

Rural

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Water

Supply in Developing Countries

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Findings of a workshop on
held in Zomba, Malawi,
August 1980

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Postal Address: Box 8500, Ottawa, Canada K1G 3H9
Head Office: 60 Queen Street, Ottawa

IDRC, Ottawa CA

IDRC-167e

Rural water supply in developing countries: proceedings of a workshop on training held in Zomba, Malawi, 5-12 August 1980. Ottawa, Ont., IDRC, 1981. 144 p. : ill.

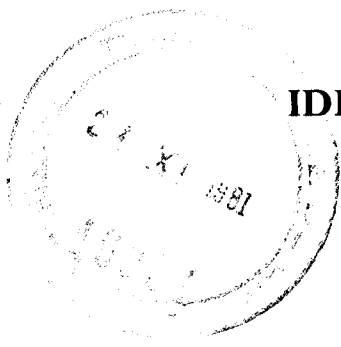
/IDRC publication/, /rural/, /water supply/, /alternative technology/, /training programmes/, /Africa/ — /self-help/, /pilot projects/, /water storage/, /pumps/, /wells/, /technical aspects/, /costs/, /methane/, /wind energy/, /water treatment/, /cultural factors/, /social participation/, /women/, /technical personnel/, /engineers/, /training/, /curriculum/.

UDC: 628.1(6-202)

ISBN: 0-88936-292-0

Microfiche edition available

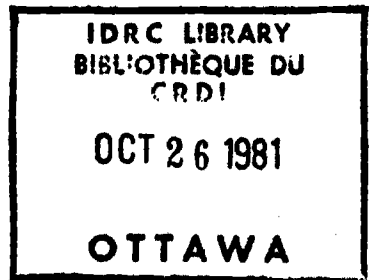
45808



IDRC-167e

Rural Water Supply in Developing Countries

Proceedings of a workshop on training
held in Zomba, Malawi, 5-12 August 1980



Sponsored by:
Government of Malawi
International Development Research Centre
Canadian International Development Agency

ARCHIV
628.1(6-22)
R 8

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The Planning and Organization of Training for Water Development in Kenya

R.C. Shikwe¹

Historical Development

Institutional Framework

Water is scarce, yet vital to life and development. Its management, therefore, attracts many agencies and organizations. At different points in time, the responsibility for the management and development of Kenya's national water resources has been shared between various organizations, government ministries, local authorities, and parastatals. Each organization has concerned itself with one aspect of water use or another. Such uses include water supply for human and livestock consumption, irrigated agriculture, and hydropower generation. Prior to 1964, public water supplies were the responsibility of the Ministry of Works and the African Land Development Organization (ALDEV) in urban and rural areas respectively.

In 1964, the Ministry of Works and the ALDEV were combined to form the Water Development Department of the Ministry of Natural Resources. In 1968, the department was transferred to the Ministry of Agriculture and made a division. In 1972, its departmental status was restored. Finally, in November 1974, it became the Ministry of Water Development. The ministry has the overall statutory responsibility for the conservation, control,

and apportionment of national water resources under the Water Act (Cap 372), Laws of Kenya. It is also responsible for water development and supplies, control of water catchments, and water quality and pollution control.

The Development of the Rural Water Sector

Concurrent with the changes in the institutional framework for the management of national water resources, the development of the rural water sector was also receiving attention. The experience of the first decade of independence and the performance of the first two 5 year national development plans had proved that the achievement of development-plan targets in other sectors, such as education, health, power, agriculture, and industry, depended upon the availability of adequate water supplies. The frequent shifting of responsibility for water management between ministries was, in effect, a reflection of the government's attempt to develop the water sector.

Toward the end of the first national development plan period in 1970, a national goal of providing water to the entire population by the year 2000 was set. This was an ambitious 30 year plan to be implemented through multiphased programs and projects. The most important of these was the rural water supply program. The objective of the program, currently in its fourth phase, is the improvement of water supplies available to people living in rural

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areas, who account for 90 percent of the national population. It is anticipated that the fifth phase of the program will commence during the current development plan period (1979–1983); to be followed by others in the series until the entire population is served by the year 2000.

