

**FARMERS' EXPOSURE TO VIRTUAL AGRICULTURAL CHANNELS
BROADCASTED THROUGH YouTube**

A THESIS

BY

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MASTER OF SCIENCE

IN

AGRICULTURAL EXTENSION AND RURAL DEVELOPMENT



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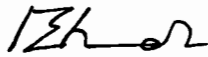
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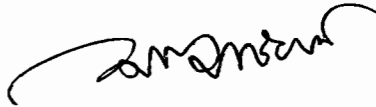
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JUNE, 2023

ABSTRACT

YouTube is a popular social media for disseminating agricultural information among the farmers through uploading agricultural videos. However the extent of farmers' exposure to it is hardly assessed through academic research. The specific objective of the study was to determine the extent of farmers' exposure to virtual agricultural channels broadcasted through YouTube. Attempts were also made to analyze twelve selected socio-economic characteristics of the farmers and their relationships with the extent of exposure to virtual agricultural channels broadcasted through YouTube and to identify problems faced by the farmers in exposing virtual agricultural channels broadcasted through YouTube. The study was conducted at Dumuria upazila under Khulna district of Bangladesh. Data were collected from eighty (80) farmers selected through snowball sampling technique, by means of personal interview using an interview schedule from 25th August, 2022 to 27th February, 2023. Appropriate scales were used in order to measure the concern variables. Spearman's ranked correlation co-efficient (ρ) was used to determine the relationships between the independent and dependent variables. Three-fifth (60%) of the respondent farmers had low exposure compared to two-fifth (40%) of total farmers having "medium exposure" to virtual agricultural channels broadcasted through YouTube. Among the ten channels, the farmers were highly exposed to Math Krishi (88.75%) while they were less exposed to Agamirkrishi (3.33%). Among twelve characteristics of the respondent farmers education, cosmopolitanism, extension media contact, contact with other virtual media and knowledge on virtual agricultural channels broadcasted through YouTube showed a positive significant relationship while age, family size and farming experience showed negative significant relationships with the farmers' exposure to virtual agricultural channels broadcasted through YouTube. Majority (55%) of the farmers faced high problem while exposing to virtual agricultural channels broadcasted through YouTube. Farmers faced problems highly for being too busy to browse internet (81.67%) while illiteracy (53.75%) was the least severe problem for exposing to virtual agricultural channels broadcasted through YouTube. This study proposes farmers' exposure to virtual agricultural channels broadcasted through YouTube including some new ideas and suggestions as to how mass media and government can participate in providing more technological opportunities to facilitate the farmers for more efficient work.

Keywords: Farmers, Exposure, Virtual agricultural channels, Broadcast, YouTube.

DEDICATED
TO
MY BELOVED PARENTS

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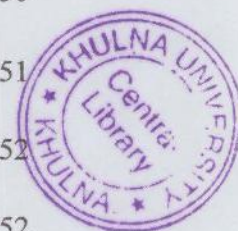


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CHAPTER I

INTRODUCTION

1.1 General Background of the Study

In Bangladesh, agriculture is a crucial sector, employing around 47% of the total workforce and contributing to around 16% of the country's GDP (BER, 2017). With a large number of small-scale farmers, access to accurate and timely agricultural information is crucial for their livelihoods. In other words farmers need new technologies and latest information so that they can cope with the challenges and difficulties they face due to lack of technology/information. Agricultural information creates awareness among farmers about agricultural technologies which is needed for overall development of agriculture and for the improvement in the living standard of farmers (Bello and Obinne, 2016).

Based on the experience of some countries in Asia that have enjoyed successes in agricultural extension and rural advisory services, and the current thinking in extension services all over the world, it is important to begin to redirect discussions and research on agricultural extension in Nigeria toward the quality, skills, competencies and strategies of effective and efficient communication that the extension agents possess, and the involvement of farmers in the communication design and delivery. The emphasis is on establishing better communication as a key strategy for effectively reaching the target audience (Fawole, 2008).

On the face of this perspective. According to the spirits of the age, the internet has revolutionized the way people access information, and this includes farmers who rely on accurate and timely information for their livelihood. With the growing popularity of YouTube, many agricultural organizations and individuals have turned to this platform to broadcast virtual agricultural channels that provide valuable information to farmers. The researcher has attempted to find out the knowledge level of farmers towards use of social media for seeking agricultural information and also analyzed the relationship between knowledge level of farmers towards use of social media and socio-economic characteristics of farmers for seeking agricultural information as it will help agricultural universities to identify areas where social media platforms are lack in grand how it can be utilized for creating farmer friendly content and aid in building farmers' communities online to connect with one another (Deriso *et al.*, 2014). Also the study will throw light on social networking sites that are more in

use among the farmers as there are various agriculture related sites, websites, applications available for farmers and they are useful to enhance the knowledge as well as utilizing the same in the field, it is important to study the knowledge level of farmers towards use of social media (Pal *et al.*, 2022).

According to an investigation on PJTSAU (Professor Jayashankar Telangana State Agricultural University), Agricultural videos of YouTube channel plays an important role in communication and dissemination process. This helps in disseminating the technologies and connect the people from one end to other end by getting them together with media facilities. Through internet, the farmers, department officials and scientists can gain instant access to the most advanced research technologies and can discuss their research problems with each other. This study found that, PJTSAU Agricultural videos of YouTube channel is providing knowledge on crop production and protection aspects of different crops to the farming community. Majority of the respondents had medium knowledge at pre-exposure stage (53.3%) and medium level at post exposure stage (66.6%) with regard to paddy production and protection aspects. A majority of the respondents were in the category of medium level at pre-exposure (71.6%) and high level at post exposure stage (75.0%) with regard to Cotton production and protection aspects. The study revealed that there was a significant difference between pre and post knowledge gain of paddy and cotton farmers (Manichandana, 2022).

Since YouTube is an important social media/development tools used by the people. It is possible to make current agricultural information accessible by means of YouTube. In addition to being the most popular video platform on the planet, YouTube has become an indispensable tool for both literate and illiterate people, as it can create highly relevant audiovisual material that can be interacted with, commented on, and shared. YouTube has emerged as a powerful tool for disseminating information related to agriculture. With the increase in the availability of the internet and smartphones, farmers across the globe have access to a vast range of agricultural information, tips, and tutorials on YouTube. The platform has become an effective channel for agricultural extension services, farm organizations, and individuals to share their knowledge, expertise, and experiences.

Farmers can use YouTube to learn about best practices in crop management, livestock care, soil management, irrigation, and marketing strategies. The platform also provides access to research findings, agricultural news, and emerging trends in the industry. Additionally, virtual

agricultural channels on YouTube can provide a platform for farmers to interact with experts, ask questions, and share their experiences with other farmers.

Apart from accessing information, farmers can create their own virtual channels, upload videos of their farming practices, and reach a wider audience. This can help farmers to improve their visibility, build their brand, and connect with potential buyers and consumers.

So this may be accepted that, the use of YouTube in agriculture has several advantages. It is a cost-effective way to disseminate information, as it does not require the creation and distribution of printed materials or physical events. It is also convenient for farmers who can access information at their convenience and from anywhere with internet access.

However, the exposure of YouTube in agriculture also depends on several factors, such as the availability and quality of internet access, language barriers, and the relevance and accuracy of the information provided. Despite these challenges, YouTube remains a valuable resource for farmers looking to improve their productivity and profitability. Information is critical in agriculture development because it acts as a tool between stakeholders and serves as a channel for accessing trends and shaping decisions (Kalusopa, 2005).

In Bangladesh, agriculture is a vital sector, employing a significant proportion of the population and contributing to the country's economy. Farmers in Bangladesh face several challenges, including limited access to resources, information, and technology. However, with the increasing availability of the internet and smartphones, YouTube has emerged as a powerful tool for disseminating information and improving knowledge among farmers.

In recent years, virtual agricultural channels broadcasted through YouTube have emerged as a potential tool for farmers to access information and learn new agricultural practices in Bangladesh also. Virtual agricultural channels on YouTube in Bangladesh cover a wide range of topics, including crop management, livestock care, irrigation, pest management, and marketing strategies. Many of these channels are run by agricultural extension services, government agencies, NGOs, and private organizations. There are some YouTube channels for example: Math Krishi, AgamirKrishi, Krishi bioscope, DeeptoKrishi, ShykhSeraj, HridoyerKrishi, Agro One, Any Bd, Uddoktar Khojeetc, which are some of popular virtual agricultural channels which provide important agricultural information for people involved in different types of agricultural farming. These channels provide farmers with valuable information, insights, and best practices, helping them to improve their productivity and profitability.

The use of virtual agricultural channels on YouTube has become an effective way to reach farmers in remote areas where traditional agricultural extension services may not be available. It has been observed that extension services are still limited in most parts of the country and that farmers' preference for any information source is significantly influenced by various socio-economic factors. Due to lack of reach of extension personnel to each and every household only small number of farmers are reached directly and it is often not possible to tackle and listen to individual problems because in India one extension officer served 1162 operation holding, i.e. the ratio of extension workers to operational holding is low at 1:1162 at the national level as against recommended 1:750 (Nandi and Nedumaran, 2019) also extension workers to farmers ratio is 1:5000 (Ragasa *et al.*, 2013).

Apart from accessing information, farmers in Bangladesh can also use YouTube to showcase their products and market their produce. They can create their own virtual channels, upload videos of their farming practices, and reach a wider audience. This can help farmers to improve their visibility, build their brand, and connect with potential buyers and consumers (Nasiruddin, 2011).

Overall, virtual agricultural channels on YouTube have the potential to significantly impact farmers' knowledge and productivity. However, it is important to ensure that these channels are accessible to all farmers, and that the content provided is accurate, relevant, and meets the specific needs of the target audience.

A study in Udham Singh Nagar district of Uttarakhand" was undertaken with objective to find the knowledge level of farmers towards use of social media as a source of agricultural information and to analyze the relationship between socio-personal characteristics and knowledge level of farmers towards social media. The study was conducted in two purposively selected villages Malsagirdharpur and Saijani of Kichha block in Udham Singh Nagar district of Uttarakhand. Every third respondent was selected by systematic random sampling. Findings of the study revealed that majority of farmers had medium level of knowledge about "social media" viz. Facebook, WhatsApp, YouTube and Twitter. It was also noted that farmers had low knowledge about use of twitter for agricultural information. Further it was found that most of the farmers were linked with social media platforms for exchange of agricultural information. Education, Social media exposure, Innovativeness, Achievement motivation had positive and significant relationship with knowledge level towards use of social media as a source of agricultural information. The findings of the study will be helpful to researchers and

policy makers for creating farmer friendly content and develop farmer oriented platforms on social media that can be accessed with ease and will be reliable (Kashem and Jones, 1988).

Despite the benefits of using YouTube in agriculture in Bangladesh, there are still challenges that need to be addressed. Internet access is still limited, particularly in rural areas, and many farmers may not have the necessary devices or skills to access and use the internet effectively. Additionally, the quality and relevance of the information provided on virtual agricultural channels may vary, leading to misinformation or confusion among farmers. Additionally, there may be challenges in reaching marginalized and vulnerable farmers who may not have access to the internet or the necessary devices to access virtual agricultural channels.

Social media is the most recent creation which has revolutionized the way people communicate worldwide and also helps in fast delivery of information. Social media serves a great place to start conversation, connect with both the young and old generation alike. Aided by mobile phones, social media is spreading fast across the world and has tremendous potential to be the biggest hub of agricultural information where farmer friendly content can be generated with the association of farmers, scientists, agricultural institutions and extension agents to bring about fruitful interaction for agricultural development (Pal *et al.*, 2022).

To overcome these challenges, efforts are being made to improve internet access, particularly in rural areas, and to provide training and support to farmers on how to use the internet effectively. Additionally, agricultural organizations and extension services are working to improve the quality and relevance of the information provided on virtual agricultural channels, ensuring that farmers have access to accurate and up-to-date information.

Technical advances in agricultural machinery are expected to contribute to improving farmers' working conditions and meet society's and consumers' demand for more efficient and healthier use of environmental resources. However, these advances may reduce farmers' mastery of equipment. A study was conducted aiming to understand the extent to which farmers master agricultural equipment and adapt it to their farming needs. Aside from the design and development of new equipment, farmers can find ways to adapt their equipment through what we will call 'bricolage'. Bricolage refers here to the non-structural changes that go beyond the settings and options proposed by the equipment manufacturers and whose purpose is to adapt the equipment functioning to the farmer's specific needs (Sboui *et al.*, 2022).

Many researchers have conducted researches on farmers' exposure to different development communication tools of AIS (Hossain, 2022), farmers' exposure to Krishi Call Center (Islam, 2019). Apart from Ahmed *et al.* (1994), Shaikh *et al.* (2010) and Amin *et al.* (2013a; 2013b and 2014a; 2014b) conducted investigations on the exposure and effectiveness of other satellite channels broadcast agricultural programs especially through radio and television. These investigations stated that modern and quick presentation of information about agricultural technology can increase the development and growth of agriculture sector. This study proposes farmers exposure to virtual agricultural channels broadcasted through YouTube including some new ideas and suggestions as to how mass media and government can participate in providing more technological opportunities to facilitate the farmers for more efficient work.

Despite these challenges, the use of virtual agricultural channels on YouTube in Bangladesh has the potential to significantly impact farmers' productivity and profitability. It is an effective tool for disseminating information, providing a platform for farmers to interact and share their experiences, and improving overall knowledge and awareness in the agricultural sector. As internet access continues to improve and virtual agricultural channels become more accessible, it is expected that their use will continue to grow and make a positive impact on Bangladesh's agriculture sector.

1.2 Statements of the problem

Exposure assessment is the process of characterizing, estimating, measuring and modeling the magnitude, frequency and duration of contact with an agent as well as the number and characteristics of the population exposed (McKone and Small, 2006).

1.3 Research gap

There are many virtual agricultural channels broadcasted through YouTube. They are used to disseminating latest agricultural information among the farmers. However, 10 of the virtual agricultural channels broadcasted through YouTube are the concern here, the followings are yet to be find out:

- Farmers' exposure to virtual agricultural channels broadcasted through YouTube
- Relationships between the selected characteristics of the farmers and their exposure to virtual agricultural channels broadcasted through YouTube
- The problems confronted by the farmers in exposing the virtual agricultural channels broadcasted through YouTube

1.4 Specific objectives

The following objectives will be pursued in the current study:

- To determine farmers' exposure to virtual agricultural channels broadcasted through YouTube
- To explore relationships between the selected characteristics of the farmers and their exposure to virtual agricultural channels broadcasted through YouTube
- To identify the problems confronted by the farmers in exposing the virtual agricultural channels broadcasted through YouTube

1.5 Scope of the Study

The present study provides valuable information about farmers and their knowledge on virtual Agriculture channels broadcasted through YouTube and the extent of farmers' exposure to virtual Agriculture channels broadcasted through YouTube in Dumuria upazila, Khulna. The results of the study would help them to design and implement the development programs effectively by considering the extent of exposure and constraints faced by farmers which are essential in increasing their exposure.

