Public Appeal Document
SABAL Project: Multi Use Water System (MUS)

Introduction

More than 80% of the population in Nepal are still dependant directly and indirectly on agriculture for their livelihoods. With over 85% of the population living in rural areas and the national GDP being heavily dependant on agriculture, this sector has been prioritized by the government for development. Despite the focus by the government and the importance of agriculture sector, most rural and remote districts have seen very little effort towards this end. The long conflict, the continuing political unrest and the current fragile government has all combined to further marginalize the interest of rural poor in the context on "New" Nepal.

Various reports and studies report that Nepal has seen an overall reduction in poverty from 42% to 31% over the last decade. However, this has been driven by the growth in private sector and is more urban focused rather than rural. Rural poverty still remains high at 35%. Lack of access to irrigation is a major factor linked with rural poverty. According to the latest "Nepal Living Standards Survey" conducted by the Government of Nepal, the risk of poverty is more pronounced among farm households that do not have access to irrigation. And as access to irrigation and the share of irrigated area increases, the poverty gap between farm households with and without irrigation grows.

Most of the middle hills region of Nepal, especially in the Far Western Nepal where incident of poverty is very high, access to water is limited at best. Most irrigation water in the middle hills comes from small rain-fed side streams. These have seasonally high discharge variability and may have no water in the pre-monsoon dry season. Some of these districts also have temperate climate and are considered to be suitable for a wide variety of vegetables and cash crops if sufficient water can be made available. However, many households, and often entire village communities, have no access to irrigation and are primarily dependent on rainfall for their crops.

Lack of access to water also has an adverse impact on domestic situation. Most families have to use communal sources of water for a wide variety of uses like drinking water, washing clothes and utensils, sanitation use like for flushing toilet and bathing and even for the use of cattle and livestock. This puts additional pressure on communal sources, increases drudgery and incidence of illness related to water borne diseases due to unhygienic management of water sources and its use. In addition, the level of awareness and exposure on the appropriate drinking water and irrigation systems are still very low at the grassroots level.

There have been numerous interventions from public and development sector on increasing the access to safe drinking water and irrigation facilities for these communities through a wide variety of approaches. However, one of the most effective approaches has been the Integrated Water Resource Management (IWRM) approach used by Practical Action, IDE Nepal, Winrock and other organizations involved in this sector. This low cost IWRM system provides community access to water for a wide variety of purpose that

encompasses social, economic, and even religious priorities of the rural people. Hence, the essence of this system lies beyond just drinking water and irrigation. The Multiuse Water Systems (MUS) project in particular has gained popularity in Nepal for its simplicity, cost effectiveness and its applicability in a wide range of geographical locations.

The technology: Multiuse Water System (MUS)

A Multiuse Water System, also known as MUS has been designed and developed in the context of Nepal by various organization working in these sectors like IDE Nepal and Winrock. Although they are many types of MUS systems the main system components are largely the same for all MUS schemes in Nepal. All systems begin with source protection at the intake of the spring, and then water is conveyed by gravity through plastic pipe to one or two water collection tanks near the target village. Most of these tanks include a Modified Thai Jar with capacities of 1,000, 1,500, and 3,000 liters and a soil-cement-lined tank with capacities of 6,000 and 10,000 liters. The Modified Thai Jars are made with ferro cement (a mixture of sand and cement which is applied as a thick plaster) and mesh-wire netting for reinforcement. The soil-cement-lined tanks are pits dug in the ground with a soil-cement plaster lining. These designs were developed with emphasis on effectiveness and low cost. The volume of size of tanks used for MUS systems is based on the flow rate of the spring and the projected need of the future population of the village or cluster.

The water is then distributed to two different types of outlet delivery structures—"hybrid tap stands" and "off takes." Hybrid tap stands have two different types of taps on them: one is a domestic tap under which a jug or other water-storage container can rest as it fills, and the other is an irrigation tap designed to directly attach a hose to fill up the drip irrigation "header" tank or directly operate a sprinkler. Off takes are single-use taps that are low to the ground and designed with two taps to attach hoses for filling the drip irrigation "header" tanks or attach directly to the sprinkle system.[1]

[1] Technical specification courtesy of IDE Nepal and referenced from Water service implementation in Nepal and India: Experience and lessons for scale up. Monique Mikhail and Robert Yoder (IDE 2008)

