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# Agricultural Research System of Ethiopia: Past History and Future Vision

Tesfaye Zegeye

## 1. Background

Agricultural Research in Ethiopia began in Jimma and Ambo in 1952 and was extended to the then College of Agriculture at Alemaya in 1957 and later in 1965 included Debre Zeit. Realizing the importance of agricultural research in economic development the Ethiopian government established the Institute of Agricultural Research (IAR) in 1966 as a semi-autonomous organization under the general supervision of the Ministerial Board of Directors.

The specific mandates of the Institution of Agricultural Research was to:

Formulate national agricultural research policies,

Coordinate national agricultural research

Undertake research in its centers and sub-centers located in various agro-ecological zones of the country.

In 1986, IAR had seven main centers and 22 sub-centers. The main centers were Awassa, Bako, Holetta, Jimma, Mekele, Werer and Nazreth (IAR 1989). These centers and sub-centers were neither adequate in number nor properly distributed to cover or represent all the major agro-ecological zones of the country. In order to expand the research activities and develop new technologies for the uncovered agro-ecologies additional 6 research centers were established (Seme, et.al, 1990). A good proportion of the research establishments are located in the highlands, comprising of the humid, semi-humid, moist, semi-moist and semi-arid zones. The coverage of the arid and per-humid zones is very poor. Additionally, because of great variations in microclimate even within seemingly similar zones, the distribution of research establishments across these zones cannot be considered adequate. Moreover, most of the research establishments are under-manned, under-equipped and lack resources.

With these developments, centers were designated in to two types of research centers: zonal or regional and commodity centers. Accordingly, IAR had two types of research approaches: commodity and zonal research approach. The commodity research approach were designed to address selected strategic crops at a national level while the zonal approach were intended to address production constraints specific to the particular agricultural development zones. In general, the national agricultural research system largely followed a team approach composed of breeders, agronomists, pathologists, entomologists, agricultural economists and soil scientists. The establishment of IAR and its different research centers; collaborations established with different international organizations such as the International Wheat and Maize Research Institute (CIMMYT); attempts made to coordinate research activities in the national system and the research approach followed as national commodity and zonal research, were positive steps taken to develop or generate new technologies.

The team approach followed by IAR was supported with functional departmental and divisional activities at center level. By late 1980s, the IAR had organized its research in 12 departments including: field crop, horticulture, stimulant crops, agronomy and physiology, crop protection, soil science and water management, farm implement, animal production, animal feed and nutrition, animal health, food science and agricultural economics and farm management.

Research proposals were evaluated and approved during the review sessions carried out at division/departmental, center and team level. An annual management meeting is the last review meeting that decides the future of each newly proposed and/or on going research activities. Out of the mandates given, the IAR had never produced a research policy. It had to a large extent, succeeded in coordinating research, but only through mutual interest and good will among participating institutions and scientists (Seme, et. al 1990). A recent review of technologies generated by the Ethiopian agricultural research system since their establishment in 1950s and 1960s shows that the following technologies has been developed tested and released (ESTC, 1994).

250 crop varieties (Cereals, oil crops, pulses, horticultural crops)

25 farm implements

28 recommended tree species

16 soil and water conservation techniques

10 livestock breeds

17 forage species

Less than half of the crop varieties are currently under production; many have been supplanted by higher-yielding varieties, others have gone out of production because of disease susceptibility and other factors, and others may have never been widely adopted because of problems of seed availability, input market opportunities or other system constraints (J.Haward et.al, 1995).

The government of Ethiopia having recognized the fact that agricultural technologies are key factors required to increase agricultural production and its contribution to the development of the national economy restructured the national research system by establishing the Ethiopian Agricultural Research Organization (EARO) in 1997 (Proclamation No. 79/1997). This proclamation was prepared with the presumption that new technologies will be generated, indigenous knowledge will be improved, exotic technologies will be adapted and new scientific knowledge and information will be developed in line with the country's Agriculture Development Led Industrialization Strategy, (EARO, 2000 The Socio-economics Research Strategy). The above activities considered as decisive activities to develop agriculture, which forms the basis for the development of Ethiopia's economy and the social welfare of its people (proclamation No. 79/1997).

The establishment of EARO is justified because of the necessity to establish an organization which shall be responsible for generating, improving and adapting technologies and coordinating, encouraging and assisting research activities in order to fulfill the current and long-term agricultural requirements of the country. In addition, the government had found it essential that research shall be undertaken in a systematic and coordinated manner in order to ensure sustainable development in production and productivity of the agricultural sector of the country (Proclamation, 1997).

