

Report of the BATAT Technology Design Team

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STRATEGIC FRAMEWORK FOR AGRICULTURAL TECHNOLOGY DESIGN TEAM FOR BROADENING ACCESS TO AGRICULTURE THRUST

1. INTRODUCTION

1.1 BACKGROUND

Historically farming services in the Republic of South Africa were founded on two parallel structures having little or no formal links between each other. The first served the commercial agriculture which predominantly resided within the white community, while the other served subsistence farming, typical of informal systems found within the black communities.

To redress the previous scenario, the Department of Agriculture supports the Reconstruction and Development Programme (RDP). This fact is highlighted by the Department's mission which is to promote the contribution of agriculture to the development of all communities, society at large and the national economy, in order to enhance income, food security, employment and the quality of life in a sustainable manner.

To fully support this initiative, the Department has launched both short term and long term strategies. Broadening Access To Agriculture Thrust (BATAT): is the Department of Agriculture policy which formulates the implementing strategy aimed at transforming the government's services and re-orienting the budget in agriculture in order that the provisions of the national constitution as well as the requirements of the Reconstruction and Development Programme are met. BATAT is embedded in the white paper on agricultural policy and is interwoven with the budget re-prioritisation process to be undertaken in the provinces. The objectives of BATAT are to design and establish mechanisms for broadening access to agriculture for previously excluded farmers in terms of their needs for financial services, human resource development, technology development, delivery systems and marketing services.

The Technology Design Team's approach to technology development is governed by the following ethos:

**DEVELOPMENT CAN ONLY COME FROM WITHIN A SOCIETY WHICH
DEFINES IN TOTAL SOVEREIGNTY ITS VISION AND ITS STRATEGY, AND
COUNTS FIRST AND FOREMOST ON ITS INTERNAL STRENGTHS AND (then)**

COOPERATES WITH SOCIETIES THAT SHARE ITS PROBLEMS AND ITS ASPIRATIONS? (Carlos Lopez, 1994).

1.2 LAUNCH OF BATAT

In order to implement the BATAT strategy, the Department of Agriculture launched a national workshop at the Department of Engineering, Silverton, Pretoria on the 8-9 November, 1994. The workshop was attended by the Deputy Minister and senior members of the Department from both National and the Provincial Department.

Other participants from educational institutions, NGO and the private sector were also invited to the workshop. The participants were then divided into five groups according to their interest to the arms of BATAT. The BATAT core team was selected at this meeting. The duties of this team include facilitating the workshops in the provinces.

1.3 TECHNOLOGY DESIGN TEAM

The Technology Design Team (TDT) was set up and the members comprised of participants who have expertise and experience in this field. The TDT devised a mission statement that would guide the objectives and aims of the team.

1.3.1 Mission

The Technology Design Team will make *proposals* on how to *facilitate* a participatory process which broadens the focus of research and technology support, to ensure it is suitable for different farming systems, with the emphasis on the needs of the new clients and taking cognisance of indigenous knowledge and coping strategies.

1.3.2 Terms of reference

The Technology Design Team aims to achieve its mission, by filling an institutional gap in the process of research and technology development that should end with the utilisation of appropriate and suitable technologies by all farmers and result in feedback into the research and development system.

1.3.3 Vision and functions

The Technology Design Team aims to:

- Facilitate the implementation of suitable structures which will identify and convey the needs of the farming sector and which will promote a participatory approach to decision making by land users.
- Help prioritise agricultural research needs and to negotiate for funds to undertake programmes to address these needs, in consultation with all role players.
- Establish and maintain a database of agricultural research information which will be accessible to all role players.
- Support the existing research capacity of organisations and agencies and to develop additional capacity where deficiencies are identified.
- Establish a forum inclusive of all organisations and agencies concerned in order to co-ordinate and integrate research programmes.

2. SITUATIONAL ANALYSIS

The Technology Design Team recognises that the identification of the problems experienced by the new client and the implementation of the subsequent research requires imagination, dedication and a high degree of professionalism.

2.1 THE PROCESS

To achieve this phase of the programme, a series of workshops were held in the provinces during the launch of BATAT. To date, only three of the nine provinces have since launched BATAT.

Workshop Purposes

1. To provide a forum for the farming community and policy makers to examine the potential of technology development and usage within their environments.
2. To identify future challenges and explore ways in which to broaden access for the clients who had been previously excluded from the system.

