A FRAMEWORK FOR INCORPORATING INDIGENOUS KNOWLEDGE SYSTEMS INTO AGRICULTURAL EXTENSION ORGANIZATIONS FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT IN INDIA

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Introduction

Indigenous knowledge (IK) is the systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments, and intimate understanding of the environment in a given culture. Local people, including farmers, landless laborers, women, rural artisans, and cattle rearers, are the custodians of indigenous knowledge systems (IKSs). These indigenous knowledge systems may appear simple to outsiders but they represent mechanisms to ensure minimal livelihoods for the rural resource-poor people in India. During the process of technology development, farmers' informal experimentation has not been considered as a source of innovation (Rajasekaran & Martin, 1990). During the process of technology dissemination, feedback information from farmers after the introduction of technologies is rarely recorded. Farmers' needs, priorities, and innovations are not considered while developing and disseminating technologies.

Indigenous knowledge is dynamic, changing through indigenous mechanisms of creativity and innovativeness as well as through contact with other local and international knowledge systems (Warren, 1990). Understanding farmers' knowledge allows a framework of reference for posing technical, scientific questions in research. It also provides the basis for evolving technological options that are not imposed as alien 'packages' which contradict its existing practices (Scoones, 1989). For instance, technological interventions with respect to agroforestry must be based on the principles of ethnobotany, agroecology, and farmers' experiments on home gardens (Rocheleau, 1987). Therefore, identifying, documenting, and incorporating indigenous knowledge systems into agricultural extension organizations is essential in order to achieve sustainable agricultural development.

Purpose

The purpose of this paper is to present a methodological framework to incorporate indigenous knowledge systems into agricultural extension organizations for sustainable agricultural development in India.
A recent study was conducted in three villages of the Union Territory of Pondicherry, India. Indigenous knowledge systems (IKSs) were recorded using farmer participatory methods such as participant observations, and unstructured interactions (Rajasekaran, 1992). The findings of the study revealed that IKSs can provide a frame of reference for strengthening agricultural extension programs. The findings of the study have led the researchers to the development of a framework for incorporating IKSs into agricultural extension organizations. This paper focuses on the development of the framework.

**Framework Development**

**Need for the Framework**

The need for researcher-farmer involvement has been given high priority in the recent farming systems research/extension literature. However, it is difficult for research station scientists to conduct research involving farmers all the time due to the insufficient human resource capacity of regional research stations (Rajasekaran & Martin, 1990; Warren, 1991). For instance, there is only one research station in the Pondicherry region, India, which is expected to cater to all agricultural research needs of the entire region. There are approximately twenty scientists working in this station. This number is far too low when compared to the number of farming communities in the region. Keeping this low researcher-farm family ratio in view, the framework advocates the use of academically well-trained and "research minded" extension personnel to identify, record, and validate farmer experiments.

**Subject Matter Specialists as Researchers**

Recent statistics show that most of the divisional-level subject matter specialists (SMSs) are post-graduates in different disciplines such as agronomy, soil science, entomology, and plant breeding. Moreover, the department of agriculture is sponsoring extension personnel to undergo post-graduate training in the specialized disciplines mentioned above. The advanced knowledge they acquire during this training period along with their field experience as SMSs should be used for validating farmer experimentation. It was found that SMSs spend most of their time in headquarters assisting their heads of offices, and preparing periodical reports to be sent to their higher authorities (Rajasekaran & Martin, 1990). In other words, the academic training acquired by the SMSs is rarely exploited. They should spend at least one day in a week on activities such as: (1) problem identification; (2) recording relevant IKSs; and (3) presenting the problems and IKSs to the technology development consortium.

**Recording Relevant Indigenous Knowledge Systems**

Indigenous knowledge (IK) is the systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments, and intimate understanding of the environment in a given culture. IK is dynamic, changing through indigenous mechanisms of creativity and innovativeness as well as through contact with other local and international knowledge systems (Warren, 1990). In the process of technology development, knowledge of indigenous livelihoods is an indispensable resource (Haverkort & Zeeuw, 1992). Indigenous knowledge may not be as abstract as scientific knowledge. It is often concrete and always dynamic. It relies strongly on intuition, directly perceivable evidence, and an accumulation of historical experiences (Farrington & Martin, 1987). Indigenous knowledge reflects the dignity of the local community and puts its members on an equal footing with the outsiders involved in the process of technology development (Haverkort & Zeeuw, 1989). Indigenous knowledge systems also provide mechanisms for facilitating understanding and communications between outsiders (extensionists, researchers) and insiders (farmers). Improved understanding and communications enhance participatory approaches to problem identification (Warren, 1992).
Recording the indigenous knowledge systems (IKSs) of farmers forms the first step of developing and disseminating sustainable agricultural technologies. In other words, how do farmers try to overcome or adapt the problems using their own knowledge? For instance, informal exchange of rice seeds from farmer-to-farmer is used as a strategy by farmers to solve the growing demands of quality rice seeds in the study villages. The SMS in coordination with agricultural officers should record IKSs.

Validating Farmer Experiments

Selection of farmers is one of the crucial activities during the process of validating farmer experiments. The various steps involved during the process of validating farmer experiments are: (1) Understanding the rationale behind farmer experimentation. Examples are testing varieties for yield increase, blending local and external inputs, avoiding risks by adjusting sowing and harvesting periods, and testing new varieties for local adaptation; (2) Recording the mode of conducting experiments. For instance, some farmers conduct varietal trials by raising local and high yielding varieties in two different plots. Others establish experiments by planting the local and new varieties in alternate rows; and (3) Identifying farmers' evaluation criteria. The criteria used by farmers to evaluate their own experiments differ from farmer to farmer and also for the same farmer, from crop to crop. The physical stand of the crop and the way it bears the earheads is one of the major criteria for rice farmers in the Eastern Visayas region of Philippines (Tung, 1992). In the study villages, farmers randomly uproot one or two groundnut crops and shake the pods by holding them close to their ears. If they hear any sound, it indicates that the pods are unfilled. If they do not hear any sound, it indicates that the pods are filled. Understanding, identifying, recording, and evaluating farmer experiments form the various stages of validating farmer experiments. It is important that extension personnel understand the farmers' own criteria when they explore indigenous approaches to farmer experimentation.

