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SUSTAINABLE DEVELOPMENT OF WATER RESOURCES, WATER SUPPLY AND ENVIRONMENTAL SANITATION

**Small town water supply and sanitation project:
The learning curve***Binay Shah and Srijan Aryal, Nepal*

Government of Nepal is implementing the Small Towns Water Supply and Sanitation Sector Project in order to improve health and quality of life of the people living in small towns by extending better and sustainable water supply and sanitation services and providing health and hygiene education program. The project design takes the community-based demand responsive approach such that the Water User and Sanitation Committee (WUSC) is fully involved and jointly responsible for all major decisions. The Project is nearing its end for the first phase and a number of projects have been completed and several are nearing completion. It is imperative at this juncture to look back and reflect on positive issues as well as hindrances, which have been instrumental in creating some delays. The paper delves into the technical problems encountered during the various stages of project implementation and identifies ways to further enhance project performance.

Background

Government of Nepal is implementing the Small Towns Water Supply and Sanitation Sector Project (STWSSSP) in order to improve health and quality of life of the people living in the project towns by constructing and extending water supply systems, limited drainage and sanitation facilities and providing health and hygiene education program in various small towns of the country. Asian Development Bank has been providing financial assistance to this project and duration of the first phase of the project is 2001-2006. Department of Water Supply and Sewerage (DWSS) is the implementing agency whereas the Ministry of Physical Planning and Works (MPPW) is the executing agency. The project will assist in implementing a part of the 15-year plan for Small Towns Water Supply and Sanitation Development in the country and about 31 Small Towns are being covered by this project.

The project embraces the community-based demand responsive approach such that the Water User and Sanitation Committee (WUSC) is fully involved and jointly responsible for all major decisions related to subproject planning, implementation and long term O&M for project co-financed facilities. The project design is also based on the principles of cost recovery, whereby the Town Development Fund (TDF) provides 30 percent of the water supply project cost as loan for a period of 12 years with interest rate of 8 percent. The community contributes an additional 20 percent of the project cost, as 5 percent upfront cash contribution and 15 percent kind. The Government provides the remaining 50 percent as grant to the qualifying community. However, all operation and maintenance cost including loan repayment and any subsequent expansion is the responsibility of the users, which is to be generated through localized incremental

tariff system.

The Project is nearing its end for the first phase and a number of projects have been completed, several are nearing completion and others are at various stage of implementation. It is imperative at this juncture to look back and reflect on positive issues as well as hindrances, which have been instrumental in creating some delay – especially during the implementation phase.

Table 1. Project Implementation Status of STWSSSP

Batches	No. of Town Projects	Gravity Schemes	GW Schemes
Batch I	8	5	3
Batch II	15	8	7
Batch III	8	1	7

Feasibility study phase

This is a very crucial phase of the entire project cycle, as it establishes the viability of the proposed project in technical, social, environmental and financial terms. It is at this stage that the consumers get a picture of the scope of the selected alternative, level of investment and tariff level required to pay back the loan amount to TDF. The project modalities are also clearly spelt out to the consumers and their role and responsibility is elucidated.

Establishment of the scope of the works

The Scope of Works for the Feasibility Study Phase is fairly comprehensive and deals with the entire gamut of technical,

social, environmental and economic/ financial issues for each of the identified alternative. Some of the listed activities for the engineering firms during this stage are quite detailed, e.g. the scope talks about conducting frequency analysis to assess the reliability of the source for the proposed systems. Availability of reliable time series hydrological data in Nepal is very limited and mostly available for gauged rivers of national importance. Similarly, conducting exhaustive surveys to establish the socio-technical benchmark of the participating communities, where every household in the service area is surveyed in detail is not really required at this stage. Benchmarking can be done using stratified sampling techniques based on the detailed household list of a town once the project has become viable. It is thus essential to further streamline and curtail the cumbersome feasibility study process and focus on the demands and needs of the users/community.

Incorporating design feedbacks

The design standards and guidelines provided by the Project Management Office (PMO) of STWSSSP have been modified on a case-to-case basis and from time-to-time. These changes and recommendations should be documented and made available to the engineering firms for proper design and estimating procedures. For example, in general it was found that pipe sizes of diameter below 40 mm should not be used in the distribution network; only Class IV (6 kg/cm²) and V (10 kg/cm²) series HDPE pipes conforming to NS standards should be used for pipes of diameter up to 75 mm; for HDPE pipes of diameter 90 mm and above even Class III series (4 kg/cm²) pipes can be considered; GI flange set should be used every 30 – 50 meters of pipe length; use of cross at network junctions should be avoided and other such technical feedbacks need to be documented and reflected, where necessary.

