

FARMERS' KNOWLEDGE ABOUT MODERN PINEAPPLE (*Ananas comosus*) PRODUCTION AT THE HILLY AREA OF SREEMANGAL UPAZILA UNDER MOULVIBAZAR DISTRICT

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Abstract

The focus of the study was to determine the knowledge of the farmers about modern techniques of pineapple (*Ananas comosus*) production in hilly areas. For doing so, 13 questions were constructed on various yield enhancing aspects of modern pineapple production, including selection of quality sucker to the uses of hormones, and identifying the exact symptom of harvesting in the pineapple field. Data were collected from randomly selected 75 respondents of three villages – namely, Radhanagor, Mohazerabad and Lakhai of Sreemangal upazila, Moulvibazar district using pre-tested interview schedule from 1 September to 2 October, 2020. A score of 2 was given for each correct answer, 1 for partially correct answer and 0 to each incorrect answer. Thus, the score obtained for 13 questions represented the knowledge score of any respondent. Results revealed that about 57% of the pineapple growers had medium knowledge of modern method of pineapple production, while 28.0% had low and only about 15% had high knowledge in this regard. However, an overwhelming majority (87%) of them had strong knowledge about maturity symptoms of fruits, the majority (53%) had clear knowledge about Giant Kew and Honey Queen-two modern varieties of pineapple, and 51% could flawlessly answer the modern planting methods in terrace, about 48% correctly answered planting time, sucker number and sucker qualities for plantation. In comparison, 79% of the respondents did not know major diseases and pests of pineapple and their remedies. They (76%) had no clear ideas about irrigation requirements and their determining factors. About 60% of the respondents had either partially correct or inadequate knowledge of hormone applications. Pearson's product-moment correlation coefficient (r) indicated that age (0.265*), educational qualification (0.447**), annual income (0.238*), experience of pineapple cultivation (0.479**) and communication exposure (0.766**) were found to positively significant relationship with the knowledge of pineapple growers, while family size (0.091), farm size (0.176), land area under pineapple cultivation (0.140), credit received (0.129) had no significant relationship.

Keywords: Farmers' knowledge, Pineapple.

Introduction

Bangladesh is predominantly an agrarian country. Due to its very fertile land and favorable weather, varieties of crop grow abundantly in this country. Agriculture is the sheet anchor of the economy of Bangladesh. Agriculture sector contributes about 15 percent to the country's Gross Domestic Product (GDP) and employs around 41 percent of the total labour force (BBS Agri. Year Book, 2017).

Fruits play a vital role in the overall economic performance of the country. The production of pineapple is increasing day by day in our country. Among all the fruits produced in the country, pineapple ranks 4th in total cropping area and production. From 1999 through 2000, Bangladesh produced 148350 Metric tons of pineapple from 34830 acres of land. However, the area under production and total production is increasing day by day. During 2018-2019 the total area under pineapple production in Bangladesh was 36800 acres, and the production was 217439 Metric tons (BBS Agri. Year Book, 2019). About 45685 ha of land is now under pineapple cultivation with the production of about 234865 M tons (Pasha, 2021).

Pineapple provides a ready source of many food nutrients and minerals. It is a good source of vitamins A, B and C. It contains calcium, iron, and phosphorus. In a ripened pineapple, 13 percent sugar and 6 percent citric acid are present.

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Fresh pineapple contains proteolytic enzymes termed bromelin. So, pineapple is a good source of nutrients along with various medicinal values (Sen, 1990).

