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Proceedings of the Workshop on the Operation and Maintenance of Village Water Supplies

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Welcoming Address

by Ato Hagos Araya
Deputy Executive Director,
CRDA

Ato Hagos welcomed the participants and introduced the theme of the workshop, "Operation and Maintenance of Village Water Supplies".

Last August, he recalled, the CRDA Water Resources Group held its first workshop on "Community Participation in Water Supply Projects". He described the highlights of that workshop as:

- lack of preventive maintenance
- lack of ownership
- lack of community input
- lack of spare parts
- lack of follow up and
- inappropriate technology

The topic of the current workshop was selected following the suggestions made by over thirty churches and agencies at last August's workshop.

Ato Hagos remarked that while the issue of operation and maintenance is essential to the long-term success of water supply schemes, it was impractical for member churches and agencies to maintain every water supply system which they build.

He drew the attention of the participants to the key problem in the operation and maintenance of water projects at the local level, namely, the lack of adequately trained people. However, he said, there were also other numerous issues that need to be faced by the government, NGOs, the UN, bilateral and multilateral donors. These issues, included the planning and implementation of water programmes. The diversity in the types of handpumps used also creates an enormous problem in the supply of spare parts, he noted.

Noting that in some cases water supply systems cease to function long before the end of their design life as a consequence of poor maintenance, lack of spare parts and trained personnel at the community level, Ato Hagos stressed that the workshop's main concern would be to seek viable solutions to these types of problems.

He said that there would be five presentations followed by discussions. In addition, questions could be asked after each working group. They include:

- training for village level operation and maintenance.
- organization of the operation and maintenance of rural water supplies.
- raising funds for the operation and maintenance.

One of the objectives of the CRDA Water Resources Group, he told the participants, was to allow churches and agencies to share experiences and information about systems, designs, products and innovations, and government policies.

He concluded by thanking the CRDA Water Resources Group for arranging the workshop and wished one and all success in endeavouring to surmount the obstacles at hand. On behalf of CRDA, he also thanked the workshops speakers for offering to share their knowledge and experiences.

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Chairman's Opening Address

by Andy Meakins,
Chairman ,
CRDA Water Resources Interest Group

Mr. Andy Meakins, welcomed the participants on behalf of the workshop organizing committee. He began by depicting a familiar scenario. There is a need for water, expressed or unexpressed, in a community. To meet that demand after months of planning and work, substantial investment of financial and human resources, a grand handing-over ceremony of water wells takes place. Later, when the NGO leaves, WSSA may or may not be informed about the new system or scheme.

In few years the system, for one reason or another, is not working. What went wrong is everybody's question.

Most members, Mr. Meakins noted, construct small scale water supplies systems for villages or small towns. He questioned whether it was realistic to expect WSSA to do all maintenance and repairs on the ever increasing number of water supply systems. In the first presentation, Mr. Andy indicated they would be hearing of WSSA's policies, experience and limitations. The operation and maintenance of their own water systems presents a step in the community development process. The success of a community in operating and maintaining its own water system over a long period of time represents a significant achievement. It involves not only technology but also many social factors, organization and training. The aim of NGOs is to make communities self-sufficient.

He pointed out that there were many interrelated issues concerning the successful operation and maintenance of village water systems. No one organization had all the answers.

Referring to a discussion he had with Mr. Rupert Talbot of UNICEF, outside the workshop, Mr. Meakins related that Mr. Talbot was encouraged by the role NGOs have in this area. Mr. Talbot noted that NGOs have highly motivated personnel, practical field experience and were flexible enough to try different approaches. NGOs are the ones who come up with good ideas but are limited in how far they can spread these ideas. In India, UNICEF picked up many good ideas from NGOs which it presented to the government.

Mr. Meakins noted that among CRDA members, there is much experience and many approaches. He encouraged members to share their successes and failures in the area of operation and maintenance. Referring to the heterogeneous nature of the participants, he also expressed his pleasure to see non-member representatives attending the workshop.

To overcome the frequent breakdowns of village water systems, he suggested that a united approach, hard work and cooperation between all involved were essential.

He then called upon Ato Taye Tadesse, Head of Operations and Maintenance of Urban Water Supplies, WSSA, to present his paper.

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Water Supply and Sewerage Authority's Policies, Practices and Experience in the Operation and Maintenance of Village Water Supplies

by Ato Taye Tadesse,
Head of Operation and Maintenance of Urban Water Supplies,
WSSA

Ato Taye thanked CRDA for organizing the workshop which, he said, provided a timely forum to exchange ideas and share valuable experiences among the participants.

Ato Taye gave an overall picture of the present situation regarding water supply and sanitation throughout Ethiopia. He began by saying that Ethiopia is richly endowed with water resources. However, water supply services, particularly in the rural areas, are very limited. He estimated that 17% of the total population have access to a safe water supply, i.e. 11% of the rural and 71% of the urban population. He estimated that nearly 38 million rural inhabitants depend upon unsafe, traditional sources of water. As far as sanitation is concerned, he revealed that 57% of the urban areas, 4% of the rural villages and a mere 1% of the dispersed rural areas are covered by the national sanitation services.

Speaking of the Water Resources Commission's setup, activities and responsibilities, he said that since the drought of 1973-74, the government has been giving increasing importance to water resources, its management and conservation.

The commission is responsible for policy formulation, planning, controlling and the overall management and development of water resources.

The Water Resources Commission has under its auspices:

1) The Water Resources Development Authority (WRDA) which designs, plans and monitors the activities of all irrigation and dam schemes. It ensures that the Commission's directives and guidelines are implemented.

2) The Ethiopian Water Works Construction Authority (EWWCA) which constructs urban and rural water supply systems, dams and irrigation schemes.

3) The Water Supply and Sewerage Authority (WSSA) designs, operates and maintains urban and rural water supply systems except for the city of Addis Ababa. WSSA currently operates 197 urban and semi-urban water systems and around 5000 rural water supply sources through its regional offices.

4) The National Meteorological Service Agency (NMSA) which establishes meteorological stations and collects data from all existing stations for weather forecasting.

He also mentioned the Ethiopian Valley Development Studies Authority, the Ministry of Health and the Ministry of Urban Development and Housing as having indirect responsibilities in the water sector.

Returning to the water situation in the country, particularly in the rural areas, the WSSA representative explained that water supply construction and rehabilitation were being supported by bilateral and multilateral assistance through UNICEF, SIDA, ODA, and the governments of Italy

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and China. This year, projects with GTZ, EEC and FINNIDA would be commissioned. Some NGOs also have tripartite agreements with WRC.

In the government's Ten-Year Perspective Plan (1984/85 - 1993/94) the programmed investment for water supply and sanitation amounts to Birr 1200 Million or about 9% of the total public sector investment. 50 to 60% of the investment for rural water supply systems would come from external agencies. For individual towns or group of towns, construction of water schemes will be financed by soft loans.

Elaborating on the execution of these schemes, Ato Taye said that rural water supply schemes are constructed on a programme rather than a project basis. Programmed construction involves simple and identical facilities in small widely scattered communities.

Addressing the aim of the workshop, he reasoned that such simple installations do not require skilled pump attendants. It is also uneconomical to store spare parts and tools at each one of them. As a result, he deduced, communities should form "Water Committees" through community promoters to administer these facilities and meet local operation and maintenance costs. These local efforts should be backed up by the head or regional offices which would send out teams to carry out major maintenance.

Ato Taye then explained the government policy on operation and maintenance of urban and rural water supply schemes.

Urban water supply services should cover all their costs and expenditures from the revenue they generate from the sale of water. These may include capital or investment cost, bank interest, operation and maintenance costs and secure funds for future extension or rehabilitation works.