Need and demand assessment

Proposed projects need to be assessed in terms of their management capacity, need and desire for water supply and sanitation services, increased service level for better quality and reliable services, etc. for the long-term sustainability of implemented projects. It has been often observed that such assessment parameters are “overlooked” leading to less needy town projects getting into the project fold. It is imperative that a very rigorous approach be adopted to establish the need and demand for improved water services in targeted small towns.

Interaction with the community in determining the service area of the project

A major bone of contention has been the demarcation of the service area for a town. Service area demarcation often has been done covering political boundaries like an entire municipality or a village development committee (VDC). Typically service area demarcation is done with respect to the feasibility of the source, settlement pattern (clustering), etc. Covering political boundaries like the entire municipality is not necessarily the most cost effective approach.

Therefore, more intensive and transparent interaction with the community is required and the service area should be demarcated as per the technical and financial viability of the water source of the project. This means that not 100 percent of the population within the municipality or VDC needs to be covered by the piped system. There have been several examples where inadequate exercise for determining the scope and service area of the project during feasibility appraisal stage has led to considerable delay in project implementation.

Box 1. Lekhnath Town Project, Kaski

Lekhnath Town was one of the first towns to be selected as a sample town during the project preparation stage in 1999. The acute shortage of water in the town made it an ideal place for the implementation of the Project. However, enhanced scope of the project during the detailed design phase led to unwanted delays and revisions to the project design. After several rounds of discussions and amendments, the scope of the project was reduced to a more manageable scale and the project has finally gone into implementation in late 2005 after a delay of about five years.

Detailed design stage

Streamlining design approach and assumptions

After the approval of the best sought alternative at the feasibility stage by the community, detailed engineering design of the adopted alternative is undertaken by the engineering consultants. As mentioned earlier, the Project has developed a brief operational manual. However, this operational manual lacks adequate details to ensure similarity and consistency in engineering design carried out by various engineering firms. Some of the critical issues requiring immediate attention to bring about consistency in the design and reporting process are:

- The number of variables with defined per capita demand is more than needed for such kind of projects. The per capita demand needs to be broadly categorized as domestic, institutional and commercial (schools and offices) and other demands like fire demand etc.
- The guidelines fail to address the issue of temporary and floating population in the selected towns, which in some cases can be fairly significant. An explicit guideline to accommodate such demand and their growth potential needs to be elaborated.
- At present the WHO Drinking Water Quality Guideline has been adopted as the defacto water quality standard. However, a more relevant drinking water quality guidelines need to be developed.
- Specific guidelines for structural design of civil structures need to be established including seismic considerations to be adopted.

Incorporating demand responsive principles in detailed design

One of the basic features of the project is demand responsiveness and incorporating consumers' wishes and demands.

Although the scheme cycle provides ample opportunities for entertaining the demands of the consumers, as it happens with most other development works, the consumers tend to float ideas and requirements even at a very later stage of the engineering design works. This may require changes and additional work for the designer, but should be taken as a challenge and the Project needs to have an inbuilt mechanism to address such “last minute” requests.

Implementation phase

Manpower for construction supervision

Although the provision of an engineer and an overseer by the Project for the construction duration appears adequate, during certain phases of construction when several construction activities are going on simultaneously, the available manpower appears rather thin. Thus, resources to hire additional manpower for a small duration should be made available to the engineering consultants.

Similarly, it has been felt that the services of certain experts are necessary during the construction phase. Minor inputs of specialists like geo-hydrologist, mechanical engineer, structural engineer and contract expert during critical instances is also necessary. The basis for allocating resources for construction supervision and contract administration should be based on the nature, size and complexity of the project, rather than allocating uniform resources for all town projects.

Balancing the community's demands and contract management

Being a community based demand responsive project, there are always certain issues that the community brings up and needs to be considered in the spirit of the Project. However, the Contract with the Contractor limits the degree of flexibility to which the request of the community can be met during construction. The need to introduce variation order and other contractual measures often limits the process. Certain financial resource either through a provisional sum or additional lending from TDF, which can be used by the WUSC directly can go a long way in providing the degree of flexibility and avoiding complex contract administrative procedures.

Additionally, consumers of several towns have also been voicing their concern regarding communities' responsibilities for factors like price escalation awarded to contractors during standard contract administrative procedures. It has been generally felt that considering the nature of the project, a simpler process to address price escalation issue needs to be taken in the contracts.

Community's role during implementation

The Project has prominently placed the role of the community in the forefront. However, this has to be further enhanced considering the high degree of maturity and knowledge demonstrated by the members of the WUSC and general community members in the planning, development and implementation (ongoing in some cases) of over 20 town projects.

Enhancing the community's role during implementation may require additional capacity building measures.

