

**SMALLHOLDER FARMERS' PERCEPTION ON MOBILE PHONE ADVISORY
POTENTIAL IN FARMING**

Abstract

Mobile phones become omnipotent device in human interface and interpersonal communication and itself become a paramount tools for grassroots agricultural extension linkage. It was investigated to extrapolate small holder farmers' perception on Mobile Phone Advisory Potential in Farming. Data was collected from 120(one hundred twenty) farmers and it was found most of the farmers were middle age group(50.00%), education level upto Secondary level(35.84%) and annual income Rs. 3 to 4 lakhs (33.33%).The respondents perception on Mobile Phone Advisory Potential in farming were, prospective tools to reach the unreached; any time retrieval of message; better decision makers; message relevance in sustainable mobile advisory usage; and high mobility to users. Farmers decision making in farming is positively and significantly correlated with information access level (0.458**) social esteem and upscaling of mobile advisory usage(0.318*) and better information sharing and feedback (0.304*). Result also revealed that 54.17 per cent farmers possessed smart phone and use whatsapp. Bihar Krishi Apps(45%) and Social media youtube(48.33%) are getting popularity among farming community in decision making. From the study it can be concluded that more agricultural related information should be make available in social media, agricultural information available in social media should be more localised and customised. Grassroots extension functionaries, viz. agri-input dealers and progressive farmers should be trained to used more ICT tools in general and smartphone in particular.

Key Words: Mobile Phone, Farmers, ICT, Smartphone, Mobile apps

1.Introduction

Smallholder farmers are marginal and sub-marginal farm households own cultivable land less than 2.0 hectare. Small-holder farmers are crucial for Indian agriculture and rural economy and their role to national grain production was nonetheless 41 per cent(Singh *et al.*,2002),however, smallholder farmers faced the constraints to use of various information sources as well as poor extension services (Salau *et al.*, 2013).Although Mobile phones become omnipotent device in human interface and interpersonal communication and farmers across globe are using it. Mobile phones have potential to connect farmers to markets, close the information gap and enable informed decisions(Masuka *et al.*, 2016), receive quality and timely information on pest and disease control of crop and irrespective of the socio-economic characteristics, the farmers were utilizing the mobile multimedia agricultural advisory system(Ganesan *et al.*,2013). Mittal and Tripathi,(2009) opined that mobile phones can act as catalyst to improving farm productivity and rural incomes, the quality of information, timeliness of information and trustworthiness of information are the three important aspects

40 that have to be delivered to the farmers to meet their needs and expectations. However,
 41 farmers decision on selection of package of practices depends on its performance and
 42 effectiveness, awareness and information, technical and operational knowledge,
 43 environmental criteria, and financial and accessibility criteria(Sharifzadeh,2018) and
 44 influence and persuasion of inputs dealers (Panda,2014).The research was conducted among
 45 the smallholder farmers of Bihar in Bhagalpur district. In Bihar around ninety per cent
 46 farmers are smallholder farmers and rural economy is agrarian nature. The major crops grown
 47 in the state are cereal(Rice, wheat, maize), pulses(lentil, gram, chick pea, grass
 48 pea),oilseeds(rapeseed and mustard, linseed),cash crops(sugarcane, potato, onion, chilli,
 49 tobacco) and different types of vegetable(cabbage, cauliflowers, brinjal, carrot, okra, radish,
 50 pumpkin). Last one decade, the state remains centre of discussion for its agricultural growth.
 51 The state has strong public extension delivery system and mobile advisory was delivery to the
 52 farmers. So, it becomes imperative to study the Smallholder Farmers' Perception on Mobile
 53 Phone Advisory Potential in Farming.

54 2.Methodology

55 For the present study, Bhagalpur district of Bihar state is selected purposively. Farmers those
 56 primary occupations was farming and having minimum 10 years of farming experiences were
 57 within the sampling frame. From this sampling frame 120(hundred twenty) farmers were
 58 selected randomly. The data was collected from the respondents during March 2018 to July
 59 2018. The summative scale and Likert Scale were used. The statistical tools included in this
 60 study were weighted mean, per cent, Rank and Pearson's Correlation Coefficient.

61 3. Results and Discussion

62 In this knowledge society information is crucial for reasonable decision making. Farmers
 63 need information for number of reasons, however, considering farming as their livelihood, so
 64 availability of timely and correct information is crucial soft inputs in scientific farming.
 65 Mobile phone advisory is best mean for grassroots level extension linkage. Farmers'
 66 possession and utilisation of mobile phone advisory is also associated with their socio-
 67 economic condition/profile.

