

**EFFECTIVENESS OF VIRTUAL AGRICULTURAL CHANNELS BROADCASTED
THROUGH YOUTUBE AS PERCEIVED BY THE FARMERS**

A THESIS

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**AGROTECHNOLOGY DISCIPLINE
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By

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STUDENT ID: MS-210837

**A thesis (Course No. AERD-6104) submitted to Agrotechnology Discipline in partial
fulfillment of the requirements for the degree of Master of Science in Agricultural
Extension and Rural Development**



**AGROTECHNOLOGY DISCIPLINE
LIFE SCIENCE SCHOOL
KHULNA UNIVERSITY
KHULNA-9208**

DECEMBER, 2023

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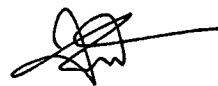
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DEDICATED
TO
MY BELOVED PARENTS

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ABSTRACT

YouTube is one of the most popular social media platforms. Now a days around more than fifty percent of the farmers are using this YouTube is useful to know about general news, enjoy music or how-to-video of Agricultural Videos. This study was conducted to determine the effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers at Dumuria upazila under Khulna district of Bangladesh. The data were collected from a sample of eighty respondents selected through snowball sampling technique, by means of personal interview during 25 August 2022 and 27 February 2023 using interview schedule. Ten popular YouTube channels were selected to study the effectiveness of virtual agricultural channels broadcasted through YouTube. The data were analyzed with descriptive statistics viz frequency distribution and percentage. The relationships between the independent and dependent variables were determined by using Spearman's ranked correlation coefficient. Most of the respondents' (86.25%) perceived that the virtual agricultural channels broadcasted through YouTube were less effective from overall consideration. Considering individual channels, Shykh Seraj and Math Krishi were highly effective while Agamir Krishi and Krishi Bioscope were less effective from farmers' perception point of view. Among the 13 characteristics, education, extension media contact, knowledge of virtual agricultural channels broadcasted through YouTube, contact with other virtual media and extent of exposure to virtual agricultural channels broadcasted through YouTube had shown a positive significant relationship and age, family size, farming experience had shown a negative significant relationship with their extent of effectiveness of virtual agricultural channel broadcasted through YouTube. The most common problem that limits the effectiveness was "required materials are expensive and not easily assessable" (77.5%) while the least common problem was "all information is not correct" (52.5%).

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

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CHAPTER I

INTRODUCTION

1.1 General Background of the Study

Bangladesh, a 147,570 square kilometer country, is one of the emerging nations with the largest agro-based economies in the world. Since her independence in 1971, Bangladesh's economy has been centered on agriculture; the sector employs 45% of the labor force and generates 17% of the GDP. Approximately 84 percent of the nation's rural residents depend on agriculture in directly or indirectly for their livelihood (Uddin, 2015).

At present, the agricultural sector needs adequate access to agricultural information due to the changes in agricultural production, the scarcity of key resources for agricultural production, including land, labor, and capital, and the need for high-quality agricultural products to meet consumer expectations (Mtega, 2018). Agricultural information raises farmers' awareness of agricultural technology, which is crucial for the development of agriculture and for the improvement of farmers' life style (Bello & Obinne, 2016). Maningas et al. (2000) found that having information in the hands of farmers results in their empowerment through control over their resources and decision-making procedures. They pointed out that having an effective and efficient delivery system for crucial information and technology services facilitates the clients' crucial role in decision-making towards better agricultural production, processing, trading, and marketing.

Along with the technical changes, information transmission practices are also changing. Recent innovations in information technology can rapidly transmit agricultural information to a large number of audiences with more accuracy (Goyal, 2011). Advancement in technology has resulted in creation of new communication channels which are either standalone or mediated communication devices. Print media, protests, various mobile phone apps, radio and television sets, and web-based (including social media) channels are some of these channels (Livondo et al., 2015). The choice of communication channel depends on a number of factors, including the media's awareness and credibility (Livondo et al., 2015), the media's richness, the characteristics of message, the availability of a feedback mechanism, and the urgency of the message (Ghanbari & Rahmati 2010). Moreover, the level of usage of various communication channels is influenced by the effectiveness of the communication infrastructure being utilized for message transmission. For example, the condition of roads can influence the transfer of print media, while the adoption and use of radio and television

sets, web-based media, and mobile phones are affected by the ICT networks' quality (Mtega & Benard, 2013).

Today's world is social media world. The dissemination of agricultural information to the farmers in recent years has been greatly influenced by a variety of modern media, such as newspapers, television, and magazines. But since the last decade the social media platforms have predominantly dominated the way of communication (Eke et al., 2014).

Social media describes human interaction in which individuals produce, share, consume, and exchange information and ideas via virtual communities and networks. Merriam-Webster (2015) defines social media as forms of electronic communication through which users can create online communities to share information, ideas, personal messages and other content. Suchiradipta & Saravanan (2016) defined social media as web-based tools of electronic communication that allow users to interact, create, share, retrieve and exchange information and ideas in any form (text, pictures, video, etc.) that can be discussed upon, archived and used by anyone in virtual communities and networks. Social media are designed for digital communication and include a variety of tools that enable interaction between individuals and are used by farmers to share knowledge. People in rural areas use social media to interact with friends and family, read the latest news, and seeks advice from their peers.

Numerous social media platforms, including as Facebook, YouTube, WhatsApp, etc., are great sources for disseminating the information and promoting agricultural production. Through social media, farmers can share innovations and knowledge alongside solving problems. An essential information source is farmer-to-farmer knowledge exchange. Farmer's experiences can be shared on social media. YouTube is one of the most popular websites in the world used by the people (Verma & Rani, 2023). YouTube has become a vital tool for both literate and illiterate people, as it can provide relevant audiovisual content that can be interacted with, commented on, and shared. It 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 world have access to a vast range of agricultural information, tips, and tutorials on YouTube. Agricultural extension services, farm organizations, and people can now effectively share their knowledge, skills, and experiences through the platform. Farmers can communicate with professionals, ask questions, and share their experiences with other farmers on virtual agricultural channels on YouTube. Along with information access, farmers can make their own online channels, upload videos of their

farming methods, and connect with a larger audience. This can aid farmers in increasing their awareness, developing their brand, and establishing connections with potential buyers and consumers. However, the use of YouTube in agriculture is also influenced by several factors, including the quality and accessibility of internet connectivity, the presence of language barriers, and the relevance and accuracy of the information provided (Kalusopa, 2005).

In Bangladesh, agriculture plays a significant role in country's economy. But lack of resources, information, and technology are the common problems faced by farmers in Bangladesh. However these days, the use of social media for agricultural information and marketing is expanding quickly with the increasing availability of the internet and smartphones. In this case, YouTube has played a great role for disseminating information and improving knowledge among farmers.

In Bangladesh, the most popular agricultural channels include Math Krishi, Agamir Krishi, Krishi Bioscope, Deepto Krishi, Shykh Seraj, Hridoyer Krishi, Agro One, Any Bd, Green Friends, Uddoktar Khoje, etc., which provide information on various aspects of agricultural sectors. These channels make it possible to spread knowledge about goods and services and increase consumer base. These details have a significant impact on how agricultural production is developed as well as the socioeconomic conditions of the farmers. In remote area where traditional agricultural extension services may not be available, virtual agricultural channels broadcasting through YouTube can be a great and successful way of reaching farmers.

Overall, virtual agricultural channels on YouTube have the potential to have a great impact on farmers' production and knowledge. But the major problem of the farmers for the development is not the lack of technologies needed for economic growth and social change but that of converting them into production accomplishments and then using them as an instrument of economic growth and social change. Success in communication of agricultural information mainly depends on the way the recipient does response to the message received (Ahmed et al., 1994). This study was designed to provide an answer to the question of how much farmers perceive effective the knowledge and information they learn and receive from virtual agricultural channels broadcasted through YouTube.

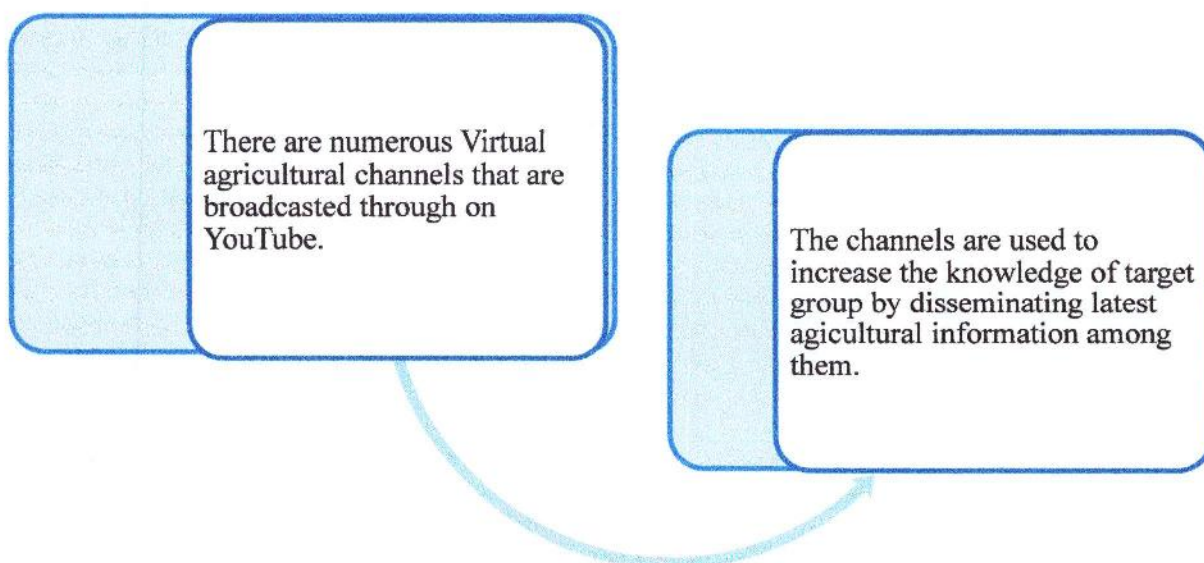
The education level of the farmers of Bangladesh is very low resulting poor communication of agricultural information through printed media. However, in this case other mass media like television, radio, and social media (such as Facebook, YouTube, WhatsApp, etc.) can be

very effective in disseminating agricultural information among the farmers (Amin et al., 2013). Ahmed (1994) and Amin et al (2013 and 2014) conducted investigations on exposure to and effectiveness of other satellite channels broadcast agricultural programs (especially through radio and television). But it is unknown about the effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers.

