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Innovations in Agriculture: Farmer's Perception

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Abstract

In this paper, the existing agricultural innovation theories and frameworks have been reviewed and it emphasize the role of extrinsic factors such as adopter characteristics and the external environment in the decision-making process. Farmers and scientists need to gain insights into the nature of farming systems and their complex relationships with local conditions and available growth factors. The intrinsic variables such as the potential adopter's awareness, expectations, and attitudes towards innovation play a key role, but less studied. This paper provides an empirical context that incorporates both extrinsic and intrinsic factors in the decision of farmers to develop new agriculture technologies. Finally, the conclusion was made The introduction of agricultural technologies is a dynamic mechanism guided by both explicit and implicit variables and suggests that further research should be carried out in order to clarify the process of implementing agricultural innovations, taking into account all control variables. A mechanistic view of the relationship and acceptance of internal and external factors can simply guarantee durability of focused technologies..

Key words: Agricultural innovation, Analytical framework, Decision-making, Farmer's perception.

Introduction

Great efforts have been made in recent decades to modernize the agriculture in the direction of high productivity and efficiency. It was believed that this so-called cycle of modernization was unilineal: the combination of scale enlargement and new (science-based) technology was viewed as the only way to success. Those who could make this mixture were seen as farmers and scientists of the "vanguard". This method urged farmers to become more market-based and dependent over the use of technologies, external inputs, and capital[1].

There has been a countervailing societal pressure for agricultural reorientation toward sustainable development since 1970s. To accommodate different sustainability requirements in agricultural production systems, the focus on high productivity and productive agriculture had to be modified. Many factors have contributed to the increased interest in the awareness of farmers in this diverse context. These include the discovery that such information is necessarily given the need to re-balance growth factors, increased awareness of the importance of diversity in agriculture, and updated understanding of the essence of innovations and processes of innovation[2].

Agricultural sciences from Von Liebig onwards have conceptualized and recognized production processes as the ongoing arrangement of a wide and versatile variety of growth

factors, literally those factors that influence growth. That growth factor defines an item in the production process that currently or theoretically affects the yields achieved in the production process. The main concern of the agricultural sciences was the upgrade of different growth factors and the necessary modification of others. The lowest growth factor in supply is seen to decide the production level, while the use of other factors clearly affects the cost.

Simultaneously, growth factors also comprise of various tasks and subtasks that make up the process of agricultural labour. Farm labour could be seen as the continuing exploration and shared modification of growth factors. Over the centuries, farmers have tried to identify the limiting growth factors and design new methods of farming in order to go beyond the known limits. From an analytical point of view, several features characterize the innovations of the associated farmers. Definitions include (1) evaluating the importance of initiatives and their effect on other' sub-systems' and/or farm level as whole. (2) Essential input and interactions ' feed-forward. In addition (3) the inventions of farmers emphasize "what could be done" instead of "how things are,"(4) they show the importance given to diversity and (5) the significance of the local horizon.

The upgrade of certain growth factors and the modification of others were largely oriented towards the economic goal of maximizing productivity growth within the modernization process. The related climate movement introduced technological innovations like water management, mechanization, fertilizers and new varieties of plants. Such innovations and the use of external inputs culminated in other growth factors being improved and thus, the yield increases subsequently[3].

There is currently a process in which, due to sustainability criteria, these growth factors play a much less essential role in farm practices. This degradation of certain growth factors in turn leads to a broader set of changes in the production processes. Although some growth factors have to be scaled back, others have to be upgraded. It is important to discover new growth factors that fit the new sustainability demands. In short, what is required is a systematic and thorough reorganization of the production process to create a new ecologically and economically sustainable balance[4].

It is worth noting here that more focus is needed on internal rather than external growth factors in order to help achieve these new social goals. Local environmental conditions and growth factors that are available locally need to be the starting point for achieving sustainable balance. Because of this local knowledge about the farm and its environment, it acquires a new relevance. Because farmers are the important carriers of this knowledge, it is not surprising that the issue of knowledge of farmers is now attracting more attention than before. Knowledge of farmers could be a useful source for better insight of how ecosystems could and could not be changed, how ecosystems could be controlled, and how social systems can be built to fit ecosystems better. Nevertheless, the emphasis on the prospect of using and improving the knowledge of farmers has been obscured for too long in the sense of the dominant system of scientific knowledge.