The tropical climatic condition is better for cultivating pineapple. Generally, it is grown almost all over Bangladesh, especially in hilly and high land where rain or floodwater does not stand. Long time drought is harmful for the production of pineapple. Drought affects its quality, quantity and size. Although Bangladesh is not a tropical country, the climate and the soil of many parts of the same are much more suitable for pineapple production. Pineapple is extensively cultivated in Sylhet, Moulvibazar, Chittagong, Bandarban, Dhaka and Tangail Districts. Sylhet division is the 4th most pineapple producing division in Bangladesh after Dhaka, Chattagram and Mymensingh. In the Sylhet division, pineapple has been grown in several districts – namely, Moulvibazar, Habiganj, Sylhet and Sunamganj. Among them, Moulvibazar ranks 1st in pineapple producing district under the Sylhet division (BBS, 2019). All areas of Bangladesh are not equitably suitable for Pineapple production. However, soil and climatic condition of some areas are much more suitable for profitable pineapple production. Sreemangal upazila under the Moulvibazar district is one of such areas. In Sreemangal, pineapple production is the main source of income for many farmers. An early study reported that pineapple covers almost 70 percent of the production of the fruits in Sreemangal (Anonymous, 2020). Pineapple cultivation plays a vital role in socio-economic development of the extensive areas of Sreemangal Upazila. However, growers of the study area cannot perform their job satisfactorily due to a lack of knowledge regarding various aspects of pineapple cultivation. Knowledge of the growers is an important factor for increased agricultural production. But, most of the farmers do not possess adequate knowledge about modern agriculture methods. Morrill (1968) reported that the farmers who are the backbone of the nation are mostly illiterate and traditional. They are often skeptical of new ideas and practices in agriculture. Due to a lack of proper understanding of the relevant factors, they often become disappointed with new agriculture practices.

Research, education and extension are correlated with each other and to get benefit from applied research, a sound extension program is essential. Agricultural extension service, therefore, needs to develop sound plans and improve knowledge of the growers' in various aspects of pineapple production. Considering the enormous importance of pineapple cultivation, the present study was undertaken to achieve the following objectives:

- a. To determine and describe the extent of knowledge of the pineapple growers regarding pineapple cultivation, and
- b. To explore the relationship between selected socio-economic characteristics of the growers and their knowledge about pineapple cultivation.

Materials and Methods

Growers' knowledge about pineapple cultivation was the focus variable of this study. Data were collected from randomly selected 75 respondents of three villages – namely, Radhanagor, Mohazerabad and Lakhai of Sreemangal Upazila, Moulvibazar district using a pre-tested questionnaire interview schedule from 1 September to 2 October, 2020. In this study, 9 characteristics were selected as independent variables: age, educational qualification, family size, farm size, land area under pineapple cultivation, annual income, the experience of pineapple cultivation, use of information source, and credit received. To measure the knowledge about pineapple cultivation, each respondent was asked to answer 13 questions related to pineapple cultivation activities. Score 2 was given for each correct answer, and also part number was given for each partially correct answer, and 0 was given for each incorrect answer. The summation of obtained score against 13 questions represented the knowledge score of any respondent. The knowledge about pineapple cultivation scores of the growers could range from 0 to 26, where 0 indicated minimal knowledge and 26 indicated high knowledge about pineapple cultivation. After collection of required all information, the data were transferred to coding sheet with numerical scores given to each question. The collected data were coded, categorized, tabulated and analyzed in a scientific way. Qualitative data were converted into quantitative data by means of suitable scoring whenever necessary. Data analysis was done using a micro-computer with an SPSS/PC+ package program. Simple statistics like frequency counts, range, percentages, average, mean, and standard deviation (SD) were used to interpret the descriptive data. Pearson's product-moment correlation coefficient (r) was computed to determine the relationship between the selected characteristics of the growers and their knowledge about pineapple cultivation.

Results & Discussion

Growers' Knowledge about pineapple cultivation

The Knowledge about pineapple cultivation scores of the growers ranged from 6 to 24 with an average of 14.48 and standard deviation of 4.85 against the possible range of 0 to 26. On the basis of their knowledge about pineapple cultivation scores, the farmers were classified into three categories: "low knowledge" (up to 12), "medium knowledge" (13-18), and "high knowledge" (above 18). The distribution of the pineapple growers according to their knowledge about pineapple cultivation scores is shown in Table 1.

