



Utilization of ICTs in Agricultural Marketing Information Delivery in Charland of Bangladesh

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Authors' contributions

This work was carried out in collaboration among all authors. Author MZH designed the study, managed the literature searches, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors MEH, FAP and MSI reviewed and edited the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Information and Communication Technology (ICT) plays a significant role in delivering agricultural marketing information to the door-steps of the agrarian community for effectively managing the farming practices and getting maximum profitability. However, the agrarian community in the rural areas, particularly in the Charland areas are yet to exploit this opportunity. Hence, this study was conducted to assess the status of ICT's utilization in receiving agricultural marketing information in a selected Charland area of Bangladesh. The study was descriptive and diagnostic type research, conducted through primary data collection from the 120 farmers by a face to face interview technique. Findings revealed that almost 60% of the sampled respondents seek information related to agricultural marketing. Although a significant number of the farmers had access to different ICT tools such as mobile phones, radio, and television, the majority of them depends on peer-group farmers and the union digital center as the key sources of marketing-related information.

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Nonetheless, 26.58% of ownership farmers utilized ICTs for getting agricultural marketing information. Low access to electricity connection and their interrupted supply, lack of sales and customer delivery center for ICT-based tools in the rural areas, and insufficient training and awareness building initiatives are major challenges for effective utilization of ICTs by the rural Charland farmers.

Keywords: ICT; agricultural farming; marketing information; charland; Bangladesh.

1. INTRODUCTION

The economy of Bangladesh is primarily dependent on agriculture. It also determines the status of food sufficiency and livelihood wellbeing of the country accommodates 160 million populations [1]. Despite the impressive achievement of attaining food sufficiency in recent years, there is a greater challenge of maintaining food production in the face of population growth, a decrease of cultivable land, and climate change-induced disasters [2,3,4]. Apart from the efforts of increasing yield from per unit land area, the country should find some other avenues such as ensuring timely availability of marketing information and reducing post-harvest losses to make the farming operation profitable. However, the availability of required marketing information at the farmers' doorstep is most increasingly necessary mainly in developing countries like Bangladesh. Nonetheless, people living in the rural and island (char) areas are among the most disadvantaged groups depriving of marketing-related information [5,6] and hence, experiencing low or deficient returns from their farm produces.

Information and communication technologies (ICTs) are considered effective tools or strategies for the economical, social, and cultural development of rural societies Chapman and Slaymaker, [7]; Harris, [8]; Islam et al. [9]; Mago and Mago, [10]; Maningas, [11]; Mruthunjaya and Adhiguru, [12]; Rahman, [13]; Shahnewaz et al. [14] that can reduce poverty by increasing service efficiency and expanding the rural industries Chapman and Slaymaker, [7]; ITU, [15]; Moghaddam and Khatoon-Abadi, [16]. Access to ICT can assist farmers in several ways AlBar and Hoque, [17]; Ali and Kumar, [18]; Beheraa et al. [19]; Chapman and Slaymaker, [7]; Eden and Kalusopa, [20]; Fountas et al. [21]; ICT Agric. Connect. Smallholders to Knowledge, Networks, Institutions, [22]; Irungu et al. [23]; Krone et al. [24]; Lehmann et al. [25]; Mago and

Mago, [10]; Mahant et al. [26]; Mugwisi et al. [27]; Mwombe et al. [28]; Palmer, [29]; Papaioannou and Dimelis, [30]; Parmar et al. [31]; Rao, [32]; Salamasis and Theodoridis, [33]. Traditional media and new ICT can play a major role in diffusing information to rural communities. The availability of market information also enables farmers to check on the prices they receive vis-à-vis the prevailing market prices. Moreover, ICT can accelerate agricultural development by facilitating knowledge management. Besides, farmers can take full advantage of ICT to enhance productivity and generate more income by adopting new technologies, including new varieties, adding value, and marketing their products. Timely access to market information via communication networks also helps farmers make well-informed decisions about what crops to plant and where to sell their produce and buy inputs. To alleviate problems such as the exploitation of farmers by the middlemen, wastage of agricultural products and resultants increase in the price of food products in the market and bridge the gap between farmers and consumers, use of ICT supported information can be instrumental. Hence, the study was conducted to: (i) explore the sources of agricultural marketing information in Charland areas, (ii) ascertain the access to and use of ICTs for agricultural marketing information, and (iii) identify the constraint interlinked with ICTs utilization in the rural Charland area of Bangladesh.

2. METHODOLOGY

The study was conducted in Kazipur upazilla of Sirajgonj district taking four villages from two unions (Fig. 1). It is located in between 24°32' and 24°46' north latitudes and in between 89°32' and 89°48' east longitudes with a total area of 368.63 sq km. This area is a riverine area and very highly vulnerable to flood and riverbank erosion.