Training Objectives and Policies

The formulation of national training objectives and policies has been conditioned by the need for relevance to prevailing circumstances. During the 1960s, after independence had been gained, there was a need to find human resources to replace departing expatriates. Therefore, the training emphasis was quantitative. The 1970s were a decade of training for development. The challenge then was to equip practicing managers and administrators with the appropriate concepts, skills, attitudes, and techniques required to enable them to play an effective role in national development. The emphasis, accordingly, shifted to qualitative training. The 1980s are destined to be a decade of “fine tuning” to achieve excellence, commitment, dedication, devotion, and loyalty in “service to the nation.”

Despite the changes in the emphasis, objectives, policies, and strategies, certain deep-rooted traditional attitudes and concepts toward training still persist. According to these attitudes and concepts, training is synonymous with employment. Selection and admission to preservice training is interpreted as direct employment or reduction in unemployment because it absorbs potential job seekers from the streets into training institutions. Furthermore, successful completion of a training course is viewed as a passport to an automatic promotion. Thus, there is a definite need to uproot such attitudes by developing a new philosophy.

Planning for Training

Training within any organization aims at developing the competence and capability necessary for the effective performance of

the activities entrusted to the organization. This involves inculcating and imparting relevant skills to the individuals comprising the work force of the organization. In planning training programs for rural water supplies, it is, therefore, logical to start with the identification of the nature and magnitude of the activities involved, followed by determination of the relevant skills required for their effective execution. Certain parameters within the Kenyan rural water sector situation are relevant in computing this information. These include the time factor, hydrology, hydrogeology, geography, and demography. For example, there are 20 years remaining in which to supply potable water to the entire population by the year 2000. The population, currently at 15 million, is increasing at 3.5 percent annually. The land area to be covered is approximately 570 000 km², two-thirds of which is arid or semi-arid land (ASAL) with a sparse human population of pastoral communities but large livestock and game populations. The other one-third of the land area, endowed with abundant rainfall and surface water, is densely populated.

From the foregoing, the following conclusions may be drawn: firstly, that the use of both surface water and groundwater resources is imperative; secondly, that the development of the water sector must involve the investigation of the availability and location of the water resources, particularly in the ASAL areas; the assessment of water quantity and quality; the planning and design of water projects; the construction of water schemes; and the operation and maintenance of completed water supplies. These are multidisciplinary activities calling for a wide range of technical and scientific skills. The key technical skills involved are civil, electrical, mechanical, environmental, and sanitary engineering. Scientific skills are required in chemistry, biology, hydrology, and geology. The support of administrative services in accounting, personnel, and supplies and the skills of economists, sociologists, demographers, and systems analysts are also required. All of these skills are required at all

levels of specialization, i.e., professional, subprofessional, technician, and craftsman.

Manpower Projections

Long-term planning for training requires manpower projections over appropriate time horizons. These may be over 1, 2, or 3 years but more appropriately in relation to the 5 year national development plan. The Ministry of Water Development (MWD) is currently preparing the national master water plan, which has prepared manpower projections for the water sector over 10, 20, and 30 year time horizons. The first decade (1978-1988) is also covered by a management study project on the MWD. The two studies make the manpower projections for the first decade fairly reliable for purposes of planning training programs for rural water supply.

The projections are based on MWD programs and the activity levels required to achieve the national goal as set for the year 2000. The MWD's capability to absorb financial expenditures was assessed on the basis of its performance during the first decade of the rural water supply program (1969-1978). This has been used to establish an engineer/expenditure ratio and an engineer/technician ratio. The projections for engineers were made on the basis of anticipated investment. The numbers in other categories of manpower were computed as ratios of the higher categories, e.g., four technicians for every engineer.

Manpower Surveys

The objective of a manpower survey is to determine the actual manpower available in terms of quantity and quality. It is the next step after manpower projections in planning training programs. The difference between manpower requirements and manpower availability indicates a training need if the difference cannot be eliminated through direct recruitment. An in-depth survey, conducted in February 1978, of existing MWD manpower in all grades showed a total staff of 5500. This number is expected to increase to 12700 by 1983. Although some positions will be filled through

redistribution of existing staff or direct recruitment, a training need has been established for engineers at the professional level, engineering assistants at the subprofessional level, water inspectors at the technician level, and water operators/pump attendants at the craftsman level. Training needs for other disciplines vary, but overall, the need for major training within the MWD has been established.

