The social impact of ICT-enabled interventions among rural Indian farmers as seen through eKutir's VeggieLite intervention

How is Digitalization Affecting Agri-food?

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https://doi.org/10.4324/9780429203701-11

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Introduction

The agriculture–food value chain is at the core of economic growth and human development in India. Agriculture and food sectors contribute over 20% to India's GDP and employ more than 50% of India's population. At the same time, the agri-food sectors also shoulder the onus of securing the nutritional security for a population that is simultaneously fighting poverty, undernutrition, and overnutrition (Moore et al., 2015). Various approaches – for and not-for-profit – have been offered as a means of addressing the endemic nature of rural poverty and undernutrition. eKutir, a social enterprise, has sought to address rural poverty through a team of microentrepreneurs that leverage information and communication technologies (ICT) to connect farmers more efficiently with markets. Microentrepreneurs engage with farmers on an everyday basis using eKutir's ICT-based digital platform (Jha et al., 2016). Microentrepreneurs are trained in (social) entrepreneurship, ICT, inputs, and market access and best practices in farming, including farm soil-testing, fertilizers, seeds and crop nutrients, and pest management. Each microentrepreneur manages roughly 200 smallholder farmers.

Core to eKutir's ICT platform is eAgrosuite, which consists of various digital technologies capturing, monitoring, and managing data and various transactions. For example, a nutrition management tool called mrittika (soil in local language) was developed to test soil quality both quickly and affordably and provide recommendations to farmers about what types of and how much fertilizer to use. Another digital tool called ankur provides recommendations on which seed varieties to use based on local soil and climate conditions, the type of crop being sought, and the growing season. Additionally, a Farmer Portfolio Management Tool, which links farmers to agricultural experts, agricultural input providers and buyers, was developed to streamline farmers' production and distribution channels. The data gathered from individual farmer transactions are used to create a more efficient and effective supply of agricultural produce to the market, obtain high quality inputs at a lower price for farmers, and a better sales price for the farmers (Jha et al., 2016).

Social impact

Through its local microentrepreneurs and ICT platform, eKutir has also organized its users into groups of 15–25 members called farmer intervention groups (FIGs). These communities of practice consist of microentrepreneurs and eKutir farmers sharing information and best practices within local FIGs (Moore et al., 2015). FIG members do not yet use digital technology while interacting, but ICT is used to form and manage the FIG by optimizing communication and making offline meetings and interactions increasingly possible in the future. In the process, eKutir has thus fostered a social ecosystem through which it introduces its ICT platform to rural farming communities and engages with local farmers. eKutir's ecosystem serves in practice to re-position farmers within their local social network, giving them access to quality information sooner than farmers not participating in the eKutir program.

A social broker is someone who acts as intermediary between two or more social actors (Burt, 2005). In social network terms, social brokerage represents the capacity that a person may have in coordinating actions across otherwise disconnected parts of a network. Social brokers thus occupy bridging positions within social networks and enable the flow of information and resources more widely across a network (Burt, 2015). Farmers having higher social brokerage have earlier access to diverse market information and an advantage in detecting market opportunities (Burt, 2005). In the remainder of this chapter, we will discuss how eKutir's ecosystem acts on the social brokerage position of its farmer members.

VeggieLite intervention

In 2014, eKutir received funding from Grand Challenges India and the Biotechnology Industry Research Assistance Council of India to implement and evaluate its VeggieLite program among farmers and consumers in Odisha, India. VeggieLite was a value-chain level intervention that aimed to address gaps in the affordability and availability of vegetables and fruits among low-income rural and urban communities. Through the application of the eKutir microentrepreneurial model in rural Odisha and the additional creation of retail microentrepreneurial services, the intervention sought to raise the productivity of farmers, farmer's income, and intake of fruits and vegetables, and make fruits and vegetables more available and affordable to individuals and households residing in slum areas of Bhubaneswar, India. Further details about the purpose of VeggieLite intervention can be found elsewhere.

