ANNUAL RESEARCH REPORT
2021-2022

Programme Leader

Dr. Muhammad Mohiuddin

Senior Scientific Officer

ON-FARM RESEARCH DIVISION

BANGLADESH AGRICULTURAL RESEARCH INSTITUTE

Kishoreganj-2300

June 2022

www.ars.kishoreganj.gov.bd

ANNUAL RESEARCH REPORT
2021-2022

Programme Leader
Dr. Muhammad Mohiuddin
Senior Scientific Officer

Edited by
Dr. Muhammad Mohiuddin, SSO

ON-FARM RESEARCH DIVISION
BARI, KISHOREGANJ
30 JUNE 2022

Citation

Annual Research Report 2021-2022, On-Farm Research Division, BARI, Kishoreganj-2300

Editorial Committee

Dr. Muhammad Mohiuddin, SSO

Compilation

Dr. Muhammad Mohiuddin, SSO
Md. Abdus Salam, ASO

Word Processing

Md. Daloar Hossain

Published by

Dr. Muhammad Mohiuddin
Senior Scientific Officer
On-Farm Research Division
Bangladesh Agricultural Research Institute
Kishoreganj-2300
Phone: +88-02997761335, Cell: +8801717-213507
E-mail: ofrd.kishoreganj@gmail.com

Published on

June 2022

List of Contributors

OFRD, Kishoreganj
Dr. Muhammad Mohiuddin, SSO
Md. Abdus Salam, ASO

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 2021-22. 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 a wide range of 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, plainland, charland 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 pattern is a demand driven initiative for making higher production and food security in Haor areas.

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

I expressed my sincere thanks and gratitude to BARI, MoA, NATP (Phase-II) and BARC for providing financial assistance to conduct different research, training, and Research-Extension linkage activities. I sincerely admire and appreciate my colleagues and SSA/SA who look after the experiments at different locations. Special thanks to the cooperator 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

Contents

Sl.No.	Title of the experiment	Page no
	I. IMPROVEMENT OF CROPPING SYSTEM (ICS)	
01.	Improvement of sweet gourd-kenaf-fallow cropping pattern against existing cropping pattern in haor areas of Kishoreganj	1-4
02.	Effect of different planting methods on the yield and maturity duration of sunflower in the haor area of Kishoreganj	5-6
	II. ON-FARM TRIALS WITH ADVANCE LINES AND TECHNOLOGIES	
03.	Adaptive trail of promising BARI released potato varieties	7-9
04.	Adaptive trials of BARI released sweet potato varieties in haor areas of Kishoreganj	9-12
05.	Adaptive trials with newly released varieties of Panikachu	13-14
06.	Adaptive trials with BARI released varieties of Mukhikachu	14-15
	III. SUMMER TOMATO	
07.	On-farm adaptive trial of BARI developed summer hybrid tomato varieties in Kishoreganj	16-17
08.	Community based pilot production programme of BARI developed summer hybrid tomato variety in Kishoreganj	18-19
	IV. FLOATING AGRICULTURE	
09.	Adaptive trial of BARI brinjal varieties in Floating Bed	19-20
10.	Adaptive trial of BARI tomato varieties on floating bed	20-21
11.	Chilli production on floating bed in Kishoreganj	21-22
12.	Pilot production program of some sleeted crops on floating bed in Kishoreganj	22-23
	V. SOCIO-ECONOMIC STUDY	
13.	Socioeconomic study of floating agriculture in Haor area of Bangladesh	23-32
	VI. TRANSFER OF TECHNOLOGY	
14.	Performance of mustard varieties at haor areas in Kishoreganj	32-33
15.	performance of sunflower variety at haor areas in Kishoreganj	33-34
16.	Performance of turmeric varieties in Kishoreganj	34-35
17.	Pilot production program of potato in the Char area of Kishoreganj	35-36
18.	Production program of BARI Bt brinjal varieties in Kishoreganj	36-38
19.	Production program of BARI Piaz-5 in Kishoreganj	38-39
	BARI TECHNOLOGY VILLAGE	
20.	BARI technology village in Kishoreganj	39-44
	APPENDICES	
21	List of training, field day and seed, seedling distribution and Media, 2021-22	45-57
22	List of Publication	58-62
23	List of scientists and scientific assistants and staff	63
24	APA 2022-23	64-90

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 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 beded modern sadar hospital in the East and the 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 Flood Plain), 9 (Old Brahmaputra Flood Plain), 16 (Middle Meghna river Ploodplain), 19 (Old Meghna Estuarine Ploodplain), 21 (Sylhet Basin) and 28 (Madhupur Tract).

Land area

(i) Total area	:	0.133 ha
(ii) Research and seed multiplication area	:	0.02 ha
(iii) Infrastructure area		
(a) Office area	:	0.113 ha
(b) Residential area	:	-
(c) Internal roads	:	-

Climate

(i) Rainfall (Jan.-Dec.-2021)	:	2010 mm
(ii) Temperature (°C)		
(a) Maximum	:	34.6
(b) Minimum	:	15.1

Scientific Personnel

Designation		Existing Post
Senior Scientific Officer	:	01
Assistant Scientific Officer	:	01
Total	:	02

Scientific Staff

Designation		Existing Post
Scientific Assistant	:	05
Total	:	07

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

M. MOHIUDDIN

Abstract

Changing single crop system to double crops pattern can play a potential role for achieving countries food security. With this view to increase crop productivity, production efficiency, land use efficiency and economic return through intensifying cropping intensity as well as crop diversity by transforming single cropping pattern to two crops, the experiment was conducted in Old Meghna Estuarine Floodplain Soils under the Agro-Ecological Zone (AEZ) 19 at Nunir haor, under the Multi-location Testing Site, Nikli, Kishoreganj, for 2021-22. 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 (14.75 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.295010 and Tk. 150190 ha^{-1} which were 98 and 138 % higher over farmers' pattern. Farmers' practice gave the lower gross return (Tk. 148800 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. The marginal benefit cost ratio (MBCR) analysis also showed that inclusion of sweet gourd and kenaf rice in the existing pattern might be profitable and acceptable to the farmers.

Introduction

Now it is time to talk about the vast haor areas of Bangladesh. The present cropping intensity of nikli upazilla of Kishoreganj is only about 112% 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 last week of September or first 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.

Objectives

1. To develop two crop-based cropping pattern for haor areas.
2. To increase cropping intensity, productivity and income of the farmers

Materials and methods

The study was carried out 2021-22 at farmer's field, at Nunir haor, 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 95were 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:

Land use efficiency= $\frac{d_1 + d_2}{365} \times 100$ Where d_1 and d_2 the duration of first and second crop of the pattern

Production efficiency: Production efficiency values in terms of Kg./ha/day were calculated by total production in a cropping sequence divided by total duration of crops in that sequence (Lal et al., 2017; Tomer and Tiwari. 1990).

$$\textbf{Production Efficiency} = \frac{Y_1 + Y_2}{d_1 + d_2} \quad Kg/ha/day$$

Where, Y_1= Yield of first crop and d_1= Duration of first crop of the pattern; and Y_2= Yield of second crop and d_2= Duration of second crop of the pattern

Rice equivalent yield: For comparison between crop sequences, the yield of all crops was converted into rice equivalent yield (REY) on the basis of prevailing market price of individual crop (Verma and Modgal, 1983).

$$\textbf{Rice equivalent yield (t/ha/yr)} = \frac{\text{Yield of individual crop} \times \text{market price of that crop}}{\text{market price of rice}}$$

The economic indices like gross return, gross margin and marginal benefit cost ratio were also calculated on the basis of prevailing market price of the product. Economic analysis involved collection of data on prices and quantities of inputs used and output produced. The inputs used included seed, fertilizer, irrigation, labour and insecticides. The MBCR of the farmer's prevalent pattern and any replacement for it can be computed as the marginal value product ((MVP) over the marginal value cost (MVC). The Marginal of prevalent pattern (F) and any potential replacement (E) for it was computed as (CIMMYT, 1988).

$$\textbf{Marginal Benefit Cost Ratio (MBCR)} = \frac{\text{Gross return (E)} - \text{Gross return (F)}}{\text{TVC (E)} - \text{TVC (F)}} = \frac{MVP}{MVC}$$

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 first years of the study, the result revealed that fruit yield of sweet gourd (hybrid Dhaka-1) and Kenaf were 18750 kg/ha, 2178 Kg./ha, respectively. Grain yield of boro rice in farmers pattern was 7240 Kg/ha. Jute stick yield was found 4135 Kg/ha in first year.

Table 1. Agronomic practices of improved and farmers' existing pattern during 2019-20 and 2020-21

Parameter	Improved Pattern (IP)		Farmers' Pattern (FP)
	Sweet gourd	Kenaf	Boro rice
Variety	Hybrid Dhaka-1	HC-95	BRRI dhan29
Sowing/ transplanting	30 October 2021	05 March 2022	02 January 2022
Seedling age (days)	-	-	45
Seed rate (kg/ha)	5	15	50
Planting method	Line	Broadcast	Line
Spacing	2m × 2m	Continuous	20cm × 15cm
Seedling/hill	2-3	-	3-4

Fertilizer dose (NPKSZnB kg/ha)	81-35-75-18-5-02	115-40-63-14-0-0	140-18-53-08-03-02
Fertilizer application method	Entire N, P, K, S & B applied as basal after final land preparation.	Entire amount of P K S and Zn fertilizers were applied as basal. N fertilizer was applied in three equal splits, 1st top dress was done after seedling establishment, 2nd one at early tillering stage and 3rd one at 5-7 days prior to panicle initiation (PI) stage	Entire amount of P K S and Zn fertilizers were applied as basal. N fertilizer was applied in three equal splits, 1st top dress was done after seedling establishment, 2nd one at early tillering stage and 3rd one at 5-7 days prior to panicle initiation (PI) stage
Weeding (no.)	Four times	Twice at 15-20 and 35-40 DAS	Twice at 15-20 and 35-40 DAT
Irrigation (no.)	5 times	Two times	Several times
Insect/ pest control	IPM	IPM	Chemical
Harvesting time	10- 20 February 2022	09 June 2022	17 April, 2022
Field duration (day)	115	96	106
Yield (Kg /ha)	18750	2178	7240
Straw yield (Kg/ha)	-	4135	4000

Rice equivalent yield

The mean rice equivalent yield revealed that improved cropping pattern produced higher rice equivalent yield (14.75 t/ha/yr) over farmers' (7.44 t/ha/yr) pattern (Table 2). Inclusion of high yielding sweet gourd and Kenaf variety and improve management practices in the improved pattern influenced to increase rice equivalent yield and total productivity increased by 98% compared to farmers' practice. 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

Items	Improved pattern	Farmers' pattern	Differences (%)
REY ($tha^{-1}yr^{-1}$)	14.7505	7.44	98.26
PE ($kgha^{-1}day^{-1}$)	99.18	47.95	106.86
LUI (%)	57.81	41.37	39.74

REY=Rice equivalent yield, PE=production efficiency and LUI= land utilization index

Production efficiency

Maximum production efficiency (99.18) in terms of kg/ha/day was obtained from improved cropping pattern followed by farmers pattern (Table 2). The higher production efficiency in two crops pattern might be due to inclusion of high yielding sweet gourd and Kenaf varieties and improved management practices. Similar trend were noted by Nazrul et al. (2013) and Khan et al. (2006).

Land utilization index (LUI)

Land utilization index (LUI) is the effective use of land in a cropping year which mostly depends on individual crop duration. It indicated that improved pattern used the land for 58% period of the year, whereas farmers' pattern for 41% period of the year (Table 2). The higher land utilization index in improved pattern because this pattern occupied the field for longest duration (211 days), whereas farmers' pattern occupied the field for 106 days of the year.

Cost and return analysis

The benefit cost ratio of improved pattern and rice based farmers' existing pattern are presented in Table 3. From the economic point of view, the gross return of improved cropping pattern (295010 Tk/ha) showed its superiority by 98% over farmers' existing pattern (148800 Tk/ha). The production cost of the improved pattern (144820 Tk/ha) was higher than farmers' pattern (85670 Tk/ha) due to inclusion of sweet gourd and improve management which takes extra cost of inputs of the production. The gross margin was substantially higher in the improved pattern (150190Tk/ha) than farmers' pattern (63130 Tk/ha). The higher gross margin of the improved pattern (138%) was achieved mainly higher yield advantages of the component crops. The mean marginal benefit cost ratio (MBCR) was found 2.47 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 gourd and Kenaf in the existing pattern might be profitable and acceptable to the farmers.

Table 3. Cost and return analysis of improved and farmers' cropping pattern in Kishoreganj during 2021-22

Items	Improved pattern	Farmers' pattern	Differences (%)
Gross return (Tk/ha)	295010	148800	98.26
Total variable cost (Tk/ha)	144820	85670	69.04
Gross margin (Tk/ha)	150190	63130	137.91
MBCR	2.47	-	-

Farmers' opinion

All the farmers under the present study expressed their satisfaction in all respects.

Conclusion

It was first year study. Final results and suggestion will be given after two years of the study.

References

CIMMYT (International Maize and Wheat Improvement Centre) 1988. Agronomic Data to Farmer Recommendation: An Economic Training Manual. International Maize and Wheat Improvement Centre, Mexico, D. F. 79p.

Tomer, S.S., and Tiwari, A.S. 1990.Production potential and economics of different crop sequences.Indian J. Agron. 35 (1&2): 30-35.

USAID (United States Agency for International Development) Bangladesh, 2006. Food And Agriculture in Bangladesh: A Success Story, United States Agency for International Development, Bangladesh, 2006.

Verma, S.P., and Modgal, S.C. 1983. Production potential and economics of fertilizer application as resources constraints in maize, wheat crop sequence. Himachal J.

EFFECT OF DIFFERENT PLANTING METHODS ON THE YIELD AND MATURITY DURATION OF SUNFLOWER IN THE HAOR AREA OF KISHOREGANJ

M. MOHIUDDIN

Abstract

A field study was conducted at Guroy, Nikli upazilla under OFRD, BARI, Kishoreganj during 2021-22, to observe the effects of different ages poly bag seedlings on yield and maturity duration of sunflower in the haor areas of Kishoreganj. The experiment was laid out in a RCBD with three replications with three treatments i. e; a. Poly bags seedling at 7 days, b. Poly bags seedling at 14 days and c. Direct seeding. The variety was BARI Surjomukhi-3. Among the treatments the highest yield was found from direct seeding (1.68 t/ha) followed by poly bags seedling at 7 days (1.56 t/ha) and poly bags seedling at 14 days (1.47 t/ha). The highest gross return (84000 Tk/ha), gross margin (36180 Tk/ha) and BCR (1.76) was calculated from direct seeding followed by Poly bags seedling at 7 days but maturity is earlier in poly bags seedling at 14 days.

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 three sunflower variety. But at rabi season sunflower takes 90 to 100 days to mature that creates a problem to next boro crop. Late transplanting of boro at haor areas could be destroyed by early flash flood. Keeping this problem in mind the experiment has been undertaken to shortening the life duration of sunflower. According to the Ministry of Commerce, the country imports 2.2-2.6 million tonnes of crude soybean and palm oils annually against the domestic demand of 2.2 million tones. Therefore the sunflower cultivation in the haor area meet up the oil scarcity in Bangladesh to a small extent.

Objective:

i. To find out the suitable planting system of sunflower in haor areas
ii. To increase yield and farmers' income

Materials and Methods

The experiment was carried out in farmer's field at Guroi, Nikli, Kishoreganj during 2021-22 to observe the performance of transplanting poly bags seedling and line sowing (Farmer's practice). Three treatments were included in this study viz; i) Transplanting poly bags seedling at 7 days, ii) Transplanting poly bags seedling at 14 days iii) Direct line sowing (Farmer's practice). The design was RCB with three replications. The variety was BARI Surjomukhi-3. In Polybags 6:1 ratios of soil and poultry manure mix soil media was filled up with 250 g soil containing poly pack than sunflowers seed was placed in the 2-3 cm depth. For the seedling establishment, the poly bags 7 days and the poly bags 14 days were sown in 15 November 2021 and 08 November 2021. Again, transplanting and sowing (Farmers practice) were executed followed by 60 cm × 25 cm spacing in 10 m x 8 m individual plots on 21 November 2021. The seeds rate was 28 kg ha^{-1} in farmers practice and 25 kg ha^{-1} for transplanting purposes. Fertilizer dose was N_{92} P_{36} K_{70} S_{27} $Zn_{3.7}$ $B_{1.7}$ Kg ha^{-1}. One-third urea and all others fertilizers were applied as basal during final land preparation. The remaining one-third urea was applied as a top dress at 35 DAS and the rest of urea was applied at 60 DAS. Three irrigations were used. All intercultural operations were done as and when necessary. In case of cutworm infestation, Karate was used three times at the rate of 1.5 ml L^{-1} water. The 7 days poly bags seedlings, 14 days poly bags seedlings and direct line sowing (Farmer's practice) crops ware harvested at 07 February/2022, 22 January/2022 and 25 February/2022 after the maturity of flowers.

Data recorded on yield, and yield-contributing characters were subjected to statistical analysis of variance and mean differences were adjudged by (LSD) Statistix 10 for windows 1998. Analytical software. Tallahassee, SLA, USA.

Results and Discussion

Yield and yield contributing attributes of sunflower were influenced significantly by the different planting system (Table 1). The parameter plant height was found highest at poly bags seedling at 14 days (83.21 cm) followed by farmer's practice (82.76 cm) and poly bags seedling at 7 days (79.2 cm). The highest head diameter was found in farmer practice (12.23 cm) and the lowest from poly bags seedling at 7 days (10.50 cm). The highest weight of head (163.58 gm) and seed/ head (283.51 No.) was found at farmer practice and the lowest from poly bags seedling at 7 days (128.62 gm) and (252.12 No.), respectively. It might be due to transplanting shock. The highest seed weight/head was found at farmer practice (18.34 gm) and the lowest from poly bags seedling at 14 days (16.42 gm). The maximum 1000 grain weight was found from poly bags seedling at 7 days (62.34 gm) and minimum from farmer practice (60.17gm). The highest yield was obtained from farmer practices (1.68 t/ha) and the lowest from poly bag seedling at 14 days (1.47 t/ha). The yield contributing characters showed superiority at farmers practice because of lifetime difference. According to the planting method, total field duration was found highest in farmers practice (96 days) followed by poly bags seedling at 7 days (84 days) and poly bags seedling at 14 days (75 days). Though the farmers practice had high yield potential (1.68 t/ha) but it had long field duration (12-21 days more) than other treatments.

Table 1. Yield and Yield contributing characters of sunflower under different planting methods during 2021-22

Treatments	Pl./ ht. (cm)	Head dia. (cm)	Wt. of head (gm)	Seed/ head (No.)	Seed wt/head (gm)	1000 seed wt. (gm)	Yield (t/ha)	Duration (days)
Poly bags seedlings at 7 days	79.2	10.50	128.62	252.12	17.61	62.34	1.56	84
Poly bags seedlings at 14 days	83.21	12.13	162.03	270.10	16.42	60.17	1.47	75
Direct seeding	82.76	12.23	163.58	283.51	18.34	61.05	1.68	96
CV (%)	3.03	7.59	6.91	1.46	1.43	3.81	5.03	-
LSD (0.05)	5.43	2.11	24.04	9.01	0.67	5.18	0.31	-

Table 2.Economic performance of sunflower in different planting methods during 2020-21

Treatments	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
Poly bags seedlings at 7 days	78000	50730	27270	1.54
Poly bags seedlings at 14 days	73500	50730	22770	1.45
Direct seeding	84000	47820	36180	1.76

Farmers' assessment

Since sunflower cultivation was totally new in the haor area thus farmers are very much keen to grow dwarf type and short duration sunflower variety for going to next crop like jute or kenaf.

Conclusion

BARI surjomukhi is an excellent oilseed crop for the upper catena of haor areas. There was unavailability of sunflower seeds at growing season because the rabi season starts early in the upper catena of haor areas. If the seeds are available to the farmers within September in haor area then they mentally prepared to produce willingly. But, farmers' need training on package technology of sunflower production, if they don't catch the actual fertilizer and insect management at the time of before maturity stage then they totally fail to produce grain.

ADAPTIVE TRAIL OF PROMISING BARI RELEASED POTATO VARIETIES

M. MOHIUDDIN

Abstract

Four farmer's field trials were conducted during rabi, 2021-22 to promote and disseminate newly released potato variety, BARI Alu-36, BARI Alu-37, BARI Alu-40, BARI Alu-41, BARI Alu-47, BARI Alu-48, BARI Alu-50, BARI Alu-56, BARI Alu-57 and BARI Alu-62 among the potato growers of Hossainpur and Upzilla in Kishoreganj. BARI Alu-62 showed excellent performance and higher yield followed by BARI Alu-56 and BARI Alu-40. The highest gross return (509450 Tk/ha), gross margin (348800 Tk/ha) and BCR (2.89) were calculated from BARI Alu-62 and the lowest gross return (396060 Tk/ha), gross margin (234260 Tk/ha) and BCR (2.23) from BARI Alu-48 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 (*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 2021-22 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-36, BARI Alu-37, BARI Alu-40, BARI Alu-41, BARI Alu-47, BARI Alu-48, BARI Alu-50, BARI Alu-56, BARI Alu-57 and BARI Alu-62. The unit plot sizes were 10 m x 10 m. The seed potatoes were planted on 10 December 2021 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. Haulms were pulled after 70 days of planting. The crop was harvested on 05 March to 7 March 2022. 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 35.14 to 44.30 t/ha. The highest tuber yield (44.30 t/ha) was obtained from BARI Alu-62 followed by BARI Alu-57 and BARI Alu-40. The lowest yield was obtained from BARI Alu-37 (35.14 t/ha) at Hossainpur, MLT site, Kishoreganj.