The cost of rural water supply construction schemes should be covered either by the government or donors and the beneficiaries should cover the cost of operation and maintenance.

He outlined the following as the major activities of his organization, WSSA.

- Operation and maintenance through its regional offices
- Responsibility for supervising, controlling and assisting urban and rural water supply services again through its regional offices
- Supervison of the construction of new water supply schemes
- Controlling of the quality of water
- Promotion of community participation in water activities

He listed WSSA's main approaches to rural water supply operation and maintenance as:

- Village level maintenance is done by pump attendants who are selected from the community and trained by WSSA.
- Maintenance at the regional office level is carried by a maintenance crew despatched from a nearby regional office. The crew is composed of a skilled electrician and a mechanic. However, if maintenance cannot be done by this type of crew, more specialized mobile crews take over.
- All major maintenance of pumps, generators and vehicles takes place at the central workshop (head office) level.

He then drew the attention of the participants to a lesser but nonetheless crucial role played by the community.

The government supports the involvement of a community (of its own water schemes) in the planning, construction, operation and maintenance of water schemes. The communities form what are known as "Water Committees". These committees, organized by community promoters, are usually made up of five members: a chairman, an accountant, a cashier, a storekeeper, and an auditor.

He described the main tasks of a water committee as:

- assisting in the selection of a site for a water point

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- mobilizing the community to offer free labour and materials for construction work
- selecting pump caretakers and requesting WSSA to train them
- setting water rates in consultation with WSSA
- utilizing some portion of the water revenues for operation and maintenance and keeping a little petty cash and depositing the rest of the collected fees in a bank
- notifyng WSSA's regional office in the event of any maintenance problem

Coming to the crux of the workshop's agenda, Ato Taye described operations and maintenance of rural water supply systems as the most neglected aspects of water development. He openly stated that designs are often selected and funds allocated for construction but little thought is given as to how the system will run once it is completed.

If physical and financial resources, he went on, are to be used effectively in any water supply programme, its operation and maintenance must also be seen on an equal footing as a new construction facility.

He listed the following as the main problems in the operation and maintenance of rural water supply schemes.

- lack of active community participation
- poorly designed and incomplete construction
- lack of standardization leading to difficulties in obtaining spare parts
- lack of collaboration between NGOs and government bodies resulting in the dumping of non-functional pumps on WSSA
- inadequate training of pump attendants
- lack of tools and machinery
- lack of vehicles and housing for employees stationed in rural areas
- handpumps are often non-functional because of vandalism
- lack of communication facilities

At the end of his presentation, Ato Taye strongly advised organizations involved in rural water supply schemes to always include the cost of training, tools, spare parts and machinery in its project budget.

He suggested that such assisting organizations should use standard designs for pumps and generators and submit the paper work to WSSA for comments and suggestions. They should also submit progress reports and data before, during and after the installation of a pump or pumps.

Ato Taye concluded by thanking CRDA, the organizing committee and the workshop participants.

Discussion of Ato Taye's Presentation

Following Ato Taye's presentation the floor was open for questions.

There were only two questions both from Ato Getachew Mekuria, Catholic Relief Services. He noted that when NGOs train handpump technicians they pay them per diems, but this practice is seen by WSSA as being improper. He cited a case he knew in the Dire Dawa area where this resulted in a row. Ato Taye simply replied that such payment are done because NGOs have extra money to spend. Hence he stressed that it ought to be discouraged.

Ato Getachew asked why it was not possible for PAs or any rural community that owns a well built for it by NGOs to open a bank account and deposit money obtained from the sale of water in its own name?

Ato Taye explained that current government policy requires that any revenue obtained from the sale of water be deposited in a government account.

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LVIA's Experience in Village Level Maintenance of Shallow Well Pumps

by Terry Dutto, LVIA

As an introduction to his presentation Mr. Dutto briefly outlined the history of the Lay Volunteers International Association (LVIA). LVIA is a non-government organization founded in 1967 in Cuneo, Italy. Its aim is to offer technical services to people in need in developing countries by employing volunteer technicians to work in development projects in Africa.

LVIA is presently implementing development projects in 10 African countries: Ethiopia, Kenya, Tanzania, Burundi, Burkina Faso, Senegal, Guinea Bissau, Mali, Ivory Coast, and the Central African Republic.

The organization selects, trains and employs volunteers and is financed by many organizations, ie. the Italian Ministry of External Affairs, EEC, international funding organizations, private donors and charities.

Mr. Dutto explained that in the Mendida area of northern Shewa, the water supply activity began more than ten years ago as a response to the need for clean water for rural villages. This activity was carried out by the LVIA volunteers, who were serving as teachers at the local technical school.

The pumps were purchased in Addis Ababa by the farmers and LVIA volunteers were called upon to install them in existing shallow wells.

Up to 1984 three water points were installed per year. Since 1985 LVIA's rural activities gained momentum with the inclusion of afforestation and horticulture. Water supply installations became the main component of LVIA's rural development projects and consequently increased, between 1985 and 1989 to 30 with an average of five pumps being installed a year.

The agreement signed by LVIA with the Ministry of Labour and Social Affairs (MoLSA) on April 30, 1988, for the implementation of an Integrated Rural Development Project in Shewa, was a milestone in defining the status of LVIA's volunteers as social development operators in the awraja.

The signing of the agreement was preceeded by allthorough evaluation of LVIA by MoLSA. Since 1984, cast iron hand pumps have been imported from Italy where thousands of such models are in use in rural areas.

The experience gained by LVIA is confined to a specific area and should not be considered necessarily transferable to other regions. It should rather be seen as a method that has made the "participation" of the village communities its first objective.

The major technical aspect to be taken into consideration is the fact that the potable water in the area is available in shallow wells at depths of 2 to 7 metres.

These shallow wells are used for human and animal needs. They are often located in valleys and they are very easily polluted by external elements.

Mr. Dutto explained that social variables are taken into considerations when LVIA analyzes the need for installing a water pump. The basic social principles of the villagers in the area are related to their land. The villages are inhabited by settled communities which have known their environment for many generations. The area is a cold isolated region with little social or commercial contact with the outside.

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Agriculturally it is considered self-sufficient in basic food production.

The hand pump used is a suction type pump which can be successfully installed over shallow wells with a static water level up to a depth of 7 metres.

The depth can be increased if an extension piston is added. In this case all maintenance operations and repairs to the piston become more complicated.

The pumps are installed at a fairly constant frequency. On-the-job training as pump attendants is given to the local farmers.

In March 1989 a survey was carried out to measure the impact of the water pump installations. The results showed that of the 82 water installations, only 10 were found totally neglected and non-functional.

For all of the failed installations, the results showed social feuds among members of the community as being the cause. There was no evidence in which technical problems were the reasons for neglect.

The LVIA design of the pump is very simple. It is made of eight pieces of cast iron, a base valve and one rubber gasket. Eight bolts keep the pump together, one spanner is enough to dismantle and re-assemble the pump.

Since 1988 maintenance course for pump attendants was given at least twice a year. The main purpose of the training was to allow people to get familiar with all the parts of the pump. The course was divided into three parts:

1) dismantling and re-assembling of the real pump

2) trouble shooting and again dismantling and reassembling the pump

3) familiarization with auxiliary shallow well operations such as cleaning, chlorination, replacement of parts, reporting on operational events and major problems.

The courses were held in Mendida. Each course attendant was provided with a spanner and a number of spare gaskets. The course included on-the-job training activities carried out on site when new installations were commissioned and when the first maintenance after installations occurs. On these occasions all the people present were asked to try to dismantle and re-assemble the pump.

From the analysis of the situation an evaluation was carried out on the overall project proposal. The outcome was a four-point statement:

1) The pump has become a familiar and simple piece of technology in the village, almost like the traditional plough or like any other tool produced locally. Therefore it is no longer seen as an extraneous object.

