

# FACTORS AFFECTING DIFFUSION OF TECHNOLOGY IN AGRICULTURAL EXTENSION

RADHIKA KRISHNAN

ASSISTANT PROFESSOR IN ECONOMICS, NSS COLLEGE, PANDALAM, KERALA, INDIA

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**Abstract:** The technology dissemination in agriculture depends on several factors. The article states about diffusion studies conducted at various parts of the world. Rogerian theory analysed about the various factors affecting adoption and is considered as pioneering work in the field of diffusion studies. Farmers adopt a technology if it is compatible with their condition. Education, social participation and information communication technology are the major factors affecting adoption of technology. The extension agencies should adopt location-specific technology.

**Keywords:** Extension, Diffusion, Technology, Adoption.

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## 1. INTRODUCTION

The technology dissemination in agriculture is very significant to remove food insecurity which is a key factor for both developed and developing countries. The process of technology dissemination in agriculture is called extension which is considered as a public good. The government is bestowed with the responsibility for extension delivery though private sector contributes to some extent. According to Udemezue J C and Osegbu EG (2018) agricultural development is a subset of rural development. Sustainable agricultural development also comprises safeguarding and maintaining productive capacity for the future and increasing productivity without damaging the environment or endangering natural resources.

## 2. LITERATURE REVIEW

The studies on diffusion found out that the curve of diffusion of technology appears to be s-shaped. The extent of adoption of technology depends on several factors according to Rogers (1995) and he had proposed different stages in the process of diffusion. The first stage is the knowledge about the innovation. The farmers are depending more on indigenous knowledge and it is a bit difficult to convince them that the adoption of new technology is beneficial to them. People are divided into five categories according to the scores of adoption index. The relationship of different variables to the level of adoption had been carried out in various parts of the world. The variables like education and literacy are positively linked to adoption index. It was also found out that higher social status, mass media exposure and social participation of farmers are positively related to adoption according to the opinion of Rogers.

Waghmare Vanasree & Waghmare (1987) studied about Kaira district in Gujarat which was the only district where lab-to-land programme of wheat cultivation has been implemented. The dependent variable was the extent of adoption of wheat technology and personal and socio-psychological variables analysed in the study included age, education, occupation, social participation and socio-economic status. The economic variables included were annual income and size of farm. The extension contact, use of information sources, and source credibility were variables related to communication. The study found out that there was increase in wheat production and better management practices were followed by farmers. The knowledge of farmers regarding chemical fertilisers, seed technology, post-harvest technology

etc. improved after the implementation of the programme. The economic impact included increase in production and income and reduced cost.

Dasgupta Sadadal (1989) in his work stated that the diffusion curves of the community are mostly S-shaped, but it varies with communities. The way in which farmers perceive innovation is different, but economic profitability and compatibility are the main factors affecting diffusion rate. Although economic factors have a major role, the unsuitability with existing practices and values that is existing prevents farmers in India to adopt innovations. The personal, situational and social characteristics of farmers have been found to be related to their adoption behavior. The channels of communication used by farmers influence their adoption behavior and they prefer personal channels to impersonal ones. Rather than mass media it is the opinion leaders that influence the farmers who want information.

The article by Gatecha et al. (2012) studied the information needs of farmers of Makueni County, Kenya. The survey was conducted among 234 farmers of the area to assess Pigeon Pea improvement project of International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The study revealed that 39% of the respondents had difficulty in obtaining information about the improved pigeon pea varieties. The age is a factor which affected Farmers' acquaintance to radio and field days and the age group between 36 and 55 were receiving more agricultural information than others. The more educated farmers are using radio, ICRISAT staff, Television etc. for obtaining agricultural information. The data showed that the most frequently used networks for receiving agricultural information are fellow farmers and the least information was obtained from brochures and newspapers. This supports Rogerian theory of Innovation which stated that interpersonal channels are more effective in persuading individuals to accept a new idea. The authors stated that ICRISAT should strive for improving adoption practices among farmers as 59% of farmers of the area are still using traditional varieties of pigeonPea.

The article by Cangura et al. (2011) studied about the case of Mozambique by taking the results of nationally representative survey of households in 2005 and used three econometric models, namely an OLS regression, the doubly robust estimator and matching and regression to estimate the economic impact of receipt of extension. The delivery of extension increased farm incomes by 12%. The extension services pointed at richer households rather than poor and this increased income inequality. The richer people adopted technology faster than poor people. The extension services used the richer farmers because it required less time and money to diffuse technology to them. They can be shown as demonstration farmers also. The shortage of staff both in quantity and quality, lack of technology diffusion are prevalent in the African country, Mozambique which makes extension difficult.

Reghunath Namita(2016) in her study on Innovations in Technology Dissemination found that majority of farmers surveyed in the study has a medium level of perception regarding Innovations in Technology Dissemination. The acuity and awareness of farmers were positively and significantly correlated with mass media exposure, extension agency contact, extension participation, and social participation, and innovation proneness, acceptance of innovation, participation efficiency, group interaction and need satisfaction. Lack of awareness about ICT, ineffective training programmes, inadequate training for farmers and extension personnel, unavailability of technology on time are the major constraints identified in the work. Farmer oriented and location specific technology dissemination should be given importance. The indigenous knowledge of the farmers should be combined with modern Information communication Technology to make extension successful.

The Agricultural Knowledge and Information System (AKIS) is a concept developed by Roling (2004) and is widely accepted. In the definition by FAO and the World Bank, the components of the system, includes farmers, educators, researchers and extension personnel. The diffusion of innovation by Rogers is the most popular theory and the theory stated that innovation diffuses among farmers rapidly with the support of extension agents. The negative aspects include increased competition and leads to loss of knowledge and cultural diversity. Transfer of Technology adopts incessant flow of technologies from fundamental scientists, to ultimate users via various intermediaries and delivery mechanisms. The West African farmers are considered to be most innovative and in spite of this the progress is not seen in agriculture. The main reason behind this is the lack of countervailing power of the farmers and they are not like their counterparts .The service institutions and inefficiency of marketing chains affects the farmers. From the point of view of communication certain questions are to be answered which includes what can work in the farming system, how the effects can be scaled etc. The article is concluded by emphasizing the importance of concerted action from the part of scientist, the economist and the lawyer.

### 3. CONCLUSION AND DISCUSSION

The studies which deals with diffusion of technology emphasizes the role of extension services whether the country is developing or developed. The situations of developing countries are different from developed countries. The personal, social characteristics of farmers definitely influence the adoption of technology. Innovations are rejected by farmers because of the incompatibility of the farmers with the existing practices and tradition. The information communication technology can help the extension agencies in the diffusion. Mobile phones and social media which are most popular can be used effectively in the diffusion of technology.

Farmers are heterogeneous in terms of land holdings, ethnicity, education, economic condition, farming systems etc. The public extension systems should focus their work after clearly after considering all the factors. The social participation of farmers is an important factor and the farmer groups can influence the decision pattern of farmers. The differences in agro-ecological zones should be taken into consideration and extension services should adopt location –specific technology. All the countries should have an extension policy taking into consideration the different factors rather than it being a hundred page documents. The extension services should function as agency for technology dissemination and extension worker should be a friend and facilitator to the farmer. The government should allocate more funds and the number of extension agents should be increased. The ratio of extension worker to the farmer should be increased and a farmer-focused approach is very essential.

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