Organization for Training

As mentioned earlier, the development of the rural water sector did not begin until the 1970s. Training for the sector is, therefore, a recent undertaking. The various phases described in the historical development of training objectives and policies are not relevant to rural water supply. When the MWD was created in 1974, there was a training gap of a decade between the MWD and the rest of the service or other sectors. This gap had to be bridged within a few years if the sector was to catch up with other industries and make its contribution to the national economy. Crash training programs appeared to be the obvious solution.

Training, however, is an expensive undertaking. It was imperative to minimize costs by avoiding the creation of new training programs in new training institutions. The objective was to realize savings on infrastructure, which could then be used for the actual training. The MWD, in line with the rest of the government, pursued the policy of making maximum use of existing facilities by avoiding duplication, gaps, and idle periods within the national training system. The MWD, therefore, continues to plan and organize its training programs within the existing national network, utilizing existing facilities at other institutions. Through improvements, improvisations, modifications, additions and extensions to buildings, and training programs within existing training institutions, the MWD has been able to provide both qualitative and quantitative training without having to construct new

facilities. The emphasis placed on on-the-job training and the planned introduction of mobile training units will further ensure decreasing expenses for the infrastructure.

The following are summaries of training programs given within each of the institutions utilized by the MWD for the training of its staff. In addition to the common skills taught at these institutions, the MWD has had specific courses, peculiar to water development, given at the University of Nairobi, the Polytechnic, and the Harambee Institutes of Technology.

The University of Nairobi

This is the highest institution of learning within the republic. It combines both formal education and training and caters to the whole economy. The various courses offered in the Faculties of Engineering and Science are relevant to the water sector's manpower requirements and are regarded as professional training. Courses in civil, electrical, environmental public health, and mechanical engineering as well as chemistry, geology, hydrology, and surveying are offered.

The university is required to produce manpower with motivation and the necessary skills to enhance national development. Certain courses, however, may not be available at the university due to high costs or insufficient demand for them. To overcome this, overseas fellowships and scholarships have been utilized. To meet the requirements of the MWD, for courses in water and sanitary engineering given at the University of Nairobi, the policy of using existing facilities was invoked. This led to the introduction of a special 1 year postgraduate diploma course in water and wastewater engineering. It was made possible through a tripartite collaboration between the University of Nairobi, the MWD, and the Norwegian government through the Norwegian Agency for International Development (NORAD). The undergraduate program of study for the degree of Bachelor of Science (B.Sc.) in civil engineering was examined with a view toward determining its suitability and

relevance to the peculiar needs of water development. It was concluded that the program was too general in nature for the purposes of water development engineering. In its place, a supplementary course in water related subjects, stressing practical application, was recommended. To begin with, a 1 year postgraduate diploma was considered appropriate, with an allowance for future modifications.

This approach can be extrapolated to other disciplines. For example, the need for a similar postgraduate course in hydrology, within the Faculty of Science, was revealed as a result of a review of the undergraduate B.Sc. program offered by the Department of Geography.

The Kenya Polytechnic

This is an institution of further education that caters to people leaving form 4. Before being admitted, trainees must first be employed in industry and commerce in order to obtain employer sponsorship to undertake training programs relevant to their employment. The objective is to acquire relevant skills, thus making the trainees more competent in the performance of their duties. The training programs lead to both professional and subprofessional qualifications.

The MWD utilizes the facilities at the Polytechnic for training its technical subprofessional personnel in selected disciplines. The MWD's trainees attending the Polytechnic must first undergo a 6 month preselection course at the MWD staff training school. Individual preference and performance in the preselection course determine selection and admission to the Polytechnic. Since 1971, the MWD has sponsored students for the following courses: ordinary diploma in water engineering (the first 6 months of this course are given at the MWD staff training school; the remainder at the Polytechnic); building (draftsmanship); science laboratory technician; land surveying; mechanical engineering; motor vehicle technician; and higher diploma in construction (structural engineering).