2) The on-the-job training of pump attendants and the structured training courses have spread the technical knowledge of the pump. Many farmers now know how to repair a pump and this is producing a healthy individual competition of skilled people to deal personally with pump troubles.

3) The process of self-training was initiated since the beginning of LVIA pump installations and now, after about ten years, results are starting to show.

4) Village participation, in all phases of the process of water supply, has produced a direct involvement of communities in handling operations and maintenance of village water installations.

There are still areas of neglect. Those are produced mostly by village internal squabbles and cannot therefore be attributed to technical failures.

Mr. Dutto suggested the following points for future improvement.

The participation of rural communities in the realization of water supply installations must be paramount at all stages.

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Villagers must be the prime movers of any village level installations or any development proposal.

Each request for intervention is to be evaluated with the local authority in charge of village water supply and should be checked against sound basic criteria for intervention: number of people, distance of water source from village, quantity of water available, level of community participation, general environmental conditions and the overall level of need.

Visits to villages are very important and offer chances to discuss with villagers, in formal and in informal ways, about their problems and their resources.

Local leaders must be found at the village level in order to ensure that the correct consciousness about clean water is established in the village, particularly among women.

Women must be involved directly in the decision-making process of the water committee which must be created prior to any intervention on site.

In any project the decision-making process must take place at the grassroot level. The grassroot connection is institutionalized by the signature of agreements between the leaders of the rural communities interested in receiving services and LVIA offering technical advice and training.

LVIA proposes a contract to all communities asking for intervention. LVIA does not interfere with the village arrangements, but ensures that the responsibilities of the villagers are fulfilled.

Each water installation is preceded by the formation of a water committee which is in charge of the installation from the planning phase of the process.

Each committee is made of seven people including the representative of the local peasant, women and youth associations and the local service co-operative. At least two women are part of the committee.

The LVIA contract consists of four points

- The level of the community participation must be specified in detail for each phase of the realization. LVIA provides technical assistance and the intervention of two skilled operators.
- The ownership of the installation is transferred to the village water committee to underline the sense of belonging among the villagers.
- The responsibilities of the committee bind them to the daily operations and maintenance of the installation.
- The participation of women in the decision-making process is emphasized and clearly spelled out.

The contract is presented, discussed and eventually signed during various community meetings open to all villagers in order to give maximum exposure to the event and to underline the guiding principle of mutual co-operation.

It must be stated that water supply activities are to be supported by other sectorial activities tied closely to availability of water. The multisectorial approach at the village level builds up in village life and becomes a spontaneous and deeply felt need which, in turn, helps to improve the consciousness towards water needs.

A re-afforestation nursery or a vegetable garden can be organized by farmers when they see that water is available first for their families, then for their animals and there is more to spare.

The personal hygiene lesson or a primary health care activity can be explained better and can have a better impact when water is easily available.

Once the villagers, particularly women, are fully experiencing the good things provided by a water installation, they become the first defenders of it from general negligence or apathy.

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The constraints for the full realization of self-sustained hand pump water supply installation at the village level are still many. Internal community squabbles or local taboos in village communities have the most devastating effects on the fate of water installations.

Mechanical and generally technical constraints are felt in very remote areas where one cannot even find the most common spanner. Mr. Dutto explained that among the day's workshop the representative of the Rural Technology Promotion Department of the Ministry of Agriculture would mention the proposal of involving the Rural Technology Centres at the service cooperative level to cope with some aspects of the matter.

Communications made difficult by the environment are major constraints to self-sufficiency of villages in rural areas. Market places, are the most common means of communication, but they are not enough to sustain a continuity in water supply installation which is supposed to be answering basic needs of people. Intermittent use of a water supply scheme induces a sense of insecurity and lack of confidence about the installation.

The spreading to the local markets or service cooperatives of the spare parts supply for the pumps and the widespread skill of some independent pump repairs should help to alleviate the problem of communication by ensuring prompt service to all the installations in a given area.

LVIA is trying to induce the production of a similar pump in Ethiopia with the above mentioned characteristics.

The local production of the pump and the related spare parts will ensure continued availability of all pump items in the local markets.

The quantity to be produced, the marketing of the pumps, the spare parts and the distribution will be tackled at a later stage when the final positive answer is received from the Spare Parts Factory of Akaki.

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Training of Village Level Technicians, Particularly Women for the Operation and Maintenance of Water Systems in Malawi.

by Michael Wood,
Community Participation Promotion Advisor,
Southern Region Office,
WSSA

As an introduction to his presentation, the speaker referred to his previous organization's, Save the Children Fund/UK involvement in Malawi's water programme following the huge refugee influx from neighbouring Mozambique from 1986 to 1988. The refugee population in Malawi eventually reached 10% of the country's population.

His experience in Malawi can be summarized as follows.

To cope with the enormous demand for drinking water, SCF/UK set out to install 458 water points. The water points had handpumps of five different makes: Aguadev, Afridev, India MK II, Nira and Climax. For wells up to 80 metres deep, they used Aquadev, Afridev and India MK II. For shallow wells, i.e. up to 8 metres deep, they used Nira.

The average output of a pump was 15 litres a minute or 10,800 litres day. This was sufficient for 540 people a day, i.e. 20 litres per person. However, the situation raised the number of consumers to 1400 a pump. Despite the insufficient water yield of the hand pumps, UNHCR discouraged the use of motorized systems because of the high cost involved and the question of their sustainability.

For the operation and maintenance of handpumps particularly in refugee camps, the following approaches were used.

First Stage: Training technicians in maintenance of all types of pumps.

- hands-on training - mostly in the field

- close cooperation of communities

- record keeping - monthly returns to the head office

Second Stage: Water Committees, composed of three men and three women. These were selected by the chiefs and local Party chairmen.

- Technicians advise the committee that women should be prepared to maintain pumps. Accordingly women were selected.

Third Stage: Technicians explain to the selected women the basic principles of how handpumps work.

- They were then trained how to use tools, to recognize faults and after having obtained the required parts from the technicians, to re-install the repaired pump.

Every pump had one technician who kept spare parts and tools with him. He obtained them from the head office and upon request handed them out to women pump caretakers.

Mr. Wood's presentation was not followed by a discussion because of lack of time. However, his presentation was supported by slides and transparencies.

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The Role of Rural Technology Centres in the Maintenance and Repair of Rural Water Supplyes Systems

by Ato Guta Milkessa,
Head of Small Scale Rural Industries Division,
Rural Technology Promotion Department,
Ministry of Agriculture.

After thanking CRDA for organizing the workshop, Ato Guta described the rural technology promotion programme of the Ministry of Agriculture. The programme focused on three major efforts to assist comprehensive rural development:

- small scale agricultural implements and machinery promotion development
- small scale rural industries promotion and technology development
- rural energy and fuel-saving technology promotion and development

The programme, he explained, has the following objectives:

- to improve agricultural productivity through utilization of improved agricultural technologies
- to increase labour productivity for agricultural and other rural development activities
- to develop a sustained technical capability in rural areas.
- to diversify rural income sources through creation of off-farm employment opportunities in rural villages
- to improve the well-being of rural communities.

He then explained the rural technology operational structure.

In order to carry out the transfer of technology to the rural areas with an assured continuity of development, rural technology promotion within the MoA has a four-tier structure.

a) Rural Technology Promotion Department (RTPD) which is set up at headquarters level, comprises four divisions: Rural Energy, Agricultural Implements, Rural Industry, and Rural Technology Popularization and Promotion.

b) Rural Technology Promotion Centres (RTPC), also called zonal workshops, which are being established at seven sites throughout the country.

c) Rural Technology Testing and Promotion Centres (RTTPC) which are established within selected producer cooperatives (PC) and are managed by PC staff with technical assistance from RTPC staff.

d) Farmers Technical Service Stations (FTSS) which are established at selected service cooperatives (SC) and are managed by SC staff with technical assistance from RTPC staff.