The highest common scab infection was observed in (BARI Alu-37) (1.43%) where the lowest in BARI Alu-41. Maximum virus infected was found in BARI Alu-40 (2.31%), where the lowest infection was observed in BARI Alu-62 (1.13%).

Table 1. Yield (t/ha) of high yielding potato varieties at farmer's field during 2021-2022

Location	Farmers (no)	BARI Alu-36	BARI Alu-37	BARI Alu-40	BARI Alu-41	BARI Alu-47	BARI Alu-48	BARI Alu-50	BARI Alu-56	BARI Alu-57	BARI Alu-62
Hossain pur	F(1)	37.5	35.18	41.62	41	41.1	36.77	41.12	41.82	41.88	44.2
	F(2)	40.41	36.57	43.28	42.95	42.31	38.64	43.15	43.52	43.95	46.21
	F(3)	39.82	34.68	42.18	42.9	41.32	38.22	41.69	42	43	43.98
	F(4)	39.23	34.12	42.51	42.52	41.6	37.24	41.08	41.93	42.22	42.82
	Mean	39.24	35.14	42.40	42.34	41.58	37.72	41.76	42.32	42.76	44.30

The highest late blight infection was observed in BARI Alu-37 (21.25%). All the tested varieties showed moderate to severe susceptibility to late blight diseases. The lowest foliage infection was recorded in BARI Alu-62 (12.75%).

Table 2. Diseases incidence (%) of high yielding potato varieties at farmer's field during 2021-22

Farmers (no)		F(1)	F(2)	F(3)	F(4)	Mean
BARI Alu-36	Common scab	0	0.5	1	1	0.625
	Virus	2	1.66	3	2.5	2.29
	Late blight	20	15	20	10	16.25
BARI Alu-37	Common scab	2.1	1.62	1	1	1.43
	Virus	1.5	1	1.66	2	1.54
	Late blight	20	25	15	25	21.25
BARI Alu-40	Common scab	1.33	1.82	1	1	1.29
	Virus	2.2	2.12	2.5	2.4	2.31
	Late blight	15	20	25	15	18.75
BARI Alu-41	Common scab	0	0.25	0.3	0.42	0.24
	Virus	2	1.66	3	2.5	2.29
	Late blight	20	15	20	10	16.25
BARI Alu-47	Common scab	0	0	0	1	0.25
	Virus	1	1.6	1	1.3	1.225
	Late blight	10	15	20	10	13.75
BARI Alu-48	Common scab	1.16	2.5	1	1	1.42
	Virus	2	1.5	3	1	1.88
	Late blight	15	20	25	15	18.75
BARI Alu-50	Common scab	0	0.5	1	1	0.625
	Virus	1.72	1.66	3	2.5	2.22
	Late blight	20	15	20	10	16.25
BARI Alu-56	Common scab	0.21	0.21	0.56	1	0.50
	Virus	1	1.6	1	1.3	1.23
	Late blight	10	15	20	10	13.75
BARI Alu-57	Common scab	1.33	2.13	1	1	1.37
	Virus	2	1.5	3	1	1.88
	Late blight	15	20	25	15	18.75
BARI Alu-62	Common scab	0.2	0.5	1	1	0.68
	Virus	1	1.2	1	1.3	1.13
	Late blight	10	12	16	13	12.75

The highest gross return (509450 Tk/ha), gross margin (348800 Tk/ha) and BCR (2.89) were calculated from BARI Alu-62 and the lowest gross return (396060 Tk/ha), gross margin (234260 Tk/ha) and BCR (2.23) from BARI Alu-48 due to price variation of different types of potato depends on its colour and shape.

Table 3. Economic analysis of high yielding potato varieties in Kishoreganj during 2021-22

Varieties	Gross return (Tk/ha)	TVC (Tk/ha)	Total cost (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Alu-36	412020	158200	173880	253820	2.37
BARI Alu-37	404110	160800	176480	243310	2.29
BARI Alu-40	445200	161500	177180	283700	2.51
BARI Alu-41	423400	160200	175880	263200	2.41
BARI Alu-47	478170	162500	178180	315670	2.68
BARI Alu-48	396060	161800	177480	234260	2.23
BARI Alu-50	459360	160500	176180	298860	2.61
BARI Alu-56	423200	159800	175480	263400	2.41
BARI Alu-57	491740	165750	181430	325990	2.71
BARI Alu-62	509450	160650	176330	348800	2.89

*TVC includes labour, Land preparation, seed, fertilizers and pesticides, Price of potato: BARI ALu-41 and 56:10 Tk/kg, BARI alu-50:11Tk/kg, BARI ALu-36, BARI ALu-40 and 48:10.50 Tk/kg and BARI ALu-37, 47, 57 and 62:11.50 Tk/kg.

Farmer's opinion

Farmers were pleased to observe the performance of the BARI Alu-62, BARI Alu-57, BARI Alu-47 and BARI Alu-37 due to white skin, oval shaped, high market demand and more price followed by BARI Alu-50 and BARI Alu-40. Farmers are also chose BARI Alu-36 due to high yielding and less insect pest infestation on red skin. They demanded quality seed for next year cultivation.

Conclusion

The climatic and soil condition these char 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.

ADAPTIVE TRIALS OF BARI RELEASE SWEET POTATO VARITIES IN HAOR AREAS OF BANGLADESH

M. MOHIUDDIN

Abstract

The field experiment was conducted during the *rabi* season of 2021-2022 in the farmer's field of Multi-location Testing (MLT) site, Nikli, Kishoreganj to find out the saitable variety of sweet potato for upper catena of haor areas. BARI released three sweet potato varieties were used for this experiment viz., i) BARI SP-12, ii) BARI SP-14 and iv) BARI SP-17. The highest sweet potato yield was obtained from BARI SP-12 (31.60 t/ha). The lowest sweet potato yield was obtained from BARI SP-14. The highest gross return (252800 Tk/ha), gross margin (126240Tk/ha) and BCR (2.00) was found in BARI SP-12 followed by BARI SP-17. The lowest gross return and gross margin was recorded from BARI SP-14.

Introduction

Malnutrition is a major problem worldwide particularly in Asia and Sub-Saharan Africa, including Bangladesh. Root and tuber crops play an important role in global food security, especially in the developing world. This may be because most of the cereals and the root and tuber crops consumed are low in vitamins. 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. It has been recommended as a crop to promote for nutritional food security in Bangladesh especially the Orange fleshed varieties that are capable of alleviating Vitamin A deficiency, in children under five years. Despite the well-known health advantages of sweet potatoes, their production and consumption are still low in Bangladesh. This may be due to low production and their vulnerability to various environmental

stresses such as nutrient supply. Recently, the need for increased productivity of sweet potato to curb household food insecurity and malnutrition is on the rise. However, continuous cultivation has resulted in depletion of soil organic matter hence the need for fertilization during sweet potato production. The growth and yield of sweet potato is affected by factors such as plant population and nutrient supply.

Sweet potato (*Ipomoea batatas* L.) is an important staple crop in many parts of the tropics. It is known for its drought resistance, vigorous growth and its productivity, with even the minimum inputs. Cultivation of this crop has increased over the years, and according to the most recent FAO statistics the world production of sweet potato was 110.75 million tons in 2013. Most of the production comes from China (more than 77.38 million tons) and other Asian countries, including Indonesia, Japan and Korea. In Bangladesh, the area under sweet potato production was 25000 ha in 2013 while it was 40874 ha in 2000. Sweet potato can play an important role in the context of food security in Bangladesh (Hossain and Siddique, 1985). The total production of sweet potato in Bangladesh increased from 92,479 to 104,000 MT in 2000 to 2013, respectively (FAOSTAT 2014). This is due to introducing of high yielding varieties and adoption of modern cultivation practices by the farmers. Sweet potato is one of the most important food crops in terms of caloric value per cultivated area (Scott et. al., 1992). Sweet potato is remarkable because of its high yield, palatability and crude protein content. Orange-fleshed Sweet potato varieties are rich in beta-carotene, while purple-fleshed ones are high in anthocyanin. These two important antioxidants thought to prevent chronic heart diseases and cancer (Teow et al., 2007). Increased availability of betacarotene (Pro-vitamin A) and crude protein content is good for nutrition and health (Ukom et al., 2009). Sweet potato is a highly nutritious food crop which gives better and faster production under diverse agroecological conditions with less input and that has immense potential to combat malnutrition and poverty (CIP, 2008). Despite the added advantages of sweet potato production and nutritional benefits, its productivity is highly affected by various biotic and abiotic stress factors (Guo et al., 2006). Although sweet potato is one of the important tuber crops in Bangladesh, the actual yield of this crop is lower than the potential yield. Of the various factors responsible for low yield is the lack of high yielding varieties, lack of proper management of soil (Elias *et al.*, 1991).

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 like drought and salinity 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 char land areas under AEZ 3 at farmer's field condition.

Materials and Method

The experiment was conducted at the farmer's field of Multiplication lest (MLT), site, nikli, Kishoreganj during the rabi season 2021-22 with a view to find out the suitable sweet potato variety for upper catena of haor areas. The soil belongs to the general soil type under the Agro Ecological Zone of AEZ 21. The soil was sandy loam. The experiment was laid out in a randomized complete block design with six dispersed replications (Ferdous et al. 2018). There were four treatments. Vine of sweet potato variety was planted in lines on 02 November 2021 at the spacing of 60 cm x 30 cm. Vines of terminal and semi-matured portions were used for planting. The cutting was about 15 cm in length with 5-6 nodes. The unit plot size was 14 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). There was no incidence of disease and insect attack. The crop was harvested during 01 March 2022 at full maturity. Ten plants were randomly selected prior to harvest for collecting the data on yield attributes of sweet potato. 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. Collected data were analyzed statistically and means were averaged over treatments and were separated using Fisher's protected least significant difference test at the 5% probability level. Production costs of sweet potato included the cost of all operations (e.g., land preparation, seed, sowing, irrigation, application of organic manure and chemical fertilizer,

spraying of insecticides and fungicides, and harvesting). 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 yield and yield contributing characters of sweet potato varieties differed significantly (Table 1). The longest plant (185.43 cm) was recorded from BARI SP-12. The lowest from BARI SP-14 produced the shortest plant (126.82 cm). The highest tuber wt/plant (407.02 g) was recorded from BARI SP-12 and lowest tuber wt/plant (301.60 g) was obtained from BARI SP-14. The highest tuber yield (31.60 t/ha) was recorded from BARI SP-12 and it was significantly higher than all other treatments. Similar results also found Mahmud et al. (2021).

Table 1. Yield and yield contributing characters of sweet potato in Kishoreganj during 2021-22.

Treatments	Plant height cm	Weight of tuber per plant (g)	Yield (t/ha)
BARI SP-12	185.43	407.02	31.60
BARI SP-14	126.82	301.60	23.51
BARI SP-17	148.55	360.41	26.65
Level of significance	**	**	**
LSD value	11.05	2.85	2.14

Table 2. Yield and economics of sweet potato at MLT site, Nikli, Kishoreganj during 2021-22.

Treatments	Yield (t/ha)	Gross return (Tk./ha)	TVC (Tk./ha)	Gross margin (Tk./ha)	BCR
BARI SP-12	31.60	252800	126560	126240	2.00
BARI SP-14	23.51	188080	126560	61520	1.49
BARI SP-17	26.65	213200	126560	86640	1.69

Cost and return analysis

Cost and return analysis is presented in Table 2. The highest gross return (252800 Tk/ha) and gross margin (126240 Tk/ha) was found in BARI SP-12. The lowest gross return and gross margin recorded from BARI SP-14. Similar results also found Mahmud et al. (2021). The highest benefit over variable cost was found from BARI SP-12 followed by BARI SP-17 and BARI SP-14, respectively.

Conclusion

Highest yield and gross return was found from the BARI SP-12. Although low yield, Vitamin-A and enthocyanin enrich BARI SP-17 are becoming popular among the farmers. So, we could recommend farmers to grow BARI SP-12 and BARI SP-17 variety for upper catena in north eastern haor region of Bangladesh.

Acknowledgement

Authors are gratefully acknowledged Bangladesh Agricultural Research Institute (BARI), Gazipur for providing financial help & logistic support and also acknowledged TCRC, BARI for providing sweet potato vine support.

References

Anwar M, Zulfiqar F, Ferdous Z, Tsusakac T W, Datta A. 2021. Productivity, profitability, efficiency, and land utilization scenarios of rice cultivation: An assessment of hybrid rice in Bangladesh. *Sustainable Production and Consumption*. 26 (752-758).

Bhuiya, M. R. and M. S. Akanda. 1982. Effect of different sources of organic materials alone and in combination with two fertilizer levels on growth parameters and combination of rice. *Bangladesh J. Agric.*7(3-4): 32-39.

CIP-Centro Internacional de la Papa. 2008. Sweet potato (I. batatas). www.cipotato.org/sweetpotato.

Elias, M., M. Hossian, J. A. Quasem, M. S. Islam and M. M. Rashid. 1991. Effect of phosphaorus fertilization on the growth and yield of potato. *Bangladesh J. Agric. Res.* **16**(2): 153-156.

FAOSTAT. 2014. Production Year Book. Food and Agriculture Organization of the United Nations, Rome, Italy. http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567

Ferdous Z, Ullah H, Datta A, Attia A, Rakshit A and Molla S H. 2020. Application of Biogas Slurry in Combination with Chemical Fertilizer Enhances Grain Yield and Profitability of Maize (*Zea Mays* L.), Communications in Soil Science and Plant Analysis, 51:19, 2501–2510, DOI: 10.1080/00103624.2020.1844728.

Ferdous, Z., A. Datta, and M. Anwar. 2017. Plastic mulch and indigenous microorganism effects on yield and yield attributes of cauliflower and maize in inland and coastal regions of Bangladesh. *Journal of Crop Improvement*31:261–79. doi:10.1080/15427528.2017.1293578.

Ferdous, Z., F. Zulfiqar, A. Datta, A. K. Hasan, and A. Sarker. 2020. Potential and challenges of organic agriculture in Bangladesh: A review. *Journal of Crop Improvement* 1–24. doi:10.1080/15427528.2020.1824951.

Ferdous, Z., H. Ullah, A. Datta, M. Anwar, and A. Ali. 2018. Yield and profitability of tomato as Influenced by integrated application of synthetic fertilizer and biogas slurry. *International Journal of Vegetable Science* 24:445–55. doi:10.1080/19315260.2018.1434585.

Guo J.M, Q.C. Liu, H. Zhai and Y.P. Wang. 2006. Regeneration of plants from Ipomoea cairica L. protoplasts and production of somatic hybrids between I.cairica L. and sweetpotato, I. batatas (L.) Lam. Plant Cell Tissue Organ. Cult., 87: 321-327.

Haque, M. A., M. Jahiruddin, M. S. Islam, M. M. Rahman, and M. A. Saleque. 2018. Effect of bioslurry on the yield of wheat and rice in the wheat–rice cropping system. *Agricultural Research* 7:432–42. doi:10.1007/s40003-018-0333-7.

Hossain, M.M. and M.A. Siddique. 1985. Sweet Potato : Production, Use and Improvement (in Bengali). Mrs, Hena Siddique, Bangladesh Agricultural University Campus, Mymensingh. 112 p.

Mahmud AA, Hassan MM, Alam MJ, Molla MSH, Ali MA, Mohanta HC, Alam MS, Islam MA, Talukder MAH, Ferdous MZ, et al.2021. Farmers'Preference, Yield, and GGE-Biplot Analysis-Based Evaluation of Four Sweet Potato (*Ipomoea batatas* L.)Varieties Grown in Multiple Environments. *Sustainability.13*, 3730. https://doi.org/10.3390/su13073730

Rahman, M. M., F. Yasmine, M. A. Rahman, Z. Ferdous, and P. S. Kar. 2011. Performance of poultry bio-slurry as a source of organic manure on potato production. *Journal of Agroforestry and Environment* 5:81–84.

Sarker, M. A. I., Z. Ferdous, M. Anwar, N. U. Mahamud, and M. Ali. 2010. Performance of poultry bio-slurry as a source of organic manure on wheat production. *Bangladesh Journal of Environmental Science* 19:36–38.

Scott, G.J., P.I. Ferguson and J.E. Herrera (eds.). 1992. Product Development for Root and Tuber Crops. Vol. III-Africa. Proceedings of the Workshop on Processing, Marketing, and Utilization of Root and Tuber Crops in Africa, held on October 26 to November 02. 1991 at International Institute for Tropical Agriculture (IITA), Ibadan, Nigeria. CIP, Lima, Peru.506p.

Teow C.C., V.D. Truong, R.F. McFeeters, R.L Thompson, K.V. Pecota and G.C. Yencho. 2007. Antioxidant activities, phenolic and b-carotene contents of sweetpotato genotypes with varying flesh colours. Food Chemistry, 103: 829–838.

Ukom AN, P.C. Oijmelukwe and D.A. Pokara. 2009. Nutrient composition of selected sweet potato (Ipomoea batatas (L.) Lam) cultivars as influenced by different levels of nitrogen fertilizer application. Pakistan Journal of Nutrition, 8: 1791-1795.

Yadav, A., and V. K. Garg. 2016. Vermiconversion of biogas plant slurry and parthenium weed mixture to manure. *International Journal of Recycling of Organic Waste in Agriculture* 5:301–09. doi:10.1007/s40093-016-0140-8

ADAPTIVE TRIALS WITH NEWLY RELEASED VARIETIES OF PANIKACHU

M. MOHIUDDIN

Abstract

The field trial was executed at MLT site Karimganj, Kishoreganj; during the year 2020-21 to know the performance of BARI released Panikachu varieties in that area. Four varieties were selected for this experiment viz; BARI Panikachu -1 (Latiraj), BARI Panikachu -4, BARI Panikachu -5 and BARI Panikachu -6. The highest stolon yield was obtained from BARI Panikachu-1 (22.27 t/ha) and the lowest from BARI Panikachu-4 (6.15 t/ha). In case of Rhizome, the highest Rhizome yield was obtained by BARI Panikachu-6 (31.20 t/ha) and the lowest from BARI Panikachu-1 (16.89 t/ha). The highest gross return (424630 Tk/ha), gross margin (198130 Tk/ha) and BCR (1.87) were calculated from BARI Panikachu-1 and the lowest from BARI Panikachu-5 (321200 Tk/ha, 94700 Tk/ha and 1.42, respectively).

Introduction

Panikachu (*Colocasia affinis* .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 of Karimganj is very much suitable for Panikachu cultivation. The Farmers of Karimganj 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 Karimganj, Kishoregonj during the year 2021-22 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 -4, BARI Panikachu -5 and Panikachu -6. The unit plot sizes were 9 m × 4.5 m^2. Spacing were followed by 60 cm x 45 cm. Panikachu suckers were sown on 22 December 2020. 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 time cultivating. Pheromone trap, secure and admire were applied to control. Harvesting of stolons started from 20th March 2021 and ended at 25th August 2021. The Rhizome was harvested form March to September 2021. Data on yield and yield contributing characters were recorded and analyzed by Statistix 10 for windows 1998. Analytical software. Tallahassee, SLA, USA.

Result and Discussion

Yield and yield contributing characters has shown table 1. The table illuminated that the highest stolons/ plant was obtained from BARI Panikachu-1 (21.13) and the lowest from BARI Panikachu-5 (6.55). The highest weight of stolons/ plant was obtained from BARI Panikachu-1 (842 gm) and the lowest from BARI Panikachu-5 (298.3 gm). The maximum height of Rhizome was obtained from BARI Panikachu-6 (72 cm) and the minimum from BARI Panikachu-1 (41.4 cm). The maximum weight of rhizome was obtained from BARI Panikachu-6 (1.42 kg) and the minimum from BARI Panikachu-1 (0.86 kg). The highest stolon yield was found from BARI Panikachu-1 (22.27 t/ha) and the lowest from BARI Panikachu-4 (6.15 t/ha). In case of Rhizome, the highest Rhizome yield was obtained by BARI Panikachu-6 (31.20 t/ha) and the lowest from BARI Panikachu-1 (16.89 t/ha). The highest gross return (424630 Tk/ha), gross margin (198130 Tk/ha) and BCR (1.87) were calculated from BARI Panikachu-1 and the lowest from BARI Panikachu-5 (321200 Tk/ha, 94700 Tk/ha and 1.42, respectively).