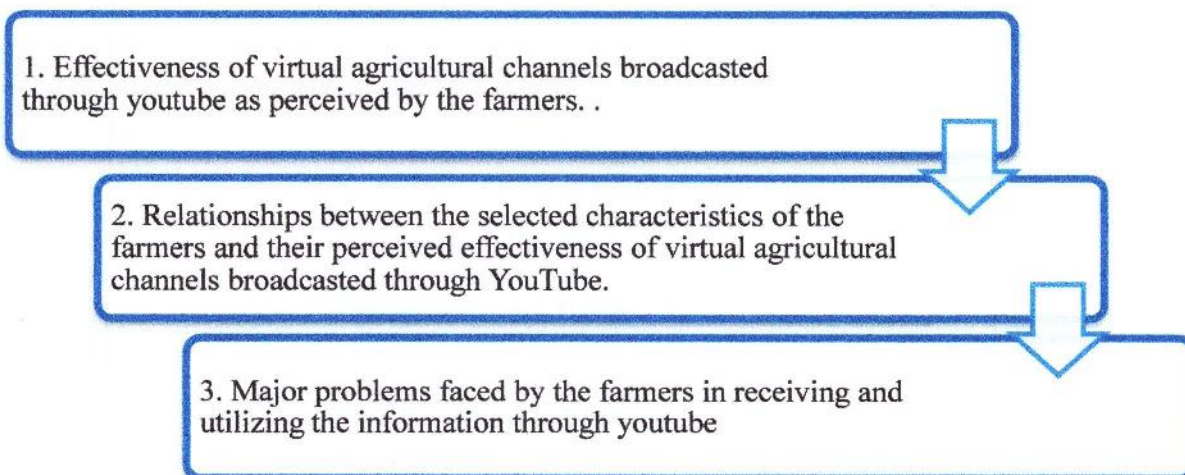
1.2 Statements of the problem

Effective assessment is the process of utilizing the information that are received by the target group. In a word, effectiveness refers to how useful something are as desired by the recipients.

1.3 Research gap



However, the followings are to be found out through this study



1.4 Scope of the Study

The present study provides valuable information about farmers and their knowledge on virtual agriculture channels broadcasted through YouTube, usefulness of the knowledge in their daily life or profession and the extent of farmers' effectiveness of these channels 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 effectiveness and problems faced by farmers which are crucial in increasing their effectiveness.

1.5 Specific objectives

- To determine the effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers.
- To explore relationships between the selected characteristics of the farmers and their perceived effectiveness of virtual agricultural channels broadcasted through YouTube.
- To identify the major problems faced by the farmers in receiving and utilizing the information through YouTube.

1.6 Limitations of the Study

As a student research project, there are time and resource restrictions on this investigation. Therefore, the findings of the study cannot be generalized to other areas and other population as a whole. Considering the time, money and other necessary resources available to the researcher the study has some potential limitations as mentioned below:

- The study was restricted to some chosen villages in Khulna district's Dumuria upazila.
- Even though there were many farmers in the study area, only 80 respondents were chosen for the analysis.
- The characteristics of the respondent in the study area were many and varied but only 13 characteristics were selected for investigation in this study as stated in the objectives.
- The researcher relied on the data provided by the sampled respondents during the interview to learn more about the study. Since none of the respondents maintained records, they responded to the various questions by recalling details like records of farming maintenance.

- For some cases, the researcher encountered unexpected interruption from the too curious side-talkers.
- There are many problems that hinder the effectiveness of the virtual agricultural channels broadcasted through YouTube to the farmers. However, only some selected problems have been considered for investigation in this study.
- Major data, facts, and figures provided by the respondents were applicable to the situation prevailing in the locality during the year 2022-23.

1.7 Assumptions

The following assumptions were in mind of the researcher during conducting the study:

- ❖ The respondents provided accurate and dependable responses.
- ❖ The chosen respondents were capable of responding to the researcher's questions.
- ❖ The respondents were able to provide proper responses to the interview schedule's questions.
- ❖ The researcher who conducts the interviews was well adjusted so the social environment of the study area. As a result, the researcher's data were impartial.
- ❖ Views and opinions furnished by the respondents were the representative views and opinions of farmers' population of the study area.
- ❖ The topics covered in the question of how farmers feel about watching virtual agriculture channels broadcast on YouTube and use the information.
- ❖ All the data concerning the variables of the study were normally and independently distributed.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to review the past studies and opinion of social scientist relevant to this research based on the major objectives of the current study. This chapter focuses on reviewing research findings from earlier studies that are pertinent to the current investigation. However, very few researches have been done to examine the effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers. The researcher made great efforts to review previous research that were either directly or indirectly relevant to the current study. It provides the framework for further research as well as assistance for the present study.

2.1 Significance of information and communication technology

ICT has a wide range of potential uses in agricultural extension. It can introduce new statistical services to rural areas, giving farmers much more control than they did in the past over current statistical channels (Zijp, 1994).

According to Lenk and Traunmuller (2009), advancements in IT, such as electronic records, group ware for computer-assisted work, the internet, etc., lead to innovative administrative records systems, which improve policy formulation, sell participation, improve service quality, increase planning effectiveness, and serve as a means of empowering citizens.

Murali (1993) developed a database on a telephone-based fully interactive voice response system called Audiotex that includes information on farmers, the agronomic conditions of the industry, local observations, suggestions, model constants, and weather data. A touch-tone phone is utilized to record field observations, and pre-recorded message were used to guide the consumer during the facts access and for advising control measures.

According to Lawal's (2008) opinion, if ICT components are included in the distribution of agricultural know-how to farmers in Nigeria, there will be a swift flow of agricultural knowledge between extension sellers and farmers.

Satellite-based communication via the internet is one of the most effective, precise, rapid, and affordable methods for disseminating information from research systems to the farmers (Chauhan, 2010).

Singh et al. (2008) draw attention to the fact that the new strategy of "Utilizing the force of on-line systems, PC, interchanges and computerized intuitive sight and sound to encourage spread of farming innovation" is known as digital development. This approach can be characterized as an expansion over the internet.

ICTs can play a significant role in combating rural and urban poverty and fostering realistic advancement by fostering data-rich social structures and fostering occupations. ICTs have the potential to be powerful tools for advancing the economy, society, and politics if they are used properly according to the requirements of urban and rural people (Nayak et al., 2010)

An investigation was done to determine the impact of Information and Communication Technologies in Agriculture Development. The majority of developing country have benefited from the technologies. The most crucial tools of communication for educating farmers about agriculture are the internet, mobile phones, radio, and television play significant roles in the dissemination of knowledge about agriculture in developing nations. Additionally, the divide between farmers and consumers has been bridged by mobile phones; now, producers can directly contact customers and obtain the market price for their goods. Farmers now have a new method of accessing weather information from the metrological department through these technologies (Chhachhar et al., 2014).

Information and communication technology (ICT) refers to the wide range of hardware, software, network architecture, and media that allow for the processing, storing, and sharing of information as well as communication both locally and internationally between computers and people. Information technologies (IT) have grown widely used in recent years, including e-mail and the World Wide Web. With the use of information technologies, the agriculture sector has the opportunity to more efficiently spread information across all industry participants. The agricultural extension system is becoming more and more dependent on IT. In order to supply farmers with relevant and location-specific technologies and timely and expert advice, IT may be the most effective way to advance agricultural education and research, as well as agricultural extension (Zahedi & Zahedi, 2012).

According to Lucky and Achebe (2012), the introduction of technology and technological devices, the medium of information storage, retrieval, and dissemination, has significantly increased the use of computers and internet facilities in accessing information in contrast to the traditional method.

According to Avgerou (2000), IT is one of the most important revitalization drivers, particularly in the context of developing nations. One sign of advancement in the global information society is the spread of different IT indicators.

ICTs include technologies that can handle many types of knowledge (voice, video, audio, text, and data) and facilitate various types of communications among human traders, between humans and technological systems, and between knowledge programs (Chowdhury, 2000).

The rapid advancement of electronic, telecommunication, computer multimedia, and web transmission and presentation of knowledge, unique varieties of understanding applied sciences, and their application in planning, selling, and production are helpful to accomplish the goal (Grudzinski & Panasiewicz, 2000)

Information and communication technologies (ICTs) are not solely related to computers, the internet, and phone lines. They focus on communication and understanding. This elevates the importance of content as we attempt to leverage new technology for poverty eradication and community development (Roman & Colle, 2003).

According to Kadiam et al. (2012), effective use of ICT, national and international information networks, the internet, educational programs, multimedia learning techniques, and PC-based coaching approaches to strengthen information availability to farmers, extension workers, and researchers' digital interactive multimedia, extension networks, and scientists to aid in the dissemination of technological expertise in agriculture.

Khobragade et al. (2013) recognized that Agro Advisory Services (AAS) provides regular, timely, and safely pre-knowledge of distinctive climate and climate prerequisites of remarkable plants. Agro Advisory Services (AAS) are valuable to farmers for increasing interest, aptitude, adoption, and the influence of climatic changes on agricultural operations.