Fig. 1. Location map of the study

All farm family heads in the selected areas were considered as the population of the study. However, a total of 120 respondents were selected as a sample following a stratified disproportionate random sampling technique. An interview schedule was developed to administer face to face interview of household heads for gathering primary data. Secondary data were collected through different sources including books, journals, and thesis papers available in BSMRAU library and other online sources such as searching Google Scholar and Researchgate platforms. In order to collect pertinent information, an interview schedule was prepared carefully with due patience keeping the objective of the research in view. The questions and statements contained in the schedule were simple, direct, and easily understandable to the respondents. The schedule contained both open and closed forms of questions. Appropriate scales and techniques of measurement were

applied to ensure correct responses of the variable concerned. After developing the draft interview schedule, it was then pre-tested with 16 respondents of the selected four locations and finalized by necessary modification based on the pre-test experience. Respondents were informed well ahead of time about the specific date of the farm visit. Local extension personnel of the four locations was managed to easily reach the selected respondents and avoid cultural conflicts. The items of the interview schedule were explained in their local language to make them understood the subject of study or questions in the interview schedule. The responses of the respondents were checked and cross-checked before leaving to avoid any missing, duplication, overestimate, or wrong information. Data on socio-demographic characteristics such as age, education, family size, marital status, land ownership, income, and occupation were collected following standard procedure and they

were analyzed to figure out the personal differences. Respondents were asked to mention the ownership of different ICT tools and their use for getting marketing information to explore the scenario of ICTs adoption in rural areas and their utilization for marketing information delivery. Data on major drivers of ICTs effectiveness were collected through FGDs and KIIs. Information gathered in the interview schedule were coded, compiled, tabulated, and analyzed with the help of Statistical Package for Social Sciences (SPSS) software for their meaningful representation and explanation.

3. RESULTS AND DISCUSSION

3.1 Farm Enterprise Characteristics

3.1.1 Socio-economic characteristics of the respondents

The purpose of studying the socio-economic characteristics of the respondents was to get an idea about the population characteristics of Charland farmers. The socio-economic characteristics included age, education, family size, farm size, and farming experience are shown in Table 1.

The highest proportion (44.17%) of the respondents was in middle aged group as compared to 38.33 percent old aged and 17.50 percent of the respondents were younger aged. The highest proportion (47.5%) of the

respondents had primary level education, 16.67 percent respondents had secondary level education, and 1.67 percent respondents had higher secondary level education compared to 34.17 percent respondents being illiterate. More than half (55%) of the respondents fell under medium families as compared with 20 percent small and 25 percent large category. Majority (56.67 %) of the respondents had a small farm size followed by medium (40.83%) and large (2.5 %) farm size. About half (49.17%) of the respondents had medium farming experience. Only 30 percent and 20.83 percent had high and low farming experience respectively.

3.1.2 Crop enterprises

Charland farmers are cultivating diversified crops in different seasons. Their crop production behavior changes over time due to climatic vulnerabilities and other constraints.

The information displayed in Fig. 2 revealed that Charland farmers emphasized cereal crop production to sustain their livelihood where most of the respondents are cultivating rice (89.17%). Majority of the respondents are cultivating vegetables (68.33%) amongst them, only a few numbers of the respondents are produced commercially due to lack of transport and other facilities as well. Maize, wheat, jute, mustard, lentil, and chili are the major crops followed by rice in the Charlands.

Table 1. Distribution of the respondent according to their socio-economic characteristics

Character	Measuring unit	Categories	No. of respondents	Percent
Age	Actual year	Young aged (up to 35)	21	17.50
		Middle aged (36-45)	53	44.17
		Old (>45)	46	38.33
Education	Year of schooling	Illiterate (0)	41	34.17
		Primary (1-5)	57	47.50
		Secondary (6-10)	20	16.67
		Higher secondary (>10)	2	1.67
Family size	Number	Small (up to 4)	24	20.00
		Medium (5 to 6)	66	55.00
		Large (7 and above)	30	25.00
Farm size	Actual (ha)	Marginal (<.02)	0	0.00
		Small (>.02 to 0.99)	68	56.67
		Medium(1 to 2.99)	49	40.83
		Large (3 and above)	03	2.50
Farming experience	No. of Years	Poor (up to 15)	25	20.83
		Moderate (16 to 20)	59	49.17
		High (above 20)	36	30.00

