Distr.
LIMITED
E/ECWA/NR/SEM.1/21
September 1977
Original: ENGLISH

UNITED NATIONS

ECONOMIC AND SOCIAL COUNCIL

ECONOMIC COMMISSION FOR WESTERN ASIA
Seminar on "Technology Transfer and Change in the Arab Middle East"
Beirut, 10 - 14 October 1977

IMPEDIMENTS TO THE TECHNOLOGICAL DEVELOPMENT OF MIDDLE EAST AGRICULTURE

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Impediments to the Technological Development of Middle East Agriculture

The Middle East Arab Countries have a substantial potential for agricultural development and production. Basically, the countries with potentials of land and water are Syria, Iraq, Egypt, Sudan and Saudi Arabia which together with Iraq, have the additional input of ample financing.

Arable and cultivated land in each of these countries is reported to be as follows:

Country	Arable land in million ha	Cultivated Land in million ha
Syria	7.7	5.8
Iraq	12	5.6
Egypt	2.8	---
Sudan	10	
Saudi Arabia	4.2	0.5 to 0.6

(These figures differ as to source ; they, however, serve as an adequate illustration of the amount of available land for agriculture.)

Despite these vast stretches of land and available water all of these countries are importers of food stuffs in one form or other. The shortages in food items have led the various authorities to initiate policies, plans, and programs to move towards self sufficiency and, ultimately, to become exporters of certain food items. Government plans appear under different titles such as short term plans, three year plans and long term plans. An examination of these plans shows that the standard and common goals among them could be grouped together as follows:

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i. to increase yields,

ii to increase cultivable land,

iii to increase and improve the utilization of water for agricultural production,

iv to improve the standard of living of the farmer and the population in general,

v. to improve the quality of the produce,

vi to diversify farm products and to meet consumer demands, eventually to export the surplus.

vii to mechanize agriculture.

The above seven points are common to every short and long term national agricultural plan in the region. They have been appearing for over two decades in the press and in reports; their actual impact, however, has not been felt in any country in the region.

A major obstacle to the attainment of these goals, amongst others, is the inadequate technology possessed by the agricultural manpower called upon to carry out these plans from the technical planning, to implementation and management. Also, whatever increase in production is being attained, the increase is not keeping pace with the increase in population and the demand of the individual for better produce. Further more, the costing and budgeting for many plans are non-realistic and below what is required to carry out these projects properly.

Inadequately qualified manpower cannot be made up with larger numbers. The shortage of qualified manpower appears at all levels and is at the roots of the gap between the intended and the attained goals.

In the aforementioned countries, we find that agricultural university level education is numerically ample and even in excess of demand. In Syria, for example, during the academic year 1973/74 the total enrollment in the faculties of agriculture at three universities was 4462 students of whom 274 graduated with the

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equivalent of the B.Sc. degree. The total enrollment for veterinary students was 388 of whom only 19 graduated. The technical vocational schools for the same period had an enrollment of 2941 students. In Iraq for the academic year 1973/1974 there were 3672 registered students at the agriculture university faculty of whom 508 graduated with the B.Sc. degree or its equivalent. Egypt has five universities offering degrees in agriculture, and two of them offer further degrees in veterinary medecine. There is no shortage of numbers of agricultural specialists, and Egypt is known to have an excess. In Sudan, university level education in agriculture and veterinary medicine is offered and graduates from universities outside the country have returned to Sudan. The recently established University of Riyadh in Saudi Arabia has a faculty of agriculture where in 1972/1973 the total enrollment was 258 students.

The overall number of University graduates in the Arab Countries specialized in the agricultural sciences thus more than adequate. Despite this relative abundance of specialists, their impact on the agricultural sector is not felt. The causes may be summarized as follows:

i limited field experience of the graduates,

ii the majority of this manpower is assigned to government posts with bureaucratic responsibilities, this manpower displays limited mobility and limited contact with field farming operations.

iii the basic training in agriculture is generally weak, and lacking in modern applied field operation training.

iv many of the graduates are unable to read the recent literature in their field of speciality either because they have no command of the language in which the literature is published or because the literature is not made available to them.

v this manpower is not integrated into institutions providing adequate functional support.

To further dwell on support services, we have to look into three general areas of activity:

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i - research

ii - extension

iii - quality of personnel in the different support activities and in the applied field.