68 **Table 1: Socio-economic Profile of the Farmers**

n=120

Characteristics	Categories	<i>f</i>	Per cent	
1. Age Groups (in Years)	Upto 35 (Young)	30	25.00	Mean=35.07 SD=10.12 CV =28.86
	> 35 to ≤ 55 (Middle Age)	60	50.00	
	> 55 (Older)	30	25.00	
2.Education Level	Illiterate	7	5.83	
	Functional literacy	12	10.00	
	Upto primary	10	8.33	
	Upto secondary	43	35.84	
	Upto higher Secondary	41	34.17	
	Graduate and above	7	5.83	
3.Farming	>10 to ≤ 11	22	18.33	Mean=17.53

Experiences (in years)	>11 to ≤ 20	32	26.67	SD= 6.54 CV =37.29
	>20 to ≤ 30	40	33.33	
	> 30	26	21.67	
4. Annual income (Rs. In Lakhs)	Upto 2.0	22	18.33	Mean=3.23 SD= 1.10 CV =34.05
	>2.0 to ≤ 3.0	32	26.67	
	>3.0 to ≤ 4.0	40	33.33	
	>4.0 to ≤ 5.0	20	16.67	
	>5.0 to ≤ 6.0	6	5.00	

70 It is noted that 50.00 per cent respondents belong to middle age group and 25.00 per cent
71 each young and middle age group. So, there is a scope to introduce new tools of ICT among
72 the farmers, especially among the young farmers, as in young age people remains enthusiastic
73 to try new tools and ideas. Finding also reveal that most of respondents education level are
74 upto secondary and above. In relation to the farmers farming experience, 33.33 per cent
75 farmers had farming experience of 20 to 30 years and only 18.83 per cent farmers farming
76 experience is 10 years. The annual income of the respondents is an important indicator of
77 farming outcome and it is noted that 33.33 per cent respondents' annual income ranged
78 between Rs. 3 to 4 lakhs with CV 34.05 (Table 1). Ogbeide and Ele (2015) noted in
79 smallholder farmers and mobile phone technology, that more young farmers use mobile
80 phones and spend more mobile phone for seeking market information than any other
81 agricultural activities and obtaining weather information.

82 **Table 2: Possession of Mobile Phone by Farmers**

83 n=120

Sl. No.	Statements		Responses			
			Yes		No	
			f	%	f	%
1	Do you own a mobile phone?		120	100	0	0
2	Do you share the mobile phone with the family member?		120	100	0	0
3	Do you use multiple SIM cards?		80	66.67	40	33.33
4	Does someone else in your family own the mobile phone?		100	83.33	20	16.67
5	Type of you mobile phone possessed in Household	Basic	80	66.67		
		Smart Phone	65	54.17		
		Basic & Smart Phone	30	25.00		

84 It becomes imperative to know the Possession of mobile phone by farmers for the advocacy
85 of the mobile phone advisory service to them. The perusal of the table 2 reveals that 100 per
86 cent farmers possessed mobile phone, out of which 66.67 per cent, 54.17 per cent and 25.00
87 per cent farmers had basic, smart phone, and basic & smart Phone respectively. Dehnen-
88 Schmutz *et al.* (2016) noted that in citizen science agriculture most of the respondents use
89 smartphone in farm management and use farm-specific apps. There are number of Agri-

90 Mobile Apps(Kisan Suvidha, IFFCO Kisan Agriculture, RML Farmer – Krishi Mitra, Pusa
 91 Krishi, AgriApp, Kheti-badi ,Plantix, AgriMarket) support the farmers from seed selection
 92 to marketing.