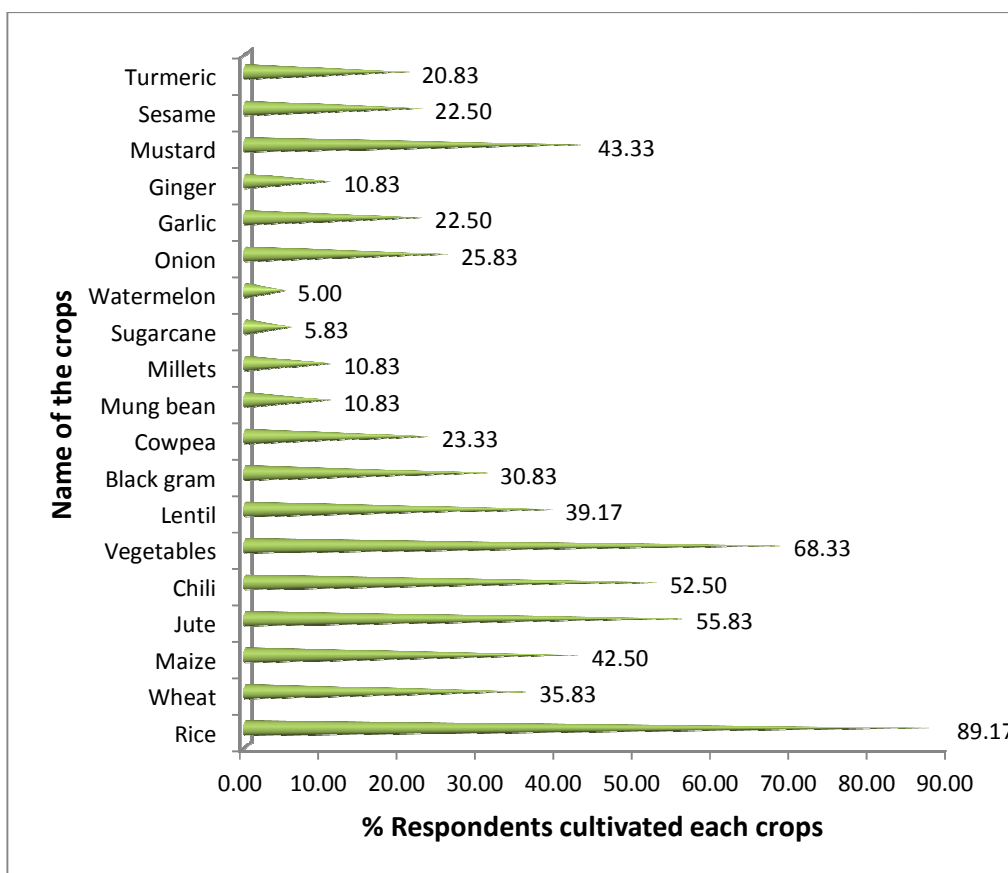


Fig. 2. Distribution of the respondents according to crop production enterprises

3.1.3 Transportation facility

Transportation of the produced commodity to the market is an important issue in Charland area. Most of the roads in the Charland are muddy and seasonal floods damage them regularly. Hence, there is no way to ride heavy vehicles like track and pickup. They mainly depend on local traditional transport to bring their commodity to the market. Fig. 3 shows that the highest proportion of the respondents used horse cart (25.83%), followed by boat (22.50%), OX cart (12.50%), Head load (10.83%). Other available vehicles were a motorcycle, hand cart, van, buffalo cart, and power tiller.

3.1.4 Ownership of ICT tools

Information and communication technology can bring a desirable change in rural areas by getting required information timely. Realizing this fact, Charland farmers are coming forward to accept and use ICT tools. Fig. 4 shows that 60.83 percent of households have mobile phones

whereas 29.17 percent have radio and 25.83 percent have television. It is promising that Charland farmers' getting aware of the laptop, computer, and internet service as their college or university going child have to operate these type of ICT tools.

3.1.5 Sources of power supply for ICT tools

Electricity is essential for operating any kind of ICT tools. But electricity is a major concern for the Charland people. In the study area, most of the households didn't have an electricity connection. Depriving of electricity facilities, Charland farmers are taking alternate means of power supply to operate their ICT tools. In this connection, Solar power energy changed the outlook of Charland area. Fig. 5 shows that 39.48 percent of respondents using a portable battery for operating their ICT tools. This category of respondents usually using radio, cassette player, and mobile phone by getting power supply from the battery. About 25.32 percent household has connected with electricity

and 13.92 percent have adopted a solar system for power supply. It is now very common that village markets have their generator facilities for power supply. From the generator, adjacent households are taking power supply on a fixed paid basis. It is very

enthusiastic and encouraging that 12.66 percent of households are taking power supply from their neighboring households. They have proven that nothing can stop them to use ICT tools. These categories of farmers are usually operating a mobile phone.