ICTs were defined by Michiel and Crowder (2001) as a collection of digital applied sciences that, when combined in a novel configuration, are flexible adaptive, able to transform enterprises, and prepared to redefine social members of the family.

Robert (2001) reported that extension services with information technology (IT) outcomes have an impact on every aspect of agricultural sequences, including compatibility, complexity, trialability, and observability.

Akpabio et al. (2007) demonstrated that ICT makes it possible for those who engage in the agricultural development sector to play complementary roles by recovering and transferring critical know-how to farmers, as opposed to being replaced.

In the opinion of Meera et al. (2004), ICT helps extension workers to gather, store, retrieve, and disseminate a wide range of information needed by small producers, such as details on best practices, new technology, better prices for inputs and outputs, better storage facilities, improved transportation links, collective negotiations with buyers, and weather data.

Ashraf et al. (2015) performed research to determine how ICT has affected the quality of life of indigenous peoples in Ruma village in Bangladesh's Bandarban district. They discovered that ICTs had a positive impact on participants' perceptions of the Grameenphone Community Information Centers (GPCIC), a shared ICT access facility where participants can access a variety of ICT services, such as Internet, voice communication, video conferencing, and locally pertinent and customized information services on subjects like agriculture, education, health, legal, environment, and politics.

2.2 Communication media being used by the farmers

2.2.1 Print media activities

- **Krishi Kotha**

Krishi Kotha, most prominent and well-known agriculture journal in Bangladesh is published and distributed by AIS. According to AIS, 2018, Krishi Kotha currently has more than 80,000 direct subscribers and more than 15 lakh readers.

- **Krishi diary**

It includes the recent technical information, agricultural statistics, and contact information for many government and non-government agencies, organizations, and people involved in agriculture.

- **Samprosharan Barta**

It is the news bulletin that is distributed and published once a month. It includes information on agricultural achievement, progress, events, and current news.

- **Other Printing materials**

Print media, such as booklets, posters, folders, and festoons, is also very important for communicating agricultural knowledge and innovations. About 35.82 lakh printed copies of

materials were published and distributed between 2009 and 2018 to farmers, extension workers, and other relevant stakeholders (AIS, 2018).

2.2.2 Electronic media activities

- **Bangladesh Television (BTV)**

With the support and aid of AIS, Bangladesh Television (BTV) is producing Mati-O-Manush, a highly regarded television program that is broadcast on BTV. Additionally, Banglar Krishi, a show that the BTV has been airing since 2014, receives the full collaboration and technical support of AIS.

- **Bangladesh Betar**

Through the "Krishi Shomachar" and "Chashabad" radio programs, AIS has been actively assuring its support and collaboration to the Bangladesh Betar for the production and transmission of various agriculture programs for national and regional stations. With this assistance, national and regional stations of the Bangladesh Betar are able to broadcast programming for around 14 hours each week.

- **Community Radio**

With the tagline "My radio, my voice," AIS built the community rural radio station Krishi Radio 98.8 FM in Amtoli, in the Borguna district, and it has been providing the people of 12 upazilas in both Borguna and Patuakhali districts with a variety of need-based agricultural and rural welfare programs for the past eight hours every day.

- **Video materials (Cinema/ Pramanno Chitro)**

A variety of agricultural technology-based video programming, including chat shows, dramas, documentaries, and filler, is produced by AIS and broadcast on BTV and commercial satellite channels. Additionally, these are also broadcast via mobile cinema vans in remote regions.

2.2.3 ICT and innovation activities

- **Krishi Call Center**

AIS developed "Krishi Call Center-16123" in 2014 to provide quick public access to expert solutions (for agriculture, fisheries, and livestock). The cost to contact 16123 from a mobile phone is only 25 paisa/minute for anyone seeking guidance.

- **Other programs**

AIS organize a variety of rallies, seminars, workshops, and other events in honor of national and international days and events.

2.3 Studies related to effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers

An investigation was done in three former districts of the Southern Telangana zone of Telangana state, to determine the effectiveness of agricultural information provided through social media as perceived by the farmers. The findings indicated that around two-fifth (39.17%) of the respondents perceived that the effectiveness of agriculture information was medium level followed by less effective (38.33 %), very highly effective (8.33%), highly effective (7.50%) and very less (6.67%) effective (Sandeep et al., 2022).

An investigation was done to ascertain how farmers felt television programs were effective in disseminating agricultural knowledge. Out of the 13 selected crops, the information linked to jute was the most successful, followed by banana, transplanted rice, winter vegetables, and so on. Citrus information, however, was less effective. Agricultural television programs were thought to be the most beneficial in the cases of fertilizer application, irrigation of the tea, and. But when it came to knowledge on preventing anthracnose, canker, and root rot diseases, it performed less well (Amin et al., 2014).

A study was done to determine the effectiveness of radio and TV in disseminating agricultural information among the farmer in 8 villages under Dinajpur Sadarthana (presently upazila). The findings indicated that farmers receive more information from radio but TV proved to be more suitable for receiving information (Ahmed et al., 1994).

2.4 Studies related to relationship between the selected characteristics of the respondent farmers to the effectiveness of virtual agricultural channels broadcasted through YouTube

2.4.1 Age and effectiveness

Amin et al (2013) found a non-significant negative relationship between age of the farmers and their perceived extent of effectiveness of information broadcasting through agricultural radio program.

Sandeep et al. (2022) found a significant relationship between age of the farmers and their perceived effectiveness of Agricultural Information Disseminated through Social Media.

2.4.2 Education and effectiveness

Amin et al. (2013) found a significant relationship between education of the farmers and their perceived extent of effectiveness of information broadcasting through agricultural radio program.

Ahmed (1994) found a non-significant relationship between education of the farmers and their perceived effectiveness of information broadcasting through radio and television.

2.4.3 Family size and effectiveness

Amin et al. (2014) found a non-significant relationship between family size of the farmers and their perceived extent of effectiveness of information broadcasting through agricultural television program.

Ahmed (1994) found a significant relationship between family size of the farmers and their perceived effectiveness of information broadcasting through radio and television.

2.4.4 Farming experience and effectiveness

Sandeep et al.(2022) found a significant relationship between farming experience of the farmers and their perceived effectiveness of agricultural information disseminated through social media.

2.4.5 Farm size and effectiveness

Amin et al. (2013) found a significant relationship between farm size of the farmers and their perceived extent of effectiveness of information broadcasting through agricultural radio program.

Ahmed (1994) found a non-significant relationship between farm size and their perceived effectiveness of information broadcasting through radio and television.

2.4.6 Annual family income and effectiveness

Amin et al. (2014) found a significant relationship between annual income of the farmers and their perceived extent of effectiveness of information broadcasting through agricultural television program.

Ahmed (1994) found a significant relationship between annual income of the farmers and their perceived effectiveness of information broadcasting through radio and television.

2.4.7 Organizational participation and effectiveness

There is a significant relationship between organizational participation of the farmers and their perceived extent of effectiveness of information broadcasting through agricultural radio program (Amin et al., 2013)

Ahmed (1994) found a non-significant relationship between organizational participation of the farmers and their perceived effectiveness of information broadcasting through radio and television.

2.4.8 Agricultural training and effectiveness

Amin et al. (2014) found a significant relationship between farm size of the farmers and their perceived extent of effectiveness of information broadcasting through agricultural television program.

2.4.9 Cosmopolitanism and effectiveness

There is a significant relationship between cosmopolitanism of the farmers and the extent of effectiveness of information broadcasting through agricultural radio program (Amin et al, 2013).

There lies a significant relationship between cosmopolitanism of the farmers and the perceived effectiveness of information broadcasting through radio and television (Ahmed 1994).

2.4.10 Extension media contact and effectiveness

There is a significant relationship between extension media of the farmers and the extent of effectiveness of information broadcasting through agricultural television program (Amin et al., 2014). But Amin et al. (2013) found that there lies a significant relationship between extension media of the farmers and the extent of effectiveness of information broadcasting through agricultural radio program.

2.4.11 Knowledge level on virtual agricultural channels broadcasted through YouTube and effectiveness

Amin et al. (2014) found a significant relationship between knowledge level of the farmers and their perceived extent of effectiveness of information broadcasting through agricultural television program.

Ahmed (1994) found a non-significant relationship between knowledge level of the farmers and their perceived effectiveness of information broadcasting through radio and television.

2.4.12 Extent of exposure to virtual agricultural channels broadcasted through YouTube and effectiveness

According to Sandeep et al (2022), an individual having more chance of access and preference to use will have positive effect on effectiveness of agricultural information disseminated through social media.



