Agricultural Research And Extension In Yemen

Current status And Future Perspectives

A Brief Overview

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Introduction

The agricultural sector, and for that matter the Yemeni economy, has gone through dramatic changes. At the time of the creation of the modern state, Yemen was rapidly modernizing its agricultural sector and was setting up an infrastructure for rural services. Agriculture was expanding, although sector growth of 2.2% in the early 90s was already lower than population growth, which stood at 3.7%.

Since then, however, a number of factors have contributed to a limited growth of the sector and deteriorating conditions in the rural areas. These include rapid inflation and the related erosion of public sector spending, the significant reduction of transfer payments that came with the return of Yemeni migrants from neighboring countries after the Gulf War and the reduction in donor support. Natural resources, and in particular water, are being overused.

Recent figures indicate that the sector employs 61% of the labor force and contributes only 18% of Gross Domestic Product(GDP). As a result, sector productivity is relatively low, leading to low rural incomes and swelling rural to urban migration. Sectoral growth is hence imperative and would, in view of the limitations on natural resource use have to come from improved productivity on the basis of sustainable use of land and water resources.

The total arable area is estimated to be about 9.5% of the total geographical area of Yemen. However, the cropped area varies from one year to another depending on the amount of precipitation. On average, it constitutes about 1.5 million hectares (ha), but in the years of ample and well distributed rainfall, it could reach 3.5 million ha. Most of the agricultural areas are rainfed. Livestock is considered an important part of the agricultural sector. The national livestock population is estimated at more than 8 million heads Sheep and goats are reared in the Eastern Plateau region while cattle dominate the Highlands and Coastal plain regions. Yemeni farmers practice an integrated crop - animal system, in which they produce cereal crops to feed their animals and use the residues as manure to improve the soil fertility.

The agricultural sector contributes about 1.7 Billion US$ a year which constitute about 18% of the total Gross National Product (GNP) (Table 1). However, this contribution is still inadequate since 61% of the total work force is engaged in this sector. Qat alone generates double the value obtained from the traditional crops.

Table 1: The percent contribution of different economical sectors in the GNP during the period 1990 – 1996

Sector	1990	1991	1992	1993	1994	1995	1996
Agriculture	18.3	18.3	18.9	15.1	20.9	17.4	17.4
Industry	29.7	28.7	25.2	24.0	25.9	27.2	38.3
Services	47.9	49.7	50.9	53.5	49.6	50.6	37.9

Table 2: The contribution of the different components of agricultural Sector in Million US$

Components	Contribution	% contribution
Agricultural crops	1,232.5	74
Livestock	296.6	18
Fisheries	71.3	4.5
Forest	55.7	3.5
Totals	1,651.1	100

From Table 2 it is clear that the contribution of the agricultural crops dominates all components of the agricultural sector followed by livestock.

The low yield per unit area and a poor agricultural marketing system reduces the contribution of agricultural sector in the national economy. This is due to a number of constraints such as:

- Institutional constraints.
- Socio-economic constraints.
- Technical constraints.

These constraints are due to land fragmentation, continuous conflicts, tribal feuds on holding boundaries, increased population growth and immigration. In addition to the constraints related to production inputs and the absence of many service org .nizations in the rural areas, there is a weak infrastructural set up and coordination among different stakeholders.

Yemeni farmers acquired a vast indigenous technical knowledge in the cultivation of traditional crops during the last 3 to 5 thousand years. However, they lack sufficient experience in dealing with modern technologies and innovations such as the use of chemicals, planting new varieties and utilizing modern irrigation techniques and agricultural machinery.

Other important basic constraints in agricultural development are the water scarcity, salinity, soil limitation and continuous erosion. The total annual renewable water resource is estimated at 2.1 billion m^3, which is equivalent to 150 m^3 per capita/year.

Importance of Research and Extension

There is no doubt about the importance of research in contributing to the development of the economy in general and therefore increase the welfare of the people. The spending of governments on research varies between countries. In the Arab world it does not exceed 0.5%; while in the developed countries it comes to 2% of the annual income. In recent years there was an apparent development in agricultural research in all countries of the world as a result of an increasing awareness regarding the role of research contributing to a real development in the agricultural sector.

Recent activities of extension services in the developing countries were concentrating on cash crops and crops grown for export to provide foreign currency, while less attention was paid to the indigenous varieties. Agricultural extension becomes important at the start of the gradual shift from the traditional to modern agriculture, which requires new technologies and alternative agricultural patterns, resulting in an increase in production, improved quality of life and raised living

standard for the farmers. Extension is the source of the introduction and spread of technology leading to an optimum utilization, maintenance and innovation of resources and protection of the environment. It should be recognized that the extension services represent the main link between the research institutions and the target groups.

