARI Alu-25) cultivation gave the higher economic return against the Maize-Fallow-T.Aman pattern. Training on production technology for Potato-Jute leaf-Cucumber-T. Aman pattern is needed.

Conclusion

The total crop productivity (in terms of REY), land use efficiency and profitability of improved cropping pattern i.e., Potato (var: BARI Alu-25)-Jute leaf (var: BJRI pat shak-1)-Cucumber (var: Thailand-1)- T. Aman were much higher than that of existing cropping pattern Maize-Fallow-T.Aman due to inclusion of HYV short duration potato. Thus, potato and cucumber can be successfully accommodated in the existing cropping pattern which increased cropping intensity and system productivity with reasonable profitability

Table 1. Management practices of improved cropping pattern and existing cropping pattern at Kishoreganj during 2021/22 to 2022/23

Parameters	Year	Improved Four crops based cropping pattern				Existing Cropping Pattern	
Crop		Potato	Jute leaf	Cucumber	T. Aman	Maize	T. Aman
Variety		BARI Alu-25	CVL-1	Thailand-1	BRRI dhan75/ BINA dhan-16	Miracle	BINA dhan-16
Date of sowing/ transplanting	2021-22	10-12-2021	25-03-2022	30-05-2022	04-08-2022	08-12-2021	25-08-2022
	2022-23	24-11-2022	25-02-2023	28-04-2023	08-08-2023	04-12-2022	14-08-2023
Fertilizer dose(N.P.K. S.Zn and B kg ha^{-1})		138-40-120-20-3.59-1.70	23-20-37.50-11-0-0	115-80-100-36-0-0	161-50-75-14-0-02	300-70-125-46-07-02	173-60-88-18-0-02
Date of harvesting	2021-22	10-03-2022	30-04-2022	25-07-2022	31-10-2022	05-05-2022	22-11-2022
	2022-23	20-02-2023	08-04-2023	30-06-2023	10-11-2023	03-05-2023	18-11-2023
Yield (t ha^{-1})	2021-22	27.53	4.20	22.58	4.66	9.09	4.85
	2022-23	28.83	3.65	25.00	4.87	9.87	4.89
Rice equivalent yield (tha^{-1})	2021-22	20.08	1.84	25.78	4.98	9.91	5.17
	2022-23	20.03	1.54	23.26	5.25	10.72	5.28

2021-22-Unit price (Tk/kg): Potato = 16.61, Jute leaf=10, Cucumber=25.79, T. Aman rice =21.43, rice straw = 1.50,Maize= 22.50 and Maize straw=1.00. 2022-23 (Tk/kg): Potato = 16.50, Jute leaf=10, Cucumber=21.60, T. Aman rice =23.75, rice straw = 2.00, Maize= 25.00 and Maize straw=1.00.

Table 3. Cost and return of improved and farmer's existing cropping pattern in haor area during 2021-22 and 2022-23

Parameters	Years	Improved cropping patterns (IP)	Farmer's cropping pattern (FP)	Increased over FP (%)
Grass return (Tk./ha)	2021-22	1193170	323155	269.23
	2022-23	1189308	380047.5	212.94
	Average	**1191239**	**351601.3**	**241.09**
Total variable cost (Tk./ha)	2021-22	706617	199330	254.50
	2022-23	733326.6	224045	227.31
	Average	**719971.8**	**211687.5**	**240.91**
Gross margin (Tk./ha)	2021-22	486554	123825	292.94
	2022-23	455980.9	156002.5	192.29
	Average	**471267.45**	**139913.75**	**242.62**

IMPROVEMENT OF SWEET GOURD-KENAF-FALLOW CROPPING PATTERN AGAINST EXISTING CROPPING PATTERN IN HAOR AREAS OF KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The experiment was conducted at Nunir haor and Pata chapra haor under the Multi-location Testing Site, Nikli, Kishoreganj, for 2021-22 and 2022-23. Two crops pattern Sweet gourd-Kenaf-Fallow was tested at on-farm condition over the existing single crop pattern only boro rice after flood water receded. Results showed that the highest rice equivalent yield (13.19 t ha^{-1}) was obtained from two crops pattern. The highest average gross return and gross margin of the two crops pattern were obtained Tk. 292756 and Tk. 136006 ha^{-1} which were 73% and 67% higher over farmers' pattern. Farmers' practice gave the lower gross return (Tk. 169428 ha^{-1}). The marginal benefit cost ratio (MBCR) was found 2.47 which indicated the superiority of two crops pattern over the farmers' existing pattern.

Introduction

The present cropping intensity of haor is only about 107% which is very low then the country's cropping intensity 195%. After flood water receded 15-20% land in haor areas is suitable for crop cultivation in third week to last week of October. At that time, farmers are waiting for cultivating Boro rice by irrigation with deep tube well up to third week of December to first mid January. As a result a vast area remains fallow for a long time (about 80 to 90 days) before Boro rice cultivation. So there is a opportunity to increase cropping intensity and crop productivity. The farmers' of Nikli, Goroi traditionally grow local variety Sweet gourd for vegetable purpose. Insertion of a new crop Sweet gourd in cropping pattern would increase the total productivity. If the farmers' show Sweet gourd seeds by last week of September or first week of October then it will be harvested at mid January to last week of January. After harvesting of Sweet gourd farmers can easily grow Jute (Kenaf) in its proper growing time which will not be affected by flash flood. Farmers will bear additional cost of Boro rice cultivation and other expanses from income of Sweet gourd and fulfill their nutritional need. The present study will be taken to achieve the stated above objectives.

Materials and methods

The study was carried out 2021-22 and 2022-23 at farmer's field, at Nikli, Kishoreganj (located in Agro Ecological Zone-19) under Old Meghna Estuarine Floodplain Soils. This trial was conducted to derive the economic consequences of two cropping patterns viz. IP: improved pattern (Sweet gourd - Kenaf-Fallow) and FP: farmer's pattern (Fallow-Boro rice-Fallow) through incorporation of high yielding varieties with improved management practices. In the improved pattern, Sweet gourd var. hybrid Dhaka-1 and Kenaf- HC 95 were introduced against fallow period and Boro rice var. BRRI dhan29 was used in farmers pattern, respectively. The agronomic parameters and cultural operation for crop production under improved and farmer's practices are presented in Table 1. All field operation and management practices of both farmer's and improved pattern were closely monitored and the data were recorded for agro-economic performance.

Agronomic performance viz. land use efficiency, production efficiency, rice equivalent yield and benefit cost ratio of cropping patterns were calculated. Land use efficiency is worked out by taking total duration of individual crop in a sequence divided by 365 days (Tomer and Tiwari, 1990). It is calculated by following formula:

Results and Discussions

Grain and By-product Yield

Results of improved cropping pattern Sweet gourd-Kenaf-fallow and the farmer's existing pattern fallow-boro rice-fallow have been presented in Table 1. After two years of the study, the result revealed that average fruit yield of sweet gourd (hybrid Dhaka-1/Wonderball) and Kenaf were 19650 kg/ha, 2219 Kg./ha, respectively. Grain yield of boro rice in farmers pattern was 7298 Kg/ha. Jute stick yield was found 4295 Kg/ha on an average.

Table 1. Agronomic practices of improved and farmers' existing pattern during 2021-22 and 2022-23

Parameter		Improved Pattern (IP)		Farmers' Pattern (FP)
		Sweet gourd	Kenaf	Boro rice
Variety	Year	Hybrid Dhaka-1/Wonderball	HC-95	BRRI dhan29
Sowing/ transplanting	2021-22	30 October 2021	05 March 2022	02 January 2022
	2022-23	03 November 2022	05 March 2023	29 December 2022
Fertilizer dose (NPKSZnB kg/ha)		81-35-75-18-5-02	115-40-63-14-0-0	140-18-53-08-03-02
Harvesting time		10- 26 February	09-20 June	16-25, April
Field duration (day)		110-115	96-107	106-115
Yield (Kg /ha)	2021-22	18750	2178	7240
	2022-23	20550	2260	7355
Straw yield (Kg/ha)	2021-22	-	4135	4000
	2022-23	-	4456	4120

Rice equivalent yield

The mean rice equivalent yield revealed that improved cropping pattern produced higher rice equivalent yield (13.19 t/ha) over farmers' existing pattern (7.52 t/ha) (Table 2). Lower rice equivalent yield was obtained in the farmers' pattern due to traditional management practices.

Table 2. Rice-equivalent yield, production efficiency and land utilization index of improved and farmers' cropping pattern at haor area of Kishoreganj during 2021-22 and 2022-23

Items		Improved pattern	Mean	Farmers' pattern	Mean	Differences (%)	Mean
REY ($tha^{-1}yr^{-1}$)	2021-22	14.77	13.19	7.44	7.52	98.53	75.34
	2022-23	11.60		7.60		52.64	
	2022-23	60.82		42.47		43.24	

REY=Rice equivalent yield

Cost and return analysis

From the economic point of view, the average gross return of improved cropping pattern (292756 Tk/ha) showed its superiority by 73% over farmers' existing pattern (169428 Tk/ha. The gross margin was substantially higher in the improved pattern (136006 Tk/ha) than farmers' pattern (81268 Tk/ha). The mean marginal benefit cost ratio (MBCR) was found 1.80 which indicated the superiority of the improved cropping pattern over the farmers' pattern.

Table 3. Average cost and return analysis of improved and farmers' cropping pattern during 2021-22 and 2022-23

Items	Improved pattern	Farmers' pattern	Differences (%)
Gross return (Tk/ha)	292756	169428	72.79
Total variable cost (Tk/ha)	156750	88160	77.80
Gross margin (Tk/ha)	136006	81268	67.35
MBCR	1.80	-	-

Conclusion

The alternate cropping patterns is profitable than that of existing pattern. By practicing the alternate cropping pattern farmers can utilize 50-60 days turnaround time and can increase cropping intensity. Thus cultivation of alternate cropping patterns would help to increase total production, farmer's income, improve soil health and reduce nutritional imbalance of human being.

DEVELOPMENT OF POTATO-JUTE-T.AMAN CROPPING PATTERN AGAINST WHEAT-JUTE-T.AMAN CROPPING PATTERN

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

An experiment was executed at the MLT site Hossainpur during 2021-2022 and 2022-23 to improve the existing cropping pattern through incorporating of modern crop varieties and improved management practices. It was laid out in RCBD with six dispersed replications. The results revealed that the mean rice equivalent yield of improved cropping pattern was 33.83 t/ha which was 62% higher than that of existing cropping pattern (16.60 t/ha).The improved cropping pattern gave the higher gross margin (289095 Tk/ha) compared to existing pattern (87170 Tk/ha). The average gross return (806365 Tk.ha^{-1}) was recorded in improved cropping pattern which was 110% higher than that of existing pattern (383920 Tk.ha^{-1}).

Introduction

In Kishoreganj, land area under Wheat-Jute-T. Aman rice cropping pattern is increasing but there have a great scope of cultivating vegetable based Potato–Jute-T.Aman cropping pattern. If farmers adapted to vegetables based pattern, productivity, cropping intensity, as well as farmers income will be increased. In this regard, vegetable based cropping pattern is now a demand of time. So, the experiment was taken to evaluate the cropping patterns at farmer's field and hence to increase economic return, employment opportunity and woman's participation, cropping intensity with nutritious food as well as retain soil fertility.

Materials and methods

The improved/alternate cropping pattern Potato–Jute-T.Aman was conducted against Wheat-Jute-T. Aman at the MLT site, Hossainpur, Kishoreganj during 2021-22 and 2022-23 in the medium highland. The soil of the experimental field was sandy loam. The experiment was laid out in RCBD with six (six farmers' field) replications. Unit plot size was 10 decimal. All agronomic activities including sowing/ transplanting and harvesting dates, seed rate, plant spacing, fertilizer management (FRG, 2018) etc. are mentioned in table 1. Irrigation, pest managements and other intercultural operations were done as and when necessary. For comparison between crop sequences, the yields of all crops were converted into rice equivalent yield on the basis of prevailing market price of individual crops (Verma and Modgal, 1983). The economic indices like gross return and gross margin were also calculated on the basis of prevailing market price of the inputs and outputs (produces). Crop cut was done from an area of 1m^2 at three spots from each plot for yield samples in all cases. The data on yield and economics of all the crops were taken plot wise and stated in table 1.

Results and discussions

On an average, the higher grain yield was obtained from Potato (29.07 t/ha), Jute (2.95 t/ha) and T.Aman (4.90 tha^{-1}) in improved pattern (IP) than the existing (Table 1). The average rice equivalent yield of Potato was the highest (20.67 t/ha), Jute (9.14 t/ha) and T. Aman had the rice equivalent yield (5.03 t/ha) in improved cropping pattern (Table 1). The total rice equivalent yield was (34.83 t/ha) in improved cropping pattern which was 61.93% higher than the existing (16.60 t/ha) cropping pattern (Table 2).

From the economic point of view, the average gross return of improved cropping pattern (806365 Tk/ha) showed its superiority by 110% over farmers' existing pattern (383920 Tk/ha). The gross margin was substantially higher in the improved pattern (289095 Tk/ha) than farmers' pattern (87170 Tk/ha) (Table 3).

Farmers' opinion

Farmers are interested to grow BARI released variety of potato in this area. They opined that the potato (BARI Alu-25) cultivation before jute gave the higher economic return against the Wheat-Jute-T.Aman pattern. Training on production technology for Potato-Jute-T. Aman pattern is needed.

Conclusion

The total crop productivity (in terms of REY), land use efficiency and profitability of improved cropping pattern i.e., Potato (var. BARI Alu-25)-Jute(var: Kenaf HC-95)-T.Aman were much higher than that of existing cropping pattern Wheat-Jute-T.Aman due to inclusion of high yielding variety of potato. Thus, potato var. BARI Alu-25 can be successfully accommodated in the existing cropping pattern which increased cropping intensity and system productivity with reasonable profitability.

Table 1. Crop management practices of alternate cropping pattern (Potato-Jute-T. Aman) and existing cropping pattern (Wheat-Jute-T.Aman) at Kishoreganj during 2021-22 and 2022-23

Parameters		Improved cropping pattern			Existing Cropping Pattern		
Crop	Year	Potato	Jute	T. Aman	Wheat	Jute	T. Aman
Variety		BARI Alu-25	Robi-1/Kenaf	BRRI dhan75/ BINA Dhan-16	BARI Gom-26	JRO-524	BRRI dhan49/ BINA Dhan-16
Date of sowing/ transplanting	2021-22	25-11-2021	30-03-2022	05-08-2022	05-12-2021	05-04-2022	25-08-2022
	2022-23	23-11-2022	25-03-2023	04-08-2023	30-11-2022	29-03-2023	22-08-2023
Fertilizer dose(N.P.K.S.Zn and B kgha^{-1})		138-40-120-20-3.59-1.70	76-20-38-11-0-0	161-50-75-14-0-1.5	187-68-132-20-01-01	78-30-50-0-0-0	173-60-88-18-0-02
Date of harvesting	2021-22	24-02-2022	20-07-2022	04-11-2022	26-03-2022	25-07-2022	22-11-2022
	2022-23	20-02-2023	28-07-2023	02-11-2023	17-03-2023	20-07-2023	22-11-2023
Yield (t ha^{-1})	2021-22	26.38	2.29	4.57	3.17	2.01	4.35
	2022-23	31.76	3.61	5.22	3.05	2.16	4.68
Rice equivalent yield (tha^{-1})	2021-22	19.93	8.76	4.75	3.77	7.80	4.54
	2022-23	21.40	9.51	5.31	4.07	7.94	4.78

Unit price (Tk/kg in 2021-22): Potato = 17, Wheat=25, T. Aman rice =22.50, rice straw = 1, Jute = 75 and Jute stick=5.50
Unit price (Tk/kg in 2022-23):Potato = 16, Wheat=28, T. Aman rice =23.75, rice straw = 2, Jute = 55 and Jute stick=5.00

Table 2. Rice equivalent yield, production efficiency and land use efficiency of improved pattern (IP) and farmer's pattern (Average of 2021/22- 2022/23)

Parameters	**Years**	Potato-Jute-T.Aman (IP)	Wheat-Jute-T.Aman (FP)	Increased (%)
Rice equivalent yield (t/ha)	2021-22	33.44	16.41	32.28
	2022-23	36.22	16.79	83.43
	Average	**34.83**	**16.60**	**61.93**

Table 3. Cost and return of improved and farmer's existing cropping pattern during 2021/22- 2022/23

Years	Parameters	Improved cropping patterns (IP)	Farmer's cropping pattern (FP)	Increased over FP (%)
2021/22	Grass return (Tk./ha)	752470	369115	103.86
	Total variable cost (Tk./ha)	493960	287560	71.78
	Gross margin (Tk./ha)	258510	81555	216.98
2022/23	Grass return (Tk./ha)	860260	398725	115.75
	Total variable cost (Tk./ha)	540580	305940	76.69
	Gross margin (Tk./ha)	319680	92785	244.54
Mean	Grass return (Tk./ha)	806365	383920	110.03
	Total variable cost (Tk./ha)	517270	296750	74.31
	Gross margin (Tk./ha)	289095	87170	231.65

DEVELOPMENT OF SWEET POTATO-KENAF-FALLOW CROPPING PATTERN AGAINST FALLOW-BORO-FALLOW CROPPING PATTERN IN HAOR AREA

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

An experiment was executed at the MLT site Nikli during 2022-2023 to introduce two crops based Sweet Potato-Kenaf-Fallow cropping patterns as well as to increase crop production and economic return of the farmers. It was laid out in RCBD design with six dispersed replications. The improved cropping pattern gave the highest rice equivalent yield (20.27 t/ha) against existing cropping pattern (7.5t/ha). The improved cropping pattern gave the higher gross margin (335403Tk/ha) compared to existing pattern (104390Tk/ha). The marginal benefit cost ratio was recorded 2.82 in improved cropping pattern over existing cropping pattern.