Agricultural scientists have long believed implicitly or explicitly that agricultural development is something that moves in one direction (e.g. towards high input, high production and hi-tech agriculture). The idea was that there is basically one optimal way to manage a farm given certain conditions. Many used categorizations of farmers such as vanguard farms," followers," early adopters," late adopters' and' laggards that illustrate this concept, namely that everyone is (or ought to be) moving in the same direction, even though some may do so faster than others. Several research studies in recent years have shown that this theory is faulty.

Farms characterized by comparable household composition along with the layouts and working under very similar conditions can still grow along different, economically viable paths. A key factor in understanding these different patterns of farm growth (often called "farming styles") are the diverse approaches, thought patterns and expectations that farmers may have their natural and social environment[5].

1. Change in perspective of innovation*:*

Methods of thinking about innovations have changed significantly in the last decades. In the research culture of "adoption and diffusion of innovations", the fundamental viewpoint was that innovations arise from scientists, are converted by intermediaries and extension agents which are applied by the agricultural professionals. This way of thinking is called the linear innovation paradigm,' as it defines a straight and one-way path between theory and action. The theories about the essence and dynamics of innovation processes have also changed significantly in conjunction with the above. While the tendency was to look at innovation mainly as scientific research and discover a process, the academics now tend to look at innovation as a process of network building, "alignment", "negotiation" and "social learning"[6].

Likewise, many have abandoned the idea that "innovation" could be defined in one-dimensional terms, replaced by the notion that "innovation" consists of different technical and social arrangements (or "sub-innovations") that together form a "coherent novel working whole." When the aim is to arrive at such a novel pattern of coordinated action, farmers and other stakeholder's views and expectations (i.e. knowledge) somehow need to be obtained and integrated into a design process.

2. An analytical framework explaining decision-making:

Considering the complex nonlinear hypothesis whereby technology diffusion influences several variables is one theory whereby does not produce a detailed image of the application process in the study of decision-making. A comprehensive structure is required that takes into account the role in decision-making between different factors. Here researchers present an empirical structure (Fig 1) that covers both extrinsic and intrinsic considerations for the adoption of technology and illustrates the role of both decision making on the implementation and adaptation of agricultural technologies [7].

