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USE OF YOUTUBE FOR DIFFUSION OF INNOVATIVE AGRICULTURAL TECHNOLOGIES: A DIGITAL SELF-HELP APPROACH TO THE FARMERS

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Abstract: The diffusion of innovative agricultural technologies is essential for improving productivity, food security, and rural livelihoods in developing countries, where conventional extension services often face financial and institutional constraints. This study investigates the role of YouTube as a digital self-help platform for farmers in rural Bangladesh, emphasising its effectiveness in disseminating agricultural information and the factors influencing its adoption. A cross-sectional survey of 276 farmers was conducted in *Rangunia* Upazila (sub-district) under the Chattogram district. Data was collected using a structured questionnaire and analysed using regression analysis. After considering Variance Inflation Factor (VIF) value, multivariate logistic regression was conducted. The results show that YouTube adoption is significantly associated with education, effective farm size, and agricultural extension contact. Farmers using YouTube reported higher agricultural knowledge, greater incomes, and more diversified farming practices than non-users. Additionally, YouTube was widely used for weather forecasts, disaster preparedness, peer learning, post-harvest management, and market engagement, underscoring its multifunctional role. Overall, platforms such as YouTube, when supported by improved ICT access, affordable digital resources, and targeted training, can significantly enhance agricultural knowledge and technology adoption among Bangladeshi farmers, thereby promoting sustainable rural development.

Key Words: Role of YouTube; adoption and adaptation; self-help approach; VIF, multivariate logistic regression.

Introduction

Agriculture remains central to livelihoods, food security, and structural transformation in developing economies. Despite its importance, productivity growth among smallholder farmers continues to be constrained by limited access to

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timely, reliable, and context-specific information (Barrett et al., 2020). Agricultural transformation increasingly depends not only on technological innovation but also on effective systems for knowledge dissemination and adoption (Fabregas et al., 2019). In many developing countries, however, public extension systems are underfunded, understaffed, and unable to provide personalised advisory services at scale (Birner et al., 2021). These structural limitations have intensified the search for alternative, scalable, and cost-effective communication channels.

The rapid expansion of information and communication technologies (ICTs) has reshaped agricultural knowledge systems. Digital platforms facilitate faster information exchange, reduce transaction costs, and support interactive and decentralised learning (Trendov et al., 2019). Empirical evidence suggests that ICT-enabled advisory services can significantly enhance farmers' knowledge, influence behavioural change, and improve adoption rates of recommended technologies (Van Campenhout et al., 2021). Beyond formal advisory services, digital tools increasingly enable peer-to-peer learning and farmer-driven knowledge exchange, thereby redefining traditional extension paradigms (Klerkx et al., 2019).

Within this evolving digital ecosystem, social media platforms have emerged as influential instruments of agricultural communication. Unlike traditional top-down extension models, social media enables interactive engagement, user-generated content, and rapid dissemination of experiential knowledge (Daum, 2021). Among these platforms, YouTube is particularly significant due to its audiovisual format, which enhances observational learning and reduces uncertainty associated with innovation adoption. Video-mediated extension approaches have been shown to improve comprehension, retention, and behavioural outcomes among smallholder farmers (Bentley et al., 2019). The ability to visually demonstrate production techniques, input application methods, and farm management practices strengthens farmers' confidence in adopting new technologies.

The YouTube content accessed by farmers in rural Bangladesh encompassed a mix of innovative agricultural technologies and conventional farming practices. Channels such as *Krishi Bioscope*, *Dipto Krish*, and *Krisna* provide localised and practical guidance, including demonstrations of modern seed varieties, mechanised planting methods, integrated pest management, organic fertiliser use, and water-saving irrigation techniques, all representing innovative agricultural technologies. At the same time, many videos also cover traditional practices, such as seasonal cropping schedules, soil preparation, composting, and livestock care, which, while widely practised, remain important for effective farm management. Farmers reported using YouTube for both technical learning and reinforcement of existing knowledge, indicating that the platform serves a dual role: introducing novel techniques and providing accessible guidance on conventional practices. This

combination allows farmers to compare new methods with familiar practices, evaluate their applicability, and adopt innovations more confidently.

Bangladesh provides a compelling context to examine these dynamics. As a predominantly agrarian economy undergoing digital transformation, the country has invested heavily in expanding ICT infrastructure and promoting digital service delivery in rural areas. Nevertheless, disparities in digital literacy, infrastructure access, and socio-economic resources continue to shape farmers' engagement with digital platforms. YouTube channels focusing on agriculture, often managed by extension agents, agribusiness actors, NGOs, and experienced farmers, have gained substantial popularity. Yet, despite the platform's increasing visibility, systematic empirical evidence regarding its role in agricultural technology diffusion remains limited.