The FAO Near East Regional studies on Organization and Administration of Agricultural Research indicates clearly the superficiality of research and the existing gaps. Furthermore, shortages of facilities and funds exist; and the bureaucracy and politics have impeded the advancement of work. There are individuals here and there who are producing research of prime quality; however, their results are lost in the existing vacuum and are not tied up to overall development programs.

Extension services further suffer from lack of properly trained personnel. The core of the extension services are graduates of technical vocation schools rather than university trained specialists with the capacity to identify problems and seek solutions. Furthermore the services lack transportation tools and communication with the farmers, besides being insufficient in number. The line of communication between research and extension is weak. This is a result of both research in the true applied technical and scientific understanding is weak, and due to the fact that the recipient of the result, i.e. the extension officer is not properly trained expert to digest these findings nor has he the effective facilities to carry out these findings to the farmer there are limited small demonstration plots, there are extension phamphlets, we do see posters, however, there are only drops of information given to a thirsty farming community with-no-effective follow-up.

To approach the state of extension technically and to suggest an applied approach to the evaluation and planning of its manpower, I shall use the formula worked out by Khalidy and Alami at Arab Projects and Development, Beirut. A number of formulas were worked out for each speciality and field in agriculture and support. services. They were based on actual field work and literature /...

surveys, besides the consideration and experience of specialists. The formula or standard for extension in crop production and protection for a unit of 194,000 ha of cultivated land in field crops and horticultural crops is as follows:

i Crop production specialists : 4B.Sc. and IM.Sc.
ii Soil science specialists : 2B.Sc. and 1 M.Sc.
iii Farm machinery specialists : 2B.Sc and 1 M.Sc.
iv Crop protection specialists : 6 B.Sc. and 1 M.Sc.
v Field extension officers : 48 B.Sc.

From the suggested figures above further findings must be brought to light. An extension unit cannot function properly unless it is backed up by proper research and support facilities. Also if such are the technical requirements for extension, then those of research should be of a higher caliber with proper diversification of work and interdepartmental cooperation and communication.

What about the vocational trained technicians? They constitute the backbone of field production. This technician is the foreman, the lead hand, the machinery and equipment operator; his post is in the field and is clearly in large demand. A general suggested formula is that for every one B.Sc graduate, there should be 40 vocational technicians. Here again we note an alarming deficiency in number; even when these technicians are available, few are actually producing in the field.

This presentation cannot end without a discussion of university curricula and the impact they could have on the improvement of agricultural manpower. Agriculture as a field of speciality is both a science and an art: that of cultivating the soil, manipulating and supplying its water needs, producing crops, raising livestock, storing the produce, and processing the food. In order to be able to attain these varied objectives, education must necessarily cover the broad fields of soil and water, crop production and protection, animal production and health, as well as the necessary related subjects required for the proper achiev-

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ement of these activities. Food science, produce handling and storage and consumer demands also have to be an integral part of the overall agricultural education program.

Agricultural education is interrelated with economics, management, botany, zoology, nutrition, physiology, chemistry and sociology and as such must be taught at the university level as an interdisciplinary program. This program should be taught by highly qualified specialists and the student of agriculture should have requisite interaction with students in the different fields on which he will rely in his future work.

The program in agricultural teaching must be rich in laboratory and field experience. Sufficient numbers of recent laboratory aids and equipment must be available for the student to work independently and think critically. Training farms, rather than demonstration farms, should be made available, fully equiped with work-shops, field equipment and machinery. Students must be trained to appreciate and maintain field equipment and machinery. The agricultural program leading to the B.Sc degree or its equivalent has to be a four year program and 11 months per year after the terminal high school science degree. During each of the four years the student must spend three months in applied agriculture on a training farm where he will have first-hand experience of the work. He should be directly involved with one growing cycle and attend to animals during their different stages of development. As a general rule, an efficient curriculum in agriculture must allow for actual laboratory work equal to 40 per cent of the curriculum. Only actual training based on high level class lectures will form the agriculture student required for the area. Specialization after the B.Sc is also required. It was found from surveys conducted by Arab Projects and Development, Beirut that to support development policies in agriculture, 35 per cent of the graduates should continue to the M.Sc level and 15 per cent should complete the PhD level of education.

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However, unless the B.Sc program is of a high academic nature, the graduate program will not develop the required high level skills and knowledge that is a characteristic of sound M.Sc and PhD study.

I must also stress the need for reward and incentive to those that work and produce. Reward those that create the proper work atmosphere, those that establish effective and efficient facilities and services and those who complete projects on time and with the right manpower. A system of rewards and incentives should be the basis for an Arab green revolution.