

Innovative extension approach for sustainable agricultural development: WhatsApp groups for farming solution

Abstract

Extension system has to be broadened by incorporating innovative extension approaches to manage present day challenges in agriculture viz., climate change, unpredictable and shifting weather, dwindling resources and population stress. With global competitiveness and market liberalization farmers are required to adjust their production portfolio to the emerging trends in food consumerism in domestic as well as global markets. With improving quality production and better job opportunities in rural areas the livelihood security of the farmers will definitely change the face of Indian agriculture. Sustainable agricultural development is very important for the security of rural livelihood. Farmers need information to make necessary decision to improve their production in agriculture for which a strong network of extension system is functioning, along with government initiative, extension scientists and functionaries working for agricultural development. The role of extension system is to groom farmer into the most intelligent and aware decision maker. The use of internet, mobile and video- conferencing assists them for their favours. Surveys reported that sixty per cent of the farmer households did not assess any information on modern technology. Lack of better and up-to-date information that has made most farmers make uninformed decisions on farming practices leading to unnecessary losses Mobile internet in India has the strong potential to improve small farmer's access to agricultural knowledge and information. The internet and social media penetration are likely to increase substantially in near future. Here lies an opportunity to use social media for sharing agrarian information to rural mobile internet users. WhatsApp; one of the most popular social media tools offers many unique advantages, which makes it a potent agricultural extension tool. However, its use is ushered by many tasks, which also need to be addressed, to use it effectively.

Keywords: Extension approaches, farmers, extension system, WhatsApp groups, innovative technology

INTRODUCTION

32 India is predominantly an agrarian country where 70 per cent of the population is
33 directly or indirectly involved in agriculture and allied sectors. People depend on agriculture
34 for their livelihood. Agriculture stands on the very complex interaction between biological,
35 climatic and geographical factors in addition to human activities. Agricultural system is
36 unpredictable, unstable, subjective, site specific and reliant on empirical decision given the
37 inherited variability of biological phenomena. In spite of nation's priorities and developmental
38 strategies in post-independence period where greater emphasis is placed on reducing poverty,
39 hunger and ensuring quality of life to its people, we are still ranked low in human
40 development index. People particularly small, marginal and landless farm households are
41 living under deprived conditions and far from the reach of modern age amenities. Good
42 education, better health facilities, required skill and attitude for successful living are beyond
43 the reach of poor people. Living conditions of people are very miserable in terms of health,
44 nutrition etc. India has about 6.4 lakh villages most with appalling physical infrastructure
45 (road, power, and telecom), groaning social infrastructure (education and health) and an
46 underdeveloped institution (banking and marketing). Most of the villages are caught in the
47 malicious cycle of poor connectivity, low productivity, low income and low consumption.

48 Agriculture sector provides employment to 65 per cent of the population. Agriculture
49 alone contributes 24 per cent of our total GDP. Our economy is based on agriculture but the
50 condition of both farmers and farming is really serious. Agriculture and allied sectors are
51 providing employment and livelihood to many of the rural households. The green revolution
52 of sixties – seventies has changed the face of Indian agriculture but now it seems that the new
53 approaches are required to meet present day challenges to compete in the global market. Our
54 farmers are still using labour intensive agriculture production technique and there is lack of
55 attitude for diversification in agriculture. Most of our farmers are unaware of recent
56 technologies and global demand. With the increasing load of population and stagnated
57 agriculture production this sector is headed for collapse. Smallholder farming systems in
58 India are much less productive and profitable as they should be (GOI, 2015). As per census
59 2011, 54.3 percent of the population of India is engaged in agriculture (GOI, 2015).
60 Technology and information gap seems to be one of the major factors for poor agricultural
61 productivity (Singh, 2002). This breach seems to be the result of insufficiencies of the current
62 agricultural information delivery system. Yield increases of 50 percent or more often occur;
63 when improved inputs are used, and better technology and knowledge applied. Limited
64 coverage, insufficient focus and attention to extension, shortage of manpower, budgetary
65 constraints, infrequent interaction and absence of regular feedback have affected the quality

66 of agricultural advisory services (Birner and Anderson, 2007; Cole and Fernando, 2012; Kaka
67 *et al.* 2014; Glendenning *et al.* 2010).

