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FARMING SYSTEMS RESEARCH LESSONS OF EXPERIENCE

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Abstract

Agricultural researchers, extension workers and developers by smallholder farmers in developing areas all over the world. The needs and constraints facing smallholder farmers and the strategies are briefly proposed arguing the need for commercialisation (FSR/E) is identified as an important element of a development strategy is analysed and it is concluded that the structural change induced by technological transformation in Africa are highlighted emphasizing: a) identification of farming systems, and commercial farming systems; b) different households, vis-a-vis implementation responsibilities; c) and multiple cropping systems and risk avoidance; and d) to be followed when considering FSR/E projects. It is concluded that research policy offers an unique opportunity to restructuring and delivery is attended to.

Samevatting

Landbounavorsers, voorligters en ontwikkelaars kom voortdurend in die ontwikkelende wêreld, verwerp word. Die behoeftes en beperkinge wat kleinboere en landbouers in die BOP word voorgestel as 'n belangrike element van enige BOP strategie. Daar word tot die gevolgtrekking gekom dat BSN-V as 'n belangrike element van enige BOP strategie, wat deur tegnologiese vernieuwing op alle vlakke in die BSN-V studies beklemtoon: (a) identifisering van verskillende landbou stelsels, boerevestigingsstelsels en kommersiële landbou, groepe en huishoudings ten opsigte van implementasie; b) die posisie van vee en veelvoudige landbou; c) word en beginsels en kriteria nagekom word wanneer Suid-Afrikaanse inisiatiewe om 'n nuwe navorsingsbelangstelling in alle landbou instellings in 'n netwerk waar toepaslike te

1. Introduction

The emphasis placed by the present economic development policies in South Africa on the application of sound economic principles and criteria, on the devolution of decision-making and responsibilities and on support to private sector agriculture and the future incorporation of Blacks as landright holders would focus pertinent attention and affirmative action on emerging black farmers (full or part-time). It would be important to design agricultural policies, strategies and models with support to and settlement of farmers as micro-enterprises (Van Rooyen, Vink and Christodoulou, 1987). This approach calls for the re-direction of present agricultural development policies towards opening access for farmers to all users of agricultural resources to the common in-product markets. This further implies emphasis on farm support programmes (FSP) as well as agricultural interaction and economic cooperation within and between regions in South Africa. These features should be considered as in

- iii) the provision of mechanization services, which cater for all aspects of, land preparation, planting and cultivation (harvesting and transport to storage may also be required), as well as the maintenance of machinery, implements and infrastructure;
- iv) the provision of marketing channels and services should this become necessary (ie grading, storage, packaging and transport);
- v) specific development related research to ensure that maximum opportunity can be made of existing and new technology and the provision of adequate extension, information and demonstration thereof;
- vi) the provision of training and management support to facilitate the development of managerial skills needed, both on the farm and at an institutional level;
- vii) the provision of off-farm agricultural infrastructure necessary to support FSP. The provision of this element differs to that of on-farm fixed improvements and is seldom paid for directly by the farmer.

A deficiency in any one of the above or in the synergy between any two could cause sufficient distortion in the system to result in failure. A pertinent planning activity would, therefore, be the harmonization of the above elements in a systematic manner. Sufficient evidence exists that a farming systems approach is central to any policy formulation on FSP (Harwood, 1979; van Rooyen, 1984; Rose and Tapson, 1984; Bembridge, 1982).

In this context, appropriate research, technology development, and the demonstration and extension thereof can be identified as one of the strategic elements in addressing development problems. A farming systems research and extension (FSR/E) approach is proposed as the most appropriate strategy in this regard (Stilwell, van Rooyen and Gouws, 1988; van Rooyen and Stilwell, 1989). Within a FSP policy framework, it is evident that FSR/E would address the whole spectrum of operational support elements, ie production inputs, production practices, appropriate equipment, training and extension, marketing and infrastructure, as well as appropriate policy.

As an integral part of the development process, the role of FSR/E in development policy and strategy warrants further detail consideration.