1.6 Assumptions

An assumption is the supposition that in apparent fact in principle is true in the light of available evidence (Goode, 1945). The following assumptions were in mind of the researcher during conducting the study:

- I. The responses furnished by the respondents were reliable and valid
- II. The selected respondents were competent enough to reply the queries made by the researcher
- III. The respondents included in the sample were capable of furnishing proper responses to the questions included in the interview schedule
- IV. Views and opinions furnished by the respondents were the representative views and opinions of farmers' population of the study area
- V. The researcher who acts as the interviewer was well adjusted to the social environment of the study area. Hence, the data collected by the researcher were free from bias
- VI. The items included in the question of attitude of farmers on exposure to virtual Agriculture channels broadcasted through YouTube and other information including such as their actual value and rights in their family as well as the society.

- VII. All the data concerning the variables of the study were normally and independently distributed.

1.7 Limitations of the Study

This study is a time bond degree-oriented research work conducted by the student and hence there is a limitation of time and resources. Therefore, the findings of the study cannot be generalized to other areas and other population of exposure to virtual Agriculture channels broadcasted through YouTube as a whole

Considering the time, money and other necessary resources available to the researcher and make the research manageable and meaningful from the practical point of view, the limitations of the current study could be mentioned below:

- I. The study was confined to some selected villages of Dumuria upazila under Khulna district.
- II. The characteristics of the respondent in the study area were many and varied but only twelve characteristics were selected for investigation in this study as stated in the objectives.
- III. There were many farmers in the study area, but only 80 respondents were considered for this study.
- IV. For information about the study, the researcher dependent on the data as furnished by the sampled respondents during the interview. As none of the respondents kept records, they furnished information to the different queries by recall such as farming maintenance records
- V. For some cases, the researcher faced unexpected interference from the over interested side-talkers while collecting data from the target populations.
However, the researcher tried to overcome the problem as far as possible with sufficient tact and skills.
- VI. Various problems were likely to be faced to expose to the virtual agricultural channels broadcasted through YouTube by the farmers. However, only some selected problems have been considered for investigation in this study.
- VII. Major information, facts and figure supplied by the respondents were applicable to the situation prevailing in the locality during the year 2022-23.

1.8 Definition of Related Terms

The terms which have been frequently used throughout the research work are defined and interpreted below:

Farmer: A person who owns or manages a farm.

Respondent: Respondent referred to the farmer beneficiaries who were exposed to virtual agricultural channels broadcasted through YouTube and were included to the sample.

Age: Age of a respondent was defined as the span of their life and was operationally measured by the number of years from his/her birth to the time of interview.

Education: Education referred to the development of desirable knowledge, skill and attitude in the individual through reading, writing, and other related activities. It is measured in terms of schooling of individual respondent.

Family Size: Family size of household was defined as the number of individuals in the family including the respondent, his/her spouse, children and other dependent members who live and eat together.

Farm: A farm of a rural farmer refers to a household or unit of holding organized for production of one or more enterprises like crops, livestock, fish, trees etc. for the purpose of satisfying the rural farmers' goal. A farm may or may not be of commercial venture.

Farming experience: It means to the skill of farmers from the starting point to present situation they in various field of agricultural activities

Farm Size: It referred to the area of land owned by a farmer on which farming activities are carried out. A respondent was considered to have full benefit from cultivated area either owned by him/her or obtained on share cropping system. The areas are estimated in terms of full benefit to the farmers. The right of farmers on the land taken on lease or mortgage from others was regarded as ownership in estimating the farm size.

Annual family income: it is defined as the total gross income before taxes, received within a 12-month period by all members of a household above a specified age. It is measured in terms of BDT.

Organizational participation: A term used in multiple social science disciplines that deals with the ways in which worker and managerial or organizational interests are associated with each other.

Cosmopolitanism: Cosmopolitanism is the measure of frequency of visit to different places by an individual external to his own society.

Extension Media Contact: The term extension media contact refers to an individual access to or contact with the communication media and sources or any extension teaching methods being used for diffusion of new technologies among the farmers

Agricultural training: Agricultural Training means the practical application of scientific, economic, and social developmental principles in the preparation for and delivery of training in agricultural production and its related training acquired by the respondents organized by different Government and Non-Government institutions .

Different virtual media: the term virtual media is nontraditional social media or platform which is now indispensable tool for both literate and illiterate people, as it can create highly relevant audiovisual material that can be interacted with, commented on, and shared. Respondent enjoy agricultural information or watch relevant videos and communicate with each other by browsing internet by the means of different types of virtual media like, YouTube, Facebook, WhatsApp , Instagram, Twiter, TikTok, Snapchat, Likee etc.

Knowledge about virtual agricultural channels broadcasted through YouTube: It referred to the rationalistic understanding of the farmers about different activities related to virtual agricultural channels broadcasted through YouTube.

Problems related to exposure: It refers the problems confronted by the farmers in exposing the virtual agricultural channels broadcasted through YouTube.

Content preference: Content preference means a greater liking for one alternative over another or others. On YouTube there are many videos based on agricultural content such as; land preparation, Fertilizer application, sowing/planting, pest and diseases identification and treatment, pesticides fungicides or herbicides application, intercultural operation, harvesting, storage and handling, use of machineries etc.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to review literature having relevance to the present study and to ascertain farmer's exposure to virtual agricultural channels broadcasted through YouTube. Researchers from different sectors teachers, students, started study on social media and its effects on different sector. But no researcher have been conducted to study the farmers' exposure to virtual agricultural channels broadcasted through YouTube. Exhaustive efforts were made by the researcher to review the previous research works directly or indirectly related to the present study at home and abroad. The researcher has tried her best to collect needed information through searching relevant studies, journals and periodicals.

2.1 Communication media being used by the farmers

2.1.1 Print media activities

➤ *Krishi Kotha*

AIS publishes and distributes *Krishi Kotha*, the most renowned and pride farm magazine in Bangladesh. At present direct subscriber of *Krishi Kotha* is more than 80 thousand and reader numbers are more than 15 lakh (AIS, 2018).

➤ *Samprosharon Barta*

It is the news bulletin being published and circulated monthly. It comprises the news of agricultural development, success, events and contemporary news.

➤ *Krishi Diary*

It contains the latest necessary technological information, statistics on agriculture as well as contact information of various government and non-government departments and individuals related to agriculture.

➤ *Other Printing materials*

For disseminating agricultural information and technologies printed materials in the form of booklets, posters, folders, festoon etc. play a significant role. From 2009 to 2018 about 35.82 lakh copies of printed materials were published and distributed amongst farmers, extension personnel and other related stakeholders (AIS, 2018).

2.1.2 Electronic Media Activities

➤ Bangladesh Television (BTV)

Mati-O-Manush, a very much popular TV program telecasted by the BTV is being prepared by the cooperation and assistance of AIS. Besides, from 2014 another program Banglar Krishi is also being telecasted by the BTV where AIS is rendering its all out cooperation and technical assistance.

➤ Bangladesh Betar

AIS has been ensuring its active support and cooperation to the Bangladesh Betar for making and broadcasting different agricultural programs both for national and regional stations through "Krishi Shomachar" and "Chashabad" radio program. With this support nearly 14 hours per week programs are being broadcasted by national and regional stations of the Bangladesh Betar.

➤ Community Radio

Having the slogan 'My radio, my voice' a community rural radio 'Krishi Radio 98.8 FM' established by AIS at Amtoli under Borguna district has been broadcasting daily 8 hours different need based rural welfare and agro-based program for the people of 12 upazilas under Borguna and Patuakhali district.

➤ Video materials (Cinema/ *Pramanno Chitro*)

AIS prepares different agricultural technology-based video documentary, film, filler, drama, talk show etc. and broadcasts through the BTV and private satellite channels. Besides, these are also shown in rural areas through mobile cinema vans.

2.1.3 ICT and Innovation Activities

➤ AICC

AIS is the pioneer for disseminating agricultural information and technologies at the root level by using ICT through establishing 499 Agriculture Information and Communication Centers (AICC) across the country (AIS, 2018). Different ICT devices like laptop, smart phone, internet modem, multimedia instruments etc. were given to these farmers operated centers along with necessary trainings.

➤ **Krishi Call Center**

AIS established 'Krishi Call Center-16123' in 2014 for providing instant expert solution (crop, fishery and livestock) to the people. Anyone can take advice dialing 16123 from his/her mobile, paying only 25 paisa/minute.

AIS (2013) reported that the farmers are provided with the instant solutions to their problems related to agriculture, fisheries and livestock by the specialists in the relevant fields in Krishi Call Centre over phone in Bangladesh. Again, it was reported by Barau and Afrad, 2017 that the farmers are benefited by the instant solutions to their different problems regarding diseases and insects of crop, cultivation practices, fertilizer management, different agricultural aspects, livestock and fisheries from the experts and field level specialists over phone from Krishi Call Centre operated by AIS. In a different study conducted by McGuire *et al.* (2015) it was reported that the farmers are benefited by e-kishok created by BIID in Bangladesh where the services based agriculture information are transferred to the farmers over mobile phones through the government infrastructures which are already in existence. Farmers are also benefited by the agricultural information provided by Miaki, a private entity in Bangladesh (AIS, 1985).

Ashraf *et al.* (2015) conducted a research to find out the impact of ICT on indigenous peoples' quality of life at Ruma village of Bandarban district in Bangladesh. They found that positive contribution was made by ICTs as perceived by the participants of Grameenphone Community Information Centers (GPCIC), a shared ICT access facility where participants can access a wide range of ICT services, e.g. Internet, voice communication, video conferencing, and locally relevant and customized information services on topics such as agriculture, education, health, legal, environment and politics. In another study, it was reported by Katalyst (2012) that the farmers were able to access the timely and accurate information and become more knowledgeable about opportunities to improve agricultural practices, production, and farm investment decisions with the help of Grameenphone Community Information Centre (GPCIC) and the helpline services in Bangladesh. It was observed that the vast majority (90%) of the beneficiaries were benefitted by preventing near-certain losses through the access to information which assisted them to counter and remedy the identified pest, disease, and animal health concerns. It was also revealed that farmers achieved benefits ranging from BDT 1,000 (approximately USD 12) to upwards of BDT 20,000 (USD 240). Again, Dey *et al.* (2008) conducted a research in two telecenters: one of them was Palli Tathya Kendra at Joyag,

Noakhali initiated by D-Net and another one was GPCIC located at Shaturia upazila, Manikganj in Bangladesh. It was observed that farmers' information needs could be made through the use of mobile phones and tele-centers by them. Use of mobile phone by some of the farmers enabled them to get cheaper fertilizers.

➤ **Website**

AIS have developed large web portal (www.ais.gov.bd) containing huge agricultural information and it is regularly being updated. Besides, two mobile apps have been launched.

➤ **AisTube**

'AisTube' is a digital initiative to provide agricultural information to create awareness among farmers in a modern way. In order to provide effective, quality agricultural information services, this archive will present all the modern technologies related to agriculture in the form of documentaries, which will enable the farmers to know the required agricultural information easily.

➤ **Ki-osk**

Ten ICT laboratories in ten agricultural regions and 11 information Ki-osks have also been established (AIS, 2018). Ki-osk is a digital information desk where farmers can find any information about agriculture,

2.1.4 Other initiatives

➤ **Krishi Mela**

AIS organize different agricultural fair with the collaboration of DAE. Every year they organize Tree fair, vegetable fair and development fair where farmers can touch with latest agricultural information.

➤ **ICT laboratory**

Different training on mass media and ICT are being organized regularly by AIS for AICC members, extension personnel, media people and other related stakeholders in ICT laboratory. As a result, efficient media and ICT personnel are being developed and they are dedicatedly working for agricultural development.



➤ **Other programs**

AIS organize different rally, seminar, workshops, etc. on the occasion of national/international days and events.

2.2. Studies related to exposure of the farmers to agricultural channels broadcasted through different platforms

2.2.1 Social media platform being used by farmers

There are several social media platforms that are popular in Bangladesh. Here are some of the most commonly used ones:

- **Facebook:** Facebook is the most popular social media platform in Bangladesh, with over 40 million users. It is widely used for sharing photos, videos, and updates with friends and family, as well as for business and marketing purposes.
- **YouTube:** YouTube is another popular social media platform in Bangladesh, with over 28 million users. It is used for watching and sharing videos, as well as for educational and entertainment purposes. YouTube is becoming an increasingly popular social media platform for farmers in Bangladesh. Here are some reasons why:
 - **Access to information:** YouTube provides farmers with access to a wide range of videos on various agricultural topics, including crop management, livestock rearing, and market trends. These videos are often produced by experts and provide farmers with valuable information and advice.
 - **Visual learning:** Videos on YouTube are often visual and provide farmers with a hands-on learning experience. This is especially useful for farmers who may not be able to attend workshops or training programs.
 - **Cost-effective:** YouTube is a cost-effective means of communication for farmers, as most videos are available free of charge. This is particularly beneficial for small-scale farmers who may not have the financial resources to attend training programs or purchase printed materials.
 - **Sharing knowledge:** YouTube allows farmers to share their knowledge and experiences with others. This helps to create a community of farmers who can learn from each other and exchange ideas and practices.

- **Convenience:** YouTube is available 24/7 and can be accessed from anywhere with an internet connection. This provides farmers with the flexibility to learn at their own pace and convenience.
- **Instagram:** Instagram is a popular social media platform in Bangladesh, with over 10 million users. It is widely used for sharing photos and videos, as well as for marketing and business purposes.
- **Twitter:** Twitter is a popular social media platform in Bangladesh, with over 1 million users. It is used for sharing news, updates, and opinions, as well as for business and marketing purposes.
- **LinkedIn:** LinkedIn is a popular social media platform in Bangladesh, with over 2 million users. It is used for professional networking, job searching, and business purposes.
- **TikTok:** TikTok is a popular social media platform in Bangladesh, with over 4 million users. It is used for creating and sharing short videos, as well as for entertainment purposes.

Other social media platforms that are popular in Bangladesh include WhatsApp, Viber, and Snapchat.

In the agricultural sector, there is growing rate of social media usage amongst stakeholders. Sokoya *et al.* (2012) opined that there is climbing increase in the utilization of social media among agricultural researchers, professionals and others stakeholders in the agricultural sector. Social media have ensured quick delivery and response to information between the receiver and sender. An effective way of ensuring successful delivery and sustainability of a viable agricultural extension subsector. In the words of Mukhtar *et al.* (2015), social media has fostered a fast platform for information dissemination and interactive contact; rivaled by none in this time. The degree of social media penetration is obviously growing faster than imagined, couple with the level of technology advancements that continue to bring world at everyone's finger tips and make information accessible without having to go through hiccups of travelling and delays. It is staggering to believe that in little as two short decades, the evolution of the internet and social media has taken place right before our very eyes. Therefore, since extension deals with audience (farmers centrally) to effect positive social change social media present a great opportunity. Since the late 1990s, several different types of social media sites have been launched (Rupak *et al.* 2014).