Table 1. Yield and yield contributing characters of Panikachu in Kishoreganj during 2021-22

Varieties	Stolon/ plant (no.)	Wt of stolen/ plant (gm)	Height of rhizome (cm)	Weight of rhizome (kg)	Yield of stolen (t/ha)	Yield of rhizome (t/ha)
BARI Panikachu-1	21.13	842	41.4	1.08	22.27	16.89
BARI Panikachu-4	8.67	323.3	68.3	1.36	6.15	30.59
BARI Panikachu-5	6.55	298.3	61.7	1.12	6.72	29.23
BARI Panikachu-6	6.64	316.67	72.0	1.42	6.83	31.20
CV (%)	6.8	5.89	6.4	8.17	3.7	5.8
LSD (0.05)	1.12	21.35	5.24	0.12	0.98	4.04

Table 2. Economic analysis of Panikachu in Kishoreganj during 2020-21

Varieties	Gross return (Tk/ha)	TVC(Tk/ha)	Gross marginal (Tk/ha)	BCR
BARI Panikachu-1	424630	226500	198130	1.87
BAR Panikachu-4	342670	226500	116170	1.51
BAR Panikachu-5	321200	226500	94700	1.42
BAR Panikachu-6	338390	226500	111890	1.49

* TVC includes land preparation, labour, seed, fertilizers and insecticides, panikachu rhizom= Tk. 8 kg^{-1} and panikachu stolon = Tk. 13 kg^{-1}

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 must be available in time at farmers level.

ADAPTIVE TRIALS WITH BARI RELEASED VARIETIES OF MUKHIKACHU

M. MOHIUDDIN

Abstract

The trial was executed at MLT site Karimganj, Kishoreganj during the year 2021-22 to know the performance of mukhikachu varieties in this area. Three varieties were selected for this experiment viz; BARI Mukhikachu-1(Bilashi), BARI Mukhikachu-2 and Local variety. The highest yield was obtained from BARI Mukhikachu-2 (20.16 t/ha) and the lowest from local variety (15.68 t/ha). The highest gross return (161280 Tk/ha), gross margin (96040 Tk/ha) were calculated from BARI Mukhikachu-2 and the lowest gross return (141120 Tk/ha) and gross margin (85320 Tk/ha) but highest BCR (2.53) from local variety due to more care and high input cost involved in BARI variety.

Introduction

Mukhikachu (*Colocasia esculenta* L) belongs to Araceae family is an edible aroid, commonly grown throughout tropical regions on the world (Ghosh et al. 1988; Fujimoto 2009) and it is an important edible aroid in Bangladesh as well as in some other countries in the world. Now-a-days, it is considered the fifth most consumed root vegetable worldwide (Rao et al. 2010). Among the tuber crops, the corms and cornel of mukhi kachu are rich source of carbohydrates and also contain sufficient quantity of protein (Verma et al., 1996). 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 of Karimganj is very much suitable for mukhikachu cultivation. The farmers of Karimganj usually cultivate local variety of mukhikachu 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 Karimganj, Kishoreganj during the year 2021-22 to know the performance of mukhikachu varieties in this area. The design was RCBD with three dispersed replication. Each farmer treated as each replication. Varieties were BARI Mukhikachu-1 (Bilashi), BARI Mukhikachu-2, and Local. The unit plot sizes were 05 decimal, Spacing were followed by 60 cm x 30 cm. Corms were sown on 05 January 2021. The recommended fertilize doses were applied N_{181} P_{36} K_{155} S_{22} $Zn_{4.32}$ $B_{1.8}$ 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 25 & 50 DAS. Two weeding and light earthing up was done after 40-45 and 90-100 DAS. This year did not appear major attacking of disease and insect. Nonetheless Red mites and aphid were present and secure and admire were applied to control. Local variety was harvested on 06 August 2021 and BARI varieties were harvested 06 September 2021. Yield Data has collected and calculated carefully.

Result and Discussion

Mean corm yield among the tested varieties were ranged from 15.68 to 20.16 t/ha. The highest corm yield (20.16 t/ha) was obtained from Mukhikachu-2 followed by Mukhikachu-1and local variety. The lowest yield was obtained from local variety (15.68 t/ha) at Karimganj, MLT site, Kishoreganj but farmers prefer it more than the BARI varieties. As a result, price of local variety was more than the BARI variety. The highest gross return and gross margin was calculated at Tk. 161280/ha and Tk. 96040/ha from Mukhikachu-2 but highest benefit over total cost was found from local variety (2.53) due to higher market demand and price over improved variety.

Table 1. Yield and economic analysis of Mukhikachu in Kishoreganj during 2021-22

Variety	Area (dc)	Duration (days)	Yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Mukhikachu-1	5	240	19.34	154720	65240	89480	2.37
BARI Mukhikachu-2	5	240	20.16	161280	65240	96040	2.47
Local	5	210	15.68	141120	55800	85320	2.53

* TVC includes land preparation, labour, seed, fertilizers and insecticides, mukhikachu= 8Tk/kg (BARI), 9Tk/kg (Local)

Farmers' opinion

The production of mukhikochu developed by BARI requires more care, more inputs like irrigation, fertilizers, so the cost was higher than the local variety. On the other hand, local variety germinate quickly and requires less care, so the benefit cost ratio is higher than BARI variety.

Conclusion

BARI developed mukhikochu is much longer and larger corm size than local variety resulting in lower market demand and price.

References

Ghosh, S.P., T. Ramanujam, J.S. Jos, S.N. Moorthy & R.G. Nain. 1988. Tuber Crops. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

Fujimoto T (2009). Taro (Colocasia esculenta (L.) Schott) cultivation in vertical wet-dry environments: Farmers" techniques and cultivar diversity in southwestern Ethiopia. Econ. Bot. 63(2):152-166.

Rao, G.S.L.H.V.P., Rao, G.G.S.N., Rao, V.U.M., 2010. Climate Change and Agriculture over India. PHI Learning Private Limited, New Delhi, 328 p.

Verma, R. B. and P. K. Singh. 1996. Effect of nitrogen and potassium levels on growth, yield and nutrient uptake of Colocasia. J. Root Crops. 22(2): 139-143.

ON-FARM ADAPTIVE TRIAL OF BARI DEVELOPED SUMMER HYBRID TOMATO VARIETIES IN KISHOREGANJ

M. MOHIUDDIN

Abstract

An experiment was conducted at the MLT site, Hossainpur during kharif II, 2021 to evaluate the performance of BARI developed two summer tomato varieties viz. BARI Hybrid Tomato (BHT)-8 and BHT-11 with two advanced lines viz. Cross-4 and Cross-12. The trial was laid out in RCB design with 3 compact replications. Maximum virus infestation was observed in Cross-12 (42%) followed by Cross-4 (38.41%) and BHT-8 (22.07 %). The lowest virus infestation was observed in BHT-11 (21.11%). The highest fruit yield was obtained from BHT-11 (34.00 t ha^{-1}) followed by BHT-8 (31.00 t ha^{-1}), Cross-4 (17.00 t ha^{-1}) and Cross-12 (15.12 t ha^{-1}). The lowest fruit yield was found from Cross-12 (15.12 t ha^{-1}) due to might be the lowest number of fruits per plant and maximum virus infestation (39 to 45%). BARI Hybrid Tomato-11 and BARI Hybrid Tomato-8 was overall accepted through the farmer's evaluation in case of more number of fruit in bunch, fruit structure, shape, keeping quality as well as yield.

Introduction

Tomato (*Solanum lycopersicum*) is one of the major vegetable crops in Bangladesh comprising a good source of vitamins and minerals as well as contains 93.1% water, 0.6% minerals, 0.7% fiber, 1.9% protein, 0.1% fat and 3.6% carbohydrate and other essential nutrients per 100 g of edible portion. Tomatoes typically contain 305 IU of beta carotene. Tomatoes typically contain 305 IU of beta carotene. Tomatoes are grown on an average of 4.8 million hectares of land in the world, with a total production of 179.44 million metric tons and an average yield of 35.58 tons per hectare (FAOSTAT, 2019). On the other hand, tomato is cultivated in a total area of 26,79 hectares in Bangladesh. Where total production is 3.69 lakh metric tons and average yield is 14.04 tons / hectare, which is 70.53% less than the world average yield (BBS, Year Book of Agricultural Statistics, 2017). The main reasons for this are variability of climate, cultivation of local varieties and non-adherence to modern production techniques. Farmers are usually growing tomato in winter season as winter vegetables in Bangladesh. On the contrary, it is grown in limited area of the country during summer season. But tomato cultivation in summer season become popularizing day by day as high value crop in the country like Satkhira, Bagerhat, Khulna, Jessore, Norail, Kushtia, Netrokona, Mymensigh, Bogura and Rajshahi. In Kishoreganj, about 20345 ha land is cultivated with vegetables. In this area, summer tomato cultivation is totally new crop to the farmers. Farmers of Kiahoreganj are starting summer tomato cultivation with support of BARI since last year and using BARI released hybrid tomato varieties (BARI hybrid tomato-8 and BARI hybrid tomato-4) with high yield potentials. Bangladesh Agricultural Research Institute (BARI) already developed high yielding 11 summer tomato varieties, of which 5 varieties are hybrid having average yield 35–40 tha^{-1}. Newly developed tomato varieties viz. BARI Hybrid Tomato-8, and BARI Hybrid Tomato-11 are high yield potentials and suitable for summer season. On-farm trial will help to popularize the variety to the farmers of Kishoreganj. Therefore, this study was under taken to evaluate the performance of BARI hybrid tomato varieties and to popularize those varieties among the farmers.

Materials and Methods

The experiment was conducted at the MLT site, Kishoreganj during Kharif II, 2021. The experiment was laid out in a randomized complete block design with three replications. Two summer tomato varieties viz. BARI Hybrid Tomato-8 (BHT-8) and BARI Hybrid Tomato-11 (BHT-11) with two advanced lines viz. Cross-4 and Cross-12 were evaluated in this study. The unit plot size was 20 m x 1 m and spacing was 60 cm x 40 cm. Forty to forty two days seedlings were planted on 22-26 August 2021. The fertilizer was applied @ 253, 90, 125, 22, 5.5 and 2 kg ha^{-1} as N, P, K, S, Zn and B, respectively. 10 tha^{-1} cowdung was also applied. Each tunnel was about 62 m^2 (20 m x 3.10 m) consisting 4 bed. For protecting from the rainfall, poly shade was prepared along with each tunnel. Three times irrigation was applied at 21, 35, 50 DAT. Half of organic fertilizer and all of P, S, Zn and B was applied as basal during final land preparation. Remaining organic manure was applied in pits before planting of seedling. One third of N was applied at 15 DAT as ring method. Rest one third N and half of K was applied at 35 and 50 DAT, respectively as ring method. A 50 cm wide channel was made in between two beds to facilitate drainage. Two times weeding were done. Eight times

fungicides with Provex, Autostin and Ridomilgold were applied as per schedule. Bio control measures like yellow sticky trap was applied at 34-40 DAT. Four times insecticides with Imitaf (imidacloprid) and Pegasus (Diafenthiuron) was applied for controlling sucking type insects. Hormone Tomatoton (2%) was sprayed six times on plants at anthesis stage 30-35 days after transplanting in each tunnel.Harvesting was started at 63-70 DAT and finished at 81-87 DAT with a number of total 12 times harvesting irrespective of varieties. Data on yield and yield contributing characters were taken and statistically analyzed with R 4.0.0 software using package 'agricolae'.

Results and Discussion

Yield, yield contributing characters and virus infestation of four varieties/lines varied significantly (Table 1). Yield were calculated at 31.22 t/ha, 34.35 t/ha, 17.33 and 15.12 t/ha for BARI hybrid tomato-8, BARI hybrid tomato-11, Cross-4 and Cross-12, respectively. The lowest fruit yield was found from Cross-12 (15.12 tha^{-1}) due to might be highly virus infestation. The gross return was found highest in BARI hybrid tomato-11 (1202250 Tk/ha) followed by BARI hybrid tomato-8 (1092700 Tk/ha) and cross-4 (606550 Tk/ha), respectively. Gross margin and BCR was calculated highest in BARI hybrid tomato-11 and lowest from the cross-12. Maximum virus infestation was observed in Cross-12 (42%) followed by Cross-4 (38.41%) and BHT-8 (17.07 %). The lowest virus infestation was observed in BHT-11 (15.11%).

Table 2 stated that, BARI Hybrid Tomato-11 and BARI Hybrid Tomato-8 was overall accepted through the farmer's evaluation in case of fruit numbers in bunch, fruit structure, shape, keeping quality and yield.

Table 1: Yield and economic analysis of different variety of summer tomato during 2021-22

Variety	Days to flowering (50%)	Virus infestation (%)	Fruit yield ($t\,ha^{-1}$)	Gross return (Tk./ha)	TVC (Tk./ha)	Gross margin (Tk./ha)	BCR
BARI Hybrid Tomato-8	30.15	17.07	31.22	1092700	364550	728150	3.00
BARI Hybrid Tomato-11	32.21	15.11	34.35	1202250	364550	837700	3.30
Cross-4	35.41	38.41	17.33	606550	364550	242000	1.66
Cross-12	41	42	15.12	529200	364550	164650	1.45

Table 2. farmer's opinionof variety/line wise

Variety/lines	Farmer's opinion
BARI Hybrid Tomato-8	Farmer's generally preferred this variety due to fruits bearing is high but shape are flattened and softens quickly resulting poor storage quality.
BARI Hybrid Tomato-11	Mostly preferred variety. The fruit shape is oblong and hardy during harvesting. Keeping quality better than that of BARI Hybrid Tomato 8 and others.
Cross 4	Farmer's don't like this variety due to fruits are flattened and softens quickly and virus infestation high.
Cross 12	Farmer's don't like this variety due to highly infestation of virus.

Conclusion

BARI Hybrid Tomato-8 and BARI Hybrid Tomato-11 gave higher yield. According to the participatory evaluation by the farmers indicate that BARI Hybrid Tomato-11 and BARI Hybrid Tomato-8 was the first choice due to its fruit shape, size as well as keeping quality. This is first year trial and need to execute for next year.

COMMUNITY BASED PILOT PRODUCTION PROGRAM OF BARI DEVELOPED SUMMER HYBRID TOMATO VARIETIES IN KISHOREGANJ

M. MOHIUDDIN

Abstract

Pilot production programme was conducted at Kishoreganj sadar under OFRD, Kishoreganj during 2021-22 to popularize and disseminate BARI hybrid summer tomato in this areas. The average yield of BARI hybrid tomato was found 32.38 t/ha. The average gross return per hectare over variable cost is observed to be Tk 971400 and gross margin is to be Tk. 624550. On an average benefit cost ratio was found to be 2.80 on variable cost basis. The cost per kilogram of hybrid tomato cultivation was Tk 10.71 and return from one kilogram of tomato production was Tk 30.

Introduction

A production program of summer hybrid tomato was conducted at the Kishoreganj sadar, Kishoreganj during Kharif II 2021. Summer tomato variety named BARI Hybrid Tomato-8 (BHT-8) was used. A total of 30 dec land of 3 farmers was cultivated. Plant spacing was 60 cm x 40 cm. Thirty to thirty-five days old seedlings were planted on 11 July 2021. Different agronomic management are stated in Table 1. 10 t ha^{-1} cowdung was also applied with fertilizer. Each tunnel was about 62 m^2 (20 m x 3.10 m) consisting of 4 bed. For protecting from the rainfall, poly shade was prepared along with each tunnel. Three times irrigation was applied at 21, 35, 50 DAT. Half of organic fertilizer and all of P, S, Zn and B was applied as basal during final land preparation. Remaining organic manure was applied in pits before planting of seedling. One third of N was applied at 21 DAT as ring method. Rest one third N and half of K was applied at 35 and 50 DAT, respectively as ring method. A 50 cm wide channel was made in between two beds to facilitate drainage. Two times weeding was done. Eight times fungicides with Provex, Autostin, copper oxychloride and Ridomil gold were applied as per schedule. Bio control measures like yellow skicky was applied at 34-40 DAT. Four times insecticides with Imitaf and Pegasus was applied for controlling sucking type insects. Hormone Tomatoton (2%) was sprayed six times on plants at anthesis stage 30-35 days after transplanting in each tunnel. Harvesting was started at 38-52 DAT and finished at 90-95 DAT with a number of total 12 times harvesting. Data on yield and economic return presented at table 2.

Table 1. Different agronomic practices of summer hybrid tomato at Kishoreganj during 2021-22

Date of transplanting	Area and spacing	Fertilizer dose (NPKSZnB kg ha^{-1}	Irrigation	Fungicides application	Insecticides application	Harvesting duration
11 July 2021	30 dec 60 cm x 40 cm	253-90- 125-22-5.5-2	3 times	8 times	4 times	65-95 DAP

Results and discussions

The average yield of summer tomato was 32.38 t/ha which was found a bit lower than the seasonal variety. The average gross return per hectare over variable cost is observed to be Tk 971400 and gross margin is to be Tk. 624550. On an average benefit cost ratio was found to be 2.80 on variable cost basis. The cost per kilogram of hybrid tomato cultivation was Tk 10.71 and return from one kilogram of tomato production was Tk 30 (Table 2).

Table 2. Yield and economic analysis of summer tomato during 2021-22

Variety	Yield (tha^{-1})	Gross return (Tk./ha)	TVC (Tk./ha)	Gross margin (Tk./ha)	BCR
BARI Hybrid Tomato-8	32.38	971400	346850	624550	2.80

Pest incidence
Leaf curl virus and white fly was infested. Proper control measures were taken.

Farmer's opinion
Farmers' are interested for cultivation of summer hybrid tomato-8.

Conclusion
BARI Hybrid Tomato-8 should be disseminated among the local farmers quickly for its higher yield and as cash crop. The supply of hybrid tomato seed should be ensured timely.

ADAPTIVE TRIAL OF BARI BRINJAL VARIETIES IN FLOATING BED

M. MOHIUDDIN

Abstract
Adaptive trial of BARI winter brinjal varieties was conducted at the Kishoreganj sadar and Karimganj upazilla of Kishoreganj district during 2021-22 to examine a suitable brinjal variety for the area. Two BARI developed varieties such as BARI begun-6 and BARI begun-10 were tested. The significantly highest yield was found from BARI begun-10 (34.68 t/ha) and the lowest from BARI begun-6 (32.88 t/ha). From financial analysis, BARI begun-10 gave the highest gross return (485588 Tk/ha), gross margin (317068 Tk/ha) and benefit cost ratio (2.88) followed by BARI begun-6.

Introduction
Farmers living in the low-lying areas traditionally grow selected vegetable and spice crops and their seedlings on water hyacinth made floating bed during monsoon season. As spice crop, only turmeric crop is grown on floating bed besides, seedlings of brinjal also produced on floating bed. It can be mentioned that the low-lying lands become submerge during monsoon season due to heavy rainfall, which is not suitable for brinjal production in this season. Cultivation of brinjal on floating bed will make available in the market during monsoon season. Considering the facts, the experiment has been undertaken to evaluate the yielding abilities of selected brinjal varieties as well as to introduce this crop on floating bed in flooded ecosystem.

Material and Methods
The experiment was conducted at Kishoreganj sadar and Karimganj upazilla of Kishoreganj district during 2021-22 to examine the suitable variety of brinjal on floating bed for that area. The experiment was laid out in a randomized complete block design with three dispersed replications. Varieties were BARI begun-6 and BARI begun-10. The unit bed sizes were 9.15 m x 1.37 m. Seedlings were planted on 05 November 2021 followed by 100 cm x 75 cm spacing. The recommended fertilize doses were applied Urea-47gm, DAP-214g, MoP-48g, Gypsum-24g, Zinc-02g and Boric acid-05g per bed respectively. All the chemical fertilizers will be applied on the floating bed in liquid form. All kinds of fertilizers will be applied in five equal splits at 15, 25, 35, 45 and 55 days after transplanting. The liquid form of plant nutrients will be applied around the crop plants as well as on the floating bed. This year did not appear any major disease of brinjal. BARI begun-6 and BARI begun-10 were started to harvest at 16 February 2022 to April 2022. Data on yield were recorded and presented in the table.

Results and discussion

BARI begun-10 gave the highest yield (34.68 t/ha), gross amrgin (317068 Tk/ha) and BCR 2.88 followed by BARI begun-6.

Table 1. Yield and economic performance of brinjal on floating bed in Kishoreganj during 2021-22

Treatments	Yield (kg/bed)	Yield (Kg/ha)	Gross return (Tk./ha)	TVC (Tk/ha)	Gross margin (Tk./ha)	BCR
BARI begun-6	41.26	32883.67	361720.37	166520	195200.37	2.172234
BARI begun-10	43.52	34684.86	485588.04	168520	317068.04	2.881486

* TVC includes cost of bed preparation, labour, price of seedlings, fertilizers and insecticides, price: BARI begun-6=11 and 10 = 14 tk/kg

Farmer's opinion

In between two varieties farmer's have chosen the BARI begun-10 for its high yielding potentiality, market demand and excellent colour.

Conclusion

It was the results of second year study. To make a final conclusion there is need to repeat the experiment next year.

ADAPTIVE TRIAL OF BARI TOMATO VARIETIES ON FLOATING BED

M. MOHIUDDIN

Abstract

Adaptive trial of BARI tomato varieties was conducted at the Kishoreganj sadar and Karimganj upazilla of Kishoreganj district during 2021-22 to examine a suitable tomato variety for the area. Two BARI developed varieties such as BARI tomato-19 and BARI tomato-21were tested. The significantly highest yield was found from BARI tomato-21 (51.63 t/ha) and the lowest from BARI tomato-19 (41.72 t/ha). From financial analysis, BARI tomato-21 gave the highest gross return (516288 Tk/ha), gross margin (345593 Tk/ha) and benefit cost ratio (3.02) followed by BARI tomato-19.

