

Accessing Agricultural Information through Mobile Phone: Lessons of IKSL Services in West Bengal

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ABSTRACT

Agricultural information is a key component for increasing agricultural production and productivity that leads to improved rural livelihoods and food security. In order to counter recent decelerating growth rate of agriculture, the challenges of infrastructural constraints, supply chain inefficiencies, and diffusion and access to information are to be addressed. In this context, increasing penetration of mobile network and widespread use of mobile phones, voice mail and SMS solutions could be an opportunity to make useful information available at the farmers' doorstep. In West Bengal, IFFCO Kishan Sanchar Limited (IKSL) made an endeavour to disseminate information and knowledge amongst the farmers through voice messaging system in local language. However, its relevance, quality and timeliness have been an issue of serious concern to the farmers. The present study was also undertaken to explore the potential of this mobile- based voice messaging services provided by IKSL Green Card, to know the frequency of its messaging. The study was conducted with sixty randomly selected farmers, who were using IKSL Green Card, from two blocks of Paschim Medinipur district, West Bengal. The result of the study revealed considerable contact of farmers with the progressive farmers (43.3%) followed by IKSL (40.0 %) and input retailers (28.3%). In respect of frequency, quality and timeliness of the information provided by IKSL, farmers ranked fertilizer, pesticide and seed as 1st, 2nd and 3rd. Market information of agricultural produce was rarely covered by IKSL service. Farmers were mostly benefited from voice mail in adopting better agricultural practices followed by increased production and revenue, change in cropping pattern and connection to market.

Key words: Agricultural information; Mobile phone; Voice mail; SMS; IFFCO Kishan Sanchar Limited (IKSL);

Agricultural growth over the past two years has averaged just 2.5 per cent compared with more than 8 per cent for the economy as a whole. Its growth has been hampered by major challenges including deficits in *physical infrastructure*, non- availability of *agricultural inputs such as seed, fertiliser and services* in rural areas, and access to *information*. A national survey of farmers found that only 40 per cent of farmer households accessed information about modern agricultural techniques and inputs (NSSO, 2005). The most common information source used by households accessing information was 'other progressive farmers' followed by 'input dealers'. Now, the real challenge before the policy makers is to overcome the information asymmetry among farmers, villages, regions and countries.

The requirement of field level extension worker of the country is estimated to be about 13-15 lakhs, against which the present availability is only one lakh, as it is cost prohibitive. So, both poor access to information and insufficient extension services have widened the gap in the adoption of technology and lead to poor productivity levels. A push towards higher agricultural productivity will require an information-based, decision making system for agriculture. In this context, mobile technologies can offer the means for development in developing countries (Rashid and Elder, 2009).

On the other hand, at the beginning of the twenty-first century, the average number of mobile phones per 100 inhabitants in Asia, Africa and Latin America and the Caribbean (LAC) has risen by 100-400% in a span of just five years (Orbicom, 2007). By 2014, mobile

teledensity—a measure of cell phone availability—is likely to reach 97.4 per cent per 100 persons as reported by *Rebello, 2010*. In overall information communication technologies (ICT) usage and applications, the mobile phone has been regarded as a more accessible and less expensive means to close the digital divide (*Wade, 2004*). India's mobile subscribers totaled 840.28 million at the last count, next to China, are enough to serve nearly more than half of the country's 1.21 billion population. It has been felt that this impressive mobile network could be put to effective use for delivering knowledge and information to the farming community.

There are several reasons why mobile phones are considered as particularly important for development. First, mobile phones offer benefits such as mobility and security to owners (*Donner, 2006*). Second, the mobile phone works using the radio spectrum, as such there is no need to rely on physical infrastructure such as roads and phone wires etc. (*Anon., 2008*). Third, mobile phones only require basic literacy, and therefore are accessible to a large segment of the population. Fourth, mobile phones allow for the transfer of data, which can be used in the context of applications for the purposes of health, education, commerce or governance. Finally, due to factors like increased private sector competition and innovative payment methods (e.g. pre-paid method), mobile phones are increasingly affordable to the lower strata of the population.