Through social media, users interact, create, share, retrieve and exchange textual, pictorial and video information (Barau and Afrad, 2017). In the agricultural sector, social media platforms are gaining acceptance with professionals using them to establish networks while farmers talk to peers and consumers (Jijina & Raju, 2016). The significance of social media in the agricultural sector is in their ability to unite farmers, industry and consumers thus enabling realization of engagement, confidence, transparency and acceptability along the value chain (Sophie, 2013).

Social media facilitates networking among peer farmers, and between farmer and industry, crisis communication as well as consumer engagement which are essential values of communication in the agricultural sector (Sophie, 2013). Generally, social media has attracted users in hundreds of millions world over who clearly appreciate the ensuing benefits leading to the intense and hyper usage shaped by users' positive attitude towards the technologies (Walther, 1996). The significance of social media at individual and society level in the recent past has triggered intense discussions on the subject matter in the academia world attracting a lot of research interests in many scientific disciplines (Khang *et al.* 2012). However, according to Rupak *et al.* (2014), some social media sites continue to exist and witness an impressive proportion of growth in terms of number of users and the quantity or volume of information exchanged while others have faltered and closed. Failure of many of these sites can be attributed to their inability to garner acceptance and popularity among the target users (Rupak *et al.* 2014).

Barau and Afrad (2017) in their study on social media and delivery of agricultural extension services found that Facebook was the most popular platform followed by Twitter, Blogs, LinkedIn and Google+ descending order in receiving agricultural information. Kuria (2014) found that in Kenya, Facebook platforms like Mkulima Young have been connecting young Kenyan farmers with their consumers locally and internationally further giving them the opportunity to share experiences with their counterparts across the globe. Kuria (2014) found that maximum number of farmers in Taiwan used Facebook in receiving agricultural information. Rupak *et al.* 2014 found that farmers and others used Facebook to communicate information in social movements related to agricultural issues.

Naruka *et al.* (2017) found that farmers perceive WhatsApp as a 'convenient communication application, problem solving with audio-visuals, on-time, and solution at the time of crisis in their agriculture activities. Thakur *et al.* (2017) found that maximum farmers in India used

WhatsApp as an agricultural extension tool. Similar results also found by Kamani *et al.* (2016) in their perspective study. Thakur and Chander (2016) found that maximum farmers in Himachal Pradesh sharing and receiving livestock related information through WhatsApp. Balkrishna and Deshmukh (2017) found that most of the farmers used WhatsApp for agricultural marketing...

Steel & Filipic (2013) found that Twitter is used by agricultural communicators belonging to the Association of Communication Excellence to post stories they have written, get story ideas, find sources, and follow hashtags.

Shultz (2010) found that Facebook and YouTube used by the agricultural communicators (farm broadcasters, agriculturists editors, public relations professionals and others. Sebotsa *et al.* (2021) found that Facebook and WhatsApp as the top highly used social media platforms amongst the youth in agriculture in Njoro Sub-county. Latif *et al.* (2020) found that Facebook, YouTube are the most common site which is used by the farmers for receiving agricultural technology and information. Daigle *et al.* (2021) found in their study that women farmers used Facebook, YouTube to reach consumers, seek agricultural information, and maintain emotional connections with other farmers.

Rhoades & Aue (2010) found that few US agricultural communication organizations, such as National Association of Farm Broadcasting (NAFB) or Agricultural Communicators Network (AAEA), are using video services such as YouTube to reach new audiences. Bhattacharjee & Raj (2016) found that farming organizations and individual farmers have YouTube channels to create awareness about agriculture and sharing information about agricultural practices and businesses. Although traditional audiences favor printed media, dissemination of information is growing through video platforms such as YouTube. Videos provide increasing opportunities for message exposure to online audiences and even cable television services.

2.2.2 Influence of demographic characteristics on social media familiarity and usage

While a number of factors could be attributed to technology adoption, numerous studies investigating acceptance and use of social media platforms have given importance to the influence of demographic variables such as age, gender, education and experience on user decisions (Lubua & Pretorius, 2018).

Fundamentally, users belonging to different age brackets are obviously likely to have varied perceptions on social media based on their needs and exposure. A study by Barau and Afrad

(2017) found that a growing number of young people using the social media platforms for receiving agricultural information. Bhargava and Manali (2015) also found the similar result in India. He found that older men in the rural areas used a lower percent of social media for receiving agricultural information. Similar result found by Bolarinwa (2015) in his respective study. Contradictory results were found by Joshi & Dhaliwal (2019). They showed that middle age farmers group utilized social media for agriculture such as new varieties, trainings etc. Chhachhar & Hassan (2013) found that older uses social media in learning a new technology compared to younger ones. Similar results also observed by Kuria (2014) in their respective study. Khou and Suresh (2018) also found that middle age farmers are used media for agricultural marketing.

Gender on the other hand is an important variable in adoption of innovations. In the context, gender is broadly categorized into male and female. Since to some extent gender difference brings about differences in societal responsibilities, this demographic factor is useful in defining how an individual values a new technology (Yonazi *et al.* 2012). In their study on social commerce in developing countries, Talat *et al.* (2013) observed that men were less reliant on facilitating conditions when learning new technologies compared to women. They found that men used social media for agricultural extension service than women.

Education of the respondent is another key demographic variable in acceptance and use of technologies (Tang & Wu, 2015). The authors further hold that more knowledge makes it easier for a user to understand the expected benefits arising from using a new technology. Baker *et al.* (2007) had earlier identified a user's education level as an important factor in influencing ones behavior and attitude towards adoption of technology. Balkrishna and Deshmukh (2017) found that higher level of education helps to utilize social media for receiving agricultural technology. Similar results also observed by Joshi and Dhaliwal (2019) and Kuria (2014) in their respective study.

Farm size has contribution to change the livelihood status that was observed by the researcher review work. Bhargava and Manali (2015) observed that receiving agricultural technology by using social media was positively influenced by farm size Contradictory results were found by Joshi & Dhaliwal (2019). They found that there was no relationship between farm size and the utilization of social media for receiving agricultural technology.

2.2.3 Use of Mass media

Nataraju and Channegowda (1985) found in a study that respondents used radio (54%), newspaper (46%), neighbors (23.30/o), demonstrations (10.6%) and group meetings (6%) in receiving information on improved dairy management practices. Mekabutra (1985) conducted a study in Thailand and reported that among the mass media that offered more knowledge in agriculture was radio, followed by television and newspaper respectively. Considering knowledge gained from mass media that were applicable to their work, farmers opined that television provided about 83.5 percent, radio 78 percent and newspaper 77 percent (Nuruzzaman, 2003).

Reisner and Hays (1989) reported that the agricultural press is a vital link in transferring information to US farmers. Dinampo (1989) conducted a study in Philippines to determine communication need and preferences. He observed that farmers were found to prefer an interpersonal media (extension agent) rather than mass media. Among mass media, first preference was radio followed by printed materials and audio visual sources. Talbbada (1988) in his study in Philippines found that radio vision was superior over radio, and the dialogue type broadcast was more effective than lecture type. Perianayagam and Arokiasamy (2002) reported that in industrialization countries people spend more time with television and radio than printed word. Radio is most important mass medium for farmers of less industrialization countries. The urban middle class in less industrialization countries now also spend considerable time watching television but it is not yet a very important medium in rural areas of this countries (Nazari and Hassan, 2011). Sinha (1985) in a study in Bihar on mass media and rural development found that television has a very positive role to play in village development, but that it is essential to support it with appropriate development infrastructure and on site advisory officer. Chidanandappa and Veerabhadraiah (1988) examined different mass media sources used by extension personnel and reported that extension personnel made use of the package of practices like booklets, extension folders, radio, newspaper and farm magazine to a large extent as media of information. De-la-Vega (1990) conducted a study in Philippines and found that in terms of availability of mass communication media channels, radio and TV were the most available. A great majority of the respondents listen the radio everyday and consider it is their main source of news. The communication channels they preferred as credible were radio, interpersonal source and TV. Hoque (1990) in his paper concluded that mass media can perform a better role in technology diffusion than what those do today. Therefore, planned efforts to introduce more of mass media strategies that proven

effective by experiments are highly recommended. Sauquet (1990) based on the experience of Brazilian extension service reported that television plays an important role, where in every Sunday morning, an agricultural programme is watched by millions of farmers. Kashem and Halim (1991) in a study found that the highest proportion of the farmers (34.89) used interpersonal contact media in the adoption of modern rice technologies. Almost equal proportion (32.52) of farmers had individual contacts. This was followed by mass contacts method. Farmers very often discuss or seek advice from their friends, relatives, neighbours and different input dealers regarding the use of modern practices in rice cultivation.

Malik (1991) in a study in Pakistan reported that radio was the only medium which broadcasted regular agricultural programmes for the farming community of Pakistan. The largest segment of population listened to radio programme. Radio solves the problems of inaccessibility of media and that of illiteracy of farmers. Sianturi (1992) conducted a study in a rubber development project and observed that radio was the highest rated sources of agricultural information followed by television. Gunzales (1993) reported that among the mass media, radio was the most available and preferred source of development information. Galindo (1994) in his study in Mexico on communication media used by farmers revealed that television and radio were the most widely used communication media and talks, demonstration and training courses were the preferred media for receiving information. Khan and Paracha (1994) conducted a study in two villages in Pakistan, one innovative and other non-innovative, among the farmers of a cotton producing district and reported that the main channel of communication. The mass media were centrally organized and included radio, television and newspapers. Ahmed *et al.* (1994) conducted that farmers received more amount of information from radio than TV. It may be due to the reason that farmers have more access exposure to radio because numbers of farm broadcasting programmes were more in radio than of TV. Kabir and Bhattachargee (1994) conducted a study on the impact and television on rural people and found that the responses regarding the usefulness of TV programme were similar to responses regarding usefulness of radio broadcast. All of the telecasts were of average benefit to most of the male and female audiences. Among the need based telecast "Apnar Shastha" seems to be most effective programme for the male viewers. About 53% of 14 the male respondent watched this programme. The next important one was "Mati-0-Manus" having 35.25% viewers. Molinar *et al.* (1994) in their paper conducted that radio would remain the most significant medium in the pacific for some time because of the geographical nature of the islands. Continued training

radio, video and print are vital if they are to meet the spatial dimension of the communication process.

DAE (1995) in order to achieve the objectives of the extension programmers consider the following extension programmers consider the following extension methods and strategies:

- Media campaign including printed media, radio and television
- Thana and district fair
- Traditional and folk media
- Group meeting Farmers training; motivational tour, farm walk, method demonstrations, field days, result demonstration, individual farm visit, etc.

Printed media commonly used are bulletins, posters, leaflet, circular letters, newspaper and magazines. Rahman (1995) in his paper reported that the rural press can serve the farmers and families in the villages by providing timely information regarding farming and harvest. The rural press by proving up-to date market prices of agricultural products can help the local farmers. Westoff and Rodriguer (1995) reported that in Kenya, about 15% women neither saw nor heard radio message. The population rose to 25% among those who have heard radio message, to 40% among those who were exposed to both radio and print message and to 50% among those to radio, print and television message of family planning actively. It was opined thas mass media can have an important effect on reproductive behavior. Khan (1996) conducted a study on the use of information sources by the poor farmers and conducted that 75% of the respondents had medium use of various information sources for receiving agricultural information.

Halim and Miah (1996) conducted a study and found that the women of modem villages with higher socio-economic status used more cosmopolite media. Cosmopolite media included radio, television extension agents etc. Among the mass media, they used radio and television as a vital source of information. Radio was very frequently (69.7%) used by all category of farm women, while TV was used by less number of women (26.9%). Islam (1995) in study found that the highest proportion of the respondents (44.55) belonged to medium media exposure category and 38.18% belonged to low exposure and 17.27% belonged to high exposure group. He also found that among 15 media, radio ranked in 6, television 7, fair 8, agricultural publication 15, and the rank 1-5 was for individual media. Wate and Rivera (1991) reported that contact with extension agencies and mass media exposure were found to be

significantly related to adoption. Age and scientific orientation were significantly related to adoption. Khan (1996) concluded that age of the farmers had a negative and insignificant effect on the use of information sources.

2.2.4 Usage of TV and radio

Sarker (1995) found in a study that respondents used radio (54 percent) newspaper (46 percent) neighbours (23.3 percent) demonstrations (10.6 percent) and group meetings (6 percent) in receiving information on improved dairy management practices. More likely, Mekabutra (1985) conducted a study in Thailand and reported that among the mass media that offered more knowledge in agriculture was radio, followed by television and newspaper respectively.

Radio has been a longstanding and effective means of communicating with farmers in Bangladesh (Rahman, 1995). Even though the use of social media and mobile technology is increasing, radio still remains one of the most popular and effective channels of communication for farmers in the country.

Here are some ways in which farmers in Bangladesh are exposed to radio and how it has been effective:

- **Radio broadcasts:** Radio broadcasts are an effective means of reaching farmers in remote areas where other forms of communication may not be available (Tabbada, 1988). Farmers can access radio programs on their radios at home or in the fields.
- **Agricultural programs:** There are several agricultural programs on radio that provide farmers with information on crop management, livestock rearing, and market prices. These programs are often broadcast in local languages, making them more accessible to farmers.
- **Interactive programs:** Some radio programs allow farmers to call in and ask questions, share their experiences, and seek advice from agricultural experts. This interactive feature helps to engage farmers and make the information more relevant to their specific needs.
- **Public service announcements:** Radio stations often broadcast public service announcements on various issues related to agriculture, such as the importance of using fertilizers and pesticides safely or the benefits of crop diversification.
- **Community radio:** Community radio stations have become increasingly popular in Bangladesh, particularly in rural areas. These stations often have a focus on agricultural

issues and are run by local communities, making them more relevant and accessible to farmers (Chakraborty, 1992).