2.5 The study's conceptual framework

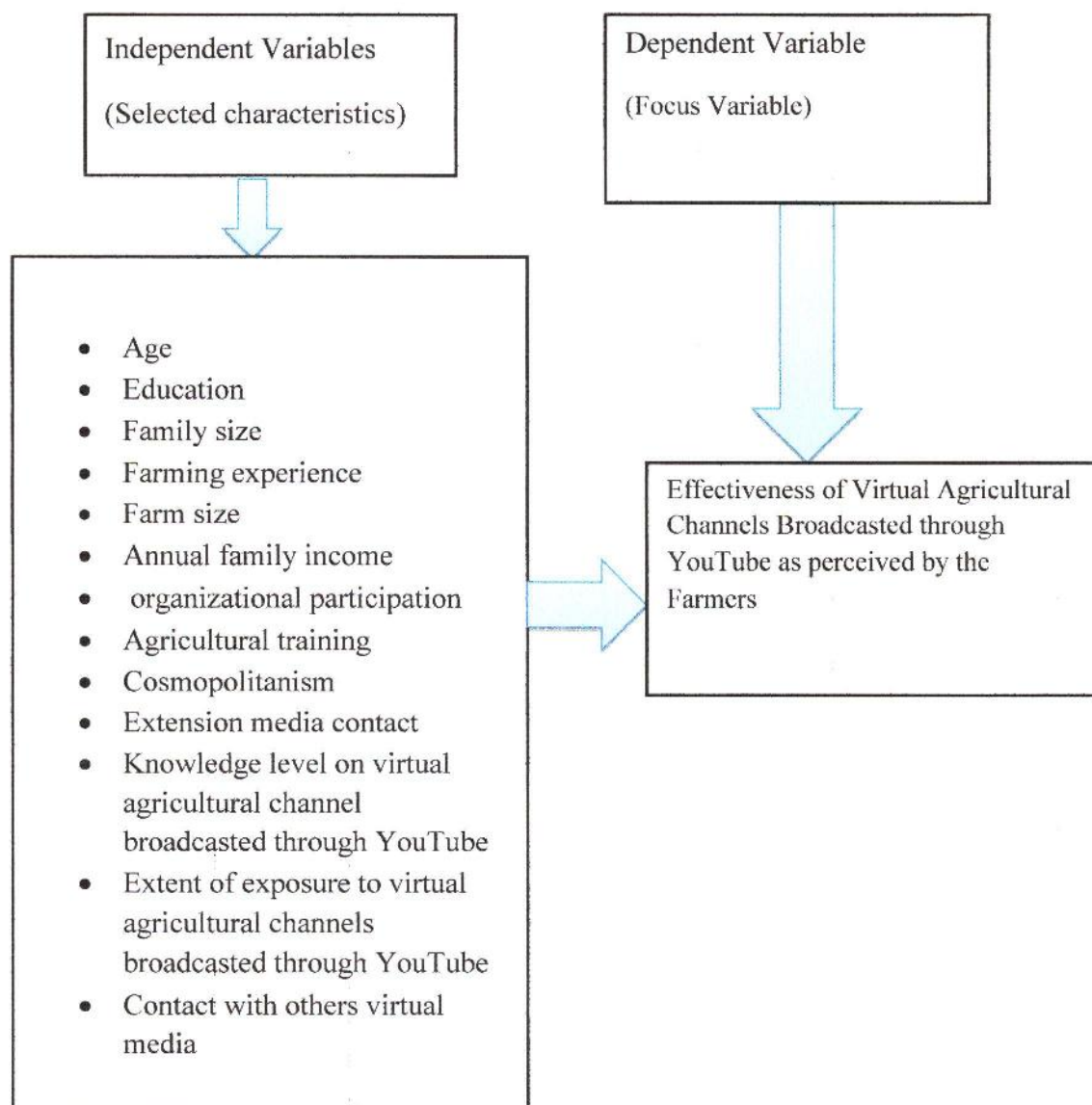


Figure 2.1: Conceptual model showing relationship between effectiveness of virtual agricultural channels broadcasted through YouTube and independent variables

CHAPTER III

METHODOLOGY

Research methods and procedures need to be carefully considered. Methodology should be such that enables the researcher to collect valid information and to analyze the same properly to arrive at correct decisions. The methods and procedures followed in conducting this research are being described below:

Research design: Research design is the framework of research methods and techniques chosen by a researcher. The structure enables researchers to focus on research techniques that are appropriate for the field and set up their studies for success. A "descriptive and diagnostic research design" was used in this investigation (Kothari, 2004). The purpose of this study was to determine the effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers.

3.1 Locale of the study

The study was conducted in Dumuria upazila under Khulna district. Dumuria is one of the largest upazila in the Khulna district in terms of land area, and its farmers are more advanced than those in other upazila in the region. Also, it is closed to the Khulna University. However, only 11 villages under Dumuria upazila (Khornia, Dumuria, Sajiara, Kalikapur, Senpara, Vulbaria, Jhaltola, Dattavanga, Bahirakra, and Boratia) were purposefully chosen for the study.

3.2 Population and sampling

The target population of the study was made up of local farmers who had access to different virtual agriculture channels broadcasted through YouTube. Upazila Agriculture Officer (UAO) of Dumuria, Khulna assisted in identifying the farmers. A number of 80 farmers were selected purposively for this study using the snowball sampling technique.



Figure 3.1: A map of Dumuria upazila

3.3 Selection of variables

In this study, the dependent variable was the effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers. On the other hand 13 selected characteristics of the farmers were considered as independent variables. The selected characteristics are:

1. Age
2. Education
3. Family size
4. Farming experience
5. Farm size
6. Annual family income
7. Organizational participation
8. Agricultural training
9. Cosmopolitanism
10. Extension media contact
11. Knowledge level on virtual agricultural channels broadcasted through YouTube
12. Extent of exposure to virtual agricultural channels broadcasted through YouTube
13. Contact with others virtual media

3.4 Measurement of variables

3.4.1 Measurement of the effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers (dependent variable)

Effectiveness refers to the suitability and applicability of information in farmers' situation.

A number of 10 popular agriculture related channels was selected for the study purpose. Each of the farmers in the sample was queried about the extent of their effectiveness of virtual agricultural channels broadcasting through YouTube using a four-point Likert type scale in which 0= not at all effective, 1= less effective, 2= moderately effective and 3= highly effective.

Table 3.1 Scale of effectiveness of virtual agricultural channels broadcasted through YouTube

Scale	Score assigned
Highly effective	3 (If the farmers rated the virtual agricultural channels broadcasted through YouTube as highly effective)
Moderately effective	2 (If the farmers rated the virtual agricultural channels broadcasted through YouTube as moderately effective)
Less effective	1 (If the farmers rated the virtual agricultural channels broadcasted through YouTube as less effective)
Not at all effective	0 (If the farmers rated the virtual agricultural channels broadcasted through YouTube as not at all effective)

Here, the score could range from 0-30, where 0 denotes not-effective and 30 denotes highly effective. The respondents were divided into the several categories on the basis of effectiveness score as presented in Table 3.2.

Table 3.2 Categories of the respondents based on their perceived effectiveness of virtual agricultural channels broadcasted through YouTube

Categories	Score
Less effective	1-10
Moderately effective	11-20
Highly effective	21-30

The following formula was used to compute an Effectiveness Index (EI) for determining the relative effectiveness of the selected virtual agricultural channels broadcasted through YouTube:

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

$$EI \text{ Score} = N_{he} \times 3 + N_{me} \times 2 + N_{le} \times 1 + N_{ne} \times 0$$

Where, EI=Effectiveness Index

N_{he} = No. of the respondents rated the virtual agricultural channels broadcasted through YouTube as highly effective

N_{me} =No. of the respondents rated the virtual agricultural channels broadcasted through YouTube as moderately effective

N_{le} = No. of respondents rated the virtual agricultural channels broadcasted through YouTube as less effective

N_{ne} = No. of respondents rated the virtual agricultural channels broadcasted through YouTube as not at all effective

The Effectiveness Index (EI) score might vary from 0 to 240 as there were 80 respondents. Here "0" denoting no effectiveness and "240" denoting high effectiveness. Based on EI (%)

virtual agricultural channels broadcasted through YouTube were ranked to determine the effectiveness of those channels by the farmers.

3.4.2 Measurement of selected characteristics (independent variables)

In this study, personal, economic, social and psychological characteristic of the farmers were treated as independent variables. Method for measuring independent variables mentioned under section 3.4.2.1 to 3.4.2.13 has been discussed below-

3.4.2.1 Age

The age of the farmers was determined by the span or duration from his/her birth to the time of the interview. It was measured in actual years based on his/her response to question No. 1 of the interview schedule (Appendix A). The respondents were divided into the several categories on the basis of age as presented 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

The level of education of a respondent was measured by the number of years of formal schooling. For each year of education, a score of 1 was given. For example, if a respondent completed class five of studies, his education score was considered as "5". A respondent who had no formal education and could not read or write was also given a score of "0" and the respondent who was just able to sign his or her name received a score of "1". The respondents were divided into the several categories on the basis of education as presented 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 was determined by the number of persons present in the family who live under same roof. The respondents were divided into the several categories on the basis of family size as presented in Table 3.5.

Table 3.5 Categories of the respondents according to their family size

Categories	Score
Small sized family	up to 4
Medium sized family	5-6
Large sized family	≥ 7

3.4.2.4 Farming experience

Respondent's farming experience was measured based on how long they had been actively involved in farming. It was calculated in years. For example, if a respondent had been farming for a year, his/her farming experience score would be "1". The respondents were divided into the several categories on the basis of farming experience as presented in Table 3.6.

Table 3.6 Categories of the respondents according to their farming experience

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

3.4.2.5 Farm size

Farm size refers to the size of the farm on which the farmers continued their farming activities. It was measured in hectare.

The following formula was used to calculate a respondent's farm size-

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

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 farm size was counted as the score of the farm size. For example, if a respondent had 0.05 ha of land, his score would be 0.05. The respondents were divided into the several categories on the basis of farm size as presented in Table 3.7.

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

3.4.2.6 Annual family income

A respondent's annual family income was calculated considering his and his family members earnings from both agriculture and non-agricultural sources. It was measured in BDT (Bangladeshi Taka). A score of 1 (one) was assigned for the income 1000 BDT. The respondents were divided into the several categories on the basis of farm size as presented in Table 3.8.

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

A respondent's organizational participation was measured based on his or her involvement in six different organizations, considering the type of participation but ignoring the duration. For example, If a respondent was actively participating in an organization, the score for organizational participation was as follows: general member (1), executive member (2), executive officer (3), and not involved (0), without considering the duration of participation. The respondent's organizational participation score was determined by summing up their scores for each organization in which they engaged. The respondents were divided into the several categories on the basis of organizational participation as presented 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 Agricultural training

Farmers' training score was measured by the number of trainings received by him/her without considering the duration. A score of 1 (one) was assigned for one training. The respondents were divided into the several categories on the basis of agricultural training as presented in Table 3.10.