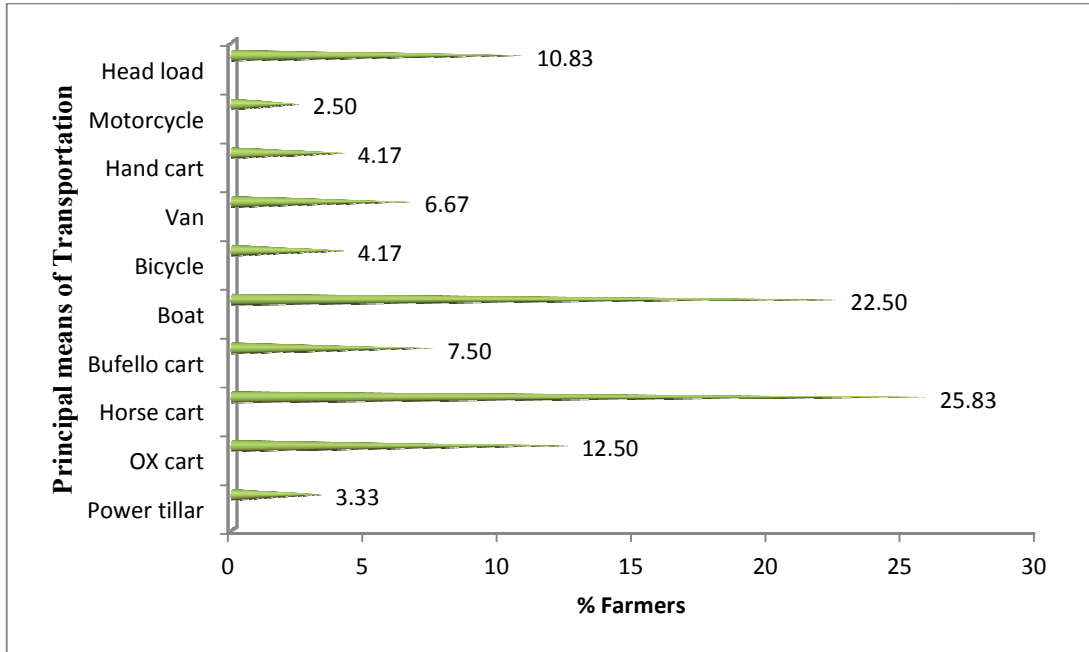


Fig. 3. Farmers' access to transportation facilities

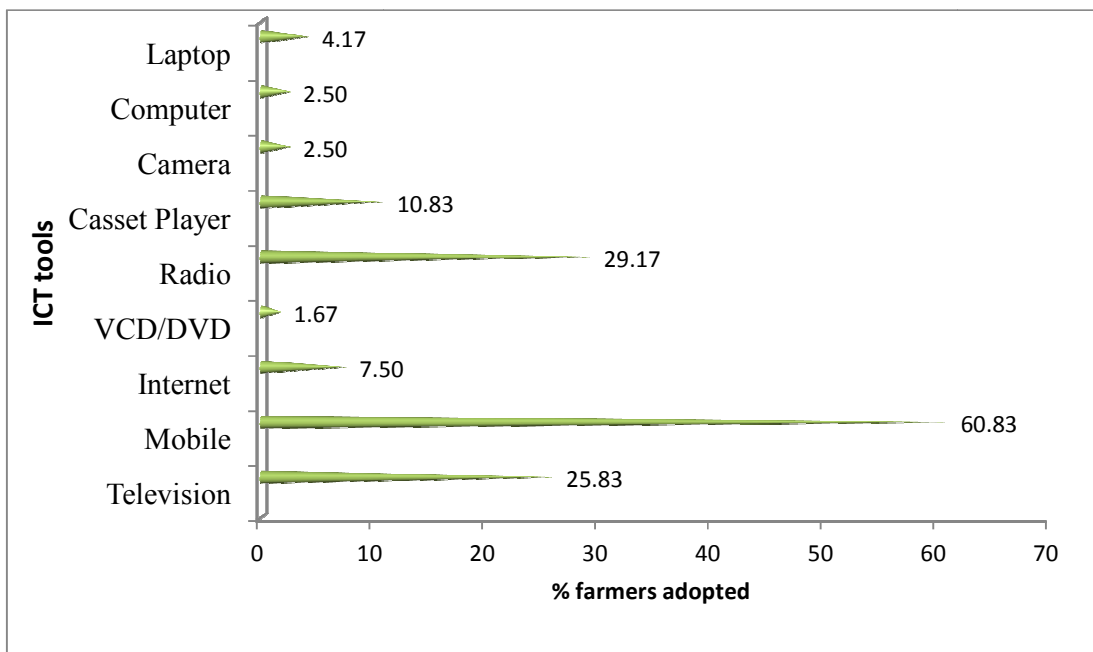


Fig. 4. Distribution of the respondents according to ownership of ICT tools

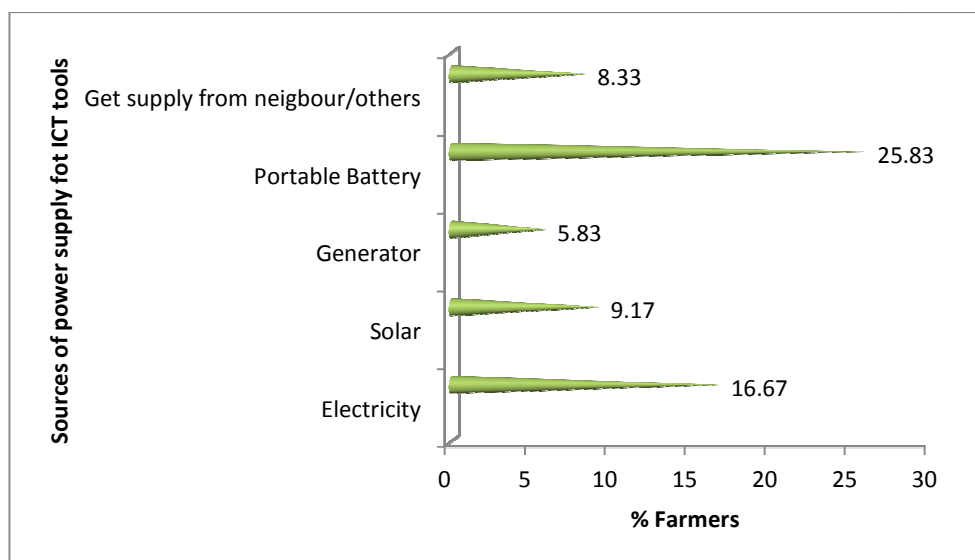


Fig. 5. Farmers’ access to power supply for ICT tools

3.2 Use of ICT for Agricultural Product Marketing Information

3.2.1 Farmers’ information needed

Fig. 6 shows that 60.83 percent of respondents are seeking farm credits and subsidies related information followed by 48.33 percent needs marketing information, 47.50 percent required the principle of pesticide usage.

3.2.2 Sources of marketing information

Marketing information is very important to receive a high sale price from the produced commodity. Hence, farmers need the market location, date of the market, a specialty of the market, price of specific products, and availability of buyers as well. Fig. 7 shows that 10.83 percent of farmers are getting marketing-related information from peer group farmers. About 5.83 percent of farmers are getting information from both Union Digital Centre and traders.

3.2.3 ICT for market information searching

Information displayed in Table 2 revealed that about 65.83 percent of respondents have ICT facilities and the remaining 34.17 percent didn’t have those facilities. About 26.58 farmers who possessed ICT facilities are using ICT tools for getting agricultural marketing information and 4.88 percent of respondents who didn’t have ICT facilities are using ICT tools on a paid basis to search for agricultural marketing information. Among all the respondents only 19.17 percent are using ICT for getting agricultural marketing information.

3.2.4 Level of use of marketing information

Information displayed in Table 3 revealed that 48.33 percent of respondents are searching market price for selling their products followed by 44.17 percent for political instability and 32.50 percent for the availability of buyers. It indicates that these three factors are the main concern for the farmers to sell their products.

Table 2. Percentage of household using ICT for market information searching

Ownership status	Percent	% of farmers using ICT tools for marketing information
Farmers who owned ICT tools	65.83 (79)	26.58 (21)
Farmers who don't own ICT tools	34.17 (41)	4.88 (2)
Total	100 (120)	19.17 (23)