Available Financial Resources of the Agricultural Research and Extension Authority (AREA)

AREA budget increased significantly in the period 1994 - 1996, the increment was about 40% in 1996 compared to 1995. The salaries account for most of the budget (83% average) for the years 1994 - 1996. AREA is funded directly from government sources and it receives also external funds. AREA suffers from shortages in operational costs (OC). Funding for operational costs dropped sharply over time, in comparison with the increase in the inflation rate. During the last 6 years, AREA budget increased about 2.5 times. The operational costs for AREA in 1997 were equal to 27 million YR, or equivalent to 8% of the total budget.

However, this sum was not fully disbursed, as AREA has to generate 18 million YR through the sales of agricultural products grown by the research stations. The balance of 9 million YR was distributed among the stations, centers and the head quarters (HQ). Consequently the conclusion can be drawn the AREA operational budget is very limited.

The extension services in the Yemen have been established with the assistance of foreign donors either through loans or technical assistance. In Yemen, the total number of projects, which participated directly, or indirectly in extension activities is about 68. The available data show that foreign investment in the budgets of 15 projects (with extension components) in the period from 1975 till 1989 amounted to 456.7 Million US$ of which 55.5 Million US$ was allocated for extension. This information reveals that extension was given reasonable support from the foreign donors and the picture looks even

more positive when the counterpart contribution was taken into account. However, it should be clear that the majority of these funds were utilized to set up the infrastructure for extension (extension centers and block centers).

Achievements of the Agricultural Research & Extension

More than twenty years have passed since the establishment of Agricultural Research & Extension in Yemen; for which AREA is now responsible. Good progress was made in developing the infrastructure for AREA and the training and qualification of scientists (the number of MSc and PhD holder increased about 15 times during the period 1980 - 1997). Despite several difficulties, many positive developments in the agriculture sector can be recorded:

- Preparation of the Agricultural Research Strategy, the Mid Term Research Plan of work, the Agricultural Extension Strategy and its corresponding Mid Term Plan. These two strategies constitute a sound foundation for long term sustainable development and will be of value long after Yemen has entered the 21st century.
- Introduction of improved, high yielding varieties, like 12 varieties of wheat, 8 varieties of onion, 3 varieties of maize; and other varieties of fruits and vegetables. It is worth to mention that the yield per ha for wheat increased by 157% by introducing the improved varieties.
- Successes have also been achieved in the field of crop management.
- Introduction of cultural practices with high economic returns, resulting in an increase of the yield per ha in 1990 for cereals by about 84% and 62% for wheat compared to yields in the years 1969 - 1971.
- Control of agricultural pests (termites, aphids and plant diseases) on fruits and vegetables.
- Determination of water and fertilizers requirements for some crops.

- Despite the short period of agricultural research, AREA obtained in 1997 the second prize for the best agricultural research, which had an economic impact in the country. The prize was granted by the Arab Organization for Agricultural Development (AOAD),. In this competition, 13 Arab research institutions competed and eight Arab Universities evaluated 102 research subjects.

Investment in Research:

The annual average population increase in Yemen is about 3.7%. To feed this growing population, the agricultural productivity should be increased significantly. However, the annuai rate of growth in the agricultural sector is approximately 2.2%. Hence, sufficient food to feed citizen is not secured. To reduce this gap there should be significant improvements in crop and livestock production, which should be backed by developing and utilizing tools of science and technology.

Any country that suffers from shortage in research capability will not be able to cater for the growing food requirements caused by the increase of its population and consequently improve the standard of living of the people. In the Yemen chances to increase the cultivated area and increase the cropping intensity will be limited; because of the fragile land resources, scarcity of irrigation water, desertification, poor technology etc.

It is generally recognized that investing in agricultural research results in a high payoff. It requires a clear vision about the agricultural development problems. Agricultural research should be directed towards generating technology that will be in line with the agricultural development plan, and capable of utilizing and maintaining the available resources taking into consideration the issue of sustainability and the economic cost. Research should be directed towards addressing the needs and problems of the farmer from his perspective and with enough attention to the socio-economic context.

High returns on capital invested in research can be expected. To demonstrate this the following example (research on wheat) can clarify the issue:

If the international price of wheat is 100 US$ per ton, an annual saving of 3,750 million US$ can be realized. USD 170,300 has been invested in the field of wheat research during the last 20 years, which gave a return of about 56,250 million US$ during 15 years. This means that up till now each US dollar spent on wheat research gives a return of 330.9 dollar.