Table 3.10 Categories of the respondents according to their agricultural training

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

3.4.2.9 Cosmopolitanism

The tendency to travel outside of one's own social structure is referred to as cosmopolitanism. Accordingly, the score was given as frequently (3), occasionally (2), rarely (1), and not at all (0) to measure the cosmopolitanism. The respondent's overall cosmopolitanism score was determined by summing their individual scores against the eight chosen places. A respondent's cosmopolitanism score can vary from 0 to 24, with "0" denoting no cosmopolitanism and "24" denoting high cosmopolitanism. This variable has been shown in the question no. 9 of the interview schedule (Appendix A). The respondents were divided into the several categories on the basis of cosmopolitanism score as presented in Table 3.11.

Table 3.11 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

3.4.2.10 Extension media contact

Extension media contact is the extent of exposure by the respondents to different sources of agricultural information throughout the previous year. The procedure followed by Ranuji (2006) in order to determine the respondents' level of exposure in extension methods with slight modification. They were asked to indicate their level of exposure as regularly, often, rarely and not at all. The scores assigned as 3, 2, 1 and 0 respectively. The score of extension media contact was determined by adding all the scores obtained by a respondent against 14 information sources. The range for the extension media contact score was 0 to 42, where 0 denotes no contact and 42 denotes the high contact. The respondents were divided into the several categories on the basis of extension media contact as presented 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 level on virtual agricultural channels broadcasted through YouTube

By asking 10 carefully chosen questions the knowledge level score of a respondent on the virtual agricultural channel broadcasted through YouTube was determined. A score of 2 was assigned for each question. Full marks were given to appropriate answer while a partial score was provided for an answer that was only partially correct. The score of '0' was given to wrong or no answer. The score of Knowledge was determined by adding all the scores obtained by a respondent against 10 selected questions. The knowledge score ranged from 0 to 20, with a score of 20 indicating a high level of knowledge and '0' indicating no knowledge. The respondents were divided into the several categories on the basis of knowledge level of virtual agricultural channel broadcasted through YouTube as presented 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
Very high knowledge	16 – 20

3.4.2.12 Extent of exposure of respondents to virtual agricultural channels broadcasted through YouTube

Farmers' exposure to virtual agricultural channels broadcasted through YouTube refers to farmers' access to different agricultural YouTube channels. A number of 10 popular YouTube channels related to agriculture were selected to determine Extent of exposure to virtual agricultural channels broadcasted through YouTube. A scale of four points, such as often (3), occasionally (2), rarely (1), and not at all (0), was employed against these selected 10 channels. The score of exposure to different virtual agricultural channels broadcasted through YouTube ranged from 0 to 30, where 0 indicates no exposure and 30 indicates the highest exposure score. The respondents were divided into the several categories on the basis of extent of exposure to virtual agricultural channels broadcasted through YouTube as presented in Table 3.14.

Table 3.14 Categories of the respondents based on their extent of exposure to virtual agricultural channels broadcasted through YouTube

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

3.4.2.13 Contact with other virtual media

Farmers' contact with other virtual media refers to farmers' access to some other popular virtual media except YouTube. Eight (8) virtual media, including Google, Facebook,

WhatsApp, Instagram, Twitter, TikTok, Snapchat, and Likee was selected to measure the contact with other virtual media, A scale of four points, such as regularly (3), occasionally (2), rarely (1) and not at all (0) were used against the 8 different types of virtual media. The score of contact with other virtual media ranged from 0 to 24, where 0 indicates no contact and 24 indicates high contact. The respondents were divided into the several categories on the basis of contact with other virtual media as presented in Table 3.16.

Table 3.15 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 3.16 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

3.4.2.14 Identification of the problems confronted by the farmers in effectiveness of virtual agricultural channel broadcasted through

A number of 7 related problems were included in item no.15 of the interview schedule (Appendix A). The farmers of the study area were asked whether they faced the problems as 'yes' or 'no'. Based on citation, the problems were ranked.

3.5 Instrument for Data Collection

In order to get relevant information an interview schedule was prepared. The schedule was made with great consideration for the goals of this study. The schedule included both closed-ended and open-ended questions. Easy, simple direct questions and several scales were used to collect necessary information required for the research. The questions were provided in a clear and systematic manner so that the respondent could understand how to provide information in a consistent and orderly manner. A pre-tested interview schedule was conducted before the final interview schedule. Based on the results of the pretest the appropriate correlations and modifications were made. The interview schedule is included in English (Appendix-A).

3.6 Collection of Data

The researcher collected data by conducting face-to-face interviews. The researcher made every effort to explain the study's objectives to the farmers. A rapport was built with the farmers before the interview and the objectives were made clear by using local language as much as possible. Data was collected between 25 August 2022 and 27 February 2023.

3.7 Compilation of Data

All of the information from the interview schedule were compiled after the field survey was finished. Local units were converted into standard units. The qualitative data were transformed into quantitative data using appropriate coding and scoring. In order to enter the data into the computer, the responses of each respondent contained in the interview schedules were transferred to a master sheet. After entry, data were examined in accordance with the study's goals.

3.8 Statistical Analysis

All the collected data were statically analyzed in computer by using SPSS version 25 software. Statistical measures such as quantity, percentage, range, rank order, mean, and standard deviation were employed to describe the independent and dependent variables of the study. Spearman's Ranked Correlation Coefficient (ρ) were done for exploring the relationship between the selected characteristics of the respondent farmers and their extent of effectiveness of virtual agricultural channel broadcasted through YouTube.

CHAPTER IV

RESULTS AND DISCUSSION

Data were collected from the respondent farmers and were carefully accomplished, coded, computed, tabulated and analyzed in accordance with the objectives of the study. After completion of those processes, this chapter was written carefully. This chapter contains explanations of the study's findings and their logical interpretations. This chapter is divided into four sections. The first section deals with the dependent/focus variable of the study i.e effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers. The second section deals with the independent variable of the study (selected characteristics of the farmers). In the third section, the relationships between the selected characteristics of the farmers and their perceived effectiveness of virtual agricultural channels broadcasted through YouTube have been discussed. And the last section contains the causes behind the low or non-effectiveness of virtual agricultural channels broadcasted through YouTube.

4.1.1 Extent of perceived effectiveness of the virtual agricultural channels broadcasted through YouTube

The calculated perceived effectiveness scores ranged from 3-14 with an average of 7.81 and a standard deviation 2.49. Based on their perceived effectiveness scores, the respondent farmers were classified into three categories (Table 4.1).

Table 4.1 Distribution of the respondents based on their perceived effectiveness scores related to virtual agricultural channels broadcasted through YouTube

Categories	Score	Respondents (N=80)		Range		Mean ±	SD
		Number	Percentage	Min	Max		
Less effective	1-10	69	86.25	3	14	7.81±	2.49
Moderately effective	11-20	11	13.75				
Highly effective	21-30	0	0				
Total		80	100				

Data presented in Table 4.1 show that most (86.25%) of the respondent farmers thought that the virtual agricultural channels broadcasted through YouTube are less effective while only a few (13.75%) of them thought that those channels are moderately effective. None of the respondent farmers belonged to highly effective category. Sandeep et al. (2022) found that two-fifth (39.17%) of the respondents perceived that effectiveness of agriculture information was medium level followed by less effective (38.33%), very highly effective (8.33%), high effective (7.50%) and very less (6.67%) effective.

4.1.2 Rank order of the virtual agricultural channels broadcasted through YouTube based on effectiveness index

The selected ten virtual agricultural channels broadcasted through YouTube are shown in (Figure 4.1). According to the respondent farmers' perception, Shykh Seraj (62.5%) and Math Krishi (62.08%) were highly effective to them. While Others (Krishi TV, Uddokter Khoje, Jubo Agro; 60.83%) and Deepto Krishi (57.08%) were moderately effective. `Agamir Krishi (2.5%) and Krishi Bioscope (15.42%) are less and very less effective, respectively. None of the respondents was exposed to Agro One, Hridoyer Krishi, Any bd and Doel Agro (0%).

