SUBMISSION OF ASSIGNMENT 3 FOR THE DIPLOMA IN WASH

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1. **Why is community based managed essential in management of water resource?**

Emphasis is now being placed on moving away from technology and towards software aspects of water supply. Much of the work in this area has focused on maximizing health and other benefits from water through the synergistic integration of water supply with sanitation, health and education programmes, and striving for long term self-sufficiency through the empowerment of communities to manage their own water supply schemes.

Population growth, urbanisation, an increase in water demand for food security and energy production, existing climatic variability as well as land and soil degradation are just some of the reasons why improved water resource management is needed. Managing water resources at a global or state level is often over-ambitious and unrealistic, particularly when many developing countries have weak regulating institutions and limited technical and financial capacity.

For fragile or developing nations or communities that remain on the periphery of support from central government, Community-Based Water Resource Management (CBWRM) may be a more realistic option for involving local water users as CBWRM aims to engage directly with community-based institutions and water user groups so that they may play an active role in water resource management from the beginning. The idea is that CBWRM provides an opportunity for communities to engage in water resource management with roles and responsibilities clearly defined alongside those of regulating water authorities.

CBWRM provides tangible benefits for development organisations because it encourages agencies to consider aspects of water quantity and quality that sustain water supply systems. Furthermore, it encourages agencies to engage in hydrological monitoring and to undertake innovative water

resource management work that can be replicated and scaled up by larger service providers. Other benefits include:

- Encourages organisations, which predominantly engage in provision of domestic water supply and sanitation services, to consider productive water requirements when designing water supply systems.
- Encourages practitioners, who are responsible for designing and implementing water supply systems, to consider issues of water quantity as well as water quality. Domestic water supply in community water supply programmes typically places low demands on available water resources. However, the risk of over-abstraction at water sources needs to be considered, especially where water usage is multipurpose. Important issues of groundwater depletion, recovery and recharge are not routinely considered in many community water supply programmes.
- Community management structures have typically focused on physical water supply infrastructure (water assets), not water resources. CBWRM therefore provides development organisations with a practical mechanism for engaging in water resource management, ensuring environmental sustainability is considered alongside operation and maintenance duties.
- The CBWRM approach is also relevant where large-scale human displacement occurs and refugee or internally displaced person camps are formed. Densely populated camps place large demands on local water resources and the protracted nature of many humanitarian crises (such as Darfur, Chad and Dadaab camp in Kenya) requires medium and long-term planning for water resource management. (WaterAid, 2011).

2. **With examples, discuss the difference between Community Management and Community Participation.**

Community participation can be loosely defined as the involvement of people in a community in projects to solve their own problems. People cannot be forced to 'participate' in projects which affect their lives but should be given the opportunity where possible. This is held to be a basic human right and a fundamental principle of democracy. Community participation is especially important in emergency sanitation programmes where people may be unaccustomed to their surroundings and new sanitation facilities. Community participation can take place during any of the following activities: (1) **Needs assessment** – expressing opinions about desirable improvements, prioritising goals and negotiating with agencies. (2) **Planning** – formulating objectives, setting goals, criticising plans. (3) **Mobilising** – raising awareness in a community about needs, establishing or supporting organisational structures within the community. (4) **Training** – participation in formal or informal training activities to enhance communication, construction, maintenance and financial management skills. (5) **Implementing** – engaging in management activities; contributing directly to construction, operation and maintenance with labour and materials; contributing cash towards costs, paying of services or membership fees of community organisations. (6) **Monitoring and evaluation** – participating in the appraisal of work done, recognising improvements that can be made and redefining needs. (Harvey, Baghri &Reed, 2002).

On the other hand, **Community Management** is "more than participation" in that it "emphasizes the communities' own decision-making power over those water supplies or components for which they hold or share responsibility..." (Wijk, 1989).

The distinctive feature of community management is the nature of decision making and the locale of responsibility for executing those decisions. Community management refers to the capability of a community to control, or at least strongly influence, the development of its water and sanitation system. Community management consists of three basic components:

i. **Responsibility**: the community takes on the ownership of and attendant obligations to the system.
ii. **Authority**: the community has the legitimate right to make decisions regarding the system on behalf of the users.
iii. **Control**: the community is able to carry out and determine the outcome of its decisions.

(McCommon et al, 1990)

An emphasis should be placed upon establishing good communications between professionals and communities facilitating closer dialogue and partnership, helping governments to move from being providers to becoming promoters and facilitators.