Introduction

Farmers living in the low-lying areas traditionally grow selected vegetable and spice crops and their seedlings on water hyacinth made floating bed during monsoon season. As spice crop, only turmeric crop is grown on floating bed Besides, seedlings of tomato also produced on floating bed. It can be mentioned that the low-lying lands become submerge during monsoon season due to heavy rainfall, which is not suitable for tomato production in this season. Cultivation of tomato on floating bed will make available in the market during monsoon season. Considering the facts, the experiment has been undertaken to evaluate the yielding abilities of selected tomato varieties as well as to introduce this crop on floating bed in flooded ecosystem.

Material and Methods

The experiment was conducted at Kishoreganj sadar and Karimganj upazilla of Kishoreganj district during 2021-22 to examine the suitable variety of tomato on floating bed for that area. The experiment was laid out in a randomized complete block design with three dispersed replications. Varieties were BARI tomato-19 and BARI tomato-21. The unit bed sizes were 9.15 m x 1.37 m. Seedlings were planted on 05 November 2021 followed by 60 cm x 40 cm spacing. The recommended fertilize doses were applied Urea-47gm, DAP-214g, MoP-48g, Gypsum-24g, Zinc-02g and Boric acid-05g per bed respectively. All the chemical fertilizers will be applied on the floating bed in liquid form. Urea was applied 3 equal splits at 10, 25 and 40 days after transplanting. MoP was applied in 3 equal splits as basal dose at land preparation time and 25 and 40 days after transplanting. The liquid form of plant nutrients was applied around the crop plants as well as on the floating bed. This year did not appear any major disease of tomato. BARI tomato-19 and BARI tomato-21 were started to harvest at 20 February 2022 to April 2022. Data on yield were recorded and presented in the table.

Results and discussion

The highest yield per bed was recorded from BARI tomato-21 (64.78 kg) and lowest from BARI tomato-19 (52.35 kg). BARI tomato -21 gave the highest gross return Tk. 516288/ha, gross margin Tk. 345593/ha and BCR 3.02 followed by BARI tomato-19.

Table 1. Yield and economic performance of tomato on floating bed in Kishoreganj during 2020-21

Treatments	Yield (kg/bed)	Yield (t/ha)	Gross return (Tk./ha)	TVC (Tk/ha)	Gross margin (Tk./ha)	BCR
BARI tomato-19	52.35	41722.25	417222.52	170695	246527.52	2.44
BARI tomato-21	64.78	51628.8	516287.96	170695	345592.96	3.02

Farmers' opinion

Farmers choose BARI tomato-21 for its high yield potential, attractive colour and market demand.

Conclusion

In the haor areas like Kishoreganj floating agriculture is disseminating day by day. So, Purpose of more dissemination and meet up to vegetable crisis further continuation is needed.

CHILLI PRODUCTION ON FLOATING BED IN KISHOREGANJ

M. MOHIUDDIN

Abstract

The pilot production program was conducted at Karimganj, Nikli and Kishoreganj sadar upazila's of Kishoreganj during the rabi season 2021-22 to popularize and disseminate the BARI developed chilli variety on floating bed among the farmers in the water logged haor area. Three chilli varieties such as BARI Morich-3, Hybrid and Local were selected for this program. Chilli hybrid variety (16.21 tha^{-1}) performed better followed by BARI Morich-3 (12.37 tha^{-1}) and the lowest was local variety (6.48 tha^{-1}). The gross return (405250 Tk/ha), gross margin (319280 Tk/ha) and BCR (4.11) were calculated from the hybrid chili variety.

Introduction

In Bangladesh total spices production is about 4.5 lakh tons and 11.5 lakh tons are imported to fulfill the national demand. Chilli is one of the most important spices crops in plain land of Kishoreganj district during *Rabi* season. It can be mentioned that the low-lying lands become submerge during monsoon season due to heavy rainfall, which is not suitable for chilli production in this season. The production of green chilli during rainy season reduces remarkably due to declining of suitable land for cultivation of this crop that ultimately increases the price of green chilli in the market. Cultivation of chilli crop on floating bed will make available of green chilli in the market during monsoon season. Considering the facts, the experiment was undertaken to evaluate the yielding abilities of selected chilli varieties as well as to introduce this crop on floating bed in flooded ecosystem.

Materials and Methods

An activity was conducted at Karimganj, Nikli and Kishoreganj sadar upazila's of Kishoreganj district during rabi season, 2021-22 to popularize and disseminate suitable chilli variety on floating bed and to introduce chilli crop under floating agriculture system in Kishoreganj areas. The work was performed in floating bed and each floating bed considered as one treatment. Three chilli varieties (BARI Morich-3, hybrid, and local) were selected for this program. The size of each floating bed was 9.15m x 1.37m (30ft long x 4.5ft wide). The number of crop row/bed was 3, plant to plant distance and number of seedling/hills was 50 cm and 1, respectively. Uniform size, healthy 20-22 days old seedlings of chilli were transplanted on 18 November 2021. The fertilizer dose (For 10 sqm floating bed area) was 47g urea, 214g diammonium phosphate, 48g muriate of potash, 24g gypsum, 2g zinc sulphate, 5g boric acid, All the chemical fertilizers was applied on the floating bed in liquid form. All kinds of fertilizers was applied in five equal splits at 15, 25, 35, 45 and 55 days after transplanting. The liquid form of plant nutrients was applied around the crop plants as well as on the floating bed.

The zinc sulphate and boric acid were applied as foliar spray. Sometimes the crop was irrigated when as necessary. Harvesting was started during 02-30 March, 2022. Data on yield were recorded and presented in the table.

Result and discussions

The highest yield per bed was recorded from hybrid chilli (20.34 kg) and lowest from local variety (8.13 kg). The local yield was the lowest among all the planted chilli due to water hyacinth of floating bed became almost rotten and roots touch the water as a result less number of chilli was harvested. Hybrid variety gave the highest gross return Tk. 405250/ha, gross margin Tk. 309250/ha and BCR 4.11 followed by BARI morich-3 and local due to low yield performance.

Table 1. Yield and economic analysisof chilli on floating bed at Kishoreganj during 2021-22

Variety	Production (kg/bed)	Yield (Tk./ha)	Gross return (Tk./ha)	TVC (Tk./ha)	Gross margin(Tk./ha)	BCR
BARI Morich-3	15.52	12.37	309250	85970	223280	3.139275
Hybrid	20.34	16.21	405250	85970	319280	4.113796
Local	8.13	6.48	162000	85970	76030	1.644503

Farmers' Opinion

- Farmers were happy to get good yield from floating bed.
- Higher market price and highly demandable to customers due to fresh
- Less availability of water hyacinth in dry season as a result refill or remake may not possible of floating bed

Conclusion

From second year study it may be concluded that floating bed is good way for production of chilli.

PILOT PRODUCTION PROGRAM OF SOME SLEETED CROPS ON FLOATING BED IN KISHOREGANJ

M. MOHIUDDIN

Production programs with different vegetables and spices crops like bitter gourd, sweet gourd, bottle gourd, cabbage (hybrid), Cauliflower, onion, garlic and flower were conducted on floating bed at Kishoreganj sadar and Karimganj area under Kishoreganj during the year round, 2021-22 to study the performances of selected vegetables and spices crops on floating bed system and to popularize those crops among the farmers. The work was performed in floating bed and each floating bed considered as one treatment. The size of each floating bed was 9.15m x 1.37m (30ft long x 4.5ft wide). The two or three or four rows of vegetables and spices were grown on each floating bed maintaining standard spacing for each of these vegetables and spices in the bed. Data on yield and cost with return showed in Table1. Among the vegetables, highest yield was found from bottle gourd (54.63 t/ha) followed by cabbage (46.59 t/ha), sweet gourd (38.57 t/ha), cauliflower ((24.40 t/ha) and bitter gourd (22.81 t/ha), respectively. Among the spices, highest yield was observed in onion (15.79 t/ha) and lowest in garlic (5.92 t/ha), respectively. Among the vegetables, highest gross return, gross margin and Benefit over full cost was calculated at Tk. 279551/ha, Tk. 217101/ha and 3.59 from cabbage and the lowest gross return (Tk. 212114/ha), gross margin (Tk. 143624/ha) and Benefit over full cost (2.53) from sweet gourd, respectively. On the other hand, among the spices crops, onion gave the highest gross return (Tk. 315766/ha), gross margin (Tk. 237206/ha) and Benefit over full cost (3.36) and the lowest gross return (Tk. 236864/ha), gross margin (Tk. 171364/ha) and Benefit over full cost (2.92) found from garlic, respectively.

Table 1. Yield and economic analysis of different vegetables on floating bed in Kishoreganj 2021-22

Variety	Production (kg/bed)	Yield (Kg/ha)	Gross return (Tk./ha)	TVC (Tk./ha)	Gross margin(Tk./ha)	BCR
Bitter gourd	28.62	22809.76	273717.1	76580	197137.1	2.97
Sweet gourd	48.39	38566.18	212114	68490	143624	2.53
Bottle gourd	68.54	54625.47	218501.9	65840	152661.9	2.69
Cabbage	58.46	46591.84	279551	62450	217101	3.59
Cauliflower	30.62	24403.73	244037.3	63250	180787.3	3.10
Onion	19.81	15788.31	315766.1	78560	237206.1	3.36
Garlic	7.43	5921.611	236864.4	65500	171364.4	2.92

SOCIOECONOMIC STUDY OF FLOATING AGRICULTURE IN HAOR AREA OF KISHOREGANJ

M. MOHIUDDIN

Abstract

The aim of this study was to examine the profitability analysis and economic viability of vegetables production on the floating bed in Kishoreganj district of Bangladesh. The study area was selected purposively and 30 households (HHs) were surveyed through purposive sampling technique from a population of 45 households. From the results of the primary data, it was found that majority of the farmers were relatively younger and middle aged and were in a position to put more physical effort for floating garden in the study area. Agriculture is the main occupation of 92% of the farmers who are involved in floating farming. On an average, gross return of the demo farmer was calculated at Tk. 30690 per year for three bed (each bed size was 30 feet long and 4.5 feet wide) which was 64% higher than non-demo farmers' of Tk.18645 and total cost was estimated at Tk. 17180 and Tk. 11010 in demo and non-demo farmers, respectively. Gross margin was estimated at Tk. 13510 in demo farmers which was 77% higher than non-demo farmers. Benefit cost ratio was 6% higher in demo farmers than that of non-demo farmers due to use modern variety and improved management.

Introduction

The Haors having a unique hydro-ecological characteristic is a large bowl-shaped floodplain depression located in the northeastern region of Bangladesh covering about 1.99 million hectares of area and accommodating about 19.37 million people. The Haor basin is an internationally important wetland ecosystem covering 43% of the northeastern region of Bangladesh, which is mostly situated in Kishoreganj, Sunamganj, Habiganj, Moulvibazar Sylhet, B. Baria and Netrokona districts. This Haor basin is a remote and difficult area that is flooded every year during monsoon. Over 80% of the rain falls during the monsoon season from June to October. Since some parts of Bangladesh remain flooded for a prolonged period of the year, agriculture is the hardest hit (MoEF, 2011; Walsham, 2010), which has a serious impact on the lives of the farming population. The farming communities of the long-term water logging areas who are completely dependent upon the land based agriculture affected seriously for water logging conditions. In such a flooded and long water logging condition, the farmers of some parts of Bangladesh have been tackling this situation and sustaining their lives by utilizing self-innovated "floating agriculture". In some parts of Bangladesh, most affected by flood and where water remains for a prolonged period of time, farmers are using their submerged lands for crop production by adopting scientific methods which are similar to hydroponic agriculture practices, i.e. floating agriculture, whereby plants can be grown on the water in a bio-land or floating bed of water hyacinth, algae or other plant residues.

This practice has traditional roots in practices dating back to the country's forbearers. According to their needs, people in different parts of Bangladesh have adopted, modified and named

this practice differently (*baira, boor, dhap, gathua, gatoni, geto, kandi* and *vasoman chash* and floating agriculture).

Actually, this practice is most successful in the coastal areas that are adjacent to the sea-bank areas, which remain submerged for long periods, especially in the monsoon season, as well as the wetland Haor Areas (MoA, GoB). The floating agriculture is a crop production practice in soilless floating beds prepared with locally available materials like water hyacinth mainly and other aquatic weeds. Locally this technique is known as "Dhap Agriculture" and it practiced from many years in the flood prone and water logging areas of Barisal, Gopalganj and Pirojpur districts (Haq et al, 2002; Islam and Atkin, 2007; Irfanullah, 2009; and Irfanullah, 2011). Moreover, very little chemical input is needed for crop production, low labor costs, and good market price of the crops is accepted as a means of cleaner production. There was no socio-economic study conducted earlier on floating agriculture in haor area of Kishoreganj therefore, the present study was undertaken to provide information through fulfillment the objectives set for the study.

Objectives

1. To know the socio-economic profile of the floating farm households
2. To examine production practices and changing profitability of selected crops with adoption of floating technology
3. To identify the problems faced by the floating farmers

Methodology

Sampling Technique, Sample Size and Data Source

Some areas of Kishoreganj district are the only source of floating agriculture. Kishoreganj sadar, Karimganj and Nikli upazila of Kishoreganj district are famous for floating vegetables production. The study was purposively selected Kishoregtanj sadar, Karimganj and Nikli Upazilas as study area only because of the highest number of farmers of this area were practicing floating agriculture in Kishoreganj. Only three villages namely Kashorarchar in Kishoreganj sadar, Pathanpara in Karimganj and Guroi in Nikli Upazila were selected for the study and sample were selected from these villages. A population of 45 households were identified from the local floating farmer's as sampling frame and all units of the population were planned for data collection. Data were collected from the members of the households who were directly involved in floating vegetables production. Out of 45 households, only 30 were found at their home at the time of interview.

Data Collection Technique

All the data accumulated for the present study was considered as primary source because of face to face interview with the help of well-structured questionnaire and the same was pre-tested before finalization. The respondents were briefed about the objectives of the study before conducting the actual interview. All the interviews were conducted in Bengali and the interviews were recorded with the consent of the respondents during April-May, 2022. Besides, the researcher took field notes, made observations as well as photos of the areas. It was explained to the floating vegetables growers that the study was purely academic. Interviews were normally conducted at the respondent's house at their leisure period.

Analytical Technique

In order to find out the cost and return from the floating vegetables production, the research included the financial analysis considering the timing of benefit and cost throughout the rotation period of vegetables production for three beds (each bed size was 30 feet long and 4.5 feet wide). The collected data were first edited and tabulated for analysis to fulfill the objectives of the study. Descriptive statistics such as average and percentage were used in this study. The profitability was estimated using gross margin, net return and benefit cost ratio analysis.

Results and Discussions

Socio-economic characteristics

Socioeconomic profile of the respondent farmers is required to have an idea about the present farm activities, possible development opportunities and potentials for more efficient farming. Therefore, information regarding respondents age, education, occupation, family size, farm size, land use pattern, training and experience in cultivation were recorded for the study.

Age: Age of the farmers plays an important role in the crop production and better management of the farming activities. The age of the floating farming was examined by classifying the three groups: 20-40, 41-60 and 61-82 years (Table 1). On an average, majority of the farmers belonged to the age group 20-40 (51%) which was 50% in Kishoreganj sadar, 52% in Karimganj and 51% in Nikli upazilla of Kishoreganj district. This information imply that majority of the farmers were relatively younger and middle aged and were in a position to put more physical effort for floating garden. Farmers belonging to this age group were supposed to have enormous vigor and risk bearing ability. A noticeable portion of the farmers (41%) were 41 to 61 years old, whereas, only 8% farmers were 62 to 82 years old (Table 1).

Education: Literacy may be defined as the ability of an individual to read and write or formal education received up to certain standard. Education helps individual to become conscious of their environment and develop rational insight into many matters of life. Farmers education is expected to be an important issue in increasing the production of farming output. Education is likely to influence the farmers to adopt the modern technology ad it makes them more capable to manage scares resources efficiently so that they can earn more profit. On the basis of education level, the literacy status of the respondent farmers has been categorized into three groups. The categories are (1) no formal education (2) primary and (3) secondary. Information on the education levels of the respondents is presented in Table 1. It is observed that, most of the farmers (71%) received formal education of which 46% have primary level and 25 have secondary level of education in the study area, respectively (Table 1).

Occupation: Main occupation of a farmer generally reflects his commitment in that particular field and demonstrates his economic standing in the society. Majority of the sample farmers (92%) reported that agriculture is their main occupation followed by petty business (8%) (Table 1). About (75%) farmers had no subsidiary occupation. Only 7% farmer had subsidiary occupation as like agriculture and 18% farmers had other profession as their subsidiary occupation.

Table-1. Percentage distribution of respondents by their socioeconomic characteristics

Particulars	% farmers responded			
	Kishoreganj sadar	Karimganj	Nikli	All
1. Age				
20-40 years	50	52	51	51
41-61 years	41	40	42	41
62-82 years	9	8	7	8
2. Level of education				
No formal education	24	30	33	29
Primary (Class I-V)	50	44	44	46
Secondary (Class VI-SSC)	26	26	23	25
3. Occupation				
Main occupation:				
Agriculture	86	96	94	92
Petty business	14	4	6	8
Subsidiary occupation:				
No profession	72	78	75	75
Agriculture	12	3	6	7
Others	16	19	19	18
6. Household size				
2-4	40	44	30	38

Particulars	% farmers responded			
	Kishoreganj sadar	Karimganj	Nikli	All
5-7	51	48	57	52
8-10	9	8	13	10
5. Farm size (%)				
Small (0.19-0.99 ha)	70	70	76	72
Medium (1.00-3.03 ha)	22	20	18	20
Large (above 3.03 ha)	8	10	6	8
4. Experience in farming				
1-10 years	45	48	42	45
11-20 years	30	29	34	31
21-30 years	17	16	15	16
31-40 years	8	7	9	8
5. Floating farming experience(no. of yrs.)	3	3	3	3
6. Training received				
Agriculture farming	72	65	63	67
Floating farming	80	74	71	75
7. Extension contact				
Strong	48	53	40	47
As usal	33	31	26	30
No contact	19	16	34	23

Household size: The family size was also investigated in the study. Household size included the number of adult mail, adult female and children of the respondent households. The household size was categorized by three such as number of members 2-4 persons, 5-7 persons and 8-10 persons (Table 1). Among all surveyed farmers, most of the respondents (52%) family size was 5 to 7 persons and it followed by 2-4 persons (38%). Only 10% of farmers had large family size with member of 8-10 persons.

Farm size: In the study areas, farm size was categorized as small, medium and large farm. Among all farmers, 72% farmers of the study areas were fall under the category of small farmers whereas 20% floating vegetables growers had medium size farm. Only 8% chickpea growers' farm size was large (Table 1).

Experience in floating and normal farming: Farming experience is an important factor to ensure farm technical efficiency. Technical inefficiency of the production is significantly related to farming experience of the farmers. About 45% farmers had 1 to 10 years' agriculture farming experience. A noticeable portion (31%) of the farmers had 11 to 20 years' experience in agriculture farming, 16% farmers had 21 to 30 years' experience and another 8% farmers had 31 to 40 years' experience (Table 1). It was found that all of the sampled farmers belonged to 3 years of floating farming experience only to cultivate floating vegetables in the study areas.

Extension contact: Majority of the farmers (47%) had strong extension contact with extension personnel. About 30% of the respondents expressed that they were connected with extension workers only 1-2 times in a cropping season which is only contemporary. A good number of people (23%) had no contact with extension services (Table 1).

Training: Farmers' training on different aspects of agriculture plays an important role in crop production. About 75% floating farmers received training on floating agriculture, especially in vegetables cultivation. About 67% farmers received training on different crops of different aspects of agriculture. It was reported that most of the trained farmers benefited by the training.

Construction of floating beds

The basic construction of the floating bed requires bamboo poles, a boat, water hyacinths and a simple tool to cut the weeds. The bed is then built up of layers of aquatic weeds, mainly water hyacinths *(Eichhornia crassipes)* but also other kinds of water weeds like water lettuce *(Pistia stratiotes)*, duckweed *(Najas graminea)*, *Salvinia* spp. and *Potamogeton alpinus*. In perennial wetlands and permanently waterlogged areas it is possible to cultivate on these floating beds the whole year round. In seasonally waterlogged areas, the beds are used during the wet season and left to decompose on the agricultural land, once the water withdraws. The floating beds are primarily constructed where water hyacinths are available. The beds can be prepared in any depth of water and they can be moved by dragging them behind a boat.

In Kishoreganj, the villagers construct floating beds using the masses of water hyacinths and other aquatic weeds that grow naturally and profusely in the river, surrounding wetlands, canals and ditches. Construction starts at the beginning of the monsoon (June-July) with the collection of water hyacinths and other aquatic weeds and it continues up to late autumn. To start the construction, farmers put a long bamboo pole (as long as they want the final bed to be), on a collected mass of fully matured water hyacinths. To build one bed, water hyacinths growing in an area roughly five times larger than the bed itself are required. Mature water hyacinths are preferred because they decompose slower than immature water hyacinths. The first layer of water hyacinths acts as the base of the floating bed and maintains the stability, buoyancy and thickness of the bed. A single man then stands on the bamboo pole lying over the mass of water hyacinths and starts to pull the water hyacinths together from both sides of the bamboo. In this process, he proceeds towards the end of the bamboo and compacts the accumulated hyacinths under his feet. This process is continued until the desired height (3.5 feet), length of the bed (30 feet) and wide (4.5 feet) is obtained. When the construction of the bed is complete, the bamboo is removed. After 7-10 days a second round of water hyacinths are dumped on the bed and then the bed is left to decompose before being planted. The top of the floating bed needs 15-20 days to decompose before sowing seed or planting seedlings. Sometimes farmers use semi-decomposed aquatic plants such as water lettuce, duckweed and immature water hyacinths on the top of the bed to speed up the decomposition, thereby making nutrients available for seedlings and reducing evaporation from the bed. To improve conditions for the young seedlings further, the seeds are sometimes placed inside a ball made of compost, manure and aquatic creepers (locally called tema), before being planted on the floating bed. In this way, a smooth germination and sufficient nutrients are ensured for the initial establishment. However, the newly constructed floating bed can also be cultivated from the first day–if compost is available and is spread thickly on the bed before planting.