In particular, little is known about how farmers perceive the credibility and influence of YouTube as an advisory source, whether they distinguish between general educational content and innovative technological knowledge, and which socio-demographic factors affect its effective use. Addressing these questions is critical for understanding whether YouTube serves merely as an informal information source or as a transformative digital self-help mechanism within agricultural innovation systems. This study therefore investigates the socio-demographic and farm-level determinants influencing farmers' use of YouTube for agricultural technology adoption in Bangladesh. It specifically examines: (a) the socio-economic profiles of farmers engaging with YouTube; (b) the extent to which YouTube facilitates innovation diffusion; (c) farmers' perceptions of its credibility and influence; and (d) the key factors shaping its adoption and intensity of use. By situating YouTube within broader debates on digital agriculture and innovation systems, the study contributes to emerging scholarship on decentralised, platform-mediated agricultural extension.

Social media platforms used by farmers

Social media platforms have increasingly disrupted traditional agricultural communication systems by facilitating two-way communication, real-time interaction, and participatory knowledge exchange. Empirical studies demonstrate that farmers worldwide are actively integrating digital platforms into their agricultural practices to seek, share, and apply information relevant to production, marketing, and risk management (Malik and Ansari, 2024). Research from multiple contexts shows that social media enhances access to agricultural knowledge, reduces information lags, and supports peer networks that complement formal extension systems (Alizada et al., 2024). The democratisation of agricultural knowledge through these platforms also challenges the traditional hierarchical flow of information dominated by extension agents and formal institutions (Gwelo, 2025). These developments are consistent with innovation systems and diffusion

frameworks, where digital platforms enhance observability, trialability, and reinvention of agricultural practices.

Farmers' usage of social media varies by platform type, reflecting both communication affordances and contextual needs. Multiple studies consistently identify Facebook, WhatsApp, and YouTube as the most widely adopted platforms for agricultural information exchange and community engagement (Malik and Ansari, 2024). Facebook groups provide spaces for networking, market linkages, and shared learning, enabling farmers to interact with peers and stakeholders across geographical boundaries. WhatsApp is valued for its immediacy and low data requirements, often serving as a channel for localised advisory services and rapid problem-solving among farmer groups. YouTube offers powerful visual learning opportunities, allowing farmers to view demonstration videos on agricultural techniques, machinery use, and pest management strategies, thereby increasing both comprehension and adoption of innovations. Recent qualitative research based on uses and gratifications theory further reveals that farmers actively engage with social media to meet various informational and social needs, including agricultural problem-solving, peer interaction, professional development, and evaluation of alternative practices (Ahmad et al., 2025). Moreover, video-based content has strengthened farmers' ability to interpret and apply complex innovations, especially where literacy levels vary.

Despite the positive trends, social media adoption is mediated by structural and socio-economic factors. Studies from India and other developing contexts indicate persistent challenges related to digital literacy, limited awareness of relevant platforms, and inadequate digital infrastructure, particularly in remote rural areas (Malik and Ansari, 2024). These constraints reduce the potential of social media to function as a fully inclusive advisory system. Research highlights that younger, more educated farmers tend to adopt these tools more readily, while older and less educated farmers face considerable barriers to effective use. Additionally, the quality of information and exposure to misinformation pose risks. Without mechanisms for content duration or verification, farmers may receive inaccurate guidance, complicating decision-making processes. These factors underscore that social media should be viewed as a complementary tool rather than a replacement for formal extension services, particularly in contexts where digital divides persist.

Although numerous studies document farmers' use of social media for communication and extension support, the specific role of video platforms particularly YouTube as self-directed learning environments remains insufficiently examined. Existing research largely frames social media as an extension delivery tool rather than investigating how farmers independently search for, interpret, and apply video-based content to solve practical production challenges. This distinction is critical because self-directed learning implies proactive knowledge seeking and

autonomous decision-making. Video platforms uniquely facilitate visual and experiential learning essential for agricultural technologies that require demonstration. However, empirical evidence on how such multimedia engagement translates into grassroots innovation adoption among farmers remains limited. Consequently, understanding YouTube's role in shaping autonomous learning and technology diffusion represents an important frontier in digital extension research.

Influence of demographic characteristics on social media familiarity and usage

Many factors influence technology adoption, with demographic variables such as age, gender, education, and experience playing a significant role in the acceptance and use of social media platforms (Lubua and Pretorius, 2018). Different age groups tend to have varied perceptions of social media based on their needs and exposure. Suchiradipta and Saravanan (2016) have found that younger people are more likely to use social media for agricultural information, while older rural men use it less. However, Joshi and Dhaliwal (2019) have observed that middle-aged and older farmers also actively use social media for learning and marketing agricultural innovations. Gender also affects technology adoption, as men and women often have different societal roles influencing their use of new technologies (Yonazi et al., 2012). Some studies show that men rely less on support when adopting technology (Talat et al., 2013), while others report men use social media more for agricultural extension services than women (Ghosh et al., 2021). Education is a key factor, with higher education levels linked to better understanding and use of agricultural technologies through social media (Zondo and Ndoro, 2024). Farm size has also been identified as influencing social media use for technology adoption, although findings are mixed (Ghosh et al., 2021; Joshi and Dhaliwal, 2019).