Considering knowledge gained from mass media that were applicable to their work, farmers opined that television provided about 83.5 percent, radio 78 percent and newspaper 77 percent. De la Vega (1990) conducted a study in Philippines and found that in terms of availability of mass communication media channels, radio and TV were the most available. A great majority of the respondents listen the radio every day and consider it is their main source of news. The communication channels they preferred as 12 credible were radio, interpersonal source and TV. Similarly, Sauquet (1990) based on the experience of Brazilian extension service reported that television plays an important role, where in every Sunday morning, an agricultural program is watched by millions of farmers. Ango et al. (2013) in their study examined the application of new technologies in agricultural information transfer process and explored future perspectives of new technologies as a force of change in developing countries. They found that print media, electronic media, radio, television, satellite computers and mobile audiovisual media were the important sources of spreading information. Moreover, in another study Galindo (1994) in his study in Mexico on communication media used by farmers revealed that television and radio were the most widely used communication media and talks, demonstration and training courses were the preferred media for receiving information. Khan and Paracha (1994) conducted a study in two villages in Pakistan, one innovative and other non-innovative, among the farmers of a cotton producing district and reported that the main channel of communication. The mass media were centrally organized and included radio, television and newspapers. Ahmed *et al.* (1994) conducted that farmers received more amount of information from radio than TV. It may be due to the reason that farmers have more access exposure to radio because numbers of farm broadcasting programmes were more in radio than of TV. It was revealed in a study that agricultural productivity was increased because of radio programmes in the Philippines (UNESCO, 1996). In another study, it was revealed by Dodds (1999) that more than 50% of the 21,000 farmers experienced increase in crop yields through extension and education by radio programmes in Zambia.

Shepherd (2000) reported that the vegetable farmers could fix their price according to the rate of vegetable price being broadcast by their local radios and at lower prices than that of the farmers who did not accept the broadcast in Indonesia. The broadcast prices were the starting point in negotiating with traders the following day. It was also observed from the study that price differences were also reduced across markets due to availability of information to

different markets in Albania. Moreover, in another study Djankov *et al.* (2001) reported that independent radio broadcasting services were found to be positively and significantly correlated with a 13 range of development outcomes which included improved lives and better functioning markets. But the results are not always similar. Different finding was observed by Glendenning *et al.* (2010) who reported that despite farmers' greater use of TV and radio than KVKs and extension workers, the empirical impact of these services on farm household income was not known.

2.2.5 Usage of mobile Phone/telephone

Bayes *et al.* (1999) reported that in case of Village Pay Phones in Bangladesh livestock mortality rates were decreased due to the farmers' better access to extension officers through the use of mobile phones. In a different study, ITU (1999) found that the farm income of the farmers was doubled as they were able to check prices regularly by telephones in rural Thailand and Columbia. There was a great impact of mobile phone services on production, marketing, and other important economic issues that were related to rural households in Bangladesh (Bayes, 2001). It was also shown in the study that farm income were increased and farm input prices were decreased due to the mechanism of information diffusion with the help of mobile phones. The price dispersion and wastage was dramatically reduced through introduction of mobile phones to Kerala fishermen by facilitating the spread of information which led to more efficient market through risk and uncertainty reduction (Jensen, 2007; Abraham, 2007). In another study, Mangstl (2008) also reported that information regarding weather forecasts, where to get the best catch, local market information was communicated through mobile phone among the fishermen in Tanzania (Rashid and Akanda, 2015). Aker (2008) reported that significant reductions in grain-price dispersion net of transport costs across markets was observed because of use of mobile phones among the grain sellers in Niger. However, there are different results also. Alenea *et al.* (2008) carried out a study on the maize market in Kenya and observed that access to communication assets had positive but insignificant effects on market participation. In a different study, the dairy farmers could connect to FoodNet, a service that supplies up-to-date price information for agricultural commodities, as well as contact details for interested buyers via SMS through mobile phones and thus became able to sell their milk without spoilage in the Bugerere District in central Uganda (Karamagi and Nalumansi, 2009). It was reported that the farmers who used prepaid credit system through mobile phone were able to change their life better by minimizing distance (Aloyce, 2005). It was also shown

in another study that farmers got access to valuable market data through the use of mobile phones and messaging technology (Campbell, 2005).

★ Scott *et al.* (2005) found significant correlations between telecommunications and indicators of socio-economic development in another study conducted in three countries (India, Tanzania and Mozambique). In another study, Kumar (2011) also revealed that the farmers were able to reduce their use of pesticides by 50 percent that lowering the costs and improving the crop productivity by receiving information about when the pests might attack via their cell phones from the agricultural department in Turkey. Again, in a study conducted by Mittal and Tripathi (2010) on the use and impact of mobile phones and mobileenabled services on agricultural productivity it was found that some of the farmers who used mobile phones for at least some agricultural activities reported about significant productivity gains (Parveen, 1995). Again, it was reported by all interviewees that positive economic benefits were generated by the mobile phone. More likely, it was reported that nearly half of the respondents (49%) indicated impacts of use of mobile phone on effectiveness, or increased productivity in rural Uganda (Martin and Abbott, 2011). Access to agricultural advice, as well as access to agricultural inputs, such as labour, seeds, plant cuttings, livestock, loans from VEDCO or NAADS; consultation with veterinarians; and increased access to market information resulted in increased production. Moreover, nearly 22% of respondents indicated the impact of mobile phones during agriculture emergencies. The overall health and productivity of the livestock and crops of the respondents was increased due to continuous consultation with veterinarians and agricultural experts through mobile phones. Besides, about 53% respondents reported about their increase in income. Forestier *et al.* (2002) showed that the farmers received better prices for their crops with the help of rural telephony which led to significant increase in their earnings.st

Another study carried out by De Silva (2008) revealed that a project in Maharashtra, India named “Warana Unwired” where the small but relevant information was sent to the sugarcane farmers via SMS on mobile phones had created a significant change in the incomes of the sugarcane farmers in the area. Again in another research it was revealed that the farmers’ income and access to finance were increased and they were more benefitted than the other players through supply chain efficiencies because of use of several m-ARD apps (Qiang *et al.*, 2012). Mittal *et al.* (2010) found that income impact of 5–25 percent of income was observed among the farmers in India due to the SMS service Reuters Market Light (RML) which provided personalized information to subscribed farmers on daily spot market prices, localized weather forecasts, and agro advisories tailored for one crop and the stage in the crop cycle.

2.1.3 Usage of Internet UNDP (2001) carried out a study and found that farmers' incomes were dramatically increased by receiving information about crop status, weather, global market prices and training through an internet network among the farmer organizations in Chile.

Again, in another study it was found that regional market price fluctuations were reduced and average yields were increased due to information providing on market prices and cropping techniques through the Internet kiosks established by the public sector in India (Goyal, 2010). In a different study, it was reported by ICTA (2009) that dairy farmers were helped to achieve self-sufficiency in milk production by introducing web and mobile technologies in Sri Lanka. Roy (2006) conducted a research to explore the adoption, usage patterns, and perceived benefits of computers and the Internet among the Great Plains farmers. The study revealed that about half of those farmers who used the Internet for farm related business had reported zero economic benefits from it.

2.2.6 Usage of Internet

UNDP (2001) carried out a study and found that farmers' incomes were dramatically increased by receiving information about crop status, weather, global market prices and training through an internet network among the farmer organizations in Chile. Again, in another study it was found that regional market price fluctuations were reduced and average yields were increased due to information providing on market prices and cropping techniques through the Internet kiosks established by the public sector in India (Goyal, 2010). In a different study, it was reported by ICTA (2009) that dairy farmers were helped to achieve self-sufficiency in milk production by introducing web and mobile technologies in Sri Lanka. Smith *et al.* (2004) conducted a research to explore the adoption, usage patterns, and perceived benefits of computers and the Internet among the Great Plains farmers. The study revealed that about half of those farmers who used the Internet for farm related business had reported zero economic benefits from it.

2.2.7 E-commerce platforms

E-commerce platforms such as Shohoz.com, Chaldal.com, and Daraz.com have become popular means of buying and selling agricultural products in Bangladesh. Farmers can use these platforms to sell their products directly to consumers, eliminating the need for intermediaries and increasing their profits.

2.2.8 Agricultural apps

There are several agricultural apps available in Bangladesh that provide farmers with information on crop management, livestock rearing, market prices, and weather patterns. These apps help farmers to make better-informed decisions about their farming practices and increase their productivity.

The use of both social media and mass media among farmers in Bangladesh is still relatively low compared to other sectors of the population, but it is gradually increasing. In recent years, there has been a growing interest in using social media as a means of connecting farmers with agricultural information and market opportunities. Overall, while the use of social media among farmers in Bangladesh is still relatively low, it has the potential to play an important role in improving agricultural productivity and livelihoods in the country.

From the above review discussions, researcher might be concluded that those journal papers reflect different social media platforms used by the farmers and their purposes of use. Unfortunately researcher never found any specific paper on YouTube which is used by the farmers in agricultural sector.

2.2.9 Farmers' exposure to YouTube and its influence in agricultural information and technology dissemination

Shushama (2021) conducted research on the topic "YouTube use, influences and credibility on innovative agricultural technology diffusion: a digital self-help approach to the farmers under Rangunia upazila of Chittogram district". The researcher investigated on the uses of YouTube by respondent farmers, its influence and credibility on agricultural information and technology dissemination but they did not studied farmers' exposure to virtual agricultural channels which are broadcasted through YouTube. So why the current study "farmers' exposure to virtual agricultural channels broadcasted through YouTube" was conducted.

2.3 The study's conceptual framework

Selection and measurement of variables are crucial tasks in scientific study. When properly formulated, a study hypothesis will have at least two crucial components: "a dependent variable" and "an independent variable." According to Townsend (1953), a dependent variable is a component that changes as the researcher adds, subtracts, or alters the independent variables. An independent variable is a variable that the researcher manipulates in an effort to

understand how it relates to an observed phenomena. Based on a review of the literature, the study's simple conceptual framework is created as follows:

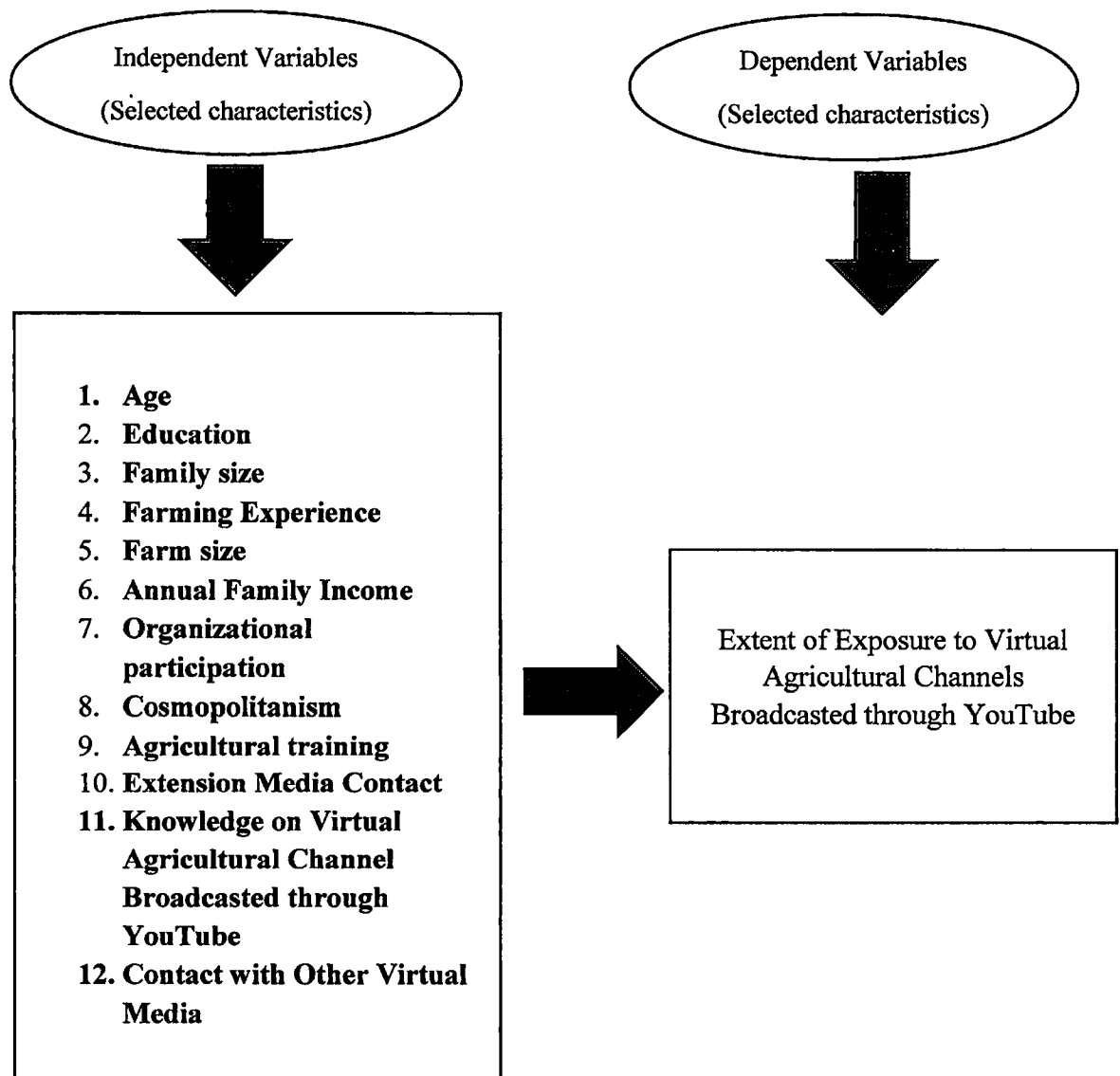


Figure 2.1: Conceptual Model showing relationship between Exposure of farmers and Independent Variables

CHAPTER III

METHODOLOGY

A methodical approach to solving research difficulties is known as research methodology. Before performing a study, it may be noted that there are important factors to consider. Unbiased data and knowledge are the fundamental components of all research. A researcher's job is to gather pertinent data and facts, conduct accurate analysis, and come to objective findings based on unbiased study. This chapter discusses the methodologies and procedures used to carry out the current inquiry.

3.1 Locale of the Study

Domuria upazila under Khulna district was selected purposively as the study area. The study area consists of 240 villages. But only 11 villages namely Khornia, Dumuria, Sajiara, kalikapur, Senpara, Vulbaria, Jhaltola, Dattavanga, Bahirakra, Boratia and Gobindajati were selected purposively. Villagers/farm families of these villages were considered as population of the study. The physical, social and cultural and heritage of this urea were similar in many cases with other areas of the country. Map of district Khulna showing Dumuria upazila presented in Figure 3.1.

