Journey for Sustainable Development and Peace Journal ISSN: 2976-1328 (Online)
(A Peer-Reviewed, Open Access Journal) 2976-1360 (Print)
Vol 1 Issue 1 2023 www.jsdp.org.np

An Approach of Sustainable Development Model for Water Security in Growing Cities

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Abstract
To address the growing water crisis, proper water resources management: realistic planning, and investment in water and sanitation can only achieve the Sustainable Development Goals (SDG) 2030. In developing countries like Nepal, government alone cannot deliver the required water services for the growing population of cities, still, the private sector is not interested and reluctant to invest due to the risks and low returns. Public Private partnerships (PPP) in water services have also provided mixed results for sustainable service delivery. To achieve the set target of managing water supply services of a scarce zone; need to understand the economic value and finance for water resources. Additionally, the formulation of essential and realistic policies, operational strategies, or plans for cost recovery and sustainable financing to increase services, particularly for the deprived and poor. Due to the lack of systematic knowledge, strategies for cost recovery are typically not comprehensive and fulfill only some aspects of the sustainability index. This leads to the degradation and low performance of water supply systems, resulting in the failure to deliver reliable services for the users. For a better living environment in cities, there are new and innovative ways to solve the problem of sustainable financing for water services such as blended finance, leveraging the services, involvement of the private sector, and promotion of commercial banks for sustainable financing of infrastructure for water services. Regardless, how to overcome the barriers by increasing the investments and contributions for coping of problems on water security in consideration with climate change: floods and droughts, that needs proper mitigation measures and sustainable growth in line with SDG target.

Keywords: Investment, sustainable, degradation, infrastructure, and mitigation

Introduction

To overcome the water crisis associated with the growing population of the cities. The water demand is increasing significantly in Nepal and access to safe and adequate drinking water is crucial (SVWSUO 2019). The public lacks awareness and education on proper sanitation issues and domestic and industrial wastewater treatment plants need to be widespread. Nepal struggles to overcome this obstacle and needs solutions to eradicate this so that its citizens can live healthier lives.

There should be proper water resources management: realistic planning and investment for water and sanitation can only achieve the Sustainable Development Goals (SDG) 2030. The government in developing countries like Nepal alone cannot deliver the required water services for the growing population of cities, and the private sector is still not interested and reluctant to invest due to the risks and low returns (Shah, 2016). Improved and reliable access to the water supply is primordial for the social and economic development of the country. It has direct links to public health and the well-being of the community people. Access to drinking water is essential but not enough to achieve significant improvement in the health situation of the urban population. Through these activities, the prevalence of water-borne diseases has been considerably reduced in the targeted population, with a recognized lasting effect. One of the main features is the collection of tariffs. According to Shah (2016), users' will pay the tariffs to

recover the costs of the water supply service to ensure the sustainability of the system. To set the tariff need to agree upon by the consumer through a fully transparent procedure, independently for each community, which is then presented to the local committee for approval.

The cost and tariff include not only the running costs of the water supply system likely electricity for the pumping, maintenance services, and pay for the staff i.e. technicians but also the depreciation for repayment, through the funds saved and kept at the bank. These remaining funds can then be used either to repay a loan contracted to build the initial water supply system or to build extensions of the service areas and replacement of the heavy equipment. For the drinking water system, over the years, the money set aside is less important since the water system needs more maintenance. A different experience from the urban, small towns, and semi-urban areas after five years, maintenance expenses increase significantly. Similarly, the cost of all investments is reflected in the tariff and repaid over 5, 10, or 25 years, depending on the type of technology and equipment for their lifespan (Datta etl, 2015).

Methodology

The set methodology for the cost recovery business model for sustainable financing to secure the water for the frequently populated cities. To improve the commercial viability and business planning for water supply

operations to achieve full water supply coverage for the city. Processes are as follows;

i. an assessment of performance indicators on existing water supply services for the city
ii. estimation of demand facility
iii. identification of capacity and willingness to pay
iv. financial and accounting analysis of existing water supply services
v. business planning based on coverage gap and
vi. estimation for capital investment projects towards full coverage

Results, Analysis and Discussion

For the city-wide coverage of water supply an assessment of performance indicators will be done. Then estimation of the demand facility will be calculated. There is also an investigation to find the capacity and willingness to pay from the consumer. It will be coupled with the financial and accounting analysis of existing water supply services and forecast for the future. There will be a gap analysis based on the existing situation for full coverage. The gap analysis will forward the estimation of capital investment projects for the full coverage

Consumer Perspective

For cost recovery business and continuity planning is effective and for the requirements of consumer's expectations. It should be a part of the water

supply utility's organizational culture. Every organization, including water supply utilities, should have a culture. Although culture is intangible and often taken for granted, it provides a core set of values and assumptions and guides the day-to-day activities of personnel in the workplace. For the sake of sustainability aspect of the water supply utilities and authorities at a different level, is not easy to run. For progress and delivery success needs to be given, capacities need to be developed and trust should be built, which takes time and persuasion.

