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PROGRESS MADE IN THE IMPLEMENTATION OF THE WORK PROGRAMME

PROMOTION OF MANPOWER TRAINING AND EDUCATION PROGRAMMES IN THE WATER SECTOR WITHIN THE ESCWA REGION

Note by the Secretariat

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INTRODUCTION

Programme element 1.1, entitled "Promotion of manpower training and education programmes in the water sector within the region", was initiated as a component of the Water Resources Development and Management Subprogramme included in the 1984-1985 work programme of ESCWA.[1/]

A detailed study was undertaken in implementation of this programme element and is under publication under the title of "Development of Manpower, Education and Training in the Water Sector in Western Asia". This brief summary report presents the highlights of the detailed study, which may be consulted for further information.

In most of the ESCWA member countries the national work-force in the water sector is not adequate to handle all the activities; therefore, most of the water development design and construction work is handled by imported manpower.

For realization of successful economic development, development of manpower must be given high priority and be planned together with economic development.

Work in the water sector involves a multidisciplinary approach, but in this study only development of manpower in directly water-related subjects, i.e., water resources engineering, hydrology, hydrogeology, sanitation, irrigation and drainage etc., is covered.

For different level jobs different types of backgrounds and skills are required; therefore, the report covers development of education and training facilities for the levels of semi-skilled-workers, skilled workers, technicians and professionals in the water sector in Western Asia.

In order to assess the present manpower situation in the sector, two questionnaires were sent to the member countries requesting information on the existing work-force and on projected requirements in line with the development plans. The data thus gathered were supplemented by additional information collected through visits to some member countries. Actually, it was rather difficult to gather such information on the water sector since this sector has been classified with the agricultural sector in some countries and with the electricity and gas sectors in the others.

Data on the education and training facilities in the universities, technical institutes and training courses in water-related subjects were also collected by sending two other questionnaires to the member countries, and through visits to these institutions. In addition, information was gathered on the problems of the institutions, capacities to expand, and other relevant subjects. These are all tabulated in the main report, which should be consulted for detailed information.

1/ See Proposed Programme Budget for the Biennium 1984-1985, vol. II, Official Records of the General Assembly. Thirty-eighth session, Supplement No. 6 (A/38/6).

I. ASSESSMENT OF MANPOWER SITUATION IN THE WATER SECTOR IN THE ESCWA REGION

The population of the ESCWA region was estimated to be over 106 million in 1985, with Egyptians constituting about 40 per cent thereof; it is expected to reach 158 million by the year 2000.

Owing to the very rapid pace of development within the last 10 years, the oil-exporting countries of the region had to import skilled and unskilled manpower to meet the work requirements. The imported labour largely came from other Arab countries, i.e., Egypt, the Yemens, Sudan and North Africa as well as from non-Arab Muslim countries (Turkey, Pakistan, Bangladesh) and from Asia (Phillippines, Thailand, India and Republic of Korea). The contribution of the developed countries was largely at professional levels.

Because of the recent drop in oil prices, the project activities have somewhat slowed down and therefore the rate of import of skilled manpower has been significantly cut down if not totally stopped. Laws regarding employment of immigrants have been tightened and steps are being taken towards replacement of expatriate professional level and highly trained technicians by the nationals of each member country.

It is estimated that there were about 4,650 to 5,150 professionals in the water sector in Western Asia in 1985; the required number would be in the order of 5,250, indicating a deficit of between 600 and 900. Furthermore, some of the professionals are not water engineers or civil engineers and require extensive training courses to be able to do the tasks assigned to them properly.

The Gulf States do not appear to have a serious shortage of professionals in the water sector, mainly because of the relatively large number of expatriates employed in these countries. In reality, this is also a deficit situation since the expatriates must gradually be replaced by the nationals. It appears that most serious deficit is in Yemen and to an extent in Democratic Yemen. Although the job situation in Egypt is tight, a large number of people employed in the water sector are actually educated in another branch of engineering requiring either replacement or extensive training.

From the estimates in the main study it is concluded that about 800 additional professionals are needed annually in the region to meet the increasing economic development activities and turnover losses in the water sector.

According to available information, which is incomplete, the number of technicians in the water sector in Western Asia was estimated to be between 16,750 and 18,350 indicating a serious deficit of between 4,300 and 5,400 technicians. What is said on the professionals above on specialization in another branch is also true for the technicians.

Estimates for semi-skilled and skilled workers were not made, largely because of lack of data. In any case, it is easier to produce these levels of workers and the necessary training can be provided as required without major capital expenditure, once the professionals and senior technicians are available to train them.