Indian Farmers Fertilizers Cooperative Limited (IFFCO), together with Bharati Airtel and Star Mobitel has promoted IFFCO Kishan Sanchar Ltd. (IKSL) a joint venture. In this venture, Airtel is providing SIM, Green card, which is used for communication of improved technology for empowering people living in rural areas through relevant and pertinent information of agriculture and allied sectors. Very few research has been conducted in home and abroad regarding the use of mobile in agricultural development (*Agarwal, 2010; Rashid and Elder, 2009*). However, it is much needed to know the relevance, quality and timeliness of such information. It is also important to know the frequency of such services and study whether and how such information are helping the farmers to improve their livelihood. Keeping this in mind, the present study aims at analysing the access of agricultural information through voice messages provided by IFFCO Kishan Sanchar Limited (IKSL) mobile services in Paschim Medinipur district of West Bengal.

METHODOLOGY

The present study was conducted in Paschim Medinipur district of West Bengal, selected purposively among eighteen districts of the State. Two blocks, namely Keshpur and Pingla out of 29 blocks of the district were selected purposively keeping in view the researcher's background and his close familiarities with respect to area, people, officials and availability of data. Thirty resource poor farmers from each block with less than 5.0 acre of land and who were availing IKSL Green Card were selected randomly for the study. Background information of the respondents such as age, educational qualification, land holding etc. as well as information sources, importance, relevance, quality and timeliness of information, frequency of information etc, were considered while designing the interview schedule. The information was collected from the respondents by personal interview method. The data were analyzed based on specific objectives with suitable statistical tools using SPSS 17 software.

RESULTS AND DISCUSSION

Background information of the respondents availing IKSL voice messages: Table 1 reveals that the majority of the respondents (75%) were of medium age group between 27-41 years, 73 per cent were educated up to secondary level and above, 88.3 per cent possessed less than 2.5 acres of land and sixty three per cent were associated with social organization. Most of the respondents had 6-8 family members and 93.3 per cent owned kutchha house. Seventy three per cent of the respondents had annual income of Rs. 32000 - Rs. 49000, forty four respondents had 6-14 years of farming experience and they possessed 125-296 cents of crop land. Fifty percent of them owned 3-9 numbers of livestock and majority of them had two agricultural implements. Fifty eight per cent of them had received agricultural training up to two days, seventy five per cent of respondents were using IKSL Green Card to avail voice messages for 9-12 months and interestingly, the respondents' relatives and neighbours started using mobile before the farmers under study.

Various information sources through which farmers get required agricultural information: It is observed from Table 2 that only one respondent (1.7%) had very high contact with progressive farmers for availing various agricultural information. High contact was observed for progressive farmers (43.3%) followed by 40.0 per cent and 28.3 per cent for IKSL and input

retailers respectively. It was also observed that the 'progressive farmers', 'IKSL' and 'input retailers' were ranked as 1st, 2nd and 3rd respectively as sources of contact by the respondents. However, they had no contact with representatives of Agri-input companies as source of information. The results reported by *Mittal et al. (2010)* are more or less in conformity with the findings of the present study. Progressive farmers still play an important source of information for the rural poor farmers and now a days IKSL voice messaging system is gaining importance.

Kind of information valued most by the farmers: The interviews indicated that the farmers, the resource poor farmers in particular, needed a wide range of

Table 1. Background variables of the respondents availing IKSL voice message (N=60)

Variables	Unit	Range	Mean	SD
Age	Year	22-48	33.95	7.39
Education	Score	3-6	4.39	1.01
Land holding	Score	1-2	1.12	0.32
Social participation	Score	1-3	1.90	1.0
Family size	Nos.	4-13	7.33	1.84
Annual income Rs.	(,000)	24-70	40.9	8.91523
Experience	Year	2-20	9.17	4.59
Area under crops	Cent	48-400	74.06	41.41
Livestock ownership	Nos.	0-14	5.67	3.79
Ownership of agri-implement	Score	4-8	7.00	1.75
Training received	Day	0-3	1.83	0.99
Duration of IKSL connection	Month	4-24	6.68	2.72
Use of mobile-Self	Month	12-60	31.80	10.78
Use of mobile-Family	Month	0-48	5.03	12.35
Use of mobile-Relative/neighbour	Month	2-48	34.43	7.57

information. Table 3 reveals that the farmers mostly needed information on weather forecasts, seed fertilizer, pesticide, machinery and market price and these were ranked as first by the farmers. The respondents also needed information on 'Use of inputs', 'Govt. Schemes' and 'Employment opportunities' and they ranked it as 2nd and 3rd respectively.

