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Role of ICT in Decision Making in Agricultural Marketing – A Case of Arid India

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I

INTRODUCTION

The world is witnessing transformational change with the onset of digital age. In this digital age, billions of inhabitants of this planet already have and in the coming decade almost all will have access to one or more personal digital devices. Today these digital devices are also being used in the agriculture sector and more specifically in agricultural marketing for making use of informed decisions. The market price information help actors in agriculture value chain make informed decisions that promote efficient production and trade. It is especially valuable for the producers that sell in local and regional markets. Such crucial information helps these producers to negotiate with traders, determine what markets to sell to, store their crops until price increase or even plan for future crops. It also facilitates spatial distribution of products from rural areas to towns and between markets (FAO) a big enabler for the section of the population which has remained unreached by other technology. The Japan International Co-operation Agency (JICA, 2009) found that as the mobile phone market expanded their coverage in Uganda, information flows increased rose and banana farmers especially those farthest from market began participating more in markets and their profit increased by 10 per cent. In Sri Lanka the Gherkin farmers were able to improve their incomes through simple mobile phones applications that helped reduce waste by information received via short message service (SMS). The study found that up to 40 per cent of crop loss could be prevented with quick Information and communication technology (ICT) interventions. The farmers also expressed their willingness to pay for such services if it could save their time and money. The Kenya Agricultural Commodity Exchange (KACE) launched SMS-based information service—SokoniSMS64—for farmers in 1997 to facilitate linkage between sellers and buyers of agricultural commodities; provide relevant and timely marketing information and intelligence; provide a transparent and competitive market price discovery mechanism; and harness ICTs for rural value addition and empowerment (USAID, 1997). In Niger, a study of the effect of mobile phone service penetration on grain price found reduced market price

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dispersion across by 10 per cent. The study also found that grain traders began trading in more markets once they had cell phones, had more market contacts and their profit increased by 29 per cent (Aker, 2010).

In India also there are already several private sector initiatives that are successfully disseminating information to the farmers on a daily basis. Several examples exist of the impact of traders and farmers by simply using mobile phone technology on their own to exchange price information. Mobile phone coverage alone lead to significant market efficiencies and helped fisherman increase profit by 9 per cent and consumer prices declined by 4 per cent (Jensen 2007) in Kerala. In Niger, a study of the effect of mobile phone service penetration on grain price found reduced market price dispersion across by 10 per cent. The study also found that grain traders began trading in more markets once they had cell phones, had more market contacts and their profit increased by 29 per cent. The research by ICRIER shows that improving productivity and rural income require an array of enablers in the production cycle which run from crop planning to the final sale of produce. The information needs of the producer vary from one stage to another (Mittal *et al.*). The ICRIER survey also reveals that the value of mobile is enhanced if many others in the social and economic milieu are also users of mobile.

The literature surveyed highlights the fast growth of mobile telephony in the emerging developing countries of Asia and Africa and their key role in reducing information search costs and information asymmetries and increasing market efficiencies. The use of mobile phones has been found to encourage poor farmers of these countries towards greater market participation and diversification to high value crops. This has helped to increase their earning through higher price realisation and reduction in wastage. In India such initiatives have also been initiated. But information about the same is scanty and sporadic.

In the light of the above discussions, the present study attempts more specifically to (a) understand the diffusion or reach of information technology, and the value added services provided by mobile phones, (b) examine the impact of mobile phones on market decisions of the farmers and their awareness about the new happenings in the field of agriculture and marketing, (c) identify information needs and its access by the farmers in order to create linkage between information and market decision and (d) highlights the constraints faced by the producer-growers in obtaining and optimising informed decision.

The paper is organised in seven sections. The first section gives methodology used for the study, while, the sections provides information about the diffusion or reach of information technology and value added services provided by mobile phones. Section III examines the impact of mobile phones on the market decision of the farmers and their awareness about the new happenings in the field of agriculture and marketing. The next section identifies information and its access by the farmers in order to create linkage between information and market decision. Section V

discusses the constraints faced by producer-growers. The conclusions and suggestions are presented in the final section.