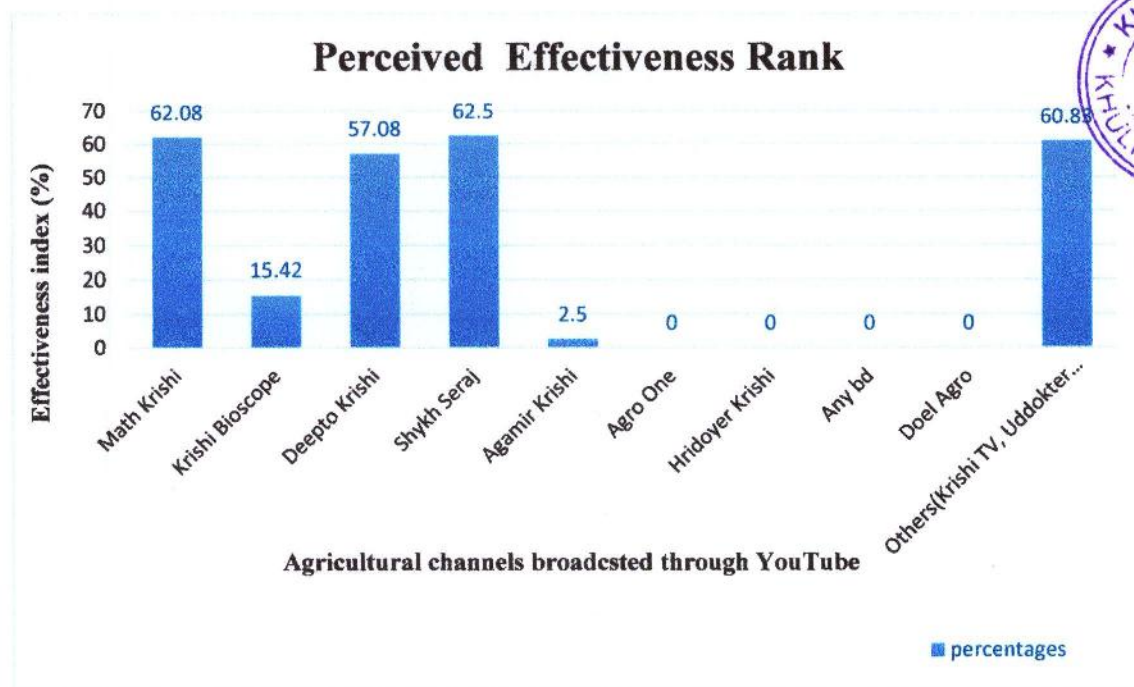


Figure 4.1 Relative position of the virtual agricultural channels based on EI

Figure 4.1 revealed that content of the Shykh Seraj (62.5%) and Math Krishi (62.08%) were the most effective to the respondents. The author of Shykh Seraj You Tube channel, Shykh Seraj is best known as an agricultural and environmental journalist, whose versatile works have taken media coverage on agriculture beyond the borders. He is a popular face of Bangladesh to all class of people specially to farmers through the show '**Hridoye mati o manus**'. Farmers claim that Shykh Seraj produces effective videos that are easy to understand and useful for their agricultural activities. On the other hand, the author of Math Krishi Md. Mosaddék Hossen, was assigned as the UAO (Upazila Agriculture Officer) in Dumuria upazila under Khunla. He was very active, hardworking and was enough competent in establishing a rapport with all the farmers. This is the reason behind the huge amount of viewers of Math Krishi. Some respondent farmers were exposed to virtual agricultural videos broadcasted through YouTube, but they did not know the particular channels name. The researcher categorized the channels as "Others," and this category ranked as 3rd. Deepto Krishi is another YouTube channel getting popular by the farmers day by day for its versatile videos. Krishi Bioscope and Agamir Krishi both channels are effective to only a few of farmers 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 and more than 1k videos uploaded in each channels. But no farmers of the study area were exposed to these YouTube channels.

4.2 Selected characteristics of the respondents

4.2.1 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 4.2.

Table 4.2 Distribution of respondent farmer according to their age

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

Highest proportion (46.25%) of the respondents were middle aged followed by young (40%) while a few were (13.75%) old (Table 4.2). The result implies that most (86.255) of the respondents fell within the economically active age. The accessibility and use of agricultural information are significantly impacted by age. Young and middle aged people (farmers) are more responsive to new ideas and practices while older ones are conservative and less responsive to adoption of new ideas and practices. Okwu et al. (2007) also found the similar results that the percentage of young and middle aged farmers is more than the old aged farmers.

4.2.2 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 4.3.

Table 4.3 Distribution of respondent farmers according to their education

Categories	Score	Respondents (N=80)		Range		Mean ±	SD
		Number	Percentage	Min.	Max.		
Illiterate	0	0	0	1	18	9.9±	4.27
Primary	1-5	14	17.5				
Secondary	6-10	37	46.25				
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 of farmers (46.25%) were educated up to the secondary level, while 21.25%, 17.5%, and 15% were educated up to the higher secondary, primary, and above secondary levels, respectively (Table 4.3). According to the study's findings, every single respondent was literate. None of them were illiterate. An individual's level of education can affect his/her access, comprehension and adoption of modern agricultural practices. Amin et al. (2013) also found the similar results that highest proportion of the respondents belongs to secondary level of education.

4.2.3 Family size

The 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 4.4).

Table 4.4 Distribution of respondent farmers according to their family size

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

Three-fourth (75%) of the farmers had small sized family while the rest one-fourth (25%) had medium sized family (Table 4.4). The average family size (3.7) of the research area's farmers is lower than national average (4.06) of Bangladesh (BBS, 2016). It indicates that the farmers in the research region are aware of population rise and planned family formation. The results of the current study differ from the findings of Hossain (2022), Amin et al. (2013), and Amin et al. (2014), where medium-sized families predominate over small ones.

4.2.4 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 4.5).

Table 4.5 Distribution of respondent farmers according to farm experience score

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

Data presented in the Table 4.5 reveal that two-fourth of the farmers (40%) are medium experienced compared to low (30%) and high experienced (30%). In contrast to farmers with high experience levels who are self-assured in their abilities, farmers with some experience in farming are eager to attempt new things for a better experience.

4.2.5 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 4.6).

Table 4.6 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	0.12	10.74	1.31±	1.74
Marginal	.02-.20	5	6.25				
Small	.21-1	43	53.75				
Medium	1-3	25	31.25				
Large	>3	7	8.75				
Total		80	100				

Krishi Diary (2023), AIS, MoA.

Data presented in the Table 4.6 reveal that majority (53.75%) of the farmers had small sized farm followed by medium sized farm (31.25%). The percentage of the farmers belongs to marginal and large sized farm were 6.25% and 8.75% respectively. None of the farmers were landless. As most of the farmers under present study belonged to small and medium sized farm they have a positive attitude toward using YouTube for various types of information and to find material that would help them develop their techniques. The result is quite similar with Amin et al. (2013) and Shaikh et al. (2010). According to Sandeep et al. (2022), the size of the farmers' farms had a favorable and significant impact on their use of social media.

4.2.6 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 4.7).

Table 4.7 Distribution of respondent farmers according to their annual family income

Categories	Score (‘000’BDT)	Respondents (N=80)		Range		Mean±	SD
		Number	Percentage	Min.	Max.		
Low Income	1-100	76	95				
Medium Income	101-300	04	05	5	120	31.12±	26.83
High Income	>300	0	0				
Total		80	100				

According to the findings, most (95%) of farmers fell into the category of low yearly family income. Only one-twentieth (5%) of respondents reported having a medium income, and none of them belonged to high income category (Table 4.7). The respondents generally were of low income. This might be due to that three-fifth (60%) of them were marginal to small farmers (Table 4.6). This can affect adoption of capital intensive modern farm technologies recommended by YouTube. Okwu et al. (2007) also found the similar result that majority of farmers fall into the low income range.

4.2.7 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. The distribution of the respondents according to organizational participation by categories is presented in Table 4.8.

Table 4.8 Distribution of respondent farmers according to their organizational participation

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

According to the findings shown in Table 4.8, majority of respondents (55%) fell into the low participation category and the rest (45%) of them fell into the no participation categories. None of the respondents fell in medium to high participation categories. The majority of respondents stated that insufficient time and a lack of interest are the main reasons for poor participation in various organizations. The findings of Ahmed et al (1994) have little bit harmony with the findings of the present study. They found that majority of respondents (74%) had low participation in any organizations followed by no participation (20%). A few of respondents (6%) had medium participation while there was no respondent belongs to high participation categories as reported by Ahmed et.al(1994). But the results of the current study have dissimilarity to those of Amin et al. (2013) and Amin et al. (2014), they found that majority of the farmers belonged to medium participation category only a fewer of them had to low participation category.

4.2.8 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. According to their agricultural training exposure scores, the farmers were classified into four categories (Table 4.9).

Table 4.9 Distribution of respondent farmers according to their agricultural training

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

According to the findings of the research, majority (51.25%) of the farmers had medium agricultural training whereas above one-fifth (21.25%) of farmers had high agricultural training. The percentage of high agricultural training was only 11.25. But a good percentage (16.25%) of them had no training in agriculture (Table 4.9). Amin et al. (2013) and Amin et al. (2014) also found that majority of the respondent farmers belongs to low to medium training category. Only some respondent had high agricultural training.

4.2.9 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 4.10).

Table 4.10 Distribution of respondent farmers according to their cosmopolitanism

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

According to the research findings, majority (51.25%) of the farmers had low cosmopolitanism, whereas below half (48.75%) of the farmers had "no" cosmopolitanism. None of them had medium to high levels of cosmopolitanism (Table 4.10). Amin et al. (2013) and Amin et al. (2014) found that majority of the respondent farmers had medium to high cosmopolitanism.

4.2.10 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 4.11).

Table 4.11 Distribution of respondent farmers according to their extension media contact

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

Table 4.11 reveals that the most (80%) of farmers had medium extension contact, whereas one-fifth (20%) of them had high extension contact. It reveals that majority of respondents were either receiving assistance from extension personnel or were aware of the services offered by various extension agencies. The findings of Amin et al. (2013) and Amin et al. (2014) on farmers' extension media contact were similar to current study.

4.2.11 Knowledge level on virtual agricultural channels 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 4.12).

Table 4.12 Distribution of respondent farmers according to their knowledge level on virtual agricultural channel broadcasted through YouTube

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

An overwhelming majority (51.25%) of the farmers had medium level of knowledge on virtual agricultural channels whereas none of them had very high knowledge level. The percentage of farmers having low level and high level of knowledge was 8.75% and 40%, respectively (Table 4.12). Amin et al. (2013), Amin et al. (2014) and Ahmed et al (1994) also found that majority of the respondent farmers belongs to low to medium knowledge categories. Only some respondents had high agricultural knowledge.

4.2.12 Extent of exposure to virtual agricultural channels broadcasted through YouTube

The range of exposure scores of the respondents was 5 to 14 with the mean value 10.05 and standard deviation 2.21. Possible range was 1 to 30. Based on their extent of exposure scores the respondent farmers were classified into three categories (Table 4.13).

Table 4.13 Distribution of respondent farmers according to their extent of exposure to virtual agricultural channels broadcasted through YouTube

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

Data presented in Table 4.13 revealed that the two-third (60%) of the respondents had low exposure whereas two-fifth (40%) of them showed the medium exposure to the virtual agricultural channels broadcasted through YouTube. None of them belonged to high exposure category. Similar results were found by Hossain (2022). According to the study, around 72.5% of the respondents reported having low exposure while 27.5% of them having low exposure and none of them had medium and high exposure. However, Shaikh et al. (2010) and Shushama (2021) came to different conclusions. They identified that majority of the responders had medium exposure.