Facilitating Village-Level Experimenter Workshops

Experimenter workshops should be conducted immediately after validating farmer experiments. The village extension workers should facilitate the experimenter workshops by involving farmer experimenters as resource persons. The SMSs should act as semi-silent observers during these workshops. This process is a way of empowering and respecting village-level...
extension workers and farmers. Farmer experimenters should be encouraged to share their experiences while conducting the experiments. They are expected to answer specific questions raised by other participant farmers. After the formal discussion, the SMSs should wrap up the workshop by sharing their experiences during the process of validating farmer experiments. The village extension worker should act as a facilitator by bringing farmers to the subject of discussion when conflicts arise and also monitor the time.

Evaluating Technological Options

Finally, farmer experimenters with inputs from other farmers should evaluate the technologies that have been tested during the farmer experimentation procedure in terms of their contribution to: (a) productivity of crops and associated livestock, (b) sustainability of the agricultural system, (c) complexity (e.g., ease of experimentation), and (d) labor intensity. They are expected to arrive at any one of the following decisions:

1. Drop the technological option that has been tested;
2. Technological option needs long-term research; and
3. Technological option is ready for further dissemination.

Technological options that need long-term research should be communicated to researchers through the technology development consortium. Technological options that are ready for further dissemination but require additional resources and infrastructural facilities should be discussed with appropriate departments. Technological options that are ready for further dissemination can be communicated to their colleagues through zonal workshops.

Technology Dissemination Through the Agricultural Extension System

Compton (1989) stated that extension personnel blanket the countryside. This enormous human resource capacity should be effectively utilized for disseminating technologies to distant locations and other villages. In spite of the continuous debate regarding the effectiveness of the Training and Visit (T&V) extension system, the T&V stands as the single major source for formal technology dissemination in many developing countries. The T&V system of extension has sought to operationalize a strong and regular link between research and extension, and between extension and farmers (World Bank, 1990). The salient features of the T&V such as (1) monthly zonal workshops; (2) biweekly training programs; (3) village extension workers contact with farmers; and (4) maintaining extension worker-farm family ratio can be effectively utilized. The potential of the T&V system of extension in increasing agricultural productivity has been clearly demonstrated (Antholt, 1992; Feder, Slade & Sundaram, 1986).

Bringing Original Innovators to Zonal Workshops

Monthly zonal workshops are the important points where farmer experimenters as original innovators of technologies need to be recognized. It is essential for agricultural extension personnel to listen to the farmer experimenters whose raw materials (IKSs) contributed to the development of finished products (technological options). Encouraging the farmer experimenters by offering cash prizes is one of several ways of providing recognition and compensation for their contribution to the development of technologies. Such rewards also encourage their colleagues to share their knowledge by participating in the process of developing technological options.

Screening Technological Options

The SMSs receive technologies from zonal workshops and relay them to their village-level extension workers without tailoring these technologies to the agro-ecological and socio-cultural conditions of their own division.
Once the technological options are disseminated to extension personnel, it is their responsibility to screen those options by considering the following factors:

1. SMSs should select those technological options that fit into agroecological environments of their division; and

2. SMSs should work with village-level extension workers in understanding the socio-cultural factors that have a negative impact on selected technological options.

### Disseminating Technological Options to Village Extension Workers

After screening, the technological options should be disseminated to village extension workers. During the process of dissemination, SMSs should act as facilitators rather than simply conducting training programs for the village extension workers. The adaptability of technological options should be discussed with village extension workers. The technological options that are disseminated to village-level extension workers using these steps differ from the existing system of delivering technologies in the following ways:

1. Technologies delivered by the existing research-extension system are fixed packages and rarely provide any options to farmers. The system expects the farmers to adopt an entire package. On the other hand, the technologies that are developed using the proposed framework provides diversified technological options which enable farmers to choose using their own decision-making system;

2. Presently technologies rarely build on IKSs of farmers. In the new approach, technological options presented to farmers originate from the farmers' own knowledge; and

3. Under the conventional system, technologies come from only one source, the research stations. In the suggested system, the technological options are developed using diversified sources such as extension agents, NGOs, farmers, and research stations in active participation with "research minded" farmers.

### Disseminating Technologies Using Indigenous Communication Channels

Village extension workers should be encouraged to follow certain guidelines while disseminating the technological options. The agricultural officers should be made responsible for providing institutional support for the village extension workers during the process of disseminating the technologies. Organizing training programs to explore indigenous communication channels for disseminating the selected technological options is essential (Mundy & Compton, 1991). Village extension workers should be encouraged to use delivery points other than farms such as shandis (market days), koil thiruvizha (village temple days), magalir mandram (a village-level women's society), and cooperative marketing points.

### Educational Importance

Incorporating indigenous knowledge systems into agricultural and extension education programs will result in: (1) understanding the 'emic' perspectives of local people; (2) bridging the communication gap between outsiders and insiders; (3) recognizing the accomplishments of local farmers; (4) helping outsiders familiarize themselves with local conditions and abstract terms; and (5) increasing the participation of farmers and their organizations in integrating, utilizing, and disseminating what already exists.

### References


