SOCIAL SCIENCE STUDIES IN FARMING SYSTEMS : FARMER PARTICIPATION AND THE ROLE OF AGRICULTURAL EXTENSION

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Introduction

Technical views of agricultural issues and concerns tend to dominate agricultural research in the developing countries. The results of this research often fail to fit the needs and opportu nities of the market of limited resource farmers. The technical bias ignores three facts; these facts are;

1) Farmers do not manage their farms on the basis of technical considerations alone.
2) Farmer markets place limitations on finding solutions to production problems.
3) Recommendations based on agronomic analyses within agro-ecological zones need to also incorporate economic and socio-cultural circumstances as these collectively influence farmers' decisions.

The managerial or systems perspective of the farmer needs to be better understood. To develop such an understanding, inter disciplinary teams of scientists (technical, economic, and social), extention educators(behavioral scientists)and farmers themselves must work together through farming systems research and extension programs

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The main focus of this paper is on farmer participation and the role of extension within FSR. First however I will recapitulate various modes of research and their relative meaning as a way to establish a suitable context for the ensuing discussion.

Modes of Research A Context

Farming systems research is a form of adaptive research and technology development We need to clarify the distinctions among basic research, applied research, and adaptive research. Basic research relates more to laboratory experiments on biological or genetic problems. Applied research tests the results of basic research within the context of various soil and climate conditions either at an experiment station or on a farm. Adaptive research is focused on the identification and adaptation of technologies appropriate to specific local situations. Farming systems research is a whole farm approach which focuses on identifying priority problems and/or opportunities in the local farming system which would give maximum returns to adaptive experimentation and subsequent extension. In other words, FSR is adaptive research using a systems perspective.

There are two important points to keep in mind

1) Markets, farmers' priorities, and limited resources are an essential part of any local situation.
2) Identification of those technologies with greatest potential leverage on the local system is an important prerequisite to adaptive experimentation. Such technologies may be identified on innovative farms in the community, from biological logic, and from research station results in country or from analogous situations elsewhere.

Typically, research scientists and extension workers make recommendations to farmers. Farmers' responses to these recommendations are then analyzed by social or economic scientists. Such

a systematic analysis of farmers' reactions to recommendations is no substitute for FSR. Such an analysis begs the question of choosing recommendations in the first place. And it is more efficient as farmers become the final arbiters at one stage or another to have farmer assessments of adaptive experimental treatments before recommendations are identified. This is better than training extension staff and organizing input and credit supplies only to have farmers reject the technology.

Farmers, extensionists, and researchers should all be involved in identifying farmers' problems and opportunities. This identification is best done by grouping farmers on the basis of homogeneity in enterprise and production methods (reflecting common natural and economic circumstances, and common farmer endowment), rather than by having a team of crop and animal scientists with a farm economist discuss local farming with local officials, business men and farmers. The diagnostic process of FSR identifies research thrusts towards solutions to priority problems or major development opportunities.

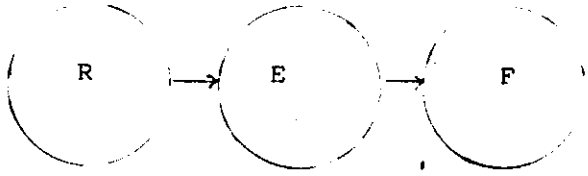
Currently the volume of applied research far outweighs adaptive research. Most countries have and will continue to have both commodity dominated research stations and stations with regional responsibilities. Adaptive research with a systems perspective to identify most effective impact points to decide experimental content is a set of procedures not a new institutional form nor an alternative to conventional research. As I see it, this set of procedures can be located in extension, if the appropriate professionals are there, or it can be located in research. Wherever, it is located, the procedural linkage to the other "partner" must be very firm and clear. The essence of the linkage is that FSR must:

a) Draw extension staff and farmers into technology selection and adaptation.

b) Have call on specialist technical researchers to help in specifying problems on farms, and identifying and detailing experiments to test solutions.