Table 1. Distribution of the growers according to their knowledge about pineapple cultivation

Categories (Score)	Growers		Mean	Standard deviation
	Number	Percent		
Low knowledge (up to 12)	21	28.0	14.48	4.85
Medium knowledge (13-18)	43	57.3		
High knowledge (above 18)	11	14.7		
Total	75	100		

The result indicated that the highest proportion (57.3%) of the pineapple growers had medium knowledge on pineapple cultivation, while 28.0% had low and 14.7% had high level of knowledge, respectively. Here data revealed that most of the pineapple growers (about 85.3%) had low to medium level of knowledge about pineapple cultivation. This might be due to poor level of education, less experience in pineapple cultivation and poor contact with extension agent etc. So, there is huge scope to improve the knowledge level of growers regarding pineapple cultivation practices. Almost similar findings were reported by Uddin et al. (2017) in their earlier study". They found 28.8% respondent had low level of knowledge on modern rice cultivation in their study area.

Characteristics Profile of the Growers

In this study, 9 (Nine) characteristics of the pineapple growers were selected as independent variables. These were: age, educational qualification, family size, farm size, land area under pineapple cultivation, annual income, the experience of pineapple cultivation, use of information source, and credit received.

A summary of the analyzed results for the selected characteristics (independent variables) of the pineapple growers were presented in Table 2.

The findings indicate that a large proportion (42.7 percent) of the growers were middle-aged compared to 40 percent young and 17.3 percent old aged, respectively. About half (46.7 percent) of the pineapple growers had primary education. The majority (48 percent) of the growers had a medium family. The average farm size was 1.367 hectare which is a little bit higher than the national average farm size, which is equivalent to 0.80 hectare (BBS, 2007). Major portion (86.7 percent) of the pineapple growers had small pineapple land areas. This happened due to the land size of the growers being decreased day by day through land division and fragmentation from generation to generation.

The results also revealed that large portion (about 68 percent) of growers had medium to high annual income. More than half portion (54.7 percent) of the growers had less experience in pineapple cultivation. A large portion (86.7 percent) of pineapple growers had low communication exposure with extension agents. The majority (53.3 percent) of the growers were not credit recipients, while 34.8 percent had received low, 5.3 percent medium and only 6.7% of the pineapple growers had received a high amount of credit.

Table 2. Salient features of the selected characteristics of the pineapple growers

Characteristics (units)	Range		Growers		Mean	Standard Deviation
	Possible	Observed	Categories	Percent		
Age (year)	Unknown	17-72	Young (up to 35)	40.0	41.47	13.19
			Middle age (36 – 55)	42.7		
			Old (Above 55)	17.3		
Education (year of schooling)	Unknown	2-12	Primary (1-5)	46.7	6.51	2.66
			Secondary (6-10)	40.0		
			Higher secondary (11-12)	13.3		
Family size (number)	Unknown	4-14	Small family (up to 4)	10.7	6.61	2.07
			Medium family (5-6)	48.0		
			Large Family (above 6)	41.3		
Farm Size (ha)	Unknown	0.13-6.99	Marginal (up to 0.2)	6.7	1.37	1.35
			Small (0.21-1.0)	49.3		
			Medium (1.01-3.0))	30.7		
			Large (above 3.0)	12.0		
Amount of land under pineapple cultivation (ha)	Unknown	0.02-3.03	Small size (up to 1.0)	86.7	0.57	0.59
			Medium size (1.01-3.0)	10.6		
			Large size (above 3.0)	2.7		
Annual income (taka)	Unknown	7000 - 350000	Low income (up to 115000)	32.0	18289 3.3	98943.8
			Medium income (116000- 230000)	36.0		
			High income (above 230000)	32.0		
Experience of pineapple cultivation (year)	Unknown	2-47	Less experience (up to 15)	54.7	18.05	13.25
			Medium experience (16-30)	29.3		
			High experience (above 30)	16.0		
Communication exposure (score)	0-18	0-8	Low (up to 6.0)	86.7	3.76	2.31
			Medium (6.1-12.0)	13.3		
Credit received (taka)	Unknown	0-300000	No credit (000)	53.3	44733 .33	81923.22
			Low (up to 100000)	34.7		
			Medium (101000-200000)	5.3		
			High (above 200000)	6.7		

Relationship between selected characteristics of the growers and their knowledge about pineapple cultivation

Pearson's product-moment correlation coefficient (r) was computed to find out the relationship between the selected characteristics of the growers and their knowledge about pineapple cultivation. The selected characteristics of the pineapple growers constituted independent variables, and knowledge about pineapple cultivation constituted the dependent variable of the study. The summary of the correlation coefficient indicating the relationship between selected characteristics of the growers and their knowledge about pineapple cultivation has been presented in Table 4.