68 To meet the present-day challenges in agriculture due to climate change and global
69 competitiveness and to meet out the technology gap, there is an urgent need to reform
70 agriculture system. Lack of better and up-to-date information that has made most farmers
71 make uninformed decisions on farming practices leading to unnecessary losses. Scientific
72 approach is required at the level of actual user to meet the challenge. Low-cost information
73 and communication technology (ICT) tools promise the ability to deliver timely, relevant, and
74 actionable information to farmers throughout the world (Aker, 2010; Cole and Fernando,
75 2012, World Bank, 2016). Among these tools, the mobile internet offers a futuristic scope for
76 access to varied forms of dynamic information needed in agricultural production. The use of
77 smart phones to provide localized agricultural information can help to reduce crop losses,
78 improve yields as well as has a much more powerful equalizing effect on the incomes of
79 small farmers, including rural women (Shoham, 2015). Smart phone users spend considerably
80 more time on social media platforms such as WhatsApp. Thus, there exists an ample
81 opportunity to utilize WhatsApp for agricultural extension activities. This article reviews the
82 scope of WhatsApp in enhancing the coverage of traditional agricultural extension.

83 WhatsApp group for farming solution is a recent extension approach with the aid of
84 internet and smart phones. Presently, most of the mobile agricultural information services
85 being delivered in Asia are voiced and SMS based services. The ratio of featured phone users
86 to the smart phone users in developing countries is nearly four to one (FAO, 2012). The
87 number of internet users in India are likely to be over 500 million by 2020 (Morgan Stanley,
88 2015). In rural India, mobiles have become major ways to access the internet. Rural mobile
89 internet use has grown from less than a million in 2010 to 25 million people in 2014. This
90 rapid spread of mobile technology in rural areas of India offers a fresh channel for delivering
91 agricultural services and an opportunity to engage countrified communities in new ways
92 (Vodafone Foundation, 2015).

93 Whatsapp has over a billion-people using it to stay in touch with their friends and
94 families worldwide. It is trendy to use it even more for agricultural information sharing.
95 WhatsApp offers is a form of a social media tool that enables one to many and many to many
96 types of conversation and sharing information and facilitating discussion (Andres and
97 Woodard, 2013). It has become the most preferred mode of communication among the smart
98 phone using farmers. One can share information in multiple forms ranging from text-based

99 messages to audios, visuals; audio-visual and even web links making it an information
100 enriched platform. Additionally, information sharing is possible at any place and at any time
101 without worrying about background disturbances. This tool is simpler and easy to use, has
102 low internet data requirements, and is increasingly popular in rural India. Thus, it has a strong
103 potential to be a viable agricultural extension tool for extension-based organisations in
104 general and extension educators, in particular, to reach out to the WhatsApp using farming
105 clientele. The applications of WhatsApp in agriculture are diverse. However, efficient use of
106 WhatsApp goes beyond mere by information dissemination to exchange and user rendezvous.

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108 **Advantages of using WhatsApp**

109 **1. Most convenient and suitable way of communicating with the farmers**

110 The existing forms of extension education methods *viz.*, face to face, mass media, etc.
111 require a considerable time and efforts to communicate with the farmers. Farmers have to
112 take efforts to reach plant clinics and to meet specialists. Mass media methods demand high
113 infrastructure requirements, content preparation, refinement and delivery to produce the
114 desired effect. In contrast, WhatsApp seems to be a relatively easier and simpler ICT tool for
115 farmers. This does not require much of ICT skills. It can be easily operated through mobile
116 internet.

117 **2. Requires lesser internet data demands**

118 WhatsApp requires less internet when compared to other applications, which is highly
119 beneficial for farmers. WhatsApp usage has reduced transaction costs as well as made
120 interaction with farmers more frequent. In the Indian State of Karnataka, the Department of
121 Agriculture has made it mandatory for its development officials to have a smartphone so that
122 they could share information, messages, and circulars through WhatsApp (Chander, 2016).