There are no fixed rules about the size and shape of the floating beds, but generally the villagers construct beds that are 30 feet in length, 4.5 feet in width and about 3-305 feet in height above the water level for better management of the crop.

Table 2. Cost of floating bed preparation for vegetables production by demo farmer

Items	Quantity	Unit cost	Total cost
Bed preparation cost:			
Bamboo	3	200	600
Net (feet)	40	10	400
Rope (Kg)	1.5	140	210
Seed or seedling purchase			1200
Fertilizer and pest management			200
Crop harvesting and maintenance	2	300	600
Labor	3	350	1050
Sub-total one bed preparation cost			4260
Macha preparation cost:			
Bamboo for macha preparation	15	200	3000
Labour for macha preparation	4	350	1400

3 bed (4260x3) with macha cost			17180

Table 3. Cost of floating bed preparation for vegetables production by non-demo farmer

Items	Quantity	Unit cost	Total cost
Bamboo	2	200	400
Net (feet)	40	10	400
Roop (Kg)	0.5	140	70
Seed or seedling purchase	-	-	1000
Fertilizer and pest management	-	-	100
crop harvesting and maintenance	1	300	300
Labor	1	300	300
			2570
Bamboo for macha preparation	12	200	2400
Labour for macha preparation	3	300	900
3 bed (2570x3) with macha cost			11010

Table 4. Production and return of different vegetables on floating bed under demo farmer

Items	Production (Kg./bed)	3 bed/year	Avg. Price (Tk./kg)	Gross return (Tk.)
Red Amaranth	46	1380 (10 times)	10	13800
Bottle gourd	150	450 (3 times)	12	5400
Sweet gourd	145	435 (3 times)	10	4350
Bitter gourd	62	186 (3 times)	20	3720
Cucumber	76	228 (3 times)	15	3420
Total return				30690

Table 5. Production and return of different vegetables on floating bed under non-demo farmer

Items	Production(Kg./bed)	3 bed/year	Price (Tk./kg)	Gross return (Tk.)
Red Amaranth	31	930 (10 times)	10	9300
Bottle gourd	75	225 (3 times)	12	2700
Sweet gourd	69	207 (3 times)	10	2070
Bitter gourd	38	126 (3 times)	20	2280
Cucumber	51	183 (3 times)	15	2295
Total return				18645

Table 6. Cost and return of floating vegetables under demo and non-demo farmer (3 bed)

Items	Demo farmer	Non-demo farmer	% over non-demo farmers
Gross return (Tk.)	30690	18645	64.60
Total variable cost (Tk.)	17180	11010	56.00
Gross margin (Tk.)	13510	7635	76.90
BCR	1.79	1.69	5.90

On an average, gross return of the demo farmer was calculated at Tk. 30690 per year for three bed which was more than 64% higher than non-demo farmers' of Tk.18645 (Table 6) and total cost was estimated at Tk. 17180 and Tk. 11010 for demo and non-demo farmers, respectively (Table 2 and Table 3). The production cost of the demo farmer was 56% higher than non-demo farmers' due to more stronger floating bed and used more bamboo and other inputs (Table 1). The gross margin was estimated at Tk. 13510 at demo farmer which was 77% more than the non-demo farmers (Table 6). Benefit cost ratio of demo farmer was 6% higher than the non-demo farmers which calculated at 1.79 in demo farmers and 1.69 in non-demo farmers, respectively.

From the study of Pavel et al. (2014), it was noted that in a period of 0.26 year depending on bed size NPR varied from BDT 6146 to BDT 127 followed by the highest revenue of TK 9275 and the lowest revenue of BDT 1050 with an average BCR of 2.68. A BCR of 3.17-3.9 found from seedling production in the research of Irfanullah et al. (2005) at Nanikhir village of Gopalgonj district which was about four times higher than floating vegetable cultivation. The study of Hoque et al. (2016) revealed that BCR ranged from 1.27 to 3.44 with an average 1.75. They also reported that traditional Aman rice give only 2-2.5 ton/ha yield where BCR is 1.20 where by introducing floating agriculture gives a BCR of 1.5. Finding of the above discussion indicates that BCR declining over time. Increasing livelihood expenditure and input cost of floating seedling agriculture over time may responsible to the reduced BCR.

Floating bed cultivation has proved to be a successful means of agricultural crop production in wetland areas of India, Burma (Myanmar) and Bangladesh (Irfanullah, 2013). Bangladesh is a low-lying country. The wetland areas of Bangladesh face more flooding/water logging for a longer duration than other countries (Pavel, et al., 2013). Floating gardening is a form of hydroponics. In the floodplains of southern Bangladesh, floating gardening is an age-old agricultural practice (Haq, et al., 2002; Islam and atkin, 2007;). Locally available aquatic plants are used to build a platform on which vegetables are cultivated and seedlings are raised during flooding. Later on, the platform residue is used as organic fertilizer for winter cropping. There are many social, economic and ecological benefits associated with this technique the year round (IUCN Bangladesh, 2009; Irfanullah et al. 2011).

Maintenance of floating bed

- Farmers use boats or rafts to look after their floating bed
- Weeding to be done as required
- The bed should be adequately fenced or covered by net to protect against duck and rodents
- Crops which are infected by pests and diseases should be uprooted, insects like Aphids, Leaf hoppers, White flies etc. can harm crops. Leaf spot, mosaic etc. are major diseases that affect floating vegetables bed crops. Organic pests and disease control measures should be adopted. No chemical pesticide should be used.

Constraints involved in floating farming

Floating farming is very famous in southern parts of Bangladesh as they are getting benefits from it. But having all the physical facilities like southern parts, it is not famous in north-eastern parts of Bangladesh. Because in north-eastern belt, there are some input, knowledge & skill, intercultural operational, social, situational and financial constraints which create obstacle regarding adoption of floating farming by the Haor farmers.

Input constraints

Water hyacinth, bamboo, straw, water wart and crop seeds are the major inputs of floating farming. But recently availability of water hyacinth had drastically been decreased in the Haor area. Unavailability and high cost of other inputs like straw, water wart and bamboo for making raft might lead the farmers abstain from this farming. Similar finding was reported by Madon (2008) that unavailability of input as the common constraints to dissemination of agricultural technology.

Knowledge and skill constraints

Knowledge is the pre-requisite for making any farming enterprise profitable and has been considered as the base for agriculture. It also hosts formation of favorable perception and thrives for skills in the relevant field. Inadequate knowledge in this regard often lead Haor farmer"s poor skill as they perceived floating bed preparation as complex and troublesome one. Enhancing skills of farmers could be gained through discussions, exposure visits and continuous practices. Learning knowledge and skill is very important for the enhancement of agricultural technology as well as improvement of rural livelihood (Robinson-Pant 2016).

Intercultural operations constraint Unlike upland agriculture, floating farming needs intensive care and repeated weeding. All these have to be done in such deteriorated water of Haor areas which has abundance of leeches. Besides, multiple harvesting in deep water and repeated movement of floating

farm caused health hazard and skin infection in deteriorated water. All these constraints might lead the farmer refrain from this farming.

Social constraints

Society plays very active role regarding adoption of any kind of farming. Stone (2004) revealed in his study that farmers appear to be enmeshed in a social fabric and their decisions often seem unduly guided by social factors such as customs, obligations, and beliefs. In Haor areas, farmers did not get sufficient support from different government organizations such as DAE, NGOs etc. Relevant skilled labors were also not available. Ignorance towards any new technology was highly found and these farmers who adopted this long forgotten traditional practice they were going to face social insult and humiliation. These social superstitions and lack of having proper cooperation might lead the farmers abstain from this farming.

Financial constraints

Adequate financial ability is very essential for the dissemination of agricultural technology. In case of Haor areas, most of the farmers are very poor, they are not able to bear the high initial cost of floating farming. They do not have their own beds and own ponds. Other financial constraints like sharing of produce and lack of capital which might influence the farmers for not adopting floating farming at a large scale.

Table 7 constraints involved in floating farming

Sl.No.	Constraints	Rank
	Input Constraints	
1	Scarcity of water hyacinth	3
2	Scarcity of raw materials (bamboo, straw, water wart etc.)	6
3	High cost of quality seeds	6
	Knowledge and skill constraints	
4	Lack of adequate knowledge	1
5	Lack of skill in floating farming	9
6	Complexity in bed preparation	20
	Intercultural operations constraint	
7	Leech biting	2
8	Weeding and harvesting in deep water	9
9	Requirement of intensive care	10
10	Requiring repeated movement of floating farm	21
11	Skin infection	7
12	Heavy weed infestation	8
13	Deteriorated water causes health hazard	5
14	Multiple harvesting	18
	Social constraints	
15	Lack of relevant skilled labors	9
16	Ignorance	10
17	Social insult	17
	Financial constraints	
18	High initial expense	10
19	Lack of own ponds	12
20	Sharing of produce	12
21	Lack of capital	11
	Situational constraints	
22	Lack of closed water bodies	19
23	Rats	4
24	Lack of advice	17
25	Waves and heavy rain caused disperse floating farms	16

26	Floating away of farms by flash flood	15
27	Ducks	14
25	Flash flood	15

Situational constraints

Closed water bodies are very important in floating farming. But in Haor areas, closed water bodies could be hardly found. The other situational constraints like attack of rats, stormy winds that might lead the farmers abstain from this farming. Waves and heavy rain created obstacle in floating farm as it caused floated farm to disperse. In Haor areas, flash flood frequently visited. Flash flood is one of the basic situational constraints of floating farming, as the farms are floated away due to it. Duck could also do a lot of harm because of highly raised by the village people of Haor areas.

Constraints relevant to input, knowledge and skill, and intercultural operation impacted greatly in degradation of adoption of this farming. Among these, scarcity of water hyacinth, complexity in bed preparation, biting of leech, lack of closed water bodies, weeding and harvesting in deep water were the top constraints. Due to inadequate knowledge and skill regarding floating farming, farmers found complexity in bed preparation. As freshwater is the way of survival for leech, so it is highly found in Haor areas. Farmers got skin infection during weeding and harvesting in deep water. Scarcity of water hyacinth is increasing for using it as a cattle food by the Haor livestock farmers as they face serious fodder crisis due to flood. Both Government and non-government organizations should come forward to minimize these constraints regarding floating farming in Haor areas and make it popular among the farmers in a sustainable way.

Opportunities

- Floating agriculture is an environmentally friendly way of increasing arable land. It is an environmentally sustainable way for supplementing incomes and increasing food in the developing nations.
- Aquatic invasive species used in floating agriculture are considered to be the second largest reason for biodiversity loss worldwide. Clearing waterways of this weed congestion is beneficial in maintaining high biodiversity of wetland ecosystems. It can have a positive impact on open water fisheries. The reduction in the carrying capacity of the water body that occurs when the weeds breaks down the drainage system, is also done away with.

References

Haq A.H, Ashaduzzamanand M, Ghosal TK. Soil-less agriculture in Bangladesh. Dhaka, Bangladesh: Grammen Trust; 2002.

Hoque, M. Z., Haque, M. E., Afrad, M. S. I., & Islam, M. N. (2106). Effectiveness of Floating Agriculture for Adapting Climate Change in Southern Bangladesh. International Journal of Economic Theory and Application. 2016a, 3(1), 14-25.

Irfanullah, H. M., Nishat, A., & Ahmed, R. (2005). Baira: The Floating Gardens for Sustainable Livelihood. IUCN-The World Conservation Union, Bangladesh Country Office.

Irfanullah HM. Floating gardening in Bangladesh: Already affected by climate variability? In: Biodiversity conservation and response to climate variability at community level, IUCN, UNEP, UNU, Dhaka, Bangladesh. 2009;7-14. 19.

Irfanullah HM, Azad MAK, Kamruzzaman M, Wahed MA. Floating gardening in Bangladesh: A means to rebuild life after devastating flood. Indian Journal of Traditional Knowledge. 2011;10(1):31-38.

Islam, T., & Atkins, P. (2007). Indigenous floating cultivation: a sustainable agricultural practice in the wetlands of Bangladesh. Development in Practice, 17(1), 130-136. https://doi.org/10.1080/09614520601092733

Madon T(2008). Overcoming barriers to agricultural productivity for smallholder farmers. University of California, Berkeley Center for Effective Global Action. https://www.atai-research.org/.../2.

Pavel, M. A. A., Chowdhury, M. A., & Mamun, M. A. A. (2014). Economic evaluation of floating gardening as a means of adapting to climate change in Bangladesh. International Journal of Environmental Studies, 71(3), 261-269. https://doi.org/10.1080/00207233.2014.911406.

Walsham M. Assessing the evidence: Environment, climate change and migration in bangladesh. Report prepared for international organization for Migration (IOM), Regional Office for South Asia, Dhaka, Bangladesh; 2010.

A.H.M.Rezaul Haq,Tapan Kumar Ghosal and Pritam Ghosh. WRDS, 21, Hazi Mohsin Road, Khulna-9100, Bangladesh. Email: wrds@bttb.net.bd, wetland@bttb.net.bd

Pavel, M.A.A., Khan, M.A.S.A., Rahman, S.A. and Mamun, M.A.A., 2013. Climate change adaptation strategy for the folk communities: An approach to vegetable production in flood prone areas. International Journal of Agronomy and Plant Production, 4, 745–752.

Irfanullah, H.M., 2013, Floating gardening: A local lad becoming a climate celebrity? Clean Slate, 88, 26 –27.

Irfanullah, H.M., Azad, M.A.K., Khan, A.K.M.K. and Wahed, M.A., 2011, Floating gardening in Bangladesh: A means to rebuild lives after devastating flood. Indian Journal of Traditional Knowledge, 10, 31 –38.

IUCN Bangladesh, 2009, 2nd Phase Final Report (April 2008–June 2009): Organizing Resource Generation and Nutritional Support (ORGANS), (Dhaka: IUCN, Bangladesh), p. 33. (Unpublished)

Robinson-Pant A .,2016. Learning knowledge and skills for agriculture to improve rural livelihoods. United Nations Educational, Scientific and Cultural Ogranisation (UNESCO), Rome-Italy pp. 144. https://unesdoc.unesco.org/.../attach_import_2c974b34-c086-40ad-b6f1-3c2bb796c0..

Stone GD(2004). Social Constraints on Crop Biotechnology in Developing Countries. AgBioForum, 7(1&2): 76-79.

PERFORMANCEOF OF MUSTARD VARIETIES AT HAOR AREAS IN KISHOREGANJ

M.MOHIUDDIN

Abstract

A field trial was conducted in the farmer's field at Nikli, Mitamoin, Karimganj, Hossainpur and Kishoreganj sadar in Kishoreganj district during the rabi season in 2021-22 to assess the performance of BARI sharisa-17 and BARI sharisa-14 in this area. Yield of BARI sharisa-17 was found 1.64 t/ha and 1.56 t/ha of BARI sharisa-14. The highest gross return (106795Tk/ha), gross margin (65545 Tk/ha) and BCR 2.59 were calculated from BARI sharisa-17 and lowest gross return (101725 Tk/ha), gross margin (60475 Tk/ha) and BCR (2.47) from BARI sharisa-14.

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 18 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, Mitamoin, Karimganj, Hossainpur and Kishoreganj sadar in Kishoreganj district during rabi 2021-22 cropping season to know the performance of BARI sharisa-17 and BARI sharisa-14 in this haor areas. The land areas were fifteen acres for BARI sharisa-17 and 30 acres for BARI sharisa-14 in different upazilas of Kishoreganj. Seeds of mustard were sown on 25-30 October 2021. 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 there were no infestations of any insects or disease. Mustard were harvested on 17-27 January 2022. 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 81-83 days for BARI sharisa-14. Seed yield of BARI sharisa-17 was calculated 1.64 t/ha and 1.56 t/ha of BARI sharisa-14. The highest gross return (106795 Tk/ha), gross margin (65545 Tk/ha) and BCR (2.59) were calculated from BARI sharisa-17 followed by BARI sharisa-14 (101725 Tk/ha, 60475 Tk/ha and 2.47, respectively).

Table 1. Yield performance of BARI sharisa-17 and BARI sharisa-14 during 2021-22

Variety	Area (acres)	Duration (days)	Seed yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI sharisa-17	15	85-90	1.64	106795	41250	65545	2.59
BARI sharisa-14	30	81-83	1.56	101725	41250	60475	2.47

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

Farmers' assessment

Farmers are highly interested to grow BARI variety but timely seed must be available at farmers level.

Conclusion

These are new and good varieties for the farmer of this areas. Though, the plant is tall but capable to give higher yield.

PERFORMANCE OF SUNFLOWER VARIETY AT HAOR AREAS IN KISHOREGANJ

M.MOHIUDDIN

Abstract

A field trial was conducted in the farmer's field at Nikli, Kishoreganj during rabi 2021-22 cropping season to assess the performance and disseminate the BARI Surjomukhi-3 among the farmers in the haor area. The total land area was 3 acres. Yield was found (1.57 t/ha) from BARI Surjomukhi-3. The gross return (71010 Tk/ha), gross margin (42260 Tk/ha) and BCR 2.47 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 2021-22 to assess the performance and disseminate the variety in the haor area. The land areas were 3 acres Seeds were sown on 31 October 2021. 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 10 February 2022. Yield Data has 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 1578 kg/ha. The gross return (71010 Tk/ha), gross margin (42260 Tk/ha) as well as BCR 2.47 were calculated from the BARI Surjomukhi-3.

Table 1. Yield performance of BARI Surjumukhi-3 in Kishoreganj during 2020-21

Variety	Area (decimal)	Seed yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Surjomukhi-3	300	1.578	71010	28750	42260	2.47

*TVC includes land preparation, labour, seed, fertilizers and insecticides, Price of sunflower = 45tk/ kg

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 and yield performance of BARI Surjomukhi-3. Farmers are facing problem to sell their produce. 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.

PERFORMANCE OF TURMERIC VARIETIES IN KISHOREGANJ

M. MOHIUDDIN

Abstract

A field trial of turmeric variety was conducted at the farmers' field of Satarpur union of Karimganj upazilla under Kishoreganj district during 2021-22 to know the performance of turmeric variety for this area. BARI developed BARI Halud-4 and local variety was tested. The significantly highest yield was found from BARI Halud-4 (32.41 t/ha) and the lowest from local variety (16.58 t/ha). From financial analysis, BARI Halud-4 gave the highest gross return (551055 Tk/ha), gross margin(400470 Tk/ha) and benefit cost ratio (3.66) followed by local variety's gross return (331780 Tk/ha), gross margin(184930 Tk/ha) and benefit cost ratio (2.26).

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 2021-22 to know the performance of turmeric variety for this area. The land areas were 0.5 acres for each variety. Seeds were sown on 11 April 2021. Spacing was 60 cm x 30 cm. The recommended fertilize doses were applied $N_{101}P_{25}K_{130}S_{20}B_{0.5}$ kg ha^{-1} with cow dung @ 10 tha^{-1} respectively. 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 and local variety were harvested at 28 January and 03 January 2022, respectively. Yield Data has collected and calculated carefully.

Results and discussion

Yield and economic data of BARI holud-4 and local varieties have presented in the Table 1. Crop durations were 293 days for BARI holud-4 and 268 days for local variety. Rhizome yield of BARI holud-4 and local variety was calculated 32.41 t/ha and 16.58 t/ha, respectively. The highest gross return (551055 Tk/ha), gross margin (400470 Tk/ha) and BCR (3.66) was calculated from BARI holud-4 and the lowest gross return (331780 Tk/ha), gross margin (184930 Tk/ha) and BCR (2.26) were from local variety.

Farmer's opinion

The farmer's of the study area have chosen the BARI Halud-4 for its high yield potentiality and excellent color.

Conclusion

Unavailability of mother rhizome at growing season was the main problem for turmeric. Seed supply should be ensured during the production season to expand the BARI variety at farmers' level.

Table 1. Yield and economic analysis of turmeric during 2021-22

Variety	Area (acres)	yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Holud-4	0.5	32.41	551055	150585	400470	3.66
Local	0.5	16.58	331780	146850	184930	2.26

* TVC includes labour, land preparation, seed, fertilizers and insecticides; price: BARI Halud- 4=17 Tk/kg and local variety=20 Tk/kg.

PILOT PRODUCTION PROGRAM OF POTATO IN THE CHAR AREA OF KISHOREGANJ

M.MOHIUDDIN

Abstract

The pilot production program was conducted at Pakundia, Karimganj and Hossainpur upazila's of Kishoreganj during the rabi season 2021-22 to popularize and disseminate the BARI developed potato varieties among the farmers in the char area. The total land area was 5 acres. Yield was found highest from BARI Alu-73 (47.42 t/ha) followed by BARI Alu-47 (39.40 t/ha) and BARI Alu-13(38.68). The gross return (663880 Tk/ha), gross margin (498130 Tk/ha) and BCR (4.01) were calculated from the BARI Alu-73.