## **2. Objectives**

- The specific objectives of the Ethiopian Agricultural Research Organization are:
- Generate, develop and adopt agricultural technologies that focus on the needs of the overall agricultural development and its beneficiaries.
- Coordinate research activities of agricultural research centers or higher learning institutes and any other related establishments, which undertake agricultural research.
- Build research capacity and establish a system that will make agricultural research efficient, effective and based on development needs.
- Popularize agricultural research results.

EARO based on its proclaimed objectives and mandates brought crop, livestock, dry land agriculture, soil and water, forestry, socio-economics and research extension linkage under its umbrella. After its establishment, EARO assessed the past efforts and constraints of its organizational structure and research approach that existed in the research system in the past and developed research strategies and priorities through the interactions and participation of both national and international organizations involved in research and development in the country.

## **3. Need for Research Strategy**

Strategic planning is a vital activity in agricultural research since it greatly assists in identifying and implementing research that address critical physical, biological, socio-economic problems and that are attractive to those who fund the research system. There are several reasons that make planning a vital activity in agricultural research. First, planning is especially important where resources are limited and must be used as efficiently as possible to solve high priority problems. Second, planning is more important when much of the agricultural research program is mission-oriented or applied in nature. Third, research organizations in the early stages of institutional development, with a significant proportion of relatively inexperienced scientists, require careful planning, monitoring and evaluation. Fourth, effective planning is related to government support, since there is a greater likelihood of obtaining funds for research if the research organization can demonstrate that it is responsive to high-priority agricultural research and national development goals. Finally, the uncertain and long-term nature of agricultural research in general suggests the importance of planning. Strategic research planning is concerned with developing the mission and direction of an agricultural research organization as well as developing broad strategies for accomplishing the mission. In addition, strategic planning helps to define an overall sense of direction and purpose for a research organization. The time frame for strategic planning is long-term, from five to ten years or longer in some cases.

Based on these concepts and using an interactive process among different stakeholders the following strategies were developed:

Crop Research Strategy,  
Livestock Research Strategy,  
Dry Land Research Strategy,  
Soil and Water Research Strategy,  
Forestry Research Strategy,

Socio-economics Research Strategy, and  
Research Extension Research Strategy

## **4. Gaps**

### **4.1 Agro ecology Gap**

In the past there was lack of focus on research geared to understand the potential of resources such as land, water and there was inadequate knowledge regarding the different farming system found in different agro-ecological zones. Due attention was not given to the pastoral and agro-pastoral production systems. The research that were undertaken were not based on agro ecologies, they were rather based on commodities and very broad classification of agro ecologies. In addition, there was inadequate coverage of research programs or centers b agro-ecological zones.

### **4.2 Manpower Development Gap**

The federal as well as the regional centers has no adequate staff to cater the research in full scale with appropriate disciplinary mix. Most of the research staff has only B.Sc. and only few have M.Sc. Most of the staff are plant science graduates and are engaged in crop improvement programs, crop selection and breeding. In all research centers there are lack of critical mass of staff in disciplines such as natural resource, agro-meteorology, agricultural economics, agricultural engineering etc.

### **4.3 Research Co-ordination Gap**

It was identified that the research efforts were commonly fragmented and uncoordinated, with inadequate information exchange among potential institutions. The system was weak in terms of organizational structure and lacked effective coordination mechanisms at different levels. Agricultural research was not multidisciplinary and therefore the research programs were not integrated with other relevant disciplines. The research approach was not participatory, problem oriented, bottom up and agro-ecologically based and because of this there was absence of farmer-research-extension linkage that facilitate technology transfer to end-users and receive feedback from them.

## **5. Goal and Objectives of the Agriculture Research Strategy of EARO**

### **5.1 The overall goals of the strategy of EARO are:**

- Alleviating poverty and maintain food security.
- Increasing income opportunity and employment generation.
- Conserving natural resources.

### **5.2 Objective**

The major objective of EARO is to develop agro-ecological based improved technologies that have the capacity of improving sustainability; increasing productivity; profitability and equity through the generation, assessment, refinement, transfer and effective adoption of appropriate technologies, which conserve resource and assist in attaining food security.

