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**AGRICULTURAL ADMINISTRATION
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ON FARM RESEARCH AND AGRICULTURAL RESEARCH
AND EXTENSION INSTITUTIONS

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The Overseas Development Institute (ODI) is an independent, non-profitmaking research institute. Within it, the Agricultural Administration Unit (AAU) was established in 1975 with support from the British aid programme. Its mandate is to widen the state of knowledge and the flow of information concerning the administration of agriculture in developing countries. It does this through a programme of policy-oriented research into selected subject areas. The dissemination of this research and the exchange of ideas and experience between countries is achieved through the four Networks on Agricultural Administration, Irrigation Management, Pastoral Development and Social Forestry. Each of these had between 600-900 members in 1986 and is drawn from a wide range of nationalities, professional backgrounds and disciplines. Members contribute to and receive papers, and newsletters containing information on recent work, workshops and other relevant events. Information on these networks is available from the Administrative Secretary of the Agricultural Administration Unit. Membership is currently free of charge, but members are asked to provide their own publications in exchange.

INTRODUCTION

In the agricultural research systems established in Eastern and Southern Africa, technical packages have been produced on research stations and offered as recommendations to farmers. Yet the research stations are often isolated islands of climate and soil, very different from the conditions of most farmers and such research stations have severe limitations. Classical reductionist research techniques isolate experimental variables from the wide sources of variation which dominate production under farmers' conditions. Top down organisation of research and extension systems and top down orientation of researchers fails to respond to the needs and problems of groups of producers operating under diverse circumstances.

The arguments for a new approach involving on-farm research within a farming systems perspective (OFR/FSP) will be familiar to most readers. There is a need for technologies appropriate to the local specific circumstances of farmers, for farmers to be part of the process of technology choice and development and for farmers' needs and problems to set the agenda for specialised disciplinary and commodity research. These are the innovating strengths of OFR/FSP for technology development. Beyond this it generates bottom up information for policy makers and planners to enable the efficient and effective mobilisation of technologies in local communities. Institutionally, it moves decision making on technology recommendations and service needs into local situations. It implies that the farmer is not only the leading expert on local farming, but that he also has a great deal to offer by participation in the technology development process. Given these qualities why, as a process for the more effective development of agricultural technology, has FSR not been grabbed by both hands by the governments of Africa? One can argue that the logic of OFR/FSP is irrefutable but its organisational implications remain difficult to swallow.

I have written elsewhere* on the political, bureaucratic and professional obstacles to OFR/FSP but leaving these to one side, there remain issues of institutional location. This paper is concerned with examining some of the alternatives for incorporating systems-based on-farm research into existing agricultural research and extension structures. This is an important area of institutional policy in the Eastern and Southern African region where research and extension are divided institutionally, often within the same ministry but relatively autonomous.

Present research organisation usually takes the form of research stations with multi-disciplinary commodity or specialist research teams with national responsibilities for their specialisation. In larger countries there may be many such stations with the commodity or specialist teams at each, sometimes focussed on commodity or disciplinary issues of particular importance in their immediate region. At the same time extension organisations within the region are increasingly using the training and visit approach, or facets of it felt to be appropriate to their particular country situations.

ON-FARM RESEARCH

Let us look briefly at the roles for systems based on-farm research and at the OFR process. Three roles are seen for OFR in technology development and dissemination:

- 1) Identifying improved technologies relevant to the priority needs of local specific groups of farmers and, where necessary, adapting them to local conditions.
- 2) Feeding back priority technical problems of local specific groups of farmers to focus and help prioritise commodity/specialist technical research, much of it done on research stations.
- 3) By operating among farmers, on their fields, providing a link between farmers and research and between research and extension.

* 'The Development of African Farming Systems: Some personal prejudices' Douglas Thornton Seminar, University of Reading, October 1986 (to be published in Agricultural Administration)

Table 1. Possible responsibilities in systems based OFR activities

OFR ACTIVITIES	FARMER	OFR	CST	EXT	POLICY PLAN
1. Target grouping		**		*	*
2. Selection of priority target groups				*	**
3. Diagnosis					
(a) Interpretation of background information	*	**	*	*	*
(b) Informal Survey	*	**	*	*	*
(c) Formal Survey	*	**		*	*
4. Identifying possible research thrusts		**	*	*	**
5. Prescreening apparently relevant solutions					
(a) Technical					
i. Adapted to local climate etc.		*	**		
ii. Interaction with local farmer management practices		**	*	*	
(b) Economic					
i. Can technology be serviced locally		**		*	**
ii. Is the technology compatible with the farmers system	*	**		*	
iii. Is it profitable to the farmer in local economic circumstances	*	**		*	
6. Experimentation on local farms					
(a) Researcher Managed					
i. Planning		*	**		
ii. Implementation		**	*		
iii. Assessment	*	*	**		
(b) Research/Farmer managed					
i. Planning		**	*	*	
ii. Implementation		**	*	*	
iii. Assessment	*	**	*	*	
(c) Farmer Verification					
i. Planning	*	**		*	
ii. Implementation	*	**		**	
iii. Assessment	**	*		*	
7. Determine priorities for CST research		*	*		**
8. Formulate recommendations		**		*	
9. Organising Servicing and Supplies				**	*
10. Demonstration: test marketing	*	*		**	
11. Monitoring farmer reaction	*	**		*	
12. Full extension to target group	**			**	