Balancing government financial requirements and ADB regulations and the community

As discussed earlier, the need to conform to two different regulations – one of the Government of Nepal and the other of ADB – often leads to some confusion and delay in project execution. It would be worthwhile to explore the possibility of having a single regulation for the execution of the town projects. This issue can be further eased by giving greater financial responsibilities to the Town Managers of their respective Town Project Offices (TPOs).

Post construction operation and management phase

Community's responsibility and capacity building

This phase has not been fully realized yet, though few projects have been completed and their respective WUSCs are operating and managing the new systems. It has been observed that some of the existing WUSCs are quite capable to handle the complexity in operations and management of the systems. Some of the WUSCs have already started providing house connections to households and collecting monthly tariff. It has been observed that some additional training and support is required to make the operating procedures effective and efficient:

- Computerizing the billing and inventory system of the WUSCs.
- Training on operating and maintaining water quality laboratory.
- Getting access to services for further improvement or expansion, etc.

Positives from the project cycle

There are strong positives vibes that have resulted with the ongoing implementation of the Small Town Water Supply and Sanitation Sector Project in various towns in the country. Apprehensions in the early stages of project implementation regarding upfront cash contribution, kind and labour contribution, effective operation and management, tariff setting based on actual operation and maintenance cost including payback of 30 percent loan, etc. have “disappeared” and stakeholders are now convinced that effective operation and management and cost recovery are essential to the success and sustainability of the project, as a whole. Some of the strengths emanating from the project concept and strategy are as follows:

Community participation

Participation of community in projects located in urban areas was thought to be very difficult – in fact well nigh impossible. However, after initial hiccups raising five percent cash upfront of the total water supply cost and additional fifteen percent cost in kind has not been a problem. In fact on the average nearly \$ 20 in cash has been contributed by each household within the service area of various towns under implementation. The community and their representatives

in the WUSC have been actively participating during contractor selection, contract implementation and running bill payments. This has greatly enhanced the sense of ownership and responsibility.

Cost recovery

A unique and probably a pioneering effort in rural and semi-urban water supply and sanitation sector in the region is process of acquiring loan to the tune of 30 percent of the total water supply cost and setting tariff to pay it back in 12 years with an interest of 8 percent per annum. This cost recovery feature of the project is in the process of implementation in some of town projects, which have been completed and

Box 2. Khairenitar Town Project, Tanahu

During the feasibility and design phases of Khairenitar Town Project, it was assessed that about 50 percent of total consumers (808) were interested in getting services from the project in the initial phases of project operation. The Project is completed and functioning since last few months. Although the project has not been formally handed over, the WUSC has taken over the operation and management responsibilities. It has provided house connections to 709 customers and is generating about US \$ 800 as monthly revenues. Its present monthly expenditure, predominantly staff salaries and regular maintenance cost, is about US \$ 350. The monthly revenue shall go up with the installation of meters and levying of incremental tariff in lieu of the present lump sum tariff.

handed over to the community (WUSC).

Local tariff

As discussed earlier, the water tariff at each town is set to cover the entire operation and maintenance cost including the loan of 30 percent of the water supply cost to TDF. Therefore, the community is responsible to make the technological choice and the level of investment associated with that choice / option. The tariff blocks are set on the incremental block tariff system, where the rate for the initial 8 – 10 cu.m. is kept at a lower rate and gradually increased for higher blocks of water consumption.

Gender involvement and social inclusion

A critical and essential feature of the project is the involvement of women and disadvantaged groups in various phases of planning, development and implementation of the town projects. This involvement does not end there and is furthered through the mandatory participation of women in the apex WUSC and ward level sub-committees.

Enhanced service level

The basic premise of the STWSSSP has been providing better services to the semi and peri-urban populace, who are often left out in the face of higher investment in the rural and purely urban areas. Therefore, the service level of the Project is higher than the typical rural schemes with higher quantity per capita, quality conforming to WHO Drinking Water Guidelines and better reliability and accessibility.

Conclusion

The Project experiences have clearly indicated that to enhance and strengthen performances of projects for emerging towns elsewhere, it is imperative to build-in the features of effective community participation, cost recovery, localized tariff, increased involvement of women and better service level. Similarly, appraisal process of proposed projects in terms of needs assessment and general feasibility has to be done in a robust manner with special focus on the determination of service area. Further, the design process needs to be streamlined to bring consistency and effectiveness. Introduction of greater flexibility in contract administration and allocating more financial responsibilities to users' organizations and local project representatives shall go a long way in making project implementation effective. Strengthening and consolidating of such issues in sector project design and implementation shall further the cause of providing sustainable water and sanitation services to small and emerging towns in the sector.

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