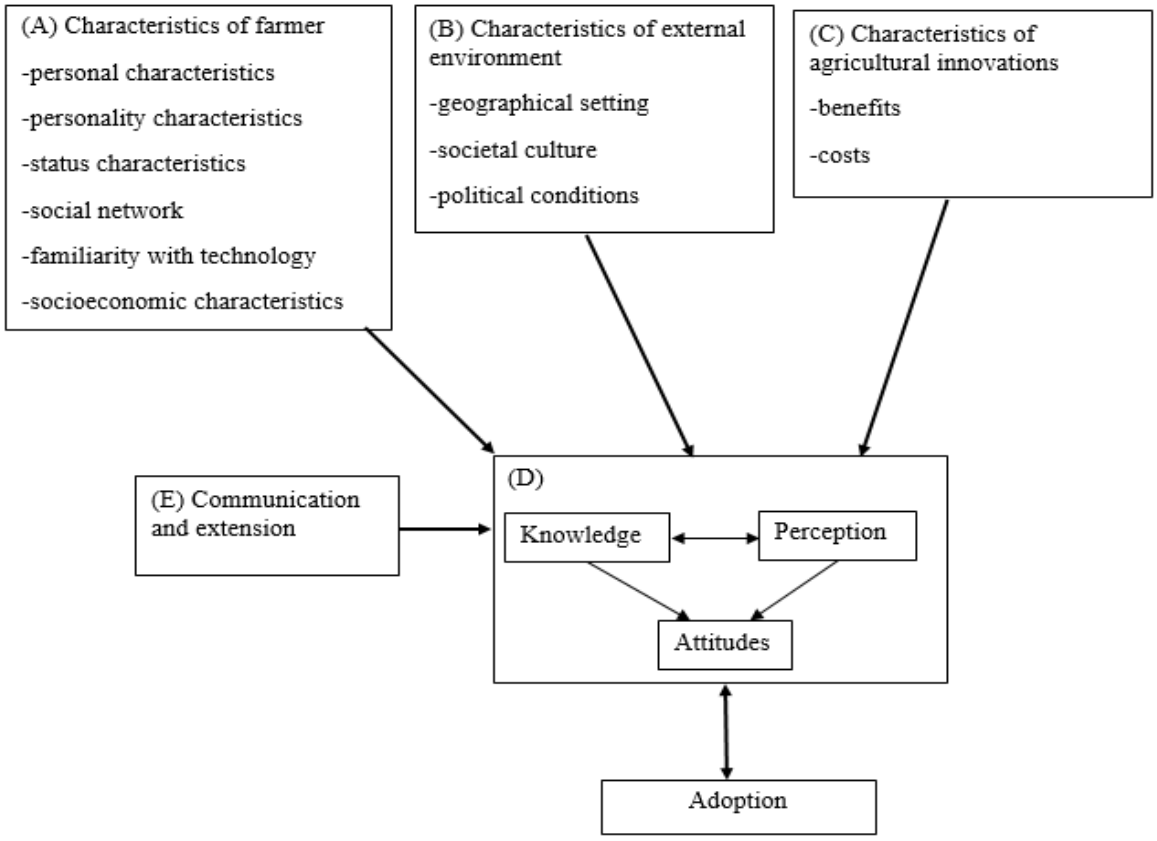

Fig. 1: Conceptual framework showing the linkages and interaction between extrinsic variables (a –c) and intrinsic variables (d), and the influence of the intervening variable (e) in the decision-making process of adoption of agricultural innovations

3. Intrinsic and extrinsic factors:

At the centre of the analytical framework (Fig 1) is the role of knowledge, perceptions and attitudes. Innovations awareness creation is the first step in the implementation decision-creation process, which is in line with the researcher's proposed model. Farmers may be familiar with the nature of a new technology that how to implement it, and what the effects are in terms of goods, yield, potential environmental benefits, risks, and costs. The knowledge a person has about a new technology then forms the basis of this individual's expectations and attitudes towards the technology.

Researchers have identified three mechanisms underpinning beliefs creation. First, in this basis of standard analysis called descriptive conviction, a relation between an object and an attribute can be identified. Second, an attribute could be related to an entity through an inference mechanism from some other assumption about the object, called an inferential belief. Thirdly, it is possible to establish a Connection between the individual and an object by the recognition of external source awareness known as the belief in facts. The perceptions of Farmer about an invention were closely connected to their comprehension. Though knowledge refers to something like the factual knowledge and interpretation of the functioning and accomplishments of the modern technologies, the convictions are connected with the views of farmers defined as the gained requirements and prior experience. Then

together, the awareness and expectations of an idea decide the attitude towards it. According to the planned behaviour theory, the component of the attitude it requires not only action attitude, and moreover subjective normative perceptions and control beliefs interpreted. In this scenario, researcher hopes a constructive approach to farming technology, to enhance the possibility of acceptance and to decrease the risk of implementation.[8].

There are many extrinsic factors that help shape the awareness, behaviours and expectations. Extrinsic variables can be divided into three categories: farmer's characteristics, external climate characteristics, and creativity characteristics. Initially, attitudes, knowledge, and perceptions are affected by the farmer's characteristics that comprises Personal features (age, gender, marriage record, etc.), the socio-economic features (assets, wages, schooling, etc.), the personality features (independence, trust, etc.) and social network roles. Secondly, environmental circumstances often impact knowledge and behaviour, including spatial situations (topology, geography, soil conditions), popular society (tribal history, vocabulary, faith, norms of thinking, philosophies, beliefs etc) as well as political developments (communal land etc.), and so forth. This often influences the production of the outer environment.