A double asterisk indicates the actor(s) with a major responsibility in the activity concerned. Clearly linkage is exceptionally important if the process is to be effectively implemented. Both the process and the linkages will be paramount in ensuring systems based OFR plays its roles in technology development.

The systems based OFR process involves five sets of actors:

- 1) Farmers
- 2) On Farm researchers
- 3) Commodity and specialist researchers
- 4) Extension staff
- 5) Policy makers and planners

Table 1 shows how responsibilities of these actors may be spread over the OFR sequence.

INSTITUTIONAL OPTIONS

Within the historical pattern of agricultural institutions in the Eastern and Southern African region, there are at least four options for the organisation of systems based OFR. Each option has advantages and disadvantages both in terms of its ability to perform the roles designated for systems-based OFR, and as a vehicle for building up OFR capacity in National Agricultural Research Services.

OPTION. A. Each Commodity/Specialist team in NARS adds a social scientist to bring the farming systems perspective into their research. All scientists of the team carry out both technical and on farm research related to the team's commodity or specialisation across its area of responsibility, ie. nation or region wide.

This model is widely advocated by commodity researchers. It was the original basis on which social scientists were introduced into agricultural research in the region in the early 1960s, before the systems-based OFR process had evolved. Those early introductions* while they made contributions to the FSR concepts now incorporated in systems-based OFR, had virtually no impact on experimental procedures

*Editor's Note: One of the first 'introductions' was Mike Collinson himself: he was employed by the Colonial Agricultural Service and worked at the Ukiriguru Station in western Tanzania in the early 1960s.

or on technology development. This model was tried by the Ministry of Agriculture, Kenya, in 1978/79, when they recruited 12 young graduates to be trainee farm economists and added them to the established research station cadres.

Advantages

- * Little institutional change or management reorganisation is required for implementation.
- * The technical/on-farm research interaction is inherent, within the team.
- * Researchers keep a foot in what has been perceived as 'real' research with promotional prospects and peer recognition on traditional, established criteria. They feel less threatened than being transferred to a 'new' type of research in which different criteria are relevant and peer recognition is not guaranteed.

Disadvantages and difficulties

- * Unless the social scientist added to the commodity or specialist teams (CST in Table 1) is very experienced in systems based OFR it is very difficult for him to make the case for social science and carry the team of technical scientists with him in introducing a systems perspective. Such experience is so far rare in national research services.
- * The pre-determined focus into the team commodity or specialisation limits the benefits from the systems perspectives.
 - research effort may be focussed on what to farmers are relatively minor problems. Identified solutions may not be attractive to farmers whose overriding concerns are elsewhere in their system.
 - technical research problems requiring commodity or specialist attention can only be identified and ranked within the special

focus. This option cannot aid prioritisation efforts across commodities and specialisations - a major contribution from a full systems perspective.

- * There is potentially overlap in the farmer focus (at the extreme five or six teams may be carrying out a special focus diagnostic and OFR experimental programme within the same target group of farmers).
- * The linkage role with extension is inhibited in this option. Little re-organisation is required and OFR's primary concern is the commodity or specialisation. This is largely incompatible with area oriented extension organisation.
- * The disadvantages listed for this option contribute to the limited cost-effectiveness of systems based OFR when integrated with commodity teams.

OPTION B. Each Commodity/Specialist team in national research services has a complementary OFR team (usually an agronomist and a social scientist) which handles the systems based OFR work relevant to the team throughout its area of responsibility, ie. nation or region wide. This system has not so far been tried in Eastern and Southern Africa.

Advantages and Disadvantages

- * This has similar disadvantages to Option A, with respect to the restricted exploitation of the systems perspective both in mobilising technical research results and in drawing priorities across commodities and specialisms.
- * It also asks OFR scientists to desert the traditional peer groups evaluation criteria in research and face the lack of an OFR career structure in national research systems.
- * On the other hand, it provides a clear institutional niche for OFR scientists, allowing for development of their capacity.

OPTION C. The set of Commodity and Specialist teams are complemented by a set of systems-oriented OFR teams. Each OFR team has regional responsibilities, each draws from and feeds back to all or any commodity or specialist work which is relevant to circumstances and priorities of farmers in its region of responsibility. This model has been adopted in Zambia in 1981 and in Ethiopia in 1985.