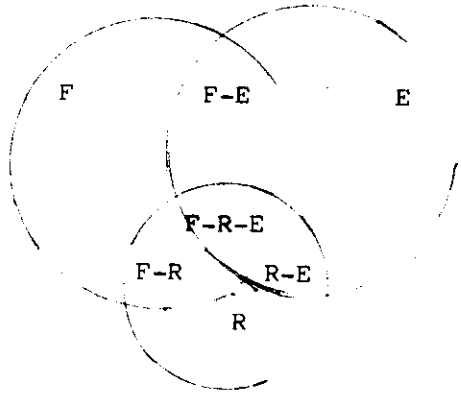
A larger Systems Perspective

In the past, we have tended to think of the general process connoted by the words creation-diffusion-utilization as synonymous with the research-extension-farming process. This notion conveys the image of a unilinear model which troubles me.



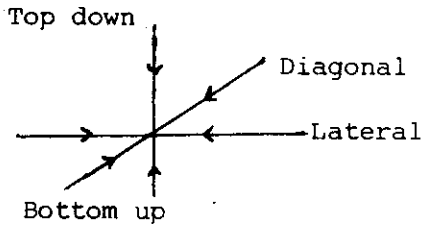
I think that surely by now we all realize the undesirable loss of time, energy, and expense which often results from separating the process of knowledge utilization from the process of creating it. The act of knowing is a creative act, of transforming one's own reality. Your knowledge is not my knowledge. What you know or what you convey to me is information which does not become knowledge for me until I have found some way to internalize it by applying it to some life situation meaningful to me. In using that information in that fashion, I will be transforming my own reality. Doing this, your information will become my knowledge as well. Information is stored in a variety of ways : in computers, in books, in libraries, in people's memories, but it is not knowledge to any one particular person until it is understood and can be used by that human being.

It seems to me that we have begun to move away from the unilinear model toward a greater concern for the functional linkages among farmers, extension workers, and research scientists. Diagrammatically, the emerging paradigm may be represented as follows:

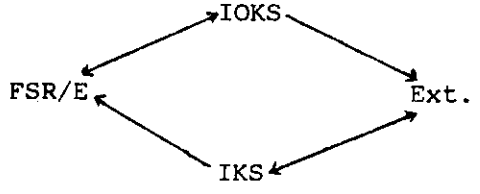


This illustration would suggest that where 'F' and 'E' overlap, we have the functions of extension workers educating and learning from farmers, Where 'R' and 'E' overlap, we have the functions of agricultural development program planning and problem solving. Where'F' and 'R' overlap, we have what is presently being labeled as farming systems research. I would suggest that we need to move more toward what is represented in the center of the diagram, 'F-R-E,' or what should be referred to as farming systems research-extension (FSR/E) wherein farmers, extension workers, and research scientists would comprise teams to deal with farming system problems, needs, and opportunities.

We need to be moving toward the development of four-way interactive systems,



of creating "system dialogue," away from "trickle-down" economics and "trickle-down" knowledge, away from rigid technological packages and technology transfer and toward the development of appropriate technology using methods which acknowledge and use indigenous knowledge and which involve farmer participants fully. In other words, we need to be moving toward the development of flexible and responsive systems, systems which can respond quickly and appropriately to the diverse needs and conditions of small, limited resource farmers. A general strategy for providing the benefits of FSR/E across a large geographic area would be as follows:



This configuration suggests that a deliberate effort would be made by interdisciplinary teams of scientists, extension workers,

and farmers to conduct FSR in carefully chosen sites and that an effort would be made to benefit from both farmer-derived or experimental knowledge (i.e. IKS, or indigenous knowledge system) and the institutionally organized or scientist-derived knowledge system (IOKS) to solve farming system problems, followed then by an enlightened effort on the part of extension personnel to facilitate the diffusion of appropriate learnings (recommendation domains) to other farmers whose conditions approximate those encountered in the site where the farming systems research was carried out.

A Perspective on the Social and Behavioral Sciences

Farming systems research thus far has been dominated by technical scientists and economists. Definition of the role and the participation of social scientists (sociologists and anthropologists) and behavioral scientists (extension educators and communication specialists) has been slow in evolving.

Social scientists especially have been criticized for having too little familiarity with planning, program administration, or with the political-bureaucratic context of administrative decision-making and resource allocation. Social scientists are said to have a tendency to ignore economic factors and to even be guilty of ignoring core agricultural production processes. Some critics have labeled soical scientists as being too descriptive of existing situations and hesitant to take risks in projecting what should be. They have been characterized as being too fearful of being bold or provocative.