4.2.13 Contact with other virtual media

The respondents' score on contact with other virtual media except YouTube varied from 3-13 having an average of 6.46 with a standard deviation of 2.34. The respondents were grouped into different categories based on the contact with other virtual media scores (Table 4.14).

Table 4.14 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	3	13	6.46±	2.34
Medium	9-16	69	86.25				
High	17-24	4	5				
Total		80	100				

According to the results, the majority of farmers (86.25%) had medium contact with other virtual media, while 8.75% and 5% of the farmers had "Low" and "High" contact, respectively (Table 4.14).

4.2.13.1 Rank order of other virtual media based on exposure index

Other virtual media including Google, Facebook, WhatsApp, Instagram, Twitter, TikTok, Snapchat, and Likee, are also accessible by the respondent farmers (Figure 4.2). From the study it was observed that respondent farmers were more exposed to Facebook (30.75%), TikTok (23.22%) and WhatsApp (16.24%) but they were less exposed to Snapchat (0.97%). However, the other online platforms mentioned by the farmers included Likee (7.54%), Google (16.06), Instagram (3.87%) and twitter 1.35%.

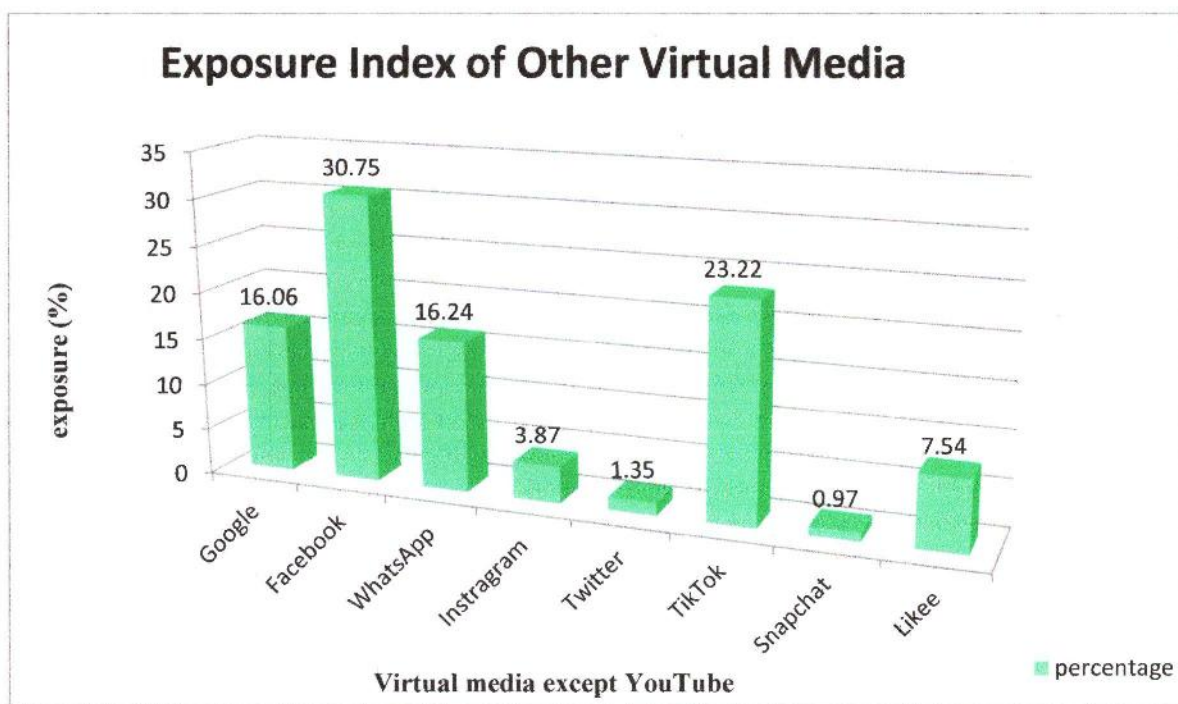


Figure 4.2 Rank order of other virtual media based on exposure index

4.3 Relationship between the selected characteristics of the respondent farmers and their perceived effectiveness to virtual agricultural channels broadcasted through YouTube

Coefficient of correlation was computed in order to determine the relationship between the independent and dependent variables. In this study, the selected 13 characteristics of the respondent farmers served as the independent variables while perceived effectiveness of the farmers to the virtual agriculture channels broadcasted through YouTube served as the dependent variable. The final null hypothesis: There is no relationship between the selected characteristics (age, education, family size, farming experience, farm size, annual family income, organizational participation, agricultural training cosmopolitanism, extension media contact, knowledge on virtual agricultural channels broadcasted through YouTube, extent of exposure to virtual agricultural channels broadcasted through YouTube, contact with other virtual media and their perceived effectiveness to virtual agricultural channels broadcasted through YouTube. Five percent and one percent level of probability were used. The results of the co-efficient of correlation indicating the relationships between the selected characteristics of the respondents and their perceived effectiveness to virtual agricultural channels broadcasted through YouTube has been presented in Table 4.15.

Table 4.15 Relationship between the selected characteristics of the respondent farmers and their perceived effectiveness of virtual agricultural channels broadcasted through YouTube

Independent Variable	Dependent Variable	Correlation coefficient
Age		-0.763 **
Education		0.359**
Family size		-0.543**
Farming experience		-0.571**
Farm size	Perceived	-0.116
Annual family income	effectiveness of	-0.119
Organizational participation	virtual	0.141
Agricultural training	agricultural	0.084
Cosmopolitanism	channels	0.032
Extension media contact	broadcasted	0.202 *
Knowledge on virtual agricultural channels broadcasted through YouTube	through YouTube	0.206*
Extent of exposure to virtual agricultural channels broadcasted through YouTube		0.543 **
Contact with other virtual media		0.261 **

** Correlation is Significant at the 0.01 level (2-tailed) * Correlation is Significant at the 0.05 level (2-tailed)

Data presented in Table 4.15 reveal that among the 13 selected characteristics, education, extension media contact, knowledge on virtual agricultural channels broadcasted through YouTube, contact with other virtual media and extent of exposure to virtual agricultural channels broadcasted through YouTube showed a positive significant relationship with their extent of perceived effectiveness of virtual agricultural channel broadcasted through YouTube. It indicates that their perceived effectiveness of virtual agricultural channels broadcasted through YouTube will increase in proportion to their education, extension media contact, knowledge on virtual agricultural channels broadcasted through YouTube, contact with other virtual media and extent of exposure to virtual agricultural channels broadcasted through

YouTube. However, negative significant relationships were also observed between farmers' perceived effectiveness of virtual agricultural channels broadcasted through YouTube and age, family size, farming experience. This indicates that farmers' effectiveness of virtual agricultural channels broadcasted on YouTube declines as their age, family size, farming experience increase. The farm size, annual family income, organizational participation, agricultural training and cosmopolitanism did not show any significant relationship with their extent of effectiveness of virtual agricultural channels broadcasted on YouTube.

Amin et al. (2013) found that education, farm size, annual income, organizational participation, cosmopolitanism, agricultural knowledge and training received had significant relation with the extent of effectiveness of information broadcasted through radio while age, family size and extension media contact were non-significant. Again Amin et al. (2014) found that education, farm size, annual family income, cosmopolitanism, agricultural knowledge, and training received extension media contact was positively while only age was negatively correlated with the extent of effectiveness of information broadcasted through television. Family size and organizational participation had no significant effect on their extent of effectiveness of information broadcasted through television.

4.4 Problems faced by the farmers

Seven different types of issues were faced by farmers in the research area (Table 4.16). According to the farmers the most prevalent issue was required materials are expensive and not easily accessible (77.5%) While all the information are not correct was relatively less common compared to other problems (52.5%). Other problems faced by the farmers were information is not relevant (68.75%), not expert in using internet (61.25%), lack of feedback or replying answer of questions (60%), some information are confusing (60%) and information is not easy to understand (55%).

Table 4.16 Distribution of respondent farmers according to the problems confronted by them related to effectiveness of virtual agricultural channels broadcasted through YouTube

Problems	Extent of problems		Rank
	Score	Percentage	
1. Information is not relevant	55	68.75	2
2. All the information are not correct	42	52.50	6
3. Information is not easy to understand	44	55.00	5
4. Lack of feedback or replying answer of questions	48	60.00	4
5. Not expert in using internet	49	61.25	3
6. Required materials are expensive and not easily accessible	62	77.50	1
7. Some information are confusing	48	60.00	4

According to the results, the most common problems was “required materials are expensive and not easily accessible”. The farmers of our country are poor and they cannot afford to buy modernized expensive product for their farm. So it is obvious they don’t follow YouTube. The second and third issues were “information is not relevant” and “not expert in using internet”, respectively. Most of the farmers are illiterate consequently they do not know how to use internet or how to find relevant information on YouTube. That’s why they don’t find the YouTube effective or useful. “Lack of feedback or replying answer of questions” was another common problem ranked as 4th. Most of the time the video creator is too busy to make another video, they don’t have time to reply all the comments to all previous video. For this reason, farmers lost interest in the video that reduce their effectiveness. Considering the all-other issues, the frequency of the problem “all information are not correct” was considerably lower.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

Social media is an important part of today's world. It helps people stay connected and share ideas, thoughts, and opinions with others in a safe and secure environment. Social media is prevalent in agriculture industry also. Social media in agriculture is playing a very effective role in dissemination of different agricultural information. It helps to bridge a geographical distance between the farmers of different places. Numerous social media platforms, including Facebook, Twitter, YouTube, LinkedIn, WhatsApp, etc., are being used more in popularity with the increase in the number of smartphones, and the ease of use. These days, the use of social media for agricultural information and marketing is expanding quickly. YouTube is the most popular platform for professionals in agriculture. It is the 2nd largest search engine next to Google. People upload more than 100 hours of video per minute to YouTube. It's one of the best ways to communicate to a wide audience, whether you're promoting programs or providing information to audience. The advantage with YouTube is that it is possible to get the response for whatever shared on the platform. Day by day YouTube is gaining more popularity than other social media platform in all aspects of life in the world as well as in Bangladesh. Bangladeshi farmers are actively exposed to virtual agricultural channels broadcasted through YouTube In order to share knowledge and grow together. But very few studies have been obtained which is directly related to effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers. Considering the point of view the present study was conducted with the following objectives.