123 **3. Extends scope for agricultural extension**

124 Extension services can be rendered very easily to the agricultural community in need
125 instantly. Mass Media is one of the most popular medium of stemming information as almost
126 20 percent of farming community get information from them (NSSO, 2014). WhatsApp as an
127 extension tool already has a huge user base globally as well as in developing countries.
128 Within few seconds, one can disseminate information to a large number of intended and
129 unintended recipients beyond limitations of time and geographical boundaries. Opportunities
130 for further feedback and clarifications are high through this tool. Similarly, office hours of
131 work are limited to extension educators. WhatsApp offers a communication approach that
132 can be quite flexible, which is rapid and prompt. Sufficient snippets of information

133 dissemination can also be delivered through WhatsApp. This is possible through WhatsApp
134 web version in which one can use desktop/laptop keyboard to type faster and with greater
135 ease. Further, it's now quite easy to send a message through WhatsApp in most of the Indian
136 and foreign languages. Thus, WhatsApp has the potential to enhance the coverage and scope
137 of extension.

138 **4. Proper information delivery**

139 In other methods of information delivery such as verbal methods, including mobile
140 call centre services; chances of loss of vital information are high. Information may be
141 incompletely understood, retained, forgotten during face to face and mass media (Television,
142 Radio) extension methods. In WhatsApp, the information storage, archival and transfer to
143 hard data-storage devices such as a computer is also possible. Further, information can be
144 delivered in multiple ways such as audios, texts, visuals, and audio-visuals. The
145 understanding of the message would, therefore, would be relatively high, through this
146 medium.

147 **5. Highly participative and user friendly**

148 Current extension education activities are largely one way of information delivery.
149 Training lectures, mobile based agro advisory services offer fewer opportunities to farmers to
150 respond and ask queries. The farmers may remain hesitant to clarify his doubts, and many of
151 his queries may remain unanswered. WhatsApp has the potential to reduce these limitations.
152 Even hesitant and shy farmers can participate through encouragement and support. User
153 feedback is easier to receive, and it is prompt. One can communicate instantaneously through
154 multiple ways in one to one, one to many and many to many ways.

155 **6. Encourages peer learning**

156 Learning is amplified, and knowledge becomes more widely available as the network of
157 people, tools and connections strengthen. WhatsApp groups fulfil requirements of this kind of
158 learning as it can promote farmer networking and interaction. It is easier for farmers to
159 communicate with peers, extension professionals and experts in real time. Many times, fellow
160 farmers answer the queries of other farmers. This has the potential to build networking and
161 trust among each other.

162 **7. WhatsApp is more advantageous than Kisan Call Centers**

163 The government of India uses mKisan portal in which farmer queries are addressed through
164 the inflow of calls in Kisan Call centres. These centres along with SMS based services offer a
165 good piece of information to the farmers. However, there are certain limitations of this
166 mechanism. Many of the farmers report that the information offered through these centres is

167 sometimes very general in nature. Diagnosing the problem in detail and delivering prompt
168 need-based answers is lacking. These limitations can be overcome through the use of
169 WhatsApp. The queries can be posted in type of pictures and audio-visual format. This
170 arrangement can improve diagnosis and advice to the farmers (Mittal *et al.*, 2010). Further,
171 farmers can post a query at any time and at any place irrespective of background ambient
172 noises and other disturbances. The resource person has ample time to think and refers to the
173 query in detail. The assessment of farmer's query is better through this platform. Thus, the
174 possibility of relevant and accurate information delivery remains much higher through this
175 platform. Furthermore, there are greater chances of peer discussions and learning, which are
176 impossible through mobile advisory services. Furthermore, important answered queries and
177 discussions can be archived for future reference.

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179 **Applications of WhatsApp in agricultural extension**

180 **1. Plant-based diagnostic support**

181 Information on how to diagnose and treat plant disease and pest attack is important for
182 farmers. Plant diseases and pests that could wipe out the entire crop is one of the biggest risks
183 that farmers face (Mittal *et al.*, 2010). Lack of awareness, distant locations and long hours of
184 diligence and work makes farmer's reluctant to visit plant clinics to seek timely plant
185 diagnostic support. Even with the toll-free calls due to longer call waiting for services, noise
186 disturbances, poor voice quality due to network problems, use of more technical language,
187 lack of audio-visual backup may affect the quality of information delivered. WhatsApp has
188 certain unique advantages in this regard. First is that it does not suffer from geographical and
189 time limitations. At an instant, farmers can post his/her query without visiting the agriculture
190 centre. This can save a considerable amount of time, money as well as the worry of the
191 farmers. They can post pictures of different parts (leaves, stem, fruits, and roots) of infected
192 crops. This can be supplemented through text or even a short-duration video. WhatsApp
193 provides a good medium in which farmers can receive crop diagnostic support services.
194 Besides, the resource person has greater freedom to think and even discuss the plant health
195 problem and is more able to diagnose the problem due to a visual examination which is
196 impossible in case of many existing mobiles-based agricultural information services.
197 Furthermore, during answering query the other farmers facing a similar type of problem are
198 as well likely to find answers to their problems. Thus, WhatsApp offers a better alternative
199 than toll-free Kisan Call centre which farmers have reported to be more general in nature.