Introduction

Sweet potato (*Ipomoea batata*) is a major food crop, which serves as a source of energy and nutrition in many countries. The crop is regarded as a food security crop due to its low input requirements, ease of production and high nutritional component. Purple flashed sweet potato are also quite excellent sources of vitamin-A and its main pigments, especially β-carotene and carotenoids are closely associated by the improvement of immune system of human beings, reduce the risk of cardiovascular complexities, age-related macular degeneration, and cataract development (Teow et al., 2007 and Wu et al., 2008). The average cropping intensity in Nikli upazila of Kishoreganj is 112% whereas national average is 195%. The vast area remains fallow for long time 80-90 days after flood water receded. So, there is a great scope of increasing cropping intensity as well as crop productivity in this area by introduce BARI sweet potato in this area. Potential adoption of sweet potato in Fallow-Boro-Fallow cropping system would generate employment and additional income of the farmers by utilization fallow and underutilize lands in the haor areas. Considering the above facts, the below mention cropping patterns will be conducted at Patachapra haor in Kishoreganj. Hence the trail will be conducted to improve the existing cropping pattern, increase cropping intensity, increase yield and economic return, access to food and nutrition, employment opportunity and woman's participation.

Materials and Methods

The experiment was conducted at the farmers' field of Nikli upazila under Kishoreganj district of Bangladesh during 2022-23. The improved cropping pattern (IP) Sweet potato-Kenaf-Fallow was tested against the farmers' pattern (FP) Fallow-Boro-Fallow cropping pattern with six dispersed replications. Unit plot size was 35 decimal. All agronomic activities including sowing/ transplanting and harvesting dates, seed rate, plant spacing, fertilizer management (FRG, 2018) etc. are mentioned in table 1. Irrigation, pest managements and other intercultural operations were done as and when necessary. Crop cut was done from an area of one square meter at three spots from each plot for yield samples in all cases. Agronomic performance like field duration, rice equivalent yield, gross return, gross margin, benefit cost ratio, were calculated. For comparison between crop sequences, the yield of all crop were converted into rice equivalent on the basis of prevailing market prices of individual crop (Verma and Modgal, 1983).

Results and discussions

Table 1 reveals that all the component crops in cropping pattern Sweet potato-Kenaf-Fallow under improved practices (IP) gave significantly higher yield. On an average, the higher grain yield was obtained from Sweet Potato (32 t/ha) and Kenaf (5.25 t/ha^{-1}) in improved pattern (IP) than the existing pattern due to high yielding variety and improved management practices. Sen et al. (1988) stated that significant variations among the genotypes were happened might be due to the adoption of proper cultural management techniques. Several researchers found that yield potentiality of sweet potato depends on the genetic make-up of plants (Naskar and Chowdhury, 1994; Siddique et al., 1988; Yooyongwech et al., 2014). The rice equivalent yield reveals that improved cropping pattern produced higher production over farmers' existing cropping pattern (Table 1). The total rice equivalent yield was 20.27 t/ha in improved cropping pattern which was (12.77 t/ha) higher than the existing (7.5 t/ha) one crop based cropping pattern.

The benefit cost ratio of improved pattern and rice based farmers' existing pattern are presented in Table 1. From the economic point of view, the gross margin of improved cropping pattern (335403Tk/ha) showed its superiority by 321.29% over farmers' existing pattern (104390Tk/ha). The marginal benefit cost ratio (MBCR) was found 2.82 which indicated the superiority of the improved cropping pattern over the farmers' pattern. The marginal benefit cost ratio (MBCR) also showed that inclusion of sweet potato and Kenaf in the existing pattern might be profitable and acceptable to the farmers.

Farmers' opinion

Farmers' expressed that once the sweet potato was indigenized root crop cultivated by poor farmers with poor management and they used to believe it contributes very low nutritional supplement. At present they are very much conscious about vitamins, minerals, dietary fibre and protein which are containing sweet potato. As a result they changed attitude and shown keen interest to cultivate purple flesh sweet potato especially BARI Mishti Alu-17 due to its carotene rich and creating market demand in haor area.

Conclusion

The total crop productivity (in terms of REY), land use efficiency and profitability of improved cropping pattern were much higher than that of existing cropping pattern due to inclusion of high yielding variety of sweet potato. Thus, sweet potato var. BARI Misti Alu-17 can be successfully accommodated in the existing cropping pattern which increased cropping intensity and system productivity with reasonable profitability.

Table 1. Management practices of alternate cropping pattern and existing cropping pattern at Kishoreganj during 2022-2023

Parameters	Improved Four crops based cropping pattern			Existing Cropping Pattern		
Crop	Sweet Potato	Kenaf	Fallow	Fallow	Boro rice	Fallow
Variety	BARI Misti Alu-17	HC-95			BRRI dhan29	
Date of sowing/ transplanting	10-11-2022	15-03-2023			10-01-2023	
Seed rate(kgha^{-1})	-	15			50	
Spacing	60cm×40cm	Continuous			20cm × 15cm	
Fertilizer dose (N.P.K.S.Zn and B kg ha^{-1})	110-65-115-18-5-02	115-40-63-14-0-0			140-18-53-08-03-02	
Date of harvesting	12-03-2023	20-06-2023			28-04-2023	
Field duration (days)	122	97			108	
Yield (t ha^{-1})	32	5.25			7.5	
Rice equivalent yield (tha^{-1})	13.71	6.56			7.5	
Rice equivalent yield (tha^{-1})	20.27			7.5		
Gross return (TK/ha)	384000	183750			210000	
Total variable cost (Tk. /ha)	153577	78770			105610	
Gross margin (Tk./ha)	230423	104980			104390	
Gross margin (Tk.ha^{-1}), Pattern	335403			104390		
MBCR (Whole pattern)	2.82			-		

GR= Gross return, TVC=Total variable cost and GM= Gross margin; Price of Sweet potato = 12tk/kg, Price of Kenaf = 35tk/kg, Price of Rice = 28tk/kg.

INTEGRATED MANAGEMENT OF FOOT ROT DISEASE OF GROUNDNUT WITH SEED AND SOIL TREATMENTS

M.Y.H. RAYHAN

Abstract

An experiment was executed at the MLT site Nikli during 2023-2024 to assess the effect of integrated diseases management modules with chemical treatments, organic amendments, and bio control agents on diseases incidence and yield of groundnut in comparison with untreated control. Five different treatments were taken. T_2 treatment (liming (1 t/ha) and seed treatment with Provex 2.5 gkg^{-1}) significantly gave highest nut yield (2.64 tha-1), with lowest foot rot (5%) infection of ground nut production. The highest gross return (290400Tk/ha), gross margin (174718 Tk/ha) and BCR (2.51) was calculated from treatment T_2 and the lowest gross return (233200 Tk/ha), gross margin (119635 Tk/ha) and BCR (2.05) were from treatment T_5 (farmers practice)**.**

Introduction

Groundnut is a major legume and an important oil seed crop throughout the world as well as Bangladesh. Numerous issues are accountable for low productivity among which diseases like leaf spot, collar rot, stem rot, bud necrosis etc are very important. Out of all, foot rot caused by *Sclerotium* **rolfsii** is a major problem and is an economically important soil borne pathogen. The huge number of sclerotia produced by *S. rolfsii* and their ability to persist in the soil for several years, as well as the abundant growth rate of the fungus make it well matched facultative parasite and a pathogen of major importance throughout the world (Punja, 1988). Different methods for the control of foot rot of ground nut were suggested worldwide, including the use of resistant cultivars (Butzler et al., 1998), cultural practices (El-Deeb and Ibrahim, 1998), biological and chemical control (Siddiqui et al., 2002; Cilliers et al., 2003). All of these control measures is an important means in checking foot rot of groundnut (Helal et al., 1994). Therefore, an attempt will be taken to assess the effect of integrated diseases management modules with chemical treatments, organic amendments, and bio control agents on diseases incidence and yield of groundnut in comparison with untreated control.

Materials and methods

A series of field experiments were conducted at the MLT site Nikli, Kishoreganj during 2023-24 to assess the effect of integrated diseases management modules with chemical treatments, organic amendments, and bio control agents on diseases incidence and yield of groundnut in comparison with untreated control. Seed was sown 22 January 2024.Three replicate plots (6 m × 5 m) with a spacing 40 cm × 15 cm for each treatment were prepared and arranged in a completely randomized block design. Groundnut variety BARI china badam-9 was used as planting material in this experiment. Five single treatments were, T_1= Liming (1 t/ha), T_2= Liming (1 t/ha) and seed treatment with Provex 2.5 gkg^{-1}, T_3= Liming (1 t/ha) and soil treated by Trichoderma 2.5 tha^{-1}, T_4=Seed treatment with Provex 2.5 gkg^{-1} and soil treated with Trichoderma 2.5 tha^{-1}, T_5= Farmers practice. All agronomic activities including sowing and harvesting dates, seed rate, plant spacing, fertilizer management (FRG, 2018) etc. are mentioned in table 1. Irrigation, pest managements and other intercultural operations were done as and when necessary. The economic indices like gross return, gross margin were also calculated on the basis of prevailing market price of the inputs and outputs (produces). BARI Chinabadam-9 was harvested at 7 May 2024 Crop cut was done from an area of $1m^2$ at three spots from each plot for yield samples in all cases. The data on yield and economics of all the crops were taken plot wise and stated in table 1.

Results and discussions

All Integrated Disease Management (IDM) modules were found to be superior over untreated farmers practice in reducing the diseases incidence and increasing nut yield during 2023-24 presented in the table 1. The experiment indicated the Liming (1 t/ha) and soil treated by Trichoderma 2.5 tha^{-1} was found to be significantly effective by recording the Maximum no. of mature nut/m^2 (331) and maximum germination (91%).

T_2 treatment (liming (1 t/ha) and seed treatment with Provex 2.5 gkg^{-1}) significantly gave highest nut yield (2.64 tha-1), with lowest foot rot (5%) infection of ground nut production. The highest gross

return (290400Tk/ha), gross margin (174718 Tk/ha) and BCR (2.51) was calculated from treatment $T_2$and the lowest gross return (233200 Tk/ha), gross margin (119635 Tk/ha) and BCR (2.05) were from treatment T_5 (Table 2)**.**

Conclusion

The climatic and soil condition of this haor land was congenial to groundnut cultivation but now a days reduction of soil pH is a core problem in this area. Due to low pH different root diseases are severe in this area. We found a better result from T_2**=** Liming (1 t/ha) and seed treatment with Provex 2.5 gkg^{-1}. So, we can say there is a positive relationship between lime and disease infestation where provex works better than other seed treating agents.

Table1. Effect of different management practices on the percentage of germination, Number of plant/m^2, Number of mature nut/m^2 and %foot rot infection of groundnut seedling during 2023-2024

Treatment	% of germination	Number of plant/m^2	Number of mature nut/m^2	% of foot rot
T_1	87	30	304	8
T_2	89	32	317	5
T_3	91	29	331	10
T_4	85	28	281	9
T_5	81	27	272	14

Here, T_1= Liming (1 t/ha), T_2= Liming (1 t/ha) and seed treatment with Provex 2.5 gkg^{-1}, T_3= Liming (1 t/ha) and soil treated by Trichoderma 2.5 tha^{-1}, T_4=Seed treatment with Provex 2.5 gkg^{-1} and soil treated with Trichoderma 2.5 tha^{-1}, T_5= Farmers practice.

Table 2. Yield and economic analysis of groundnut during 2023-24

Treatment	Yield (t/ha)	Gross return (Tk)	TVC (Tk)	Gross margin (Tk)	BCR
T_1	2.47	271700	110325	161375	2.46
T_2	2.64	290400	115682	174718	2.51
T_3	2.43	267300	118535	148765	2.25
T_4	2.32	255200	119352	135848	2.13
T_5	2.12	233200	113565	119635	2.05

Here, T_1= Liming (1 t/ha), T_2= Liming (1 t/ha) and seed treatment with Provex 2.5 gkg-1, T_3= Liming (1 t/ha) and soil treated by Trichoderma 2.5 tha-1, T_4=Seed treatment with Provex 2.5 gkg-1 and soil treated with Trichoderma 2.5 tha-1, T_5= Farmers practice. Price of groundnut= 110tk/kg.

IMPROVEMENT OF MUSTARD-BORO-FALLOW CROPPING PATTERN AGAINST FALLOW-BORO-FALLOW

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

An experiment was executed at the Balikhola hoar, Karimganj, Kishoreganj during 2023-2024 to introduce two crops based Mustard-Boro-Fallow cropping patterns as well as to increase crop production and economic return of the farmers. It was laid out in RCBD design with six dispersed replications. The improved cropping pattern gave the highest rice equivalent yield (12.51 t/ha) against existing cropping pattern (7.25t/ha). The improved cropping pattern gave the higher gross margin (138600Tk/ha) compared to existing pattern (65550Tk/ha). The MBCR (2.35) indicates the superiority of the improved two crop based cropping pattern over the farmer's one crops based cropping pattern.

Introduction

The country is losing 0.49% cultivable land every year for high population pressure and other purposes (Hasan et al., 2013). Ensuring food security of increased population, the country needs to be increased food production by increasing cropping intensity. At last week of September or First week of October 20-30% haor areas of Kishoreganj is suitable for crop cultivation. There is a great scope of increasing cropping intensity as well as crop productivity here. If we insert Mustard, farmers can easily cultivate two crops like mustard and boro. Considering the above facts, a trial on Mustard-Boro-Fallow was conducted in the same piece of land in a year at balikhola in Kishoreganj.

Materials and methods

The improved/alternate cropping pattern based Mustard-Boro-Fallow was conducted against Fallow-boro-Fallow at the MLT site, Karimganj, Kishoreganj during 2023-24. The soil of the experimental field was sandy loam. The experiment was laid out in RCBD design with six (six farmers' field) replications. Unit plot size was 10 decimal. All agronomic activities including sowing/ transplanting and harvesting dates, seed rate, plant spacing, fertilizer management (FRG, 2018) etc. are mentioned in table 1. Irrigation, pest managements and other intercultural operations were done as and when necessary. For comparison between crop sequences, the yields of all crops were converted into rice equivalent yield on the basis of prevailing market price of individual crops (Verma and Modgal, 1983). The economic indices like gross return, gross margin and benefit cost ratio (BCR) were also calculated on the basis of prevailing market price of the inputs and outputs (produces). Crop cut was done from an area of $1m^2$ at three spots from each plot for yield samples in all cases. The data on yield and economics of all the crops were taken plot wise and stated in table 2.

Results and discussions

Table 1 reveals that all the component crops in cropping pattern Mustard-Boro-Fallow under improved practices (IP) gave significantly higher yield. The rice equivalent yield reveals that improved cropping pattern produced higher production over farmers' existing cropping pattern (Table 2). The total rice equivalent yield was 12.51 t/ha in improved cropping pattern which was (5.26 t/ha) higher than the existing (7.25 t/ha) one crop based cropping pattern. Lower rice equivalent yield (7.25 t/ha) was obtained in the farmer's pattern due to traditional management practices.

From the economic point of view, the improved two crops based cropping pattern showed its superiority over the farmer's one crop based cropping pattern. The improved cropping pattern gave the higher gross margin (138600Tk/ha) compared to existing pattern (65550Tk/ha). The MBCR (2.35) indicates the superiority of the improved two crop based cropping pattern over the farmer's one crops based cropping pattern.

Farmers' opinion

Farmers opined that in improved two crops based cropping pattern, use of modern high yielding rice variety (BRRI dhan89) with insertion of mustard instead of Fallow-boro-Fallow can increase farm production and income. They showed their interest to replace their existing Fallow-Boro rice-Fallow pattern by the newly developed Mustard-Boro-Fallow cropping pattern.

Table1. Crop management of existing and alternate cropping patterns in the haor areas of Kishoreganj during 2023-24

Parameter	Fallow-Boro-Fallow	Mustard-Boro-Fallow	
Crop	Rice	Mustard	Rice
Varieties	BRRI dhan29	BARI Sharisa-14	BRRI dhan89
Date of sowing/ Transplanting	25-12-2023	08-11-2023	11-02-2024
Seed rate (kg ha^{-1})	50	8	50
Spacing (cm)	25 x15cm	Broadcast	25x15cm
Fertilizer dose (N,P,K,S,Zn and B)	140-18-53-08-03-02	115-32-40-25-02-02	140-18-53-08-03-02
Date of harvesting (range)	23-04-2024	30-01-2024	23-05-2024
Field duration (days)	120	83	102
Turnaround time (days)	-	169	11

Table 2. Yield and economic performance of existing and alternate cropping patterns in the haor areas of Kishoreganj during 2023-24

Parameter	Fallow-Boro-Fallow	Mustard-Boro-fallow	
Crops	BRRI dhan29	BARI Sharisa- 14	BRRI dhan89
Yield	6.33	1.56	7.15
Straw yield (t ha^{-1})	4.4	3.2	4.3
Rice equivalent yield (tha^{-1}/year)	7.25	4.46	8.05
Whole pattern REY (t ha^{-1})	7.25	12.51	
Gross return (Tk./ha)	174000	107800	193200
Total variable cost (Tk./ha)	108450	53450	108950
Gross margin(Tk/ha)	65550	54350	84250
Whole pattern gross margin (Tk/ha)	65550	138600	
MBCR Whole pattern	-	2.35	

Unit price (Tk. kg^{-1}): Boro rice=24.00, Rice straw =5, Mustard=65, Mustard straw =2

ADAPTIVE TRAIL OF BARI RELEASED POTATO VARIETIES IN HAOR AREA

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

Four farmer's field trials were conducted during rabi, 2023-24 to promote and disseminate newly released potato varieties among the potato growers of Nikli upazila in Kishoreganj. BARI Alu-78 showed excellent performance and higher yield followed by BARI Alu-62 and BARI Alu-48. The highest gross return (546613 Tk/ha), gross margin (362233 Tk/ha) and BCR (2.96) were calculated from BARI Alu-78 and the lowest gross return (267400 Tk/ha), gross margin (83020 Tk/ha) and BCR (1.45) from BARI Alu-53 due to yield variation. Farmers were happy to observe the performance of the varieties and demanded quality seed for next year cultivation.