These criticisms tend to come from the technical, economic or administrative sciences. A different set of criticisms emanates from the behavioral scientists or extension educators who sometimes see social scientists as lacking the physical capability (in terms of numbers and energy or will) to do the large scale job of facilitating increased production and improved quality of life of limited resource farmers while at the same time remaining too

arrogant and aloof to work with extension educators (who do have the numbers, energy, and will)to help them learn how to do their job better. The work of enlightening and empowering small farmers will not be done by economists, technical scientists, or even social scientists but rather by behavioral scientists and their off-spring (village extenstion workers. Community development workers, nonformal adult functional literacy educators, rural health workers, extension trainers and subject matter specialists).

But social scientists do have definite contributions to make to FSR/E. As we begin to realize that the major focal point for FSR/E is an undrstanding of "the farmer's system," and as we begin to realize that we have in the past generally failed to take into account all of the types of factors affecting a farmer's decision-making (e.g. that farmers' decision-making is not based upon technical factors alone), then we are gradually beginning to recognize the important role social scientists can play.

We now understand that house old-level decision-making regarding cooperation in agricultural or farming activities is an important dimension of FSR/E. The development cycle of the farm family, the social organization of family labor resources, the family authority system and its impact on age and gender-based divisions of labor, and family values and objectives are all important aspects of the farmer's system. Farmer attitudes, community relationships, and numerous other ono-economic or non-technical factors influence the farmer's economic behavior.

Technical and economic scientists lack the tradition and tools to deal with these social and behavioral variables. Social scientists can contribute here in a variety of ways. In regards to method, social science techniques of participant observation, informal surveys, and the use of key informants represent a suitable replacement for inappropriate or impossible large scale surveys in FSR/E work. Social scientists can help promote an understanding of the cultural organization of resources: the

nature and fit of the family farm, the division of labor, modes of informal cooperation, patterns and channels of information diffusion, local organization and leadership patterns and flexibility, and the farmer's knowledge structure and perspective.

Farmer Indigenous Knowledge and Participation

Local farmer knowledge is often the result of literally centuries of creative and discovery learning. Knowledge that has been passed on from generation to generation has been expanded and refined through day-to-day experiments within the farmer's natural micro-environment.

Indigenous knowledge can be seen as an asset, although it is sometimes seen by others as a barrier to agricultural development. On a macrospective basis, it may be seen as both a national treasure which should be identified and catalogued, and as a valuable local resource. Awareness of indigenous knowledge can facilitate communication, two-way empathy, and a mutual understanding of symbols. Properly understood and used, it can help bridge two worlds.

There are three important questions we need to pursue:

1) What can we learn from rural people?
2) How can we learn from them?
3) How can we make use of what we learn in agricultural development programs?

1) What can we learn from rural people?

Ecological and environmental factors

- Climatic factors:
  --micro-climate and rainfall patterns
  --water levels-retention-duration-timing-dependability
- Soil characteristics and capabilities
  --which plants will grow in which type of soil
  --response pattern of particular soils to fertilizer and manure treatments

-classification systems for various types of soils

Cultivation practices

-New and traditional crop and animal varieties being used in an area

-Nature of such practices as inter-cropping and multiple cropping patterns suitable to local ecological and economic situ tions and the rationale for these interlocking systems

-Biological control devices for eliminating plant and animal diseases

-Value of planting at key times to avoid effects of plant sunburn and too rapid water evaporation

-Rationale for various planting and sowing sequences; for example, dropping seeds into freshly plowed furrows in order to obtain better germination from moist soil

-Effect of various crop planting and rotation patterns on soil fertility and plant production, in both the short term and long term

Other technical matters

-The effect of past failures of introducing new innovations on subsequent decisions to adopt or not adopt a similar one

-Ecological inter-relationships of man, man-made items, and the natural environment

-"Appropriate" crop, method, time to plant in a given area

-Utility, effectiveness, and efficiency of various farm tools

-Efficiency of use of local resources such as land, labor, capital and water

-Possible means available for gaining access to land

-Limits to usage of certain kinds of technology

-Local media practices

-Various food processing methods

Local social organization factors

-Perceptions of leadership patterns
-Rule and norms for selecting leaders and carrying out responsibilities
-Perceptions of social or ethnic relationships and how these affect people's decisions to get along
-Perceptions of community power structure and the bases upon which the structure exists and operates
-Perceptions of family-neighborhood-community relationships and their effects on social maintenance, continuity, and change
-Perceptions of the degree to which the community can control its internal affairs and the nature of its ties to the outside world
-Perceptions of the community's various institutional structures such as farmers' associations, cooperatives, or water users' associations.