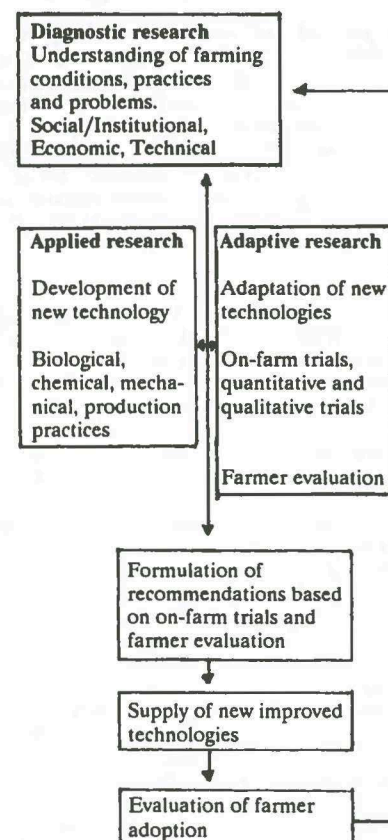
The goals of FSR/E should be in harmony with the overall development policy objectives of a particular state or region, and its role should be to support overall development policy. It should thus focus on national objectives and the farmers' requirements for improved technologies (Gamble, 1984). Goal incongruity between any two of the national objectives, farmer objective functions and FSR/E objectives, would result in FSR/E not being applied as a coherent coordinated strategy, and result in unproductive research efforts.

The expected future emphasis on smallholder farming will have a substantial impact on the structuring of a agricultural research and technology system supporting the newly instituted Agricultural Research Council. Some suggestions on this topic will be made at the end of this paper.

2. The concept of FSR/E

It should not be argued that FSR/E be subordinated to national agricultural objectives as this may unnecessarily restrict its role. Rather, FSR/E should be viewed as supportive of national objectives in developing the necessary perspectives on farmers' objective functions and proposing appropriate tech-

Figure 1: The farming systems' research and extension



Source: Adopted from Rose and Tapson, 1984

3. FSR/E in practice in South Africa

Within the above framework, the ultimate goal of FSR/E should be to structure agricultural change towards the transformation of economic, social and structural change in small farming induced by technological transformation.

3.1 Case studies

The FSR/E approach toward development has only been introduced into South Africa fairly recently. At a seminar on FSR/E at DBSA, a number of case studies were analysed.

i) Ciskei Small Farm Systems Research (SFSR)

The researchers, the Agricultural and Rural Development Research Institute (ARDRI), University of Fort Hare, considered that an appropriate research model should have three basic phases, as adapted from the Cornell University Farm Systems research programmes (Rose and Tapson, 1984; Rose and Williams, 1988; Eckert, Rose and Williams, 1988):

- diagnostic phase;
- research phase; and
- implementation phase.

Because of the critical lack of detailed knowledge of the realities of rural areas, the diagnostic phase was based on the following techniques. Firstly, benchmark surveys to establish the *quo in*, and constraints imposed upon, the community.

Pollet (1988) reports that although the egg unit proved to be a viable enterprise (US\$1492 over 341 days net farm income), few local people have expressed interest in becoming egg producers, and the simpler broiler production system with a quick turnover is preferred and several requests have been received from members of the local community for assistance to establish similar units.

The two small dairy units have failed due to the advanced technology employed (eg oestrus synchronization) and resultant demotivation of participants. However, another local smallholder on observing the dairy trials has initiated a dairy farm on his own accord and has subsequently approached the INR for assistance.

The community garden operated collectively by a local women's group has been successful and positive institution-building aspects have resulted.

Initially, there was doubt as to whether the afforestation on the steep uplands would be acceptable to the local community. The interesting aspect is that after initiating individual afforestation plots with 6 smallholders in 1987, the demand has increased phenomenally by another 153 applications at present.

iii) Dry Bean Research Project (D.B.R)

The researchers, the Department of Crop Science, Faculty of Agriculture, University of Natal, state that the objective of the research is to improve bean production among smallholder farmers in through the development and introduction of high yielding, disease resistant cultivars (Mellis, 1988).