Introduction

Potato (*Solamun tuberosum*) is the world's fourth most economically important food crop, after wheat, rice and maize. It is a part of the diet of half a billion consumers in the developing countries. In Bangladesh, the crop is the third most important crop in Bangladesh next to rice and wheat. It is grown not only for food, but also for animal feed, industrial uses and seed tuber production. Potatoes are also a good source of minerals, at least 12 essential vitamins and extremely high content of vitamin C comparable to other food crops. According to DAE, the crop occupies 4.963 lac hectare lands with the annual production of 103.04 lac metric tons during 2015-16. The national average yield of potato is very low (20.77 tha^{-1}) compare to its potential yield, due to lack of quality seed, cultivation of indigenous potato and high price of quality seed. Tuber Crop research Centre (TCRC), BARI has developed a good number of potato varieties which are supposed to be higher yielder and less susceptible to insect pest and diseases. These newly varieties need to be evaluated for their performance under different agro-ecological zones. Therefore, an adaptive trial with BARI developed potato varieties/lines was conducted to evaluate their yield performance and know farmer's opinions about the newly released improved potato varieties in different locations of Bangladesh.

Materials and Methods

The experiment conducted at MLT site Hossainpur and Karimganj during rabi season 2023-24 to know the performance of newly released BARI potato varieties in this area. The design was RCB with four dispersed replication. Each farmer treated as each replication. Varieties were BARI Alu-25, BARI Alu-40, BARI Alu-41, BARI Alu-46, BARI Alu-47, BARI Alu-48, BARI Alu-49, BARI Alu-50, BARI Alu-53, BARI Alu-62, BARI Alu-63, BARI Alu-77, BARI Alu-78, BARI Alu-79, BARI Alu-87, BARI Alu-88, BARI Alu-90, and BARI Alu-91. The unit plot sizes were 10 m x 10 m. The seed potatoes were planted on 128 November 2023 followed by 60 cm x 30 cm spacing. TCRC standard fertilizer doses were applied and standard intercultural management practices were followed in the trial plots. Orientation was given to the farmers before and during the cropping season on improved seed production techniques as well as irrigation, disease management practices etc. Farmers were also suggested to follow a routine spray schedule to control Late Blight infection. The crop was harvested on 05 February 2024. Finally, the yield data and diseases observation data were taken from the trial plots and farmers' fields and finally compared.

Results and discussion

Mean tuber yield among the tested varieties were ranged from 15.28 to 31.24 t/ha. The highest tuber yield (31.24 t/ha) was obtained from BARI Alu-78 followed by BARI Alu-88, BARI Alu-47, BARI Alu-62 and BARI Alu-79. The lowest yield was obtained from BARI Alu-53 (15.28 t/ha) at Nikli, Kishoreganj. The highest common scab infection was observed in (BARI Alu-53) (3.35%) where zero level infection was found in BARI Alu-46, BARI Alu-47, BARI Alu-62, BARI Alu-63, BARI Alu-78 and BARI Alu-79 (0%). Highest late blight infection was observed in BARI Alu-53 (23%). All the tested varieties showed moderate to severe susceptibility to late blight diseases. The lowest foliage infection was recorded in BARI Alu-78 (5%).

The highest gross return (546613 Tk/ha), gross margin (362233 Tk/ha) and BCR (2.96) were calculated from BARI Alu-78 and the lowest gross return (267400 Tk/ha), gross margin (83020 Tk/ha) and BCR (1.45) from BARI Alu-53 due to yield variation (Table 2).

Table 1. Yield (t/ha) and diseases incidence (%) of high yielding potato varieties at farmer's field during 2023-2024

Varieties/Rep	F(1)	F(2)	F(3)	F(4)	Mean	Common scab	Late blight
BARI Alu-25	21.36	21	21.65	20.87	21.22	2.51	20
BARI Alu-40	21.62	20.87	21.02	22.15	21.42	1.02	16
BARI Alu-41	28.05	27	28.23	26.8	27.52	2.01	21
BARI Alu-46	20.42	22.42	20.8	21.2	21.21	-	13
BARI Alu-47	31.25	30.82	29.93	30.12	30.53	-	10
BARI Alu-48	27.15	25.49	26.84	27.5	26.75	2.0	23
BARI Alu-49	22.3	20.62	21.67	21.85	21.61	1.50	25
BARI Alu-50	18.68	19.64	16.57	16.24	17.78	1.20	20
BARI Alu-53	16.35	15.32	14.25	15.2	15.28	3.35	28
BARI Alu-62	29.65	32.13	30.4	29.91	30.52	-	8
BARI Alu-63	26.15	21.92	27.61	26.5	25.55	-	15
BARI Alu-77	31.00	27.88	28.88	28.45	29.05	-	6
BARI Alu-78	29.87	33.52	32.5	29.05	31.24	-	5
BARI Alu-79	29.53	31.24	31.02	29	30.20	-	8
BARI Alu-87	23.51	21.8	23.4	22.95	22.92	3.12	18
BARI Alu-88	30.89	28.64	31.52	32	30.76	1.0	6
BARI Alu-90	28.9	26.54	26.98	27.17	27.40	2	12
BARI Alu-91	20.58	22.12	20.5	22.21	21.35	1	21

Table 2. Economic analysis of high yielding potato varieties in Kishoreganj during 2022-23

Varieties	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Alu-25	371350	184380	186970	2.01
BARI Alu-40	374763	184380	190383	2.03
BARI Alu-41	481600	184380	297220	2.61
BARI Alu-46	371175	184380	186795	2.01
BARI Alu-47	534275	184380	349895	2.90
BARI Alu-48	468038	184380	283658	2.54
BARI Alu-49	378175	184380	193795	2.05
BARI Alu-50	311194	184380	126814	1.69
BARI Alu-53	267400	184380	83020	1.45
BARI Alu-62	534144	184380	349764	2.90
BARI Alu-63	447038	184380	262658	2.42
BARI Alu-77	543288	184380	358908	2.95
BARI Alu-78	546613	184380	362233	2.96
BARI Alu-79	528456	184380	344076	2.87
BARI Alu-87	401013	184380	216633	2.17
BARI Alu-88	538344	184380	353964	2.92
BARI Alu-90	479456	184380	295076	2.60
BARI Alu-91	373669	184380	189289	2.03

*TVC includes labour, Land preparation, seed, fertilizers and pesticides, Price of potato: 17.50 Tk/kg.

Farmer's opinion

Farmers were pleased to observe the performance of the BARI Alu-78, BARI Alu-79, BARI Alu-47 and BARI Alu-62 due to high yield, market demand and more price. Farmers are also chose BARI Alu-88 due to early high yielding and less insect pest infestation on red skin.

Conclusion

The climatic and soil condition of haor land was congenial to potato cultivation, unavailability of quality and latest variety seed was the core problem. Thus, BADC should supply good quality seeds timely for dissemination newly released high yield potential potato varieties.

DEMONSTRATION OF BARI RELEASED VARIETIES OF PANIKACHU

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The field trial was executed at MLT site Hossainpur, Kishoreganj; during the year 2022-23 to know the performance of BARI released Panikachu varieties in that area. Seven varieties were selected for this experiment viz. BARI Panikachu-1 (Latiraj), BARI Panikachu-2, BARI Panikachu-3, BARI Panikachu-4, BARI Panikachu-5, BARI Panikachu-6 and BARI Panikachu-7. The highest stolon yield was obtained from BARI Panikachu-1 (25.40 t/ha) and the lowest from BARI Panikachu-3 (7.15 t/ha). In case of Rhizome, the highest Rhizome yield was obtained by BARI Panikachu-6 (41.21 t/ha) and the lowest from BARI Panikachu-1 (17.55 t/ha). The highest gross return (552500Tk/ha), gross margin (301080Tk/ha) and BCR (2.19) were calculated from BARI Panikachu-1 and the lowest from BARI Panikachu-7 (380000 Tk/ha, 251420Tk/ha and 1.51, respectively).

Introduction

Panikachu (*Colocasiaaffinis* .L) is an important edible aroid in Bangladesh as well as in some other countries in the world. Panikachu is rich in iron and vitamin- A. Now in Bangladesh, it comes to market as an important summer vegetable when most of the vegetable are not available in the market. Climatic condition and soil types ofHossainpuris very much suitable for Panikachu cultivation. The Farmers of Hossainpur usually cultivate local varieties of Panikachu which give low yield as well as low returns. They do not know about BARI developed high yielding, disease and insect resistant variety. So if these varieties are introduce in this area then farmer will be benefited .Thus, this experiment was taken in this area. The possibility of further expansion of area under aroids cultivation seems likely because of shortage of vegetable at that time.

Materials and Methods

The experiment was conducted at MLT site Hossainpur, Kishoregonj during the year 2022-23 to know the performance of BARI released Panikachu varieties in that area. The design was RCBD with three disperse replication. Each farmer treated as each replication. Varieties were BARI Panikachu-1 (Latiraj), BARI Panikachu-2, BARI Panikachu-3, BARI Panikachu-4, BARI Panikachu-5, BARI Panikachu-6 and BARI Panikachu-7. The unit plot sizes were 9 m × 4.5 m^2. Spacing was followed by 60 cm x 45 cm. Panikachu suckers were sown on 29 December 2022. The recommended fertilize doses were applied as N_{152} P_{34} K_{180} S_{20} $Zn_{4.3}$ $B_{1.7}$ kg^{-1} respectively. Half of urea and MoP and all others fertilizers were used at final land preparation. The remaining part of Urea and MoP fertilizer was applied at the side of the row in two equal splits at 45 & 60 DAS. Prorania caterpillar, leaf roller, red mite were observed in the field at the cultivating time. Pheromone trap, secure and admire were applied to control. Harvesting of stolon started from 20th March 2023 and ended at 16th August 2023. The Rhizome was harvested from March to September 2023. Data on yield and yield contributing characters were recorded and analyzed for report writing.

Result and Discussion

Yield and economic analysis has shown table 1. The highest stolon yield was obtained from BARI Panikachu-1 (25.40 t/ha) and the lowest from BARI Panikachu-3 (7.15 t/ha). In case of Rhizome, the highest Rhizome yield was obtained by BARI Panikachu-6 (41.21 t/ha) and the lowest from BARI Panikachu-1 (17.55 t/ha). The highest gross return (552500 Tk/ha), gross margin (301080 Tk/ha) and BCR (2.19) were calculated from BARI Panikachu-1 and the lowest from BARI Panikachu-7 (380000 Tk/ha, 251420 Tk/ha and 1.51, respectively).

Farmers' opinion

Farmers prefer BARI Panikachu-1 for stolon production due to high market demand and price and BARI Panikachu -6 for rhizom production.

Conclusion

The unavailability of good quality suckers at growing season was the major problem in this area. So, Purpose of more dissemination and meet up vegetable crisis, sucker should be available in time at farmers level.

Table 1.Economic analysis of Panikachu in Kishoreganj during 2022-23

Varieties	Yield of stolon (kg/ha)	Yield of Rhizome (kg/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Panikachu-1	25.40	17.55	552500	251420	301080	2.19
BARI Panikachu-2	20.25	18.20	485750	251420	234330	1.93
BARI Panikachu-3	7.15	30.20	409250	251420	157830	1.63
BARI Panikachu-4	9.10	27.50	411500	251420	160080	1.64
BARI Panikachu-5	8.40	26.20	388000	251420	136580	1.54
BARI Panikachu-6	7.48	41.21	524300	251420	272880	2.08
BARI Panikachu-7	7.10	27.35	380000	251420	128580	1.51

* TVC includes land preparation, labour, seed, fertilizers and insecticides, rhizom= Tk. 10 kg^{-1} and stolon = Tk. 15 kg^{-1}

DEMONSTRATION OF BARI RELEASED VARIETIES OF ELEPHANT FOOT YAM

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The field trial was executed at Sadar upazila of Kishoreganj during the year 2022-23 to know the performance of BARI released Ol kachu varieties in the study area. Three varieties were selected for this experiment viz; BARI Olkachu-1, BARI Ol kachu-2 and local. The highest rhizome yield was obtained from BARI Olkachu-1 (30.32 t/ha) and the lowest from local variety (25.31 t/ha). The highest gross return (303200Tk/ha), gross margin (116620 Tk/ha) and BCR (1.63) were calculated from BARI O lkachu-1and the lowest from local variety (253700 Tk/ha, 67120 Tk/ha and 1.36, respectively).

Introduction

Elephant foot yam is a tropical tuber crop that offers excellent scope for adoption in the tropical countries as a cash crop due to its production potential and popularity as a vegetable in various delicious cuisines. Many indigenous ayurvedic and unani medicinal preparations are also made using its tubers. The tubers are believed to have blood purifying characteristics and are used in medicines for the treatment of piles, asthma, dysentery and other abdominal disorders. However, some farmers of different regions of the country like Jashore, Satkhira, Narsingdi, Kishoreganj along with Hill Tracts cultivate it commercially. It is important for its nutrients content and medicinal values though it is used as vegetable. BARI released two varieties of yam as BARI ol kachu-1and BARI oL Kachu-2. The Farmers of Kishoreganj usually cultivate local variety of Ol kachu which give low yield as well as low returns. They do not know about BARI developed high yielding, disease and insect resistant variety. So if these varieties are introduce in this area then farmer will be benefited .Thus, this experiment was taken in this area.

Materials and Methods

The experiment was conducted in Kishoregonj during the year 2022-23 to know the performance of BARI released Ol kachu varieties in that area. The design was RCBD with three replications. Varieties were BARI Ol kachu-1, BARI Ol kachu-2 and local variety. The unit plot sizes were 9 m × 4.5 m^2. Spacing was followed by 60 cm x 45 cm. Ol kachu were sown on 26 February 2023 to 28 March 2023. The recommended fertilizer doses were applied as N_{132} P_{34} K_{180} S_{20} $Zn_{4.3}$ $B_{1.7}$ kg^{-1} respectively. Half of urea and MoP and all others fertilizers were used at final land preparation. The remaining part of Urea and MoP fertilizer was applied at the side of the row in two equal splits at 45 & 60 DAS. Harvesting of rhizome started from 21th October 2023 and ended at 26th November 2023. Data on yield and yield contributing characters were recorded and analyzed for report writing.

Result and Discussion

Yield and economic analysis has shown table 1. The highest yield was found from BARI Ol kachu-1 (30.32 t/ha) and the lowest from local variety (25.37 t/ha). The highest gross return (303200 Tk/ha), gross margin (116620 Tk/ha) and BCR (1.63) were calculated from BARI Ol kachu-1 and the lowest from local variety (253700 Tk/ha, 67120 Tk/ha and 1.36, respectively).

Farmers' opinion

Farmers prefer BARI Ol kachu-1 for higher yield potential with market demand and price.

Conclusion

The unavailability of good quality rhizome at growing season was the major problem in this area. So, Purpose of more dissemination and meet up vegetable crisis rhizome must be available in time at farmers' level.

Table 1. Yield and economic analysis of Ol kachu in Kishoreganj during 2022-23

Varieties	Yield	Gross return (Tk/ha)	TVC(Tk/ha)	Gross marginal (Tk/ha)	BCR
BARI Olkachu-1	30.32	303200	186580	116620	1.63
BAR Olkachu -2	27.23	272300	186580	85720	1.46
Local variety	25.37	253700	186580	67120	1.36

* TVC includes land preparation, labour, seed, fertilizers and insecticides, Ol kachu=Tk. 10 kg^{-1}

VALIDATION OF BIOFERTILIZER ON GROUNDNUT IN KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

Experiment was conducted at the farmers' field at Nikli, Kishoreganj during robi Season, 2023-2024.The highest number of nut/plant (23) was found from T_2 treatment and the lowest (18) in T_1 treatment. The maximum yield of nut (2.39t/ha) was found from T_2 and the minimum (2.07 t/ha) from T_1 treatment. The highest gross return (317900tk/ha) and gross margin (200050tk/ha) were observed from T_2 treatment due to its higher yield. The lowest gross return (289100tk/ha) and gross margin (183380tk/ha) were found from T1 treatment due to its lower yield.

Introduction

Groundnut (*Arachis hypogaea*) is an important leguminous oilseed crop. It is cultivated during rabi and kharif under rainfed condition. It contains high protein and fat. In Bangladesh groundnut cultivated in an area 34,857 ha of land and production is 66,744 ton (BBS. 2021). Brady rhizobium bacteria forms nodules in the roots of groundnut plant which fixes atmospheric nitrogen and used for its own and groundnut plants are being benefited simultaneously. Farmers of different char land areas of Bangladesh grow groundnut after receding of flood water. BARI has developed a good number of high yielding varieties of groundnut. Therefore, the experiment was undertaken to popularize the rhizobium bio-fertilizer technology for producing groundnut in the farmer's level.

Materials and Methods

The experiment was carried out at farmer's field of Nikli, Kishoreganj during rabi season, 2023-24. The study was set up in RCBD design with four dispersed replications. Groundnut Var. BARI Chinabadam-9 was used. The unit plot size was 3m x 4m. Treatments were: T_1=Without Rhizobium inoculant + P-K-S-Zn, T_2=With Rhizobium inoculant + P-K-S-Zn. Seeds were sown on 22 January 2024. The crop was fertilized with N-P-K-S-Zn @0-20-35-32-5 kg/ha and rhizobium bio-fertilizer @1.5 kg/ha during final land preparation. The intercultural operations Such as weeding, irrigation, pest control etc were done as and when necessary. The crop was harvested on 7 May 2024.