II

The study has been purposively conducted in the arid western region of the country because of strong presence of IFFCO – IKSL, its partnership with Krishi Vigyan Kendras (KVK) for providing extension and advisory services to the farmers and their last mile connectivity in the region. Among the various states of Western Region, Rajasthan was selected due to large presence of KVKs in each and every districts and their strong linkage with producer-growers for providing market and marketing related services. Of the total districts in the state, four districts with a combination of predominant crops, viz., Mustard, bajra, jowar and wheat from Sri Ganganagar, Udaipur, Jaipur and Bharatpur districts were selected for detailed study. A complete list of growers using the services of IFFCO –IKSL service of text and voice message for decision making was obtained from KVKs located in the respective districts. A total of 245 respondents spread across four districts were interviewed for getting detailed information. The interviews were conducted in person and responses were captured with help of a specially structured questionnaire for the purpose. Field survey was conducted during the harvest seasons of the crops during 2011. The entire information has been analysed with the help of simple statistical tools.

III

In India the rural penetration of mobile devices is on the increase. The rural tele-density in 2009 was 16.61 per cent which increased to 38.4 per cent in 2012. Given that India has 700 million rural inhabitants and almost 266 million rural people are connected, this makes nearly 38 per cent rural Indians connected with mobile network. National Telecom policy 2011, makes a special mention of rural tele-density, it seeks to increase rural tele-density from the current level of around 38 per cent to 60 per cent by the year 2017 and 100 per cent by the year 2020. The growth in increasing tele-density throws the challenge for using this medium for delivering contents, services and value added information to the rural population which is necessary for inclusive growth.

The rural connectivity has enhanced by increasing use of mobile phones in India. The market is vibrant with different mobile service providers. Private operators as compared with public sector has a large share in the rural market as can be seen in Table 1.

TABLE 1. SHARE OF MOBILE OPERATORS IN RURAL CONNECTIVITY SEPTEMBER 2011

Total user base (1)	Rural subscribers (million) (2)	Per cent of rural users to total (3)	Rural market share (per cent) (4)
172.78	71.11	41.16	23.90
144.99	55.62	38.36	18.70
100.18	52.10	52.01	17.51
95.79	34.00	35.49	11.43
147.09	32.68	22.22	10.98
660.83	245.51		

The mobile devices provide an effective channel for dissemination of market prices, agri-specific news and inputs and advisory. There are already several private sector initiatives that are successfully disseminating information to farmers on a daily basis. The efforts of Reuters Market Light (RML), IFFCO Kisan Sanchar Ltd, Nokia, Airtel, Tata Teleservices etc. have greatly improved the reach of ICT to rural masses in a meaningful way. Hundreds of RML farmers have reaped the benefits of accurate, timely and personalised information and achieved upto INR 200,000 of additional projects on the sale of their crops by following RML's service only for a few weeks (RMI).

The popularity of mobile devices is mainly attributed to user friendly interface and the convenience of high mobility. With the integration of local language the mobile services have been of immense use by the farmers. The major services provided to the farmers by various initiatives are summarised as follows:

- timely tips and crop advisory from experts for the crops grown by the farmer;
- Pest management, best practices, latest techniques of crop cultivation,
- Prevailing market prices and arrivals of crops from the nearest mandis,
- Other related educative and entertainment services.

Access to information can possibly enable for better incomes and productivity to the farmers. In Rajasthan, use of mobile phones as a mode of providing agriculture related information depend on how far the mobile phone network has been able to link the farmers to market information which is timely and accurate. Information on the price, prices of inputs and output, and non-price factors like information about availability of inputs, quality of seeds, modern techniques, etc. play the primary role in improving farm productivity.

IV

SMS are being used in Indian agriculture and are starting to deliver information across the value chain. The opinion of producer-growers in the region was obtained about the know-how of SMS received on the mobile. Mobile services is being used by all age group. However it was found popular among the age groups of 20-30 years (35 per cent) (Table 2), followed by age group of 30-40 years. The percentage of users declined in the higher age group. It was observed that the younger generations are adapting more to the SMS system and consult Krishi Vigyan Kendra for advice from time to time.