Table 3. Relationship between selected characteristics of the growers and their knowledge about pineapple cultivation

Dependent variable	Independent Variable	Correlation co-efficient (r) values
Knowledge About Pineapple Cultivation	Age	0.265*
	Educational qualification	0.447**
	Family size	0.091 ^{NS}
	Farm size	0.176 ^{NS}
	Land area under pineapple cultivation	0.140 ^{NS}
	Annual income	0.238*
	Experience of pineapple cultivation	0.479**
	Communication exposure	0.766**
	Credit received	0.129 ^{NS}

**Correlation is significant at the 0.01 level, *Correlation is significant at the 0.05 level, NS= Non significant relationship

The findings demonstrate that the age of the pineapple growers had a significant positive relationship with their knowledge about pineapple cultivation. It might be due to the fact that older growers can gather more knowledge by their involvement in pineapple cultivation for many years. Educational qualifications had a significant positive relationship with their knowledge about pineapple cultivation. Education develops the mental and psychological ability of a person to understand and decide on new ideas and practices. Education expands one's outlook and expands the horizon of knowledge. Higher educational qualifications are commonly associated with more knowledge and skill-seeking behavior with the potential for greater learning capacity to increase a relative advantage of technology, resulting in higher or more rapid adoption (Huffman, 2020). Haq et al. (2007) and Uddin et al. (2017) also reported the same relationship in their respective studies.

Family size, farm size, land area under pineapple cultivation, and credit received did not show any relationship with their knowledge about pineapple cultivation. However, annual income, experience in pineapple cultivation, and communication exposure of the growers had a significant positive relationship with their knowledge about pineapple cultivation.

The concerned study area was also a hilly area, where no other crops are extensively and commercially grown. So, the respondents cultivated mainly pineapple and developed a positive knowledge and attitude towards pineapple cultivation, which greatly impacted their increased income. Growers with an increased income are able to afford the costs involved in the package adoption. Haq et al. (2007) stated that, the income of the growers helps to develop their economic, social and cultural knowledge. Uddin et al. (2017) also found the same relationship in their study. Farming experience helps to enhance agricultural knowledge. Experience helps to switch from traditional agricultural technologies to improved technologies on the basis of observed performance and learning by doing (Arrow, 1962; Dosi, 1982). Poor contact with extent media/communication sources decreases the opportunity of the pineapple growers to get information about pineapple cultivation activities. Agricultural extension contact helps to increase the diversified knowledge of growers and make them able to cope with the adverse situation, and also helps them to get the latest information about different agricultural activities. Haq et al. (2007) and Uddin et al. (2017) also reported that communication exposure had a positive relationship with farmers' knowledge.

Table 4. Knowledge questions asked to the pineapple growers with their corresponding answers

Knowledge questions	Answer types (%)		
	Incorrect	Partial correct	Correct
Name two modern varieties	0.0	46.7	53.3
Name two best qualities of sucker for plantation	1.3	50.7	48.0
Name two modern planting method of pineapple	6.7	42.7	50.7
Appropriate planting time	9.3	42.7	48.0
Required number of sucker per decimal	14.7	38.7	46.7
Row to row distance for plantation	9.3	54.7	36.0
Name two irrigation determining factors in the pineapple field	76.0	9.3	14.7
Name two major insects of pineapple	18.7	41.3	40.0

Name two diseases of pineapple	78.7	20.0	1.3
Name two insecticides used against major insects of pineapple	18.7	49.3	32.0
Name two pesticides used against major diseases of pineapple	78.7	20.0	1.3
Maturity symptoms of pineapple	1.3	12.0	86.7
Time of Ethrel (hormone) application	37.3	22.7	40.0