The Staff Training School

This is the MWD's own and only training institution. It was started in 1965 on a small scale but served the entire public water sector as it was then under the Ministry of Works. It has steadily expanded over the years to its present size and status, with an annual enrollment of 185 into 3 year training programs. The main course programs begin in July of each year, with a common 6 month preselection course.

The school has the responsibility of training subprofessional and technical staff for the MWD. The former, to some extent, is accomplished on an agency basis by the Kenya Polytechnic. The school has trained students from Swaziland, Sudan, and a number of local authorities. Between January and June, in-service, refresher, and upgrading courses are offered. Because the present site has been fully developed and the school still remains overcrowded, plans for the construction of a Water Resources Training Institute on a new site are being developed.

The Industrial Training Centres

These centres implement the national industrial training scheme established under the Industrial Training Act (Cap 237), which regulates the training of apprentices. Its aim is to promote, develop, and regulate systematic and standardized training for apprentices and other indentured learners. It operates on the premise that skills are not inherent but have to be learned. Lack of formal training denies workers the opportunity of acquiring skills to enable them to progress.

Apprenticeship training is designed to provide specialized skills and knowledge geared to the specific needs of the country's industries. It benefits the employer by developing skilled workers; the apprentice by providing the opportunity to acquire the skills necessary for advancement in the trade of their choice; and the country by accelerating its development. The skills acquired under the scheme are relevant and common to many industries. The MWD has utilized these centres without the necessity

of having to request that special courses be arranged.

The Harambee Institutes of Technology

Kenya has a self-help activity called the Harambee movement. It is responsible for a large part of the development within the rural areas. The rural water sector has received double benefits from the movement. Firstly, directly through the construction of self-help water schemes and, secondly, through the movement's latest expression in education in the form of the establishment of a number of institutes and colleges of science and technology, collectively called the Harambee Institutes of Technology. There are 15 such institutes in Kenya.

These offer technical training at the technician and craftsman levels. It has been possible, by the construction of additional facilities through donor assistance, to convert three of these institutes into suitable training institutions for purposes of rural water development. The additional facilities provided by the MWD include hostels, workshops, accommodations for instructors, tools, and equipment. Among the leading donors in this new area of training are the Danish International Development Agency (DANIDA), the Canadian International Development Agency (CIDA), and the Swedish International Development Authority (SIDA). The three institutes will turn out 360 trained water operators per year.

The Kenya Water Resources Training Institute

The manpower projections and surveys already carried out have established beyond doubt that the greatest quantitative training needs are within the subprofessional and technician cadres. The two main institutes for training these cadres are the Polytechnic and the staff training school. They cannot cope with the requirements for operation and maintenance as more complex and larger schemes are completed. To meet this demand and because the MWD's staff train-

ing school cannot be expanded any further, it is planned, through World Bank assistance, to establish the Kenya Water Resources Training Institute on a new site.

The Kenya Technical Teachers College

The need for the training of instructors is obvious. The present staff training school, the proposed Water Resources Training Institute, the on-the-job training, and the proposed mobile training units all need personnel trained in the art of imparting their skills to others. These will be deployed as technical teachers or instructors. The Kenya Technical Teachers College at Gigiri in Nairobi is the appropriate institution for this purpose.

The Kenya Institute of Administration and Government Training Institutes

The above summary has only outlined training programs for technical personnel at all levels. The MWD also needs nontechnical manpower with administrative skills in accounting, personnel, supplies, clerical, and secretarial duties. Even technical officers who occupy supervisory and managerial positions need training in administrative skills.

The Kenya Institute of Administration at Kabete is the main government institution responsible for the training of top executives and middle cadre administrative staff. Two government training institutes at Maseno and Mombasa and a secretarial college at Nairobi cater to the other cadres.

