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

The community management goes beyond community participation and prepares communities to take responsibility of their own water supply enlargements. Water resource management is the movement of planning, developing, distributing and managing the optimum use of water resources. Water Management is important since it helps determine future Irrigation expectations. Integrated water management can only be possible if the community is empowered through decentralization and is free to make decisions on their natural resource management. The four main important resources are land, water livestock and forest which form the village ecosystem. Without a balanced management of all of these four basic resources, the development process cannot be sustainable. The development programmes must be built around a sound land-water-forest-livestock oriented model with decision making at the mircolevel.

Rural water supply should not be preserved as a mere service delivery process but as a step towards household water security. Water security requires household, community and national actions to protect and preserve water sources, to use water as a scare resource and to ensure its equitable supply. Investment in the capacity building of the community in planning, development, implementation and maintenance of the water supply project is one of the first steps towards sustainable development. To analyze the complete socioeconomic impact of a water supply, sanitation and hygiene project, the full impact should be taken into consideration. They include less disease, better education for children, better nutrition for mothers and children, time energy saving for women and secure livelihoods. To achieve maximum impact through water and sanitation interventions in rural communities there is a need for multilevel and intersectional actions.

Water management is the organization of water resources under set strategies and regulations. Water, once an abundant natural resource, is becoming a more valuable commodity due to droughts and overuse. It is a sub-set of water cycle management. Ideally, water resource management planning has regard to all the competing demands for water and seeks to allocate water on an equitable basis to satisfy all uses and demands. As with other resource management, this is rarely possible in practice. Hence, the successful community managed water systems are;

The community has authentic authority and operative mechanism over management of the water supply system and over the consumption of the water. The community constrains people and raises money towards the implementation and upkeep of the water system. The link between the scale of the community contribution and resulting sense of possession is not yet well understood. Supporting agencies provide advice and technical support but all key decisions are taken with 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.

Indigenous organization for water management are in tune with existing community decision making structures and ensure that the views of all section of the community are reflect in management decisions. Strong community leadership has been shown to be a major factor in the success of many community managed water supplies. A community’ partners in the management of its water supply system may include government agencies, Ngos and private sectors. Relationships change as the community develops greater capacity to manage its own affairs and to choose for itself where to acquire the support services it needs to keep its water system functioning reliably.

The resources need to be organized to cultivate an empowering environment by promoting and supporting self-motivation, building skills, communicating knowledge and aligning social service systems.

1. **With examples, discuss the difference between Community management and Community Participation.**

The difference between community participation and community management is that community participation is a process of encompassing in decision making processes, planning and its implementations in order to share equal responsibilities of the project while community management is an approach seeking to make the best procedure of resources available within the community with support from Govt, NGOS and private sectors. However, the involvement of community participation came to the minds of govt and donors in mid-eighties when they don’t afford operation and maintenance systems for water and sanitation. Planners began to realize that in order to share the responsibilities for maintenance; beneficiaries would have to be involved in some way in the on-going maintenance of their own community system. For instance,

1. Consultation;

Consultation is a basic means of giving communities some voices of involving them in decisionmaking.Consultation may involve;

1. Consultation with community representatives or leaders**,** such consultation does not amount to real community participation unless the decisions formally made by representatives and unless the community is involved in decision-making on significant aspects of the project.
2. Consultation with all sections of the community**.** This involves ascertaining the view of those sections of the community
3. A financial contribution by community

Cash collection made by and within the community, generally prior to the time of implementation of a project, usually as a contribution to capital construction.Execluded as not really constituting community participation, are cases which amount to a payment by individual families for service.

1. Community specialize workers.

The preparation and appointment of few community members on a voluntary basis to perform specialized tasks. For instance, community health workers or community water operators. Training and technical supervision are carried out by an external agency but some form of community authority.

1. Collective commitment to behavior change.

Surroundings where community varieties are communal decision to change customs or personal habits and collective social pressure is exercised for realization of such changes. For instance range from penning of domestic animals to construction and use of latrines.

1. Endogenous development

There is an autonomous generation of ideas and movement for the improvement of living conditions within the community as opposed to stimulation by outside agents. The community however, has recourse to external agencies to help with implementation. But where this pressure for service to be provided, it hardly qualifies for the term community participation.