The workshop held in The Hague, The Netherlands (1992) studied in depth seven case studies from developing countries including Honduras, Guatemala, Cameroon, Yemen, Indonesia, Pakistan and Uganda. The principal findings were the following:

Community Management goes beyond community participation and equips communities to take charge of their own water supply improvements.

Some critical features distinguish community management from community participation and are at the heart of successful community managed water systems:

- The community has legitimate authority and effective control over management of the water supply system and over the use of the water.
- The community commits people and raises money toward the implementation and upkeep of the water system. The link between the scale of community contribution and the resulting sense of ownership is not yet well understood, but the need for a significant contribution is well established.
- Supporting agencies provide advice and technical support, but all key decisions are taken with the community. This means that real choices must be offered, backed by a full appraisal of all the resources needed for each.
- Development of people is a parallel goal with development of water. Community management is "people-centered". Its success depends on the user community and support agency staff acquiring new skills and confidence in applying them. Special capacity-building techniques are required.

Community Management involves a long-term and changing partnership between communities and supporting agencies. It strengthens the capacity of each partner and enables their combined resources to be used more effectively.

3. **Give five maintenance problems and difficulties. How can you overcome maintenance difficulties in the water supply system management?**

Five maintenance problems and difficulties:

i. Technical challenges- design, construction and operational errors lead to requirement of frequent and often costly repairs leading to prolonged down-times for the system.

ii. Institutional challenges- some government and other private institutions can hinder the urgent procurement of labour or maintenance equipment, either directly or through their policies.

iii. Inadequate number of experienced skilled labour especially mechanical and electrical experts for maintaining equipment.

iv. Lack of adequate funds for maintenance. High maintenance costs that result mainly from transportation;

v. Environmental challenges-such as floods and droughts. These can adversely affect the availability of water and functionality of water systems. The water system can be completely be damaged or lead to very costly repair and maintenance.

vi. Reluctance of communities to take any initiatives to protect and prevent misuse of installations which are considered to be the responsibility of a distant government.

Maintenance difficulties and problems with frequent breakdowns are multiplied by selecting inappropriate pumps and other materials. Hand pumps, in particular, are not always appropriate for the heavy intense use to which they are subjected as communal facilities. Pumps which require specialized tools and equipment are sometimes selected, so that even the smallest maintenance task is beyond the capability of willing community members.

How to overcome maintenance difficulties in the water supply system management:

Maintenance requires skills, tools and spare parts (**Carter 2009).** Maintenance can be classified as follows:

Preventive maintenance: includes work that is planned and carried out on a regular basis to maintain and keep the infrastructure in good condition, such as network inspection, flushing of the well, cleaning and greasing of mechanical parts and replacement of items with a limited lifespan. It sometimes also includes minor repairs and replacement as dictated by the routine examinations.

Corrective maintenance: replacing or repairing something that was done incorrectly or that needs to be changed; an example is the reallocation of a pipe route or replacement of a faulty pump.

Reactive maintenance: a reaction to a crisis or public complaints; it normally occurs as a result of failures and the malfunctioning or breakdown of equipment. In order to ensure the routine maintenance and health of the system, the technician should adhere to a routine check-up. The project manager will need to ensure that the technician is doing his/her job. If done correctly and on a regular schedule, preventive measures can reduce the risk of costly repairs. The key to ensuring effective equipment maintenance is to make certain that responsibilities are clearly defined and maintenance personnel have the tools and skills to do their job effectively. It is also essential to schedule preventive maintenance. **(Castro 2009)**

In the selection and procurement of pumps there should be the maximum possible standardization on one or a small number of models which are robust, appropriate to the local situation, simple and on which maintenance can be undertaken by community members with a minimum of tools and training.

To ensure a consistent level of quality in the hand pumps used in water supply programmes, a national quality assurance and inspection system should be established in all countries which have large-scale hand pump programmes, using international standards and quality control procedures which are available for most popular hand pumps, funds and technical skills are available, neither routine maintenance nor repairs will be done promptly unless the necessary tools and spare parts are also on hand at the local level, and at reasonable and affordable prices.

Tools must, similarly, be immediately available. Provision may be made to supply each community with the tools necessary for routine maintenance and simple repairs.

In the case where the communities are reluctant to take any initiatives to protect and prevent misuse of installations which are considered to be the responsibility of a distant government, the government can establish systems of village level operation and maintenance where community members are primarily responsible for the operation and maintenance of installations.