Results and Discussions

Results obtained from the study have been presented in Table 1. The tallest plant (51.3 cm) was obtained from T_2 treatment and the shortest (47.35 cm) from T_1 treatment. The highest number of nut/plant (23) was found from T_2 treatment and the lowest (18) in T_1 treatment. The maximum yield of nut (2.39t/ha) was found from T_2 and the minimum (2.07 t/ha) from T_1 treatment. The highest gross return (317900tk/ha) and gross margin (200050tk/ha) were observed from T_2 treatment due to its higher yield. The lowest gross return (289100tk/ha) and gross margin (183380tk/ha) were found from T_1 treatment due to its lower yield.

Farmer's opinion

Farmers are interested to grow groundnut var. BARI Chinabadam-9 with application of rhizobium inoculant due to its higher yield as well as higher income.

Conclusion

Considering yield potentiality and economic point of view, it was found that T_2 rhizobium inoculum was applied gave the better performance. The experiment should be repeated for more confirmation.

Table 1. Yield and yield attributes of Groundnut at Nikli, Kishoreganj during robi season, 2023-24

Treatment	Plant height(cm)	No. of plant /m	No. of Nut/plant	Nut yield (t/ha)	GR (Tk/ha)	TVC (Tk/ha)	GM (Tk/ha)
T_1	50.12	37	21	2.71	298100	114720	183380
T_2	51.3	36	23	2.89	317900	117850	200050

T_1=Without Biofertilizer (Rhizobium inoculant) + P-K-S-Zn @ 20-35-32-5 kg/ha T_2=With Biofertilizer (Rhizobium inoculant) +P-K-S-Zn @ 20-35-32-5 kg/ha. GR= Gross return, TVC = Total variable cost and GM= Gross margin; Price of groundnut = 110tk/kg.

ON FARM TRIAL OF CORIANDER LEAF CULTIVATION IN KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The field trial was executed at Kuliarchar, Kishoreganj during the year 2023-24 to know the performance of BARI released coriander variety in that area. Six varieties were selected for this experiment viz; BARI Dhonia-2, Faizer, Ispahani, Jamal and Vairab seed. The highest leaf yield was obtained from Jamal seed variety (6.89 t/ha) and the lowest from BARI Dhonia-2 (4.20 t/ha). The highest gross return (137800 Tk/ha), gross margin (69300 Tk/ha) and BCR (2.01) were calculated from Jamal seed and lowest from Voirab (96000 Tk/ha, 27500 Tk/ha and 1.40, respectively).

Introduction

Coriander is commonly known as 'Dhaniya' in India, Bangladesh and in some parts of Europe. All parts of the plant are edible but fresh leaves are the parts mostly used in cooking. It is an excellent source of Vitamin A and Vitamin C & packed with fiber, magnesium, protein and many other elements that are making it beneficial for health. It is a crop with high commercial turnover, due to its short cycle (on average 30 to 40 days) and good emergence, generating a fast economic return for producers, which is one of the main reasons for its presence in vegetable farming (PEREIRA *et al*., 2011). It is traditionally cultivated by small producers, in home, school and community gardens (GRANGEIRO *et al*., 2011; LINHARES *et al*., 2012). Coriander can be used in all type of curries, pickles. Coriander soups and juices are also popular. The leaves contain 52.10 g/100g carbohydrates, 21.93g/100g proteins and 1246 mg/100g calcium, respectively (Anon., 2013). Kuliarchar of Kishoreganj is very famous for coriander leaf cultivation. Farmers here usually cultivate coriander almost throughout the year. They are not very familiar with the varieties of coriander released by BARI and they used various private companies' hybrid seeds for the production of coriander. As a result, the cost of production is very high. If we can replace this hybrid variety with BARI released coriander varieties, then the production cost of the farmer will be reduced and at the same time the BARI released coriander varieties will be expanded.

Materials and Methods

The experiment was conducted at Kuliarchar, Kishoregonj during the year 2023-24 to know the performance of BARI released coriander varieties in that area. The design was RCBD with three replications. Six varieties were selected for this experiment viz; BARI Dhonia-2, Faizer, Ispahani, Jamal and Voirab seed. The unit plot sizes were 9 m × 4.5 m^2. Broadcast method was followed as farmers choice. Coriander seed were sown on 13 November 2023. The recommended fertilize doses were applied as N_{82} P_{25} K_{65} S_{25} $Zn_4B_2kg^{-1}$ respectively. Half of urea and MoP and all others fertilizers were used at final land preparation. Harvesting of leaf started from 27th December 2023 and ended at 12th January 2024. Data on yield and yield contributing characters were recorded and analyzed for report writing.

Result and Discussion

Yield and yield contributing characters of coriander leaf cultivation has shown table 1. The highest germination rate was obtained from jamal seed (95%) and lowest from Voirab seed (81%). Ispahani seed took lowest time to start its germination (5 days), on the other hand BARI Dhonia-2 took highest time to start its germination (11 days). Highest leaf yield was obtained from Jamal seed (6.89 t/ha) and the lowest from BARI Dhonia-2 (4.20 t/ha). The highest gross return (137800 Tk/ha), gross margin (69300 Tk/ha) and BCR (2.01) were calculated from Jamal seed and lowest from Voirab (96000 Tk/ha, 27500 Tk/ha and 1.40, respectively).

Farmers' opinion

Farmers didn't accept BARI released coriander variety BARI Dhonia-2 due to low rate of germination and low yield but smell is excellent than other varieties, As a result market demand and price was more than others.

Conclusion

However, most results are obtained during just one growing season, and there is little research on the productive potential and financial return of the coriander leaf cultivation as a function of local weather factors.

Table 1. Yield and yield contributing characters of coriander leaf during 2023-24

Varieties	Date of sowing	Days to germination started (DAS)	Days to 50% germination (DAS)	Germination percentage	Days to full germination (DAS)
BARI Dhonia-2	13/11/2023	11	18	83	25
Faizer seed	13/11/2023	7	10	88	12
Ispahani seed	13/11/2023	5	8	90	10
Jamal seed	13/11/2023	6	8	95	10
Vairob seed	13/11/2023	10	13	81	16

Table 2. Yield and economic analysis of coriander leaf cultivation in Kishoreganj during 2023-24

Variety	Leaf yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Dhonia-2	4.2	105000	68500	36500	1.53
Faizer seed	5.6	112000	68500	43500	1.64
Ispahani seed	6.68	133600	68500	65100	1.95
Jamal seed	6.89	137800	68500	69300	2.01
Voirab seed	4.8	96000	68500	27500	1.40

*TVC includes land preparation, labour, seed, fertilizers and insecticides, Price of coriander leaf = 20 tk/kg, BARI Dhonia-2=25 tk/kg.

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DEVELOPMENT OF POTATO-GROUNDNUT-FALLOW CROPPING PATTERN AGAINST EXISTING FALLOW-BORO RICE-FALLOW

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

An experiment was executed at the MLT site Nikli during 2023-2024 to introduce two crops based Potato-Groundnut-Fallow cropping patterns as well as to increase crop production and economic return of the farmers. It was laid out in RCBD design with four dispersed replications. The improved cropping pattern gave the highest yield (47 t/ha) against existing cropping pattern (7.57t/ha).The improved cropping pattern gave the higher gross margin (357193Tk/ha) compared to existing pattern (87722Tk/ha). The MBCR (2.68) indicates the superiority of the improved two crop based cropping pattern over the farmer's one crops based cropping pattern.

Introduction

The country is losing 0.49% cultivable land every year for high population pressure and other purposes (Hasan et al., 2013). Ensuring food security of increased population, the country needs to be increased food production by increasing cropping intensity. At last week of September or First week of October 20-30% areas of Nikli upazilla is suitable for crop cultivation. There is a great scope of increasing cropping intensity as well as crop productivity here. If we insert potato, farmers can easily cultivate two crops like groundnut after short duration potato. Considering the above facts, a trial on potato-groundnut-fallow was conducted in the same piece of land in a year at mohorkuna in Kishoreganj.

Materials and methods

The improved/alternate cropping pattern Potato-Groundnut-Fallow was conducted against Fallow-boro-Fallow at the MLT site, Nikli, Kishoreganj during 2023-24 in the medium highland. The soil of the experimental field was sandy loam. The experiment was laid out in RCBD design with four (four farmers' field) replications. Unit plot size was 10 decimal. All agronomic activities including sowing/ transplanting and harvesting dates, seed rate, plant spacing, fertilizer management (FRG, 2018) etc. are mentioned in table 1. Irrigation, pest managements and other intercultural operations were done as and when necessary. For comparison between crop sequences, the yields of all crops were converted into rice equivalent yield on the basis of prevailing market price of individual crops (Verma and Modgal, 1983). The economic indices like gross return, gross margin and benefit cost ratio (BCR) were also calculated on the basis of prevailing market price of the inputs and outputs (produces). Crop cut was done from an area of $1m^2$ at three spots from each plot for yield samples in all cases. The data on yield and economics of all the crops were taken plot wise and stated in table 1.

Results and discussions

Table 1 reveals that all the component crops in cropping pattern Potato-Groundnut-Fallow under improved practices (IP) gave significantly higher yield. On an average, the higher grain yield was obtained from Potato(12.13 t/ha^{-1}) in improved pattern (IP) than the existing pattern due to high yielding variety and improved management practices. The rice equivalent yield reveals that improved cropping pattern produced higher production over farmers' existing cropping pattern (Table 1). The total rice equivalent yield was 25.47 t/ha in improved cropping pattern which was (17.9 t/ha) higher than the existing (7.57 t/ha) one crop based cropping pattern. Lower rice equivalent yield (7.57 t/ha) was obtained in the farmer's pattern due to use of cardinal variety of boro rice and traditional management practices.

From the economic point of view, the improved two crops based cropping pattern showed its superiority over the farmer's one crop based cropping pattern. The gross margin was substantially higher in the improved pattern (357193Tk/ha) than that of the traditional pattern (87722 Tk/ha). The MBCR (2.68) indicates the superiority of the improved two crop based cropping pattern over the farmer's one crops based cropping pattern.

Farmers' opinion

Farmers opined that in improved two crops based cropping pattern, use of modern high yielding groundnut variety (BARI Chinabadam-9) with insertion of Potato instead of Fallow-boro-Fallow can increase farm production and income. They showed their interest to replace their existing Fallow-Boro-Fallow pattern by the newly developed Potato-Groundnut-Fallow cropping pattern.

Table 1. Management practices of alternate cropping pattern and existing cropping pattern at Kishoreganj during 2023-2024

Parameters	Improved Two crops based cropping pattern			Existing Cropping Pattern		
Crop	Potato	Groundnut	Fallow	Fallow	Boro rice	Fallow
Variety	Romana	BARI Chinabadam-9			BRRI dhan29	
Date of sowing/ transplanting	22-11-2023	23-01-24			15-01-2024	
Seed rate(kgha^{-1})	2000	102			50	
Spacing	60cm × 25cm	30cm × 15cm			20cm × 15cm	
Fertilizer dose (N.P.K.S.Zn and B kg ha^{-1})	171-48-185-42-4-2	0-15-25-20-2-1			140-18-53-08-03-02	
Date of harvesting	22-01-2024	07-05-24			16April, 2024	
Field duration (days)	61	105			108	
Yield (t ha^{-1})	12.13	2.25			7.57	
Rice equivalent yield (tha^{-1})	15.16	10.31			7.57	
Rice equivalent yield (tha^{-1})	25.47			7.57		
Gross return (TK/ha)	363900	247500			181680	
Total variable cost (Tk. /ha)	139577	114630			93958	
Gross margin (Tk./ha)	224323	132870			87722	
Gross margin (Tk.ha^{-1}), Pattern	357193			87722		
MBCR (Whole pattern)	2.68					

GR= Gross return, TVC = Total variable cost and GM= Gross margin; Price of groundnut = 110tk/kg. Price of potato = 30tk/kg.

DEVELOPMENT OF MUSTARD-BORO-T. AMAN CROPPING PATTERN AGAINST FALLOW -BORO -T. AMAN CROPPING PATTERN

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

An experiment was executed at the MLT site Hossainpur during 2023-2024 to introduce three crops based Mustard-Boro- T.aman cropping patterns as well as to increase crop production and economic return of the farmers. It was laid out in RCBD with four dispersed replications. The total rice equivalent yield was (16.98 t/ha) in improved cropping pattern which was (3.68 t/ha) higher than the existing (13.3 t/ha) two crop based cropping pattern. Lower rice equivalent yield (13.3 t/ha) was obtained in the farmer's pattern due to fallow period and traditional management practices. The MBCR (4.20) indicates the superiority of the improved three crop based cropping pattern over the farmer's two crops based cropping pattern.

Introduction

The present cropping intensity of the country is about 195%. Food requirement is estimated to be doubled in the next 25 years. Under such condition, it is very important to increase cropping intensity and for this reason, more suitable crop (s) should be accommodated in the existing cropping pattern. One of the major cropping pattern is practiced by farmers' in Kishoreganj region is Fallow -Boro-T.Aman. After harvest of T.Aman and before going to transplanting Boro rice, around 80-85 days remains fallow. To increase the cropping intensity, this fallow period might be utilized by inclusion of any short duration crop like mustard. BARI released mustard var. BARI Sarisha-14 is a high value oil crop might be introduced after T. Aman harvesting without hampering the existing cropping sequence. Again, the productivity of existing pattern is low due to local varieties and poor management practices. However, introducing modern variety and improved technology of Boro and T.Aman offered the opportunity to overcome the situation. Hence, the study was conducted with alternate cropping pattern Mustard-Boro- T. Aman cropping pattern against Fallow-Boro- T. Aman cropping pattern to increase yield and economic return.

Materials and methods

The improved/alternate cropping pattern Mustard-Boro- T.aman was conducted against Fallow-Boro-T. aman at the MLT site, Hossainpur, Kishoreganj during 2023-24 in the medium highland. The soil of the experimental field was sandy loam. The experiment was laid out in RCBD design with four (four farmers' field) replications. Unit plot size was 10 decimal. All agronomic activities including sowing/ transplanting and harvesting dates, seed rate, plant spacing, fertilizer management (FRG, 2018) etc. are mentioned in table 1. Irrigation, pest managements and other intercultural operations were done as and when necessary. For comparison between crop sequences, the yields of all crops were converted into rice equivalent yield on the basis of prevailing market price of individual crops (Verma and Modgal, 1983). The economic indices like gross return, gross margin and marginal benefit cost ratio (MBCR) were also calculated on the basis of prevailing market price of the inputs and outputs (produces). Crop cut was done from an area of $1m^2$ at three spots from each plot for yield samples in all cases. The data on yield and economics of all the crops were taken plot wise and stated in table 1.

Results and discussions

Table 1 reveals that all the component crops in cropping pattern Mustard-Boro- T.aman under improved practices (IP) gave significantly higher yield. The rice equivalent yield reveals that improved cropping pattern produced higher production over farmers' existing cropping pattern (Table 1). The total rice equivalent yield was 16.98 t/ha in improved cropping pattern which was (3.68 t/ha) higher than the existing (13.3 t/ha) two crop based cropping pattern. Lower rice equivalent yield (13.3 t/ha) was obtained in the farmer's pattern due to fallow period and traditional management practices.

From the economic point of view, the improved three crops based cropping pattern showed its superiority over the farmer's two crop based cropping pattern. The gross margin was substantially higher in the improved pattern (195380Tk/ha) than that of the traditional pattern (128080 Tk/ha). The

MBCR (4.20) indicates the superiority of the improved three crop based cropping pattern over the farmer's two crops based cropping pattern.

Farmers' opinion

Farmers opined that in improved three crops based cropping pattern, use of modern high yielding rice variety (BRRI dhan92) with insertion of mustard instead of Fallow-Boro-T. aman can increase farm production and income. They showed their interest to replace their existing T. aman-Fallow-Boro pattern by the newly developed Mustard-Boro- T.aman cropping pattern.

Table 1. Management practices and economic analysis of alternate cropping pattern and existing cropping pattern at Kishoreganj during 2023-2024

Parameters	Improved Three crops based cropping pattern			Existing Cropping Pattern		
Crop	Mustard	Boro	T. aman	Fallow	Boro	T. aman
Variety	BARI Sarisha-14	BRRI dhan92	BINA dhan-16		BRRI dhan89	BRRI dhan49
Date of sowing/ transplanting	14-11-2023	09-02-2024	09-08-2024		18-01-2024	18-08-2023
Seed rate(kgha^{-1})	8	50	50		50	50
Spacing	Broadcasting	20cm × 15cm	20cm × 15cm		20cm × 15cm	20cm × 15cm
Fertilizer dose (N.P.K.S.Zn and B kg ha^{-1})	115-32-40-25-2-2	130-30-53-08-0-02	140-18-53-08-0-02		173-60-78-18-0-02	140-18-53-08-0-02
Date of harvesting	30-01-24	17-06-2024	10-11-2024		02-06-2024	29-11-2023
Field duration (days)	77	129	95		136	103
Yield (t ha^{-1})	1.54	7.87	5.26		7.97	5.33
Rice equivalent yield (tha^{-1})	3.85	7.87	5.26		7.97	5.33
Rice equivalent yield (tha^{-1})	16.98					
Gross return (TK/ha)	92400	188880	126240		191280	127920
Total variable cost (Tk. /ha)	41350	88230	82560		108560	82560
Gross margin (Tk./ha)	51050	100650	43680		82720	45360
Gross margin (Tk.ha^{-1}), Pattern	195380			128080		
MBCR (Whole pattern)	4.20					

GR= Gross return, TVC = Total variable cost and GM= Gross margin; Price of mustard = 60tk/kg. Price of rice= 24tk/kg.