Numbers in the parentheses are the number of farmers

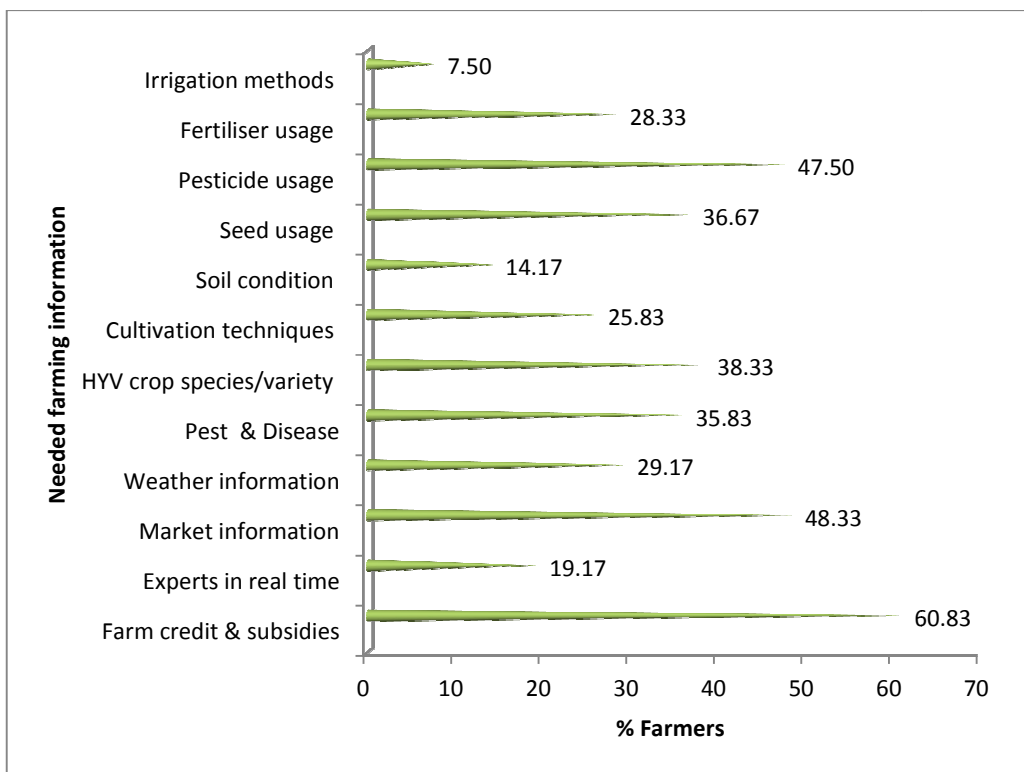


Fig. 6. Distribution of the respondents according to their information needed

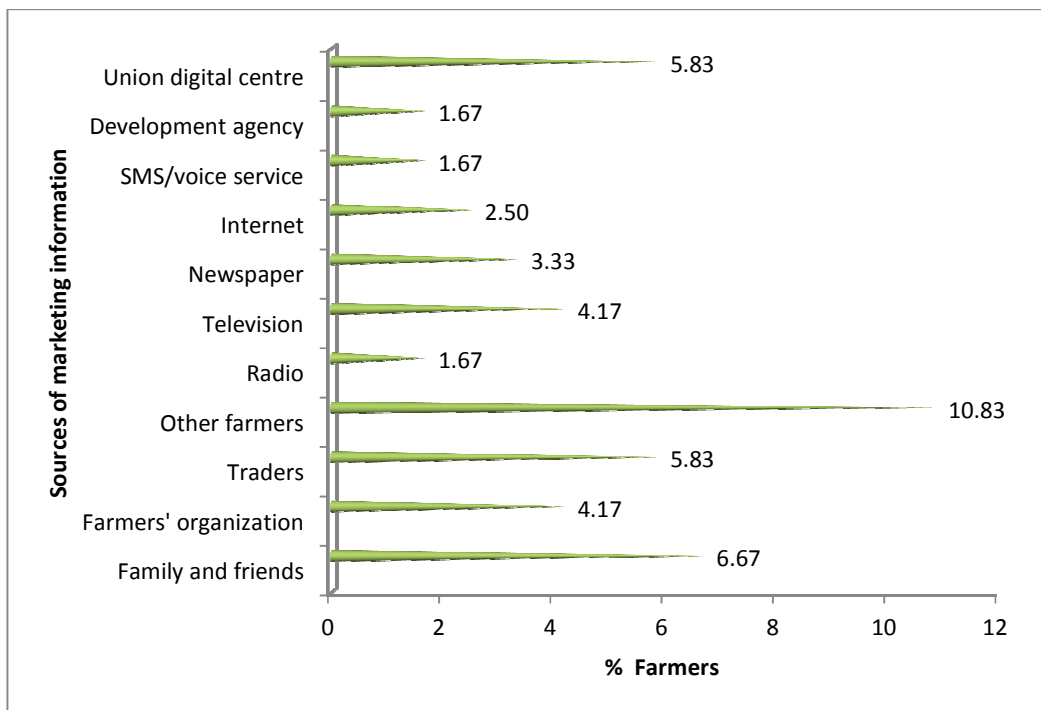


Fig. 7. Farmers' access to marketing information sources

Table 3. Percentage of farmers using different types of marketing information

Types of marketing information	% Respondents
Market days	28.33
Market where products can be sold	22.50
Market demand	26.67
Type of products to sell in the markets	19.17
Different market locations	15.83
Market price	48.33
Communication facilities	19.17
Availability of buyers	32.50
Security facilities	21.67
Political blockade/instability	44.17