4. **What are Water technologies available in your area? Explain five.**

i. **Hand-Dug Wells-**these are common in our County for a long time especially in the remote areas that are still not served with piped water. They are used to abstract ground water. Some of the advantages of the hand-dug wells are: a) they do not require highly skilled labour; b) the level of community involvement and ownership can be enhanced through the appropriate participation of beneficiaries in the actual construction of the water point; c) an efficiently managed hand-dug well construction programme can be the most inexpensive water supply option; and d) the improvement in an existing hand-dug well is often the first step towards a safe water source for the community. However, the drawbacks

include: a) in the absence of appropriate safety measures and equipment, the construction of wells can be dangerous; b) although there are many cases of very deep hand-dug wells, most are relatively shallow (less than 15 to 20m) and tend to tap water from the uppermost (unconfined) aquifer, and are thus more susceptible to bacteriological contamination and the effects of falling water tables; c) unsealed hand-dug wells are especially susceptible to contamination from people and animals; and d) the fact that this technology is only efficient in soft geological formations with relatively high groundwater levels restricts its application to specific areas and regions.

ii. **Hand-Drilled Bore wells-** these are drilled using simple, inexpensive hand-operated equipment. It is a very appropriate technique where the aquifer is relatively shallow (usually less than 25 to 30 meters), and the formation is soft. Well screens and, in most cases, a gravel pack are used.

iii. **Machine-Drilled Bore wells** - Mechanized drilling is chosen over hand-digging or hand-drilling for three principal reasons: bore wells can be drilled much faster than with the other two methods, much greater depths can be achieved, and drilling rigs are available which can efficiently produce bore wells in semi-consolidated and consolidated (hard) formations. In fact, in many regions, mechanized drilling rigs are the only choice for groundwater-based water supply programmes. An example is the Baricho Water Works under Coast Water Services Board.

iv. **Water pans**-these are constructed at a low point to collect surface runoff from rainfall. Water pans are very common in the drier parts of my County. Most are designed in such a way that there are separate watering points for human being and for livestock.

v. **Rain water collection using water tanks-**is an increasing technology in our County as the rainwater harvested requires less treatment for use. Affordable water tanks that are durable and do not degrade under sunlight mean that most people have access to this technology.

5. **How do you ensure cost effectiveness in supply of water?**

i. **Technical and logistical considerations**- by using experienced personnel such as civil engineers, hydrogeologists, etc., will result in a cost effective design. Inexperienced personnel usually under-design leading to over-utilisation of the water system, or over-design leading to uneconomical projects. For instance; correct choice of drilling equipment, drilling area, and drilling rig movement can reduce overall costs. Selection of the right equipment depends on the geological conditions and anticipated drilling depths. Proper surveys prior to drilling can contribute significantly to cost reduction. For example, in Nigeria the failure rate in the government programme, due to inadequate surveys, has been particularly high with a number of boreholes running dry after a short period of time. Since drilling costs are the single major component of cost, actions to optimize the use of surveys, rig movement and monitoring can have a major impact.

Standardization of installed equipment reduces requirement for spare parts and reduces operational costs. Low productivity with high systems costs adds to the unit cost of a water point.

ii. **Ensuring Community Management and the Participation of Women-**Ensuring that communities are the managers of their own water supply systems should be given high priority, as a means of reducing long-term costs. The formalization of the differing roles of government, the donor agency, private contractors and the community through contractual agreements is a good first step towards achieving true community management. Project design must also address the key role of women as water providers. The full and meaningful

participation of women in community management structures is essential for long-term efficiency and success.

iii. **Capacity Building-** Long-term cost reduction and sustainability in the sector can only be achieved if national capacity for delivery of these services is enhanced through training, planning and organization. Capacity building should ideally be carried out at the community, technical and managerial levels.

iv. **Local Production of Materials and Spare Parts-** Imported inputs add both to the capital and maintenance costs and are a constraint to sustainability. The scope for medium-term cost reduction in countries which have the capacity for local production of materials - including spare parts, without sacrificing quality - should be investigated. It should be noted, however, that in smaller countries the economies of scale necessary to justify local production may be difficult to achieve.

v. **Tariff Reduction-**In countries where local production is not feasible, it will be necessary to import equipment and materials. The cost of importing can be substantially reduced if the government reduces or eliminates tariffs on imports for this purpose.

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