This review shows that demographic characteristics influence social media use in agriculture. However, no specific studies have examined the use of the digital self-help approach via YouTube for agricultural technology diffusion. Although there are studies on platforms such as Facebook, WhatsApp, YouTube, and Instagram for agricultural innovation, there is a notable gap in research focusing on YouTube's role, particularly in Bangladesh. This study aims to address that gap.

Material and Methods

Study design and sampling methodology

This study employed a cross-sectional survey design to systematically document and list the factors that influence farmers' use of YouTube to adopt innovative agricultural technologies in rural Bangladesh. The study was conducted in *Rangunia* Upazila (Sub-district) of Chattogram district, where most people are

engaged in farming activities. *Rangunia* Upazila (sub-district) comprises fifteen unions, and the present study was conducted purposively in five selected villages from four unions: '*Pomra*, *Parua*, *Padua*, *Mariamnagar* and *Chandraghona*'. In collaboration with the Upazila (sub-district) Agricultural Extension Office and the relevant Sub-Assistant Agriculture Officer (SAAO), we compiled a list of active farmers from all five villages in the study area. This list served as the primary sampling frame, ensuring that only individuals actively engaged in agricultural practices were included in the population. The total number of active farmers across the five villages in the sub-district was 3,067. This group includes both YouTube users and non-users, but all are active farmers. To ensure representativeness and statistical precision, the sample size of 276 farmers was determined by applying the formula given by Yamane (1967). In calculating the sample size, a 5% precision level, 50% degree of variability, and a Z value of 2.57 at a 99% confidence level were chosen, using the following formula:

$$n = \frac{Z^2 P\,(1-P)N}{Z^2 P\,(1-P)N + N\,(e)^2}$$

where: n=sample size, N=population size, e=the level of precision, Z=the value of the standard normal variable at the chosen confidence level, and P=the proportion or degree of variability. The sample size from each village was determined using a proportionate random sampling technique. Of the total sample of 276, it was found that 162 individuals were YouTube users, and 114 were non-users, based on a single question. A reserve list of 30 farmers was also prepared so that these farmers could be interviewed if those in the original sample were unavailable at the time of the interview.

Data collection tools and procedure

For the quantitative component, a structured questionnaire was designed to collect data from farmers. A close-ended questionnaire was used to gather information on socio-economic factors, agricultural resources, and training-related aspects. An open-ended questionnaire was also used for certain variables. The questionnaire was pre-tested among 20 farmers from a village not included in the study area, ensuring clarity, reliability, and cultural relevance. Feedback from the pre-test informed minor revisions to improve the questionnaire. All data were collected from 19 January 2021 to 20 February 2021. The data collection was carried out by a team of five enumerators under the supervision of the researcher. The enumerators were local graduate students with prior experience in conducting surveys and interviews in agricultural contexts. Each enumerator received five days

of training from the researcher on the study objectives, the questionnaire content, and ethical considerations, including obtaining informed consent from participants. The enumerators conducted face-to-face interviews with the farmers, recording the responses manually using hard copy questionnaires and pens. Upon completion of the fieldwork, the enumerators carefully transferred the collected data into Microsoft Excel. The researcher implemented cross-checking and verification procedures for all responses to ensure accuracy and consistency during data entry and to minimise transcription errors.

Variable selection and measures

The explanatory variables in this study were adapted from similar published studies conducted in Bangladesh (Table 1).

Table 1. Measurement of the variables.

Variable	Measurement	Measuring unit
Age	1 for 1 year of age	Years
Crop-focused farming	1 for yes, 0 for no	Score
Livestock-focused farming	1 for yes, 0 for no	Score
Aquaculture-focused farming	1 for yes, 0 for no	Score
Education	Number of years of schooling (1 for each year of schooling)	Score
Effective farm size	Hectare (1 for 1 hectare of land)	Hectare
Farming experience	Number of years (1 for each year of experience)	Years
Annual family income	1 for 1000 tk	BDT
Agricultural extension media contact	5-point Likert scale (4 for regular contact; 3 for frequent contact; 2 for occasional contact;1 for rare contact; and 0 for no contact)	Score
Agricultural knowledge	1 for a full answer to each question; and 0.5 for a partial answer to each question	Score
Use of digital self-help approach (YouTube)	5-point Likert scale (4 for regular use; 3 for frequent use; 2 for occasional use;1 for rare use; and 0 for no use)	Score

Source: Authors' systematisation based on using different measuring units

Conceptual framework

The conceptual framework for this study is presented in Figure 1. This illustrates the use of YouTube for the diffusion of innovative agricultural

technologies and helps to explain the relationships between variables, identify patterns, and develop research questions. The framework helps to ensure that research is logically sound and grounded in established theory.