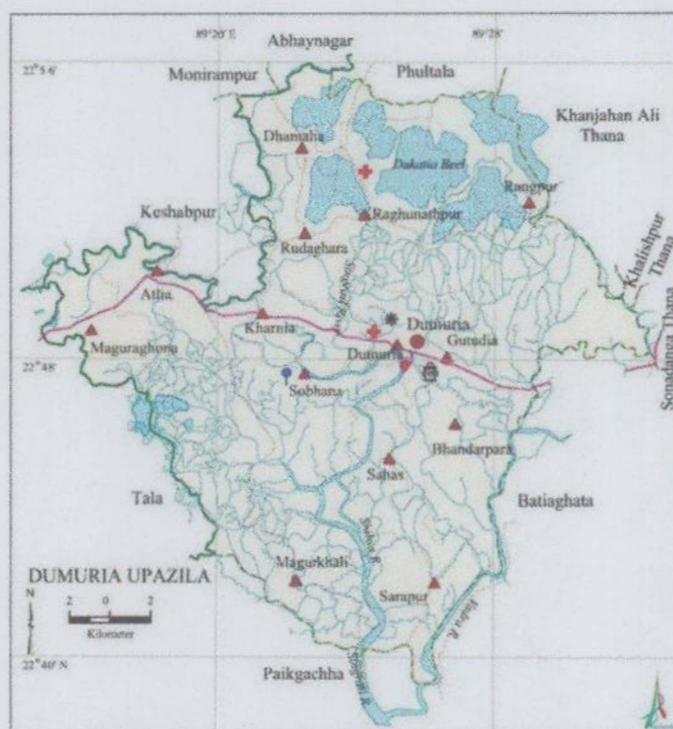


Figure 3.1: a Map of Dumuria Upazila

3.2 Population and Sampling

With the assistance of the Upazila Agriculture Officer (UAO) of Dumaria, Khulna an up-to-date list of few farm families of the selected villages was prepared. The population of this study consisted of the farmers in the study area who had been exposed to virtual agricultural channels broadcasted through YouTube. Eighty farmers were chosen as the study's sample using the snowball sampling technique.

3.3 Selection of Variables

Farmers' exposure to virtual agricultural channels broadcasted through YouTube was focus (dependent) variable of the study while the selected characteristics of the farmers were considered as independent variables. The selected characteristics were age, education, family size, farming experience, farm size, annual family income, organizational participation, cosmopolitanism, agricultural training, extension media contact, knowledge level on virtual channels and contact with others virtual media.

3.4 Measurement of Variables

3.4.1 Measurement of farmers' exposure to virtual agricultural channels broadcasted through YouTube (dependent variable)

A number of 10 virtual agricultural channels broadcasted through YouTube were incorporated in item no. 14 of the interview schedule (Appendix A) to measure the exposure of the farmers. To measure farmers' exposure to virtual agricultural channels broadcasted through YouTube a 4-point rating scales were used such as often, occasionally, rarely and not at all. A score 3, 2, 1 and 0 were assigned against the rating scales respectively (Table 3.1). The exposure score of a respondent was calculated by adding all the scores obtained by him/ her against the selected 10 virtual agricultural channels broadcasted through YouTube.

Table 3.1 Scale of exposure to virtual agricultural channels broadcasted through YouTube:

Scale	Score assigned
Often	3 (If the farmers are exposed frequently to virtual agricultural channels broadcasted through YouTube)

Occasionally	2 (If farmers are exposed to virtual agricultural channels broadcasted through YouTube as needed)
Rarely	1 (If farmers are exposed very casually to virtual agricultural channels broadcasted through YouTube)
Not at all	0 (If farmers are not at all exposed to virtual agricultural channels broadcasted through YouTube)

The exposure score of a respondent farmer could range from 0 to 30 where “0” indicates no exposure and 30 indicates high exposure towards virtual agricultural channels broadcasted through YouTube. Based on exposure score, the respondent farmer were grouped into following categories as shown in Table 3.2

Table 3.2 Categories of the respondents based on their Exposure to virtual agricultural channels broadcasted through YouTube:

Categories	Score
Low exposure	1-10
Medium exposure	11-20
High exposure	21-30

An exposure Index (EI) was calculated to determine the relative position of the 10 virtual agricultural channels broadcasted through YouTube using the following formula:

$$EI (\%) = \frac{\text{Obtained EI Scores}}{\text{Possible EI Scores}} \times 100$$

Further EI Score will be determined by the following formula:

$$EI \text{ Score} = N_{of} \times 3 + N_{oc} \times 2 + N_{ra} \times 1 + N_{na} \times 0$$

Where, EI=Exposure Index

N_{of} = No. of respondents exposed often to virtual agricultural channels broadcasted through YouTube

N_{oc} = No. of respondents exposed occasionally to virtual agricultural channels broadcasted through YouTube

N_{ra} = No. of respondents exposed rarely virtual agricultural channels broadcasted through YouTube

N_{na} = No. of respondents not at all exposed to virtual agricultural channels broadcasted through YouTube

As there were 80 respondents, so, the Exposure Index (EI) score could range from 0 to 240 where "0" indicates no exposure and "240" indicates high exposure. Based on EI (%) virtual agricultural channels broadcasted through YouTube were ranked to compare the level of exposure by the respondent farmers.

3.4.2 Measurement of selected characteristics (independent variables)

In this study selected twelve (12) personal, economic, social and psychological characteristic of the farmers were considered as independent variables. Procedure for measuring independent variables mentioned under section 3.4.2.1 to 3.4.2.12 has been discussed.

3.4.2.1 Age

Age of a respondent was defined as the span of their life and was operationally measured by the number of years from his/her birth to the time of interview. It was measured in terms of actual years on the basis of his/her response to question no: 1 of the interview schedule (Appendix A). According to their age, the respondents were categorized into different categories as depicted in Table 3.3.

Table 3.3 Categories of the respondents according to their age

Categories	Score (Years)
Young	0-35
Middle aged	36-50
Old aged	>50

3.4.2.2 Education

Education was defined in terms of formal education of a respondent. It was operationalized by the number of years spent to acquire formal education. A score of one was given to the respondent for one year of schooling. Besides, a score of '0' was given to the respondent who

has no formal education and don't read and write. A score of '1' also given to the respondent who can only sign the name. According to their education, the respondents were categorized into different categories as depicted in Table 3.4.

Table 3.4 Categories of the respondents according to their education

Categories	Scores (Years)
Illiterate	0
Primary	1-5
Secondary	6-10
Higher Secondary	11-12
Above Higher Secondary	≥ 13



3.4.2.3 Family size

Family size of a farmer was determined by the total number of members in his family including himself, his wife, children and other dependents who live under same roof and share same kitchen. On the basis of family size, the respondent farmers were classified into different categories as shown in Table 3.5.

Table 3.5 Categories of the respondents according to their family size

Categories	Score
Small size family	upto 4
Medium size family	5-6
Large size family	≥ 7

3.4.2.4 Farming Experience

Farming experience of a respondent was measured on the basis of duration of his/her involvement in farming. It was measured in terms of year. For example, if a respondent involved in farming for one year, his/her experience score is "1". According to farming experience, the respondents were grouped into different categories as shown in Table 4.6.

Table 3.6 Categories of the respondents according to their farming experience

Categories	Score (years)
Low experience	10
Medium experience	11-20
Higher experience	>20

3.4.2.5 Farm Size

Farm size was measured as the size of the farm on which the farmers continued their farming operations during the period of study. The area was measured in terms of hectare. The farm size of a respondent was measured by using the following formula:

$$\text{Farm size (FZ)} = A+B+1/2 \text{ or } 1/3(C+D) +E+F+G$$

Where, A. Homestead area (including garden and fallow land)

B. Own land under own cultivation

C. Own land under others cultivation

D. Others land under own cultivation

E. Leased in

F. Pond/Ditches

G. Others

Actual size of the farm was considered as the score of the firm size. For example, if a respondent having 0.05 ha of land, then his score was 0.05. According to farming size, the respondents were grouped into different categories as shown in Table 4.7.

Table 3.7 Categories of the respondents according to their farm size

Categories	Score (ha)
Landless	<.02
Marginal	.02-.20
Small	.21-1
Medium	1-3
Large	>3

(DAE, 1996)

3.4.2.6 Annual Family Income

A respondent's entire yearly earnings from agriculture and non-agricultural sources, including the earnings of family members, were used to calculate his annual family income in BDT (Bangladeshi Taka). The income was determined by taking into account the earnings of each respondent and the members of his family from a variety of sources (such as agriculture, services, businesses, and others). To calculate the overall family income, the yearly earnings of each family member from both agricultural and non-agricultural sources were put together. A score of 1 (one) was assigned for the income 1000 BDT. According to annual family income, the respondents were grouped into different categories as shown in Table 4.8.

Table 3.8 Categories of the respondents according to their annual family income

Categories	Score ('000' BDT)
Low income	1-100
Medium income	101-300
High income	>300

3.4.2.7 Organizational Participation

Organizational participation of a respondent was measured on the basis of his/her involvement in 6-different organizations considering the nature of participation but not considering the duration. For example, if a respondent involved in an organization has/her organizational participation score is accordingly as general member (1), executive member (2), executive officer (3) and no involvement (0) without considering duration. The organizational participation score of a respondent was calculated by adding all the scores against all the organizations s/he participated considering his/her nature of participation. The organizational participation score of a respondent could range from 0-18 where '0' indicates no organizational participation and '24' indicates high organizational participation. According to organizational participation score, the respondents were grouped into different categories as shown in Table 3.9.

Table 3.9 Categories of the respondents according to their organizational participation

Categories	Score
No participation	0
Low participation	1-6
Medium participation	7-12
High participation	13-18

3.4.2.8 Cosmopolitaness

Cosmopolitanism of an individual referred to his frequencies of visits to eight different types of places outside his own villages (Appendix A, Interview Schedule Item no 9). The score assigned accordingly as frequently (3), occasionally (2), rarely (1) and not at all (0). Cosmopolitanism score of respondent was calculated by adding all the scores obtained by a respondent against the eight selected places. The cosmopolitanism score of a respondent could range from 0-24 where '0' indicates no cosmopolitanism and '24' indicates high cosmopolitanism. According to cosmopolitanism scores, the respondents were grouped into different categories as shown in Table 3.10.

Table 3.10 Categories of the respondents according to their cosmopolitanism

Categories	Score
No cosmopolitanism	0
Low cosmopolitanism	1-8
Medium cosmopolitanism	9-16
High cosmopolitanism	17-24

3.4.2.9 Agricultural Training

Farmers' training score was determined by the number of trainings received by him/her. For example, if a respondent received one training his/her training score was "1" irrespective of

duration. According to agricultural training score, the respondents were grouped into different categories as shown in Table 3.11.

Table 3.11 Categories of the respondents according to their agricultural training

Categories	Score
No training	0
Low training	1
Medium training	2-3
High training	≥ 4



3.4.2.10 Extension Media Contact

It refers to the extent of exposure to different sources of agricultural information during the last year. The procedure followed by Ranuji (2006) in order to access the extent of exposure of the respondents in extension activities with slight modification. The different information sources were listed and they were asked to indicate their extent of exposure as regularly, often, rarely and not at all. The scores assigned as 3, 2, 1 and 0 respectively. Extension media contact score of a respondent was determined by adding all the score obtained by a respondent against the selected 14-information sources. Extension media contact score against the 14-selected information sources could range between 0-42 where '0' indicates that no contact and '42' indicates high contact. According to extension media contact scores, the respondents were grouped into different categories as shown in Table 3.12.

Table 3.12 Categories of the respondents according to their extension media contact

Categories	Score
Low contact	1-14
Medium contact	15-28
High contact	29-42

3.4.2.11 Knowledge on Virtual Agricultural Channel Broadcasted through YouTube

The knowledge level score on virtual agricultural channel broadcasted through YouTube was measured by asking 20 selected questions and a score of 2 was assigned to each of the

questions. Full marks were given to appropriate answer and partial score was given for partially correct answer whereas '0' score was given to wrong or no answer. Knowledge score of a respondent was calculated by adding the scores obtained by him/her against 20 questions. Knowledge score could range from 0 to 40 where '0' indicated no knowledge while '40' indicated high knowledge (question no. 12 of the interview schedule). According to knowledge scores, the respondents were grouped into different categories as shown in Table 3.13

Table 3.13 Categories of the respondents according to their knowledge level on virtual agricultural channels broadcasted through YouTube

Categories	Score
Low knowledge	1-5
Medium knowledge	6-10
High knowledge	11-15

3.4.2.12 Contact with Other Virtual Media

It refers to the contact of respondents with some other popular virtual media except YouTube. For this purpose a number of 8 virtual media such as, Google, Facebook, WhatsApp, Instragram, Twitteen, TikTok, Snapchat, Likee (item no. 13 of the interview schedule; Apemndix A and Table 3.15) were considered to measure the contact with other virtual media. A four-point scales such as regularly (3), occasionally (2), rarely (1) and not at all (0) were employed against the 8 different types of virtual media. Contact with other virtual media score against the 8-selected virtual media could range between 0-24 where "0" indicates that no contact and '24' indicates high contact. According to contact with other virtual media scores, the respondents were grouped into different categories as shown in Table 3.14.

Table 3.14 Rank order of other virtual media based on assigned score:

Types of other virtual media	Assigned Score
Google	Regularly (3) Occasionally (2) Rarely (1) Not at all (0)
Facebook	Regularly (3) Occasionally (2) Rarely (1) Not at all (0)
WhatsApp	Regularly (3) Occasionally (2) Rarely (1) Not at all (0)
Instagram	Regularly (3) Occasionally (2) Rarely (1) Not at all (0)
Twitter	Regularly (3) Occasionally (2) Rarely (1) Not at all (0)
TikTok	Regularly (3) Occasionally (2) Rarely (1) Not at all (0)
Snapchat	Regularly (3) Occasionally (2) Rarely (1) Not at all (0)
likee	Regularly (3) Occasionally (2) Rarely (1) Not at all (0)

Table 3.15 Categories of the respondents according to their contact with other virtual media

Categories	Score
Low contact	1-8
Medium contact	9-16
High contact	17-24

3.5 Content Preference

Different types of contents are disseminated via virtual agricultural channels broadcasted through YouTube. However, a number of 10 aspects related to contents were included in item no.15 of the interview schedule (Appendix A) and Table 3.17 to measure the preference of respondents. A five-point scales such as very much (5), much (4), medium (3), less (2), very less (1) were employed against the 10 different contents as presented below:

Table 3.16 Categories of the respondents according to their extension media contact

Type of Contents	Assigned Score
1.land preparation	very highly (5) highly (4) moderately (3) less (2) very less (1)
2. Fertilizer application	very highly (5) highly (4) moderately (3) less (2) very less (1)
3. Sowing/ planting	very highly (5) highly (4) moderately (3) less (2) very less (1)
4. Pest and diseases identification and treatments	very highly (5) highly (4) moderately (3) less (2) very less (1)

5. Pesticides, fungicides, herbicides application	very highly (5) highly (4) moderately (3) less (2) very less (1)
6. Intercultural operation	very highly (5) highly (4) moderately (3) less (2) very less (1)
7. Harvesting	very highly (5) highly (4) moderately (3) less (2) very less (1)
8. Post harvesting operations	very highly (5) highly (4) moderately (3) less (2) very less (1)
9. Storage and handling	very highly (5) highly (4) moderately (3) less (2) very less (1)
10. Use of machineries (tractor, combine harvester, hand harvester, fertilizer spreaders, seeders, harrows, other tractor attachment etc)	very highly (5) highly (4) moderately (3) less (2) very less (1)



To identify the most preferred content, a content preference index was (CPI) was calculated using following formula:

$$(\%) \text{ CPI} = \frac{\text{Obtained CPI Scores}}{\text{Highest Possible CPI Scores}} \times 100$$

$$\text{CPI Score} = N_{pvh} \times 5 + N_{ph} \times 4 + N_{pm} \times 3 + N_{pl} \times 2 + N_{pvl} \times 1$$

Where, CPI = Content Preference Index

N_{pvh} = No. of the respondents prefer the content very highly which are disseminated by virtual agricultural channels broadcasted through YouTube

N_{ph} = No. of the respondents prefer the content highly which are disseminated by virtual agricultural channels broadcasted through YouTube

N_{pl} = No. of the respondents prefer the content less which are disseminated by virtual agricultural channels broadcasted through YouTube

N_{pvl} = No. of the respondents prefer the content very less which are disseminated by virtual agricultural channels broadcasted through YouTube

The CPI scores could range from 80 to 400 where '80' indicate very less preferred content and '400' indicate very highly preferred content. Based on CPI (%), the contents were ranked.