Weather information was found to be crucial for most of the small farmers in our investigation. Being resident of rainfed areas, many of these farmers were highly dependent on weather condition, rainfall in particular, for successful harvest of their crop. It was critical at certain key junctures of cropping period like - during planting, application of agricultural inputs like fertilizer and pesticides, harvesting and storage. The result of the study is consistent with the findings of *Martin and Abbott (2010)* who reported in their study "Development calling: The use of mobile phones in Agriculture Development in Uganda" that more than half of the farmers were using their mobile phones for coordinating the access to agricultural inputs, getting market information and monitoring financial transaction.

Ranking of relevance, quality, timeliness and their average score in respect of voice message from IKSL: As revealed from Table 4, there was no difference among the ranking of IKSL voice messages in respect of relevance, quality and timeliness as perceived by the respondents and, information about 'fertilizer', 'pesticide' and 'seed' provided by IKSL voice mail were ranked as first, second and third when over all scoring of relevance, quality and timeliness were considered. These were followed by 'use of inputs' 'vegetables, fruit and flower cultivation', 'other farm practices like weeding, harvesting, etc.', 'animal husbandry', and 'cattle health'. Rank difference

Table 2. Sources of information use by the respondent for meeting livelihood needs (Percentage in parenthesis)

Source of information	Very high	High	Average	Not much	Not at all	Score	Rank
IKSL	0 (0.0)	24 (40.0)	32 (53.3)	4 (6.7)	0 (0.0)	3.33	II
Radio	0 (0.0)	0 (0.0)	3 (5.0)	16 (26.7)	41 (68.3)	1.37	VI
TV	0 (0.0)	0 (0.0)	6 (10.0)	10 (16.7)	44 (73.3)	1.37	VI
Newspaper	0 (0.0)	1 (1.7)	0 (0.0)	25 (41.7)	34 (56.7)	1.47	V
Farm publications e.g. Leaflet, booklet	0 (0.0)	0 (0.0)	1 (1.7)	1 (1.7)	58 (96.7)	1.05	VII
Progressive farmers	1 (1.7)	26 (43.3)	29 (48.3)	2 (3.3)	2 (3.3)	3.37	I
Input retailer	0 (0.0)	17 (28.3)	29 (48.3)	14 (23.3)	0 (0.0)	3.05	III
Extension worker	0 (0.0)	0 (0.0)	1 (1.7)	0 (0.0)	59 (98.3)	1.03	VIII
Input company personnel	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	60 (100.0)	1.00	IX
Relatives	0 (0.0)	5 (8.3)	40 (66.7)	7 (11.7)	8 (13.3)	2.70	IV

Very high - 5; High - 4; Average - 3; Not much - 2; Not at all - 1

Table 3. Kind of information the farmers valued most

Type of information	Importance of information						Score	Rank
	Excellent	Very good	Good	Average	Poor			
Weather forecasts	60(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	5.0	I	
Seed	60(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	5.0	I	
Fertilizer	60(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	5.0	I	
Pesticide	60(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	5.0	I	
Machinery	60(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	5.0	I	
Labour	58(96.7)	0(0.0)	2(3.3)	0(0.0)	0(0.0)	4.93	IV	
Use of inputs	58(96.7)	2(3.3)	0(0.0)	0(0.0)	0(0.0)	4.97	II	
Tillage & soil conservation	56(93.3)	4(6.7)	0(0.0)	0(0.0)	0(0.0)	4.93	IV	
Other farm practices like harvesting, storage etc.	55(91.7)	5(8.3)	0(0.0)	0(0.0)	0(0.0)	5.92	V	
Market price	60(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	5.0	I	
Animal husbandry	28(46.7)	13(21.3)	10(16.7)	7(11.7)	2(3.3)	3.97	VI	
Fish cultivation	9(15.0)	6(10.0)	5(8.3)	9(15.0)	31(51.7)	2.22	IX	
Govt. Schemes	57(95.0)	3(5.0)	0(0.0)	0(0.0)	0(0.0)	4.95	III	
Employment opportunities	57(95.0)	3(5.0)	0(0.0)	0(0.0)	0(0.0)	4.95	III	
Human health	55(91.7)	5(8.3)	0(0.0)	0(0.0)	0(0.0)	4.92	V	
Cattle health	11(18.3)	22(36.7)	4(6.7)	8(13.3)	15(25.0)	3.10	VIII	
Vegetables, fruit and flower cultivation	35(58.3)	4(6.7)	5(8.3)	9(15.0)	7(11.7)	3.85	VII	

Excellent -5-; Very good – 4; Good – 3; Average – 2; Poor -1
 Figures in parentheses indicate percentage.