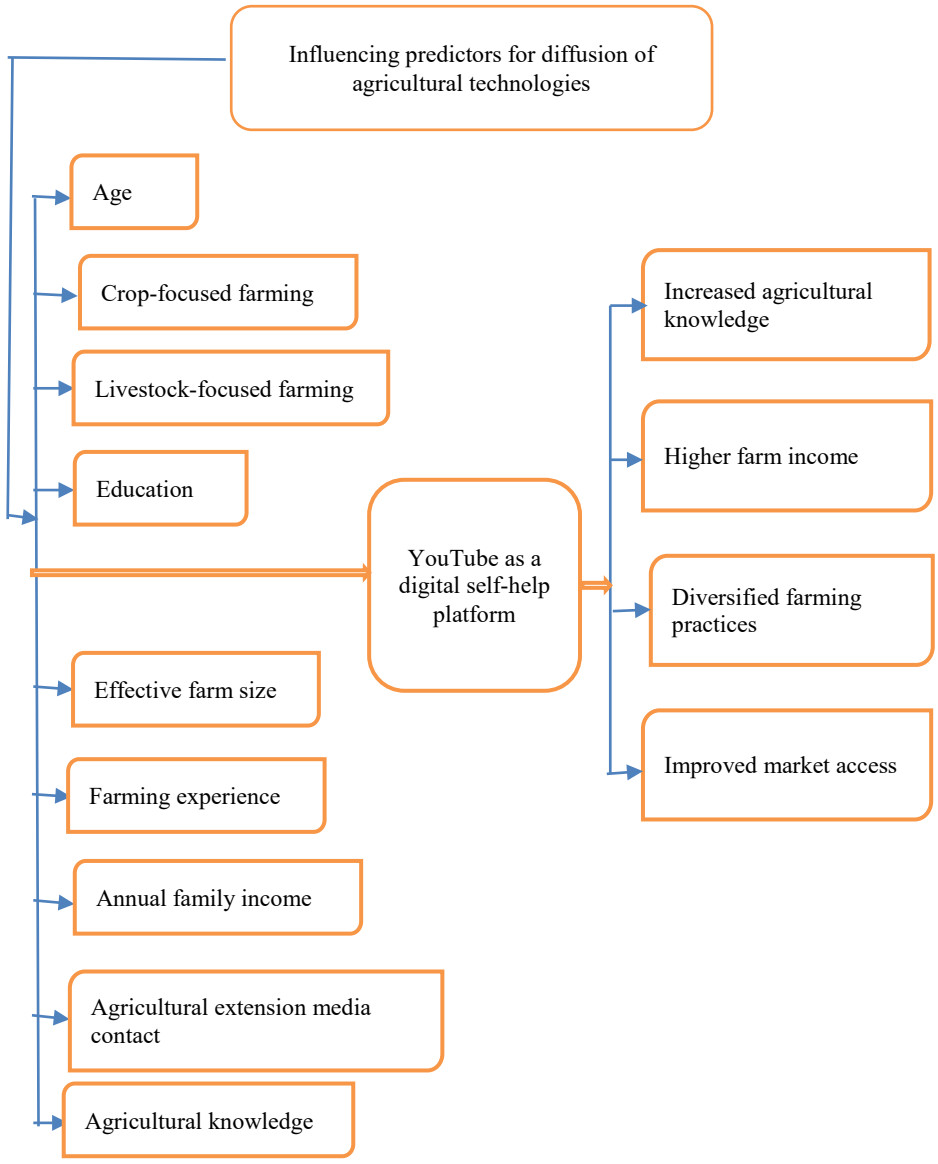

Figure 1. A schematic diagram showing the proposed study: how does YouTube facilitate the diffusion of innovative agricultural technologies through a digital self-help approach?

Source: Authors' systematisation based on review study

Statistical modelling

All statistical analyses were performed using Python. The analysis employed Python libraries, including pandas, NumPy, and SciPy for descriptive statistics, and stats models and scikit-learn for regression analysis. Descriptive statistics, such as frequencies, percentages, means, and standard deviations (SDs), were calculated to summarise the quantitative data. The extent of farmers' use of the digital self-help approach (YouTube) was considered as the outcome variable to develop an Ordinary Least Squares (OLS) model to identify related explanatory variables and predict their level of contribution to the diffusion of innovative agricultural technology. A p-value of less than 0.05 was considered statistically significant. The multiple regression model used in this analysis was:

$$Y_i = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + e$$

where Y_i represents the use of the digital self-help approach (YouTube) by the farmers; x_1 is their age; x_2 is educational level; x_3 is family size; x_4 is the effective farm size; x_5 is the farming experience; x_6 is annual family income; x_7 is agricultural extension media contact; and x_8 is the agricultural knowledge. Then, b_1, b_2, b_3, b_4, b_5, b_6, b_7 and b_8 are the regression coefficients for the respective independent variables, and "e" represents random error, which is normally and independently distributed with a mean of zero and constant variance. The variance inflation factor (VIF) was calculated for each explanatory variable to test for multicollinearity. Since all VIF values were below 2, no explanatory variables were excluded from the models.