3.6 Identification of problems of farmer's faced/confronted by the farmers in exposing to virtual agricultural channels broadcasted through YouTube

A number of 9 problems were incorporated under item no. 16 of interview schedule (Appendix A and Table 3.18). Each of the farmers was deliberately asked to identify the listed problems as highly severe, moderately severe, less severe and not all a problem. A score of 3, 2, 1 and 0 was assigned against the rating scales respectively.

Table 3.17 Identification of extent of problems in exposure to virtual agricultural channels broadcasted through YouTube

Scale	Score assigned
Highly sever	3 (If the problem of the farmer is too severe to expose virtual agricultural channels broadcasted through YouTube)
Moderately sever	2 (If the problem of the farmer is moderately severe to expose virtual agricultural channels broadcasted through YouTube)
Less sever	1 (If the problem of the farmer is less severe to expose virtual agricultural channels broadcasted through YouTube)
Not at all	0 (If the problem of the farmer is not at all an obstacle to expose virtual agricultural channels broadcasted through YouTube)

Problem confronted score of a respondent was determined by summing up all the scores obtained by the respondent against the 9 problems in exposing to virtual agricultural channels broadcasted through YouTube. The problem confronted score of a respondent could range from 0 to 27 where “0” indicate not at all a problem and “27” indicate severe problem.

Table 3.18 Categories of the respondents based on extent of problems for exposing to virtual agricultural channels broadcasted through YouTube

Categories	Score
Low	1-9
Medium	10-18
High	19-27

To determine the severity of the identified problems for exposing the 10 virtual agricultural channels broadcasted through YouTube a Problem Confronted Index (PCI) was calculated by using the following formula:

$$(\%) \text{ PCI} = \frac{\text{Obtained PCI Scores}}{\text{Highest Possible PCI Scores}} \times 100$$

$$\text{PCI Score} = N_s \times 3 + N_{ms} \times 2 + N_{ls} \times 1 + N_{na} \times 0$$

Where, PCI = Problems Confronted Index

N_{hs} = No. of the respondents rated the problems as highly severe for exposing to virtual agricultural channels broadcasted through YouTube

N_{ms} = No. of the respondents rated the problems as moderately severe for exposing to virtual agricultural channels broadcasted through YouTube

N_{ls} = No. of the respondents rated the problems as less severe for exposing to virtual agricultural channels broadcasted through YouTube

N_{na} = No. of the respondents faced no problems for exposing to virtual agricultural channels broadcasted through YouTube

As there were 80 respondents, so Problem Confronted Index (PCI) score could range from 0 to 240. Where “0” indicate not at all a problem and “240” indicate as severe problem. Based on

selected characteristics of the respondents and their exposure to virtual agricultural channels broadcasted through YouTube Spearman's Ranked Correlation Coefficient (ρ) and regression were computed. Data were analyzed by using software named SPSS version 25.

CHAPTER IV

RESULTS AND DISCUSSION

1.1 Farmers' Extent of Exposure to Virtual Agricultural Channels broadcasted through YouTube

The computed extent of exposure scores ranged from 5-14 with an average of 10.05 and a standard deviation 2.21 of against the possible range of 1-30. Based on their extent of exposure scores the respondent farmers were classified into three categories (Table 4.1).

Table 4.1 Distribution of respondent farmers according to their extent of exposure

Categories	Score	Respondents (N=80)		Range		Mean $\pm$	SD
		Number	Percentage	Min	Max		
Low	1-10	48	60				
Medium	11-20	32	40	5	14	10.05 $\pm$	2.21
High	21-30	0	0				
Total		80	100				

Data presented in Table 4.1 shows that majority/ three-fifths (60 percent) of the respondent farmers had low exposure compared to two-fifth (40 percent) of total farmers having "Medium exposure" to virtual agricultural channels broadcasted through YouTube. None of the respondent farmers belonged to high exposure category. These findings are similar with Hossain (2022). The researcher found that about three-fourth (72.5%) of the respondents expressed very low exposure whereas other one-fourth (27.5%) of the respondents showed low exposure and none of them showed both medium and high exposure. But the findings are dissimilar with Shaikh *et al.* (2010) and Shushama (2021). They found that majority of the respondents showed medium exposure.

1.2 Rank order of Virtual Agricultural Channels broadcasted through YouTube based on Exposure Index

In order to identify the most exposed virtual agricultural channel broadcasted through YouTube, an exposure index was computed. The selected ten virtual agricultural channels

broadcasted through YouTube are shown in Table 4.17. The farmers were highly exposed to Math Krishi (88.75%) while they were less exposed to Agamirkrishi (3.33%). The channels which are also exposed by the respondents were ShykhSeraj (80.42%), Others (Agro One, HridoyerKrishi, jubo Agro) (77.5%), Deeptokrishi (68.33%) and Krishi Bioscope (16.67%). None of the respondents were exposed to Agro One, Any bd and Doel Agro (0%).

Table 4.2 Rank order of virtual agricultural channels broadcasted through YouTube based exposure index

Channels	Exposure index		Rank
	Scores	Percentages	
1. Math Krishi	213	88.75	1
2. Krishi Bioscope	40	16.67	5
3. Deeptokrishi	164	68.33	4
4. ShykhSeraj	193	80.42	2
5. Agamirkrishi	8	3.33	6
6. Agro One	0	0	-
7. HridoyerKrishi	0	0	-
8. Any bd	0	0	-
9. Doel Agro	0	0	-
10. Others (Krishi TV, UddogtarKhoje, jubo Agro)	186	77.5	3

The farmers of the study area were highly exposed to the channel Math Krishi and ShykhSeraj followed by other channels (Table 4.2). This study was conducted on Dumuriaupazila under the Division Khunla. Kbd Md Mosaddek Hossen, the content creator of ‘Math Krishi’ was assigned as the UAO (Upazila Agriculture Officer) there in. He was very active and kind personnel who was enough competent in establishing a rapport with all the farmers. This is the reason behind the huge amount of viewers of Math Krishi. Actually personal contact added a favor on farmers’ exposure to Math Krishi. And “ShykhSeraj” is the author of the YouTube channel “ShykhSeraj” is the popular face to all classes of people specially farmers in Bangladesh and also out of this country. That is why farmers of any division are more or less

exposed to both of his television program and YouTube channel. There were some respondent farmers who were exposed to virtual agricultural videos broadcasted through YouTube, failed to recall the name of the YouTube channel. Some of them mentioned a few namely Krishi TV, Uddogtar Khoje and Jubo Agrobut. They were also failed to specify exposure to each of the channels individually. For this, researcher grouped the channels as “Others” and this group ranked as 3rd (Table 4.17). But there are some more virtual agricultural channels broadcasted through YouTube such as Agro one, Hridoyer Krishi, Any bd and Doel Agro which own more than about 900k subscribers with more than 1k videos uploaded in each channels (by exposing the mentioned channels on 15 march). Moreover millions of viewers had already viewed the videos uploaded there. But unfortunately no respondent farmers of the study area were exposed to these YouTube channels.

1.3 Content Preference

Rank Order of Content Preference

The respondent farmers of the study were exposed to different types of content broadcasted through virtual agricultural channels via YouTube such as land preparation, fertilizer application, sowing/ planting, pest and diseases identification and treatments, pesticides, fungicides, herbicides application, intercultural operation, harvesting operations, post harvesting handling and highly transportation storage and handling and use of machineries (tractor, combine harvester, hand harvester, fertilizer spreaders, seeders, harrows, other tractor attachment etc) etc. Table 4.3 showing the extent of preference of content which are broadcasted though YouTube. However, the farmers highly prefer content related to pesticides, fungicides, herbicides application (87.5%) and pest and diseases identification and treatments (85.5%) while they less prefer the content about intercultural operation (40%). Other content preferred by the respondent farmers were Use of machineries (tractor, combine harvester, hand harvester, fertilizer spreaders, seeders, harrows, other tractor attachment etc) (78%), fertilizer application (76%). storage and handling (67.25%), sowing/ planting (67%), post harvesting handling and transportation (55.5%), land preparation (46.75), harvesting operations (44.5%) and intercultural operation 40%).

Table 4.3 Distribution of respondent farmers according to their content preference

Content preference	Rank		
	Score	Percentage	
1. Land preparation	187	46.75	8 th
2. Fertilizer application	304	76	4 th
3. Sowing/ planting	268	67	6 th
4. Pest and diseases identification and treatments	342	85.5	2 nd
5. Pesticides, fungicides, herbicides application	350	87.5	1 st
6. Intercultural operation	160	40	10 th
7. Harvesting operations	178	44.5	9 th
8. Post harvesting handling and transportation	222	55.5	7 th
9. Storage and handling	269	67.25	5 th
10. Use of machineries (tractor, combine harvester, hand harvester, fertilizer spreaders, seeders, harrows, other tractor attachment etc)	312	78	3 rd

Farmers usually prefer to follow the traditional way to produce crop or their product. Thus they face new problems with newly introduced pest disease. And this make them to be more interested in seeking information related to pesticides, fungicides, herbicides application and pest and diseases identification and treatments related videos on YouTube. Findings shown in Table 4.3 also representing that respondent farmers of the study have content preference highly on pesticides, fungicides, herbicides application and pest and diseases identification and treatments related videos on YouTube respectively. And now a day farmers are getting involved in using different types of machineries (tractor, combine harvester, hand harvester, fertilizer spreaders, seeders, harrows, other tractor attachment etc) which make their work easy, more production within less time. That's why "Use of machineries (tractor, combine harvester, hand harvester, fertilizer spreaders, seeders, harrows, other tractor attachment etc)" ranked 3rd.

Whether the respondent farmers showed less interests on viewing videos related to intercultural operation.

2.0 Selected Characteristics of the Respondents

2.1 Age

Age of the farmers ranged from 23 to 65 years with the mean of 39.51 years and standard deviation of 9.76. However, based on their age the farmers were classified into three categories as shown in Table 4.4.

Tables 4.4 Distribution of respondent farmer according to their age

Categories	Score	<u>Respondents (N=80)</u>		<u>Range</u>		Mean±	SD
	(Years)	Number	Percentage	Min	Max		
Young	0-35	32	40				
Middle aged	36-50	37	46.25	23	65	39.51 ±	9.76
Old aged	>50	11	13.75				
Total		80	100				

Table 4.4 reveals that highest proportion (46.25 percent) of the farmers were middle aged, while two-fifths (40 percent) of them were young and the rest 13.75 percent were old. The findings again reveal that overwhelming majority (86.25 percent) of the farmers were young to middle aged. Generally young and middle aged farmers are more exposed to virtual agricultural channels broadcasted through YouTube. They are typically an influential partner in decisions about farming matters because they have a positive attitude toward experimenting with new ideas and they keep better communication with the many information sources available in rural areas. Shaikh *et al.* (2010) and Amin *et al.* (2014a) also found the similar result that the percentage of young and middle aged farmers are more than the old is farmers.

2.2 Education

The education score of the respondents ranged from 1 to 18, the average being 9.9 with the standard deviation of 4.27. On the basis of their education score, the farmers were classified into four categories, as shown in Table 4.5.

Table 4.5 Distribution of respondent farmers according to their education

Categories	Score	Respondents (N=80)		Range		Mean ±	Standard Deviation
		Number	Percent	Min.	Max.		
Illiterate	0	0	0				
Primary	1-5	14	17.5				
Secondary	6-10	37	46.25	1	18	9.9 ±	4.27
Higher Secondary	11-12	17	21.25				
Above Higher Secondary	≥13	12	15				
Total		80	100				

“Can sign only” respondent farmers are scored as “1”

Highest proportion (46.25 percent) of the farmers had secondary level of education compared to 21.25, 17.5 and 15 percent of them had higher secondary, primary and above higher secondary level of education respectively. None of them were illiterate (Table 4.5). From the findings of the study, it reveals that 100 percent of the respondents were literate which is higher than the national average literacy rate 63.6 percent (BBS, 2017). Farmers need to have some education in order to use the many virtual agricultural channels disseminated through YouTube appropriately and ultimately it produce good result. Shaikh et al. (2010), Amin et al. (2013b) and Amin et al. (2014b) also found that majority of the respondent farmers belonged to secondary category.

2.3 Family Size

The observed family size scores of the farmers ranged from 2 to 6 having an average of 3.7 and standard deviation of 1.15. On the basis of their family size scores, the farmers were classified into the following three categories (Table 4.6).

Table 4.6 Distribution of respondent farmers according to their

Categories	Score	Respondents (N=80)		Range		Mean ±	SD
		Number	Percent	Min.	Max.		
Small sized family	upto 4	60	75				
Medium sized family	5-6	20	25	2	6	3.7 ±	1.15
Large sized family	≥7	0	0				
Total		80	100				



Findings reveal that three-fourths (75 percent) of the farmers had small sized family compared to one-fourth (25 percent) having small family. The average family size of the farmers of the study area (3.7) is smaller than that of national average family size of Bangladesh which is equivalent to 4.06 (BBS, 2016). It means that the farmers of the study area are aware about population growth and planned family. The findings of the present study have dissimilarities with the findings of Hossain (2022), Amin *et al.* (2013b) and Amin *et al.* (2014b) where medium sized family is prominent over small sized family.