PERFORMANCEOF OF MUSTARD VARIETIES AT HAOR AREAS IN KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

A field trial was conducted in the farmer's field at Nikli, Itna, Karimganj, Pakundia, Hossainpur and Kishoreganj sadar in Kishoreganj district during the rabi season in 2023-24 to observe the yield performance of BARI sharisa-17 and BARI sharisa-14 in block approach. Yield of BARI sharisa-17 was found 1.52 t/ha and 1.56 t/ha of BARI sharisa-14. The highest gross return (101400Tk/ha), gross margin (58250 Tk/ha) and BCR 2.35 were calculated from BARI sharisa-14 and lowest gross return, gross margin and BCR were 98800 Tk/ha, 56300 Tk/ha and 2.32, respectively from BARI sharisa-17. 178 farmers were involved in the production program covering land area of 62.75 ha. Farmers were benefited to cultivate BARI Sarisha-14 due to higher seed yield and economic return.

Introduction

Now mustard is ranked as first oil seed crop in Bangladesh. Current oil seed production can't keep peace with the current oil demand of the country. The farmer's of Kishoreganj traditionally used local variety (Tory-7) for mustard seed production which have low yield potential. BARI has developed a good numbers of high yielding varieties (about 20 varieties) and many of the farmer's of haor don't know about these high yielding BARI variety. If short duration and high yielding BARI variety inserted in these area, cropping intensity and farmers' income may increase and reduce oil scarcity of the country. So the present program had been taken to assess the performance and to introduce a new variety in different haor area to meet up the oil scarcity as well as increase productivity.

Materials and methods

An experiment on mustard was conducted at farmer's field of Nikli, Karimganj, Pakundia, Hossainpur and Kishoreganj sadar in Kishoreganj district during rabi 2023-24 cropping season to know the performance of BARI sharisa-17 and BARI sharisa-14 in this haor areas. The land area were 10.12ha for BARI sharisa-17 and 52.63ha for BARI sharisa-14 in different upazilas of Kishoreganj. Seeds of mustard were sown on 15 November-5 December 2023. The seeds were sown in broadcasting method. The recommended fertilizer doses were applied at the rate of $N_{115}P_{32}K_{40}S_{25}Zn_2$ and B_2 kg ha^{-1}. Among the fertilizers half of urea and all others fertilizers were applied as basal during final land preparation. The remaining half urea was applied as top dress at 25 DAS. In cultivating time there were no infestations of any insects or disease. Mustard was harvested on 05-16 February 2024. Yield Data has collected and calculated carefully.

Results and discussion

Yield and economic data of BARI sharisa-17 and BARI sharisa-14 has presented in the Table 1. Crop durations were 85-90 days for BARI sharisa-17 and 81-85 days for BARI sharisa-14. Seed yield of BARI sharisa-17 was calculated 1.52 t/ha and 1.56 t/ha of BARI sharisa-14. The highest gross return (101400 Tk/ha), gross margin (58250 Tk/ha) and BCR (2.35) were calculated from BARI sharisa-14 followed by BARI sharisa-17 (98800 Tk/ha, 56300 Tk/ha and 2.32, respectively).

Table 1. Yield and economic performance of BARI sharisa-17 and BARI sharisa-14 during 2023-24

Variety	Area (ha)	No. of Farmers	Duration (days)	Seed yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI sharisa-17	10.12	70	85-90	1.52	98800	42500	56300	2.32
BARI sharisa-14	52.63	108	81-85	1.56	101400	43150	58250	2.35

*TVC includes labour, Land preparation, Seed, fertilizers and Insecticides, Price of Mustard= Tk. 65 kg^{-1}

Farmers' opinion

Farmers were happy to get higher yield. They preserved their seeds and will go for cultivation in the next year. They sold seeds of BARI Sarisha-14 and BARI Sarisha-17 among the neighboring farmers and they were also happy and interested to cultivate in the next year.

Conclusion

Farmers have been cultivating these improved varieties of mustard for the past few years but this year some plots have been attacked by Alternaria blight, so resistant varieties are needed. Extension personnel should encourage farmers to spray fungicides after flowering stage to increase yield. More production program should be done for making availability of BARI Sarisha-14 and BARI Sarisha-17 to the rural farmer's.

Acknowledgement

It is acknowledged to the project entitled 'Enhance production of oil crop (BARI part) project' for his generous and stimulating financial and logistic support.

PERFORMANCE OF SUNFLOWER VARIETY AT HAOR AREAS IN KISHOREGANJ

M. MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

A field trial was conducted in the farmer's field at Nikli, Kishoreganj during rabi 2023-24 cropping season to assess the performance and disseminate the BARI Surjomukhi-3 among the farmers in the haor area. The total land area was 1 acre. Yield was found (1.53 t/ha) from BARI Surjomukhi-3. The gross return (96390 Tk/ha), gross margin (52890 Tk/ha) and BCR 2.22 were calculated from the BARI Surjomukhi-3.

Introduction

Haor is bowl-shaped large tectonic depression and receive surface runoff water by rivers, Khals and consequently, a haor becomes very extensive water body in monsoon period. In Bangladesh, 17% of the country's land covering by haor area. From the month of April-May haor get its sea like appearance and relief up to October. Most of the farmers are haor agriculture, practicing Boro-fallow-fallow cropping pattern. They transplant boro in the last week of January to first week February. Before going to boro season most the land remain fallow i.e; about 90 days. In some lands are high lands in the haor farmers are cultivating sweet potato, chilli, maize and other vegetable crops. Like mustard, sunflower is one of the vital oil seed crops and has scope to adapt. BARI has developed a sunflower variety. Earlier, sunflower was not cultivated in the haor but for the last two/three years, OFRD, BARI Kishoreganj has started cultivating sunflower in the haor area. This year, government supported demonstration of sunflower was set up by DAE. Therefore, the present pilot production program was taken to introduce as a new variety in the haor area to meet up the oilseed scarcity.

Materials and methods

An experiment on BARI Surjomukhi-3 was conducted at the farmers field of Nikli, Kishoreganj during rabi season 2023-24 to assess the performance and disseminate the variety in the haor area. The land areas were 1 acre. Seeds were sown on 06 November 2023. Spacing was 50 cm x 25 cm. The seeds were sown in line sowing method by BARI seeder. Before sowing all seeds were treated with provex @ 2.5 g kg^{-1}. The recommended fertilizer doses were applied at the rate of $N_{90}P_{40}K_{75}S_{30}$ Zn_8 and B_7 kg ha^{-1}. Among the fertilizers half of urea and all others fertilizers were applied as basal during final land preparation. The remaining half urea was applied as top dress at 25 DAS. In cultivating time there were infestations of insects and three splitted spraying were done by Karate. Crops were harvested on 16 February 2024. Yield data was collected and calculated carefully.

Results and discussions

Yield and economics data of BARI Surjomukhi-3 has presented in the Table 1. Crop durations were 102 days. Seed yield was calculated 1527 kg/ha. The gross return (96390 Tk/ha), gross margin (52890 Tk/ha) as well as BCR 2.22 were calculated from the BARI Surjomukhi-3.

Table 1. Yield performance of BARI Surjumukhi-3 in Kishoreganj during 2023-24

Variety	Area (decimal)	Seed yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Surjomukhi-3	100	1.53	96390	43500	52890	2.22

*TVC includes land preparation, labour, seed, fertilizers and insecticides, Price of sunflower = 63tk/kg

Farmers' Opinion

Since sunflower cultivation was totally new in the haor area thus farmers are interested to get a new variety and they pleased to observe the dwarf type and yield performance of BARI Surjomukhi-3. Farmers are facing problem to sell their product. As a result sunflower has to be sold at lower price than mustard.

Conclusion

It's a new practice and a good variety for the haor areas farmer. If they can sell their produce easily in the local market then it would be popular sharply.

Acknowledgement

It is acknowledged to the project entitled 'Enhance production of oil crop (BARI part) project' for his generous and stimulating financial and logistic support.

PRODUCTION PROGRAM OF BARI CHINABADAM-8 VARIETY IN KISHOREGANJ

M. MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The production program of groundnut was taken in the farmer's field at Hossainpur upazila of Kishoreganj during rabi 2023-24 cropping season to assess the performance and disseminate the BARI Chinabadam-8 among the farmers. The total land area was 1.5 acre. Yield was found (2.13 t/ha) from BARI Chinabadam-8. The gross return (213000 Tk/ha), gross margin (97350 Tk/ha) and BCR was calculated at 1.84 from the BARI Chinabadam-8. Farmers were benefited to cultivate BARI chinabadam-8 due to higher yield and economic return.

Introduction

Groundnut (Arachis hypogaea) is an important leguminous oilseed crop. It is cultivated both in Rabi and Kharif seasons in Bangladesh. This crop is an important source of oil (43-55%) and protein (25-28%), hence used as food and feed. It is a good source of edible oil as it contains about (50% oil). It is excellent source of vitamins and contains high levels of thiamine, riboflavin and niacin. Being highly digestible, the children's food made of groundnut can help in meeting part of the nutritional needs. Groundnut, being a drought tolerant crop, it require low input and produces high output for the farmer. Since it is a leguminous crop it can fix atmospheric nitrogen enhancing soil health by adding nitrogen to soil. Farmer's of haor areas of Bangladesh usually grow groundnut with local variety which produce lower yield and susceptible to pest and disease. BARI has developed some modern varieties of groundnut, which are supposed to be higher yield and less susceptible to pest and disease. The present study was undertaken to observe the yield performance of BARI Chinabadam-8 in block approach.

Materials and Methods

The experiment was conducted at MLT site, Hossainpur during the season, 2023-24. OFRD, BARI, Kishoreganj has supplied all inputs like seed of BARI chinabadam-8, chemical fertilizers and pesticides to the farmers. Total land area was 1.5 acres. Seeds were sown maintaining a spacing of 30 cm x 15 cm. Before sowing, seeds were treated with provex @ 0.2% to prevent seed and soil borne disease. Seeds were sown on 03 December, 2023. All nutrients were applied following BARI technology handbook (50-50-30-35-2-1.5 kg of NPKSZn and B ha^{-1}). Other intercultural operations were done as when necessary. The crop was harvested on 20 April, 2024. Data on yield and other characters were recorded and analyzed statically. The gross return was calculated on the basis of prevailing market price of the commodities.

Results and Discussion

The performance of BARI Chinabadam-8 was presented in Table 1. The seed yield of BARI Chinabadam-8 was 2.13tha^{-1}. Gross return, total variable cost and gross margin were Tk 213000 ha^{-1}, Tk 115650 ha^{-1} and Tk. 97350 ha^{-1} respectively. Satisfactory seed yield and attractive gross margin was achieved might be due to sowing at optimum time and timely proper management practices like timely application of fertilizer, irrigation and pest management.

Table1. Yield, cost and return analysis of BARI Chinabadam-8 during 2023-24

Location	No. of Farmers	Area (acre)	Seed yield (t ha^{-1})	Gross return (Tk. ha^{-1})	Total variable cost (Tk. ha^{-1})	Gross margin (Tk. ha^{-1})	BCR
Hossainpur	10	1.50	2.13	213000	115650	97350	1.84

Market price of Chinabadam @100 $Tk.kg^{-1}$

Farmers' opinion

Farmer`s were happy to see the high yielding variety of BARI Chinabadam-8. Although groundnut is profitable crop, farmers face various socioeconomic problems during its cultivation. The major problems are lack of irrigation facility, germination failure of last year stored seed, scarcity of seed on time and lack of extension personnel visit and their suggestion.

Conclusion

Groundnut cultivation is profitable to the farmers. This variety should be expanded among all other farmers.

Acknowledgement

It is acknowledged to the project entitled 'Enhance production of oil crop (BARI part) project' for his generous and stimulating financial and logistic support.

PRODUCTIVITY AND PROFITABILITY OF SUMMER CHILLI CULTIVATION IN SOME SELECTED AREAS OF KISHOREGANJ DISTRICT

M. MOHIUDDIN

Abstract

A survey was carried out in two upazillas of Kishoreganj district to assess the existing agronomic practices, productivity and profitability as well as to identify the problems of production of summer chilli during 2023-24. Tabular method was followed. The majority of the farmers sowed their seeds during the second to third week of February. The average yield and gross margin were observed at 4.68 t/ha and 259882 Tk./ha, respectively. Per kilogram cost and return were estimated at Tk. 55.34 and 105.51, respectively. Lack of quality seed, high insect pest infestation and lack of scientific production technology were the major problems found in the study areas.

Introduction

Chilli is one of the most important commercial spice crops used extensively worldwide. In summer season, chilli was cultivated in an area of 20361 hectare during 2021-22, with production of 1.29 lakh mt (BBS, 2022). Total area of summer chilli in Kishoreganj was 885 ha and production 1814 mt (DAE, 2024). Chilli is usually cultivated in winter in Bangladesh and the price is 52 Tk/kg (BBS, 2022) during harvesting time. As the production of summer chilli is relatively low, the price of chilli increased during this time up to 500-1000 Tk/kg this year (The Daily Star, 2023). Its demand is very high in summer season but the production is very low due to lack of good varieties. Spices research Centre of BARI has developed one variety (BARI Morich-2) for Kharif season. Therefore, increasing the production of summer chilli is very important in the socio-economic context of the country. Earlier some socio-economic studies have been done on different aspect in different locations for winter chilli cultivation (Sanap *et al.* 2023; Chowdhury *et al.* 2012 and Islam et al. 2011) but no study was done on summer chilli till now. Hence this study has been taken with the following objectives.

1) To find out the agronomic practices and productivity of summer chilli cultivation. 2) To estimate cost and return of summer chilli cultivation at farm level and 3) To identify the problems faced by the farmers in cultivating summer chilli.

Methodology

The present study was conducted in purposively selected in intensively summer chilli growing two upazilas namely Pakundia and Hossainpur under Kishoreganj district. Purposive random sampling techniques was followed and a total of 60 farmers were randomly selected from the list of all chilli growers in four villages, taking 15 from each. The collected data were coded, edited, summarized, tabulated and analyzed to fulfill the objectives of the study.

Results and Discussion

Agronomic practices: Farmers followed transplanting method for chilli production in the study area. Maximum farmers (69%) sowed the seeds in their seed bed during second to third week of February (Table 1). The time of seedling transplanting depended on wheat and potato harvest completed. Generally farmers transplant 35-40 days old seedlings from seed bed to main field. All of the farmers used local variety seed named Paboyia variety. Among the sources, the maximum (62%) farmers purchased seeds from their neighbor followed by own seed saved from the previous harvest (22%) while the rest (17%) purchased from the market. The average seed rate per hectare of summer chilli cultivation was found to be 4.94 kg. The seed rate used by the farmers was three times higher than the recommended seed rate of BARI Morich 2: 500-800g.

Financial profitability of Summmer Chilli cultivation

Table 2 revealed that on an average, total cost, return and gross margin of summer chilli cultivation was estimated at Tk. 258980, Tk. 493792 and Tk. 259882 per hectare, respectively. Average yield per hectare was observed 6.73 metric ton. The cost and return per kilogram of chilli cultivation was Tk. 55.34 and Tk. 105.51.

Problems of Summer Chilli cultivation

Although summer chilli is profitable crop though lack of quality seed, adverse weather, severe infestation of insect and diseases, lack of knowledge about improved production technology, low rate

of seed germination and lack of storage facility were the most important limitations of producing it found in the study area (Table 3).

Conclusion and Recommendations

Chilli provided high return to investment. Traditional cultural practices are being followed by the farmers so, it is necessary to provide information regarding appropriate level of input use and time of operation for achieving higher yield and profits. Altogether, scientifically innovated modern production technology with its new HYV/cultivars to counter the climatic changes and pest incidences is very needed at this time. Pathologist and entomologist should conduct research on summer chilli for controlling insect pest infestation. Department of agricultural marketing should give more importance on market monitoring to ensure fair market price.

Table 1. Distribution of farmers according to different sowing date and source of seed

Date of sowing		Percent of the farmer
Month	Week	
February	1-2	41
February	3-4	59
Source of seed		
Own seed		22
Purchased		78
Used seed rate (kg/ha)		4.94
Rec. seed rate (gm/ha)		500-800

Table 2. Per hectare production cost of cultivation

Cost items	All
Cost of land preparation	11362 (4)
Cost of human labour	144320 (56)
Cost of seeds	14114 (5)
Cost of fertilizers	30874 (12)
Cost of pesticide	33240 (13)
Land use cost	21171 (8)
Interest on op. capital	3899 (2)
Total Variable Cost	233910 (90)
Total Fixed Cost	25070 (10)
Total Cost	258980 (100)
Yield (Kg/ha)	4680
Gross return (Tk./ha)	493792
Gross margin (Tk./ha)	259882
Cost per kg	55.34
Return per kg	105.51

Table 3. Problems of summer Chilli cultivation in the study areas

Types of problems	% of farmers responded
Lack of quality seed	96
Heavy rainfall at harvesting	93
High infestation of pests	86
Lack of knowledge about improved production technology	73
Low rate of seed germination	71
Lack of storage facility	61

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ON-FARM VALIDATION AND TECHNOLOGY DISSEMINSATION OF RELAY SWEET GOURD WITH POTATO AT FARMERS FIELD

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

An experiment was executed at the MLT site Hossainpur during 2023-2024 to introduce relay sweet gourd with potato cropping practice as well as to increase crop production and economic return of the farmers. It was laid out in RCBD design with six dispersed replications. The improved cropping practice gave the highest potato equivalent yield (32.74 t/ha) against existing cropping practice (21.65t/ha).The improved Relay sweet gourd with potato cropping practice showed its superiority over the farmer's potato cultivation. The improved relay cropping practice gave the higher gross margin (551660Tk/ha) compared to existing practice (332686Tk/ha).