Results and Discussion

Comparison of socioeconomic characteristics of YouTube users and non-users

The results in Table 2 show clear socioeconomic differences between YouTube users and non-users. Farmers identified as YouTube users had higher mean education levels, larger effective farm sizes, higher annual family incomes, greater agricultural extension media contact scores, and higher agricultural knowledge scores compared to non-users. These differences were statistically significant ($p < 0.001$). The largest differences were observed in education (15.3 vs. 6.5 years), effective farm size (3.1 vs. 0.9 hectares), and annual family income (335,117.9 vs. 211,648.7 BDT). This indicates that farmers with higher educational attainment and greater economic resources were more represented in one of the two groups. Similarly, higher extension media contact (22.2 vs. 18.5) and agricultural knowledge scores (21.0 vs. 18.9) suggest that exposure to agricultural information and existing knowledge levels differ between the groups.

Table 2. Comparison of socioeconomic characteristics by YouTube usage among farmers.

Variable	Overall respondents (n = 276)	YouTube users (n = 162)	YouTube non-users (n = 114)
Age, mean (SD)	45.2 (14.3)	45.2 (14.3)	45.2 (14.3)
Crop-focused farming, n (%)			
No	179 (100.0)	122 (68.2)	57 (31.8)
Yes	97 (100.0)	40 (41.2)	57 (58.8)
Livestock-focused farming, n (%)			
No	185 (100.0)	127 (68.6)	58 (31.4)
Yes	91 (100.0)	35 (38.5)	56 (61.5)
Aquaculture-focused farming (base group), n (%)			
No	184 (100.0)	128 (69.6)	56 (30.4)
Yes	92 (100.0)	34 (37.0)	58 (63.0)
Education, mean (SD)	10.1 (5.9)	6.5 (4.9)	15.3 (2.6)
Effective farm size (hectares), mean (SD)	1.8 (1.4)	0.9 (0.8)	3.1 (1.0)
Farming experience (years), mean (SD)	13.2 (10.3)	16.4 (12.0)	8.7 (3.8)
Annual family income (BDT), mean (SD)	262,646.9 (176,425.7)	211,648.7 (178,100.1)	335,117.9 (146,726.2)
Agricultural extension media contact, mean (SD)	20.0 (2.8)	18.5 (2.5)	22.2 (1.4)
Agricultural knowledge, mean (SD)	19.8 (2.1)	18.9 (2.3)	21.0 (0.8)

Source: Authors' calculation based on face-to-face data collection.

Differences were also observed across farming orientations (crop, livestock, and aquaculture). The distribution of users and non-users varied within these categories, indicating that enterprise focus may be associated with YouTube use, although no causal relationship can be inferred from these data. Age showed no difference between the two groups, as the mean age was identical. This suggests that age alone may not distinguish YouTube users from non-users in this sample.

Overall, the findings demonstrate that YouTube use was associated with variations in education, farm size, income, extension contact, and agricultural knowledge. The results describe group differences but do not establish causality. Further analysis would be required to determine whether these characteristics directly influence digital platform use or are correlated with other underlying factors.

Distribution of YouTube usage frequency

Table 3 presents the distribution of YouTube usage frequency among the respondents.

Table 3. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for Factors.

Influencing agricultural practices			
Variable	Adjusted OR	95% CI	p-value
Age	1.07	0.98 – 1.17	0.135
Crop-focused farming	3.11	0.19 – 51.77	0.430
Livestock-focused farming	13.39	0.33 – 536.56	0.168
Aquaculture-focused farming (base group)	103.94	1.01 – 10690.37	0.049 **
Education	2.37	1.34 – 4.20	0.003 **
Effective farm size	57.47	2.99 – 1104.79	0.007 **
Farming experience	0.62	0.37 – 1.05	0.075
Annual family income	1.00	1.00 – 1.00	0.313
Agricultural extension media contact	3.74	1.08 – 12.92	0.037 **
Agricultural knowledge	3.40	0.85 – 13.61	0.084

Source: Authors' calculation based on face-to-face data collection.

The logistic regression results in Table 3 indicate that education, effective farm size, aquaculture-focused farming, and agricultural extension media contact were significantly associated with the outcome variable. Education showed a positive and statistically significant association (OR = 2.37, 95% CI: 1.34–4.20, p = 0.003). This suggests that higher educational attainment was associated with increased likelihood of the outcome. Effective farm size was also positively associated with the outcome (OR = 57.47, 95% CI: 2.99–1104.79, p = 0.007). Although statistically significant, the wide confidence interval indicates substantial variability in the estimate and suggests that the magnitude of the effect should be interpreted with caution. Aquaculture-focused farming (compared with the base category) showed a significant association (OR = 103.94, 95% CI: 1.01–10690.37, p = 0.049). However, the extremely wide confidence interval suggests high uncertainty in the estimate. Agricultural extension media contact was positively associated with the outcome (OR = 3.74, 95% CI: 1.08–12.92, p = 0.037), indicating that farmers with greater extension media contact were more likely to experience the outcome. In contrast, age, crop-focused farming, livestock-focused farming, annual family income, farming experience, and agricultural knowledge were not statistically significant at the 5% level.