Table 4. Ranking of relevance, quality, timeliness and their average score in respect of voice message from IKSL

Type of information	Mean score with rank			Av. score with rank
	Relevancy	Quality	Timeliness	
Weather forecasts	1.98 (IX)	1.13 (XII)	1.98 (VIII)	1.70 (XI)
Seed	2.93 (III)	3.47 (II)	2.97 (III)	3.12 (III)
Fertilizer	3.48 (I)	3.72 (I)	3.50 (I)	3.57 (I)
Pesticide	3.37 (II)	2.97 (III)	3.40 (II)	3.25 (II)
Machinery	1.20 (XI)	1.08 (XIII)	1.07 (XII)	1.12 (XIII)
Labour	1.00 (XIV)	1.00 (XV)	1.00 (XIII)	1.00 (XVI)
Tillage & soil conservation	2.58 (V)	2.13 (VIII)	1.87 (IX)	2.19 (IX)
Use of inputs	2.90 (IV)	2.60 (V)	2.62 (IV)	2.71 (IV)
Other farm practices like harvesting, storage etc.	2.90 (IV)	2.68 (IV)	1.98 (VIII)	2.52 (VI)
Market price	2.47 (VII)	1.73 (X)	1.10 (XI)	1.77 (X)
Animal husbandry	2.57 (VI)	2.48 (VI)	2.42 (VI)	2.49 (VII)
Fish cultivation	2.10 (VIII)	2.38 (VII)	2.08 (VII)	2.19 (IX)
Govt. Schemes	1.07 (XIII)	1.00 (XV)	1.07 (XII)	1.05 (XV)
Employment opportunities	1.10 (XII)	1.03 (XIV)	1.07 (XII)	1.07 (XIV)
Human health	1.80 (X)	1.05 (XV)	1.40 (X)	1.42 (XII)
Cattle health	2.57 (VI)	2.03 (IX)	2.42 (VI)	2.34 (VIII)
Vegetables, fruit and flower cultivation	2.58 (VI)	2.60 (V)	2.60 (V)	2.59 (V)

Rank difference correlation with significance level between

Relevance and quality
 0.903 **

Quality and timeliness
 0.907 **

Relevance and timeliness
 0.934 **

(Figures in parenthesis indicates ranking) ** Significant at 1 % level

Table 5. Frequency of sending various information provided by IKSL voice messaging system

Type of information	Importance of information					Score	Rank
	Very Freq.	Frequently	Not so Freq.	Not at all			
Weather forecasts	0(0.0)	25 (41.7)	33 (55.0)	2 (3.3)	2.38	VIII	
Seed	25 (41.7)	35 (58.3)	0 (0.0)	0 (0.0)	3.42	III	
Fertilizer	46 (76.7)	14 (23.3)	0 (0.0)	0 (0.0)	3.77	I	
Pesticide	34 (56.7)	25 (41.7)	1 (1.7)	0 (0.0)	3.55	II	
Machinery	0 (0.0)	0 (0.0)	0 (0.0)	60 (100.0)	1.00	XIV	
Labour	0 (0.0)	0 (0.0)	0 (0.0)	60 (100.0)	1.00	XIV	
Use of inputs	0 (0.0)	24 (40.0)	36 (60.0)	0 (0.0)	2.40	VII	
Tillage and soil conservation	34 (56.7)	0 (0.0)	26 (43.3)	0 (0.0)	3.13	IV	
Other farm practices like harvesting, storage etc.	0 (0.0)	1 (1.7)	5 (8.3)	54 (90.0)	1.12	XI	
Market price	0 (0.0)	0 (0.0)	2 (3.3)	58 (96.7)	1.03	XIII	
Animal husbandry	0 (0.0)	19 (31.7)	41 (68.3)	0 (0.0)	2.32	IX	
Fish cultivation	0 (0.0)	56 (83.3)	10 (16.7)	0 (0.0)	2.83	V	
Govt. Schemes	0 (0.0)	0 (0.0)	0 (0.0)	60 (100.0)	1.00	XIV	
Employment opportunities	0 (0.0)	0 (0.0)	0 (0.0)	60 (100.0)	1.00	XIV	
Human health	0 (0.0)	0 (0.0)	6 (10.0)	54 (90.0)	1.10	XII	
Cattle health	1 (1.7)	24 (40.0)	35 (58.3)	0 (0.0)	2.43	VI	
Vegetables, fruit and flower cultivation	0 (0.0)	3 (5.0)	57 (95.0)	0 (0.0)	2.05	X	