Third, the new technology's characteristics also influence the awareness, behaviours and expectations. The advantages and expenses of the novel strategy are the contributions that it may bring to household incomes, food protection, soil fertility growth, food and wellness, firewood and construction materials and the prices of input procurement in the field of organic technologies;, machinery, pest and disease control, etc., that affect awareness, expectations and attitudes [9].

4. The role of extension and communication:

In developing knowledge, expectations and attitudes about agricultural technologies, the role of extension and training is crucial (Fig 1). Researchers identified five simple agro-forestry practices extension models: "Extension to newspapers, 'complementary extension,' 'training through meetings,' 'research and enhancement to agricultural systems' and 'population expansion'." Since current agricultural processes can vary considerably in structure & sophistication in various contexts, it is necessary to take these variations into consideration in adapting extension measures [10].

Increasing focus has been placed on the "Farmer-led growth,' where growers are the main representatives of the community's transition and help others introduce new technologies. The 'growers first' strategy was introduced and stressed the value of local awareness and farmers' creativity to supplement conventional strategies to technological transfer for agricultural study and development. Despite considerable criticism of the method, the concept of connecting agricultural research with the knowledge of farmers was generally accepted.

Nonetheless, one of the considerations that was frequently underestimated in adoption research is the extent to which growers actually are interested in creating and engaging with modern technologies. Modern tech is sometimes referred to as a "finished commodity" and farmers can or should not accept it. Even so, farmers also play with various changes in technology that science research groups appear to overlook. The capacity for efficient and sustainable adoption will improve when growers are capable of adapting and utilize the new technologies in their surrounding ecology.

Literature Review

Considering the environmental impact of industrial agriculture, building on farmer's agro-ecological expertise to develop environment-friendly agricultural systems is crucial. Researchers studied the farmer's knowledge of management of agro-biodiversity and examined how farmer's knowledge and current agricultural contexts would direct potential farming systems in Benin's sub-humid and semi-arid regions. They conducted organized interviews with 180 farmers and used generalized linear models and correlation analysis to explain the information and interpretation of farmer's spatio-temporal dynamics [3].

This study evaluates the farmer's understanding and perception of the causes and impacts of landslides in Eastern Uganda's Bududa district. Open-ended questions were intended to assist farmers in providing their scientific findings-related interactions, understanding and observations. Steep hills, concavity areas and those with underground water flow have been classified as landslide-prone areas. Stoniness, sandy and high water penetration are the soil characteristics of landslide-prone areas. Low lands and areas have been described as stable with sticky and hard soils [11].

Andalusia is the largest olive-growing region in the world, located in southern Spain. Because of this agricultural sector's importance to regional income, this paper examines the perspectives of olive farmers on olive production after their retirement and potential factors that affect them, including economic, social, environmental and spatial factors. Researchers use data from a 2010 survey of 431 Andalusian olive growers. Researchers' findings show spatial dependency in describing farmer's views at relatively small distances on the future of olive farming [12].

Conclusion

Researchers have developed an empirical context to analyse the process of adopting agricultural innovations, taking into account both extrinsic and intrinsic factors and their role in the decision-making process for the adoption of agricultural innovations. Although they indicate that awareness, attitudes and expectations about the technology's benefits and challenges play a key role in the decision to adopt, they do not argue that conventionally studied variables such as farm characteristics and economic variables are not relevant in the decision-making process or that existing models based on extrinsic factors are flawed.

Rather, they suggest a mid-term period in the application process whereby farmers 'features and control indicators impact acceptance indirectly affects consciousness, conduct and aspirations that in turn influence or just not farm owners' determination to adopt technologies. . The concept stresses that these extrinsic factors affect awareness and expectations and therefore behaviours with respect to technology. Through understanding what awareness and perceptions people have about and how agricultural technologies are brought in, people can start planning projects that are of local interest.

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