The Zonal Rural Technology Promotion Centres were established with the following objectives:

- to develop efficient and appropriate technology for rural energy supply and fuel-saving technology

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- to assist farmers cooperatives in the establishment and development of small scale industries and handicrafts
- to produce agricultural machinery and equipment as recommended by the Institute of Agricultural Research (IAR)
- to develop and promote small scale rural construction machinery and equipment for testing and popularization
- to promote and develop food industries and technology
- to conduct technical training for farmers and MoA staff
- to provide technical assistance to farmers' in the field of maintenance, repair and production of agricultural machinery and equipment related to rural industries and energy.

Ato Guta also informed the workshop participants about the role of farmers technical service stations.

In rural areas, from 1987 to 1989 some 152 farmers' technical service stations were established in farmers service cooperatives. These technical service station workshops were equipped with welding machines, generators furnaces, anvils, handtools, and other essential equipment.

People who work in technical service workshop were trained in rural technology promotion centres for. 2 - 3 months in manufacturing handtools and in repairing and maintenance of different types of equipment.

He pointed out that the farmers' technical service workshops were established at service cooperatives to:

- provide technical service in rural areas such as repair and maintenance of threshers, flour mills, oil mills, agricultural implements, irrigation pumps, village biogas pipelines, village water supply carts, household equipment, tyre repair units, etc.
- manufacture small handtools, such as ploughs, plough parts, hoes, cultivators, matchetes, knives, spades, axes, baking plates, sickles, winnowing forks, hinges, wedges, chisels, stoves, water tanks, beds, horse saddles, punctures, tubes, and chains.

In Ethiopia, he informed the participants that over the past few years, the utilization of solar energy is being accelerated by the development of photo-voltaic technology.

This technology has attracted attention as an energy source for village water supply, electricity supply for health centres, rural night schools and rural communications.

In remote areas where electricity is not available, transportation is difficult and maintenance services are available, the utilization of solar photo-voltaic energy is one of the most important options there is for the improvement of rural life.

In their technology promotion programme, he said they have installed solar pumps for lifting water and photo-voltaic modules to supply electricity to rural houses at Farmers Technology Testing and Promotion Stations. The transfer of technical knowledge to the rural people is carried out through their extension system. He explained also that particular attention is given to training the necessary field technicians, extension staff and to the farmers themselves.

Presently the farmers are managing the photo-voltaic modules satisfactorily, he said.

There is also a programme for installing 30 solar pumps and some solar electric generating systems in rural villages.

The existing Rural Technological Advancement Centres, are being supported by vocational training schemes for basic training and upgrading of skills of workers and are frequently visited by rural technology

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promotion centres technicians for technical assistance.

He raised as constraints the following two points:

- shortage of raw materials in the market

- the low quality of produced items

As in the previous case, his presentation was not followed by a discussion. However, a video cassette on the activities of his department was shown.

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The Introduction of Standardized VLOM Hand-pumps in Ethiopia

by Rupert Talbot, UNICEF.

Mr. Talbot shared with the participants the experience he gained in India where his organization has spent millions of dollars in installing hand-pumps on a national basis. Later UNICEF realized that the holes were dry and pumps were breaking everywhere.

In the long run, UNICEF had to learn remedies from NGOs who had a longer experience than the UN agency in this area.

He also mentioned the efforts of UNDP and the World Bank Group who developed over 70 types of hand pumps.

He displayed several reference books on hand-pumps, and highly recommended to the participants, a publication entitled "Community Water Supply", published jointly by UNDP and the World Bank for the International Drinking Water Supply and Sanitation Decade.

Mr. Talbot put forth that standardization was the best solution for operation, maintenance and sustainability in any given country. Standardization, he suggested, can be attained:

- through local manufacture.
- by spreading spare parts.
- by training technicians and caretakers.
- by limiting the types of pumps, if pos sible, to a bare minimum e.g. two to three types

At the end of his very short but enlightening presentation, he informed the participants that the Water Resources Commission is organizing a workshop and, if the participants wished, they could attend it.

By way of a conclusion, he said the role of NGOs in standardization in Ethiopia should be to:

- help the government in monitoring water spots.
- avoid working in isolation
- make sure pumps are designed right

He commented that it is better to install pumps that require servicing or repair at least every six months rather than those which operate for a year and a half only and then end as scrap.

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Members' Experiences in Operation and Maintenance of Village Water Supplies

The presenters and group reporters formed a panel to answer questions and elaborate on some issues that emerged from the audience.

Mr. Dutto was asked how the water was tested.

He replied that LVIA has not yet made tests. Chlorination by directly pouring chlorine into the wells every six months is all LVIA does at the moment. However, random testing is planned for future.

One participant noted that three members of the panel have been involved in three different areas outside Ethiopia. He asked how their experiences could be replicated by WSSA in a huge country like Ethiopia.

The panelists commented that:

- Training at the village level is difficult and expensive
- Because of the existing diversity in localities, services given in one area cannot be replicated in another.
- Women in one area participate in community services whereas in another, it is almost impossible to include them for cultural reasons.

Another participant asked Mr. Wood why he selected women exclusively as caretakers of pumps in Malawi?

He replied that because women are the main users of water. The upkeep, therefore, should be entrusted to them. In the case of Malawi, women were always selected from among the refugees. Men simply were not available for such services because they were either killed or recruited to serve in the Mozambican National Resistance.

Mr. Dutto, was asked to elaborate on the statement he made in his presentation that 10 pumps out of 82 were not working because of social reasons. He explained that some pump attendants got involved in social conflicts and were either put in prison or ran away from the village. In some cases vandals destroy the pumps at night. When rodents were seen around wells, people ceased to use the wells.

Participants asked Mr. Wood, what differences he has noticed between Malawi and Ethiopia.

He listed the differences as follows:

Malawi

- is smaller in area and population
- with a homogeneous population
- is a capitalist state
- has had the same leader ever since independence
- uses agriculture as a base for its economy
- women's organizations are more developed
- water system is centralized
- gravity system to draw water are used through pipelines that stretch over distances of 200 km.

Mr. Dutto, was asked why LVIA pumps break down so often?

He explained that, more often than not, this was because of faulty designs. LVIA also does not know who repairs the pumps. Some of the pumps have been in use for more than five years. If pumps must function, as they should, spare parts must also be centralized. He suggested that spare parts could be stockpiled with the Rural Technical Promotion Department. Socially oriented training must be offered.

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Discussion Of Group Reports

The workshop participants were assigned to two discussion groups where they examined the following topics.

Group 1. Training for village level operation and maintenance.

Group 2. Organization of operation and maintenance of rural water supplies.

Group 1. Presentation

Mr. Ian Shaw, CRDA ,delivered the report for the group.

The group was given the following guidelines and questions.

1) Draw up guidelines on the training of water system attendants and maintenance workers, suggesting suitable training methods and programmes and a means of follow-up.

2) How should programmes be arranged so that trained "technicians" do not leave for other employment? How can such technicians be suitably remunerated.

In response to Question One above,

1)The group suggested that the beneficiaries must be made aware of the value of the parts of the pump and what happens when the pump breaks down.

2) The group proposed that pump attendants should be selected from among the people who have prior knowledge of technical matters. He gave blacksmiths as an example.

The group realized that in setting this criterion rural women would most probably not be selected. However, the group also felt that women have an important role to play as social animators, especially among other women, in water supply schemes.

3) The group stressed that a classical classroom approach would be ineffective in training for water supply schemes. Instead, the report suggested that the training should take place as close as possible to the pump site and that the trainers should train with the actual materials that go into the water supply system.