Local cultural beliefs and value systems

-Beliefs related to existing agricultural practices, i.e. spirit worship
- [illegible] of women and other family members in the agricultural
-Perceptions of values, biases, emphases, priorities, and cultural context

2) How can we learn from the farmer?
(what method or technique can we use to learn what it is that the farmer knows, and does, and why?)
- Observation (being around, listening)
- Participant observation (by becoming a member of the farmers' group and working directly with them)
- Dialogue (informal, spontaneous, or guided, structured, contrived)

Joint agronomic ventures:

- By providing tools, materials, and some production inputs in return for cooperation in cultivation tasks
- By supplying labor in return for teaching, F ⟶ A
- By renting land for experiments and using local help
- By having farmers participate in the planning of experiments and trials

- Using devices for stimulating exchanges and eliciting information (games and pictures)
- Farmer journal keeping, with regular joint analysis
- Questionnaire techniques (direct or projective devices and instruments)
- Evolving a written folk classification of soils and plants using the farmers' help

3) How can we make use of what we learn from farmers to improve agricultural development?

(How can we integrate indigenous knowledge into an overall Knowledge system for development?)

- To help us identify and enhance the appropriate use of indigenous facilitatons and local leadership for project site development
- To initiate a team approach (inclusive of farmers) for carrying out farming systems research
- To begin work on developing a scientific understanding of how indigenous knowledge works and thereby envision ways of closing the remaining gap between farmer-derived (indigenous knowledge) and scientist-derived (institutionally-organized knowledge)
- To facilitate a "lateral" transfer of knowledge among farmers, "F-to-F"
- To facilitate the use of farmers' terminology in training programs
- To facilitate feedback to and from farmers in planning local projects

- To facilitate the use of audio-visual aides and media materials

Which fit the perceptions-symbolism-meaning of farmers

In summary, the composite knowledge and resources of local areas throughout a country represent an untapped or under-utilized national resource. Such local knowledge and resources are likely to continue to be ignored by extension personnel whose training has led them to believe that scientific or valid knowledge is the scope solely of institutionally based scientists, and those who would be their messengers. This flaw in extension programming continues to prevail in spite of the growing number of well-documented analyses of the value and validity of indigenous knowledge. Ignoring such indigenous knowledge, whether intentional or not, further restricts the ability of extension personnel to communicate effectively with farming populations. A lack of awareness of farmer-derived knowledge-classification schemes for biological systems severely limits the ability of extension personnel to communicate effectively with local farmers.

Communication is an essential factor in the promotion of the participation of farmer clientele in the development, implementation, and evaluation of agricultural development programs. This is also a principle which is often given lip service. Few people seem to be able to explain in specific terms what they mean by farmer participation. It is imperative that farmers be involved in the planning process, to assure a proper balance of program inputs, proper timing or sequence of those inputs, and the bridging of cognitive, social and geographic distance between more formally educated agricultural development personnel and frequently less formally educated farmers.

The resources needed to develop diverse and populous areas of the world are so massive that a major proportion of these resources must be mobilized from within these areas themselves.