II. ASSESSMENT OF EDUCATION AND TRAINING IN WATER-RELATED FIELDS IN THE ESCWA REGION

Although the ESCWA region has some of the oldest universities in the world (Al Azhar, Mustansiriyah), technical education is relatively new. Undergraduate studies in engineering started largely within the last 20 years, (except in Egypt and Iraq).

Specialization in water engineering is rather limited at the undergraduate level in the region. Some universities produce irrigation and drainage engineers in the faculties of agriculture, but the output in other aspects of water engineering is very low. The recent number of graduates with a B.S. degree in civil engineering exceeded 5,000 in the region, but out of this only slightly over 200 were specialized in hydraulics/water engineering. In the civil engineering faculties usually 3 to 6 water-related subjects are offered as basic and elective courses at this level, whereas in the faculties where specialization starts during the undergraduate years it is possible to concentrate on water-related subjects in the last two years of engineering school.

A civil engineer with a basic B.S. degree is the candidate for most of the jobs within the water field; however, he would require training in water subjects related to his job in order to be sufficiently competent to undertake the tasks that would be assigned to him. Some universities, i.e., Qatar and Yarmouk in Jordan, have started offering specialized education at the undergraduate level. In this way specialization starts within the first degree, producing relatively more competent graduates within their field of work. At the moment specialization is not favoured within the region perhaps due to the fact that it limits the civil engineer to his special line of work and limits the opportunity to shift out of that sector. Weighing the advantages of specialization against the classical civil engineering education, a number of universities are considering changing their systems.

Member countries should take a policy decision on whether the specialization should start at the undergraduate level or at the graduate level and then the plans for emphasis and support can be made accordingly.

At present graduate-level studies in the region are very recent and output is very small. The total number of M.S. level graduates was less than 100 and there were only a very few Ph.ds.

In the ESCWA member countries there is a remarkable effort being made to establish new universities and offer a professional level of education within the region to replace education abroad. It is gratifying for each country to possess its own university complexes. However, where the population is not large enough to support a diversity of faculties, concentration on fewer subjects should be the goal. For example, in the Gulf region, where each State is endeavouring to have its own university, it may not be feasible to have all the faculties in every university. Serious consideration should be given to dividing the fields of work between countries, with one concentrating on education, another the medical profession, another engineering and another agriculture, etc. Students may be exchanged on a certain quota basis.

Actually, there is a student exchange situation at present where in almost every university there are students from the other Arab countries in the civil engineering departments.

A review of the curricula of the civil engineering faculties revealed that they are quite adequate but require consolidation. If the member countries decide to initiate specialization at the undergraduate level, then new curricula must be considered, including a number of additional special topics as compulsory and elective courses. Sample curricula have been presented in the main report.

The member States should take more advantage of the training courses organized by UNESCO and other international and regional agencies in the water resources field. Trainees, upon their return, may conduct similar courses themselves for their colleagues and for junior staff, thereby disseminating what they learned in these courses.

In addition, there should be an interaction between the government agencies dealing in the water-related activities and the universities and the technical institutes so that manpower development can be actually planned according to needs.

At the technician level, similar problems are faced by the education and training institutions. First, the potential students prefer to attend a university, or at junior technician level to continue their education in a general secondary school, rather than enrolling in a secondary technical school.

In some countries (i.e., Syria) the number of civil engineering university graduates has been greater than the number of technical institute outputs. The university entrance requirements can be raised to reduce the number of entrants to the engineering faculties and also to allow higher quality entrants in the technical institutes. In planning the number of technical school graduates the generally accepted engineer to technician ratio of 3 to 1 can be kept in mind. Again it should be noted that the technical institutes need adequate laboratory and practical training equipment.

The agencies involved in water-related activities may raise the quality of their staff at all levels by establishing and running, or sponsoring, technical institutes or training centres, introducing short-term training courses for all levels of personnel, and organizing a system for on-the-job training. Some higher level personnel, as mentioned earlier, can be sent on a fellowship programme abroad.

The curricula presented in the main report for university education in the water-related studies, for technical institutes and training centres may be consulted as a check-list when the establishment of a new programme or the upgrading of the existing one is under consideration.

Another important problem faced in the training of personnel is the lack of textbooks, teaching aids, manuals, etc., written in Arabic. Most of the university students of the region know English in varying degrees and are thus able to follow the textbooks written in this language and the lectures which are given quite often by foreign lecturers.