4) Training should be integrated with the construction activities.

5) There should always be more than one pump attendant trained.

6) Trained attendants should disassemble and re-assemble their pumps every six months so that they do not forget what they have learned.

7) The awareness of women of the need of clear water should be increased so that they can apply social pressure on the men to maintain and repair the water supply systems.

8) The community, not WSSA, should bear the primary responsibility for the maintenance and repair of the pump - WSSA's role should be restricted to what is beyond the community's ability.

9) Follow-up should be market-oriented. In other words, people should know where to go in the local or regional markets to find what is needed to repair their water supply system.

For the second question, the group came up with the following ideas.

To have pump attendants carry out their responsibilities, remuneration should come from the community itself in one form or another.

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Several pump attendants should be trained for each system.

CHAs and TBAs should be involved in the water supply scheme and, if possible, trained alongside the pump attendants.

The group observed that the concentration of standardized equipment in a given geographical area can lead to some pump attendants specializing in pump repair and offering their services to other communities where such pumps are installed. This development of specialized self-employment skills should be encouraged.

Lastly, the group believed that the selection of married people with children as pump attendants could lead to more stable repair services.

Discussion of Group 1 Presentation

One participant asked why the group had excluded women from being handpump attendants.

Mr. Shaw replied that the group did not deliberately exclude women from this task but realized that if the criterion of prior technical knowldege was applied for selection of handpump attendants, rural women would probably not be the best candidates.

Many members of the audience strongly opposed the use of criteria which would tend to exclude women from being handpump attendants.

Group 2 Presentation

Mr. Gerry Garvey, Oxfam/UK, presented the Group 2 report. This group was given the following guidelines and questions.

1. Set down some specific steps NGOs can follow to ensure long service of water supplies in rural areas.

2. Some NGOs continue to maintain water systems which they have installed by paying their own technicians. Is this an acceptable way to overcome the problems of maintenance?

3. Can communities be expected to manage the operation and maintenance of their own water supplies without any outside assistance?

4. Is it realistic to expect WSSA to be responsible for repairing and maintaining the ever-increasing number of rural water systems?

5. How can NGOs assist WSSA in carrying out its assigned responsibilities?

The following were the views and suggestions of the group.

For Question 1, the group reporter said that communities should be involved in the planning, design and construction in order for maintenance to be successful. He proposed that:

- Rural population must be involved.
- Water committees must be elected.
- Pump attendants must be selected and trained.
- Fast moving spare parts must be provided.

Ideally there should be a connection with WSSA. The community must be aware of the need for an improved water source, and a system of prioritizing site selection should be adopted to help programme planning.

For Question 2, the following was suggested.

Some NGOs maintain all the pumps they have installed. But sometimes different types of pumps are installed in the same area by other NGOs. It is better to have a centralized maintenance system of standardized pumps.

Some participants felt that NGOs should continue to pay their technicians for some time after installation as the community cannot be mobilized from the beginning. The group suggested that after responsible

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people from the community have been identified and the community as a whole assumes the responsibilty of the pump, NGOs should withdraw.

For Question 3, the suggestion goes as follows. There are various degrees of self-reliance. Generally two types of water lifting system are common, namely, handpump and motorized. For handpumps, if training is given, tools and spare parts are available, then minor maintenance can be community-based with monitoring from WSSA. All maintenance for motorized systems must be done by WSSA.

A distinction was made between Addis Ababa-based NGOs who have development programmes of limited duration, and church-based organizations which are active in their areas over a long period of time.

For the fourth question, the group said that WSSA should not be expected to be responsible for repairing and maintenance of rural water systems.

The fifth and last question was more elaborately answered.

The group noted that there is a tendency for NGOs to undertake projects using different approaches. Some NGOs pay for all work in cash, while others use food for work, and others seek to mobilize some form of community participation. There should be an effort to standardize their approaches.

Many NGOs started working during the drought and famine period, hence their agreement is normally with the RRC only. Afterwards, many NGOs moved into development, but were reluctant to approach the relevant government authorities, e.g., the Ministry of Agriculture for agricultural programmes, or the Water Resources Commission for water programmes. This was possibly because the NGO did not know that the relevant government authority existed. With respect to water, the RRC and the WRC have now come to an arrangement regarding tripartite agreements with NGO involving the RRC and the WRC. Within this, all aspects of planning, design, operation and maintenance are delegated to WSSA. So now, there should be more integration between WSSA and NGOs involved in the water sector.

Some NGOs think that they may be too small to contribute to strengthening WSSA's operation and maintenance capability. However, even small inputs like tools, spare parts or even a vehicle can help greatly. WSSA has a problem with foreign currency to purchase imported goods.

WSSA is sometimes not aware of the existence of water projects until they break down or after the NGO has left the area. Records of completed projects with location, type of pump, and availability of spares should be left with the WSSA regional office even if the particular NGO has no agreement with WSSA. This will greatly assist future maintenance.

NGOs should forward standard designs to WSSA for comments, follow-up of maintenance when required and for standardization of equipment and spare parts.

WSSA's Community Participation Promotion Officers, (CPPOS) are available in each region. NGOs should try and use these trained personnel for setting up water committees, to disseminate health education and make sociological surveys. A simple way of doing this is for WSSA to second a CPPO to an NGO, with WSSA paying the salary while the NGO pays the per diem.

WSSA would like to be involved from the very beginning in NGOs water programmes. For a long time WSSA has wanted a closer relationship with NGOs, and this workshop has been a good forum for an initial dialogue.

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Appendix I Workshop Programme November 23, 1989

Registration	08:30 a.m. - 08:45 a.m.
Opening Address	08:45 a.m. - 09:00 a.m.
Presentation 1 Water Supply and Sewerage Authority's Policies, Practices and Experience in the Operation and Maintenance of Village Water Supplies by Taye Tadesse, Head of Operation and Maintenance of Urban Water Supplies, WSSA	09:00 a.m. - 09:30 a.m.
Discussion on Presentation 1	09:30 a.m. - 10:00 a.m.
TEA/COFFEE BREAK	10:00 a.m. - 10:15 a.m.
Presentation 2 and Discussion LVIA's Experience in Village Level Maintenance of Shallow Well Pumps by Terry Dutto, LVIA	10:15 a.m. - 10:45 a.m.
Presentation 3 and Discussion Training of Village Level Technicians, Particularly Women for the Operation and Maintenance of Water Systems in Malawi by Michael Wood, Community Participation Promotion Advisor, Southern Region Office, WSSA	10:45 a.m. - 11:15 a.m.
Presentation 4 and Discussion The Role of Rural Technology Centres in the Maintenance and Repair of Rural Water Supplies by Guta Milkessa, Head of Rural Technology Promotion Department, MoA	11:15 a.m. - 11:45 a.m.
Presentation 5 The Introduction of Standardized VLOM Hand-pumps in Ethiopia by Rupert Talbot, UNICEF	11:45 a.m. - 12:00 noon
LUNCH 12:00 noon - 01:00 p.m.	
Member's Experience in the Operation and Maintenance of Village Water Supplies	01:00 a.m. - 02:00 p.m.
Group Discussion	02:00 p.m. - 03:15 p.m
TEA/COFFEE BREAK	03:15 p.m. - 03:30 p.m.
Reports from Group Discussion and Summing up	03:30 p.m. - 04:15 p.m.