2.4 Farming Experience

The observed farming experience scores of the farmers ranged from 2 years to 50 years. The average farming experience was 17.68 years and the standard deviation was 9.78. The farmers were classified into three categories based on their farming experience scores (Table 4.7)

Table 4.7 Distribution of respondent farmers according to farm experience score

Categories	Score (years)	<u>Respondents (N=80)</u>		<u>Range</u>		Mean±	SD
		Number	Percentage	Min	Max		
Low experience	10	24	30				
Medium experience	11-20	32	40	2	50	17.68 ±	9.78
Higher experience	>20	24	30				
Total	80		100				

It was found that two-fifths (40 percent) of the farmers possessed medium farming experience compared to 30 percent of them having low and high farming experience respectively. The findings show harmony with Islam (2019) and Uddin (2007). Less experienced farmers (70 percent) are more exposed to the virtual agricultural channels broadcasted through YouTube rather than the high experienced farmers (Table 4.7).

2.5 Farm Size

Farm size of the respondents ranged from 0.12 to 10.74 ha having an average of 1.31 ha and standard deviation of 1.74. The farmers were classified into following five categories based on their farm size scores (Table 4.8).

Table 4.8 Distribution of respondent farmers according to farm size

Categories	Score (ha)	Respondents (N=80)		Range		Mean±	SD
		Number	Percentage	Min	Max		
Landless	<.02	0	0				
Marginal	.02-.20	5	6.25				
Small	.21-1	43	53.75	0.12	10.74	1.31 ±	1.74
Medium	1-3	25	31.25				
Large	>3	7	8.75				
Total		80	100				

Krishi Diary (2023) of AIS, MoA.

The findings contained in Table 4.8 reveals that majority (53.75 percent) of the farmers possessed small farm while 31.25, 8.75 and 6.25 percent having medium, large and marginal farm holdings respectively. None of them were landless. Most of the farmers under present study belonged to small and medium sized farm. This type of distribution is helpful to access different sources for disseminating agricultural information according to farmers need and which kept good impact on exposure of virtual agriculture channels broadcasted through YouTube. Though the result is similar with Amin *et al.* (2013b) and Shaikh *et al.* (2010), but it is dissimilar with Amin *et al.* (2014b) who found that 45% of his respondent farmers were marginal farmers. Bhuiyan (1988) also found that the farm size of the farmers had positive and significant effect on the use of communication media.

2.6 Annual Family Income

The observed annual family income of the farmers ranged from 5-120 having an average of 31.12 with a standard deviation of 26.83. Based on their annual income score, the farmers were classified into three categories (Table 4.9).

Table 4.9 Distribution of respondent farmers according to their annual family income

Categories	Score ('000BDT)	<u>Respondents (N=80)</u>		<u>Range</u>		Mean $\pm$	SD
		Number	Percentage	Min	Max		
Low Income	1-100	76	95				
Medium Income	101-300	04	05	5	120	31.12 $\pm$	26.83
High Income	>300	0	0				
Total		80	100				

Data computed in the Table 4.9 shows that most (95 percent) of the farmers belonged to low annual family income category. As all farmers fall into the low income range, it is reasonable to expect that they may not have as much access to be exposed to virtual agricultural channels broadcasted through YouTube (Table 4.9) as other classes of people in the society because, as is evident, modern equipment of this kind is expensive. Amin *et al.* (2014a) and Shaikh *et al.* (2010) also found the similar in their respective study.

2.7 Organizational Participation

The observed organizational participation scores of the farmers ranged from 0 to 6 with an average of 0.9 and a standard deviation of 1.06. On the basis of their organizational participation scores, the farmers were classified into four categories (Table 4.10).

Table 4.10 Distribution of respondent farmers according to their organizational participation

Categories	Score	<u>Respondents (N=80)</u>		<u>Range</u>		Mean $\pm$	SD
		Number	Percentage	Min	Max		
No Participation	0	36	45				
Low Participation	1-6	44	55	0	6	0.9 $\pm$	1.06
Medium participation	7-12	0	0				
High Participation	13-18	0					
Total		80	100				

Findings shows that the majority (55 percent) of the farmers had low organizational participation compared to 45 percent having no participation. None of the respondents belonged to medium and high organizational participation categories (Table 4.10). Being busy with their farming activities, it is obvious that they do not have enough time to participate in various organizations, which is crucial for self-actualization and exposing to technological information disseminated through virtual agricultural channels broadcasted via YouTube. The results of the current study are dissimilar to those of Amin *et al.* (2013a) and Amin *et al.* (2014b), they found that fewer of their respondent farmers were belonged to low participation category.

2.8 Cosmopolitanism

The observed cosmopolitanism scores of the farmers range from 0 to 5 having an average of 1.25 with a standard deviation of 1.38. Based on the cosmopolitanism scores, the farmers were classified into four categories (Table 4.11).

Table 4.11 Distribution of respondent farmers according to their cosmopoliteness

Categories	Score	<u>Respondents (N=80)</u>		<u>Range</u>		Mean $\pm$	SD
		Number	Percentage	Min	Max		
No	0	39	48.75				
Low	1-8	41	51.25				
Medium	9-16	0	0	0	5	1.25 $\pm$	1.38
High	17-24	0	0				
Total		80	100				

The findings shows that the majority (51.25 percent) of the farmers had low cosmopolitanism compared to 48.75 percent of total farmers having “no” cosmopolitanism. None of them had medium to high cosmopolitanism. This was logical, because in general the farmers in the rural areas of Bangladesh are less cosmopolite in nature. The result shows dissimilarity with Shaikh *et al.* (2010), Amin *et al.* (2013b) and Amin *et al.* (2014b).

2.9 Agricultural Training

The observed agricultural training scores of the farmers ranged from 0 to 5 having an average of 1.93 and a standard deviation of 1.27. On the basis of their agricultural training exposure scores, the farmers were classified into four categories (Table 4.12).

Table 4.12 Distribution of respondent farmers according to their agricultural training

Categories	Score	<u>Respondents (N=80)</u>		<u>Range</u>		Mean±	SD
		Number	Percentage	Min	Max		
No training	0	13	16.25				
Low training	1	17	21.25	0	5	1.93 ±	1.27
Medium training	2-3	41	51.25				
High training	≥4	9	11.25				
Total		80	100				

Majority (51 percent) of the respondents had “Medium” agricultural training and 21.25 percent and 16.25 percent of them had “low” and “no” agricultural training. A few (11.25 percent) of them had high amount of agricultural training (Table 4.12). Shaikh *et al.* (2010) found 40.74% of respondent farmers belonged to low training category but Amin *et al.* (2014b) found only 19% of them belonged to low training category.

2.10 Extension Media Contact

The observed extension media contact scores of the farmers range from 5 to 21 having an average of 12.1 with a standard deviation of 2.81. Based on the extension media contact scores, the farmers were classified into three categories (Table 4.13).

Table 4.13 Distribution of respondent farmers according to their extension media contact

Categories	Score	<u>Respondents (N=80)</u>		<u>Range</u>		Mean±	SD
		Number	Percentage	Min	Max		
Low	1-14	0	0				
Medium	15-28	64	80	5	21	12.1 ±	2.81
High	29-42	16	20				
Total		80	100				

Table 4.13 shows that most (80%) of the farmers belonged to medium extension contact compared to one-fifth (20%) of them maintained high extension contact. Low agricultural extension media contact might be the reason that some respondent may think that they have enough knowledge about farming activities. Agricultural extension media contact pertains to ones contact with multifarious sources of farming knowledge and information. It reveals that most of the respondents have secondary education so their communication eagerness is also developed. Thus, it can be concluded that most of the respondents were getting help from the extension workers or they were aware of the services provided by different extension agencies. Amin *et al.* (2013b) and Amin *et al.* (2014b) and Shaikh *et al.* (2010) also found the similar result in relation to farmers' extension media contact on their respective study.

2.11 Knowledge on Virtual Agricultural Channel Broadcasted through YouTube

The observed knowledge scores of the farmers ranged from 4 to 15 having an average of 9.7 and a standard deviation of 2.66. Based on the knowledge scores, the farmers were classified into the four categories (Table 4.14).

Table 4.14 Distribution of respondent farmers according to their knowledge level of virtual agricultural channel broadcasted through YouTube

Categories	Score	<u>Respondents (N=80)</u>		<u>Range</u>		Mean±	SD
		Number	Percentage	Min	Max		
Low	1-5	7	8.75				
Medium	6-10	41	51.25				
High	11-15	32	40	4	15	9.7 ±	2.66
Very High	16-20	0	0				
Total		80	100				

Findings indicate that majority (51.25 percent) of the farmers had medium level of knowledge on virtual agricultural channels compared to 40 and 8.75 percent having high and low level of knowledge respectively. It can be concluded from Table 4.14 that overwhelming majority of the respondent farmers (91.25 percent) had medium to high level of knowledge on virtual agricultural channel broadcasted through YouTube.

2.12 Contact with Other Virtual Media

The observed contact with other virtual media scores of the farmers ranged from 3 to 13 having an average of 6.46 with a standard deviation of 2.34. Based on the contact with other virtual media scores, the farmers were classified into three categories (Table 4.15).

Table 4.15 Distribution of respondent farmers according to their contact with other virtual media

Categories	Score	Respondents (N=80)		Range		Mean±	SD
		Number	Percentage	Min	Max		
Low	1-8	7	8.75				
Medium	9-16	69	86.25	3	13	6.46 ±	2.34
High	17-24	4	5				
Total		80	100				

The findings show that the most (86.25 percent) of the farmers had medium contact with other virtual media compared to 8.75 percent and 5 percent of total farmers having “Low” and “High” contact with other virtual media (Table 4.15).

2.12.1 Exposure Index of Other Virtual Media

The respondent farmers of the study were exposed to 8 different types of virtual media which are Google, Facebook, WhatsApp, Instagram, Twitter, TikTok, Snapchat and Likee (Table 4.16). However, the farmers were highly exposed to Facebook (30.75%) while they were less exposed to Snapchat (0.97%). Other the virtual media as exposed by the farmers were TikTok (23.22%), WhatsApp (16.24%), Google (16.06%), Likee (7.54%) and Instagram(3.87%) and Twitter(1.35%).

Table 4.16 Index of contact with other virtual media

Others virtual media	Exposure Index		Rank
	Score	Percentage	
1. Google	83	16.06	4 th
2. Facebook	159	30.75	1 st
3. WhatsApp	84	16.24	3 rd
4. Instragram	20	3.87	6 th
5. Twitter	7	1.35	7 th
6. TikTok	120	23.22	2 nd
7. Snapchat	5	0.97	8 th
8. Likee	39	7.54	5 th

From Table 4.16 it was observed that respondent farmers of this study were more exposed on Facebook, TikTok and WhatsApp respectively. These are very common platform exposed by the all classes of people in a society and farmers are also not left out. Very few study have been conducted in order to find out the farmers' exposure to different types of virtual media.

3.0 Relationship between the Selected Characteristics of the Respondent Farmers and their Exposure to Virtual Agricultural Channel Broadcasted through YouTube

For this study twelve characteristics of the respondent farmers were selected and each of the characteristics was treated as independent variable. The final null hypothesis: There is no relationship of the selected characteristics (age, education, family size, farming experience, farm size, annual family income, organizational participation, cosmopolitanism, agricultural training, extension media contact, contact with others virtual media, and knowledge on virtual channels with their exposure to virtual agricultural channel broadcasted through YouTube).

It was observed that out of 12 selected characteristics, respondents farmers' education, cosmopolitanism, extension media contact, contact with other virtual media and knowledge on virtual agricultural channels broadcasted through YouTube showed a positive significant relationship while age, family size, farming experience, farm size and annual family income showed negative significant relationships with the farmers' exposure to virtual agricultural channels broadcasted through YouTube. It means that the higher is the farmers' education, cosmopolitanism, extension media contact, contact with other virtual media and knowledge on virtual agricultural channels broadcasted through YouTube, the higher is their exposure to virtual agricultural channels broadcasted through YouTube while the higher is the age, family size, farming experience, farm size and annual family income of the farmers, the lower is their

exposure to virtual agricultural channels broadcasted through YouTube. And there was no significance relationship with farmers' organizational participation and agricultural training.

Hossain (2022) found that level of education, farm size, annual family income, cosmopolitanism, innovativeness, extension contact, organizational participation, training, knowledge and attitude was positively correlated with the exposure to AIS development communication tools. However, age, family size, farming experience of farmers having non-significant relationship with the DCTs of AIS. Again Shushama (2021) found significant relationship with effective farm size, farming experience, annual family income, innovativeness and agricultural extension media contact while agricultural knowledge and age, level of education and family size were non-significant towards exposure of YouTube.



Table 4.17 Relationship Between the selected characteristics of the respondent farmers and their exposure to Virtual Agricultural Channel Broadcasted through YouTube

Independent Variables (Selected Characteristics)	Dependent Variable	Correlation coefficient (ρ)
1. Age	Extent of Exposure to Virtual Agricultural Channels Broadcasted through YouTube	-.513**
2. Education		0.348**
3. Family size		-0.328**
4. Farming experience		-0.517**
5. Farm size		-0.150*
6. Annual family income		-0.151*
7. Organizational Participation		.117
8. Cosmopolitanism		.227*
9. Agricultural training		.102
10. Extension media contact		.225*
11. Knowledge on virtual agricultural channels broadcasted through YouTube		.320**
12. Contact with other virtual media		.382**

** Significant at .000-.009 (1% level) Significant at .010-.049 (5% level)

4.0 Problems Confronted

The observed problems related to exposure scores of the farmers ranged from 9-26 having an average of 18.36 and a standard deviation of 5.21. On the basis of their problems faced scores, the farmers were classified into three categories (Table 4.18).

Table 4.18 Distribution of respondent farmers according to the problems confronted by them related to exposure to virtual agricultural channel broadcasted through YouTube

Categories	Score	<u>Respondents (N=80)</u>		<u>Range</u>		Mean±	SD
		Number	Percentage	Min	Max		
No							
Low	1-9	3	3.75				
Medium	10-18	33	41.25	9	26	18.36 ±	5.21
High	19-27	44	55				
Total		80	100				

The findings show that majority (55%) of the respondent farmers confronted high problems followed by medium (41.25%) and low (3.75%) problems in exposing virtual agricultural channels broadcasted through YouTube (Table 4.18).

4.1 Problem Confrontation Index

The farmers of the study area confronted nine types of problems (Table 4.19). However, the farmers faced problems highly for being too busy to browse internet (81.67%) while illiteracy (53.75%) was the less severe problem. Other problems faced by the farmers were lack of android mobile (75.42%), high subscription rate of internet (73.75%), internet quality (73.33%), unavailability of preference content (71.67%), electricity failure (63.33%), don't know how to search on YouTube (60%), and lack of notification of video upload (60%).