Table 4. Farmers' constraints to the Use of ICTs

Constraints	% respondents
No connection of electricity	83.33
Repair of Technical Faults	39.17
High Cost of Maintenance	39.17
Fluctuating Services	37.50
Missed Information	30.83
Inadequate Access to ICTs Tools	29.17
High Call Tariff	27.50
No Network Coverage	23.33
Erratic Power Supply	16.67

3.2.5 Problems in using ICTs

The results in Table 4, show the constraint to the use of ICTs in accessing marketing information in the study area. The areas in which the respondents realized substantial constraints to the use of ICTs were electricity connection (83.33%), erratic power supply (16.67%), high cost of maintenance (39.17%), fluctuating services (37.50%), and missed information (30.83%). This implies that connection and erratic power supply is the most realized constraint to the use of ICTS in the study area. This is an issue that borders on public policy, which the Bangladesh government should endeavor to ameliorate for the benefit of rural farmers.

4. CONCLUSION

The study conducted in a typical Charland of Bangladesh unpacked the gradient of agrarian farm families in terms of their socio-demographic status, farming practices, information requirements, information sources, ownership and use of ICT tools for farming and marketing information, and constraints of ICTs utilization which will provide an essential guideline for the policymaker who are being involved with the mission of transforming the country as "digital Bangladesh". Findings revealed that Charland

farmers showed marked individual differences in their socio-economic status. Respondent farmers are practicing diversified crop-based farming practices that indicate the necessity of marketing information to get a reasonable price from selling their farm produces. Charland farmers still dependent on the mobile phone, radio, and television to collect agricultural farming information. The root cause of their laggardness in accepting modern ICT tools was the problem of electricity supply because most of the respondents still rely on portable battery or solar energy to support their ICT tools. It was found that Charland farmers are still dependent on their neighboring farmers, friends, and relatives to get the marketing-related information. Hence, there remains an extensive scope to boost up their awareness on the potentiality of ICT supported tools for marketing as well as the farming information delivery. It is increasingly being necessary to take initiative to supply the required electricity and internet facility along with a service center for the ease of buying and repairing of the ICT tools at farmers' doorstep.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Hoque M, Rahman M, Haque M, Afrad M, Rahman M. Comparative contribution of crops and homestead forest enterprises to rural household economy: A Case Study of Keshorita Village in Bangladesh. *Asian J. Adv. Agric. Res*; 2018. Available: <https://doi.org/10.9734/ajaar/2018/41652>
2. Chowdhury AKMHU, Haque ME, Hoque MZ, Rokonuzzam M. Adoption of BRRI Dhan47 in the Coastal Saline areas of Bangladesh. *Agric. J.* 2012;7:286–291. Available: <https://doi.org/10.3923/aj.2012.286.291>
3. Hoque MZ, Cui S, Xu L, Islam I, Tang J, Ding S. Assessing agricultural livelihood vulnerability to climate change in coastal Bangladesh. *Int. J. Environ. Res. Public Health.* 2019;16:4552. Available: <https://doi.org/10.3390/ijerph1624552>
4. Nasim FA, Hoque MZ, Haque ME, Islam MS, Parveen N, Chakma S, Afrad MSI. How does adoption of crop variety reduce the impact of drought in agriculture and mitigate food insecurity of smallholder farmers? A Case Study on BUDhan1 Rice Variety in Bangladesh. *Asian J. Agric. Extension, Econ. Sociol.* 2019;30:1–12. Available: <https://doi.org/10.9734/ajaees/2019/v30i330114>
5. Hoque MZ, Haque ME, Hossain MA. Adoption of Farming Technology by the Charland Farmers. 2010;22:49–55.
6. Khalil M, Haque M, Hoque M. Adoption of BARI recommended potato (*Solanum tuberosum*) Varieties by the Potato Farmers of Bangladesh. *Agric.* 2014; 11:79–86. Available: <https://doi.org/10.3329/agric.v11i2.17492>
7. Chapman R, Slaymaker T. ICTs and rural development: review of the literature, current. London Overseas Dev. Inst; 2002.
8. Harris R. A framework for poverty alleviation with ICTs. Roger Harris Assoc. Hong Kong. 2002;1.
9. Islam M, Haque M, Afrad M, Abdullah H, Hoque M. Utilization of ICTs in agricultural extension services of Bangladesh. *Asian J. Agric. Extension, Econ. Sociol.* 2017;16:1–11. Available: <https://doi.org/10.9734/ajaees/2017/31207>
10. Mago, Stephen, Mago, Shamiso. Information and communications technologies (ICTs) and livelihoods enhancement in agro-rural communities in Zimbabwe: connections using the capabilities approach. *J. Commun.* 2015;6:93–103.
11. Maningas RV, Mainstreaming Farmers and Intermediaries Into Information and Communications Technology (ICT): A Strategy Towards Adopting ICT for Rural Development and Agricultural Extension, in: *Computers in Agriculture and Natural Resources.* 23-25 July 2006, Orlando Florida. 2006;146.
12. Mruthunjaya, Adhiguru A. ICT for Livelihood Security: A Reality Check. *Mainstreaming ICTs.* 2005;2:14–18.
13. Rahman MA. Role of information & communication technology (ICT) in rural poverty alleviation. BRAC University; 2008.
14. Shahnewaz N, Haque ME, Afrad MSI, Hoque MZ. Role of Union Information and Service Centre in Community Development. 2016;2:40–47.
15. ITU. *ICT Development Index*; 2017.
16. Moghaddam BK, Khatoon-Abadi A. factors affecting ICT adoption among rural users: A case study of ICT Center in Iran. *Telecomm. Policy.* 2013;37:1083–1094.
17. AlBar AM, Hoque MR. Factors affecting the adoption of information and communication technology in small and medium enterprises: a perspective from rural Saudi Arabia. *Inf. Technol. Dev*; 2019. Available: <https://doi.org/10.1080/02681102.2017.1390437>