Introduction

Potato (*Solanum tuberosum*) 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 Bnagladesh (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 three BARI varieties viz; BARI ALu-13, BARI ALu-47 and BARI ALu-73 to popularize and disseminate the variety among the farmers in char areas during rabi season in 2021-22. The land areas were 5 acres. Seeds were sown on 10-12 December 2021.

Spacing was 60 cm x 30 cm. The recommended fertilize doses were applied N_{156} P_{42} K_{124} 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 03-05 March 2022. Yield Data has collected and calculated carefully.

Results and discussions

Yield and financial data of different BARI variety has presented in the Table 1. Crop durations were 84 days. Yield were calculated at 38.68 t/ha, 39.40 t/ha and 47.42 t/ha for BARI ALu-13, BARI ALu-47 and BARI ALu-73, respectively. The gross return was found highest in BARI ALu-73 (663880 Tk/ha) followed by BARI ALu-47 (551600 Tk/ha) and BARI ALu-13(464160 Tk/ha), respectively. Gross margin and BCR was calculated highest in BARI ALu-73 and lowest from the BARI Alu-13.

Farmers' assessment

Farmers of char areas prefer white and elongated varieties of potatoes which look like Diamont as its high price and demand in the market. Out of the three varieties, BARI Alu-73 is the most preferred by the farmers. Since BARI Alu-73 and BARI Alu-47 were totally new and high yield potential in the char area, they showed their interest to store some seeds of this 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 2021-22

Variety	Area (acres)	yield (t/ha)	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
BARI Alu-73	1.5	47.42	663880	165750	498130	4.01
BARI Alu-47	2.0	39.40	551600	164590	387010	3.35
BARI Alu-13	1.5	38.68	464160	165820	298340	2.80

*TVC includes land preparation, labour, seed, fertilizers and insecticides, Price of BARI Alu-73 and BARI Alu-47:14.00Tk/kg, and BARI Alu-13:12Tk/kg.

PRODUCTION PROGRAM OF BARI Bt BRINJAL VARIETIES IN KISHOREGANJ

M.Mohiuddin

Abstract

The trial was carried out at 3 farmer's field of MLT site, Hossainpur under OFRD, BARI, Kishoreganj during Rabi season 2021-22 to observe the performance of transgenic Bt brinjal varieties at the farmers' field of Kishoreganj. The trial consists of one BARI Bt brinjal variety viz., BARI BtBegun-4 against non Bt counterpart. Among the tested varieties BARI Bt brinjal variety performed better against non Bt counterparts. The Bt brinjal variety reduced brinjal shoot and fruit borer infestation, produced maximum healthy fruit and offered higher gross margin for the farmers. This variety showed 0.0% shoot infestation and 0.05% fruit infestation (by no.) against 22% shoot and 26.5 % fruit (by no.) infestation in Non Bt brinjal counterparts. Higher fruit yield was found in BARI Bt Begun-4 (31.06 t ha^{-1}) as compared to Non Bt Begun-4 (18.65 t ha^{-1}).

Introduction

Brinjal (*Solanum melongena*) is one of the most important and popular vegetables in Bangladesh that grown widely round the year throughout the country. The crop is damaged severely by the notorious insect called brinjal shoot and fruit borer (BSFB) and the damage ranges from 30-70% depending upon the locality and edaphic conditions. For controlling this pest, farmers frequently applied large quantities of insecticides, but the success is very poor. Farmers in major brinjal producing areas in the country spray chemical insecticides every other day, 60-180 times per growing season. The practice is unacceptable and unhygienic to consumers, farmers and the environment. Bt brinjal is a transgenic

brinjal developed by inserting a crystal protein gene (Cry*1Ac*) from the soil bacterium, Bacillus thuringiensis into various brinjal cultivars and these plants are found to be resistance against BSFB. Bangladesh is the first country in the world to approve the commercial cultivation of four Bt brinjal varieties viz. BARI Bt Begun-1, BARI Bt Begun-2, BARI Bt Begun-3 and BARI Bt Begun-4. Previous experiments conducted at different station of BARI indicate that Bt varieties reduce the BSFB infestation, number of insecticide applications and improve yield. The present study was undertaken to evaluate the performance of the varieties under the farmers' field condition and to popularize the varieties among the farmers to promote their adoption in different areas of Bangladesh.

Materials and methods

The trial was conducted to 3 farmers' field at MLT site, Hossainpur under OFRD, BARI, Kishoreganj to observe the performance of BARI Bt Begun in farmers' field (Table 1). Brinjal varieties viz. BARI Bt begun-4 and Non Bt begun at the farmers' field. One rows of non Bt counterpart was also planted as border crops. Unit plot size was 20 m x 20 m with spacing of 100 cm x 100 cm. Stable bleaching powder was applied 20 days before transplanting @ 21 kg/ha for preventive measure against bacterial wilt. The fertilizers were used @ 138-40-100-18-1.7-3.6 kg ha^{-1} NPKSBZn and Cowdung 10 t ha^{-1}. One-third MP and rest fertilizers except urea were applied during final land preparation. Remaining two-third MP was divided into three split and applied at 20 DAP, at flowering and fruiting stage. Urea was applied in four equal installments at 20 DAP, at flowering and two times at fruiting stage. Dates of transplanting were 21-23 November 2021 and harvesting was started 07 February 2022. Standard crop management practices with irrigation, weeding and lower branch pruning were done properly. Plant protection measures for other pest were taken; Furadan was applied @ 33 kg ha^{-1} during transplanting, Bio-neem plus I EC (Azadirachtin) @1.0 ml/L and Admire was sprayed @ 0.5 ml/L alternately at seedling stage to control whitefly in some heavily infested plot. Similarly, Bavistin @ 2ml/L was sprayed in 2-3 times to control Fusarium wilt infested plots. *Epilachna* beetle was controlled by destroying egg mass and larva, pupa and adult by hand picking. Ten plants were selected randomly from each plot to record data on yield and BSFB infested fruit/plant.

Result and Discussion

Higher fruit yield was observed in BARI Bt Begun-4, due to no infection of BSFB. On the other hand, Non Bt varieties produced lower fruit yield due to infestation by BSFB, as the infested fruits were smaller, thinner and lighter in weight than non-infested fruits. BARI Bt Begun-4 produced 31.06 t/ha marketable fruit while Non Bt brinjal counterpart gave 18.65 t ha^{-1}. BARI Bt brinjal variety showed 0.0% shoot infestation and 0.05% fruit infestation (by no.) against 22% shoot and 26.50% fruit (by no.) infestation in Non Bt brinjal counterparts (Table 2). For no/very less infestation of BSFB in BARI Bt brinjal the fruit yield is high.

Cost and Return analysis

Gross return, total variable cost, gross margin and benefit-cost ratio of BARI Bt brinjal have been shown in Table 3. Higher gross return (248480 Tk. ha^{-1}) and gross margin (97250 Tk. ha^{-1}) were obtained from BARI Bt Begun-4 due to its higher yield. The lowest was found in Non Bt Begun.

Table 1. Disease and insect infestation of *Bt* and non *Bt* brinjal in Kishoreganj during 2021-22

Variety	BSFB		Bacterial wilt (%)
	Infected shoot (%)	Infected fruit (%)	
BARI *Bt* Begun-4	0	0.05	8-10
Non *Bt* Begun	22	26.5	2.-4

Note: BSFB- Brinjal shoot and fruit borer

Table 2. Table 1. Yield (t/ha) of *Bt* and non *Bt* brinjal varieties at farmer's field during 2021-22

Location	Farmer no.	BARI *Bt* Begun-4	Non *Bt* Begun
Yield (t/ha)	1	31.90	18.32
	2	30.13	18.38
	3	31.14	19.26
Mean		31.06	18.65

Table 3. Cost and return analysis of brinjal varieties at Kishoreganj during 2021-22

Variety	Gross return (Tk. ha^{-1})	TVC (Tk. ha^{-1})	Gross margin (Tk/ha)	BCR
BARI *Bt* Begun-4	248480	151230	97250	1.64
Non *Bt* Begun	18650	162350	24150	1.15

Average sells price of BARI *Bt* Begun-Tk. 8 kg^{-1} and Non *Bt* Begun Tk. 10 kg^{-1}

Farmer's reaction

Farmers obtained higher income due to higher fruit yield from BARI Bt Begun-4. Farmers expressed satisfaction to produce it and said that it is more profitable and less laborious due to no infestation of BSFB. So, they were very happy to cultivate the BARI Bt begun-4 and they were continuing it. On the other hand, the neighbor farmers' showed interest for cultivating BARI Bt begun-4 in their own land next year.

Conclusion

BARI Bt Brinjal varieties performed better over their Non Bt counterparts in respect of BSFB infestation. The fruit yield was found higher in BARI Bt brinjal compare to Non Bt brinjal. This technology is highly effective against the target insect pest brinjal shoot and fruit borer.

PRODUCTION PROGRAM OF BARI PIAZ-5 IN KISHOREGANJ

M. Mohiuddin

A production program of BARI Piaz-5 was conducted at farmer's field of the MLT sites of Kishoreganj during the *Kharif-II* 2020-21 to observe the performance of BARI Piaz-5. The program was conducted in about 160 decimals land. A total of 06 farmer's were selected. Different crop management practices like date of transplanting, intercultural operations, date of harvest etc. are stated in Table 1. 45-50 days old seedling was transplanted on 5-10 January 2022. The crop was fertilized with 70-40-88-20-5-1.5 kg of N-P-K-S-Zn & B ha^{-1} in Hossainpur and Karimganj the form of urea, TSP, MoP, gypsum, zinc sulphate mono hydrate and boric acid, respectively. All of P, S, Zn and B, and half of N and K will be applied as basal during final land preparation. Remaining N and K will be applied in two equal splits at 21-22 DAT and 39-41 DAT under moist soil condition and mixed thoroughly with the soil. Weeding was done twice at 16-18 and 45-47 DAT. Pesticides named Roval (2 times), Amister top (2 times), Nativo (1 time), Imitaf (2 times) were sprayed. Onion varieties were harvested at 62-70 DAT. Data on yield and economic returns were recorded and presented in Table 2.

Table 1. Crop management practices used in BARI Piaz-5 at Kishoreganj during 2021-22

Variety	Farmer (nos.)	Area (dec)	Date of trans plantin g	Fertilizer dose (N-P-K-S-Zn-B) kg ha^{-1})	Urea and MoP top dressing (DAT)	Irriga tion	Wee ding (Tim es)	Pesticide spray (Times)	Date and DAT to harvest
BARI Piaz-5	6	180	05-10 Januar y 2022	70-40-88-20-5-1.5	2 (21-22 and 39-41)	4 (Pre trans., just after trans., 22-25, 45-50)	2	7 (fungicid e 5 times insecticid e 2 times	12-20 March 2022 (62-70 DAT

Results

The average bulb yield of BARI Piaz-5 was observed at 18.61 t ha^{-1}, gross margin Tk. 135146 per ha., respectively.

Table 2. Yield and economy return of BARI Piaz-5 at Kishoreganj during 2021-22

Location	Variety	Bulb yield (t ha^{-1})		Gross return (Tk ha^{-1})	Total variable cost (Tk ha^{-1})	Gross margin (Tk ha^{-1})
		Range	Average			
Kishoreganj	BARI Piaz-5	18.15-20.23	18.61	317571	182425	135146

Price: Input: seed (Tk kg^{-1}): BARI Piaz: 3000,Bulb: BARI Piaz-5: 17.00 Tk kg^{-1}

Farmers' opinion

Farmers opined positively to the BARI Piaz-5 for its higher bulb yield. Next cropping season, they will cultivate BARI Piaz-5 variety. Market price of BARI Piaz-5 was lower due to late transplanting in farmers field.

BARI TECHNOLOGY VILLAGE IN KISHOREGANJ

M. MOHIUDDIN

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 Parabhanga under Sadar upazila of Kishoreganj district. A "Crop Museum" has developed at the farmers' field and also a demonstration program was conducted during rabi 2021-22 to grow interest about BARI released crop varieties to the farmers. The museum contained 20 improved varieties under 10 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 based on different agro-ecological zones of the country. After reorganization of Directorate of Agriculture (Research and Education) as BARI in 1976, the institute has developed more than 400 high yielding varieties of a wide range of 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 such as nutrient management practices for major cropping patterns and packaged these technologies into integrated farming system modules in whole farm perspectives to maximize farm productivity and resource use efficiency. The institute has also developed a good number of technologies for agricultural mechanization and post-harvest handling and processing. 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 Projukti Polli (BARI Technology Village) 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.

Materials and Methods

BARI technology village at Sadar upazila of Kishoreganj has been initiated on April, 2019. The Agricultural Research Sub-station of BARI, OFRD, Kishoreganj has established "A Crop Museum" and set up production program of field crops (mustard, Bottle gourd and brinjal), at the farmers' field of Parabhanga and Moishakhali under Sadar upazila of Kishoreganj during 2021-22. The whole area of crop museum was 5 decimal where BARI released selected different crop varieties were grown as per BARI recommended management practices. The museum

contained 13 improved varieties under 09 crops. The name and amount of supplied materials are given in Table 1. The crops were sown on 17 November to 12 December, 2021 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 paravanga BARI Technology village, production program of field crops, homestead vegetable production and fertilizer & water management of planted/developed tree saplings were provided during 2021-22.

PROGRAM: FIELD CROP PRODUCTION

The three crops of mustard, bottle gourd and brinjal were taken under crop production program at BARI Technology Village, Kishoreganj during *rabi* season 2021-22that are presented crop 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) Moishakhali, Kishoreganj

3. Name of Team Leaders: Dr. M. Mohiuddin, SSO, OFRD, Kishoreganj

4. Name of Site-Co-ordinator: Md. Aminul Haque, SA, OFRD, BARI, Kishoreganj

5. Number of Selected Farmers: 02

6. Objectives

a. To introduce BARI developed mustard variety 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-14	30	800
BARI Sarisha-15	30	800

8. Date of Initiation: December, 2021

9. Introduction

Bangladesh Agricultural Research Institute (BARI) has developed latest short duration (BARI Sarisha-14 and BARI Sarisha-15) mustard variety. The farmers in this area mainly cultivate BARI Sarisha-14 but due to improper agronomic management, low yield from that variety observed. 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, Moishakhali,Kishoreganj sadar, Kishoreganj during *rabi* season of 2021-22. The mustard crop named BARI Sarisha-14 and BARI Sarisha-15 were cultivated by two farmers. The provax treated seed was sown on 12 December 2021. The recommended doses of fertilizer were applied @ 120-36-40-15-2-1kg ha^{-1} N-P-K-S-Zn-B by OFRD, Kishoreganj but @ 90-28-48-18-0-0.85 kg ha^{-1} N-P-K-S-Zn-B were applied by the farmers. weeding (one time at 15 DAS) and top dressing of urea fertilizer (one time at 28 DAS)were done. One time fungicide spray with Amister top for controlling blight (65 DAS)and 2 times insecticides spray controlling aphid were done during crop production time. The BARI Sarisha-14 and BARI Sarisha-15 were harvested at 81 DAS (3 March 2022).

11. Results and Discussion

Yield performance of BARI Sarisha-14 and BARI Sarisha-15 were satisfactory which is shown in table 1. Yield of mustard variety of BARI Sarisha-14 for production program plot and neighboring farmers plot were 1.56 tha^{-1} and 1.25 tha^{-1}, respectively. Yield of BARI Sarisha-15 was calculated at 1.45tha^{-1} in the study area. The higher gross margin (Tk.61762 ha^{-1}) and BCR (2.30) was found in production program plot of BARI sarisha-14 due to obtain higher yield. Different amount of seed was preserved.

Table 1. Yield performance of mustard varieties during2021-22 in Kishoreganj

Variety	Area (dec.)	Seed yield (t ha^{-1})	GR (Tk ha^{-1})	TVC (Tk ha^{-1})	GM (Tk ha^{-1})	BCR	Seed stored (kg)
BARI Sarisha-14	30	1.56	109270	47508	61762	2.3	40
Farmers variety (BARI Sarisha-14)	30	1.25	87710	43765	43945	2.0	30
BARI Sarisha-15	30	1.45	101640	46700	54940	2.18	25

Input price (Tk. kg^{-1}): seed: 100.00, Market output price (Tk. kg^{-1}): 70 for Mustard

12. Findings/conclusion

Mean yield of mustard variety of BARI Sarisha-14 from production program plot was satisfactory (1.56 and 1.25 tha^{-1}). A good impact was created among the farmers due to applying of modern production technology 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.
ii). Farmers were motivated to follow the modern production technology.

B.Vegetables (Bottle gourd on support of bamboo)

1. Name of Base Station (BARI) of BTV: On-Farm Research Division, BARI, Kishoreganj

2. Name of Technology Village: BARI Projukti Polli (BTV) Parabhanga, Kishoreganj

3. Name of Team Leaders: Dr. M. Mohiuddin, SSO, OFRD, Kishoreganj

4. Name of Site-Co-ordinator: Md. Aminul Haque, SA, OFRD, BARI, Kishoreganj

5. Number of Selected Farmers: 01

6. Objectives

a. To introduce BARI developed bottle gourd (BAR Lau-4) among the farmer of that area.

b. To introduce modern production technology for increasing yield of vegetable crop.

7. Name and amount of supplied materials: (seeds)

Variety	Area (dec.)	Seed supplied (g)
BAR Lau-4	10	110

8. Date of Initiation: October, 2021

9. Introduction

Bangladesh Agricultural Research Institute (BARI) has released BARI Lau-4 that are high yielding but farmers cultivate local bottle gourd variety. The dissemination of new variety is needed to increase yield and farmers income. 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).

10. Methodology

The production program was conducted at BARI Technology village, Parabhanga, Kishoreganj sadar, Kishoreganj during *rabi* season of 2021-22. BARI Lau-4 was cultivated. One farmer was involved. The area covered 10 decimals of land. The seed was sown on 5 October and 15 days old seedlings was transplanted at main field by 20 October, 2021. The crop was fertilized with 60-40-30-10-2-0 kg ha^{-1} N-P-K-S-Zn-B, respectively with cow dung @ 5 tha^{-1}. Half of cowdung were applied during final land preparation. The remaining half of cowdung, full amount of P and half of N and K were applied during pit preparation. The rest of N and K were applied as top dress at 15, 35, 55 and 75 days after sowing (DAT). The crop was irrigated four times after top dressing. Weeding was done thrice at 21, 54 and 70 DAT. For controlling disease, one time Carboxin (17.5%) +Thiram (17.5%) group (Provax

200 WP) on 14 DAT and Propiconazole (Tilt 250 EC) on 36 DAP were sprayed. Three times Emamectin Benzoate (Guilder and Proctin 5WDG) during 16, 36, 56, and 76 DAT, one time Thiamethoxam (Actara 25WG) with Diafenthiuron (Pegasus) during 80 DAT, was applied for controlling aphid, jassid, whitefly type sucking insect. For better crop growth, two times Fulvic acid based PGR (crop plus) at 60 and 85 DAT were also applied. Harvesting of fruit started from 88 DAT to 140 DAT.

11. Results and Discussion

Yield performance of BARI Lau-4 is shown in table 1.Mean yield of BARI Lau-4 variety was 60 tha^{-1} which was 37% higher than that of local cultivar. The higher gross margin (Tk. 220250 ha^{-1}) was found in BARI Lau-4.

Table 1. Yield performance of bottle gourd variety during 2021-22 at Kishoreganj

Variety	Area (dec.)	Yield ($t\ ha^{-1}$)	GR ($Tk.\ ha^{-1}$)	TVC ($Tk.\ ha^{-1}$)	GM ($Tk.\ ha^{-1}$)	Seed stored (kg)
BARI Lau-4	10	59.65	357900	137650	220250	2.60
Local	10	43.56	261360	134950	126410	1.94

Input Price $Tkkg^{-1}$: Urea-18.00, TSP-25.00, MOP-15.00, Gypsum-10.00, $ZnSo_4$-220.00,Boric acid-300.Seed $Tkkg^{-1}$: 2500, **Output Price Tk kg^{-1}:**Fruit: 6.00

12. Findings/conclusion

The yield of BARI Lau-4 was 37% higher than that of local. A good impact was created among the farmers of this area due to initiation of new variety of bottle gourd. The farmers of that locality will follow the modern production technology in next year.

13. Farmer's opinion

i). Farmers were happy to observe the yield of BARI Lau-4 variety against existing variety.
ii). Farmers were motivated to introduce new variety in existing local due to higher yield.