- To determine the effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers.
- To explore relationships between the selected characteristics of the farmers and their perceived effectiveness of virtual agricultural channels broadcasted through YouTube.
- To identify the major problems faced by the farmers in receiving and utilizing the information through YouTube.

The study was conducted at Dumuria upazila under Khulna district. Data were collected from 80 farmers through personal interview using an interview schedule from February 05 to February 29, 2023. The concerned variables were measured using appropriate scales. In order

to ascertain the correlations between the independent and dependent variables, Spearman's Ranked Correlation Coefficient was utilized.

5.2 Summary of major findings

A summary of major findings of this research is given in the subsequent sections-

5.2.1 Extent of effectiveness of the virtual agricultural channels broadcasted through YouTube: Most (86.25%) of the respondent farmers thought that the virtual agricultural channels broadcasted through YouTube are less effective while only a few (13.75%) of them thought that those channels are moderately effective. None of the respondent farmers belonged to highly effective category.

Among the 10 selected channels, Shykh Seraj (62.5%) and Math Krishi (62.08%) were the most effective while others (Krishi TV, Uddokter Khoje, Jubo Agro) (60.83%) and Deepto Krishi (57.08%) are moderately effective. Agamir Krishi (2.5%) and Krishi Bioscope (15.42%) are both less effective to the respondent farmers. On the other hand, YouTube channels named Hridoyer Krishi, Agro One, Any bd, and Doel Agro have never been exposed by any of the respondent.

5.2.2 Selected characteristics of the respondents

Age: Highest proportion (46.25%) of the respondents were middle aged followed by young (40%) while a few were (13.75%) old.

Education: Highest proportion of farmers (46.25%) were educated up to the secondary level, while 21.25%, 17.5%, and 15% were educated up to the higher secondary, primary, and above secondary levels, respectively.

Family size: Three-fourth (75%) of the farmers had small sized family while the rest one-fourth (25%) had medium sized family (Table 4.4). The average family size (3.7) of the research area's farmers is lower than national average (4.06) of Bangladesh.

Farming experience: Two-fourth of the farmers (40%) are medium experienced compared to low (30%) and high experienced (30%).

Farm size: Majority (53.75%) of the farmers had small sized farm followed by medium sized farm (31.25%). The percentage of the farmers belongs to marginal and large sized farm were 6.25% and 8.75% respectively. None of the farmers were landless.

Annual family income: Most (95%) of farmers fell into the category of low yearly family income. Only one-twentieth (5%) of respondents reported having a medium income, and none of them belonged to high income category.

Organizational participation: Majority of respondents (55%) fell into the low participation category and the rest (45%) of them fell into the no participation categories. None of the respondents fell in medium to high participation categories.

Agricultural training: Majority (51.25%) of the farmers had medium agricultural training whereas above one-fifth (21.25%) of farmers had low agricultural training. The percentage of high agricultural training was only 11.25%. But a good percentage (16.25%) of them had no training in agriculture.

Cosmopolitanism: Majority (51.25%) of the farmers had low cosmopolitanism, whereas below half (48.75%) of the farmers had "no" cosmopolitanism. None of them had medium to high levels of cosmopolitanism.

Extension media contact: Most (80%) of farmers had medium extension contact, whereas one-fifth (20%) of them had high extension contact.

Knowledge level on virtual agricultural channel broadcasted through YouTube: An overwhelming majority (51.25%) of the farmers had medium level of knowledge on virtual agricultural channels whereas none of them very had high knowledge level. The percentage of farmers having low level & high level of knowledge was 8.75% & 40%, respectively

Extent of exposure to virtual agricultural channels broadcasted through YouTube: Two-third (60%) of the respondents had low exposure whereas two-fifth (40%) of them showed the medium exposure to the virtual agricultural channels broadcasted through YouTube. None of them belonged to high exposure category.

Contact with other virtual media: Most of farmers (86.25%) had medium contact with other virtual media, while 8.75% and 5% of the farmers had "Low" and "High" contact, respectively.

Among eight selected other virtual media except YouTube, the Respondent farmers were more exposed to Facebook (30.75%), TikTok (23.22%) and WhatsApp (16.24%) but they were less exposed to Snapchat (0.97%). However, the other online platforms mentioned by the farmers included Likee (7.54%), Google (16.06), Instagram (3.87%) and twitter 1.35%.

5.2.3 Relationship between the selected characteristics of the respondent farmers and their effectiveness of virtual agricultural channels broadcasted through YouTube:

Among the 13 characteristics, education, extension media contact, knowledge of virtual agricultural channels broadcasted through YouTube, contact with other virtual media and extent of exposure to virtual agricultural channels broadcasted through YouTube had shown a positive significant relationship and age, family size, farming experience had shown a negative significant relationship with their extent of perceived effectiveness of virtual agricultural channel broadcasted through YouTube. The farm size, annual family income, organizational participation, agricultural training and cosmopolitanism had no significant effect on the extent of perceived effectiveness of virtual agricultural channels broadcasted through YouTube.

5.2.4 Problems confronted index: The most prevalent issue was “required materials are expensive and not easily accessible” (77.5%). The second and third common issues were “information is not relevant” (68.75%) and “not expert in using internet” (61.25%), respectively while the less common problem was “all information are not correct” (52.5%).

5.3 Conclusions

From the study, it can be concluded that most (86.25%) of the respondents thought that the virtual agricultural channels broadcasted through YouTube are less effective.

The most common problems was “required materials are expensive and not easily accessible” followed by “information is not relevant” and “not expert in using internet”,

Among the 13 selected characteristics of the respondents, all of them except the farm size, annual family income, organizational participation, agricultural training and cosmopolitanism had shown significant relationship with their extent of perceived effectiveness of virtual agricultural channel broadcasted through YouTube.

5.4 Recommendations for future study

The present study has some limitations that must be recognized. The following suggestions are made for further research into related studies.

- ☐ The research was restricted to the Dumuria upazila in the Khulna District. It does not represent the whole scenario of Bangladesh about the extent of effectiveness of virtual agricultural channels broadcasted through YouTube as perceived by the farmers. So it is recommended to conduct the survey in other part of the Bangladesh for appropriate result.
- ☐ Exploratory research can be used to conduct further studies.



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APPENDIX-A
Agrotechnology Discipline
Life Science School
Khulna University, Khulna-9208

Interview Schedule

(English version of the questionnaire)

**Effectiveness of Virtual Agricultural Channels Broadcasted through YouTube as
Perceived by the Farmers**

(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

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

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

7. Organizational participation:

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

B) If yes, then answer the following question



SL. NO.	Name of the organization (Non-political)	Serial (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/madrasa)						
4.	NGO maintained						
5.	GO maintained associations						
6.	Other (specify)						

*Executive officer means President, General Secretary

8. Agricultural training (number):

Are you trained? "Yes" or "No"

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

SI no	Title of training(s)	Duration (Days)	Venue of training	Organized by	Sponsored By
01					
02					
03					

9. Cosmopolitanism:

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 Upazila Sadar				
4.	Other Upazila Sadar				
5.	Own District Sadar				
6.	Other District Sadar				
7.	City (Khulna)				
8.	Other cities (Dhaka, Chittagong, Rajshahi, Barisal, Mymensingh, Sylhet, Rangpur)				

10. Extension media contact (score)

Please state where you get the information about agricultural technology

Sl No.	Communication media	Frequency of contact			
		Regularly (3)	Often (2)	Occasionally (1)	Not at all (0)
A.	Personal media contact				
1.	Sub Assistant Agricultural Officer (SAAO)				
2.	Agricultural Extension Officer (AEO)				
3.	Upazila Agricultural Officer (UAO)				
4.	Other extension Officers (Livestock, Fisheries)				

5.	NGO workers				
B.	Group media contact				
1.	Village meeting				
2.	Result demonstration				
3.	Farmers field day				
4.	Method demonstration				
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)				

11. The Knowledge level of respondent on virtual agricultural channel broadcasted through YouTube:

Sl. No	Statements	Mark Assigned (2)	Obtained Mark
1.	What type of media is YouTube?		
2	Name two virtual agricultural channel broadcasted through YouTube		
3	How do you benefit from YouTube?		
4	What types of information are found in Math Krishi?		
5	What type of information are found in Krishi Bioscope		

6.	Why do you like about Math Krishi?		
7.	Why do you like about Krishi Bioscope?		
8.	What is the different between television channel and YouTube channel?		
9.	What is the objective of Math Krishi?		
10.	What types of information are found in Shykh Seraj YouTube channel?		

12. Extent of exposure of the respondents to virtual agricultural channels broadcasted through YouTube:

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, UddoktarKhoje, Jubo Agro)				

13. Contact with others virtual media

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

14. Do you watch or enjoy Agricultural related channel in YouTube: Yes of No

If yes, what channels do you watch in YouTube? ; Mention the frequency of watching and their effectiveness.

Sl. No	Name of the YouTube channel	Exposure to the selected channels				Effectiveness			
		Oft en (3)	Occasi onally (2)	Rarely (1)	Not at all (0)	Highly effectiv e (3)	Moder ately effectiv e (2)	Less effective (1)	Not at all effective (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, Uddogtar Khoje, Jubo Agro)								