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Utilization of Agricultural Knowledge Systems in Farming Systems Research / Extension

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Introduction

During the past decade, the Farming Systems Research (FSR) approach has gained significant ground in agricultural programmes, especially in developing countries. A farming system is the result of interactions between several interdependent components (Gilbert *et al*, 1980). The FSR takes a whole view of the farm. It identifies opportunities, sets out the conditions necessary to achieve desired goals and estimates the probability of output that is acceptable to a farmer. A chief technical adviser of one of the farming systems programmes has recently stated that the system approach is evolving as a way of bridging the gap between the generation of knowledge by research and the use of that knowledge to improve the output of products and money (Vacharapongpreecha, 1986). However, between knowledge generation and knowledge utilization, there is another important function often scientists and policy-makers grant little attention. That is knowledge exchange.

The FSR approach can be viewed as an adjustment in, or reorientation of, prior efforts at agricultural research and extension. As a result, certain changes can be expected at the users' level which influence greater farm efficiency. However, over the past period many agricultural programmes which were based on FSR approach have paid much attention towards organizing the research component in order to evolve technical solutions to farmers' problems. In fact, in many situations, this task has been achieved and, therefore, to some extent the generated knowledge is already there. This acquired knowledge should be disseminated to the ultimate users specifically to a certain category of farmers for whom the knowledge has been developed. But up to the recent past many FSR programmes have not granted much emphasis to knowledge dissemination. Moreover, even today many FSR programmes rest their investigations on 'agro-ecosystem analysis' paying much attention to agronomic and physical factors, but, it is very clear that FSR addresses a complex series of interactions between agronomic, physical, economic and social factors. Therefore, generated knowledge may be technically competent, but unless it suits farmers' social and economic conditions, in practice, the diffusion effects will be rather slow and discouraging. As the FSR programmes mainly deal with small farmers, this fact must receive prime consideration because it is evident that the majority of small farmers is confronted with limitation of resources.

The utilization of AKS in FSR/E paradigm

Biggs (1985) has stated that relatively homogeneous groups of farmers should be identified as clients of research in specific agro-climatic zones and has further, highlighted the need of research teams to define specific groups of farmers for whom an FSR programme is working. Comparatively, few research studies have been undertaken in this area and consequently, known facts are extremely limited. Further, knowledge dissemination cannot function efficiently unless the generated knowledge is need-oriented. In this context, identification of target categories makes prime sense. This is, therefore, another area on which research has to be focused. The FSR programmes have recognised the vital importance of the knowledge dissemination function in the entire system and, therefore, in many FSR programmes, an extension component has also been included naming the programmes as Farming Systems Research and Extension (FSR/E) (Watts and Claar, 1983).

The concept of AKS was first introduced to extension science by Nagel (1980). However, within a short spell, it captured the interest of many scientists in different fields, because it has been realized that this concept can be used as an analytical tool. Recently, Havelock (1986, a. b. c.), Engel (1987) and Roling (1988) have made vital contributions to the concept of AKS. The AKS can be defined as a system in which knowledge generation, transformation, exchange, testing, utilisation and feedback, function synergically. The entire AKS includes three subsystems. They are the research subsystem, the dissemination subsystem and the user subsystem (Nagel, 1980). The research subsystem mainly deals with generation of knowledge while the dissemination subsystem is responsible for dissemination of acquired knowledge. The farming community can be viewed as the user subsystem which makes experiments on the gained knowledge under farming environments and finally, puts the knowledge into a production process if it is appropriate to the prevailing conditions. These subsystems are linked through transmitting agricultural knowledge or information. Therefore, relationships between the elements within the AKS are governed by the communication linkages between them (Haverkort and Engel, 1986).

The FSR/E has also been regarded as an analytical tool rather than a full fledged development strategy (Fresco, 1985). In fact, both FSR/E and AKS can be regarded as concepts which make an attempt to incorporate certain elements of the agricultural development mix explained by van Dissel and Roling (1985). Moreover, both concepts deal with some essentials and accelerators of agricultural development described by Mosher (1966). All these strategies have identified knowledge dissemination as an important instrument in the process of overall agricultural development. However, past experiences have clearly shown that the extension strategies utilized so far were confronted with the problem of dissemination of inappropriate technologies

which were handed over to delivery system. Such strategies have contributed to increasing disparities between farmers (Roling *et al*, 1976). Therefore, whatever the strategy, greater care has to be taken to ensure dissemination of technologies which cater for the farmers' needs. The AKS concept has paid much attention to this aspect. In order to perpetuate an effective knowledge dissemination process the AKS has stated six basic functions (Nagel, 1980). They are, identification of knowledge required, generation of knowledge, operationalisation, dissemination, utilisation and evaluation.

A typical FSR/E programme consists of four stages (Gilbert *et al*, 1980) They are, diagnostic stage, design stage, testing stage and extension stage. That is, extension or knowledge dissemination is an essential component of FSR/E, but less is known about this area than almost any other aspect of FSR/E (Pemberton, 1987). Morris (1986) has stated that knowledge will be popularized through conventional dissemination activities, but it has been clearly demonstrated that conventional approaches in extension have not contributed much to equitable diffusion (Roling *et al*, 1976; Adams, 1982; Melkote, 1984; Wijeratne, 1988). In fact, even today, empirical realizations with respect to the diffusion of knowledge through FSR/E programmes are severely limited. The AKS concept can therefore, be utilized to strengthen the knowledge dissemination component of the FSR/E projects. Pemberton (1987) has elaborated the methodological aspect of FSR/E and has made some refinements. He has revised the series of steps involved in FSR/E elaborating on them to include more production-oriented programmes.

Conclusions

In a theoretical perspective, FSR/E makes an attempt to incorporate the components needed in order to look at the farm as a whole, but it is evident that, in practice, many components have been overlooked. Fresco (1986) has demonstrated that FSR/E programmes have a tendency to adopt a single factor approach to intensification, usually by focusing on increasing returns to land resource through the application of improved inputs. In fact, inputs are increasingly becoming important in ths context of technology-propelled development but an essential condition in the overall agricultural development is to put all the development apparatus in a perspective manner to receive a development mix. The knowledge dissemination system is one of the apparatus used in the development process. Unfortunately, so far, the development strategies have not granted prompt attention to strengthen this vital tool. Even though the concept of FSR/E has gained considerable popularity among the developing countries, often the knowledge dissemination component is not well placed in many FSR/E projects. As this paper illustrated, the AKS concept can be utilized to reinforce knowledge transfer function in FSR/E programmes.

Abstract

The concept of Farming Systems Research and Extension (FSR/E) is penetrating into mainstream agricultural development practice but the impression created is that it mainly focuses on the reorientation of locality specific research based on 'agro-ecosystem analysis'. Much of the knowledge dissemination function in FSR/E is not yet clear. The Agricultural Knowledge Systems (AKS) grant more attention in delivering an appropriate offering to the clients. Agricultural development programmes should be more concerned with the knowledge dissemination aspect as it has already been realized that past development efforts are aloof on this. The concept of AKS can be utilized to reinforce the knowledge dissemination function. AKS includes three subsystems namely, research subsystem, dissemination subsystem, and user subsystem which are linked through dissemination of knowledge or information. AKS has six functions such as need identification, generation of innovative knowledge, operationalization, dissemination, utilization, and evaluation. The concept of AKS provides vital contribution to the knowledge dissemination aspect of the FSR/E paradigm.

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