Observation of KwaZulu farmers' production systems revealed that their dry bean yields were mainly affected by rust (*Uromyces appendiculatus*) and bean common mosaic virus (BCMV). Materials made available by the Centro Internacional de Agricultura Tropical (CIAT, Colombia) and introduced into local breeding programmes has resulted in the development of disease-resistant, high-yielding cultivars adapted to the local conditions (Mkuzi, Vulindlela, Loteni, En-seleni and Pongola). These cultivars were released through farmers' days, courses for extension officers, demonstration plots and distribution of a thousand 200 gm packets of seed among farmers. The objective was to introduce the farmers to the new cultivars and give them the opportunity to compare these with their traditional cultivars. Agricultural extension officers and farmers were asked to give a report back on the performance of the new cultivars. Mellis (1988) reports that the new cultivars have been well accepted with farmers making seed available to their neighbours. Also, a commercial seed company (Agri-Aid) has taken over the distribution of seed on a national scale. An analysis of the impact of the improved technology on complementary, supplementary and competitive relations within the farming system has not been conducted.

iv) The Malekutu Dryland Project (M.D.P.)

The Malekutu community identified that with pressure on land and resultant decreasing bush, fallow periods and the shortage of individual family labour, the traditional system of agriculture no longer provided a reasonable return. In 1983, the Malekutu community approached the KaNgwane Department of Agriculture and Forestry (KDAF) for assistance and advice. KDAF, in collaboration with a private company, Chemserve Stein Hall (Pty) Ltd (CSH) initiated the development. The community formed the Thuthukani Farmers Association (TFA) to coordinate development. A research and demonstration farm was set up on the farmers' land to teach the principles of soil conservation and to identify suitable cultivars and fertilizer practices for the Malekutu area (Beck, 1988).

3.2 Observations and lessons of experience

Lessons from the five implemented FSR/E projects gained:

- i) All five research models tend to neglect one or more phases of the FSR/E model. The Ciskei SFSR did not proceed past the diagnostic phase. In the KwaZulu-Bushebe Research and Malekutu projects all the phases were implemented, i.e. diagnostic, on-station farm research (technology development) and extension and adoption. Researchers however subjected the technical research to statistical analysis in contrast to both the Ciskei SFSR and KwaZulu-Bushebe RA where valuable insights on policy perspectives and farmer problems were gained through analysis of the demographic, social, economic and environmental within which rural households exist. The Biyela project was supply driven without diagnosis, however, significant farmer/communities responses are observed to the various technical interventions. These responses require empirical analysis in order to arrive at any meaningful conclusions.

- ii) A different perspective to the one taken by the Ciskei SFSR project on the issue of "farmers" could render their research on the issue inappropriate. If farmers are viewed as rural dwellers utilizing resources to produce agricultural commodities, focus is directed towards establishing a system which would promote access to farm inputs, community support systems and extend the choice to all rural smallholders (van Rooye and Stacey, 1988).

The structuring of FSR/E to accommodate the use of a "supply" approach is strongly advocated as operationally a more useful approach than one which identifies smallholder farmers alone.

- iii) In all the case studies with the exception of KwaZulu-Bushebe RA, it appears as if too little cognisance is taken of the relation between household economic activities and smallholder farming in developing areas (Stacey, 1984). In both the Malekutu and Biyela projects farming was pursued as a sustainable system. In the dry bean project did not investigate interventions within the farming system.

It is strongly proposed that the sustainability of the system is broadened in terms of the wider household context, assessing the impact of technological innovation within the household economy of production and use and vice versa.

- iv) In both the Malekutu and Biyela projects, grass-roots farmers committees have led to positive action in requesting assistance while risk reduction and decision-making on implementation was at the individual (household) level.

The lack of an effective grass-roots committee in the Ciskei SFSR has resulted in no research being established as of date. The committee action institution operating at grass-roots level needs to be pertinently integrated into the FSR/E model.