93 **Table 3: Usage of mobile phone by farmers**

94 n=120

Sl. No.	Statements		Responses			
			Yes		No	
			<i>f</i>	%	<i>f</i>	%
1.	How many years you are using your smart phone?	Last 3 years	45	37.50		
		More than 3 years	20	16.67		
2.	Do you have Whatsapp in your mobile?		65	54.17		
3.	How many mobile handsets you have?	One	90	75.00		
		More than one	30	25.00		
4.	Do you know how to send SMS/texts?		120	100		
5.	Do you know how to receive SMS/texts?		120	100		
6.	Do you have access to the internet on your mobile phone?		70	58.33		
7.	Do you know how to operate the internet on your mobile phone?		50	41.67		
8.	Do you heard about Kisan Call Centre?		70	58.33	50	41.67
9.	Do you ever make any call to Kisan Call Centre(i.e.1551)?		53	44.17	67	55.83
10.	Do you heard about Bihar Agricultural University Kisan Help Line?		30	25.00	90	75.00
11.	Do you ever make any call to Bihar Agricultural University Kisan Help Line?		25	20.83	95	79.16
12.	Do have account in any of the social media?	<i>facebook</i>	16	13.33		
		Any other	0	0		

95 It become imperative to know the access and possession of mobile phone as tool of
 96 information interface for farmers, accordingly, number of statements were set and asked to
 97 the respondent based on dichotomous variables(mostly-yes or no). The result showed that
 98 most of the farmers were using smartphone for the last three years and 54.17 per cent
 99 respondents had whatsapp in their mobile. It was also noted that 58.33 per cent respondents
 100 access internet in their mobile. Farmers also called to Kisan Call Centre(i.e.1551) for
 101 advisory service(44.17%) and only 13.33 per cent farmers use facebook(social Media) as
 102 general purpose(Table 3). Mobile phones as a primary conduit for agricultural information
 103 and services(Steinfeld *et al.*, 2015),and presents an opportunity to strengthen market linkage.
 104 However,the cost of mobile phone airtime recharge vouchers and the lack of electricity for
 105 recharging phone batteries are the major impediments to the use of mobile phones(Okello *et*
 106 *al.* 2010).

107 **Table 4: Rank Position of Farmers' Perception towards Mobile Phone Advisory Service**
 108 **Potential in Decision Making in Farming**

109 n=120

Sl.No.	Farmers' Perception	Weighted Mean	Rank	
			Broad Areas Specific	Overall
A.	Access of information in anytime	4.87		I
i.	Mobiles are potential tools to reach the unreached	4.50	I	I
ii.	Any time retrieval of text message is possible in mobile advisory services	4.03	II	III
iii.	In physical absence of expert, mobile advisory leads adoption of technology and information	3.37	III	XVI
iv.	Mobile advisories can replace the personal extension contact methods	3.13	IV	XVII
v.	Mobile technology deliver personalized information	2.56	V	XXIII
B.	Enhancing social esteem and upscaling	4.11		II
i.	Better informed farmers are better decision makers	4.37	I	II
ii.	Mobile advisory subscription enhances self esteem and reputation of a farmers	3.90	II	V
iii.	Mobile advisories can meet location specific needs of the farmers	3.80	III	VII
iv.	Farmer's interaction can be up scaled with mobile advisories.	3.70	IV	IX
C.	Challenges in use of mobile service	3.97		III
i.	Illiteracy is a constraint in using mobile information services	3.93	I	IV
ii.	Absence of smartphone create problem in getting proper advisory service.	3.87	II	VI
iii.	Higher mobile use skill is needed to receive and read the messages	3.80	III	VII
iv.	Mobile advisory usage requires high level of literacy	3.07	IV	XVIII
v.	Mobile technology access is difficult for resource poor farmers	3.06	V	XIX
vi.	Only rich farmers are affordable to use mobile agro advisories	3.03	VI	XX
vii.	Mobile advisory subscription will increase the phone recharge expenditures	2.80	VII	XXI
D.	Sustainability and farm planning	3.74		IV
i.	Relevance of the message decides the sustainable mobile advisory usage	3.77	I	VIII
ii.	Mobile advisories save travel time / cost of the	3.66	II	X

	farmers.			
iii.	Mobile advisories helps farmers in farm planning exercises	3.60	III	XI
F.	Information Sharing and feedback	3.41		V
i.	Early feedback can be obtained through mobile advisory service than traditional extension methods	3.50	I	XIII
ii.	Mobile Phones offers high mobility to users	3.49	II	XIV
iii.	Sharing of information will be easier via mobile technology	3.38	III	XV
iv.	Anytime anywhere message delivery is possible through mobile advisory services	2.67	IV	XXII
G.	Socio- economic development and cost in access	3.11		VI
i.	As a knowledge disseminating tool, mobile technology will contribute for socio- economic development	3.60	I	XII
ii.	Mobile handsets facilitate low cost access to information	2.03	II	XXIV