TABLE 2. AGE GROUP OF MOBILES USERS IN RAJASTHAN

Age group (Yrs) (1)	Per cent of users (2)
20-30	35.5
30-40	24.33
40-50	20.66
More than 50	19.50

The information about the SMS service by IKSL reached the farmers through the Gram sewaks who were entrusted with the task of distributorship by the society. It is observed that about 29 per cent of the farmers received the information regarding newly introduced SMS of IKSL about the service through the distributors followed by another 22 per cent through the mobile sellers (Table 3). Personal contact and regular discussion with the farmers was found to be helpful in making the farmers adopt the service by becoming the subscribers.

The study explores the kind of information that farmers value most and who uses the most. The information of mandi price reported to the farmers enable them to bring awareness about the market price, trends, price offered by traders and commission agent. Weather information helps the farmers to take appropriate measure to avoid crop losses due to extreme weather events. Crop advisory and plant protection is expected to motivate farmers to accept new crop varieties and improve their cultivation practices.

It was observed that 25 per cent of the farmers growing coarse grains and oilseeds regard weather information as the most vital information along with crop management (Figure 1). Both types of information emerged as a priority information. The farmers opined that they would like to have information on humidity, temperature, wind direction, drought conditions in advance so that they can take a decision for growing particular crops and other agricultural operations like harvesting, storage etc. The response of 17 per cent of the farmers indicates that regular SMS alerts regarding prevailing price in mandi, availability of fertiliser and seeds are the others types of information for which farmers expressed keen interest.

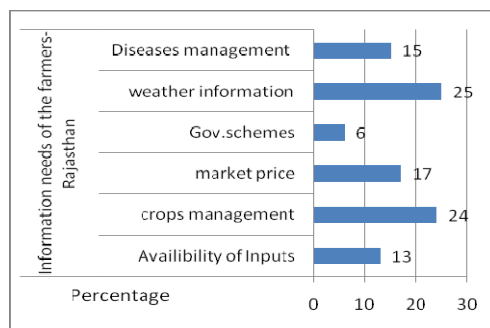


Figure 1. Priority of Information Received by the Farmers

Besides the current information provided on mobile phones there is a strong need for information about other aspects, i.e., the location of godowns and warehouses in near proximity, availability of space in these warehouses, availability of transportation etc. The farmers also opined that they should be informed about the new variety of seeds, effective insecticides and pesticides, new variety of crops, new methods of farming, government schemes, subsidies etc. so that they can avail the facilities of these programmes.

v

The study explores the effect of SMS services on production, marketing and communication. Nearly 45.34 per cent farmer’s revealed that received better knowledge about managing the crops and diseases (Figure 2) which made them more capable of crop management, fertiliser dosage, and disease management. Due to this awareness they also approached KVK to seek further solutions. On the other hand, about 20 per cent of the farmers have been able to enhance their market visits thereby increasing market participation. Furthermore tracking price induced the producer – growers to take the marketable lot and reap the benefit of better price, this lead to increase their profitability.

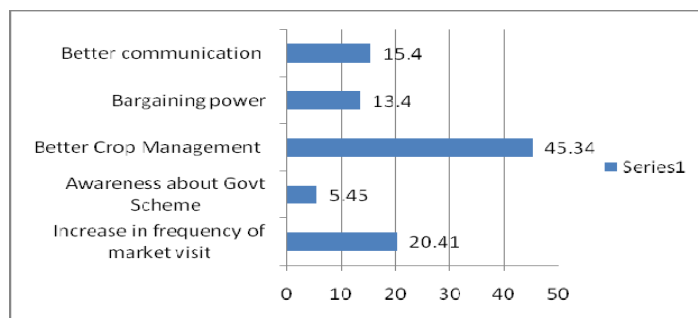


Figure 2. Impact of SMS Service on the Producers

The information received was also shared by producer-growers in the area with their friends and fellow framers. They discussed the trend of price and plan to harvest marketable lot. This way they have created their own network of friends which has enhanced the social network and exchange of information which leads to taking collective decision.

VI

The technology of receiving information through SMS has been newly introduced in the State, though there is high level of interest and adoption. However, there are some constraints which acts as barrier to optimisation of information by the receiver. Figure 3 illustrates the details of the constraints in reaping and optimising the information use.