- v) The findings of the Ciskei SFSR in respect of a large portion of women heads of households are indicative of the hitherto neglected need to identify and structure support specifically toward "farmers" and their role in household decision-making.

3.3.2 Criteria

The following criteria should be considered:

- a) Farmers are defined as all those using resources for the production of agricultural commodities.
- b) FSR/E should be directed at solving the farming problems faced by the rural households.
- c) FSR/E should primarily be designed within those constraints faced by the farmer, over which he has control.
- d) FSR/E should be adaptable enough to allow for a "learning by doing" approach to be followed by farmers and researchers.
- e) The FSR/E approach should be multi-disciplinary and take into account the social, technical, environmental, financial and economic variables operating in rural communities, as well as within the wider economy where the rural : urban interface should be pertinently emphasized.
- f) FSR/E should seek to follow an evolutionary, rather than a radical approach to technological innovation.
- g) In the event of radical technological change being adopted by planners as the only alternative, FSR/E should seek to minimize the associated economic and social risks.

3.3.3 Differing Farming Systems

South Africa is and will most probably continue to be characterized by different farming systems over the long-run.

Within various development strategies, ie. Community Support Programmes (CSP), and Farmer Support Programmes (FSP), Farmer Settlement (FS) including commercial farming (CF), it would be necessary to identify research systems to address the particular needs of these various domains.

Community Support Systems Research (CSSR) would be targeted at that large portion of rural households that do not have access to productive land or are not interested in farming and would consist of benchmark and felt needs surveys, analysis of these needs, the formulation of appropriate community support programmes and obtaining commitment and participation of the community to implement those plans, eg village water supply projects, community gardens, sewing clubs, clinics, schools, etc.

Farmer Settlement Model Research (FSMR) would be directed at the description, design and testing of optimal institutional, technical and socio-economic arrangements that would support individual farmer settlement and participation within formal agricultural development projects.

Farm Systems Research and Extension (FSRE) would consist of the identification and study of present farming systems, the identification of major problem areas, design of the appropriate on-farm experiments and related strategies, the implementation and testing thereof by extension staff and farmers and the further extension of the acceptable findings within the broader smallholder farming community as part of a comprehensive Farmer Support Programme.

Commercial Farming Systems Research (CFSR) would be targeted at fully commercial farmers and study their present farming systems, identify major problem areas, design multi-disciplinary research station experiments, on-farm testing and

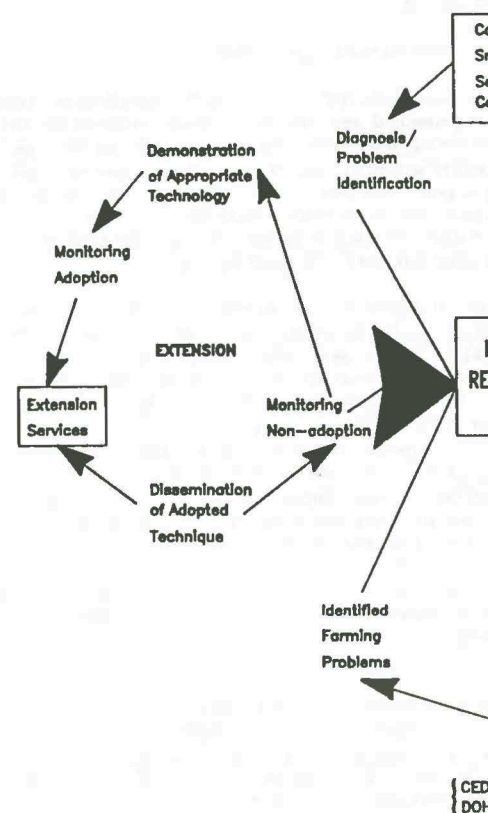


Figure 2: Policy/Decision making/Research station - a

In this context, a phased approach with clear milestones be followed, ultimately leading to large scale comp Farmer and Community Support Programmes a ameliorating the economic deprivation of less develop and enabling these areas to make a positive contributi national economy.

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