Constraints Facing Research and Extension

The delay in approving the constitutional status of AREA lead to job instability and postponement of approval of the institutional set-up.

Lack of attention by decision-makers for the position of workers in agricultural research and extension.

Shortage in financial resources for extension especially operational costs and the timely release of the same.

- Shortage of qualified personnel in some fields.
- Inadequate distribution of technical and administrative staff.
- Weaknesses in the financial system of research and extension.

The absence of adequate incentives for staff in the less attractive regions.

Weakness in co-ordination, especially at the higher levels within the agricultural sector and with other partners in agricultural development.

Future Prospects

To realize it's mandate and objectives, agricultural research should lead in having a predictable, well-defined vision to determine the direction of research work. Agricultural research should extrapolate scientific and practical plans for the future in line with the National Development Plan and generate applicable packages of suitable new technologies to be aimed at the complete farming and production systems.

Research must have closer and more effective links with the objectives of agricultural development. The anticipated successes of research cannot be achieved without strengthening the linkages with the various partners. Researchers must familiarize themselves with the objectives and goals of the Agricultural Development Plan, available resources and the expected constraints.

The rate of success of research can be estimated by calculating the increment rate in production per unit area and the degree of reducing cost of production. The maturing time should be taken into consideration, which will reduce the limitation in agricultural land. All this should be achieved by breeding/introducing early maturing, high yielding varieties resistant to drought. Paying attention to farming systems will have a positive impact on production and on the proper utilization of natural resources.

The same attention should be given to the social aspect of rural life, since agricultural development does not limit its importance to the increase of production but also to alleviation of poverty and improvement in the standard of living.

Since most of the agricultural areas in the Yemen are rainfed; research will have to concentrate its efforts on rainfed agriculture. Research aimed at issues like water use efficiency, soil maintenance and conservation; integrated pest management (IPM) and genetic improvement of local strains of livestock will be of paramount importance.

The management of research and resources, including human resources should be given high priority. This was clearly stated in the Research & Extension Strategies, which have been prepared by AREA in1997, with the active participation of different partners.

The success of research work is reflected by the degree of acceptance of the results by the users, especially the farmers. In this context, Agricultural Extension plays a crucial role in the quick transfer of research results to the target groups and feeding back to research any problems obstructing the agricultural development in the country.

The importance of technical supervision and the strengthening of Research/Extension/Farmers linkages is imperative and will have to be institutionalized to ensure sustainability in the long term.
The principle objective of the Agricultural Extension is to increase the standard of living of the rural population by increasing their awareness, train them in the proper utilization of available resources to ensure sustainability and upgrade their ability to use different modern agricultural technologies. Extension and research organizations have to deal with the farm population as partners to solve in a participatory way the agricultural problems facing the country.

Despite the Aden Agenda reforms, extension will remain one of the main services of the Ministry of Agriculture and Irrigation (MAI), and its activities will be mainly directed at the farm population farming on rainfed areas. Special attention should be given to the quality of extension personnel. The participatory approach in planning, implementation and evaluation of extension programs with all the stakeholders should be given a top priority

As most of the workers in extension are not academically qualified for extension work, it is clear that the National Agricultural Training Center (NATC) and the Regional Training Centers are going to play an important role in improving the quality of the work force of the extension organizations. To be able to carry out this mission the development of the National Training Strategy will be a vital undertaking.

In all this, AREA has to play an important role. Its mandate foresees in strengthening linkages between research, extension and farmers; and improving the quality of extension by giving advice and consultancy services to extension organizations. AREA/Extension and Training Division (ETD) will approve the budgets of extension organizations before these budgets are submitted to the MAI before funding, to carry out research in new extension methodologies and to evaluate extension activities carried out by the different extension providers.

Further Support Required

The Agricultural Sector Management Support Project (ASMSP) project is ending in May 1999. This project financed by an IDA loan provided considerable support for the sector. However, after its conclusion the government has to identify new possibilities to support AREA and its affiliated organizations.

A new concept, which will govern in future the activities of AREA is the Aden Agenda. This document gives a clear vision of the future tasks of the government in agriculture. It foresees in a streamlining the MAI and reconsidering its core tasks. Research will remain under government control while extension will be partially handed over to the private sector. The poor segment of the farm population, farming on marginal and rainfed lands will stay entitled to receive extension services free of charge.

AREA developed recently the research and extension strategies and parallel mid term plans of which the emphasis is on rainfed agriculture for which a project has been developed and implemented since 1998.

Although AREA will concentrate in future also on delivering services to the private sector by entering into research contracts, it will not generate sufficient funds to implement both strategies and their mid term plans successfully.

It is therefore that AREA will need donors, technical assistance and financial support now and in the future

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