To assess the effectiveness of the VeggieLite intervention, we used a quasi-experimental evaluation design, with pre- and post-intervention data collected one year apart. To evaluate the effects of the intervention, a rural and urban study sample was created. For the purposes of this chapter, we focus exclusively

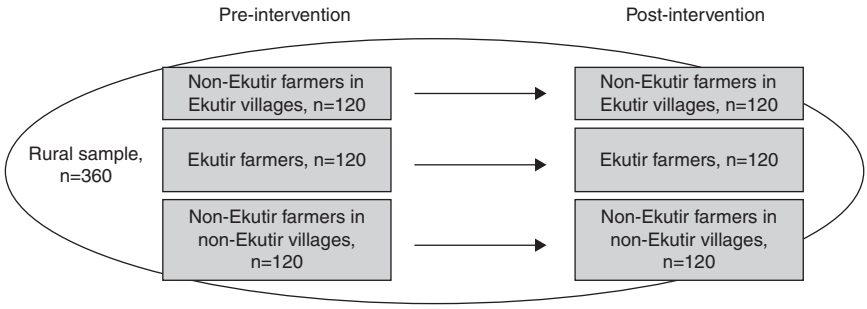

Figure 7.1 VeggieLite evaluation framework in rural Odisha.

on the rural arm of the VeggieLite intervention. Figure 7.1 illustrates the overall evaluation design for the rural arm of the intervention.

Among the 32 rural villages taking part in the evaluation, our quasi-experimental design consisted of three groups: (1) rural farmers using the agricultural microentrepreneurial services and having access to eKutir's retail markets (FMEs+RMEs), (2) rural farmers with access only to the retail markets (RMEs), and (3) farmers in villages unexposed to the eKutir ecosystem (comparison farmers). This three-group design was meant to enable a series of comparative assessments of the effect of the eKutir ecosystem on fruit and vegetable consumption, purchase and production patterns of rural farming households. Further details on the evaluation design may be found elsewhere (Dubé et al., 2020).

Structured household questionnaires were administered at pre- and post-intervention to participating head of households, with questions about household demographics, agricultural production and cropping, fruit and vegetable consumption, and social networks. Baseline questionnaires were administered to the heads of rural households in April/May 2015 with endline questionnaires administered to rural households in April/May 2016 (Moore et al., 2015). For the purposes of this chapter, we focus on the social network module of the rural questionnaires.

The social network module consisted of two name-generator questions asking farmers to name up to three other farmers with whom they have discussed about agriculture in the last three months and up to three farmers with whom they might discuss food matters in the last three months. Farmers might thus name anywhere between zero and six farmers with whom they had agricultural or food discussions. We reviewed the list of farmers' names separately for each of the 32 villages in the VeggieLite intervention to remove redundant names and create a matrix indicating the connections among farmers in the study villages. This matrix was used to construct a quasi-whole network

map of each study village, with these maps used to calculate the social brokerage position of the farmers participating in the evaluation study.

Social brokerage among rural farmers

Figure 7.2 is a snapshot of one part of a village network with the red square or node indicating a farmer with a higher level of social brokerage in the network.

To examine whether the eKutir social ecosystem might affect the social brokerage position of eKutir-participating farmers, we measured the social brokerage of farmers at the beginning and end of the intervention. Furthermore, to assess whether the intervention might affect the social brokerage of eKutir-participating farmers differently than non-participating farmers, we compared the scores of eKutir-participating farmers with those of the other quasi-experimental groups (i.e., the RMEs and comparison farmers).

Multilevel linear regression was used to assess the degree to which the endline levels of social brokerage differed among the farmer groups, while adjusting for baseline levels of social brokerage and accounting for the clustering of farmers