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) Parabhanga, Kishoreganj
3. Name of Team Leaders: Dr. M. Mohiuddin, SSO, OFRD, Kishoreganj
4. Name of Site-Co-ordinator: Md. Aminul Haque, SA, OFRD, BARI, Kishoreganj
5. Number of Selected Farmers: 01

Table 1. Name and amount of supplied vegetables and other crop seeds for BARI technology village during rabi 2021-22

Sl No	Crop	Crop variety	Amount(g/kg)
01	Tomato	BARI Tomato-18	04
		BARI Tomato-19	04
		BARI Tomato-20	04
		BARI Tomato-21	04
02	Spinach	BARI Palong shak-1	34
03	Radish	BARI Mula-3	17
		BARI Mula-4	17
04	French Bean	BARI Jhar Seem-2	70
		BARI Jhar Seem-3	70
05	Stem amaranth	BARI data-1	50
06	Red amarnath	BARI Lalshak-1	34
07	Brinjal	BARI Begun-9	04
		BARI Begun-10	04
08	Garden pea	BARI Motorshuti-1	34
		BARI Motorshuti-3	17

09	Batishak	BARI Batishak-1	10
10	Bottle gourd	BARI Lau-4	17
11	Onion	BARI piaz-4	34
12	Mustard	BARI sorisha-11	800
		BARI sorisha-14	800
		BARI sorisha-15	800

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 2021-22

Sl no	Crop	Crop variety	Sow. date	Har. date	duration (days)	Yield (t/ha)	Remarks
01	Tomato	BARI Tomato-18	23.11.22	02.02.22-19.03.22	116	55.45	
		BARI Tomato-21	23.11.22	26.01.22-26.03.22	118	57.53	Yield was very good. Farmers expressed their willingness to cultivate in field but seed have to available in the market.
02	Spinach	BARI Palong shak-1	23.11.22	07.01.22	45	29.38	Very good performance
03	Radish	BARI Mula-3	23.11.22	15.01.22-20.01.22	53-58	32.24	
		BARI Mula-4	23.11.22	17.01.22-22.01.22	55-60	34.61	Farmers are happy
04	French Bean	BARI Jhar Seem-1	23.11.21	08.03.22	106	10.25	New vegetables in the areas and famers feeling is good
		BARI Jhar Seem-2	23.11.21	14.03.22	112	4.13	
05	Stem amaranth	BARI Data-1	23.01.21	12.03.22	47	10.34	
	Red amarnath	BARI Lalshak-1	23.11.21	28.12.21	35	10.50	
06	Brinjal	BARI Begun-9	17.11.21	25.02.22-27.04.22	161	36.20	
		BARI Begun-10	17.11.21	02.03.22-18.04.22	152	38.65	
07	Garden pea	BARI Motorshuti-1	23.01.21	05.02.22	74	5.86	
		BARI Motorshuti-3	23.11.21	11.02.22	80	5.40	
08	Batishak	BARI Batishak-1	23.11.21	10.01.22	48	27.23	
09	Bottle gourd	BARI Lau-4	28.09.21	25.11.21-16.02.22	141	42.83	High market demand and price
10	Onion	BARI piaz-4	17.11.21	22.03.22	125	14.15	
11	Mustard	BARI sorisha-11	12.12.21	27.03.22	104	1.95	
		BARI sorisha-14	12.12.21	02.03.22	80	1.35	
		BARI sorisha-15	12.12.21	03.03.22	81	1.32	

Saplings of BARI released different fruit varieties were distributed among the farmers of the technology village during 2021-22. 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	100
	BARI Aam-4	200
	BARI Aam-8	200
Malta	BARI Malta-1	100
	BARI Malta-2	100
Alu Bukhara	BARI Alu Bukara	75
Orange	BARI Komola-1	100
	BARI Komola-2	100

Farmers' opinion: Farmers of Kishoreganj sadar, Kishoreganj area are interested in growing different types of BARI developed vegetables varieties due to higher yield. Farmers were impressed to see the overall performance of BARI released modern varieties of different crops. Farmers were also happy for having good varieties of fruits.

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.

Title: Technology Transfer

List of training, field day, Seed and Seedling Distribution,2021-22

Month: July 2021 to June, 2022

No of Training	No of Field day	Distribution of seed and seedling activities
05	20	900

a. Training:

Category of trainees: Farmers

Sl.No	Title	Venue/ Location	Date	No. of batch	Total no. of Participants	Print media/ Photo	Electronic media
1.	SAAO, SSA/Sa Training on "Modern production technology of vegetables on floating bed	Training room, OFRD Kishoreganj	17 Dec: 2021	01	30		
2.	Power tiller driver, mechanics and farmers training on mechinary introduction, maintainance, and repairing	Panchrukhi, Nikli Kishoreganj	09-10 June.22	02	40		
3.	Power tiller driver, mechanics and farmers training on mechinary introduction, maintainance, and repairing	Kishoreganj Sadar	18-19 June.22	01	20		
4.	Training on Summer tomato production	Training room, OFRD Kishoreganj	18 June.22	01	10		
5.	Training on Summer tomato production	Training room, OFRD Kishoreganj	19 June. 22	01	10		

b. Field day:

Sl. No	Title	Venue/ Location	Date	No. of batch	Total no. of Participants	Print media/ Photo	Electronic media
1.	**Field day on** floating Agricultural	Kishoreganj Sadar	17 Dec. 2021	01	80		
2.	Adaptive trial on wheat seed sowing by BARI Seeder	Kisboreganj Sadar	17 Dec: 2021	01	40		
3.	Production Program of BARI Shorisha-14	Nikli Kishoreganj	05 Jan: 2022	01	70		--
4.	Adaptive trial on Farm Mechinary and sustainable crop production technology	Nikli Kishoreganj	01 Jan: 2022	01	40		--
5.	Adaptive trial on BARI Seeder	Kishoreganj Sadar	06 Feb: 2022	01	40		
6.	Adaptive trial on sunflower seed sowing by BARI Seeder	Nikli Kishoreganj	07 Feb: 2022	01	40		--
7.	Field day on Modern Production Technology of Sweet potato	Nikli Kishoreganj	12 Feb:2022	01	65	 	
8.	Modern Production technology of floating bed Agricultural	Kishoreganj Sadar	12 Feb:22	01	80		

Sl. No	Title	Location	Date	No. of batch	Total no. of Participants	Print media/ Photo	Electronic media
9	Adaptive trial on BARI Seeder	Moishakhali , Kishoreganj Sadar	30 May: 2022	01	40		
10.	Adaptive trial on Jute seed sowing by BARI Seeder	Shitdar, Nikli, Kishoreganj	31 May. 2022	01	40		--
11.	Adaptive trial on BARI Seeder	Moishakhali , Kishoreganj Sadar	01 June. 2022	01	40		
12.	Adaptive trial on BARI Seeder	Panchrukhi, Nikli, Kishoreganj	01 June. 2022	01	40		
13	Adaptive trial on BARI Seeder	Moishakhali , Kishoreganj Sadar	10 June. 2022	01	40		
14	Adaptive trial on Corrpost separator	Donail, Kishoreganj Sadar	10 June. 2022	01	40		
15	Adaptive trial on Excialm flow pump	Kishoreganj Sadar	18 June. 2022	01	40		
16	Adaptive trial on Crop thresher	Kishoreganj Sadar	19 June. 2022	01	40		
17	Adaptive trial on Potato grader	Kishoreganj Sadar	19 June. 2022	01	40		
18	Adaptive trial on BARI Seeder	Kodalia Kishoreganj	02 June. 2022	01	40	 	
19	Adaptive trial on BARI Seeder	Kodalia Kishoreganj	13 June. 2022	01	40		
20	Adaptive trial on Potato grader, by BARI Seeder	Kishoreganj Sadar	21 June. 2022	01	40		

C. Seedling and Seed Distribution:

Sl No	Title	Location	Date	No. of batch	Total no. of Participants	Print media/ Photo	Electronic media
1.	Seedling transplanting of BARI Alubokhara	Kishoreganj Sadar	21-01-2022	-	**80**		
2.	Seedling transplanting of BARI Avokado-1	Mitamoin	17-12-2022	-	**1**		
3.	Seedling transplanting of BARI Rambutan-1	Mitamoin	17-12-2022	-	**1**		
	Seedling transplanting of BARI Aam-3	Kishoreganj Sadar	01-01-2022	**01**	**100**		
	Seedling transplanting of different BARI varieties	Itna, Mitamoin, Kishoreganj sadar, Taril, Pakundia	10-09-2021		**700**		
	Distribution of BARI Projukti hand book	Tarail, Karimganj	26-03-2022		**10**		
	BARI Chinabadam-9 Seed distribution in Haor areas	Nikli	12-12-2021		**10**		

নিউজ পুকুর

কিশোরগঞ্জে বীজ বপন যন্ত্র এবং রিপার এর পরীক্ষামূলক ব্যবহার

ডিসেম্বর ১৮, ২০২১

নিজস্ব প্রতিবেদক: বারি উদ্ভাবিত বীজ বপন যন্ত্র এবং রিপার এর পরীক্ষামূলক ব্যবহার অনুষ্ঠিত হয়েছে কিশোরগঞ্জে। সরেজমিন গবেষণা বিভাগ কিশোরগঞ্জ এর উদ্যোগে ফার্ম মেশিনারি বিভাগ গাজীপুর এর অর্থায়নে অদ্যবার কিশোরগঞ্জ সদর উপজেলার মৈশাখালী গ্রামে যন্ত্র দুটির পরীক্ষামূলক ব্যবহার অনুষ্ঠিত হয়।

অনুষ্ঠানে প্রধান অতিথি হিসেবে উপস্থিত ছিলেন বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউটের (গাজীপুর) মহা পরিচালক ড. দেবাশীষ সরকার। বিশেষ অতিথি ছিলেন পরিচালক (প্রশিক্ষণ ও যোগাযোগ) ড. সামসুল আলম। সভাপতিত্ব করেন সরেজমিন গবেষণা বিভাগের (গাজীপুর) মুখ্য বৈজ্ঞানিক কর্মকর্তা ও প্রধান মুহাম্মদ সহিদুজ্জামান।

প্রধান অতিথি ড. দেবাশীষ সরকার তার বক্তব্যে বলেন, কৃষিতে শ্রমের ঘাটতি থাকায় বর্তমান সরকার কৃষি যান্ত্রিকীকরণ এবং বাণিজ্যিকীকরণে গুরুত্ব দিয়েছে। জনসংখ্যা বৃদ্ধির সাথে তাল মিলিয়ে খাদ্য উৎপাদন বৃদ্ধি করতে হলে কৃষি যান্ত্রিকীকরণ অপরিহার্য। তিনি আরও বলেন, বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউট দেশের জনগণের আর্থসামাজিক অবস্থা বিবেচনা করে বিভিন্ন ফসলের এ পর্যন্ত মোট ৫০টি লাগসই কৃষি যন্ত্রপাতি উদ্ভাবন করেছে। এ কৃষি যন্ত্রপাতির মধ্যে অন্যতম হলো বারি বীজ বপন যন্ত্র। এর সাহায্যে বীজ বপন করলে বীজের পরিমাণ কম লাগে, সহজে আগাছা পরিষ্কার করা যায়, গাছ বেশি আলো-বাতাস পায় এবং সর্বোপরি উৎপাদন বাড়ে। পাওয়ার টিলারচালিত এই বীজ বপন যন্ত্র নির্দিষ্ট স্থানে ও সঠিক গভীরতায় সুষমভাবে বীজকে বপন করে। এটি ব্যবহারে প্রচলিত পদ্ধতির চেয়ে ১০ থেকে ৪০ শতাংশ বীজ কম লাগে এবং ফলনও ১০ থেকে ১৫ শতাংশ বৃদ্ধি পায়। সবকিছু মিলিয়ে প্রচলিত পদ্ধতির চেয়ে প্রায় ২৫% সময় ও খরচ কম লাগে। বারি উদ্ভাবিত আরেকটি চমৎকার যন্ত্র হলো রিপার। যেখানে প্রচলিতভাবে এক বিঘা জমির ধান কাটতে ৮-১০ জন শ্রমিক লাগে, সেখানে এর সাহায্যে এক ঘণ্টায় এক বিঘা জমির ধান কর্তন করা যায়। এতে সময় ও খরচ অনেক বেঁচে যায়। ফলে কৃষক লাভবান হয়।

উক্ত অনুষ্ঠানে আরও উপস্থিত ছিলেন এফএমডিপি প্রকল্পের পিডি ড. মো. নুরুল আমিন ও কিশোরগঞ্জ কৃষি গবেষণা কেন্দ্রের উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. মোহাম্মদ মহিউদ্দীন। অনুষ্ঠানে এলাকার ৪০ জন কৃষক উপস্থিত ছিলেন।

দৈনিক পূর্বকণ্ঠ
THE DAILY PURBOKONTHO

বক্তব্য রাখছেন কৃষি মন্ত্রণালয়ের অতিরিক্ত সচিব কমলারঞ্জন দাশ - পূর্বকণ্ঠ

রবিবার, ১৩ ফেব্রুয়ারি, ২০২২

ক্যান্সর ও অন্ধত্ব রুখবে বারি উদ্ভাবিত মিষ্টিআলু

 # নিজস্ব প্রতিবেদক :-

গাজীপুরের বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউট (বারি) উদ্ভাবন করেছে ওষুধি গুণসম্পন্ন মিষ্টি আলুর জাত। এসব আলু ক্যান্সার প্রতিরোধক হিসেবে যেমন কাজ করবে, অন্ধত্ব দূরীকরণেও কাজ করবে। এমনকি ডায়াবেটিস প্রশমনেও এসব মিষ্টি আলু ভূমিকা রাখবে। আবার উচ্চ রক্তচাপ এবং রক্তে ইউরিক এসিড নিয়ন্ত্রণেও কাজ করবে। কিশোরগঞ্জের হাওর উপজেলা নিকলীর মাঠে মিষ্টি আলুর ফলন পর্যবেক্ষণ করতে গিয়ে এমনই বর্ণনা দিয়েছেন কৃষি মন্ত্রণালয়ের অতিরিক্ত সচিব (গবেষণা) কৃষিবিদ কমলারঞ্জন দাশ, বারির মহাপরিচালক ড. দেবাশীষ সরকার ও বারির কন্দাল ফসল গবেষণা কেন্দ্রের পরিচালক ড. সোহেলা আক্তার। তারা জানান, বারি মিষ্টি আলু-১৭ 'অ্যান্থোসায়ানিন' নামে এন্টিঅক্সিডেন্ট সমৃদ্ধ। এই আলু একদিকে ক্যান্সার রোধ করে, অন্যদিকে উচ্চ রক্তচাপ ও রক্তে ইউরিক এসিডের মাত্রা কমাতে সাহায্য করে। অন্যদিকে বারি মিষ্টি আলু-১২ বিটা ক্যারোটিন সমৃদ্ধ, যা অন্ধত্ব দূরীকরণে সাহায্য করে। এসব জাত প্রতি হেক্টরে ২৫ টন উৎপাদিত হতে পারে।

কৃষি গবেষণা ইনস্টিটিউটের জেলা সরেজমিন গবেষণা বিভাগের মাধ্যমে নিকলীর পাঁচরুখি এলাকার কৃষক নিখিল মিয়াকে দিয়ে এবার এসব মিষ্টি আলুর আবাদ করানো হয়েছে। শনিবার (১২ ফেব্রুয়ারি) বিকালে সেখানে শতাধিক কৃষককে নিয়ে মিষ্টি আলুর আবাদে উদ্বুদ্ধকরণে মাঠ দিবস পালন করা হয়েছে। বারির মহাপরিচালক ড. দেবাশীষ সরকারের সভাপতিত্বে অনুষ্ঠানে প্রধান অতিথি কৃষি মন্ত্রণালয়ের অতিরিক্ত সচিব কমলারঞ্জন দাশ, বিশেষ অতিথি কন্দাল গবেষণা কেন্দ্রের পরিচালক ড. সোহেলা আক্তার, সরেজমিন গবেষণা বিভাগের প্রধান ড. মু শহীদুজ্জামান, পাট গবেষণা ইনস্টিটিউটের সাবেক পরিচালক মো. মাহবুবুল ইসলাম, কিশোরগঞ্জ সরেজমিন গবেষণা বিভাগের উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. মোহাম্মদ মহিউদ্দিন ও জেলা প্রেস ক্লাবের সভাপতি মোস্তফা কামাল বক্তব্য রাখেন। অতিরিক্ত সচিব ও অন্যান্য কৃষি বিজ্ঞানীগণ বলেন, আগে সাধারণ মানের স্থানীয় জাতের মিষ্টি আলুর আবাদ করা হতো। সেগুলি তেমন পুষ্টিগুণ সম্পন্ন ছিল না। বারি মিষ্টি আলু-১২ জাতটি বাইরে থেকে সাদাটে বর্ণের। এর ভেতরকার আংশটি বিটা ক্যারোটিনের জন্য অনেকটা কমলা বর্ণের হয়।

এটি দৃষ্টিশক্তির সুরক্ষা দেয়। আর বারি মিষ্টি আলু-১৭ জাতটি বাইরে থেকে বেগুনি বর্ণের হয়। আর ভেতরকার আংশটি গাঢ় বেগুনি বর্ণের। এটি ক্যান্সার প্রতিরোধে এবং উচ্চ রক্তচাপ ও রক্তে ইউরিক এসিডের মাত্রা হ্রাস করে। এসব মিষ্টি আলুর গায়ে জাতাইসের সংক্রমণ হয় না। অথচ পাশের জমিগুলোতেই স্থানীয় জাতে জাইভাসের সংক্রমণ দেখা গেছে।

বক্তাগণ বলেন, এখন বারির বিজ্ঞানীরা নানা রকম উচ্চ ফলনশীল ওষুধি গুণসম্পন্ন ও পুষ্টিসমৃদ্ধ শাকসবজি উদ্ভাবন করছেন। এগুলি মাঠ পর্যায়ে ছড়িয়ে দেয়া হচ্ছে। একদিকে জনসংখ্যা বাড়ছে, অন্যদিকে জমির পরিমাণ কমছে। কাজেই উচ্চ ফলনশীল জাতগুলো আবাদ করে ক্রমবর্ধমান জনসংখ্যার চাহিদা পূরণ করতে হবে। প্রধানমন্ত্রীর অভিপ্রায় অনুযায়ী আগামী ২০৩০ সালের মধ্যে খাদ্যোৎপাদন দ্বিগুণ করার লক্ষ্য নিয়ে কাজ করা হচ্ছে।

দৈনিক পূর্বকণ্ঠ
THE DAILY PURBOKONTHO

কিশোরগঞ্জে ভাসমান কৃষির আধুনিক প্রযুক্তির মাঠদিবস

বক্তব্য রাখছেন কৃষি মন্ত্রণালয়ের অতিরিক্ত সচিব কমলারঞ্জন দাশ - পূর্বকণ্ঠ

শনিবার, ১২ ফেব্রুয়ারি, ২০২২

 # মোস্তফা কামাল :-

কিশোরগঞ্জে কৃষি গবেষণা ইনস্টিটিউটের সরেজমিন গবেষণা বিভাগ কার্যালয়ে ভাসমান কৃষির আধুনিক প্রযুক্তির ওপর মাঠ দিবস হয়েছে। আজ ১২ ফেব্রুয়ারি শনিবার সকালে গাজীপুরের বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউটের মহাপরিচালক ড. দেবাশীষ সরকারের সভাপতিত্বে অনুষ্ঠানে প্রধান অতিথি কৃষি মন্ত্রণালয়ের অতিরিক্ত সচিব (গবেষণা) কমলারঞ্জন দাশ, বিশেষ অতিথি কন্দাল গবেষণা কেন্দ্রের পরিচালক ড. সোহেলা আক্তার, সরেজমিন গবেষণা বিভাগের প্রধান ড. মু শহীদুজ্জামান, পাট গবেষণা ইনস্টিটিউটের সাবেক পরিচালক মো. মাহবুবুল ইসলাম, কিশোরগঞ্জ সরেজমিন গবেষণা বিভাগের উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. মোহাম্মদ মহিউদ্দিন, জেলা কৃষক নীতের সভাপতি আহমেদ উল্লাহ, জেলা প্রেস ক্লাবের সভাপতি মোস্তফা কামাল, বীর মুক্তিযোদ্ধা মো. নিজাম উদ্দিন, ভাসমান বাগানের কৃষক সাইফুল ইসলাম ও খলিলুর রহমান বক্তব্য রাখেন।

প্রধান অতিথি বলেছেন, এখন আমাদের দেশে পর্যাপ্ত খাদ্যশস্য এবং শাকসবজির আবাদ হচ্ছে। স্বাধীনতার পর খাদ্যের ঘাটতি থাকতো। এক বিঘা জমিতে ৭ মণ ৮ মণ ধান হতো। এখন এক শতাংশ জমিতে এক মণ ধান হয়। এগুলি কৃষি বিজ্ঞানীদের অবদান। দিন দিন জমি কমছে। কিন্তু আমরা খাদ্যে স্বয়ংসম্পূর্ণ হয়েছি। তবে এখন পুষ্টিকর ও নিরাপদ খাদ্যের ওপর জোর দেয়া হচ্ছে। ভাসমান বেডে নিরাপদ ও পুষ্টিকর শাকসবজির আবাদ সম্ভব হচ্ছে বলে তিনি জানিয়েছেন। তিনি বলেন, বিভিন্ন ফসলের মধ্যে আন্তঃজিন জেনেটিক ইঞ্জিনিয়ারিং করে নতুন নতুন উচ্চ ফলনশীল জাত উদ্ভাবন করে এখন শীতকালের ফসল যেমন গ্রীষ্মকালে ফলানো হচ্ছে, আবার ওষুধি গুণও সন্নিবেশিত করা হচ্ছে। তিনি পানি নেমে যাবার সময় ব্রাসের ওপর বীজ বপন করে মাড়াই লাভ জাতীয় সবজি চাষ প্রযুক্তি নিয়েও পরামর্শ দেন। ভাসমান কৃষিতে খাদ্য চাহিদা পূরণের পাশাপাশি কৃষকরাও অর্থিকভাবে লাভবান হতে পারেন বলে প্রধান অতিথ মন্তব্য করেছেন।