Introduction

In Bangladesh, Potato is the third most important crop in Bangladesh next to rice and wheat. It is grown not only for food, but also for animal feed, industrial uses and seed tuber production. Tuber Crop research Centre (TCRC), BARI has developed a good number of potato varieties which are supposed to be higher yielder and less susceptible to insect pest and diseases. On the other hand, sweet gourd holds a special significance as a versatile culinary ingredient known for its vibrant orange hue and distinctively sweet flavour. Sweet gourd is rich in nutrients such as vitamins A, C, and E, as well as minerals like potassium and magnesium. Its seeds, often roasted and enjoyed as snacks, are packed with protein, fibre, and healthy fats. Farmers of the Hossainpur usually cultivate potato in their field. If farmers adapted to relay sweet gourd with potato cropping practice, productivity, cropping intensity, as well as farmer's income will be increased. Relay sweet gourd with potato is a new established technology developed and already published as a booklet by On-Farm Research Division, BARI, Kishoreganj. Now it is time to validate and disseminate at farmers field. So, the experiment was taken to on-farm validation and technology dissemination of relay sweet gourd with potato at farmers field and hence to increase economic return, employment opportunity and woman's participation, cropping intensity with nutritious food as well as retain soil fertility.

Materials and methods

The improved/alternate cropping practice based on relay sweet gourd with potato was conducted against potato at the MLT site, Hossainpur, Kishoreganj during 2023-24. The soil of the experimental field was sandy loam. The experiment was laid out in RCBD with six (six farmers' field) replications. Unit plot size was 10 decimal. All agronomic activities including sowing/ transplanting and harvesting dates, seed rate, plant spacing, fertilizer management (FRG, 2018) etc. are mentioned in table 1. Irrigation, pest managements and other intercultural operations were done as and when necessary. For comparison between crop sequences, the yields of all crops were converted into potato equivalent yield on the basis of prevailing market price of individual crops (Verma and Modgal, 1983). The economic indices like gross return, gross margin and benefit cost ratio (BCR) were also calculated on the basis of prevailing market price of the inputs and outputs (produces). Crop cut was done from an area of $1m^2$ at three spots from each plot for yield samples in all cases. The data on yield and economics of all the crops were taken plot wise and stated in table 1.

Results and discussions

Table 1 reveals that all the component of relay sweet gourd with potato under improved practices (IP) gave significantly higher yield. The potato equivalent yield reveals that improved practice produced higher production over farmers' existing practice (Table 1). The total potato equivalent yield was 32.74 t/ha in improved practice which was (11.09 t/ha) higher than the existing (21.65 t/ha) cropping practice. Lower potato equivalent yield (21.65 t/ha) was obtained in the farmer's practice due to use of single crop and traditional management practices.

From the economic point of view, the improved Relay sweet gourd with potato cropping practice showed its superiority over the farmer's sole potato cultivation. The improved cropping practice gave the higher gross margin (551660Tk/ha) compared to existing practice (332686Tk/ha).

Farmers' opinion

Farmers opined that relay sweet gourd with potato by using modern high yielding potato variety (BARI Alu-7) with insertion of sweet gourd instead of potato can increase farm production and income. They showed their interest to replace their existing sole potato cultivation by the newly developed relay sweet gourd with potatocropping practice.

Table 1. Management practices and economics of relay sweet gourd with potato at Kishoreganj during 2023-24

Parameters	Relay sweet gourd with potato		Potato
Crop	Potato	Sweet Guard	
Variety	BARI Alu -7	Moyuri/ Dhaka-1	BARI Alu -25
Date of sowing/ Transplanting	05.11.2023	15.11.2023	10-11-2023
Seed rate(kgha^{-1})	1500	6	2000
Spacing	60 x 25cm	2 x 2m	60 x 25cm
Fertilizer dose (N.P.K.S.Zn and B kg ha^{-1})	115-30-125- 20-04-02	Relay with potato	115-30-125- 20-04-02
Date of harvesting	15-01-2024	20-03-2024	08-02-2024
Field duration (days)	71	126	90
Yield (t ha^{-1})	17.25	25.81	21.65
Potato equivalent yield (tha^{-1})	17.25	15.49	21.65
Total potato equivalent yield (tha^{-1})	32.74		21.65
Gross return (TK.ha^{-1})	431250	387150	541250
Total variable cost (Tk. ha^{-1})	1,91255	75485	208564
Gross margin (Tk. ha^{-1})	239995	311665	332686
Whole Gross margin (Tk. ha^{-1})	551660		332686

Unit price (Tk. kg^{-1}): Potato = 25 and Sweet gourd = 15

PILOT PRODUCTION PROGRAM OF BARI DEVELOPED POTATO VARIETIES IN KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The pilot production program was conducted at Hossainpur upazila of Kishoreganj during the rabi season 2023-24 to popularize and disseminate the BARI developed potato varieties among the farmers in the char area. Three potato varieties were evaluated i.e. BARI Alu-47, BARI Alu-49 and BARI Alu-25 in the farmers field. The total land area was 4.20 acres. The highest yield was found from of BARI Alu-25 (29.37) followed by BARI Alu-47 (28.13) and BARI Alu-49 (27.68). The highest gross return (513975 Tk/ha), gross margin (209395 Tk/ha) and BCR (1.69) were calculated from BARI Alu-25 and the lowest gross return (470560 Tk/ha), gross margin (165980 Tk/ha) and BCR (1.54) from BARI Alu-49 due to price variation of different types of potato depends on its colour and shape. Farmers were happy to observe the performance of the varieties and demanded quality seed for next year cultivation.

Introduction

Potato (*Solanumtuberosum*) is the 4th world crop after wheat, rice and maize. Bangladesh is the 7th potato production country in the world (FAOSTAT, 2012). Potato is one of the main commercial crops grown all over the country. Potato cultivation has been getting popular over the last couple of years. Total area and production of potato during 2018-19 has been estimated as 468421 hectares and 9655000 ton in Bangladesh (BBS, 2020). Farmers of Kishoreganj char areas cultivate old variety such as diamond and cardinal resulting low yield and less benefit. Taking this in mind, this pilot production programme was taken in the char area of Kishoreganj to popular latest high yielding BARI varieties and increase farmers income.

Materials and methods

The production program was conducted with BARI variety i.e. BARI Alu-47, BARI Alu-49 and BARI Alu-25 to popularize and disseminate the variety among the farmers in char areas during rabi season in 2023-24. The land areas were 4.20 acres. Seeds were sown on 02-05 December 2023. Spacing was 60 cm x 30 cm. The recommended fertilize doses were applied N_{156} P_{42} K_{120} S_{21} $Zn_{3.5}$ $B_{1.2}$ kg^{-1} respectively. Half of urea and all others fertilizers were used at final land preparation. The remaining part of N fertilizer was applied at the side of the row in two equal splits at 30 & 60 DAS. One weeding and two earthing up was done after 25 DAS and 45 DAS. In cultivating time there were found some insects and pest infestations which controlled by spraying karate, mancozeb and indofil. Crops were harvested on 01-03 March 2024. Yield data has collected and calculated carefully.

Results and discussions

Mean tuber yield among the tested varieties were ranged from 27.68 to 29.37 t/ha. The highest tuber yield (29.37 t/ha) was obtained from BARI Alu-25 followed by BARI Alu-47 and BARI Alu-49. The lowest yield was obtained from BARI Alu-49 (27.68 t/ha) at Hossainpur, MLT site, Kishoreganj.

The highest common scab infection was observed in (BARI Alu-47) (1.13%) where the lowest in BARI Alu-25. Maximum virus infected was found in BARI Alu-47 (1.97%), where the lowest infection was observed in BARI Alu-49 (1.13%).

The highest late blight infection was observed in BARI Alu-47 (8.79%). All the tested varieties showed moderate to severe susceptibility to late blight diseases. The lowest foliage infection was recorded in BARI Alu-25 (7.75%).

The highest gross return (513975 Tk/ha), gross margin (209395 Tk/ha) and BCR (1.69) were calculated from BARI Alu-25 and the lowest gross return (470560 Tk/ha), gross margin (165980 Tk/ha) and BCR (1.54) from BARI Alu-49 due to price variation of different types of potato depends on its colour and shape.

Farmers' assessment

Farmers of char areas preferred and elongated varieties of potatoes like BARI ALu-25 and BARI Alu-47 as its high price and demand in the market. They showed their interest to store some seeds of these two varieties to grow in next year.

Conclusion

Farmers are highly interested to produce BARI variety but seed is not available in time. BADC have to take initiative to supply latest high yielding BARI varieties seed in next year.

Table 1. Yield and economic analysis of different variety of potato during 2023-24

Variety	Area (acres)	Yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Alu-25	3	29.37	513975	304580	209395	1.69
BARI Alu-47	0.60	28.13	478210	304580	173630	1.57
BARI Alu-49	0.60	27.68	470560	304580	165980	1.54

*TVC includes land preparation, labour, seed, fertilizers and insecticides, Price: BARI Alu-25=17.50Tk/kg., BARI Alu-47 & 49 = 17 Tk/kg.

PILOT PRODUCTION PROGRAM OF BARI DEVELOPED SWEET POTATO VARITIES IN HAOR AREAS

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The field experiment was conducted during the rabi season of 2023-2024 in the farmer's field of Multi-location Testing (MLT) site, Nikli, Kishoreganj to find out the suitable variety of sweet potato for upper catena of haor areas. BARI released two sweet potato varieties were used for this experiment viz., i) BARI SP-12 and BARI SP-17. The highest yield was obtained from BARI SP-12 (35.61 t/ha). The highest gross return (356100 Tk/ha) and gross margin (214550 Tk/ha) was found from BARI SP-12 followed by BARI SP-17.

Inroduction

Sweet potato (*Ipomoea batatas*) is a major food crop, which serves as a source of energy and nutrition in many countries. The crop is regarded as a food security crop due to its low input requirements, ease of production and high nutritional component. In recent years, Bangladesh Agricultural Research Institute (BARI) has developed several high-yield beta-carotene-enriched sweet potato varieties that are able to grow in unfavorable situations to satisfy the daily intake of vitamin A. For large-scale dissemination throughout the country, these varieties need on-farm validation trials in the various agro-ecological zones (AEZ) to identify the appropriateness of the different varieties and get feedback from the farmers. Therefore, the present study was undertaken to find out a suitable sweet potato variety for haor areas under AEZ-21 at farmer's field condition.

Materials and Method

The experiment was conducted at the farmer's field of MLT site, nikli, Kishoreganj during the rabi season 2023-24 with a view to find out the suitable sweet potato variety for upper catena of haor areas. The experiment was laid out in a randomized complete block design with six dispersed replications (Ferdous et al. 2018). There were three treatments. Vine of sweet potato variety was planted in lines on 06 November 2023 at the spacing of 60 cm x 30 cm. The cutting was about 15 cm in length with 5-6 nodes. The unit plot size was 11 decimal. One weeding was done at 30 days after planting (DAT). The source of NPKS and Zn were urea, TSP, MP, gypsum, and zinc sulphate. Half of urea and all other fertilizers were applied at final land preparation. Remaining urea was top-dressed in two equal splits at 30 and 55 days after transplanting (DAT). The crop was harvested during 24 February 2024 at full maturity. Data on tuber yield was recorded from $6m^2$ (2 m x 3 m) areas. Plants were not harvested near the borders of each plot to avoid the border effect. Total gross return under a treatment was calculated by multiplying the total gross amount of crop produced by the farm-gate price. The total gross margin was calculated by subtracting the cost of production from the total gross return (Anwar et al. 2021).

Results and Discussion

The highest sweet potato yield was obtained from BARI SP-12 (35.61 t/ha). Cost and return analysis is presented in Table 1. The highest gross return (356100 Tk/ha) and gross margin (214550Tk/ha) was found in BARI SP-12. The gross return of BARI SP-17 was (312000 Tk/ha) and gross margin was (181600Tk/ha) and the highest BCR 2.52 were calculated from the BARI SP-12.

Conclusion

Orange flesh BARI SP-12 and purple flesh BARI SP-17 varieties were evaluated in haor region, the high yielder sweet potato var. BARI Mishti Alu-12 had acceptable tuberous root yields with maximum economic profit. Though BARI SP-17 was low yielder but already created local market demands due to its purple colour and sweetness.

Table 1. Yield and economics of sweet potato at MLT site, Nikli, Kishoreganj during 2023-24

Treatments	Yield (t/ha)	Gross return	TVC	Gross margin	BCR
BARI SP-12	35.61	356100	141550	214550	2.52
BARI SP-17	31.20	312000	130400	181600	2.39

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PILOT PRODUCTION PROGRAMME OF BARI MUSTARD VARIETIES IN KISHOREGANJ

M.MOHIUDDIN AND Y. H. RAYHAN

Abstract

The production program was conducted at MLT site Nikli, Hossainpur Kishaoreganj sadar and Karimganj under OFRD, Kishoreganj during the rabi season 2023-24 to popularize and disseminate of BARI mustard varieties among the farmers in this area. The total land area was 48 acres. The highest yield was obtained from BARI sarisha-14 (1.63 t/ha) and the lowest from BARI sarisha-17 (1.57 t/ha). The highest average gross return (105950 Tk/ha), gross margin (63390 Tk/ha) and BCR (2.49) were calculated from BARI sarisha-14 and the lowest from BARI sarisha-17 (102050 Tk/ha, 60390 Tk/ha and 2.45, respectively).

Introduction

Now mustard is ranked as first oil seed crop in Bangladesh. Current oil seed production can't keep peace with the current oil demand of the country. The farmer's of Kishoreganj traditionally used local variety (Tory-7) for mustard seed production which have low yield potential. BARI has developed a good numbers of high yielding varieties (about 20 varieties) and many of the farmer's of haor areas don't know about these high yielding BARI variety. If short duration and high yielding BARI variety inserted in these area, cropping intensity and farmers' income may increase and reduce oil scarcity of the country. So the present program was taken to popularize and disseminate of new variety in different haor area to meet up the oil scarcity as well as increase productivity.

Materials and methods

The experiment was conducted at farmer's field of Nikli, Karimganj and Kishoreganj sadar in Kishoreganj district during rabi 2023-24 cropping season to popularize and disseminate BARI sharisa-14 and BARI sharisa-17 in this areas. The land areas were more than 48 acres for BARI varietie. Seeds of mustard were sown on 25 November- 10 December 2023. The seeds were sown in broad casting method. The recommended fertilizer doses were applied at the rate of $N_{115}P_{32}K_{40}S_{25}Zn_2$ and B_2 kg ha^{-1}. Among the fertilizers half of urea and all others fertilizers were applied as basal during final land preparation. The remaining half urea was applied as top dress at 25 DAS. In cultivating time a small incidence of Alternaria blight was observed, controlled by spray Rovral 50 wp @4 gm/l water at the onset of disease symptoms which no effect on yield. Mustard was harvested on 17 March- 25 March 2024 (Table 1). Yield data has collected and calculated carefully.

Results and discussion

The performance of BARI Sharisha-14 is presented in Table 2. Average seed yield of BARI Sharisha-14was found 1.63 t/ha. Crop durations were 81-85 days for BARI sharisa-14. Average gross return (105950Tk/ha), gross margin (63390Tk/ha) and BCR 2.49 were calculated from the BARI sharisa-14.

Farmers' opinion

Farmers are interested to grow BARI released variety of mustard in this area. They opined that the Mustard (BARI Sarisha-14) cultivation gave the higher economic return against BARI sarisha-17. Farmers also opined that training on production technology of Mustard by research organization is needed.

Conclusion

Results revealed that mustard production is profitable at the farm level. The average yield of mustard is 1.63 t/ha (BARI Sarisha-14) and 1.57 t/ha (BARI Sarisha-17) with gross margin BDT 63390/ha (BARI Sarisha-14) and BDT 60390/ha (BARI Sarisha-17), respectively.

Table 1. Crop management practices of BARI mustard varieties at different MLT site of Kishoreganj during the year of 2023-24.

Location	Variety	Farmer (nos.)	Area (acre)	Date of sowing	Fertilizer dose (N-P-K-S-Zn-B kgha^{-1})	Irrigation and Urea top dressing (DAS)	Date and DAS to harvest
Kishoreganj	BARI Sarisha-14	30	48	25 November -10 December 2023	115-32-40-25-2-2	Irri: 2 Urea top: 25	17 March-25 March 2024
Kishoreganj	BARI Sarisha-17	3	0.5	25 November -05 December 2023	115-32-40-25-2-2	Irri: 2 Urea top: 25	17 March-25 March 2024

Table 2.Yield and economic return of BARI mustard varieties at different MLT site ofKishoreganj during 2023-24.

Location	Variety	Seed yield (t ha^{-1})		Gross return (Tk ha^{-1})	Total cost (Tk ha^{-1})	Gross margin (Tk ha^{-1})	BCR	Seed stored (kg)
		Range	Average					
Kishoreganj	BARI Sarisha-14	1.58-1.66	1.63	105950	42560	63390	2.49	200
Kishoreganj	BARI Sarisha-17	1.53-1.59	1.57	102050	41660	60390	2.45	35

*TVC includes labour, Land preparation, Seed, fertilizers and Insecticides, Price of Mustard= Tk. 65 kg^{-1}

PILOT PRODUCTION PROGRAMME OF SUNFLOWER VARIETY IN KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

A field trial was conducted in the farmer's field at Kishoreganj sadar during rabi 2023-24 cropping season to assess the performance and disseminate the BARI Surjomukhi-3 among the farmers. The total land area was 3 acre. Yield was found (1.24 t/ha) from BARI Surjomukhi-3. The gross return (78120 Tk/ha), gross margin (35440 Tk/ha) and BCR was calculated at 1.83 from the BARI Surjomukhi-3.