Overall, the findings indicate that education level, farm size, aquaculture engagement, and extension media contact were statistically associated with the outcome in this model. However, the wide confidence intervals for some variables suggest variability in the estimates, and causal relationships cannot be inferred from these results.

Distribution of frequency level of YouTube use among the users

It reveals that the most common usage pattern was 2–3 times per week, reported by 30% of participants, suggesting moderate and routine engagement with the platform. A further 22% used YouTube 4–5 times weekly, while 18% accessed it almost daily (6–7 times a week), highlighting a significant proportion of regular users. Meanwhile, 20% of individuals used the platform less than twice a week, indicating a lower level of engagement. Notably, 10% of respondents reported using YouTube more than 7 times per week, reflecting a small group of highly active users who may watch content multiple times daily (Figure 2).

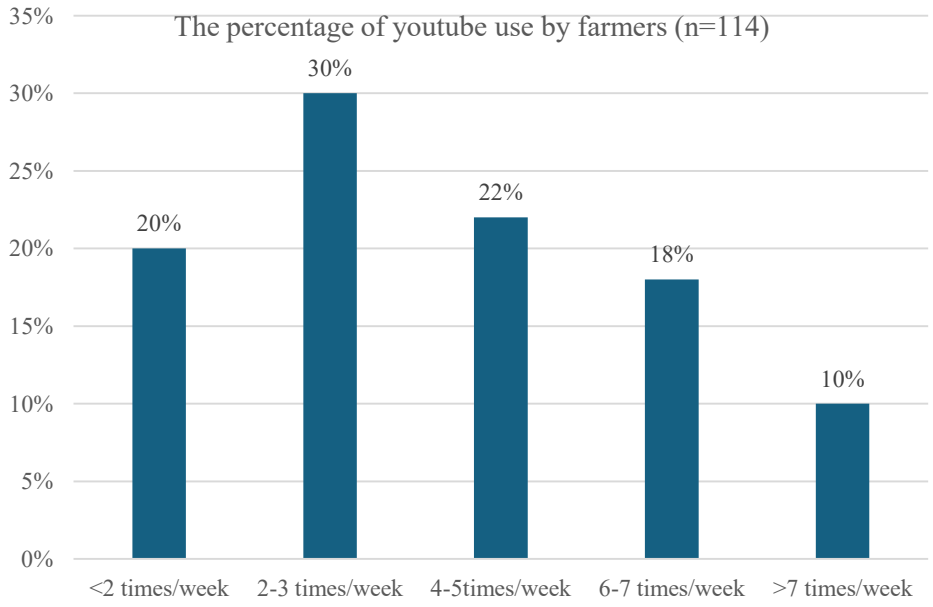

Figure 2. The percentage of YouTube use by farmers (n=162).
Source: Authors' calculation based on face-to-face data collection.

Figure 2 shows the distribution of YouTube usage frequency among farmers (n = 162). These results indicate that the majority of farmers used YouTube at least a few times per week, suggesting that the platform was integrated into their routine, although daily use was less common. Moderate usage suggests selective and purposeful engagement with content rather than passive or continuous use. The data also suggest that YouTube was accessible to farmers as a flexible tool for agricultural information, allowing repeated viewing and on-demand learning.

While usage patterns varied, the frequency distribution indicates that most farmers interacted with the platform regularly enough for it to serve as a supplementary source of agricultural knowledge, complementing traditional extension services.

Overall, these findings highlight that YouTube was a consistently used digital resource among farmers, with moderate frequency reflecting its practical integration into their weekly activities. Future initiatives aimed at improving digital access, providing relevant local content, and supporting efficient platform use could help maintain and enhance engagement.

Distribution of YouTube users based on their purpose

The findings highlight the multifunctional role of YouTube in supporting farmers' agricultural practices and livelihoods.

Table 4. YouTube as a multifunctional tool for farmers: insights into usage purposes (n=162).

Purposes of YouTube use by farmers	Value	Percentage (%)
Acquiring agricultural expertise and technical training through YouTube videos	110	96.5%
Accessing weather forecasts and disaster preparedness information	90	78.9%
Engaging in the exchange of farming knowledge and experiences with peers	87	76.3%
Receiving guidance on best practices for post-harvest management	75	65.8%
Obtaining updates on agricultural regulations and government services	70	61.4%
Identifying sources of support for acquiring agricultural inputs	82	71.9%
Accessing and sharing pricing information for farming supplies	70	61.4%
Connecting with buyers for the sale of farm goods	60	52.6%
Promoting agricultural products through online marketing strategies	40	35.1%

Source: Authors' calculation based on face-to-face data collection.