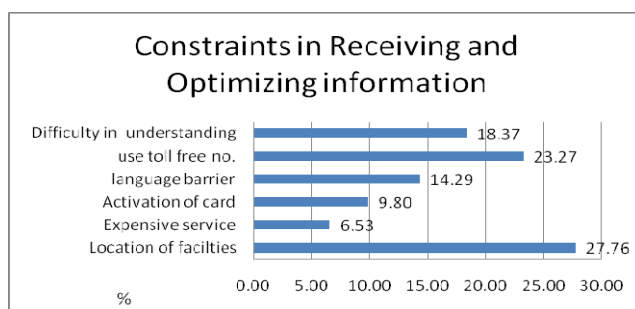


Figure 3. Constraints in Receiving and Optimising Information

TABLE 3. SOURCE OF INFORMATION ABOUT SMS SERVICE

Source (1)	Total per cent in Rajasthan (2)
Distributor	28.57
Mobile seller	22.43
Family member	31.00
Newspaper	02.00
Other	16.00

These constraints can be grouped as follows:

1. The information received by nearly 28 per cent the farmers could not be optimised owing to the difficulty in location of facilities, difficulty in having access to markets, warehouses and godowns, availability of means of transportation, etc.
2. The farmers (23.27 per cent) could not make use of toll free number because of either non-response or very heavy occupancy of the phone line. Activation charges of the SIM card, charges for SMS service use of toll free number are

the in-built factors with the technology which are encountered in the initial stage of adoption.

3. Difficulty in understanding the text or voice message was also experienced as a major constraint by nearly 18 per cent of the producer-growers. This also hampered farmers to take informed decision for selling, negotiating, storing the produce.
4. Some of the farmers (14.29 per cent) reported language as a barrier for optimising information use.
5. The time taken for activation of SIM card of the producer grower followed by expensive services of sms was also reported as the constraints which hampered the decision making in the area.

VII

CONCLUSIONS AND SUGGESTIONS

1. In spite of the fact that technology has been growing by leaps and bounds, the technological barriers that exist in rural areas are the major challenges. These barriers need to be surmounted by better customer care and a proactive approach in reaching the clients to provide solution to technological glitches, e.g., activation charges of the SIM card, charges for SMS service use of toll free number. A better customer care, better service providers reach out to the farmers will be of immense help in reaching the farmers and limiting the constraints faced by the farmers in accessing the technology. Customising the service as per the needs of the small and marginal farmers such as information on transport costs, availability of packaging material, availability of storage space and customised solution will go a long way to make the exchange of information a fruitful experience.

2. To optimise the use of information, there is a need to initiate co-ordinated transportation services connecting them to markets, having a network of collection centres, procurement points so that the farmers can reach and sell the produce. Integrating information with an end to end supply chain right from procurement, marketing to payment backed up by hybrids of information technology tool would go a long way in enhancing better returns and improving crop profitability of the farmers.

3. Developing a community and information sharing networks of the farmers coupled with launching of tech savvy programme would make them manage efficiently and optimize the use of the ICT tools. The farmers should be trained in the use of technology and how to solve troubles encountered while using the technology etc. Through a continuous consultation technology and advice on market led extension, finance, ICT tools etc., the farmers and communities can be educated

on these aspects. A special training programme by Government of India for the farmers, communities of various states should be designed to build capacity and bridge information gaps.

4. To spread the usage of SMS for decision making in the age group of more than 30 years, it is suggested that Adult ICT orientation programme be formulated and implemented on the pattern of adult education programme to extend benefit to the producer-growers of the region.

5. Constraints in making a group marketing decision exist in rural areas in the form of caste, religion, disputes over resources are the predominant factors affecting group dynamics. By organising farmers into groups, they create knowledge societies within which information can be exchanged and resource mobilised. These groups work irrespective of social constraints enumerated above, but are the best way to facilitate aggregating of knowledge at grassroot level.

6. Further to spread penetration of mobile phones among producer-growers, it is suggested to launch a special scheme for Indian growers which can ensure availability of mobile phone instrument at a cheaper cost. Incentivising the input user or equipment like tractors in agriculture with mobile phones would enhance their spread and popularise use of SMS among the producer growers for information needs.

7. To optimise the use of information for making informed decision and enhanced utility of the information, Voice Message may be flashed in vernacular language with a focus on local dialect.

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