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2. Livestock based diagnostic support.

The occurrence of new diseases poses as an unforeseen problem to farmer leaving him clueless and in a confused state. This along with another labour demanding routine agricultural chores delay timely intervention needed to the ailing animal. As a result, due to negligence the owner faces several animal production losses. WhatsApp can provide timely information and advice and can significantly reduce major complications likely to emerge in case the animal remains unattended by the basic veterinary aids. Basic first aid support for a number of animal health problems such as seasonal diarrhoea, heat stress, worm load, mineral deficiency diseases, minor digestive disorders, wounds, reduced feed intake and decreased milk production can be offered through this platform. Furthermore, receiving feedback about/on recovered animal is easier through this platform. This can definitely improve the quality of disease diagnosis and timely veterinary aid. After receiving the queries from different experts, the mediator can share the pooled advice in an easily understandable form to the farmer clientele (Thakur, 2016).

Challenges of using WhatsApp in agriculture

- 1. Diversity among the groups:** The group members were randomly selected and as a result, there are variations in terms of age, education, cultural background as well as the type of agricultural enterprise. The group members of varied and mixed enterprises carrying out activities in cereal production, vegetable production, dairy production, goat entrepreneurship, poultry, horticulturalism and floriculturalism etc. Further, they undertake agriculture as either a full-time or as a subsidiary activity. The only commonality among them is that they are WhatsApp users. Due to their different backgrounds, information delivery suited to their needs remains a challenge.
- 2. Requires regular attention:** Use of social media requires regular and frequent attention. Sometimes members may post impertinent contents in form of promotional messages, jokes, etc. Hence; the members may be reminded not to post such type of irrelevant messages in the group. Repeated offenders may be removed from the group. Furthermore, the quality of images received through farmer participants of the group may sometimes be poor in offering diagnostic information and advice to them.
- 3. Commitment of Administrators:** WhatsApp usage in agricultural extension requires committed time and effort of administrators and to a certain extent, from the members as well. One has to keep on posting something new, which must be pertinent to the farmers (Yadav *et al.* 2015). Similarly, information received through mobile phones

235 have also been criticised by farmers as generic, old and of routine nature surprising as
236 locally contextual content has productivity (Mittal *et al.*, 2010). Content curation, as
237 well as content management, can, therefore, be the biggest challenge of using
238 WhatsApp for the farmers. Often farmers in developing countries have limited
239 internet data pack availability. So, care should be taken about posting excessive
240 updates, which may create unnecessary information overload as well lost of internet
241 data to them. Instead, periodic short snippets of information can be offered.

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243 **Success stories of WhatsApp groups**

244 There were a lot of success stories of WhatsApp groups as a farming solution. Few
245 are discussed below:

246 Punjab WhatsApp group “Young innovative farmers” is a recent success of this
247 technology dissemination. Farmers in Punjab can now get immediate advice via a WhatsApp
248 group “Young Innovative Farmers”, about soil health, use of fertilisers and pesticides and
249 from crop health to seed procurement. The group was set up by Gurdaspur Agriculture
250 Development Officer, Dr Amrik Singh. “Moreover, the farmers in the group have set up their
251 own groups with local farmers to disseminate the information,”

252 WhatsApp groups connects farmers with each other. One particular WhatsApp group,
253 ‘Baliraja’, allows farmers from various villages to seek and share agriculture advice as well
254 as connect with experts in various fields and learn new practices. This group has now been
255 active for over two years and was founded by Anil Bandawane, a farmer from Junnar close to
256 Pune. Bandawane said that he began the group “to discuss exotic vegetables like broccoli,
257 zucchini which are in demand in urban markets. But the biggest discussion is always about
258 soil and the rain. The group’s membership grew from 100 to more than 400.