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Appendix II List of Participants of the Operation and Maintenance of Village Water Supplies November 23, 1989

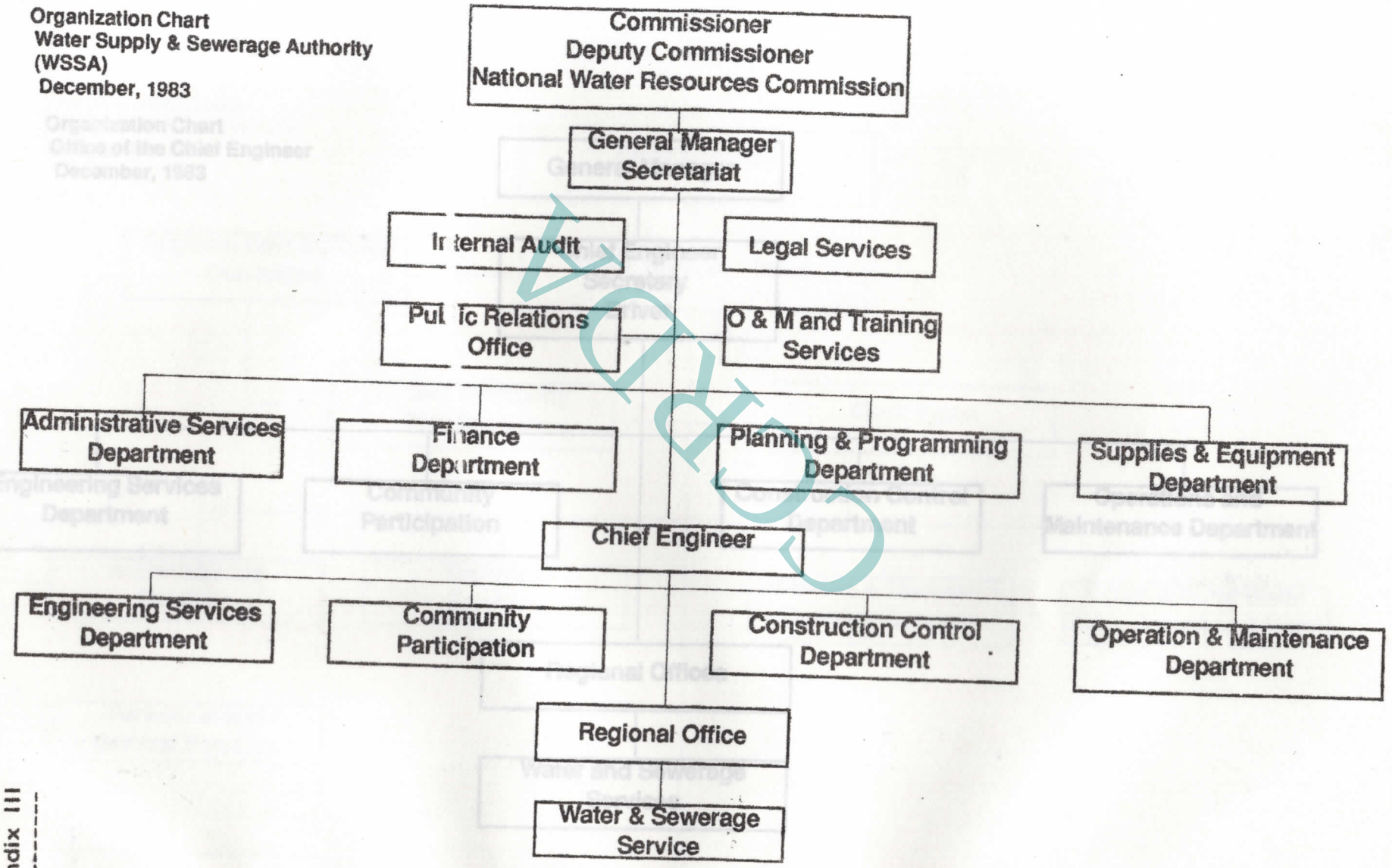
Wzo. Mulu G/Meskel - World Vision International/Ethiopia
Wzo. Yeteshawork Mame - World Vision International/Ethiopia
Ato Temesgen Berhanu - Hope Enterprises
Ato Samuel Teshome - Catholic Church - Gamo Gofa
Ato Abel Mebrahtu - Faith Mission
Ato Bekele Tefera - Save the Children Fund/UK
Ato Mogus Mehari - Kale Heywet Church Development Programme
Ato Guta Milkessa - Ministry of Agriculture
Ato Getnet Kebede - Action Internationale Contre la Faim
Ato Tekle G/Mariam - Faith Mission
Ato Teshome Ali - Food for the Hungry International
Ato Megbar Debebe - Food for the Hungry International
Ato Getachew Makuria - Catholic Relief Services
Mr. Edoardo Schmidt - IT. EMB-UTL
Ato Habtu Zemech - Church of Christ
Ato Solomon - Japan International Volunteer Centre
Ato Tadesse Belachaw - Save the Children Federation/USA
Mr. Wally Eshenaur - Baptist General Conference Mission
Ato Addisu Haile - Baptist General Conference Mission
Ato Girma Begashaw - World Vision International/Ethiopia
Mr. T. D. Schctanus - Kale Heywet Church Development Programme
Ato Desta Demessie - Kale Heywet Church Development Programme
Mr. Andy Meakins - Kale Heywet Church Development Programme
Mr. Rupert Talbot - UNICEF
Ato Addisu Beyene - CIDA, PSU
Mr. Jeff Pearson - Baptist Mission of Ethiopia
Ato Gezahegn Duga - Baptist General Conference Mission
Ato Shimelis Derebe - Norwegian Church Aid
Ato Aseged Mammo - Ethiopia Water Works Construction Authority
Ato Yilma Mengistu - AAE
Mr. Giordani Francesco - CVM
Ms. Laura D. Litwiller - Mennonite Mission in Ethiopia
Mr. Andrew Hood - Kale Heywet Church Development Programme
Ato Beyene Megersa - Lutheran World Federation/WS
Ato Negussie Deme - Lutheran World Federation/WS
Mr. Gerry Garvey - Oxfam
Ato Kifle Balcha - Oxfam
Ato Tesfom Haile - WSSA
Ato Shawel Astatke - ASE
Wzt. Etsegenet Yoseph - Jesuit Relief Service
Mr. Chinaglia Piero - Italian Embassy
Mr. Chiusano Amtonio - EWWCA
Ato Tameru Reta - CVM
Ato Fekrie Zewdie - ActionAid
Ato Wondifraw Zenebe - Catholic Church - Gamo Goffa
Mr. Carl Perrin - Kale Heywet Church Development Programme
Ato Shiferaw Legesse - Finnish Mission
Ato Yohanes Rozalin - North Omo - Jinka

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Ato Berhane G/Hiwot - Oxfam
Ato Fessaha G/Hiwot - American Joint Distribution Committee
Wzo. Kiros G/Hiwot - Oxfam
Ato Fikre Negussie - Lay Volunteers International Association
Ato Taye Tadesse - WSSA
Ato Teshome G/Michael - ASE
Ms. Patricia Hotchkiss
Mr. Pero Buce - EWWCA
Mr. Sergio Bemparad - EWWCA
Mr. Michael Wood - WSSA, Awassa
Mr. Terry Dutto - Lay Volunteers International Association
Ato Yeneneh Worku - World Vision International/Ethiopia
Ato Girma Mamo - World Vision International/Ethiopia
Ato Belai Kebede - World Vision International/Ethiopia
Mr. Jerry Grosh - Mennonite Mission in Ethiopia
Mr. Ian Campbell - Canadian Hunger Foundation
Ato Hagos Araya - CRDA
Mr. Ian Shaw - CRDA
Ato Yilma Feleke - CRDA