Introduction

Acute shortage of edible oil has been prevailing in Bangladesh during the last several decades. This shortage inherited from the past has been met through imports, using a huge amount of foreign exchange every year. In such a situation, increasing production and marketing of oilseed will help us to reduce our import dependence on edible oil. In order to meet the increasing demand of edible oil, sunflower can be emerged as an important oilseed crop in Bangladesh. It is a potential source of high quality edible oil and is second to soybeans as an oil crop. A sunflower seed contains 48-52% of good quality edible oil and 40-50% of protein which is more than that of any other oilseed (Anon, 2015). Due to its larger adaptation capability and higher oil quality, sunflower can be grown in the local agriculture system and in most areas in Bangladesh (Sencar et al., 1991). As the demand for sunflower oil is rising in the market, farmers cultivate this high value crop considering its widespread future potentiality. Recently Bangladesh Agricultural Research Institute developed a dwarf type sunflower variety named BARI surjomukhi-3 which is higher yielder and short duration. Therefore, the present pilot production program was taken to disseminate as a new variety in the study area to meet up the oilseed crisis.

Materials and methods

An experiment on BARI Surjomukhi-3 was conducted at the farmers field of Kishoreganj sadar, Kishoreganj during rabi season 2023-24 to assess the performance and disseminate the variety. The land areas were 3 acres. Seeds were sown on 19 December 2023. Spacing was 50 cm x 25 cm. Before sowing all seeds were treated with provex @ 2.5 gkg^{-1}. The recommended fertilizer doses were applied at the rate of $N_{90}P_{40}K_{75}S_{30}Zn_8$ and B_7 $kgha^{-1}$. Among the fertilizers half of urea and all others fertilizers were applied as basal during final land preparation. The remaining half urea was applied as top dress at 25 DAS. In cultivating time there were infestations of insects and three splitted spraying were done by Karate. Crops were harvested on 30 March 2024. Yield data has collected and calculated carefully.

Results and discussions

Yield and economic data of BARI Surjomukhi-3 has presented in the Table 1. Crop durations were 102 days. Seed yield was calculated 1240 kg/ha. The gross return (78120 Tk/ha), gross margin (35440 Tk/ha) as well as BCR was calculated at 1.83 from BARI Surjomukhi-3 (Table 1).

Farmers' assessment

Since sunflower cultivation was totally new in the haor area thus farmers are highly appreciated to get a new variety and they pleased to observe the dwarf type of BARI Surjomukhi-3. Farmers are facing problem to sell their produce. Besides sunflower opened new horizons of tourism in haor area but tourists break the flowers and hence sunflower farming in haor has come to a standstill.

Conclusion

It's a new practice and a good variety for the haor areas farmer. If they can sell their product easily in the local market then it would be popular sharply.

Table 1. Yield performance of BARI Surjumukhi-3 in Kishoreganj during 2023-24

Variety	Area decimal)	Seed yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Surjomukhi-3	300	1.24	78120	42680	35440	1.83

*TVC includes land preparation, labour, seed, fertilizers and insecticides, Price of sunflower = 63 tk/kg

PRODUCTION PROGRAM OF BARI CHINABADAM-8 VARIETY IN KISHOREGANJ

M. MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The production program of groundnut was taken in the farmer's field at Karmganj upazila of Kishoreganj during rabi 2023-24 cropping season to assess the performance and disseminate the BARI Chinabadam-8 among the farmers. The total land area was 5 acre. Yield was found (2.23 t/ha). The gross return (222600 Tk/ha), gross margin (103980 Tk/ha) and BCR was calculated at 1.88 from the BARI Chinabadam-8. Farmers were benefited to cultivate BARI chinabadam-8 due to higher yield and economic return.

Introduction

Groundnut (Arachis hypogaea) is an important leguminous oilseed crop. It is cultivated both in Rabi and Kharif seasons in Bangladesh. This crop is an important source of oil (43-55%) and protein (25-28%), hence used as food and feed. It is a good source of edible oil as it contains about (50% oil). It is excellent source of vitamins and contains high levels of thiamine, riboflavin and niacin. Being highly digestible, the children's food made of groundnut can help in meeting part of the nutritional needs. Groundnut, being a drought tolerant crop, it require low input and produces high output for the farmer. Since it is a leguminous crop it can fix atmospheric nitrogen enhancing soil health by adding nitrogen to soil. Farmer's of haor areas of Bangladesh usually grow groundnut with local variety which produce lower yield and susceptible to pest and disease. BARI has developed some modern varieties of groundnut, which are supposed to be higher yield and less susceptible to pest and disease. The present study was undertaken to observe the yield performance of BARI Chinabadam-8 in block approach.

Materials and Methods

The experiment was conducted at MLT site, Karimganj during the season, 2023-24. OFRD, BARI, Kishoreganj has supplied all inputs like seed of BARI chinabadam-8, chemical fertilizers and pesticides to the farmers. Total land area was 5 acres. Seeds were sown maintaining a spacing of 30 cm x 15 cm. Before sowing, seeds were treated with provex @ 0.2% to prevent seed and soil borne disease. Seeds were sown on 05 December, 2023. All nutrients were applied following BARI technology handbook (50-50-30-35-2-1.5 kg of NPKSZn and B ha^{-1}). Other intercultural operations were done as when necessary. The crop was harvested on 21 April, 2024. Data on yield and other characters were recorded and analyzed statically. The gross return was calculated on the basis of prevailing market price of the commodities.

Results and Discussion

The performance of BARI Chinabadam-8 was presented in Table 1. The seed yield of BARI Chinabadam-8 was 2.23 tha^{-1}. Gross return, total variable cost and gross margin were Tk 226600 ha^{-1}, Tk 118620 ha^{-1} and Tk. 103980 ha^{-1} respectively. Satisfactory seed yield and attractive gross margin was achieved might be due to sowing at optimum time and timely proper management practices like timely application of fertilizer, irrigation and pest management.

Table1. Yield, cost and return analysis of BARI badam-8 during 2023-24

Location	No. of Farmers	Area (acre)	Seed yield (t ha^{-1})	Gross return (Tk. ha^{-1})	Total variable cost (Tk. ha^{-1})	Gross margin (Tk. ha^{-1})	BCR
Karimganj	10	5.00	2.226	222600	118620	103980	1.88

Market price of Chinabadam @100 $Tk.kg^{-1}$

Farmers' opinion

Farmer`s were happy to see the high yielding variety of BARI Chinabadam-8. Although groundnut is profitable crop, farmers face various socioeconomic problems during its cultivation. The major problems are lack of irrigation facility, germination failure of stored seed and scarcity of seed on time.

Conclusion

Groundnut cultivation is profitable to the farmers. This variety should be expanded among all other farmers.

PILOT PRODUCTION PROGRAM OF BARI DEVELOPED BRINJAL VARIETY IN KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The pilot production program was conducted at Sadar upazila of Kishoreganj during the rabi season 2023-24 to popularize and disseminate the BARI Begun-12 among the farmers. The total land area was 1 acre. Yield was found (31.67 t/ha) from BARI Begun-12. The gross return (316700 Tk/ha), gross margin (140350 Tk/ha) and BCR was calculated at 1.80 from the BARI Begun-12. Farmers were benefited to cultivate BARI Begun-12 due to higher yield and economic return.

Introduction

Vegetables are globally accepted as healthy thus always recommended to include in everyday diet. It also provides energy, vitamins, minerals and fibre and there is growing evidence of additional health benefits from a range of phytonutrients. Besides, brinjal is equally important for both farmers and consumers as it contains almost 95 percent of water and is rich in fiber, folic acid, manganese, thiamin, and Vitamin B6, magnesium and potassium contents compared to other vegetables. Furthermore, brinjal is one of the commonly consumed as well as highly produced vegetables in Bangladesh as well as in the world. In 2007, China and India was the main contributor to brinjal‟s global production. In addition, Brinjal is a strong source of cash income for marginal and small farmers and full of nutrient. In 2007, Bangladesh produced 340,000 m. tons of brinjal (Meherunnahar, 2009). In 2016-17, over 125860 acres of total cultivable land was devoted to brinjal cultivation which was produced 507,432 metric tons (BBS, 2018). The growth and production of brinjal is alarmingly lowered due to a dozen of insect pest. Due to climatic conditions and vulnerable to diseases, Bangladesh has the lowest productivity of brinjal in the world. Researchers are always trying to improve the productivity by using modern technology and genetically modified crops play a vital role in order to increase income and nutrition as well as production by reducing loss (Choudhary and Gaur; Adesina and Zinnah, 1993; Von, 1995; James, 2006). Farmers of Kishoreganj areas cultivate old variety which gives low yield and less benefit. Taking this in mind, this pilot production programme was taken to popular latest high yielding BARI variety and increase farmers income.

Materials and methods

The experiment was conducted at Kishoreganj Sadar during the season, 2023-24. OFRD, BARI, Kishoreganj has supplied all inputs like seed of BARI Begun-12, chemical fertilizers and pesticides to the farmers. Total land area was 1 acre. Seedlings were sown maintaining a spacing of 120 cm x 70 cm. Before sowing, seeds were treated with provex @ 0.2% to prevent seed and soil borne disease. Seedlings were sown on 06 December, 2023. All nutrients were applied following BARI technology handbook (50-50-30-35-2-1.5 kg of NPKSZn and B ha^{-1}). Other intercultural operations were done as when necessary. The crop was harvested on 25 April, 2024. Data on yield and other characters were recorded and analyzed statically. The gross return was calculated on the basis of prevailing market price of the commodities.

Results and discussions

The performance of BARI Begun-12 was presented in Table 1. The yield of BARI Begun-12 was 31.67 tha^{-1}. Gross return, total variable cost and gross margin were Tk 316700 ha^{-1}, Tk 176350 ha^{-1} and Tk. 140350 ha^{-1} respectively. Satisfactory yield and attractive gross margin was achieved might be due to timely proper management practices like timely application of fertilizer, irrigation and pest management.

Farmers' assessment

Farmers preferred BARI Begun-12 as its high yield and demand in the market. They showed their interest to grow in next year.

Conclusion

Farmers are interested to produce BARI variety but seed is not available in time. BADC have to take initiative to supply latest high yielding BARI varieties seed in next year.

Table 1. Yield and economic analysis of BARI Begun-12 during 2023-24

Variety	Area (acres)	Yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Begun-12	1	31.67	316700	176350	140350	1.80

*TVC includes land preparation, labour, seed, fertilizers and insecticides, Price: BARI Begun-12=10.00Tk/kg.

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PILOT PRODUCTION PROGRAM OF BARI DEVELOPED TURMERIC VARIETY IN KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

The pilot production program was conducted at Karimganj upazila of Kishoreganj during 2023-24 to popularize and disseminate the BARI Halud-4 among the farmers. The total land area was 0.25 ha. Yield was found (18.75 t/ha) from BARI Halud-4. The gross return (375000 Tk/ha), gross margin (229640 Tk/ha) and BCR was calculated at 2.58 from the BARI Halud-4. Farmers were benefited to cultivate BARI Halud-4 due to higher yield and economic return.

Introduction

In Bangladesh total spices production is about 4.5 lakh tons and 11.5 lakh tons are imported to fulfill the national demand. Turmeric (*Curcuma longa*) is one of the most important spice crops in Bangladesh as well as in south Asia. Local variety covers the greater portion of turmeric growing areas in Kishoreganj. Farmers traditionally practice this low yielding local variety for its production and thus get poor yield. If they practice and accept the BARI developed high yielding turmeric variety they have the possibility to obtain smart yield. Therefore, the study was undertaken to find out the appropriate variety for turmeric in Kishoreganj.

Material and Methods

The experiment was conducted at Karimganj upazilla of Kishoreganj district during 2023-24 to popularize BARI variety of turmeric for that area. The experiment was laid out in a randomized complete block design with three dispersed replications. Variety was BARI Halud-4. The unit plot sizes were 0.25 ha. The mother rhizomes were planted on 07 April 2023 followed by 60 cm x 25 cm spacing. The recommended fertilize doses were applied Urea-220kg, TSP-125kg, MoP-260kg, Gypsum-110kg and Boric acid-2.2kg per ha pectively. Half of urea and MoP and all other fertilizers were used at final land preparation. The remaining part of urea and MoP fertilizer was applied at the side of the row in two equal splits at 80-90 DAS and 110-120 DAS respectively. Two weeding and earthing-up was done after 80-90 DAS & 110-120 DAS respectively. This year did not appear any major disease of turmeric. Nevertheless mancozeb and otostine were applied to control leaf blotch and rhizome rot of turmeric. BARI Halud-4 waas harvested at 10 January 2024. Data on yield and economic parameters were recorded.

Results and discussion

The performance of BARI Halud-4 was presented in Table 1. The yield of BARI Halud-4 was 18.75 tha^{-1}. Gross return, total variable cost and gross margin were Tk 375000 ha^{-1}, Tk 145360 ha^{-1} and Tk. 229640 ha^{-1} respectively. Satisfactory yield and attractive gross margin was achieved might be due to timely proper management practices like timely application of fertilizer, irrigation and pest management.

Table 1. Yield and economic analysis of BARI Halud-4 during 2023-24

Variety	Area (ha)	Yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Halud-4	0.25	18.75	375000	145360	229640	2.58

* TVC includes labour, land preparation, seed, fertilizers and Insecticides, Price: BARI Halud-4 was15 tk/kg

Farmer's opinion

Farmer's have chosen the BARI Halud-4 for its high yielding potentiality and excellent colour.

Conclusion

Farmers are interested to produce BARI variety but rhizome is not available in time.

SURFACE SEEDING OF BLACKGRAM IN HAOR AREAS OF KISHOREGNAJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

A field trial was conducted in the farmer's field at Balikhola haor Karimganj, Kishoreganj during rabi 2023-24 cropping season to assess the performance and disseminate the BARI released blackgram variety among the farmers in the haor area. The total land area was 10 acre. Yield was found (1.60 t/ha) from BARI Mash-3. The highest gross return (160000 Tk/ha), gross margin (116550Tk/ha) as well as BCR 3.68 were calculated from BARI Mash-3 (Table 2).

Introduction

The average cropping intensity in haor areas is 104% whereas national average is 195% (DAE, 2019). At first week of October to last week of October, 20-25% areas of haor are suitable for crop cultivation. Farmers are waiting to produce Boro rice in this plot by irrigation with deep tub well. As a result, the vast area remains fallow for long time 80-90 days after flood water receded. So, there is a great scope of increasing cropping intensity as well as crop productivity here. With the increase production of nutrient-rich crops like more pulses and oilseeds, farmers can ensure reduction of poverty at grass root-level with increase nutritional food security at local levels (Rahman and Zilani, 2009). BARI has developed some short duration Black gram varieties which can be easily cultivated before boro rice cultivation in haor areas (Mohiuddin, 2022). Moreover, blackgram is very much popular in Bangladesh and ranks 3rd in terms of consumption and total area in which different varieties of this crop are cultivated (BBS, 2014).Potential adoption of black gram in Fallow-Boro rice-Fallow cropping system would generate employment and additional income of the farmers by utilization fallow and underutilize lands in the haor areas.

Materials and methods

An experiment on BARI Mash-3 was conducted at the farmers field of Balikhola haor Karimganj, Kishoreganj during rabi season 2023-24 to assess the performance and disseminate the variety in the haor area. The land areas were 10 acre. The design was RCBD with three disperse replication. Each farmer treated as each replication. Seeds were sown on 25 October- 30 October 2023. The recommended fertilizer doses were applied at the rate of $N_{20}P_{18}K_{27}S_{13}Zn_0$ and B_2 kg ha^{-1}. All fertilizers were applied as basal during final land preparation. . In cultivating time there were found some insects and pest infestations which controlled by spraying riva, nitro and indofil. Crops were harvested on 06 February- 10 February 2024. Yield Data has collected and calculated carefully.

Results and discussions

Yield and yield contributing characters of Blackgram has presented in the Table 1. The average Number of Plants/$m^2$was 23 and 26, Number of Pod/ Plant was 24 and 21, Number of seed/ Pod were 7 and 4, weight of 1000 seed (gm) was 45gm and 42gm for BARI Mash-3 and local variety respectively. Seed yield was calculated 1.60t/ha and 0.91 t/ha for BARI Mash-3 and local variety. The highest gross return (160000Tk/ha), gross margin (116550Tk/ha) as well as BCR 3.68 were calculated from BARI Mash-3 (Table 2).

Farmers' assessment

Farmers prefer BARI Mash-3 due to high yield, high number of Pod/ Plant and low insect and pest infestation.

Conclusion

BARI Mash-3 was profitable to the farmers. More production program should be done for making availability of BARI Mash-3 to the rural farmers.

Table1. Yield and yield contributing characters of Blackgram in Kishoreganj during 2023-24

Varieties	Number of Plants/m^2	Number of Pod/ Plant	Number of seed/ Pod	Weight of 1000 seed (gm)	Yield (t/ha)
BARI Mash-3	23	24	7	45	1.60
Local Variety	26	21	4	42	0.91

Table 2. Yield economic analysis of surface seeding of Blackgram in Kishoreganj during 2023-24

Variety	Yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Mash-3.	1.60	160000	43450	116550	3.68
Local Variety	0.91	95550	49650	45900	1.92

*TVC includes land preparation, labour, seed, fertilizers and insecticides, Price of BARI Mash-3= 100tk/ kg and Price of local variety= 105tk/ kg

LINE SOWING OF MUSTARD WITH BARI DEVELOPED SEEDER IN KISHOREGNAJ

M.MOHIUDDIN AND Y. H. RAYHAN

Abstract

The program of Line Sowing of mustard with BARI developed Seeder was conducted at MLT site, karimganj and kishoreganj sadar during the rabi season of 2023-2024 to observe yield performance and popularize BARI developed Seeder in Kishoregnaj among farmer's field. Four farmers were involved in the production program covering land area of 2 acre. Average seed yield of BARI Sharisha-14 was found 1.72 t/ha for line sowing and 1.53t/ha for broadcasting. Average seed yield of BARI Sharisha-18 was found 1.89 t/ha for line sowing and 1.68 t/ha for broadcasting. The highest gross return, gross margin and BCR was found (122850 tk/ha, 80290 tk/ha and 2.88) from line sowing of BARI Sharisha-18. The lowest gross return, gross margin and BCR was found (99450 tk/ha, 56800 tk/ha and 2.33) from broadcasting of BARI Sharisha-14.