259 In a novel initiative to promote organic farming, Neeleshwaram municipality of
260 Kerala state has embarked on an ambitious project by forming a ‘WhatsApp’ group of stake
261 holders to streamline cultivation making use of available barren land. The group coordinated
262 by the municipal Secretary has councillors, aspiring group farmers, Kerala Agriculture
263 University experts, Agriculture officials, Community Development Society (CDS) members,
264 and vegetable vendors.

265 In a distant, dusty village in India with no motorable road and poor electrical
266 connectivity, a cow owned by a farm woman is sick and there is no veterinarian around.
267 Normally, she would have lost her cow but with her recently purchased mobile phone, she
268 could connect with the veterinary doctor in WhatsApp and got the needed advice on time. Yet

269 another farmer in a remote, mountainous terrain in the north-eastern part of India finds the
 270 leaves of his chilies curling. Fearing crop failure, he takes photos of the affected plants sends
 271 them via WhatsApp to the expert in the nearest agricultural university seeking advice so he
 272 could save his crop (Kamal, 2016).

273 In the Indian state of Karnataka, the Department of Agriculture made it mandatory for
 274 agricultural development officials to have smartphones so that they could share information,
 275 messages, and circulars through WhatsApp, even before hard copies could reach them. This
 276 helped officials to take quick action and improve their interactions with farmers in distress.

277 . Farmers are even using WhatsApp to connect with consumers and to sell vegetables
 278 via WhatsApp groups. In India, WhatsApp is even changing the way people grow and buy
 279 food. Some agripreneurs have turned WhatsApp into a classified marketplace helping farmers
 280 to trade grains, vegetables, seeds, irrigation equipment and tractors, and more.

281 At the Indian Veterinary Research Institute, the Krishi Vigyan Kendra (KVK)
 282 manages a WhatsApp group consisting of 256 farmers and agricultural scientists. On average,
 283 10 to 12 queries are posted daily in this group, which is considered by the participating
 284 farmers as very beneficial.

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286 WhatsApp group have been shared below in Table 1: (Kamal, 2016; Vora, 2015)

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288 **Table 1. Examples of popular WhatsApp groups for farming solution in India**

Name of the group	Information about members	Administrator of the group	Type of content shared
Krishi Jagran group	Farmers of states of Rajasthan, Uttar Pradesh, Madhya Pradesh, Maharashtra	Farmer Entrepreneur	Information about crop varieties, soil management, irrigation practices, agricultural machinery, input companies, marketing prices of various commodities
Pasupalan group	Farmers of states of Rajasthan, Maharashtra, Madhya Pradesh, Rajasthan Uttar Pradesh Haryana and Gujarat	Veterinarian	Information about livestock breeds, feeding and health management.
Balirajja	Farmers of states of Maharashtra	Farmer Entrepreneur	1. Pictures of agricultural Produce 2. General information on agriculture problems.
Young	Farmers of state of	Agricultural	1. Information about seed

Progressive farmers group	Punjab,	officer, Punjab	treatment of wheat and paddy 2.Information about soil testing based application of phosphate fertilizers in the cultivation of paddy 3. Awareness regarding management of yellow rust disease in addition to information about training camps to be organized.
5.Goat	Farmers of Pune and Mumbai	Managed by Farmer Entrepreneur	1.Photos of Live animals 2.Negotiations of selling and buying

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290 CONCLUSION

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Social media platforms are continuously evolving. Online communities tend to be more fickle and fragile as visual cues and body languages are generally lacking (Andres and Woodard, 2013). This can also be a challenge while using social media platforms to communicate with farmer clientele. This is a technology that depends on upon the human interface. Unless the users are enthusiastic about its use, this platform would not succeed. WhatsApp is actually transforming agriculture value chain actors such as agro dealers, agribusiness SMEs, and agriculture extension workers creating value for smallholder farmers. Rather than travelling long distances to farmers' fields, extension agents are increasingly using either mobiles or a combination of phone calls, text, videos, and the Internet. This reduces transaction costs and interacting with farmers becomes more frequent. As youngsters are the back bone of our country attracting youth with latest technologies like 'WhatsApp' groups will encourage their involvement in agriculture. WhatsApp is an easy and cost effective way to establish and maintain linkages with smartphone farmer clientele. As researchers, it does let us know more about agricultural problems at the grassroots level. As an extensionist, it helps build trust and credibility among the farmers. Overall, it is a wonderful tool to promote and support networking, encouragement and enthusiasm among the farmers. Extension-based organisations should encourage and support this innovative outreach tool.

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