The workshops held in the provinces reconfirmed agricultural's key role in economic development. Through group discussions, the participants examined how technology development contributed to agricultural development.

2.2 THE CURRENT SCENARIO

The current scenario is a summary of the deliberation made in the three provinces. The provincial and the scientists' perspective represent views of some of the stakeholders (in this case the end user and the designer of the technology). It would therefore be foolhardy to claim that all the role players and their views have been included in this draft and preliminary report.

A generalised statistical analysis, categorises farmers according to their resources and contribution to national food production as follows:

1. Resource poor households (no land, money, in rural areas) 31%
2. Small holders (small piece of land) 56%
3. Emerging farmers 13%
4. Commercial farmers 0,2%

2.2.1 The provincial perspective

The overall view from the provinces concerning technology development is that traditional approaches to research and extension have failed to bring about satisfactory increases in agricultural production to resource poor farmers. The reports describe the technology as being inappropriate, inaccessible and that there has not been adequate training in the use of the existing facilities.

To be relevant, the technology should address the farmer's priority production problems. The farmers were not consulted on the design of the technology and were expected to accept and adopt something they knew little about. The current scenario can best be described as an era that offers technology that increases output per unit of land requiring additional labour and capital input (in the form of purchased inputs and equipment). This is the reverse of what is needed from the perspective of the small holder farmer who has generally little capital and labour and has no security of land tenure. Another problem is that of energy. The energy crisis is closely linked to agricultural and environmental decline. This crisis first manifests itself on the over-reliance on wood fuel in the face of the disappearing forests. The second is the over-reliance on human labour for agricultural production. The shortage of animal traction for cultivation also means that possibilities for increased production per unit of land and labour are minimal.

Most of the black farmers have small holdings of land, soils are poor and they farm under unfavourable climates. The majority of these farmers have little capital and lack access to financial institutions for inputs and outputs. Most of the farmers are women, are elderly, have poor health support systems and low levels of education. Management and decision making skills are poor due to lack of access to information and training. The previous government policy aggravated the situation resulting in inadequate public investment in infrastructure. This resulted in poor rural education, agricultural services such as extension and research not available and accessible. Poor government policy and poor public investment led to a lack of private investment in farming, farm input supply and markets. As a result of the disparity in provision of services, these areas are characterised by increased populations surviving on marginal lands. Increased populations have put great pressure on available water resources and environmental degradation has reduced the availability and accessibility to water.

2.2.2 Provincial recommendation

From the farmer's view, the BATAT initiative is critical for them to increase and sustain the contribution of agriculture to economic growth in South Africa. All research efforts will be wasted if they do not lead to wide scale adoption of the technology by the farmers. The technology has to be relevant to the needs and objectives of the farmer and to his/her household and appropriate to the household's resources and operating circumstances.

The ultimate objective of technology development from the farmer's perspective should be to maximise the output of relevant technology to serve the priority needs of farmers identified by policy makers as target groups. National goals should determine the priority to be given to research efforts. This exercise leaves open the questions of who is best able to produce that technology and who may be expected to pay for its development.

2.2.3 The scientist perspective

The scientist (research institutions, universities, NGO's) summarised their problem as that of lack of policy and long term strategic management in research and the linkage mechanism between agricultural research institutes and their clients. Lack of clarity on how these linkages can and should be strengthened has also resulted in the weakening of farmer - extension - researcher linkages. From the scientist's perspective, it is a difficult process to address the needs of small holder farmers because there is no existing information on their needs. The operations are also limited by lack of basic data and reliable production statistics.

on rural areas. The poor communication between researcher and farmer and the lack of farmer participation slows technology innovation. As such not much research has gone into the use of indigenous crops, resulting in poorly conceived agricultural projects in some areas. There is also no proper coordination of research activities conducted by the research institutions, the Universities and the private sector. There is therefore competition for funds and grants and an inclination towards basic research as opposed to adaptive and problem solving research. Where communication linkages have existed, the success has been minimal due to the fact that the farmers are illiterate and the extension officers sometimes not motivated to perform their duties.

2.2.4 The scientists' recommendations

1. Policy Framework

a) The workshop proposed that a research strategy for agriculture and rural development should be a Systems Approach. The following three aspects (critical success factors) must be in place:

i) active farmers participation

ii) multidisciplinary research teams

iii) multidisciplinary institutional interactions (including NGO's)

b) Co-ordination of research should take place at provincial level. For this to be a success there should be a research co-ordinating committee representing the following institutions: Department of Agriculture, Research Institutions, Universities and Farmers' Unions.