110 Farmers' Perception towards Mobile Phone Advisory Service Potential in Decision Making
111 in Farming is assessed in terms of broad areas of Access of information in
112 anytime;Enhancing social esteem and upscaling; Challenges in use of mobile
113 service;Sustainability and farm planning, Information Sharing and feedback; and Socio-
114 economic development and cost in access. The finding reveals that mobiles are potential tools
115 to reach the unreached(Rank I) and any time retrieval of text message is possible in mobile
116 advisory services(Rank II) are major perceived factors in relation to broad area of
117 Information access. Regarding the Enhancing social esteem and upscaling, it is noted that
118 major perceived factors are better informed farmers are better decision makers(Rank I) and
119 mobile advisory subscription enhances self esteem and reputation of a farmers(Rank II).
120 While farmer also faces challenges in use of mobile service in relation to illiteracy is a
121 constraint in using mobile information services(Rank I) and absence of smartphone create
122 problem in getting proper advisory service(Rank II). Regarding Sustainability and farm
123 planning the mobile advisory service contribute in Relevance of the message decides the
124 sustainable mobile advisory usage(Rank I),Mobile advisories save travel time / cost of the
125 farmers(Rank II) and mobile advisories helps farmers in farm planning exercises(Rank
126 III).Regarding the Information Sharing and feedback in mobile advisory service, the major
127 factors are receiving of early feedback(Rank I), Mobility in Use(Rank II) and easy sharing of
128 information (Rank III)(Table 4).

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133 **Table 5: Rank Position of Broad Areas of Farmers' Perception towards Mobile phone**
 134 **Advisory Service Potential in Decision Making in Farming**

135 n=120

Sl. No.	Farmers perception	Weighted Mean	Rank
1.	Access of information in anytime	4.87	I
2.	Enhancing social esteem and upscaling	4.11	II
3.	Challenges in use of mobile service	3.97	III
4.	Sustainability and farm planning	3.74	IV
5.	Information Sharing and feedback	3.41	V
6.	Socio- economic development and cost in access	3.11	VI

136 Amongst the different broad areas of farmers Perception towards Mobile phone Advisory
 137 Service Potential in Decision Making in Farming, the major perceived areas are Access of
 138 information in anytime(Rank I),Enhancing social esteem and upscaling(Rank II) and
 139 Constraints in use of mobile service(Rank III)(Table 5).

140 It becomes imperative to know farmers decision making in farming in relation to their
 141 perception towards Mobile Phone Advisory Service, accordingly Correlation Coefficient was
 142 assessed. It was noted that decision making in farming was positively and significantly
 143 correlated with the variables $X_1(0.458^{**})$, $X_2(0.318^*)$, $X_3(0.486^{**})$, $X_5(0.304^*)$. It implies
 144 that mobile phone advisory service can increase any time access of information, promote
 145 social esteem of farmers, better information sharing and ultimately it assisted farmers in
 146 better decision making in farming(Table 6). It was also note that socio-economic variables
 147 age is positively and significantly correlated with access of information in anytime(X_1 :
 148 0.486^{**}), Education level is positively and significantly correlated with access of information
 149 in anytime(X_1 : 0.327^*) and challenges in use of mobile service($X_3:0.356^*$). It is also
 150 observed that annual income of farmers was positively significantly correlated with access of
 151 information in anytime(X_1 : 0.321^*), Enhancing social esteem and upscaling(X_2 : 0.376^*) and
 152 Challenges in use of mobile service(X_3 : 0.387^*)(Table 7).

153 **Table 6: Correlation Coefficient between Farmers' Perception towards Mobile Phone**
 154 **Advisory Service (independent variables) and Decision Making in farming (dependent**
 155 **variable)**

156 n=120

Sl. No.	Farmers perceptions	Correlation Co-efficient (r)
1.	Access of information in anytime(X_1)	0.458**
2.	Enhancing social esteem and upscaling(X_2)	0.318*
3.	Challenges in use of mobile service(X_3)	0.421**

4.	Sustainability and farm planning(X ₄)	0.187 ^{NS}
5.	Information Sharing and feedback(X ₅)	0.304*
6.	Socio- economic development and cost in access(X ₆)	0.156 ^{NS}

157 **Correlation is significant at the 0.01 level.

158 *Correlation is significant at the 0.05 level .

