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Water quality improvement in Nepal: scaling up of a water safety plan (WSP)

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In Nepal, 50 percent people have access to piped water supply system including 30 percent spring sources, 10 percent stream sources and 10 percent deep tube well. 30 percent of the people are using shallow hand pump systems and remaining 20 percent are still having traditional systems as primary source for domestic water. Spring sources are likely to be safe, however, equally prone to contamination due to poor sanitary condition around the source. Government has approved National Drinking Water Quality Standard and Directives which require all service providers to develop water quality improvement plan. Water Safety Plan(WSP) has been practiced in rural and urban towns since 2007 for continuous safety of water supply. Practical knowledge has been gained and guiding document has been prepared for service providers. Government of Nepal is planning to expand WSP in all 75 districts. This paper highlights WSP experiences and approach for scaling up.

Background

In Nepal, about 80% people have access to some kinds of improved system. Approximately 50 % people have access to pipes system, 30% to hand pumps and remaining 20% still depended on traditional systems. According to studies 1.8% tube well have water with arsenic concentration more than limiting value (50ppb) given by the Nepal Drinking Water Quallity Standard(NDWQS). And water from about 50% tube wells seems to have bacteriological contamination. Data of recently conducted national survey by Department of Water Supply and Sewerage(DWSS) have revealed that among piped systems, only 19% are functioning well, 39% need minor repair and maintenance, 12 percent need major repairs, 21% need rehabilitation and remaining 9% need reconstruction. About 10 percent of the water supply projects have elapsed its s design period of 20 years and need reconstruction.

Only 31% projects have users committee registered or have acquired the legal entity, 25 % have VMSW and only 27 % have maintenance tools in place. About 20 % projects have some maintenance funds in their bank accounts.

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Water Safety Plan in Nepal

The delivery of the safe drinking water is vital for protecting public health and promoting more secured livelihood in the rural and urban areas. However, assessment of water safety is often limited to occasional tests of water quality and insufficient attention to the proactive management of the water safety. In order to ensure the delivery of safe drinking water, it is important that water safety objectives are established and implemented in a sustained manner. Third edition of WHO Guideline for Drinking Water Qualities also described the basic process. Water Safety Plans (WSP) represents an approach of assessing and managing

risk that ensures the safety of a drinking water supply from catchments to consumer. This is the most cost effective method for preventing water contamination . Based on practice in 2008-09 following 10 steps approach has been approved by DWSS for implementing WSP in Nepal.

Team formation	Monitoring plan
System analysis	Validation of controls
Identification of hazard and risk analysis	Verification and recording
Control measures	Assessment of users satisfaction
Urgent corrective action	Documentation

Case study of Sishuwa and Abukhaireni

Shisuwa Badahare Water Supply Project

Shisuwa Badahare Water Supply Project is situated at Lekhnath municipality ward no 14 and 15 in Kaski. The project area is located at 14 km away from the District Headquarter-Pokhara. About 211 households and two schools are benefited from this project. This is one of the complex community water supply project completed in 2000. Water has been collected from the source located in other village at 5 km distance (3 hour walk) and is flowed to reservoir (50 m^3) near village crossing 150 m deep gully requiring high pressure DI pipe. 33 tap stands have been distributed through 6km distribution pipelines. Project is managed by users committee elected by water users as applies to community projects in Nepal. They have two maintenance workers one looking after transmission and other as operator at reservoir tank. They will get Rs 1700(US$24) and Rs 500(US$7) per month. Tariff for water use is Rs 170(US$2.3)/HH/Year, Which is just sufficient for paying for operators.

Water Safety Plan was initiated in 2007 after participating orientation workshop organized by water and sanitation division office. WSP team, coordinated by user's committee secretary, was formed comprising 4 men and 3 including school teacher and health post in charge. The WSP team visited from source to all taps, identified all contamination points, and decided the source point as having much risk. They corrected other points in the system but could not do anything on source because people from upstream used to collect water from source point and wash clothes. When water was tested, they found 50 E- Coli in the source. After discussion with upstream users they sealed off spring point located at river (seasonal) from surface pollution and provided a separate tap points at source. With this, they did prevent contamination at intake point and number of E Coli got reduced to only 5. Further, they became able to collect more water due to better collection at source which otherwise was wasted due to leakage.

In 2009, Cholera out break took place in the western part of the country starting from Jajarkot. It caused death of about 300 lives. This news made people of Shisuwa Badahare more conscious of water safety and prompted their mind to go for alternate treatment like Solar Disinfection(SODIS) and boiling. Later, they supported to upstream village folks for toilet construction which made upstream people avoid open defecation nearby the source, and make the source free from bacteria. The case of Shisuwa Badahare water supply project is very successful in highlighting the quality assurance from "Catchments to Consumer" – the basic principle of WSP.