Advantages

- * In diagnosing foci in the system without pre-determination to a particular commodity or specialism, priority problems are better identified. It is these priorities which offer best leverage for improvement of the system, and appropriate solutions for these should be readily absorbed by target group farmers.
- * Feeding back technical research agendas, made up of unsolved priority farmer problems, helps balance technical research efforts according to identified farmer needs.
- * The two points above and the responsibility of one OFR team for any one region make a strong contribution to a cost-effective research effort.
- * The regional or area orientation of the OFR teams is wholly compatible with extension organisation. It offers great potential for drawing extension staff into the later stages of generation of the techniques they will later have to sell to their farmer clients. It helps extension staff identify with technologies incorporated into recommendations.
- * It creates an institutional niche for scientists where they can be sheltered during orientation, while their professional competence in OFR is built up.

Disadvantages

- * The separation from commodity and specialist teams may have several adverse effects:
 - It asks scientists to isolate themselves from traditional peer group criteria in assessing research programmes.
 - It may cause uncertainties as to career structure and promotional opportunities.
 - Drawing from, and feedback to, commodity and specialist research are indispensable features of OFR. By separating the two sets of teams, there is a danger of poor linkages between them, even when both are within the national system.
 - A more complex re-organisation of institutions and budgets is required to implement this option.

In Zambia the adoption of this model has brought a strong institutionalisation of systems based OFR. It has created a sheltered niche into which both Zambian nationals and technical assistance funds and personnel have been drawn, and which has been particularly useful to allow the build up of capacity among young Zambian professionals. The relative independence of the OFR teams has encouraged interactions with the extension services and with regional planning committees. On the negative side, as is indicated in the listing of disadvantages, developing effective interactions has proved a major challenge. While a linkage mechanism has been established, specialist researchers are not all convinced of the need for systems based OFR.

OPTION D. This is the same structure as Option C but with the OFR teams institutionalised within the extension services, not in national research. It has the same advantages and disadvantages as Option C, but it has the added disadvantages of the complete isolation of the CST's and thus greater dependence on feedback for the effective application of the systems perspective by the OFR teams. Malawi established

its first systems based OFR teams in 1984, in the Department of Agricultural Research (DAR). Although they are in DAR the teams are under the day to day control of the Managers of Agricultural Development Divisions (ADD) including extension and research, at the local level. It has brought difficulties in linkages with the commodity teams. Further, some ADD managers have tended to dictate the programmes of the OFR teams jeopardising the process in two ways:

- 1) By managers insisting they know the problems requiring on-farm research and short-circuiting the diagnostic process.
- 2) By managers wanting new OFR teams to be active throughout their divisions and lowering the quality of work by spreading trainee manpower too thinly.

DISCUSSION

Each country is unique and there is no universally best option for incorporating a systems-based on-farm research approach in national research and extension services. The options must be weighed by decision makers in the light of their specific circumstances. These include:

- The variability of farming situations across the country - the more variable, the more local specific will be technology needs.
- The complexity of farming systems - the more complex, the greater the potential contribution of a systems perspective in research prioritisation and the generation of appropriate technology.
- The existing organisation of research and attitudes of researchers. It may be important to minimise re-organisation. It may be counter-productive to risk alienation of the existing research cadre.
- The existing linkage between research and extension - where this is effective then less weight need be given to reconciling the

structure of OFR with extension.

- Analogous situations with strong technical research efforts in other countries of the region will, given regional co-operation, influence the desirable balance between commodity-based technical research and OFR in particular country situations.

The size and complexity of the country also affects the desirable balance between technical and on-farm research and the choice of the OFR option. At the extreme, very small countries with larger, agro-ecologically similar and co-operative neighbours or near neighbours, may choose OFR and rely on co-operation to provide the technical stockpile for domestic OFR to utilise. Larger countries may do this for areas which have analogous conditions elsewhere in the region with strong technical research efforts. There is massive scope for regional co-operation between countries in agricultural research in which the need for a critical mass of research is recognised but domestic resources - in terms of both manpower and budgets are often limited. In Southern Africa, with SADCC and SACCAR as its agricultural research committee, such co-operation is increasingly feasible. In Eastern Africa, with differences between member States, with bilateral disputes and with the rundown internal condition of several countries, the political will for regional co-operation is limited.

The inertia of the technical research establishments and the inexperience of the young national professionals involved remain the major obstacles to effective OFR. And more effort and evidence is required to convince the technical research establishment that systems based OFR procedures can mobilise their findings for use by farmers. Yet these issues apart, there remains the major challenge of institution-alising the on-farm research process; and in addressing this challenge research managers must consider the range of factors which determine the form of organisation in which researchers of all types can operate successfully.