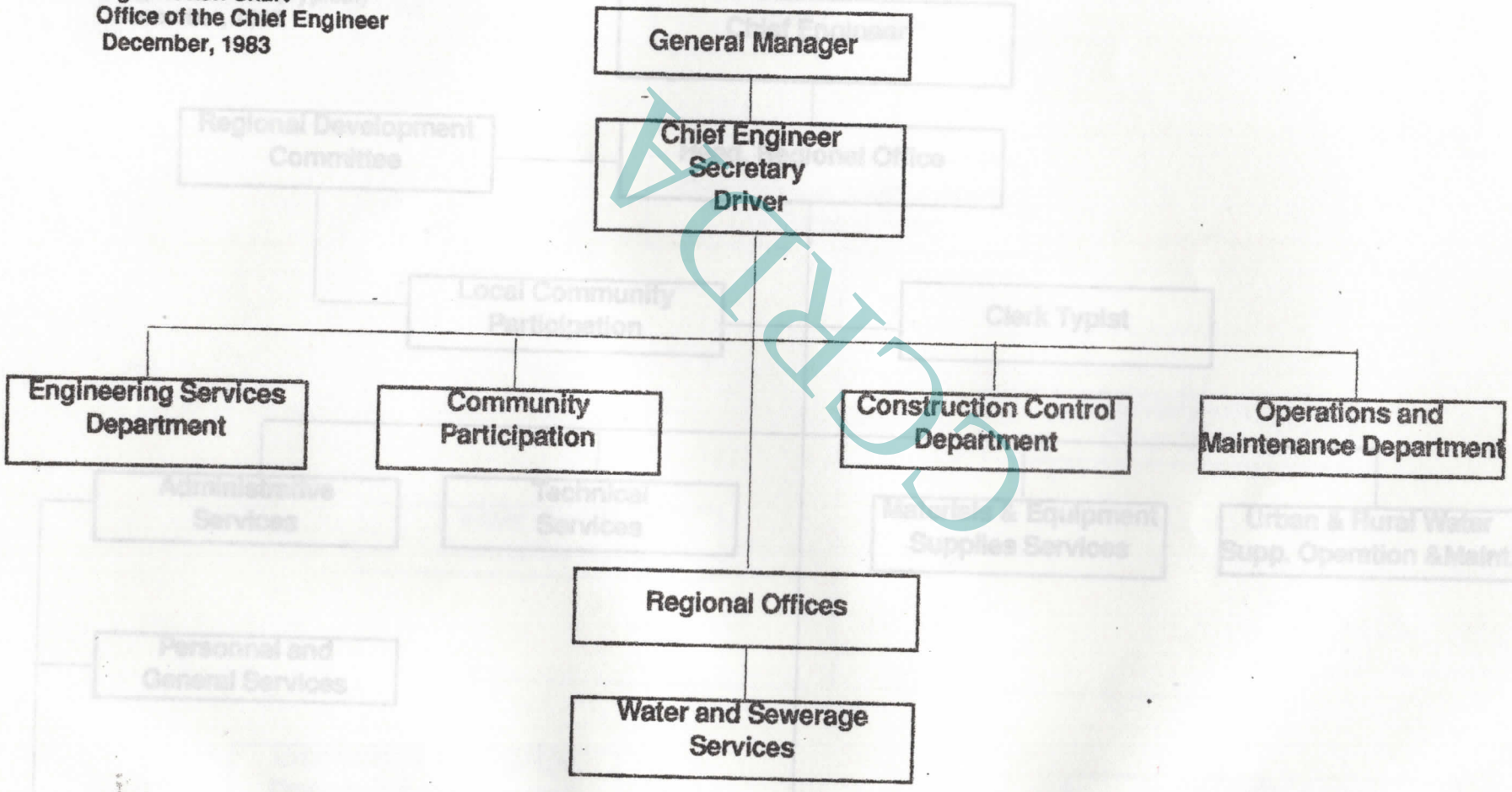
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Organization Chart
Water Supply & Sewerage Authority
(WSSA)
December, 1983