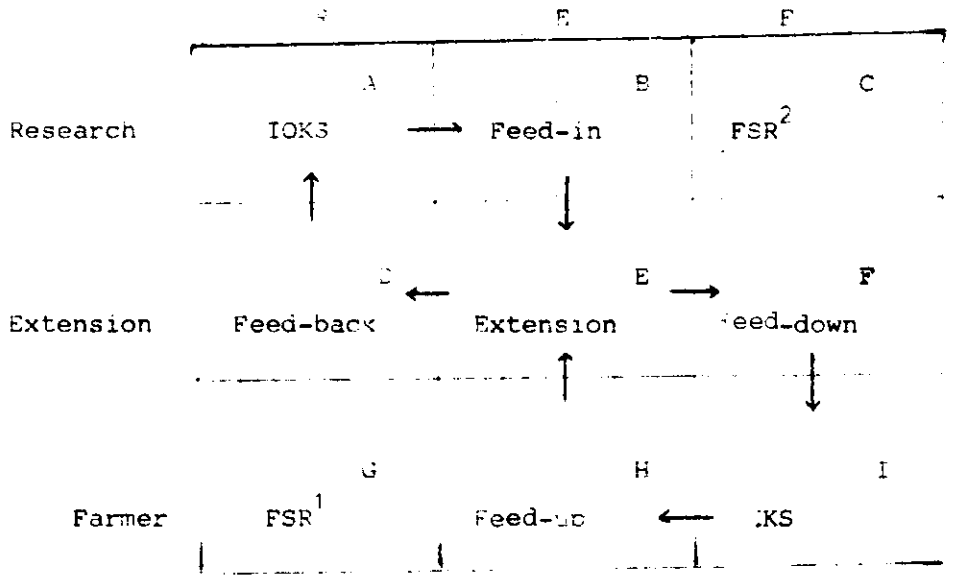
Additionally, the reception and use of delivered services is largely dependent upon demand, which is based upon the receiver's perceptions of the fit of the product or service to his or her needs. We have also found that highly centralized strategies of development decision-making have not been able to accommodate local variations, indigenous experience and knowledge, and the absolute need of people to have a chance to practice and improve their planning and management skills. People have a right to, and the need of, self-determination. It is clear that there is a relationship between participation and the development of an ensuing positive self-concept, a sense of control, and a sense of commitment and responsibility to others, which together provide a motivational basis for change and improvement.

In specific reference to FSR, I can best point to the importance of farmer participation by use of an actual case scenario, comparing two of the six research sites in a large-scale FSR project. In one site, careful attention had been given to dialoguing with farmers about FSR philosophy and method and soliciting the participation in and subsequent partial responsibility for the project. The total farmer group of the community had a voice in selecting eight farmer cooperators for the project. In the other site, farmer cooperators were chosen by the site researchers, barrio captain, and local extension agent. In the first site, the farmer cooperators had an active voice in designing the experiments whereas in the other site they were pretty much instructed on what to do. All the labor requirements for the first site were met by the farmers themselves, whereas at the other site the farmers insisted on having some assistance with various cultivation tasks. During the conducting of informal interviews in the second site, it became obvious that there was little awareness, understanding, or involvement with the project site activities on the part of the majority of the other farmers in the community. However, in the first site, the farmer cooperators were having a significant educative influence on not

only the other farmers in their own community, but from surrounding barrios as well. Other farmers were simply passing by the trials, talking with the copperating farmers and asking what they were doing. Not only was this happening, but, according to the testimony of the farmer cooperators, they were also taking some ideas back to their own land and trying these things out piece by piece. They would test something out and the next time they would pass by the farmer cooperators, they would pick up some new ideas and go back to try those out. Most importantly, the farmer cooperators referred to the project as their project.

Role of Extension

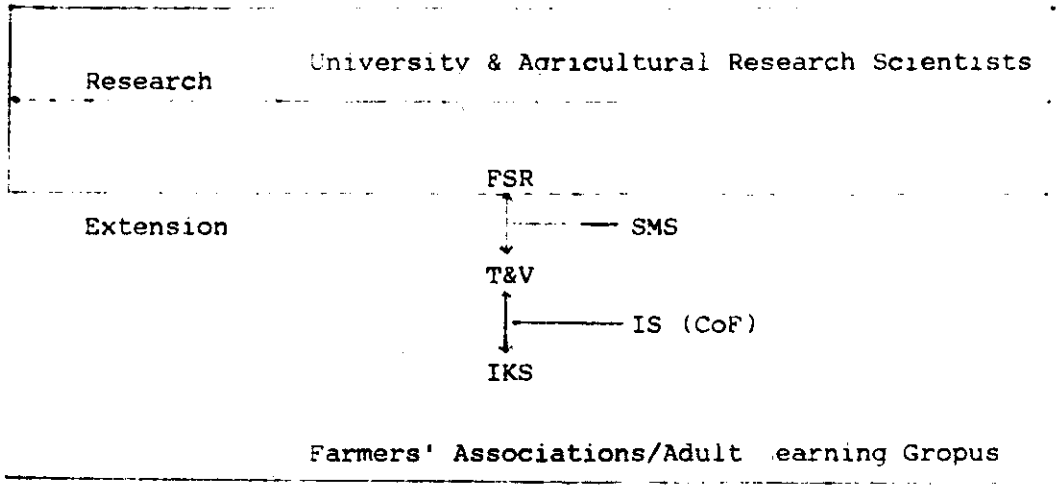
Scientists need to spend a certain amount of time in direct interaction with farmers and farming systems situations. Because of the complex, multifaceted nature of many farming situations, there is a need for teams of scientists representing different disciplines to cooperatively study, analyze, and reach conclusions about ways of helping small farmers better cope with the existing constraints to production. Obviously, farmers and selected extension staff should be part of such teams -- farmers because of their potential for contributing to the team's understanding of a problem, and extension because of the desire to assure a speedy and effective dissemination and utilization of resulting knowledge gains to benefit other farmers. Also, it is important to realize that whi e agricultural scientists number in the hundreds extension workers number in the thousands, literally blanket the countryside, and are in daily contact with farmers. They therefore are in a position to be vital cogs in the exchange of information between scientists and farmers.