Introduction

Mustard (*Brassica* spp.) is an important oil seed crop in Bangladesh. According to DAE, the crop occupies 5.81 lakh hectare lands with the annual production of 7.03 lakh metric tons during 2019-20. The average yield of mustard (1.21 t/ha) in the country is quite low compared to world context. The reason behind this lower yield is genetically low yield potential of local varieties and poor management practices due to broadcasting method of sowing. Oilseed Research Centre, BARI has been released some mustard varieties and Farm power machinery division has been released BARI seeder for line sowing of different cereal crops. Earlier this variety was evaluated in agro climatic condition of Kishoreganj district and result showed that BARI developed mustard variety performed better than local variety in the farmers' fields. But till now the farmers of Kishoreganj follow broadcasting method of sowing which is comparatively less effective than line sowing. So, the production program was undertaken to popularize and disseminate the BARI developed seeder in the farmers' field at Kishoreganj.

Materials and methods

The experiment was conducted at farmer's field of Karimganj, Kishoreganj district during rabi 2023-24 cropping season to popularize and disseminate BARI developed seeder. The land areas were 2 acre for line sowing. Seeds of mustard were sown on 22-25 November 2023. The seeds were sown in line sowing method. The recommended fertilizer doses were applied at the rate of $N_{115}P_{32}K_{40}$ S_{25} Zn_2 and B_2 kg ha^{-1}. Among the fertilizers half of urea and all others fertilizers were applied as basal during final land preparation. The remaining half urea was applied as top dress at 25 DAS. In cultivating time there were no infestations of any insects or disease. Mustard was harvested on 13- 28 February 2024 (Table 1). Yield Data has collected and calculated carefully.

Results and discussion

The performance of BARI Sharisha-14 is presented in Table 1 and the performance of BARI Sharisha-18 is presented in Table 2. Average seed yield of BARI Sharisha-14 was found 1.72 t/ha for line sowing and 1.53t/ha for broadcasting. Average seed yield of BARI Sharisha-18 was found 1.89 t/ha for line sowing and 1.68 t/ha for broadcasting. The highest gross return, gross margin and BCR was found (122850 tk/ha, 80290 tk/ha and 2.88) from line sowing of BARI Sharisha-18. The lowest gross return, gross margin and BCR was found (99450 tk/ha, 56800 tk/ha and 2.33) from broadcasting of BARI Sharisha-14. Satisfactory seed yield and gross margin was achieved might be due to sowing method and proper management practices. The variety also produced a good amount of straw which is used for fuel purpose. This program should be disseminated in more suitable areas involving large number of farmers.

Farmers' opinion

Farmers were happy to get higher grain and straw yield and easy management practice. They preserved their seeds and will go for cultivation by using BARI developed seeder in the next year.

Conclusion

Line sowing of mustard was profitable to the farmers. More production program should be done for making availability of BARI developed seeder to the rural farmers.

Table 1.Yield and economic analysis of Line sowing of mustard in Kishoreganj during 2023-24.

Location	Variety	Sowing Method	Yield (t/ha)	Gross return (Tk ha^{-1})	Total cost (Tk ha^{-1})	Gross margin (Tk ha^{-1})	BCR
MLT site,Karimganj	BARI Sarisha-14	Line sowing	1.72	111800	40560	71240	2.75
	BARI Sarisha-14	Broadcasting	1.53	99450	42650	56800	2.33

*TVC includes labour, Land preparation, Seed, fertilizers and Insecticides, Price of Mustard= Tk. 65 kg^{-1}

Table 2.Yield and economic return of Line sowing of mustard in Kishoreganj during 2023-24.

Location	Variety	Sowing Method	Yield (t/ha)	Gross return (Tk ha^{-1})	Total cost (Tk ha^{-1})	Gross margin (Tk ha^{-1})	BCR
MLT site,Karimganj	BARI Sarisha-18	Line sowing	1.89	122850	42560	80290	2.88
	BARI Sarisha-18	Broadcasting	1.68	109200	45120	64080	2.42

*TVC includes labour, Land preparation, Seed, fertilizers and Insecticides, Price of Mustard= Tk. 65 kg^{-1}

BARI TECHNOLOGY VILLAGE IN KISHOREGANJ

M.MOHIUDDIN AND M.Y.H. RAYHAN

Abstract

A technology village of Bangladesh Agricultural Research Institute has been established under OFRD of Agricultural Research Sub-Station, Kishoreganj at the farmers' field of Pathankandi under Sadar upazila of Kishoreganj district. A "Crop Museum" has developed at the farmers' field and also a demonstration program was conducted during rabi 2023-24 to grow interest about BARI released crop varieties to the farmers. The museum contained 28 improved varieties under 14 crops. BARI varieties produced encouraging yield in the crop museum.

Introduction

Bangladesh Agricultural Research Institute is the largest multi-crop research institute conducting research on cereals, tubers, pulses, oilseeds, vegetables, fruits, spices, flowers etc and has developed a large number of varieties and improved technologies of these crops. The institute has also developed a huge number of production and management practices of crops and cropping patterns as well as integrated system based technologies. Therefore, BARI has established a technology village concept to disseminate technologies nearby areas of BARI stations and FSRD sites, motivate farmers to adopt new technologies to identify farmers constrains adoption of the technologies, give feedback for appropriate on-station research and strengthening linkage among farmers-scientists and extension personals.

Objectives

a. To introduce BARI developed crop varieties /technologies among the farmers.
b. To identify field level farmers problem and feedback to the research station for future verification.
c. To make BARI TechnologyVillage self sufficient for seed production preservation and marketing.
d. To improve socio-economic condition of farmer and
e. To make bridge between farmers and researchers.

Methodology

In this BARI Technology village, production program of field crops, homestead vegetable production and fertilizer & water management of planted/developed tree saplings were provided during 2023-24.

PROGRAM: FIELD CROP PRODUCTION

Mustard was taken under crop production program at BARI Technology Village, Moishakhali, Kishoreganj sadar during *rabi* season 2023-24 that is presented variety wise in below.

A. Oil Crop (Mustard)

1. Name of Base Station (BARI) of BTV: On-Farm Research Division, BARI, Kishoreganj
2. Name of Technology Village:BARI Projukti Polli (BTV) Kishoreganj sadar
3. Name of Team Leaders: Dr. M. Mohiuddin, SSO, OFRD, Kishoreganj
4. Name of Site-Co-ordinator: Md. Yeasinul Haque Rayhan**,** SO, OFRD, BARI, Kishoreganj
5. Number of Selected Farmers: 5 (BARI Sarisha-11, BARI Sarisha-14, BARI Sarisha-15, BARI Sarisha-17 and BARI Sarisha-18 each)

6. Objectives

a. To introduce BARI developed mustard varieties among the farmer of that area.
b. To introduce modern production technology for increasing yield of mustard crop.
c. To make bridge between farmers and researchers

7. Name and amount of supplied materials

Variety	Area (dec.)	Seed supplied(g)
BARI Sarisha-11	60	2000
BARI Sarisha-14	60	2000
BARI Sarisha-15	60	2000
BARI Sarisha-17	70	2000
BARI Sarisha-18	60	2000

8. Date of Initiation: November and December, 2023

9. Introduction

Bangladesh Agricultural Research Institute (BARI) has developed latest short duration (BARI Sarisha-11, BARI Sarisha-14, BARI Sarisha-15 and BARI Sarisha-17) and long duration (BARI Sarisha-18) mustard variety that is higher yielder. The farmers in this area mainly cultivate tori 7 that is low yielding. The dissemination rate of newly developed BARI mandate crop varieties/ technologies to the farmer's field is very slow. So there is a proper way to transfer technologies through establishment of BARI Technology Village (BTV).

10. Methodology

The production program was conducted at BARI Technology village, Kishoreganj sadar during *rabi* season of 2023-24. The three varieties of mustard crop named BARI Sarisha-11, BARI Sarisha-14, BARI Sarisha-15 and BARI Sarisha-18 were cultivated by four farmers. The provax treated seed was sown on 22 November-8 December 2023 for BARI varieties mustard. The recommended doses of fertilizer were applied @ 120-36-40-15-2-1kg ha^{-1} N-P-K-S-Zn-B. Irrigation (two times at 1, 25-26 DAS), weeding (one time herbicide before sowing) and top dressing of urea fertilizer (one time at 25-26 DAS) were done. One time fungicide spray with Amister top for controlling blight (65 DAS for BARI mustard varieties) and 2 times insecticides spray controlling aphid were done during crop production time. During the fungicide spray, boron was sprayed @ 2 g $litre^{-1}$ water. Short duration mustard varieties were harvested at 80 to 83 DAS and BARI Sarisha-18 at 103 DAS.

11. Results and Discussion

Yield performance of four varieties was satisfactory which is shown in table 1. Yield of mustard variety of BARI Sarisha-11, BARI Sarisha-14, BARI Sarisha-15 BARI Sarisha-17 and BARI Sarisha-18 were 1.48, 1.56, 1.53, 1.51 tha^{-1} and 1.61 tha^{-1}, respectively. The higher gross return (Tk.104650 ha^{-1}) was found in BARI Sarisha-18 due to obtain higher yield. Different amount of seed was preserved.

Table 1. Yield performance of mustard variety during 2023-24 in Kishoreganj

Variety	Area (dec.)	Seed yield (t ha^{-1})	By product (t ha^{-1})	GR (Tk ha^{-1})	TVC (Tk ha^{-1})	GM (Tk ha^{-1})	Seed stored (kg)
BARI Sarisha-11	60	1.48	1.65	96200	53650	42550	-
BARI Sarisha-14	60	1.56	1.79	101400	53780	47620	50
BARI Sarisha-15	60	1.53	1.69	99450	53500	45950	10
BARI Sarisha-17	60	1.51	1.65	98150	53600	44550	25
BARI Sarisha-18	60	1.61	2.40	104650	55620	49030	25

Input price (Tk. kg^{-1}): seed: 90.00, Market Price (Tk. kg^{-1}): Mustard-BARI mustard= 65.00.

12. Findings/conclusion

Mean yield of mustard variety of BARI Sarisha-14, 15 and BARI Sarisha-18 were satisfactory. Days to harvest (80-83 days) was shorter in BARI Sarisha-14, 15 than BARI Sarisha-18 (103 DAS). A good impact was created among the farmers of this area due to initiation of new variety of mustard. The farmers of that locality will follow the modern production technology in terms of mustard variety cultivation to increase yield.

13. Farmer's opinion

i). Farmers were impressed by observing the higher yield of cultivating mustard variety against tori-7 and yellow colored seed.
ii). Farmers were motivated to introduce new varieties in existing crop due to short life cycle.

Program: BTV Crop Museum

1. Name of Base Station (BARI) of BTV: On-Farm Research Division, BARI, Kishoreganj
2. Name of Technology Village:BARI Projukti Polli (BTV) Kishoreganj sadar
3. Name of Team Leaders: Dr. M. Mohiuddin, SSO, OFRD, Kishoreganj

4. Name of Site-Co-ordinator: Md. Yeasinul Haque Rayhan**,** SO, OFRD, BARI, Kishoreganj
5. Number of Selected Farmers: 1

6. Objectives
a. To introduce BARI developed varieties /technologies among the farmer of that area.
b. To introduce modern production technology for increasing yield.

Table 2. Name and amount of supplied vegetables and other crop seeds for BARI technology village during rabi 2023-24

Sl No	Crop	Crop variety	Amount(gm)
01	French Bean	BARI Jhar Seem-2	250
		BARI Jhar Seem-3	250
02	Bottle gourd	BARI Lau-3	40
		BARI Lau-4	80
03	Radish	BARI Mula-1	80
		BARI Mula-2	80
04	Gardenpea	BARI Motorshuti-1	800
		BARI Motorshuti-3	1600
05	Tomato	BARI Tomato-18	20
		BARI Tomato-19	20
		BARI Tomato-20	20
		BARI Tomato-21	20
06	Brinjal	BARI Begun-8	15
		BARI Begun-9	15
		BARI Begun-10	15
07	Red amarnath	BARI Lalshak-1	160
08	Spinach	BARI Palongshak-1	100
09	Stem Amaranth	BARI danta-1	40
10	Chilli	BARI Morich-2	40
11	Country bean	BARI Seem-8	160
		BARI Seem-9	160

8. Date of Initiation: December 2023

9. Introduction
Bangladesh Agricultural Research Institute (BARI) has released new varieties of different crop that are grown in winter season and high yielding. The dissemination of new variety is needed to increase yield. The dissemination rate of newly developed BARI mandate crop varieties/ technologies to the farmers field is very slow. So there is a proper way to transfer technologies through establishment of BARI Technology Village (BTV).

Materials and Methods
BARI technology village at Sadar upazila of Kishoreganj has been initiated on April, 2019. The On-Farm Research Division (OFRD) of BARI, Kishoreganj has established "A Crop Museum" at the farmers' field of Latibabad under Sadar upazila of Kishoreganj during 2023-24. Two farmers were involved. The whole area of crop museum was 7 decimal where BARI released selected different crop varieties were grown as per BARI recommended management practices. The museum contained 23 improved varieties under 12 crops. The name and amount of supplied materials are given in Table 2. The crops were sown on 07-10 December 2023 in rabi season. Fertilizers were applied during final land preparation as per recommended packages for the respective crops. Crop management and plant protection measures were taken as per requirements of the crops. In this BARI Technology village, production program of homestead vegetable production and fertilizer & water management of crops were provided during 2023-24.

Results and Discussions

A. Crop Museum with BARI crop varieties: Yield and other information of modern varieties used in "Crop Museum'' were given in Table 2.

Table 2. Performance of BARI released crop varieties of different vegetables in crop museum during rabi 2023-24

Sl no	Crop	Crop variety	Sowing date	Harvesting date	Field duration (days)	Yield (t/ha)	Remarks
01	French Bean	BARI Jharseem-2	07.12.23	10.03.24	63	3.64	Early and disease free but farmers are not habituated with this vegetables
		BARI JharSeem-3	07.12.23	15.03.24	66	4.01	
02	Bottle gourd	BARI Lau-3	10.12.23	07.03.24-15.04.24	122	35.26	Early marketable and no disease & insect pest attack
		BARI Lau-4	10.12.23	10.03.24-18.04.24	128	36.50	
03	Radish	BARI Mula-1	07.12.23	28.01.24	50	32.59	Yield satisfactory and upto long days it can be harvestable. No disease & insect pest attack
		BARI Mula-2	07.12.23	05.02.24	58	33.29	Yield satisfactory. White in colour, no disease & insect pest attack.
04	Garden pea	BARI Motorshuti-1	07.12.23	10.02.24	63	3.05	Yield was good and no disease and insect infestation and farmers are very happy having good market value
		BARI Motorshuti-3	10.12.23	121.02.24	61	3.25	Farmer has shown keen interest in growing motorshuti due to high market price
05	Tomato	BARI Tomato-18	7.12.23	17.03.24	101	34	Farmers are satisfied
		BARI Tomato-19	10.12.23	20.3.24	102	31.52	
		BARI Tomato-20	7.12.23	25.3.24	107	32.35	
		BARI Tomato-21	7.12.23	20.3.24	103	36.35	
06	Brinjal	BARI Begun-8, BARI Begun-9 and BARI Begun-10	07.12.23 10.12.23	29.04.24-04.5.24	140-145	27.35	Farmers are satisfied
07	Red amaranth	BARI Lalshak-1	07.12.23	22.01.24	45	7.62	Farmers are satisfied
08	Spinach	BARI Palongshak-1	07.12.23	20.01.2024	43	27.38	Farmers are satisfied
09	Stem Amaranth	BARI dantashak-1	10.12.23	27.01.2024	47	25.58	Farmers are satisfied

10	Chilli	BARI Morich-2	10.02.24	22.06.24	133	5.68	Farmers are satisfied
11	Country bean	BARI Seem-8 and BARI Seem-9	10.12.23	15.03.24	93	5.03	Farmers are satisfied

Farmer's opinion over production program

1. Farmers were very impressed to see the production program of different crops in BTV.
2. The neighbor farmers showed interest to grow the new BARI crops/crop varieties.
3. They also demanded the seeds of those crops to grow for the next season.

Conclusion

The crop museum has created interest among the farmers and extension personnel of this location due to their yield potentiality. Farmers are interested in growing modern crop varieties in the next year.

The cooperator farmers' distributed seeds of harvested crops to the nearer farmers.

Saplings of BARI released different fruit varieties were distributed among the farmers of the technology village during 2023-24. Farmers planted sapling according to the advice of the concerned scientist.

Table 1. Fruit trees distributed to BTV

Name of fruit tree	Variety	Total no.
Mango	BARI Aam-11	30
	BARI Aam-4	30

Farmer's opinion

Fruiting has started in mango and guava trees in many households. Farmers were happy for having good varieties of fruits.

Conclusion

From the above discussion, it is concluded that, BARI Technology Village plays an important role to transfer technologies among the farmers community in very fastest way.

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