The cost recovery business model provides information to help the consumer to make an initial assessment of the capability to effectively utilize new funding and internal resources to accomplish the following goals to achieve;

- Assessment for need system structure; that will provide the demands of our growing service area.
- Enhance the capacity of water utility in critical areas related to capital project monitoring and evaluation, asset management, NRW reduction and water quality laboratory establishment.
- Extension of services and attraction of consumers for house connections – on-time service provisions for the consumer.
- Management of assets to ensure that operation and maintenance as per the need and to obtain the maximum span of life from investment in water system assets.

- Reduce Non-Revenue Water (NRW), by reducing leakage, replacing and under-registering customer meters and eliminating illegal water to provide more water to meet demand and increase revenues.
- Consumers' grievances handling and satisfaction survey, for a better understanding of the customer concerns and develop plans to meet customer expectations.

Business plan Perspective

The cost recovery model business plan project goal is to accomplish the identified and structured and effective utility management planning and prioritization tools. Business Plan includes information about service area, institutional and organizational structure, water supply assets, customer base, and tariffs. It also includes a summary of the most challenging threats and weaknesses that we plan to overcome through the business plan projects.

- Details of each of the plan project goals including activities and cost estimates needed to accomplish each business plan project goal.
- It includes the details on how the water utility proposes to finance the capital investment projects that make up the first business plan project goal (Construct Urgently Needed Infrastructure) and other general improvements.

- The estimated cost proposed financing plan and timeline to construct these capital projects and other general improvements.
- It includes a list of potential risks and mitigation measures.

Cost Recovery Model

The main features of water utility are the collection of tariffs per cubic meter off water provided. This tariff is agreed upon by the population through a fully transparent procedure, independently for each cluster of community, which is then presented to the local agencies' general assembly to approve. The tariff includes not only the running costs of the water system (electricity for the pump, maintenance services, salaries of the staff and technicians, etc.) but also the depreciation for amortization, through the funds saved and kept at the bank. These remaining funds can be used either to repay a contracted loan for the construction of the initial stage of water supply system or to build extensions of the distribution network and/or replacement of the other heavy equipment likely treatment systems.

For a cost per capita, the initial investment cost remains affordable, as demonstrated by the number of systems successfully set and run. The model proposed can supply water through shared tap stands, or to private household connections fitted with water meters. It can also work for the multi-community cluster where several communities depend on a single source of water, be it underground water or surface water.

Affordable and Accepted Tariff

The tariff elaborated with the help of community clusters per cubic meter, the initial investment cost remains affordable, as demonstrated by the amount of systems successfully set up and running. The model proposed can supply water through shared tap-stands, or to private household connections fitted with water meters. It also works for multi-cluster systems where several clusters depend on a single source of water, be it underground water or surface water. Foremost, the initial phase is crucial and requires a strong commitment from the utility. For full coverage and ownership of the systems, the full engagement of and by the population is required to mobilize the resources for the water supply system, design and construction work and define the tariff structure as agreed by them through their general assembly, transparent management and control from the population, accountability of executive bodies on the technical and financial situation of the system.

Water security for the growing cities

Water security is essential to humankind as it supports public health, economic growth, environmental sustainability, political stability and disaster risk reduction. Population growth, urbanization, industrialization, rising living standards and Westernized diets are likely to further increase the over-extraction and pollution of water resources. This will raise insecurity and uncertainty over water access and the vulnerability of communities and infrastructure to natural disasters.

Improving water security is about focusing actors and resources on key water risks. It is also about collaboratively planning and implementing specific activities to mitigate risks and provide tangible benefits to water users. Water security activities should combine gray and green infrastructure (including improved operation and maintenance of existing infrastructure), awareness raising, and behavior change campaigns, management as well as policy and institutional improvements. Key considerations for implementing water security principles:

- delivering on-demand principle
- establish cost recovery model
- effective communications and adaptive management
- accountability by mobilizing promised resources and fulfilling responsibilities
- comply with regulations.

A wide range of tangible actions and measures can improve water security. These can be broadly listed under four categories: gray as well as green infrastructure; policy, regulatory, and institutional measures; and social and behavioral change measures.

Conclusion

Sustainable Development Goal (SDG) 6 reflects towards Clean Water and Sanitation (Shah 2016). It also focused on water management and

increasing water security for the water supply sanitation and hygiene (WASH) sector. To cope with the problem on water security; the cost recovery business model is one of the sustainable solutions. This includes how to explore the new 'waterscapes and source protection'. The cost recovery business model provides modality and information to help consumers by providing an initial assessment to find the capability of effectively utilizing the new funding mechanism, and run the internal resources.

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Article history: Received: 20 Dec. 2022 and Accepted: 8 Jan. 2023