Very frequently-4; Frequently – 3; Not so frequently– 3; Not at all - 1, (Figures in parentheses indicate percentage)

Table 6. Perception of the respondent as to whether mobile helped them

Subject	Perceptions					Score	Rank
	Manifold	A lot	Slightly	Not at all			
Get connected to markets	0 (0.0)	27 (45.0)	33 (35.0)	0 (0.0)	2.45	IV	
Adoption of better agricultural practices	24 (40.0)	36 (60.0)	0 (0.0)	0 (0.0)	3.40	I	
Increased revenue	24 (40.0)	31 (51.7)	3 (5.0)	2 (3.3)	3.28	II	
Influenced cropping pattern	16 (26.7)	37 (61.7)	5 (8.3)	2 (3.3)	3.12	III	
Reduced wastage decision	0 (0.0)	10 (16.7)	23 (38.3)	27 (45.0)	1.72	V	

Figures in parentheses indicate percentage;

Many fold - 4; A lot - 3; Slightly - 2; Not at all - 1

correlation coefficient among relevance, quality and time of IKSL voice messages showed high and significant correlation among relevance, quality and timeliness of the provided information.

Frequency of various information provided by IKSL voice messaging system: Table 5 reveals that, information about 'fertilizer', 'pesticide' and 'seed' were prioritized by the users as first, second and third followed by 'tillage and soil conservation', 'fish cultivation', 'cattle health' and 'use of inputs'. Some information on 'machinery', 'labour', 'Government schemes', 'employment opportunities' were also provided. But a very few information was messaged regarding 'market price', though demanded by the respondents.

Whether and how IKSL voice messages are helping the farmers to improve their livelihood: According

to ranking assigned by the farmers they were benefited mostly in respect of 'adoption of better agricultural practices' and it was ranked as first position. This was followed by 'increased production and revenue', 'influenced cropping pattern', 'get connected to markets' and 'reduced wastage decision' and was ranked as 2nd, 3rd, 4th and 5th position respectively (Table 6).

In respect of 'increased production and revenue' the result of the present study is more or less in conformity with the findings of *Waverman, et al. (2005)* that, mobile telephone could be used to deliver agricultural information that could stimulate increased production. Accurate and timely market information, particularly of perishable items, can significantly reduce transaction and travel costs as reported by *Rashid and Elder (2009)*.

CONCLUSION

'Progressive farmers', 'IKSL' and 'input retailers' were observed as important sources of contact for the respondents. The farmers required a wide range of information and they mostly needed information on weather forecasts, fertilizer, pesticide and market price. They also needed information on 'seeds', 'use of inputs', 'machinery', 'vegetables fruit and flower cultivation', 'animal husbandry', 'cattle health', 'human health' as well as 'employment opportunities'. Information provided through IKSL voice messages on 'fertilizer', 'pesticide' and 'seed' were prioritized as first, second and third when scoring of all the attributes like relevance, quality and timeliness were considered. Information on 'pesticide', 'use of inputs' and 'vegetables, fruit and flower cultivation' were provided frequently through IKSL voice messages.

Very few information were messaged regarding 'market price', and 'weather forecast'. Information like 'machinery', 'labour', 'Government schemes' and 'employment opportunities' were rarely covered, though these were required by the respondents. So, these should be addressed properly for the overall benefit of the farmers. Overall, the farmers in the study areas were benefited from IKSL messaging system. They were benefited mostly in respect of 'adoption of better agricultural practices' followed by 'increased production and revenue', 'influenced cropping pattern', 'get connected to market' and 'reduced wastage decision'. Results of this study may be used to formulate farmer centric ICT for development programmes.

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