Table 4.19 Distribution of respondent farmers according to the problems confronted by them related to exposure to virtual agricultural channel broadcasted through YouTube

Problems	Extent of problems		Rank
	Score	Percentage	
1.Electricity failure	152	63.33	6
2.Illiteracy	129	53.75	8
3.Dont't know how to search on YouTube	144	60.00	7
4.Lack of android mobile	181	75.42	2
5.Lack of notification of video upload	144	60.00	7
6.Unavailability of preference content	172	71.67	5
7.High subscription rate of internet	177	73.75	3
8.Internet quality	176	73.33	4
9.Too busy to browse internet	196	81.67	1



Data contained in Table 4.19 indicates that the farmers confronted highest problem in "too busy to browse internet" as indicated by percentage of 81.67. As all the time they *setpent* their time to perform different activities of agriculture so they have some a few time to browse internet. This is the main problem of the farmers in using YouTube. The second and third problems confronted by them are "Lack of android mobile" and "High rate of internet" respectively. In this way comparatively less problem confronted by the farmers is "illiteracy" that means it is not a serious problem for the farmers in using YouTube. Khou *et al.* (2018) in their study found that most of the farmers indicated the first problem of using YouTube is weak data and networks and the second problem is insufficient in training and education of using YouTube.

From the above discussion, it seems that government should take necessary steps to reduce the high cost of internet and give the facilities to farmers by providing them the knowledge about the virtual agricultural channel broadcasted through YouTube.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings, conclusions and recommendations of the study.

5.1 Summary

Agricultural information has a significant impact on agricultural productivity in a variety of ways. The specific objective of the study was to determine the extent of farmers' exposure to virtual agricultural channels broadcasted through YouTube. Attempts were also made to analyze eleven selected socio-economic characteristics of the farmers and their relationships with the extent of exposure to virtual agricultural channels broadcasted through YouTube and to identify problems faced by the farmers in exposing virtual agricultural channels broadcasted through YouTube. The study was confined at Dumuria upazila under Khulna district of Bangladesh. Data were collected from randomly selected eighty (80) farmers through personal interview using an interview schedule from 25 August, 2022 to 27 February, 2023. Appropriate scales were used in order to measure the concern the variables. Spearman's Ranked correlation co-efficient (ρ) was used to determine the relationships between the independent and dependent variables. No research has been done related to this topic that is why the current dubious "Farmer's exposure to virtual agricultural channels broadcasted through YouTube" was conducted.

5.2 Major Findings

5.2.1 Farmers' Exposure to virtual agricultural channels broadcasted through YouTube

Three-fifths (60%) of the respondent farmers had low exposure compared to two-fifth (40%) of total farmers having Medium exposure to virtual agricultural channels broadcasted through YouTube. None of the respondent farmers belonged to high exposure category.

Out of 10 agricultural channels broadcasted through YouTube, the study's respondent farmers were exposed to 7 channels to varying degrees i.e. variation in farmers' exposure to virtual agricultural channels broadcasted through YouTube was observed. The farmers were highly exposed to Math Krishi (88.75%) while they were less exposed to Agamirkrishi (3.33%). The channels which are also exposed by the respondents were ShykhSeraj (80.42%), Others (Agro

One, Hridoyer Krishi, jubo Agro) (77.5%), Deeptokrishi (68.33%) and Krishi Bioscope (16.67%). None of the respondents were exposed to Agro One, Any bd and Doel Agro (0%).

5.2.2 Selected Characteristics of the Respondents

Mejority (46.25%) of respondent farmers are middle-aged, as opposed to the younger (40%) and older (13.75%) aged groups. The mejority of respondents (46.25%) were classified as having a secondary level of education, while 17.5%, 21.25%, 15%, and 0% of farmers, respectively, fell into the primary, higher secondary, above secondary, and illiterate categories. Additionally, the maximum of respondents (75%) belonged to small-sized families, while 25% and 0% of respondents, respectively, belonged to medium-sized families and large-sized families. Most (40%) of the respondent farmers were belong to medium farm experienced followed by low experience (30%) and higher experience (30%). The majority of farmers (53.75%) owned small farms, while 0%, 6.25%, 31.25% and 8.75% had Landless, marginal, medium-sized and large sized farm.

Most (95%) of the respondent farmers belonged to low annual family income category whereas 5% of them had medium income and none of them belonged to high annual income category. The majority (55%) of the farmers had low organizational participation compared to having no participation (45%). None of the respondents belonged to medium and high organizational participation categories.

The majority (51.25%) of the farmers had low cosmopolitanism compared to 48.75 percent of total farmers having “no” cosmopolitanism. None of the respondent farmers had medium to high cosmopolitanism. Majority (51%) of the respondents had medium agricultural training and 21.25% and 16.25% percent of them had low and no agricultural training respectively. A few (11.25 %) of them had high amount of agricultural training.

Most (80%) of the farmers belonged to medium extension contact compared to one-fifth (20%) of them maintained high extension contact. Majority (51.25%) of the farmers had medium level of knowledge on virtual agricultural channels compared to 40% and 8.75% having high and low level of knowledge respectively. The most (86.25%) of the farmers had medium contact with other virtual media compared to 8.75% and 5% of total farmers having low and high contact with other virtual media. The respondent farmers were highly exposed to Facebook (30.75%) while they were less exposed to Snapchat (0.97%). Other the virtual media as exposed by the farmers were TikTok (23.22%), WhatsApp (16.24%). Google (16.06%), Likee (7.54%) and Instragram (3.87%) and Twitter (1.35%).

5.2.3 Relationship between the Selected Characteristics of the Farmers and their Exposure to DCTs of AIS

Out of 12 selected characteristics, respondents' education, cosmopolitanism, extension media contact, contact with other virtual media and knowledge on virtual agricultural channels broadcasted through YouTube showed a positive significant relationship while age, family size, farming experience, farm size and annual family income showed negative significant relationships with the farmers' exposure to virtual agricultural channels broadcasted through YouTube.

5.2.4 Identification of Problems Confronted in Exposure of DCTs of AIS by Farmers

The study's respondent farmers experienced issues with getting exposed to virtual agricultural channels broadcasted through YouTube to varying degrees. Majority (55%) of the respondent farmers faced high problems followed by medium (41.25%) and low 3.75%) problems.

The farmers faced problems highly for being too busy to browse internet (81.67%) while illiteracy (53.75%) was the less severe problem. Other problems faced by the farmers were lack of android mobile (75.42%), high subscription rate of internet (73.75%), internet quality (73.33%), unavailability of preference content (71.67%), electricity failure (63.33%), don't know how to search on YouTube (60%), and lack of notification of video upload (60%).

5.3 Conclusions

A conclusion presents the statements based on major findings of the study and these statements mostly confirm to the objectives of the research in the shortest form. It presents the direct answers of the research objectives, or it relates to the hypothesis" (Labon and Schefter, 1990).

Following conclusion were made based on major findings. The exposure of the respondents is not so satisfactory .Although the farmers under study were exposed to almost 7 virtual agricultural channels broadcasted through YouTube, but the bulk of them (60%) demonstrated relatively low exposure to virtual agricultural channels broadcasted through YouTube. The farmers were highly exposed to the "Math Khrishi" and "ShykhSeraj" while they were least exposed to "AgamirKrishi", "Krishi Bioscope" and "DeeptKrishi". Most of the characteristics of the farmers influenced the extent of exposure to virtual agricultural channels. Majority (55%) respondent farmers faced high problems such as of being too busy to browse internet, lack of android mobile, high subscription rate of internet, internet quality, unavailability of

preference content, electricity failure, don't know how to search on YouTube and lack of notification of video upload and illiteracy.

5.4 Recommendations

The recommendations are broken down into two sections: recommendation for policy implications and recommendation for additional research. Below are the recommendations for play implications based on the study's findings and conclusion.

5.4.1 Recommendations for Policy Implication

- a) For encouraging adoption of improved for practices by the factors in receiving agricultural information there is an urgent need for a sound system of broadcasting agricultural contents for providing adequate innovative information to the farmers.
- b) The Department of Agricultural Extension (DAE) needs to pay attention to ensure the engagement of extension officer for better response from the farmers. For some extension officers having good understanding with the farmers under his/her area; great impact has been noticed in the diffusion of agricultural innovation on that area.
- c) While taking programmers, time demanding content, language, age, and educational background should be taken into consideration. Comparatively young and middle-aged farmers would be given more consideration while selecting programmers for agricultural information.
- d) As a large number of farmers are not trained to use YouTube, arrangement should be made to provide non-formal training to the farmers. This will help to change attitude, behavior and outlook of the future farmers.
- e) Government should encourage young generation to evolve themselves in agricultural sector as they are more likely to adopt new innovations or technologies than the old farmers.

5.4.2 Recommendations for Future Study

- a) A limited amount of research such as that which has been done cannot fully explain how farmers are exposed to virtual agricultural channels broadcast on YouTube for the purpose of receiving agricultural information.
- b) The findings of this study demonstrate the necessity for farther research in order to provide directions. The following recommendations are offered for additional investigation into related studies.

- c) A survey in all districts in Bangladesh would provide a fuller picture of farmers' exposure to virtual agricultural channels broadcast on YouTube in Bangladesh because the study was time-constrained to the selected district from the south zone.
- d) b) Additional research can be carried out utilizing an exploratory research approach.
- e) c) Experimental research must be done.

CHAPTER VI

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APPENDIX-A

Agrotechnology Discipline

Life Science School

Khulna University, Khulna-9208

Interview Schedule

(English version of the questionnaire)

Farmer's Exposure to Virtual Agricultural Channel Broadcasted through YouTube

(Confidentiality will be maintain and all information will be used for study purpose)

Sample no:

Date: 2023

Name of the respondent:

Father/Husband name:

Village:

Union

Upazilla:

District:

Contact No. (must provide):

1. Age (year):

2. Educational Qualification: Please put tick mark (✓) against the correct response

- I. Can't read and write.....
- II. Can sign only.....
- III. Passed.....Class/PEC/USC/SSC/HSC/Bachelor/Master Degree

3. Family size (number of member) and education:

Name of the Family Members	Relation	Age	Education	Occupation	Subsidiary Occupation

1.	Self				
2.					
3.					
4.					

4. Farming experience: Years

5. Farm size: (Hectare)

Type/Ownership of Land	Area	
	Local Unit	Hectare
A) Homestead (including garden and fallow land)		
B) Own land under own cultivation		
C) Own land under others cultivation(1/2 or 1/3)		
D) Others land under own cultivation(1/2 or 1/3)		
D) Leased in		
E) Pond/Ditches		
F) Others		
Total [a+b+0.5(c+d)+e+f+]=		

6. Occupation:

A) Major occupation.....() B) Subsidiary.....()

7. Annual family income ('000' BDT): Please mention you and your family member annual income from different sources:

A. Income from agricultural sectors: How much money did you receive Income sources from the following agricultural sectors in the preceding year?

Sl. No.	Income Sources	Sources	Total production (Local unit)	Price/Unit (Taka)	Total price (Taka)
1.	Agriculture	Crops			
		Vegetables			

		Fruits			
2.	Livestock rearing	Cattle			
		Goat			
		Poultry			
3.	Fisheries				
4.	Social forestry				
5.	Homestead gardening				
6.	Others (specify) (lased out)				
7.	Total				

B. Income from non-agricultural sectors: How much money did you receive from the following non-agricultural sectors in the preceding year?

SL. NO.	Income sources	Total value (Taka)
1.	Service	
2.	Business	
3.	Day labor	
Total		

Total income = A+B (BDT) = ...Taka

8. Organizational participation:

A) Are you involved in any organization? Yes () /No ()

B) If yes, then answer the following question

SL. NO.	Name of the No. Serial organization (Non-political)	Extent of involvement				Duration (year)
		No Involvement (0)	General Member (1)	Executive Member (2)	Executive Officer (3)	
1.	Youth organization					

2.	Farmer club					
3.	Committee (mosque/Temple /church/Mandir/madras a)					
4.	NGO maintained					
5.	GO maintained associations					
6.	Other (specify)					

*Executive officer mean President, General Secretary

9. Cosmopolitaness:

Please state your frequency of visits outside your town or village:

Sl No	Place of visit	Frequency of visit			
		regularly(3)	Often(2)	Occasionally(1)	Not at all(0)
1.	Other village				
2.	Other union				
3.	Own Upazilla Sadar				
4.	Other Upazilla Sadar				
5.	Own District Sadar				
6.	Other District Sadar				
7.	City (Khulna)				
8.	Other cities (Dhaka, Chittagong, Rajshahi, Barisal, Mymensingh, Sylhet, Rangpur)				

10. Agricultural training (number):

Are you trained? "yes" or "No"

If your answer is "yes", please giving me the following information

C.	Mass media contact				
1.	Television				
2.	Radio				
3.	Internet/Web media				
D.	Printed materials				
1.	Leaflet related with rice, jute, Wheat, vegetables, fruits, seed, fertilizer and pest control information)				
2.	Bulletin (related with rice jute whet vegetables, fruits, seed, fertilizer and pest control information)				

12. The Knowledge level of respondent about virtual agricultural channel broadcasted through YouTube:

Sl. No	Statement	Mark Assign (2)	Obtain Mark
1.	What type of media is YouTube?		
1.	Name two virtual agricultural channel broadcasted through YouTube		
2.	What type of information are found in Math krishi?		
3.	What type of information are found in krishi bioscope		
4.	Why do you like about math krishi?		
5.	Why do you like about krishi biscope?		

6.	What is the different between television channel and YouTube channel?		
7.	What is the objective of Math Krishi?		
8.	What is the objective of Krishi bioscope?		
9.			
10			
11			

13. Exposure to different virtual media related to agriculture:

Sl.	Virtual media	Nature of Participation			
		Regularly(3)	Occasionally(2)	Rarely(1)	Not at all(0)
1	Google				
2	Facebook				
3	WhatsApp				
4	Instragram				
5	Twitter				
6	TikTok				
7	Snapchat				
8	Likee				

14. Extent of Exposure

Do you watch or enjoy Agricultural related channel in YouTube? If yes, what channels do you watch in YouTube and mention the frequency of watching?

SL. No.	Virtual Agricultural Channels	Extent of Exposure			
		Often (3)	Occasionally (2)	Rarely (1)	Not at all (0)
1.	Math krishi				

2.	Krishi bioscope				
3.	Deepto krishi				
4.	Shykh Seraj				
5.	Agamir krishi				
6.	Agro One				
7.	Hridoyer Krishi				
8.	Any bd				
9.	Doel Agro				
10.	Others (Krishi TV, UddogtarKhoje, jubo Agro)				

15. Content preference

Please check the content which do you will adjust to your vector to be broadcast through virtual agricultural channel:

Types of content	Order of preference					Remark
	Very much (5)	Much (4)	Medium (3)	Less (2)	Very less (1)	
1.land preparation						
2. Fertilizer application						
3. sowing/ planting						
4. pest and diseases identification and treatments						
5. pesticides, fungicides, herbicides application						
6. intercultural operation						
7. harvesting						
8. post harvesting operations						
9. storage and handling						