Table 4 shows that farmers used YouTube for a variety of purposes related to agricultural practices. The majority (96.5%) reported using the platform for acquiring technical knowledge and training, followed by accessing weather forecasts and disaster preparedness information (78.9%) and exchanging knowledge with peers (76.3%). Other common purposes included sourcing agricultural inputs (71.9%), post-harvest management (65.8%), accessing market information (61.4%), connecting with buyers (52.6%), and promoting products online (35.1%).

These results indicate that YouTube was primarily used as a source of agricultural knowledge and technical guidance. Peer-to-peer knowledge exchange also represented a notable component of usage, suggesting that farmers use the platform to complement formal learning and extension services. Additionally, a substantial portion of farmers used YouTube for market-related purposes, such as

finding buyers and sharing pricing information, indicating its growing relevance along the agricultural value chain.

Overall, the findings demonstrate that YouTube served multiple functions for farmers, including technical learning, risk preparedness, and market engagement. The platform was integrated into farmers' practices and provided a flexible, on-demand source of information, with usage patterns reflecting both learning and practical application needs. These insights highlight the role of digital platforms as accessible tools for agricultural information and support, particularly where traditional extension services may be limited.

Contribution of the selected characteristics of the farmers to their use of the digital self-help approach (YouTube)

In this study, eight characteristics of the respondents were selected, with each characteristic treated as an independent variable. The null hypothesis states that there is no significant contribution of the selected characteristics, namely age, level of education, family size, effective farm size, farming experience, annual family income, agricultural extension media contact, and agricultural knowledge to the farmers' use of the digital self-help approach (YouTube).

Table 5. Multiple regression analysis showing the contribution of the selected characteristics of the farmers to their use of the digital self-help approach (YouTube).

Dependent Variable	Independent variables	B	SE B	B	T	Sig. T
Use of digital self-help approach (YouTube)	Age	-.048	.041	-.11	-1.17	.245
	Level of education	.043	.085	.036	.510	.612
	Family size	-.08	.164	-.03	-.495	.622
	Effective farm size	1.12	.570	.145	1.97	.052*
	Farming experience	.102	.050	.214	2.06	.042*
	Annual family income	.017	.005	.282	3.23	.002**
	Agricultural extension media contact	.434	.210	.204	2.06	.042*
	Agricultural knowledge	.626	.315	.216	1.98	.050*

**significant at 1% level; *significant at 5% level; R2=0.67; adjusted R2=0.64; F=19.52 and P=0.00; Source: Authors' calculation based on face-to-face data collection.

Multiple regression analysis was conducted to determine the contribution of eight selected characteristics to farmers' use of the digital self-help approach (YouTube). The overall model was statistically significant ($F = 19.52$, $p < 0.001$), with $R^2 = 0.67$ and adjusted $R^2 = 0.64$, indicating that 64% of the variation in farmers' use of YouTube was explained by the included variables. Among the

eight independent variables, five were found to have a statistically significant contribution: Annual family income (B = 0.017, β = 0.282, p = 0.002) was significant at the 1% level and showed the strongest standardised effect. Farming experience (B = 0.102, β = 0.214, p = 0.042), agricultural extension media contact (B = 0.434, β = 0.204, p = 0.042), agricultural knowledge (B = 0.626, β = 0.216, p = 0.050), and effective farm size (B = 1.12, β = 0.145, p = 0.052) were marginally significant at approximately the 5% level. The standardised beta (β) coefficients indicate that annual family income had the highest relative contribution among the significant predictors, followed by agricultural knowledge, farming experience, and extension media contact. Effective farm size showed a comparatively smaller effect.

Overall, the findings suggest that farmers' economic capacity, experience, knowledge level, and exposure to extension media were associated with their use of YouTube as a digital self-help approach, whereas demographic factors such as age (p=0.245), education (p=0.612), and family size (p=0.622) were not statistically significant in this model. Joshi and Dhaliwal (2019) found that age and education significantly influenced YouTube usage in agriculture at the 1% level, while Sebotsa et al. (2020) reported contrasting findings, with YouTube use not significantly affecting youth engagement in agriculture (p = 0.226), highlighting variability across contexts.

The regression results (Table 5) indicate that annual family income, farming experience, agricultural extension media contact, agricultural knowledge, and (marginally) effective farm size were statistically associated with farmers' use of YouTube as a digital self-help approach. Among these variables, annual family income made the strongest relative contribution. In contrast, age, education, and family size were not significant predictors in the model.

The strong association between annual family income and YouTube use suggests that economic capacity remained a key determinant of digital engagement in agriculture. Farmers with greater financial resources are more likely to afford smartphones, internet connectivity, and data services, which are necessary for accessing video-based platforms. This finding aligns with broader evidence that digital technology adoption in agriculture is often shaped by resource endowment and the capacity to invest in complementary inputs (Fabregas et al., 2019). In this context, YouTube use appears not merely as a behavioural choice but as an outcome influenced by structural economic factors.