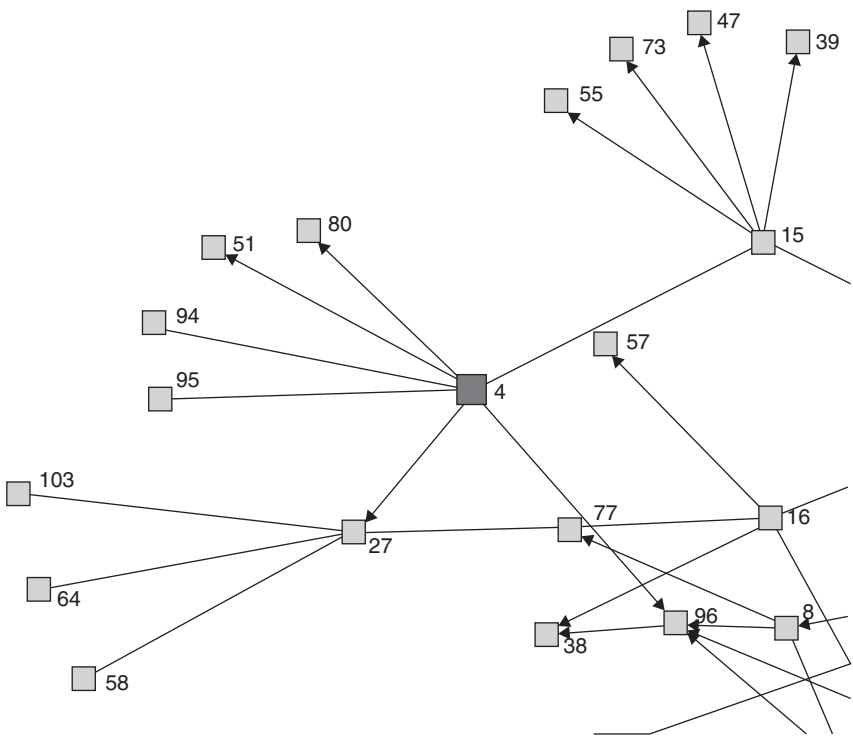

Figure 7.2 Snapshot of social brokerage position in a village network.

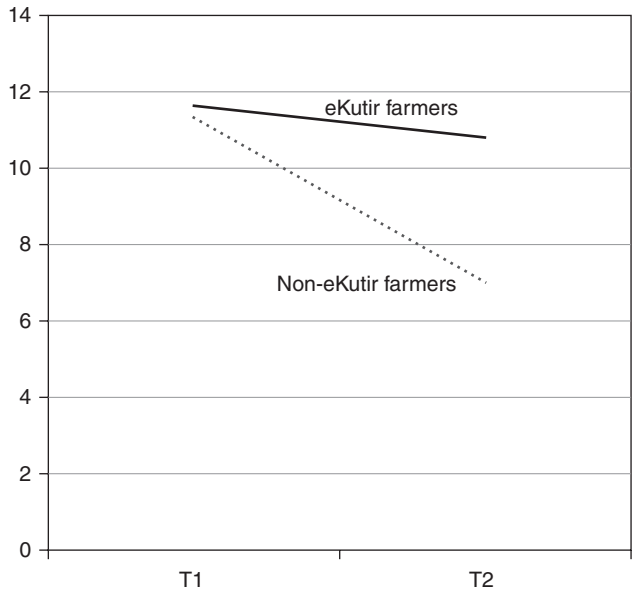

Figure 7.3 Graph comparing one-year change in social brokerage between eKutir-participating farmers and non-participating farmers.

within village networks. Figure 7.3 illustrates graphically the results of these statistical analyses.

Analyses show that the brokerage position of non-participating eKutir farmers declined significantly in comparison to eKutir-participating farmers over the course of one-year intervention. The findings thus suggest that the eKutir ecosystem may have acted to buffer or protect its participating farmers against fluctuations in their brokerage position within villages. In contrast, those farmers outside the eKutir ecosystem of programs – ICT, microentrepreneurs, and FIGs – were more vulnerable to changes in their network connectivity and brokerage role within villages.

Conclusion

Within the context of an ICT-enabled intervention among rural farmers, our study highlights the social impact that such interventions may have on the social networks of rural farmers. Social network data taken from the evaluation of eKutir's VeggieLite intervention suggest that the broader social ecosystem that eKutir created around its microentrepreneur-based program operated in a protective fashion to preserve the social brokerage position of its farmer members. Further research is needed to assess whether this protective role was due in greater part to the ICT-enabled parts of the intervention or the FIG activities.

In addition, comparative research is needed to assess whether interventions led by other social enterprises have similar social impacts on their participating members.

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