Curricula and syllabi must be periodically reviewed and upgraded according to the needs of the society and in consideration of the new developments and techniques in the field. In preparing to launch a new curriculum adequate preparation must be made to provide the necessary number and quality of professors and to meet the laboratory and practical equipment requirements. Training of teachers for engineering schools takes a long time, and it is preferable to have persons with some actual practical experience as well as academic qualification.

III. RECOMMENDATIONS FOR DEVELOPMENT OF MANPOWER, EDUCATION AND TRAINING FACILITIES IN THE WATER SECTOR IN WESTERN ASIA

Guidelines for development of manpower, education and training facilities in the water sector in Western Asia were formulated in the last chapter, and at the end of the study recommendations will be made to the following bodies for implementation:

- Government policy organs and water resources agencies;

- Educational institutes and training centres;

- United Nations agencies, other international, regional and subregional organizations and bilateral agencies.

Development of manpower will depend on the interaction of the three responsible sets of bodies identified above, and therefore, the recommendations must be taken into consideration for implementation by all concerned.

A. Recommendations to the Governments of the ESCWA member States

1. Periodic surveys of the available manpower at different levels may be conducted prior to the preparation of a new five-year development plan, and should be both quantitative and qualitative.

2. Periodic estimates for the manpower required for undertaking various water development and management activities must be made. These again can be carried out in relation to short and medium-term development plan. Once the number and quality of the available manpower are determined, the training requirements of the staff on board can be established according to the needs in line with the development plans.

3. After establishing the necessary increases in the numbers of personnel at different levels, the framework for the required education and training system within the context of the general education pattern should be developed by consolidating the existing institutions and/or setting up new ones.

4. Governments should ensure a continuing link between the water resources agencies and the education and training institutions, so that the outputs of these institutions can be adjusted according to the needs after establishing the amount and quality of expertise necessary to undertake the functions of various posts.

5. Governments must have a policy on training of trainers, i.e. lecturers, instructors, etc., who were educated at the government's expense.

6. The governments should have a policy on whether to produce unnecessarily large numbers of civil engineering graduates and cause a surplus or provide specialization at undergraduate levels and raise the quality of graduates. It appears that in the larger countries of Western Asia, i.e., in Egypt, Syria and Iraq, specialization within civil engineering is very limited and the universities are geared to produce large numbers of graduates

annually. Actually, in the populated countries specialization should be given priority, because there will be adequate numbers of students in each area, as well as need for such expertise. Raising the entrance standards will produce higher quality students and also will channel the others into technical institutes, unless the government's policy is to employ engineers in technicians' jobs at the beginning. However, this practice is not recommended simply because it demoralizes a university graduate at the beginning of his career.

7. Governments of the less populated countries, such as in the Gulf area, should seriously consider concentration of resources. Each country should concentrate on one or two fields and exchange students with one another.

8. Manual work should be promoted in Western Asia through the changing of peoples' attitudes towards manual work. This rejection of manual work is probably one of the most important reasons for the lack of adequate numbers of personnel below the professional level.

9. Governments should endeavour to increase the percentage of students opting for higher and secondary technical schools. The number of entrants into general high schools can be limited in order to divert more students to the technical fields. In the countries of the region with larger populations, further specialization at the secondary technical and vocational schools may be considered to produce junior technicians and skilled workers possessing adequate knowledge in the work related to the water sector.

10. When the governments establish a central body for co-ordinating the activities of all the agencies dealing with water, a training centre, catering to the needs of these organizations can be established, this is preferable to a number of smaller training centres attached to each agency and following different curricula and methods for similar posts.

11. Governments should co-operate in making the arrangements for translation of various textbooks, manuals and other guidance materials to be used in the education and training institutions in the region.

B. Recommendations to the government agencies dealing with water

1. Whether it is the government's policy or not, each agency should have periodically updated information on the quantity and quality of their staff at each level, and then plan for their intake and design the training programmes.

2. Water agencies should maintain a link with the universities, technical institutes and other educational institutions in their countries for utilizing the facilities for upgrading and refresher courses. In return, the agencies could support these institutions by providing equipment and the expertise of their professionals.

3. Water agencies should provide induction training, career paths and continuing education and training facilities to maintain and upgrade the competence and performance of their staff. Giving salary incentives and providing special allowances for employees working in the field would help the water sector retain its personnel.