অনুষ্ঠানের সভাপতি প্রধান অতিথির কাছে কিশোরগঞ্জের কৃষির গুরুত্ব বিবেচনা করে এখানকার সরেজমিন গবেষণা বিভাগটিকে আধুনিক প্রযুক্তির সমন্বয়ের সুপরিসর জায়গায় সরেজমিন গবেষণা কেন্দ্রে উন্নীত করার জন্য প্রধান অতিথির কাছে দাবি জানিয়েছেন। এর জবাবে প্রধান অতিথিও এ ব্যাপারে উদ্যোগ গ্রহণের আশ্বাস প্রদান করেছেন। অতিথিগণ এর আগে পার্শ্ববর্তী নরসুন্দা নদীর ওপর কয়েকটি ভাসমান সবজি বাগান পরিদর্শন করেছেন।

ঢাকা : বৃহস্পতিবার : ২৭ জানুয়ারি-২০২২ : পৃষ্ঠা : ৪

সংবাদ

ভাসমান বাগানে সঞ্জীব বাঁধাকপি

আসমান সবজি বাগানে এবার চকচকে বাঁধাকপি

মোস্তফা কামাল :

আসমানে বেড়ে ফুলকপি ছিঁড়তে পারবে না কেউ

মোস্তফা কামাল :

সোমবার, ৭ ফেব্রুয়ারি, ২০২২

মোস্তফা কামাল :

৪ মার্চ, ২০২১ বাংলাদেশ প্রতিদিন পত্রিকার কৃষি ও প্রকৃতি পাতায় প্রকাশিত (অনলাইন ভার্সন)

bd-pratidin.com

ক্যান্সার প্রতিরোধী নতুন জাতের মিষ্টি আলুর চাষ কিশোরগঞ্জে | বাংলাদেশ প্রতিদিন

দৈনিক পূর্বকোণ

THE DAILY PURBOKONTHO

জমিয়ে পাশাপাশি জলমগ্ন বৃদ্ধিও বাড়ছে
জলমগ্ন লবণাক্ত পানিতে মিষ্টি
ভূমধ্যসাগর অঞ্চলীয় গবেষণা

বাংলাদেশ প্রতিদিন

ক্যান্সার প্রতিরোধী নতুন জাতের মিষ্টি আলুর চাষ কিশোরগঞ্জে

কিশোরগঞ্জ প্রতিনিধি

ক্যান্সার প্রতিরোধী নতুন জাতের মিষ্টি আলুর চাষ কিশোরগঞ্জে

বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউট (বারি) উদ্ভাবিত মিষ্টি আলু-১২, ১৪ ও ১৭ জাত চাষ করা হয়েছে কিশোরগঞ্জের নিকলীতে। এর মধ্যে বারি মিষ্টি আলু-১৭ এ বছরই প্রথম চাষ করা হয়েছে। গতবছর এই জাতটি উদ্ভাবন করা হয়। এই নতুন জাতের আলু ক্রেস্ট ও কোলন ক্যান্সার প্রতিরোধে গুরুত্বপূর্ণ ভূমিকা রাখবে বলে সংশ্লিষ্টরা জানিয়েছেন।

কিশোরগঞ্জ জেলা কৃষি গবেষণা কেন্দ্রের সরেজমিন গবেষণা বিভাগ সূত্রে জানা গেছে, কিশোরগঞ্জের নিকলী উপজেলার পাঁচরুখি ও পাটোয়ারপাড়া গ্রামের বারি উদ্ভাবিত মিষ্টি আলু-১২, ১৪ ও ১৭ জাত চাষ করা হয়েছে। পাঁচরুখি ও পাটোয়ারপাড়া গ্রামের কৃষক সিদ্দিক মিয়া ও শহীদ মিয়ার এক একর জমিতে পরীক্ষামূলকভাবে বারি মিষ্টি আলু চাষ করা হয়েছে।

আজকের পত্রিকা

প্রথমবার বারি পেঁয়াজ-৫ চাষে লাভের আশা কৃষকের

সূত্রটি আরও জানায়, এর আগে বারি মিষ্টি আলু-১২ ও ১৪ চাষ করা হলেও বারি মিষ্টি আলু-১৭ এ বছরই প্রথম চাষ করা হয়েছে।

কিশোরগঞ্জ জেলা কৃষি গবেষণা কেন্দ্রের ঊর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. মোহাম্মদ মহিউদ্দীন জানান, বারি মিষ্টি আলু-১৭ তে অ্যান্থোসায়ানিন নামক এন্টি অক্সিডেন্ট আছে, যা মানব শরীরে রোগ প্রতিরোধ ক্ষমতা বৃদ্ধি করে।

এসিডের মাত্রা কমাতে সাহায্য করে। এই মিষ্টি আলুতে সায়ানিডিন ও পিওনিডিন নামক পিগমেন্ট হেতি মেটাবোলিজম বিশাক্ততা কমাতে সাহায্য করে এবং ক্রেস্ট ও কোলন ক্যান্সার প্রতিরোধে গুরুত্বপূর্ণ ভূমিকা রাখে।

তিনি আরও জানান, স্থানীয় জাতের মিষ্টি আলুতে ভাইরাসের আক্রমণের কারণে গাছ জন্মে রস ধারণ করে। কিন্তু নিএআরআই উদ্ভাবিত জাতগুলো রোগবালাই ও পোকামাকড়ের আক্রমণমুক্ত।

তাছাড়া ফলনও আশানুরূপ। এক বর্গমিটার জমির আলু উত্তোলন করে ২.৬২ কেজি আলু পাওয়া গেছে।

বিডি প্রতিদিন/জুনায়েদ আহমেদ

দৈনিক পূর্বকণ্ঠ
THE DAILY PURBOKONTHO

যন্ত্র ব্যবহারে স্বল্প ব্যয় নিকলীর সূর্যমুখি চাষ ভোজ্য তেলের নতুন উৎসের হাতছানি

৭ ফেব্রুয়ারি, ২০২২

যন্ত্র ব্যবহারে স্বল্প ব্যয় নিকলীর সূর্যমুখি চাষ ভোজ্য তেলের নতুন উৎসের হাতছানি

৮ সংবাদ

গ্রীষ্ম-শরতে শীতকালীন 'বারি টমেটো-৮' : সফল কৃষক

বিশ্লেষণ

মোক্তেল কামোল :-

দৈনিক পূর্বকণ্ঠ
THE DAILY PURBOKONTHO

কিশোরগঞ্জে উচ্চ ফলনশীল বারোমাসি পেঁয়াজের আবাদ দূর হবে 'পেঁয়াজবাজি'

রবিবার, ২৭ মার্চ, ২০২২

 # মোস্তফা কামাল :-

দু'বছর ধরে দেশে পেঁয়াজ নিয়ে চলছে 'পেঁয়াজবাজি'। সরবরাহে ঘাটতি না থাকলেও, এমনকি উৎপাদন মৌসুমেও একটি কুচক্রি মহল কৃত্রিম সঙ্কট তৈরি করে মাত্রারিক্ত উচ্চমূল্যে পেঁয়াজ কিনতে ভোক্তাদের বাধ্য করছে। এবার দেশের কৃষি বিজ্ঞানীদের বদৌলতে এই সঙ্কটের হাত থেকে দেশবাসী পরিত্রাণ পেতে চলেছে। কেবল শীত মৌসুমে নয়, সারা বছর আবাদ করার মত পেঁয়াজের জাত উদ্ভাবন করেছেন গাজীপুরের বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউটের (বারি) আঞ্চলিক মসলা গবেষণা কেন্দ্রের বিজ্ঞানীরা। 'বারি পেঁয়াজ-৫' নামের এই পেঁয়াজ কেবল ১২ মাস আবাদ করা যায় তাই নয়, ফলনও হয় অন্যান্য প্রচলিত পেঁয়াজের প্রায় দ্বিগুণ। রোপন থেকে আহরণ পর্যন্ত সময় লাগে ৯৫ থেকে ১১০ দিন। প্রতি হেক্টরে এই পেঁয়াজের ফলন হয় ১৮ থেকে ২০ মেট্রিকটন। আর প্রচলিত পেঁয়াজের ফলন হয় ১০ থেকে ১২ মেট্রিকটন। নতুন জাতের এই পেঁয়াজ চারাটিতে এক কেজি হয়েছে বলে জানিয়েছেন কৃষি বিজ্ঞানীরা।

বাংলাদেশ প্রতিদিন

২৩ এপ্রিল, ২০২২

কিশোরগঞ্জে বছরব্যাপী চাষ হচ্ছে বারি পেঁয়াজ-৫

সাইফউদ্দীন আহমেদ লেনিন, কিশোরগঞ্জ:

বারি পেঁয়াজ-৫ এখন সারা বছরই চাষ হচ্ছে কিশোরগঞ্জে। এর আগে বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউট এ পেঁয়াজ গ্রীষ্ম ও খরিপ মৌসুমে আবাদের জন্য অবমুক্ত করে।

প্রথমবারের মত কিশোরগঞ্জের হোসেনপুর উপজেলার রামপুর গ্রামে এ পেঁয়াজ চাষের উদ্যোগ নেয় কিশোরগঞ্জ কৃষি গবেষণা উপকেন্দ্র। রামপুর গ্রামের ছয়জন কৃষকের তিন বিঘা জমিতে এ পেঁয়াজ চাষ হয়।

ফলে এই নতুন জাতের পেঁয়াজ আবাদ করে দেশের চাহিদা পূরণ করে বিদেশে রপ্তানি করা সম্ভব বলেও কৃষি বিজ্ঞানীরা ধারণা দিয়েছেন। কিশোরগঞ্জের হোসেনপুরের কৃষকদের নিয়ে এবার পরীক্ষামূলক আবাদ করিয়ে এর অভাবনীয় ফলনের প্রমাণ পাওয়া গেছে। পেঁয়াজের আকৃতি এবং রংও বেশ আকর্ষণীয়।

কিশোরগঞ্জ সরেজমিন গবেষণা উপকেন্দ্রের উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. মোহাম্মদ মহিউদ্দীনের পরামর্শে হোসেনপুরের দাপুনিয়া এলাকায় ৪ জন কৃষক এবার ৩৫ শতাংশ জমিতে 'বারি পেঁয়াজ-৫' আবাদ করেছেন। গত ১০ জানুয়ারি তারা পেঁয়াজ রোপন করেছেন। আরও অন্তত ২০ দিন পর এসব পেঁয়াজ আহরণ করা যাবে। জমি থেকে কিছু পেঁয়াজ উত্তোলন করে এখনই আশ ফলনের লক্ষণ দেখা গেছে।

আজ রোববার ২৭ মার্চ দুপুরে দাপুনিয়া এলাকায় এই পেঁয়াজ সম্পর্কে ধারণা প্রদান ও এর আবাদে কৃষকদের উদ্বুদ্ধকরণে লক্ষ্যে মাঠ দিবসের আয়োজন করা হয়। ড. মো. মহিউদ্দীনের সভাপতিত্বে অনুষ্ঠানে প্রধান অতিথি গাজীপুরের আঞ্চলিক মসলা গবেষণা কেন্দ্রের মুখ্য বৈজ্ঞানিক কর্মকর্তা হরিদাস চন্দ্র মন্ডল, বিশেষ অতিথি আঞ্চলিক মসলা গবেষণা কেন্দ্রের প্রধান বৈজ্ঞানিক কর্মকর্তা ড. ওসমান আরা, উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. মো. ইকবাল হক স্বপন, উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. শ্যামল চন্দ্র, উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. মাসুদুল হক, উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা ড. নূরে ইউসুফ, বৈজ্ঞানিক কর্মকর্তা আল আমিন খান, শাহেদল ব্লাকের উপসহকারী কৃষি কর্মকর্তা অপূর্ব চন্দ্র দাস, সাবেক শিক্ষা কর্মকর্তা মো. খুরশিদ উদ্দিন, পেঁয়াজ চাষী রিয়াদ হোসেন প্রমুখ বক্তব্য রাখেন।

প্রধান অতিথি বলেন, দেশে বছরে পেঁয়াজের চাহিদা রয়েছে ৩৫ লাখ থেকে ৩৬ লাখ টন। দেশে উৎপাদিত হয় প্রায় ৩৩ লাখ টন। খুব বেশি ঘাটতি থাকে না। তার পরও একটি মহল কারসাজি করে দাম বাড়িয়ে দেয়। এখন বাজারে নতুন পেঁয়াজ রয়েছে। এরই মধ্যে দাম বাড়িয়ে দিয়েছে। 'বারি পেঁয়াজ-৫' সারা বছর আবাদ করা যায়। যেসব জমিতে ধানের শর্দি জন্মে থাকে না, সেসব জমিতে শীত নেই গ্রীষ্ম নেই, সবসময় এই পেঁয়াজের আবাদ করা যাবে। ফলে কৃষকরা এই পেঁয়াজ আবাদ করলে দেশে পেঁয়াজের কোন সঙ্কট থাকবে না। কৃষকরাও আর্থিকভাবে লাভবান হতে পারবেন।

ড. ওসমান আরা বলেন, এই পেঁয়াজ সারাবছর আবাদ করা যাবে। তবে শীতকালে আকারে বেশি বড় হয়। অন্যান্যে জেলায় এই পেঁয়াজ আবাদ করে দেখা গেছে, ৪টি পেঁয়াজে এক কেজি হয়েছে। কাজেই বারি পেঁয়াজ-৫ দেশে নতুন সম্ভাবনা তৈরি করতে পারে বলে তিনি জানান। ড. মহিউদ্দীন জানান, দাপুনিয়া এলাকায় মূলা আহরণের পর বারি পেঁয়াজ-৫ আবাদ করা হয়েছে গত ১০ জানুয়ারি। পেঁয়াজ আহরণের পর একই জমিতে পাটের আবাদ করা যাবে। ফলে কেবল নতুন নতুন ফসলের জাতই নয়, একই জমিতে ফসলের বহুমুখিকরণেও জোর দেয়া হচ্ছে।

বীজ বপণের সময় অত্যধিক রোদ, বৃষ্টি থেকে রক্ষা পাওয়ার জন্য পলিথিন বা চাটাই ব্যবহার করা এবং অতিরিক্ত পানি নিষ্কাশনের ব্যবস্থা করতে হবে। বীজতলা থেকে ৪০-৪৫ দিনের চারা মূল জমিতে রোপণ করতে হয়। সফলভাবে পেঁয়াজ চাষের জন্য হেক্টরপ্রতি প্রয়োজনীয় জৈব ও অজৈব সার ব্যবহার করতে হয়। সাধারণত হেক্টর প্রতি ৫ টন গোবর, ১৫০ কেজি ইউরিয়া, ১৭৫ কেজি এমওপি, ২০০ কেজি টিএসপি, ১০০ কেজি জিপসাম ও ১২ কেজি জিংক সালফেট ব্যবহার করা হয়।

ব্যবহার নিয়মানুযায়ী জমির শেষ চাষের সময় সম্পূর্ণ গোবর, টিএসপি, এমওপি, জিপসাম, জিংক সালফেট ও আগাম চাষের জন্য দুই তৃতীয়াংশ ইউরিয়া মাটির সাথে ভালোভাবে মিশিয়ে দিতে হবে। চারা রোপণের ২০-২৫ দিন পর অবশিষ্ট এক-তৃতীয়াংশ ইউরিয়া পার্শ্বপ্রয়োগ করতে হবে। মাটিতে প্রয়োজনীয় রস না থাকলে সারের পার্শ্বপ্রয়োগের পরই সেচ দিতে হবে।

পেঁয়াজের চারা রোপণের পর একটি প্লাবণ সেচ অবশ্যই দিতে হবে। মাটিতে চটা বাঁধলে কন্দের বৃদ্ধি বাধাগ্রস্ত হয়।

Prothom Alo
23 Apr ·

সারা বছরই ফলবে যে পেঁয়াজ

Description
সারা বছরই ফলবে যে পেঁয়াজ

সারা বছর ফলবে—এমন পেঁয়াজের জাত উদ্ভাবন করেছে গাজীপুরের বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউট। 'বারি পেঁয়াজ-৫' নামের এই পেঁয়াজে ৩ থেকে ৪ মাসেই ফলন হয় প্রচলিত জাতগুলোর প্রায় দ্বিগুণ।

#Bangladesh #agriculture #prothomalo

কৃষি গবেষণা উপকেন্দ্র সূত্র জানায়, প্রতি বিঘায় ১২ হাজার থেকে ১৫ হাজার টাকা খরচ পড়ে। আর উৎপাদন হয় বিঘাপ্রতি ২৫০০ কেজি।

কৃষি গবেষণা উপকেন্দ্র সূত্রে জানা গেছে, উচ্চ সেচ, পানি নিষ্কাশনের সুবিধাযুক্ত বেলে দোআঁশ বা পলিযুক্ত মাটি পেঁয়াজ চাষের জন্য উত্তম। সাধারণত চারা তৈরি করে বারি পেঁয়াজ-৫ চাষ করা হয়।

কিশোরগঞ্জ কৃষি গবেষণা উপকেন্দ্রের উর্ধতন বৈজ্ঞানিক কর্মকর্তা ড. মোহাম্মদ মহিউদ্দীন জানান, মধ্য ফেব্রুয়ারি থেকে মধ্য জুন পর্যন্ত বীজতলায় বীজ বপন করা যায়। তবে মার্চ মাস পর্যন্ত চারা উৎপাদন করা উত্তম। অতঃপর ৪০-৪৫ দিনের চারা মূল জমিতে রোপণ করতে হয়।

তিনি আরও জানান, নাবি চাষের ক্ষেতে জুলাই থেকে আগস্ট মাসে বীজতলায় বীজ বপন করতে হবে। পরবর্তীতে ৪০-৪৫ দিনের চা জমিতে রোপণ করতে হয়। আগাম চাষে সেজন্য মাটির 'জো' আসার সাথে সাথে চটা ভেঙ্গে দিতে হয় এবং আগাছা পরিষ্কার করতে হয়। নিড়ানীর সাথে সাথে ঝুরঝুরে মাটি দিয়ে গাছের গোড়া ঢেকে দিতে হবে।

পেঁয়াজের গাছ পরিপক্ব হলে এর গলার দিকের টিস্যু নরম হয়ে যায়। চারা থেকে কন্দের পরিপক্বতা হওয়া পর্যন্ত আগাম চাষের ক্ষেত্রে ৬০-৭০ দিন এবং নাবি চাষের ক্ষেত্রে ৯৫-১১০ দিন দরকার হয়। শীতল ও ছায়াময় স্থানে ৮-১০ দিন রেখে কিউরিং করতে হবে। বর্ষাকালীন সময়ে উত্তোলনকৃত পেঁয়াজ এক মাসের বেশি সংরক্ষণ করা যায় না। তবে এমন ভাবে শুকাতে হবে যাতে কন্দে সরাসরি রোদ না লাগে। এরপর বাছাই ও গ্রেডিং করার পর বাঁশের মাচা, ঘরের সিলিং, প্লাস্টিক বা ঘরের পাকা মেঝেতে শুষ্ক ও বায়ু চলাচলযুক্ত স্থানে পেঁয়াজ কিছুদিন সংরক্ষণ করা যায়।

Bijoy TV

কিশোরগঞ্জে শুরু হয়েছে,

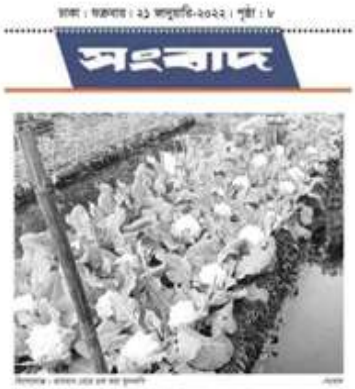
কৃষি গবেষণা ইনস্টিটিউটের (বারি) বিজ্ঞানীদের তৈরী বারি সোনার, বারি সিভার ও বারি রিপার ভাগ্য বদলাবে কৃষকদের। বিস্তারিত প্রতিবেদনে.....।

Rupantor TV

Rupantor Television • Follow
20 Dec 2021 ·

কিশোরগঞ্জে কৃষি গবেষণা উপকেন্দ্রে আধুনিক প্রযুক্তির পর্যবেক্ষণ ও মাঠ দিবস অনুষ্ঠিত
https://youtu.be/yabQhn0b7mA

MESSENGER
Rupantor Television
Send Message



সংবাদ

নতুন সম্ভাবনা ভাসমান কৃষি

কিশোরগঞ্জ

দৈনিক পূর্বকণ্ঠ
THE DAILY PURBOKONTHO

ভাসমান বাগানের নতুন চমক বারি টমেটো-১৯

১১ মার্চ, ২০২২

ভাসমান বাগানের নতুন চমক বারি টমেটো-১৯

 # মোস্তফা কামাল :-

দৈনিক পূর্বকণ্ঠ

THE DAILY PURBOKONTHO

কিশোরগঞ্জে ভাসমান কৃষিতে মিষ্টি কুমড়ার অভাবনীয় ফলন

৬ ফেব্রুয়ারি, ২০২২

কিশোরগঞ্জে ভাসমান কৃষিতে মিষ্টি কুমড়ার অভাবনীয় ফলন

মোস্তফা কামাল :-

News 24/7

youtube.com

Modern Technology Observation And Field Day in Kishoreganj

কৃষি গবেষণা

ON-FARM RESEARCH DIVISION

BANGLADESH AGRICULTURAL RESEARCH INSTITUTE

Kishoreganj-2300

June 2022