Such a committee could be chaired by a representative from the Department of Agriculture. The main task of such a team would include the following functions:

- identify target areas for research
- identify research priorities and needs
- put together a team to address these problems and to do the research
- to maintain a databank of all existing research

c) There should be an active liaison between provincial co-ordinating committees. Mechanism to accomplish this could be through electro mailing and an initial bi-annual meeting for information exchange to be facilitated by BATAT.

d) The provinces should take cognisance of the need to re-orientate and sensitise all stakeholders to the systems approach.

2. Delivery Mechanism

Bearing in mind the policy framework and the critical success factors of active farmer participation, multi-disciplinary research teams and multi-institutional teams, the delivery of technology will be automatically achieved using any of the following methodologies:

- Rapid rural appraisal
- Participatory rural appraisal
- Community/Farmer action planning

These processes enables and involves situational analysis, planning, implementation with built-in evaluation mechanisms. Delivery to the end user can be effective if user friendly language is implemented. Terms like technology transfer should be reviewed. Terms like providing, designing accessible information should be encouraged.

3. Researcher identified topics for research

The technology to be used for smallholder farmers should take into consideration the following factors:

- should be low cost and affordable
- ensure sustainable environmental management
- use available local resources
- interventions to be area specific

4. Technology options

- animal traction (draught power) with an appropriate environment and conditions
- post harvest technology with added value
- health aspects of meat processing and abattoir
- Jersey by Nguni cross cattle for milk production
- milk, cheese and yoghurt production
- maize varieties
- cropping patterns
- cropping systems
- water harvesting technologies
- genetic engineering

3. CONCEPTUAL ISSUES

3.1 THE VISION

The vision and the proposals made is that agriculture technology development and research should empower people to derive and maximise benefits from the use of natural resources.

3.2 THE CONSTRAINTS

There are certain constraints that need to be addressed before the vision is attained. One of the major constraints is the lack of clarity on how research will be conducted and how it should be delivered. Linked to this is the establishment of farmer - extension - research linkages. The financial and budgeting implications this has especially of government resources and those of the research institutions poses threats to many stakeholders. It is therefore imperative that there is a broad policy framework and long term strategic planning to address these issues.

3.3 THE FIVE TYPES OF RESEARCH

In order to clarify the relationship of agricultural research components to science/technology and development and to knowledge, dissemination and adoption of technology, it will be useful to define the nature of the five types of research.

a) *Basic research* focuses on acquisition of new understanding but is not problem directed, e.g. viral reproduction mechanisms.

b) *Diagnostic research* focuses on the acquisition of new understanding and is problem directed, e.g. identification of disease causing agents.

c) *Applied research* draws on the world body of scientific knowledge in developing new technology in response to identified problems, e.g. tissue culture of virus free plants.

d) *Adaptive research* is directed at the testing and adaptation of new technology and is focussed on specific environments and considers the interaction of the technology with the specific environment, e.g. fertiliser requirements of cotton on the vertisols of the Makhathini Flats.

e) *Farming systems research and extension* is directed at applying the technology within a specific farming system, often called a recommendation domain, is multidisciplinary, on-farm and participatory, creating a learning situation for the end user.

FSR is a scientific method that focuses on farmers' circumstances and seeks to integrate farmers into the research process. Of particular relevance are the perceptions and expectations of small farmers and the constraints confronting them. Essentially FSR/E adopts a farmer oriented and problem solving approach to agricultural research through appreciation of the production system of farmers, their farm household interaction and the environmental variables - ecological, biological, socio-cultural, economic and political which influence farmers' decisions. FSR/E thus recognises that farming systems are dynamic and involve not merely the interaction of physical forces but also expressions of free will arising from the purposiveness of farmer behaviour.

3.4 LINKAGES

Implicit in research and development is the adoption of new improved technologies that are -

a) relevant to the farming household's needs and household production objectives;

b) appropriate to the household's operational circumstances and resources.

Links between agricultural research institutes and their clients who are the farmers and technology agents are vital for successful technology development and delivery.

Key factors to strengthening links:

a) Agricultural development and research policies.

b) Resources and organisational structures of institutions involved.

c) Technical issues such as the existing knowledge base, available technologies and diversity of farming systems.