The marginal significance of effective farm size further supports the role of farm resource endowment. Larger farms may have stronger incentives to seek productivity-enhancing information and may perceive greater returns from accessing online agricultural content. Although its statistical contribution is smaller than that of income, the direction of the relationship suggests that commercially oriented farmers may be more inclined to utilise digital advisory tools. The positive

effects of farming experience, agricultural knowledge, and extension media contact indicate that informational and experiential capital facilitate digital platform use. Farmers who are more experienced or better connected to extension systems may possess greater capacity to identify relevant content, assess its credibility, and apply it effectively. This pattern suggests that YouTube functions as a complementary source of information within existing knowledge networks rather than as a substitute for traditional extension services.

Overall, the findings underscore that farmers' engagement with YouTube for agricultural learning was shaped by both socioeconomic and informational characteristics. Although digital platforms offer additional opportunities for technology dissemination, their utilisation appears conditioned by farmers' financial capacity and prior exposure to agricultural information. Future research should further explore whether increased use of digital self-help platforms leads to measurable improvements in technology adoption and farm performance.

Limitations

First, the cross-sectional design captures associations rather than causal relationships, limiting the ability to infer whether YouTube use directly improved technology adoption or productivity. Second, the sample was restricted to 276 farmers from a single Upazila in Bangladesh. Third, the study focused primarily on quantitative determinants and did not explore qualitative aspects. Finally, there is a need for longitudinal studies to capture dynamic adoption trends. Further work might also be needed to cross-check the reliability of respondents' comments.

Conclusion

The findings indicate that YouTube functioned as a valuable digital self-help platform for farmers, but its use was strongly influenced by socioeconomic and informational factors. Significant differences between users and non-users were observed in education, farm size, income, extension media contact, and agricultural knowledge. Farmers with greater economic resources and stronger information networks were more likely to use the platform, while age showed no meaningful difference. Most users accessed YouTube moderately (two to five times per week), suggesting purposeful and routine engagement. The platform served multiple functions, including technical training, weather information, peer exchange, and market-related activities, demonstrating its integration into farmers' agricultural decision-making processes. Regression results showed that annual family income was the strongest predictor of YouTube use, followed by farming experience, agricultural knowledge, extension media contact, and effective farm size. These findings suggest that financial capacity and prior exposure to agricultural

information played key roles in enabling digital engagement. Overall, while YouTube offered important opportunities for agricultural learning and market participation, access and use remained uneven. Promoting digital inclusion and strengthening links between digital platforms and extension services may help ensure broader benefits for farmers.

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UPOTREBA JUTJUBA ZA ŠIRENJE INOVATIVNIH POLJOPRIVREDNIH TEHNOLOGIJA: DIGITALNI PRISTUP PODRŠKE POLJOPRIVREDNICIMA

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R e z i m e

Širenje inovativnih poljoprivrednih tehnologija je od suštinskog značaja za poboljšanje produktivnosti, prehrambene sigurnosti i uslova života u ruralnim sredinama zemalja u razvoju, gde se javne savetodavne službe često suočavaju sa finansijskim i institucionalnim ograničenjima. Ova studija istražuje ulogu Jutjuba kao digitalne platforme za podršku poljoprivrednicima u ruralnim područjima Bangladeša, naglašavajući njegovu efikasnost u širenju informacija iz oblasti poljoprivrede i faktore koji utiču na njihovo usvajanje. Transverzalno istraživanje je sprovedeno među 276 poljoprivrednika u Ranguniji Upazili (podokrug) u okrugu Čatogram. Podaci su prikupljeni korišćenjem strukturiranog upitnika i analizirani primenom regresione analize. Nakon razmatranja vrednosti VIF-a, sprovedena je multivarijaciona logistička regresija. Rezultati pokazuju da je usvajanje Jutjuba značajno povezano sa obrazovanjem, efektivnom veličinom gazdinstva i kontaktom sa poljoprivrednim savetodavnim službama. Poljoprivrednici koji koriste Jutjub pokazali su viši nivo poljoprivrednog znanja, ostvaruju veće prihode i primenjuju raznovrsnije poljoprivredne prakse u odnosu na one koji ga ne koriste. Pored toga, Jutjub je bio široko korišćen za praćenje vremenske prognoze, pripremu za prirodne nepogode, učenje od drugih poljoprivrednika, upravljanje nakon žetve/berbe i angažovanje na tržištu, što ističe njegovu višestruku ulogu. Sveukupno posmatrano, platforme kao što je Jutjub, uz unapređen pristup IKT-ma, pristupačne digitalne resurse i ciljane obuke, mogu značajno unaprediti znanje iz oblasti poljoprivrede i usvajanje tehnologija među poljoprivrednicima u Bangladešu, čime se podstiče održivi ruralni razvoj.

Ključne reči: uloga Jutjuba, usvajanje i prilagođavanje; pristup podršci; faktor inflacije varijanse (engl. *Variance Inflation Factor* – VIF); multivarijaciona logistička regresija.

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