Abukhaireni Water Supply Project

Project is located in Tanahu district of Western Nepal. This project was constructed in 1990 when water supply department was expanded to all 75 districts. Before this project people of Abukhaireni used to carry water from nearby springs. There is abundance water in the source located in 2.5 km from village. At time of construction, the project consisted of 63mm HDPE transmission, 100m3 storage tank and 23 public stand posts. In 20 years time, the project has been expanded to meet increasing demand. There are 4 lines of transmission pipes, sedimentation tank and provided 400 private connections. Project has been managed by users committee. The monthly income from water tariff is about Rs. 40 thousand/month from 400 private connections, half of which goes to salary of 5 staff.

Water Safety Plan - concept was initiated here in 2007 and WSP team comprising of 17 members were formed. Team prepared very good project map which we can see in office of the Users Committee. They identified all hazards points which are gradually been controlled. In the beginning, they controlled all the leakages along transmission pipes which have been laid in very difficult terrain. Users committee with technical support of water supply and sanitation division office constructed intake- filter at source which checks flooding of mud in intake area and checks high turbidity to enter in to pipes, however it can not

check high turbidity during rainy seasons. The system is well functioning. Impressed with the activity of users committee, Department of Water Supply and Sewerage (DWSS) has provided about 80% financial support for introducing roughing filter and slow sand filter in the scheme in 2009.

Since the project is located at middle of Nepal and near highway and possesses all kinds of project feature including treatment plants and strong management team, this project has been selected for developing as Resource Center by DWSS. Project has been visited by many new project teams to learn about project management and WSP. This project is used to help other project team for one day visit and provide all kind information for applying WSP. Standard presentation, 10 minute video and information booklet are being developed in 2010. This kind of resource center concept will provide base for sustainable knowledge center.

Strategy for scaling up of WSP

Pilot projects applying WSP concept and 10 steps process for quality assurance and sustainability of the water supply system/schemes has proved that WSP is very essential. Thus, they are well accepted by various agencies and communities. But how to scale up WSP application in almost all water supply schemes and make WSP as integral part of project management is still a burning issue.

There are lot of water supply and sanitation activities going on as normal practice in the country for which there is no lack of fund flow. All these activities will be linked with WSP. For example, WSP concept will be incorporated in all new projects since the survey and design and community development phase of the project.

WSP will be introduced as the entry point for repairing and upgrading the schemes in the running projects which are in need of various degree of repair. This will ensure that hazard points are at least controlled. WSP in projects running in normal operation & maintenance phase will be applied by following 10 steps processes which will be linked with monitoring system at regional and district level.

In Nepal 60% Households are yet to construct toilet and almost all VDC except 120 needs total sanitation campaign. Unless people have access to safe water or practice of using safe water, sanitation alone will not help for reducing diarrhoea. Hence, WSP can be incorporated in total sanitation campaign throughout the VDC. Sanitation committee at VDC level will take up WSP as one of the result area and WSP team will be formed at project level. Ten steps of WSP process will be followed.

For the community using point sources like hand pump, shallow tube well, springs will be different from the one for those using pipe systems. WSP team will be formed within community. Existing water supply system will be analyzed and suggested for applying various types of treatment options at HH or source level. WQ testing facilities will be made available within community.

Institutional monitoring under water sanitation sector and surveillance system under health sector will enforce WSP at all kind of water supply systems.

Institutional monitoring system

The wide spread of WSP application and its continuation in all types of water supply projects need an effective monitoring mechanism. An institutional monitoring system is proposed as follows:

All existing five regional laboratories will be converted into an autonomous unit so that it can monitor independently the water quality status of the schemes. Central laboratory in the premise of DWSS will act as the lead laboratory. These monitoring units will be staffed with sanitary engineer at all regions and senior engineer at center in addition to the existing manpower like chemists and microbiologists.

Government will allocate regularly funds for staff salary and equipment costs. The running cost including consumable chemicals will be covered from revenue generated from the charge for analysis. Service charge of water quality test will be fixed by the government and annually reviewed on the basis of the rates charged by private laboratories and be made comparatively cheaper.

In each region a local steering committee comprising of representative from water and sanitation sector, local bodies and civil societies will be formed to provide guidance.

Regional laboratories can recruit temporary local staff to be financed by the project fund or revenue considering existing government policy, which allows only 80 percent of the revenue to be spent for operation of the laboratories.

DWSS will allocate certain fund to each region to carryout numbers of WQ tests. Based on available fund and set criteria and requirement of monitoring system, regional laboratories will monitor and test WQ in number of projects in the region and report to surveillance agent (district health office?) and DWSS/WQ. This will make regional laboratory busy enough to fulfil monitoring needs.

Conclusion

In Nepal National Drinking Quality Standard and Directive are the strong policy documents which give mandate to all service providers to prepare water quality improvement plan. Water safety Plan is the simplest and complete approach for water quality improvement and continuous safety of water. Highly motivated WSP team is necessary for successful functioning of WSP. WSP helps to capacitate team at project level and improve linkages with users and users committee for sustained water quality. How to integrate WSP in to all projects of the country is a challenge. For which a simple and self assessment type of process and institution is necessary. Appropriate WSP model is developing in Nepal for both rural as well as urban context.

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