4. WAY FORWARD

4.1 TECHNOLOGY DEVELOPMENT PATHWAY FOR SOUTH AFRICA

In designing an agricultural technology development pathway for South Africa, research policy should address the following questions:

6 Should there be a national agriculture research system?

6 What purpose will the national agriculture research system serve?

6 How much research should be carried out?

6 What type of research should be done?

6 What is needed to manage the national agriculture research system?

The proposed pathway will bring together several recurring ideas on the structure of decision making in a national agricultural system. Such a design will be influenced by resources and the farming systems that the small holder is subjected to. These resources are characterised by the following constraints:

6 Labour and time constraints

6 Harsh climate environments

6 Limitations on the amount of working capital

Research and technology development should be addressed within the paradigm of these constraints. Similarly to develop a national research agricultural system, policy should be within a systems framework that ensures that all role players are involved. For this task to be accomplished it is proposed that provincial priority setting exercise/objectives to establish well focussed and cost effective priority research programmes forms the background and backbone of the technology development pathway. This strategy will be supported by national drives and the environment within which policy should operate will be outlined.

4.1.2 Implementation of technology development pathway

Phase 1: The Master plan (Fig. 1)

Activities

a) Policy articulation. To address technological, policy and institutional changes and the importance of multi-disciplinary approach to address a broad range of needs.

b) A 5 year budgetary and operational plan is formulated (Fig. 2)

This will be an inclusive approach that will involve debate consultation with all stakeholders.

Phase 2:

- a) Set up of provincial co-ordinating committee representing the Department of Agriculture, Research Institutions, Universities, Farmers organisations and the private sector.
- b) Basic studies to understand the local environment. Such data to include:
 - 6 audit of available technology
 - 6 resource data collection, collation of ex-homelands
 - 6 audit of indigenous technologies
- c) Develop provincial level actions master plan.
- d) Workshop to work out policy and legal frameworks.
- e) Facilitate linkages among public, private, local and regional institutions with provinces and facilitate international links.
- f) Develop capacity for policy analysis, performance, monitoring and impact assessment.
- g) Design suitable extension farmer - researcher linkages.
- h) Review of master plan.

Phase 3:

- a) Continuous adaptation of use of agricultural research systems.
- b) Review linkage arrangements.
- c) Embark on new research directions as indicated by the national agricultural research system.
- d) Skills development programme to be linked to the master plan.
- e) Review of master plan.

4.1.3 Support activities

For the technology development pathway to be successful, the following support activities are proposed:

- a) Integrating participatory adaptive research (farming systems research approach into public sector research systems).

b) Establishing linkages with international agricultural research centres to use research resources more efficiently.

c) A policy environment that stimulates interests and investment in the commodity system that is being targeted. This will enhance the evolution of technology systems.

d) Policy environment must offer incentives to potential users of technology to invest in the production of technology. These include -

6 legislative mandates of the research institutions

6 intellectual rights and patent laws especially if the private sector is to be encouraged to invest in its agricultural application

6 rights of government agents to enter into contracts

6 financing and granting mechanisms that encourage competition for research resources and help leverage resources

6 to encourage private sector participation and investment curtaining policies and regulations may need reform

6 set priorities for research and through analysis of policies facilitate policy dialogue

6 reform of the research institutes as well as the legislative mandates governing them

6 establishing efficient planning, financing, contracting and monitoring mechanisms

6 developing a sustainable level of finance

6 policies, procedures and partnerships that speed up the development, adaptation, review, release and commercialisation of profitable technologies

6 ensure the multiplication, distribution, marketing and extension of agricultural technologies

6 strong client research linkages

6 promoting active collaboration between technical specialists and social scientists to encourage attention to social interests from research conceptualisation through implementation

6 being selective at the design stage and rejecting proposals that do not meet relevant criteria

6 the challenge is to establish an appropriate balance between research that focuses on production and supply and research that focuses on market and demand

6 a sustainable approach that focuses on developing and transferring technologies that continue to contribute

CONCLUSION

In order to develop suitable agricultural technology which can be practically applied and which will contribute to the development of all communities, society at large and the national economy, a healthy research capacity will have to be maintained. Strong links between researchers and clients, a supporting policy framework and suitable funding will form the backbone of such a research capacity.

Co-ordination and prioritization of research needs identified in the various provinces must form the framework for research programmes. To achieve this, suitable linkages must be designed and maintained. A farming systems approach with active farmer participation will ensure that technology is developed to the satisfaction of the client.