## **6. Research Approaches and Vision**

EARO's long term strategic plan have been developed to tackle the problems of food insecurity by improving the productivity of crops and livestock found in different agro-ecological zones and by providing technologies that limit or reduces natural resource degradation. EARO will focus on identified and prioritized activities across agro ecologies and farming systems within agro ecologies. It will implement research activities expected to produce results in the short, medium and long-term and provide lasting solutions (or reduce the challenges) faced by small farmers of the country.

### **6.1 Agro-ecological Approach**

Ethiopia has a varied and diverse agro ecological zones (18 major and 49 minor) that have the capacity of providing food that will enable support current and future generations. Past research activities were commodity based and research was not performed on agro ecological basis. Thus, careful characterization of agro ecological zones to identify major constraints and opportunities has been identified as one of the priority researchable area. Based on the identified constraints and opportunities EARO will develop sound and effective research programs appropriate for each agro ecological zones.

### **6.2 Participatory Approach**

The enormous challenges and constraints of agriculture indicated in the various research strategies are far more than EARO can address alone. The organization will work in partnership with other institutions i.e. farmers, development organizations such as the ministry of agriculture and regional bureaus, agro-industries, agricultural commodity exporters, higher learning institution both in the country and abroad, international research organizations, regional and sub regional organizations responsible for coordinating and conducting research, international and bilateral organizations, etc, to effectively implement the strategic plan. In order to facilitate client oriented and demand driven research the following strategy is adopted. These are:

Small and large farmers who are supposed to be the end users of research technologies will be involved in the planning, designing and execution of research activities.

Develop and strengthen alliance with organizations that complement the research activities in terms of expertise and skill (international research centers, universities, NGOs, etc)

Develop mechanisms that will facilitate the flow of information among stake holders

### **6.3 System approach**

Past research approach was commodity and zonal based. This approach resulted in the non-commodity research areas to be ignored or to remain small or in some cases not being considered at all. The research areas that were not given due attention were natural resource management and environmental protection, agro meteorology, biodiversity and habitat conservation, farm mechanization irrigation and drainage, farm forestry and range land resource management, animal (apiculture, fishery, poultry), etc. In addition, agricultural policy, marketing and natural resource economics were completely forgotten. As indicated above, EARO based on its long-term strategy has given emphasis to crops, livestock, natural resources (soil and water, forestry) dry land agriculture and socio-economics. This hopefully is expected to enable EARO to address the chronic problems of the agricultural sector.

## **6.4 Organization and Structure**

EARO to overcome its challenges will have an organizational structure, which is decentralized, multidisciplinary and, multifaceted (in terms of stakeholder). The organization, based on its long-term strategy has adopted structural organization that permits growth and agility to address the multiple demands of stakeholders. A number of research programs and projects are developed for the different research directories and departments. The primary units for program execution will be projects. The projects will be disaggregated in to problem oriented, multidisciplinary research activities that address the key thematic areas identified in crop, livestock, soil and water, dry land and forestry research strategies of EARO. In addition, socio-economic programs and projects are developed in order to diagnose and understand the different constraints of agro ecologies; develop interventions from technologies generated by EARO for field testing, assist the delivery of proven technologies and evaluate the interventions under farming systems with in agro ecologies. On top of these, based on the researchable thematic areas of the socio-economic research strategy, programs and projects are designed that addresses issues of natural resource economics and agricultural policy and marketing. The socio-economic research programs and projects will encompass all the key research activities of EARO as a necessary and holistic integration technique. Determining the problems and constraints that will define the research and related agenda will come about by working in collaboration with regional and federal extension systems, exporters, agro-industries, farmers, NGO's, international agricultural research centers, etc, in a participatory manor. This approach hopefully will help reply to anxieties about the lack of impact from past research efforts.

## **7. Research Program and Projects**

EARO in order to undertake its research activities effectively and efficiently has developed different research programs under each of the directorates and departments. The research programs are developed based on gaps that were identified during the formulation of the strategy. All in all 51 research programs and 184 projects are developed as indicated in the following table.



**Table 1: Number of Programs and Projects by Research Directorate and Departments**

<b>Directory and Departments</b>	<b>No of programs</b>	<b>No of Projects</b>
Crop	13	51
Livestock	11	32
Soil and Water	5	13
Dry Land	4	17
Forestry	4	12
Socio-economics	3	9
Crop Protection	1	7
Research Extension	2	8
Agricultural Engineering	2	6
Agricultural Biotechnology	1	3
Food Science	2	9
Agro-meteorology, Biometrics, GIS, and Modeling	1	5
Research and Development	1	4
Indigenous Knowledge	1	5
<b>Total</b>	<b>51</b>	<b>184</b>

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