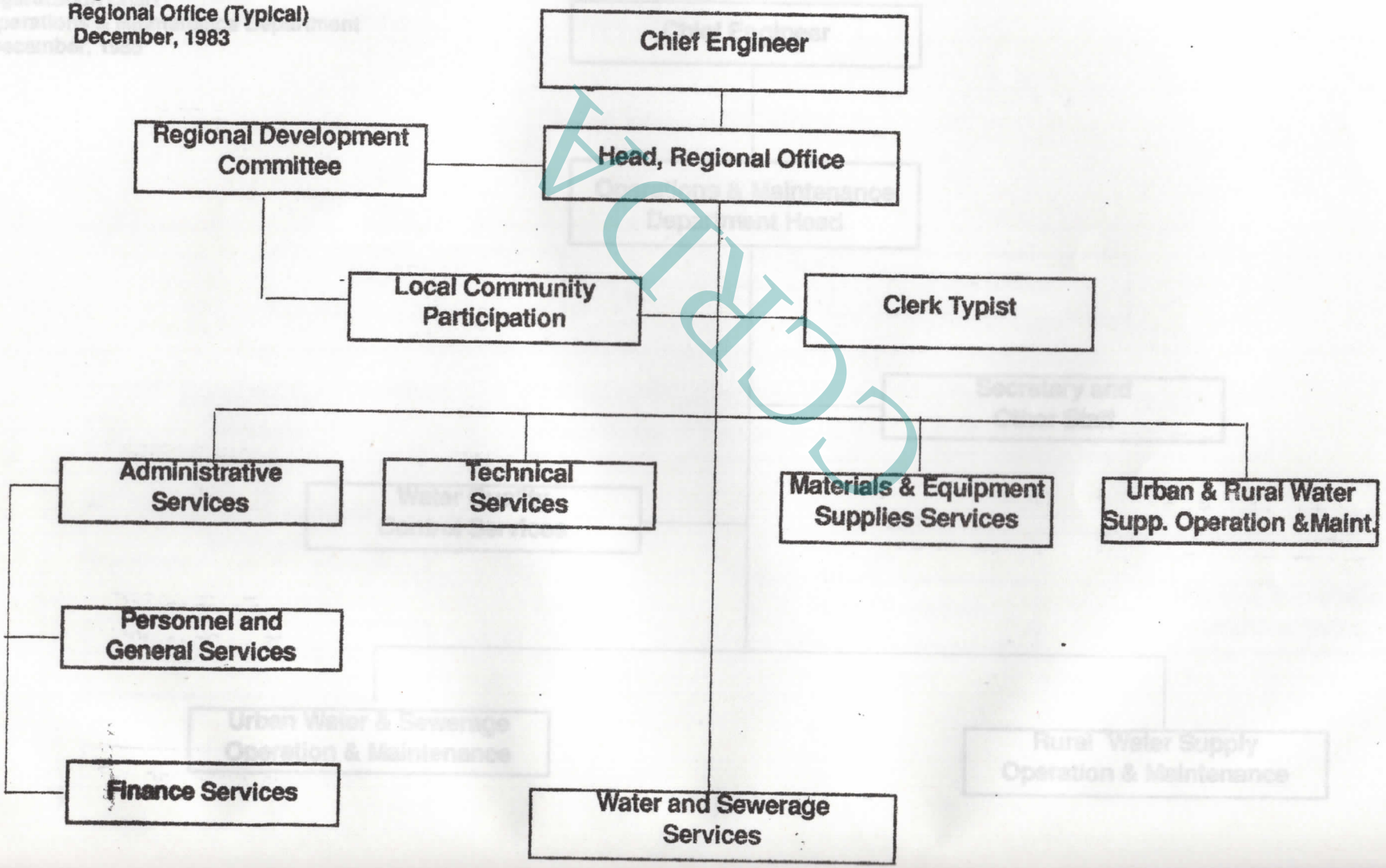
Appendix III

Organization Chart
Office of the Chief Engineer
December, 1983

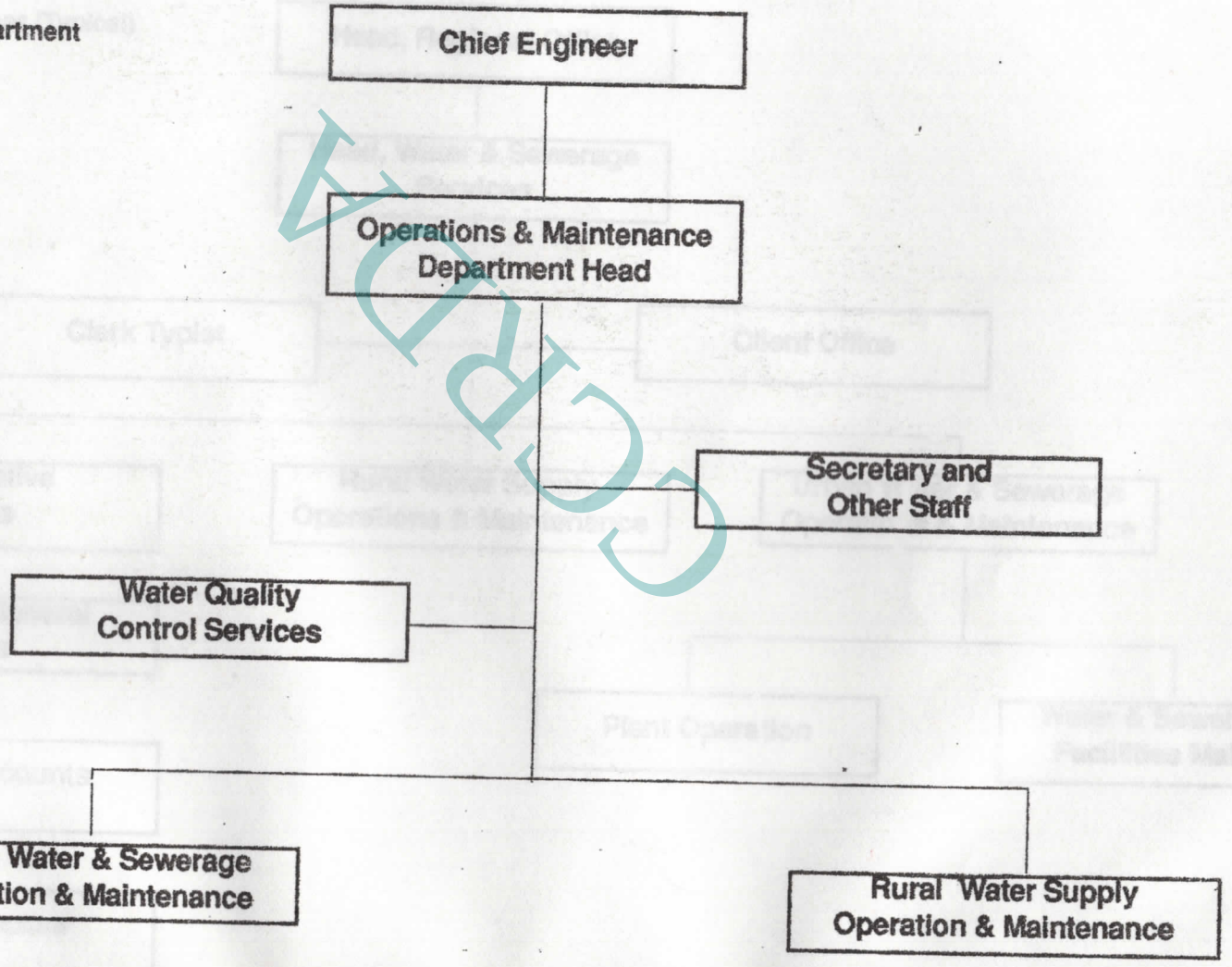


ARD

Organization Chart
Regional Office (Typical)
December, 1983

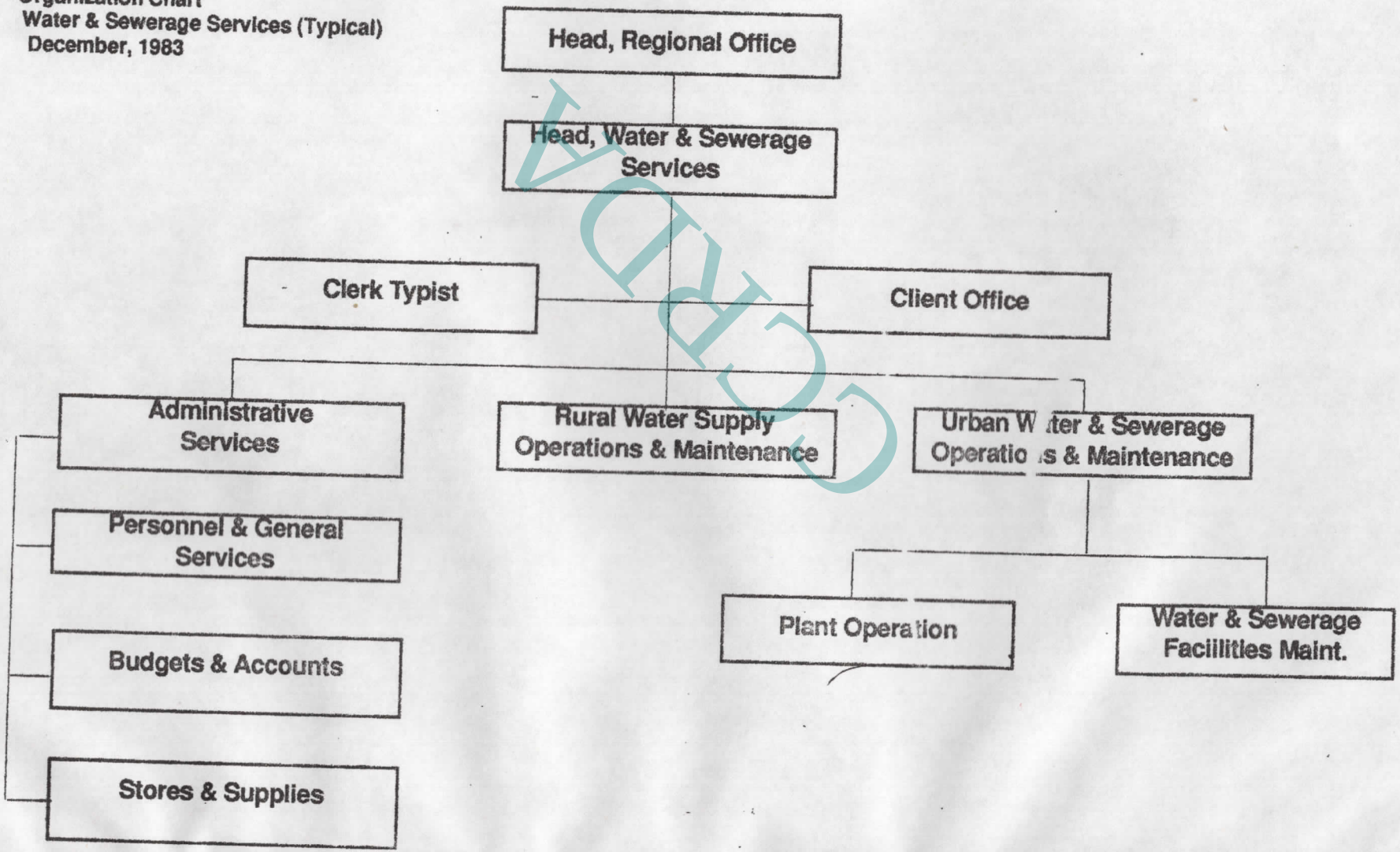


Organization Chart
Operations & Maintenance Department
December, 1983



CERA

Organization Chart
Water & Sewerage Services (Typical)
December, 1983



CERDA