Overseas Fellowships

It is Kenyan government policy to train locally within the Kenyan environment in order to give training a practical orientation and relevance. As stated earlier, however, certain courses may not be offered locally. This necessitates overseas training. Sanitary engineering is a case in point where the MWD has to seek overseas fellowships. However, unless donor sponsorship is forthcoming, this type of training, because of the expense involved, must be reduced to

the very minimum and cater to qualitative training only.

Towards a New Philosophy on Training

Manpower and Water as National Resources

Human beings and water are both taken for granted, yet they are also the two most valuable resources in any nation. Total absence of either can bring to an abrupt end the processes of development, civilization, and life itself.

The achievement of national development is not conditioned by the endowment of natural resources and capital only. The availability of manpower with appropriate skills and attitudes to exploit and convert these resources effectively for the national benefit is an imperative condition. Training, therefore, concerns itself with this very important process of imparting and developing the appropriate skills in individuals to enable them to perform tasks related to national development. With regard to national development, training should be viewed as the development of the most important national resource, the human resource. The developed manpower becomes a tool or agent for other development efforts. Manpower training should, therefore, take on a new meaning and a new rating value. For the individual, training is the method and means by which one's potential can be developed to the fullest extent.

Water, on the other hand, is the forerunner of development. Human activities, in a given setting, presuppose the availability of sufficient and reliable supplies of water of good quality. Training for water development should be given a high priority rating in the allocation of national resources for development. This will ensure its availability both as a catalyst and as a factor of development in other fields of human endeavour.

Training Programs and Organizational Climate

There is a growing awareness and acceptance of the need for comprehensive and enhanced training programs. Such programs must be multifaceted and multiphased, covering all levels of specialization from craftsmanship to professionalism. It is important that skill levels be advanced on all fronts so that progress in one sphere is not negated by the inability of other spheres to adapt their activities to changed conditions. The needs of organizations change; technologies change also. In this process, training must be a continuous activity lasting an entire career. It will normally start with induction; continue with on-the-job instruction; and should, from time to time, include specifically designed courses to meet increased responsibilities or adaptation to new technologies. It is at this juncture that training for rural water supply differs from urban water supply in the need for orientation towards, and emphasis on, simpler and cheaper technologies contrasting with the sophistication of urban water supplies.

It should be policy to employ people in meaningful work that provides motivation, challenge, and an opportunity to develop by offering well-defined opportunities for advancement. This requires hiring and promoting individuals on the basis of talent and competence. It also requires providing relevant training opportunities at the appropriate time so that advancement becomes reality, and when one still has much of their working life ahead of them. It contrasts sharply with a situation where training is merely part of employment. Thus, organizations must be flexible, up-to-date, and capable of planning for change. The chronic shortage of particular skills in a given organization may be attributed to the inadequacy of the organization itself. Although the fact of a nationwide shortage of skilled manpower is recognized and accepted, it is the duty of each organization

to strive to make itself competitive in attracting and recruiting whatever scarce manpower is available. It should be noted, however, that it is one thing to recruit, but quite a different thing to retain the recruited manpower. Here, the organizational climate and conditions of service are critical. The challenge facing training for rural water supply is whether or not trained manpower can be retained in a rural working environment when the urban environment can offer more attractive working conditions, e.g., better salaries, housing, education, and health facilities.

Conclusions

The purpose of this paper was to advocate "low cost" as a major objective of planning and organizing training for rural water supply. The Kenyan method is an example of one way the objective can be achieved. It makes maximum use of existing facilities within the national training network, thereby reducing expenses by avoiding creation of new training facilities within the infrastructure. Implied in this is the sharing of common facilities among sectors, which can be extended to an entire region. Infrastructure in this context means and includes physical facilities and training aids or materials. Training programs, course structures, and contents are conditioned by the anticipated working environment. These include the equipment and technologies used. Thus, the author's advocacy for low cost or reduced expenses on training infrastructure applies equally to low-cost technologies for rural water supply.

The low-cost objective, by saving on expensive infrastructure, allows scarce financial resources to be used on the training itself. Lastly, a resource that is often overlooked, but is used effectively in this approach, is that of time. Through the use of existing facilities and instructors, the delay in implementing a training program, while facilities are being constructed and instructors are being trained, is avoided.