IOKS refers to the institutionally organized knowledge system that is based on scientist-derived knowledge. IKS refers to the indigenous knowledge or farmer-derived knowledge system and recognizes the gradual awareness by agricultural scientists, administrators, and educators that such a knowledge system does exist. FSR refers to farming systems research, wherein an effort is made by multidisciplinary teams comprised of social scientists -anthropologists, sociologists, extension educators, nutritionists, communications media specialists, and economists - and technical agricultural scientists - plant pathologists, plant breeders, soil scientists, crop scientists, and entomologists - along with farmers, to identify and study "human-crop-animal-society-climate-soil-water" interactions that influence behavior and production. FSR^1 refers to an assessment by teams of scientists, extension workers, and farmers of the reflection of existing farming practices in what scientists recommend. FSR^2 refers to an assessment by such teams of the extent to which scientists' recommendations are reflected in what farmers do. The responses to these obverse situations have very different implications. Feed-in, feed-down, feed-up, and feed-back designate key points of interaction among scientists, extension staff, and farmers.

What is suggested here also is the importance of incorporating farmers and extension personnel in all phases of the FSR/E process.

Many countries, Thailand included, have now adopted the training and visit strategy for agricultural extension. Various critics of this approach, myself included, have warned of the deficiencies of this model of reliance upon a rigid regular schedule of visits to farmers by village extension workers (VEWs), followed by bi-weekly training sessions for VEWs as provided by subject matter specialists (SMSs). We tend to see the major weaknesses as lying at both ends of this hierarchically organized strategy, e.g. the research end and the community end.



The weaknesses of this strategy are not irredeemable. By placing emphasis on 1) the role of SMSs as facilitators of the linkage between FSR results and extension messages to farmers, and 2) the better selection, training, and support of contact farmers as indigenous specialists and educators of other farmers, it is conceivable that the T&V strategy could be made much more effective (although with the new emphasis on SMS interaction with contact farmers directly and VEWs doing more follow-up work, a change in title from "train and visit" to "exchange and follow" might be in order).

I will assert that in due course of time, as extension services expand the number and qualifications of SMSs, farming systems research should become the responsibility of extension. Teams of SMSs representing a variety of discipline and problem-based skills and in frequent interaction with appropriate technical, economic, and social scientists on the one hand and VEWs and CoFs on the other, should be able to organize and supervise the type of FSR experiments and trials needed.

I will suggest that there should also be an SMS for local Social Organization who can work with VEWs and help develop or strengthen farmers associations and dialogue or learning groups. I do not believe in the value of visits to farmers for the sake of maintaining adherence to a set schedule. There should be a reason for such visits. A greater effort at FSR and local organization can result in such a reason.

Farmer participation in FSR/E is necessary. Farmer knowledge and skills are essential elements in the design and implementation of trials. The fact of farmer participation probably assures a speedier and more expansive receptivity of new technology or innovative re-arrangements of old technology by other farmers for whom the resulting recommendations are appropriate. Extension's role can be catalytic, coordinative, and educative/facilitative and, as extension develops the necessary technical expertise, administrative. FSR/E, in sum, represents both a challenge and an opportunity to those who work to improve the productive capability and quality of life of limited resource farmers.

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