4. The agencies in the water sector should take advantage of and make the most out of international co-operation in education and training in the water sector. The United Nations Department of Technical Co-operation for Development (DTCD), UNESCO, The World Meteorological Organization and the World Health Organization and other United Nations agencies offer extensive training, mostly to university graduate-level people. Often scolarships are available for the qualified; therefore, full advantage of these opportunities should be taken.

5. The water agencies should assign a number of personnel to the consulting engineers and contractors who are doing work for them so that some of their personnel can acquire valuable experience. Expatriates working in these agencies should also be assigned the duty of training the nationals in their respective fields of work.

6. The agencies should consider establishing a system for on-the-job training for personnel at various levels, in addition to induction training. These activities will be particularly useful to the professionals who are to be associated with water-related activities, but not specialized on this subject. Economists, sociologists, environmentalists, lawyers, and others must be provided with adequate knowledge in the water field so that they can perform their functions at desired levels.

C. Recommendations to the universities, technical institutes and training centres

1. The universities should periodically review their curricula and make revisions as necessary. In this study suggestions for typical curricula with relevance to the current conditions and needs of the region are presented for various branches of water engineering, including courses on economics and environment.

2. The universities of the region, in particular those in the populated countries, should diversity their programmes and introduce specialization at undergraduate levels.

3. Universities and other educational and training institutions should provide opportunities for professional and academic growth to their faculty and staff members within the country and abroad, through conferences, seminars and training programmes. Material and moral incentives would help to keep the staff in the establishment.

4. As mentioned before, the universities should review their entrance requirements and if necessary make cuts in the intake numbers. The material presented in the curricula should be fully covered through lectures, laboratory work and practical training in a well-balanced manner. Most of the universities, technical institutes and training centres of the region lack adequate laboratory and practical training.

5. By maintaining strong links with the agencies in the water field the educational institutions may acquire some equipment. It is also important that the institutions provide their facilities for induction, upgrading and refresher courses. (In the University of Technology of Baghdad and the University of Baghdad such an arrangement appears to be working well).

6. Universities may consider sharing their premises and facilities, if possible, with technical institutes until the latter gain their own.

7. The educational institutions, in particular the universities, should intensify their contacts with the other Arab and foreign universities through the exchange of visiting professors, participation in joint research and visits by university officials. During the course of this study a number of universities and technical institutions within the region were visited, and it was observed that knowledge of the activities of similar institutions in the other countries of the region was minimal.

8. When the number of graduates is less than the needs of the country, universities and other institutions should consider providing correspondence courses and evening classes. This would probably be more successful at junior technician, skilled and semi-skilled worker levels.

9. Many institutions are seeking donors for obtaining laboratory and practical training equipment. However, these requirements are not well-documented so that no action can be taken by the central government agencies who are presenting proposals for funding to various bilateral aid agencies.

10. The governments should consider establishing separate technical universities (i.e., University of Technology, Baghdad).

11. While recruiting people for professorship or lecturer posts, presently only academic qualifications are sought. A doctorate degree, usually obtained through a research-oriented thesis, is adequate criteria for these posts. It is recommended that practical experience also be given weight in recruiting teaching staff.

D. Recommendations to the United Nations agencies, international, regional, subregional and bilateral organizations dealing with the water sector

1. The governments should be assisted in preparation, conduct and evaluation of manpower surveys in order to determine the quantity and quality of the existing manpower before any plans can be made for further recruitment and training that may be required to meet the increasing demands of the development activities.

2. The governments should be assisted in establishing and strengthening of education and training institutions in the countries of the region by the development of training programmes and the provision of teaching staff and laboratory and practical training equipment. This can be in the form of direct support or by the establishment of regional training centres or international training courses on particular needs of the water sector of this region.

3. Opportunities should be provided to government personnel to exchange experiences and to gain further experience through study tours, consultations, meetings, etc.

4. The governments should be made increasingly aware of the available training courses, seminars, conferences, symposia, etc., and adequate levels

of participation should be achieved through the provision of some fellowships. Experience has shown that international activities may be arranged for the professional level government staff, but that technician training should be handled at regional and subregional levels.

5. The governments should be assisted in translation of textbooks and other materials into Arabic for their effective use in the training courses and in educational institutions within the countries.

It can be concluded that in Western Asia education and training in the water sector have to be consolidated and strengthened in order to develop the manpower required to undertake the planned development activities in this field and gradually replace the expatriates by the nationals of each country. Water is one of the most important resources in Western Asia and the activities in water development and management deserve utmost attention so that this scarce resource does not become a major constraint in the economic development of the region.