18. Ali J, Kumar S. Information and communication technologies (ICTs) and farmers' decision-making across the agricultural supply chain. *Int. J. Inf. Manage.* 2011;31:149–159.
19. Beheraa BS, Panda B, Behera RA, Nayak N, Beherae AC, Jena S. Information communication technology promoting retail marketing in agriculture sector in india as a study, in: *Procedia Computer Science*; 2015.
Available: <https://doi.org/10.1016/j.procs.2015.04.148>
20. Eden BL, Kalusopa T. The challenges of utilizing information communication technologies (ICTs) for the small-scale farmers in Zambia. *Libr. hi tech*; 2005.
21. Fountas S, Pedersen SM, Blackmore S. ICT in Precision Agriculture – diffusion of technology, in: *Sciences-New York*; 2005.
Available: <https://doi.org/10.13140/2.1.1586.5606>
22. ICT in Agriculture: Connecting Smallholders to Knowledge, Networks, and Institutions. *ICT in Agriculture: Connecting Smallholders to Knowledge, Networks, and Institutions*; 2011.
Available: <https://doi.org/10.1596/12613>
23. Irungu KRG, Mbugua D, Muia J. Information and Communication Technologies (ICTs) Attract Youth into Profitable Agriculture in Kenya. *East African Agric. For. J*; 2015.
Available: <https://doi.org/10.1080/00128325.2015.1040645>
24. Krone M, Dannenberg P, Nduru G. The use of modern information and communication technologies in smallholder agriculture: Examples from Kenya and Tanzania. *Inf. Dev*; 2016.
Available: <https://doi.org/10.1177/0266666915611195>
25. Lehmann RJ, Reiche R, Schiefer G. Future internet and the agri-food sector: State-of-the-art in literature and research. *Comput. Electron. Agric*; 2012.
Available: <https://doi.org/10.1016/j.compag.2012.09.005>
26. Mahant M, Shukla A, Dixit S, Patel D. Uses of ICT in Agriculture. *Int. J. Adv. Comput. Res*; 2012.
27. Mugwisi T, Mostert J, Ocholla DN. Access to and utilization of information and Communication Technologies by Agricultural Researchers and Extension Workers in Zimbabwe. *Inf. Technol. Dev*; 2015.
Available: <https://doi.org/10.1080/02681102.2013.874317>
28. Mwombe SOL, Mugivane FI, Adolwa IS, Nderitu JH. Evaluation of Information and Communication Technology Utilization by Small Holder Banana Farmers in Gatanga District, Kenya. *J. Agric. Educ. Ext*; 2014.
Available: <https://doi.org/10.1080/1389224X.2013.788454>
29. Palmer N. Using ICT to enable Agricultural Innovation Systems for Smallholders ICT innovations. *e-Agriculture*; 2012.
30. Papaioannou SK, Dimelis SP. Information technology as a factor of economic development: Evidence from developed and developing countries. *Econ. Innov. New Technol*; 2007.
Available: <https://doi.org/10.1080/10438590600661889>
31. Parmar IS, Soni P, Kuwornu JKM, Salin KR. Evaluating farmers' access to agricultural information: Evidence from semi-arid region of Rajasthan state, India. *Agric*; 2019.
Available: <https://doi.org/10.3390/agricultur e9030060>
32. Rao R. ICT and e-Governance for Rural Development. *Cent. Electron. Governance, Indian Inst*; 2004.
33. Salampasis M, Theodoridis A. Information and Communication Technology in Agricultural Development Preface. *Procedia Technol*; 2013.
Available: <https://doi.org/10.1016/j.protcy.2013.11.001>

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