The overwhelming majority of the growers (87%) had a clear idea about the maturity symptoms of pineapple. It might be because most of the growers sell their products to the stockers, stockers sell them to the retailers, retailers to consumers – the way takes at least 10 to 15 days to reach consumers. Growers are very careful about this fact, so they usually harvest their fruit when the surface color turns one-third yellow. Regarding the name of two modern varieties, 53% of respondents correctly mentioned two names, Honey queen and Giant Kew, followed by 47% respondents' partially correct answers. About the qualities of suckers for plantation, 48% of respondents correctly mentioned crown and slip are the two best qualities to choose for plantation. In the study area, growers used crown and slip sucker for plantation. Some of the growers (48%) had given the correct answer and some (50.7%) given partial answer about the name of two best qualities sucker. Results revealed that almost half of the growers (50.7%) were able to give a correct answer about the name of two modern planting methods of pineapple. It might be because the present study was conducted in a hilly area where growers follow terracing or contour planting methods for pineapple cultivation. In the study area most of the growers prefer rain-fed conditions for pineapple cultivation. As a result, most of the growers (76%) were not able to give correct answer about the name of two irrigation determining factors in the pineapple field. Insects and pests attack is comparatively low in a pineapple field. Moreover, for this reason most of the growers were not able to give a correct answer about the name of insects & diseases as well as insecticides and pesticides. Growers of the study area spray Ethrel (hormone) to get uniform flowering. As a result, most of the growers (62.7%) were able to give a correct and partial correct answer about the appropriate time of Ethrel (hormone) application.

References

- Arrow KJ. 1962. The economic implications of learning by doing. *The Review of Economic Studies*, 29(3), 155–173.
- Anonymous. 2020. Srimangal witnesses bumper pineapple production.
- BBS. 2019. Yearbook of Agricultural Statistics. Bangladesh Bureau of Statistics Statistics and Informatics Division (SID). Ministry of Planning. Government of the People's Republic of Bangladesh. www.bbs.gov.bd
- BBS. 2017. Yearbook of Agricultural Statistics. Bangladesh Bureau of Statistics Statistics and Informatics Division (SID). Ministry of Planning. Government of the People's Republic of Bangladesh. www.bbs.gov.bd
- BBS. 2007. Statistical Yearbook of Bangladesh. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of Peoples Republic of Bangladesh.
- Dosi G. 1982. Technological paradigms and technological trajectories: A suggested interpretation of the determinants and directions of technical change. *Research Policy*, 11(3), 147–162.
- Haq ABMA, Karim ASMZ and Kashem MA. 2007. Farmers' Knowledge on Arsenic Related Problems of Environment. *Bangladesh Journal of Extension Education*. Volume 19, No. 1 &2: 27-32.
- Huffman WE. 2020. Human capital and Adoption of innovations: Policy Implications. *Journal of Applied Economics Perspective and Policy*.
- Morril GI. 1968. Good Teaching and Training as Factors Influencing the Success of Agricultural Extension Work: In East Pakistan, (Mimeographed), A paper read at Agricultural Officers' Seminar, Dhaka.
- Pasha MK. 2021. Pineapple, Bangladesh. <https://en.banglapedia.org/index.php/Pineapple> National Horticulture Board, Ministry of Agriculture, Govt. of India: http://nhb.gov.in/report_files/pineapple/PINEAPPLE.htm.
- Sen SK 1990. In: *Fruits: Tropical and subtropical* (Eds. T.K. Bose and S.K. Mitra), NayaProkash, Kolkata, India, P. 252-279.
- Uddin MJ, Billah KMM, Akanda GR, Prince MH, Rahman MM, Sumon MMP and Antor NH. 2017. Farmers' Knowledge on Modern Rice Cultivation Techniques at DumkiUpazilla. Vol. 2, Issue 10: 01-07. <http://ijaas.kibanresearchpublications.com/index.php/IJAAS>.