While, community management refers to the capacity to control or at least strongly influence, the development of its water and sanitation system. Community management consists of three basic components;

1. Responsibility: the community takes on the ownership of and attendant obligations to the system. The possession and sustainability of water facility must lie on the communities as they manage their facilities financially and physically.
2. Authority: the community has the legitimate right to make decisions regarding the system on behalf of the water users in the localities. The local leaders should keep a sharp look to the managers of water facilities to have strongly taken care of their affairs properly.
3. Water user committees: The water user committees must put down the by-laws that govern the facility in order to discharge their duties in regards to maintenance and ownership of the water points. Water management important requirements for community management are:
4. The community demands for an improved system for water points
5. The information required to make informed decisions must be available to the community
6. Technologies and levels of service must be corresponding with community needs and capacity to finance, manage and maintain the facilities.
7. The community must be willing to invest in capital and recurrent costs
8. The community must be empowered to make decisions to control the system
9. The community should have the human resources to run these institutions.

Therefore, the community management benefits should include;The short term improvements in system performance such as greater use of water and sanitation facilities, adoption of improved hygiene practices, and greater community support for system maintenance. Communities should be perceived as informed consumers, clients and mangers, capable of making decision choices as to the type of services they have the capacity to provide rather than passive receivers. Also, change in support conditions and long term impacts, the long term improvements in available resources and complementary investments.

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

The five maintenance problems come in many forms: technical, environmental, economic, political, social and administrative challenges, among others;

**1-Technical Challenges**:

Practical challenges include design, construction and operations errors, leakages, aging pipelines, inappropriate technology, ineffectively skilled workforce and water quality degradation, among others.

*Design, Construction and Operations Errors:* WD design is prone to errors coming mainly from wrong assumptions, inadequate statistics, computing input errors, inappropriate field changes during construction works and operational mistakes. Consequently, areas of low and high pressure regimes become unavoidable during operations. These often lead to frequent pipe bursts, loss of treated water, high repair and maintenance costs, traffic hold ups or diversions and reinstatement of roads before, during and after pipeline repairs.

**2-Environmental Challenges:**

In WD, operations managers and operatives are increasingly faced with meeting emergencies when the environment roars. These include how to minimize wastages, restore or divert water supply, and minimize damages to properties during flood. Others include how to cope with drought, rainfall variability and bush fire.

*Flood:* Flooding of urban communities can cause damages (disconnection, breakages, flotation, back siphonages, silting of chambers, destruction of indicator posts, etc.) to various connecting pipelines. The affected networks may have to be partly or totally shut off, repaired, flushed, disinfected, and reconnected as quickly as possible. In unpaved areas, gradual erosion of earth cover over pipelines laid on hilly slopes is common.

*Drought:* With drought comes water rationing (diversions) to serve various segments of the communities affected thereby creating a good condition for back siphon age of unwholesome and dirty waters from the surrounding in areas not served or having low pressures. During this time, Engineers, Managers and operatives may have sleepless nights figuring out solutions and implementing the needed diversions to ameliorate people’s sufferings. During this time also bush fires can touch and damage Up VC, PVC and HDPE pipelines that are not fully buried underground.

**3-Economic challenges include:**

*Inadequate Networks:* In developing countries, WD networks are inadequate to meet up with growing urbanization and population increase. WD networks in Nairobi and eleven satellite towns showed 10 percent to 47 percent approx. coverage13. In ten urban centres surveyed in Ghana in 2007, only Accra had 82 percent coverage with others having 12 percent to 48 percent coverage5. Nigeria has 47 percent water supply coverage1 thus implying that WD might be about 30 percent.

*Cost of investment:* All over the world, every WD is known to be capital intensive. The pipes, valves, fittings, service reservoirs, booster stations, meters, etc. do not come cheap. Sydney water invests about $300 million annually in order to cope with growth in water demand6.

**4-Political challenges include**: lack of political will, politics of contract awards and absence of common needs, among others.

*Lack of political will:* Only the political will can commit so much money into WD. Often this political will is lacking in most countries, whether developing or developed. The reason is not farfetched. Most of the political leaders in positions of authority do not come from the water industry, do not experience water shortages and cannot fathom why more funds should be committed into WD systems. In Nigeria, any such fund for WD must necessarily be for extension into areas previously unnerved to gain political advantage (recognition in military regimes or votes in democratic regimes).

*Politics of contract awards:* Instances abound on contract awards to high ranking and favored political party sponsors and or members at all three tiers (federal, state and local) governments in Nigeria. Gradually, the Nigerian water industry has been witnessing a surge in the influx of politicians, lawyers and accountants, among others. But this is an industry where expertise in the investigation, design, construction and operation of WD are required.