159 ^{NS} Not Significant

160 **Table 7:** Correlation Coefficient between Farmers' Perception towards Mobile Advisory
161 Service Potential and Demographic variables

162 n=120

Sl. No.	Farmers perception	Correlation Co-efficient			
		r ₁	r ₂	r ₃	r ₄
1.	Access of information in anytime(X ₁)	0.486**	0.327*	0.287*	0.321*
2.	Enhancing social esteem and upscaling(X ₂)	0.167 ^{NS}	0.178 ^{NS}	0.312*	0.376*
3.	Challenges in use of mobile service(X ₃)	0.167 ^{NS}	0.356*	0.173 ^{NS}	0.387*
4.	Sustainability and farm planning(X ₄)	0.189 ^{NS}	0.298*	0.128 ^{NS}	0.198 ^{NS}
5.	Information Sharing and feedback(X ₅)	0.194 ^{NS}	0.187 ^{NS}	0.432*	0.231*
6.	Socio- economic development and cost in access(X ₆)	0.145 ^{NS}	0.178 ^{NS}	0.139 ^{NS}	0.368*

163 **Correlation is significant at the 0.01 level.

164 *Correlation is significant at the 0.05 level .

165 ^{NS} Not Significant

166 r₁= Correlation Coefficient of Age, r₂= Correlation Coefficient of Education level

167 r₃= Correlation Coefficient of Farming Experience , r₄= Correlation Coefficient of Annual
168 Income

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170 **Table 8: ICT Tools usage by Farmers**

171 n=120

Sl. No.	ICT tools	f*	Per cent
1.	Whatsapp Group	70	58.33
2.	Mobile SMS	95	79.17
3.	Bihar Krishi Apps(Mobile Apps)	54	45.00
4.	Video Screening through LCD Projectors	110	91.67
5.	Video Screening from Youtube (Social Media)	58	48.33
6.	Attending farmers personal phone call	40	33.33
7.	E-leaflet	55	45.83

172 *Multiple response

173 Due to the progress of Information and Communication Technology(ICT) and high
174 penetration of mobile technology and mobile network in rural areas, the farmers are using

175 number of ICT tools. Farmers ICT tool usage was assessed. From the study, it was noted that
176 farmers used number of ICT tools – Mobile SMS(79.17%), WhatsApp(58.33%), Bihar Krishi
177 Apps(45.00%), Youtube(48.33%) and remaining as shown in table 8.

178 **4. Conclusions and Recommendation**

179 Mobile phones become omnipotent device. Due to availability of low cost basic/feature
180 phone to moderate cost multifunctional smart/android phone, itself become a paramount tools
181 for grassroots extension linkage. Smallholder farmers are future of world agriculture and in
182 national agriculture their contribution in grain production was nonetheless 41 per cent.
183 Farmers considered that Mobile Phone Advisory in farming are prospective tools to reach the
184 unreached; anytime message/content retrieval; farmers can take decision better however,
185 relevance of the message decides the sustainable mobile advisory usage. Being it is very
186 small device, its portability and mobility is high. Farmers decision making in farming is
187 positively and significantly correlated with information access level (0.458**) social esteem
188 and upscaling of mobile advisory usage(0.318*) and information sharing and feedback
189 (0.304*). Socio-economic variable age and education is positively and significantly
190 correlated with access of information in anytime(0.486**). It was noted that 54.17 per cent
191 farmer possessed smart phone and use whatsapp. Bihar Krishi Apps(45%) and Social media
192 youtube(48.33%) are getting popularity among farming community in decision making.
193 Farmers also called to Kisan Call Centre(i.e.1551) for advisory service(44.17%) and only
194 13.33 per cent farmers use facebook(social Media) as general purpose. From the study it can
195 be concluded that more agricultural related information should be make available is social
196 media, agricultural information available in social media should be more localised and
197 customised. Grassroots extension functionaries, agri-input dealers and progressive farmers
198 should be trained to used more ICT tools in general and smartphone in particular. There are
199 number of Agri-Mobile Apps(Kisan Suvidha, IFFCO Kisan Agriculture, RML Farmer –
200 Krishi Mitra, Pusa Krishi, AgriApp, Kheti-badi, Plantix,AgriMarket) support the farmers
201 from seed selection to marketing. Actually, mobile applications (m-apps) hold significant role
202 in providing the most affordable ways for millions of farmers to access information, markets,
203 finance, and governance systems(Qiang *et al.*, 2012).

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COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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