*Absence of common needs:* The needs of countries vary from one to another, and have created some gulfs in having common collective decisions. While in the developed world, the needs are centered primarily on maintaining continuous flows with adequate pressures, replacing aging WD pipeline networks, and gathering/analyzing/managing field data, the needs in developing countries are centered primarily on extension to communities not yet served, tariff determinations, revenue collection and ownership structure (i.e. whether it should remain public, private or public-private). Also, the standards set by each country vis-à-vis the United Nations on “access to water” (i.e. safe tap water) vary from home taps in the developed countries to stand pipes located about 5km away15 in the developing countries.

**5-**Social challenges faced include:

*Management structure:* WD has been under public ownership in Africa for more than half a decade. Yet privatization has been successful in the developed world and has encouraged a push for its implementation in Nigeria16 and in Africa.  However, this move has been resisted by labor unions and the general public. Ghana tried it between 2006 and 2011 only to back out when it failed17. *Poor communication:* Water is a “blue gold” and “Water is life” are slogans in the water industry. But when a bill board shows a child drinking from a tap or bathing under a stand pipe, the impression given is that water is not only cheap but a free social obligation15. In Africa, WD is taken as a social responsibility of water agencies and governments to provide. Viewed in this perspective, pipe bursts and water wastages are not accepted as the responsibilities of the consumers. Thus pipe bursts before flow meters located within consumers’ premises may not be reported.

**6-Administrative Challenges:**

Administrative challenges facing WD include the determination and implementation of adequate wages and allowances structures to motivate Engineers, Managers and operative; their training and re-training; provision of adequate tools and equipment; better work schedules; etc. Others include ability to gather and manage large scale volumes of data on consumers, supply, demand, tariff, revenue, repair and maintenance, water quality, volume, pressure, pipeline materials and age

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

The water point’s technologies available in my area are;

1. Single point systems, which consist of dug wells or small-diameter drilled wells which water is drawn using a hand pump.
2. Standpipes; piped distribution systems which feed a limited number of public taps, each of which serves all households and other water users-in the vicinity.
3. Household connections; Piped systems which deliver water to taps in individuals household compounds or homes.
4. Roofs stand pipe; this is a water flow pipes from the roofs where rain water current run down to the water containers.
5. Ground man stand pipe; this is a pipe where ground is dug in order for water to flow to the pools of dug deep grounds.

However, the piped systems are fed by gravity-flow directly from the source. For instance, Mountain spring or elevated tanks into which water is pumped from deep bore wells.

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

The establishment costs of a water system include the more obvious costs such as the cost of labor, materials and equipment needed for the construction of the system but also include less transparent costs such as those associated with project planning and administration, donor agency overheads import duties, equipment amortization.

Operation and maintenance costs are frequently higher than originally anticipated and not fully taken into account at the project planning stage. Although the situation has improved in recent years with the application of lessons learned over the last two decades, there are still many water supply projects that ultimately fail because of inadequate provisions for these costs. For instance, the cost of fuel or electricity for pumps in piped water system.

**1-Variables affecting cost;**

The costs of water vary from couple of dollars to several hundred dollars per person served and depend on a number of variables.

**2-Technology choice;**

There is always a choice of technologies for new water supply systems that affects the final cost of the system. This choice is often related to the level of service desired but can be influenced by other factor such as the type of source, government and donor agency preference, and the lack of awareness.

**3-Labor and material costs;**

These costs are highly variable within and between countries and regions and have a major influence on the final cost of the system. The degree to which a project depends on highly skilled national or expatriate technicians influences the overall cost. Another important factor is the amount of material and equipment which must be imported from abroad. While importing equipment such as hand pumps may be economically justifiable during the construction phase of the project, it can create problems later with the maintenance of the system, especially if no provision has been made for continuing import spare parts once the project has finished.

**4-Accessibility and quality of the water source;**

The least expensive water supply systems are, with few exceptions, based on shallow-to-medium depth groundwater sources. This is because there are a variety of inexpensive technologies to tap and pump the water or greater importance, the water does not often have to be treated before use. The use of water sources such as deep groundwater that is beyond the range of hand pumps.

**Conclusion**

**The challenges** facing WD are numerous and cannot be exhausted and so do their corresponding feasible solutions. New challenges will crop up as the future unfolds, especially those relating to climate change. Governments and financial institutions should continue to invest in WD because such an action is worthwhile, reliable, profitable, recoverable and socially lifestyle enhancing.

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