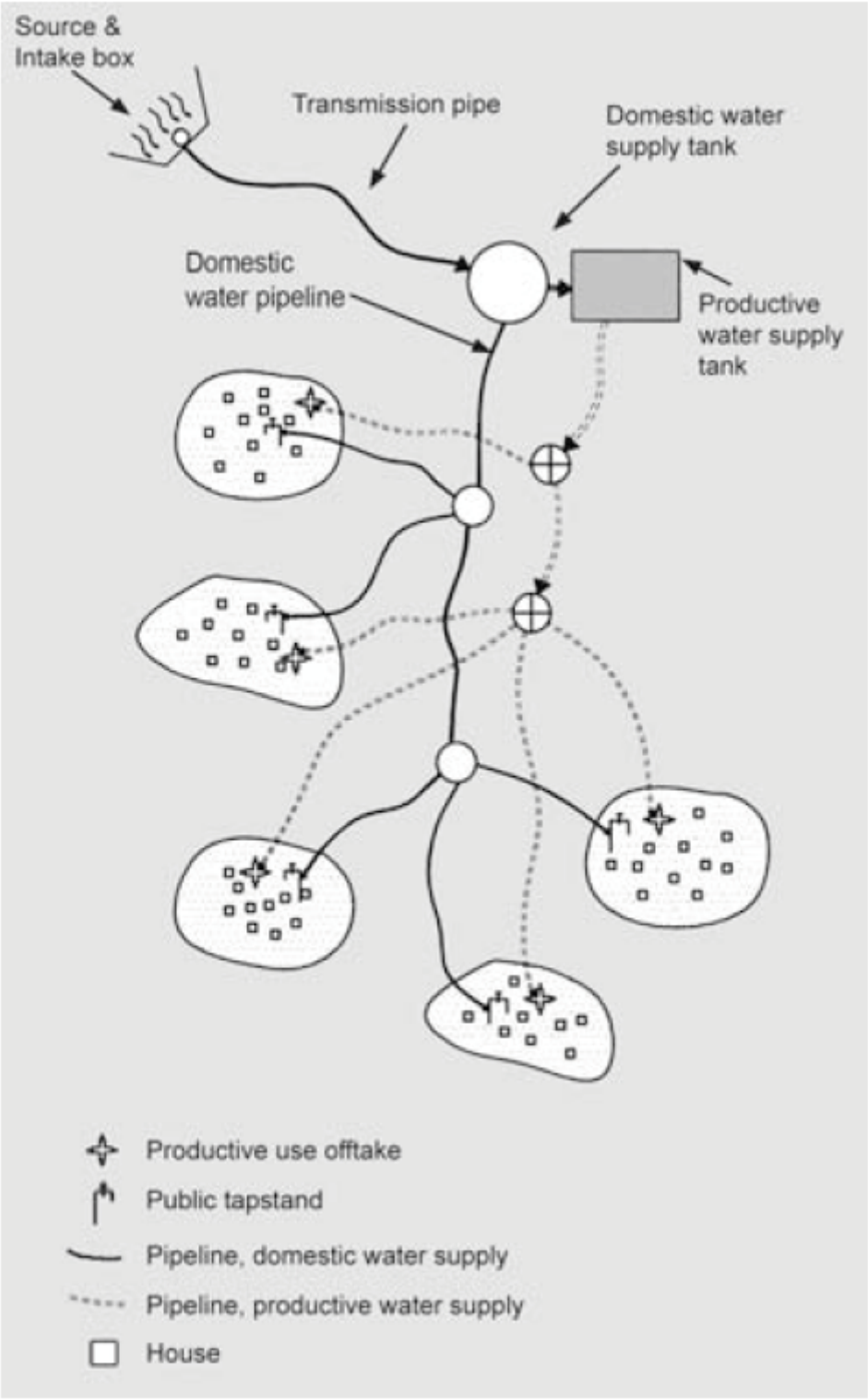

Photo 1: MUS transmission line. Photo courtesy of IDE Nepal.

Cost of the MUS projects

Each individual MUS project varies in costs as variables like designs, village/cluster sizes, distance from the source and other factors add to the costs. However, in 2008 IDE published a well researched report on a whole range of MUS projects in Nepal which provides fairly accurate cost estimation of the average project cost per household.

MUS system is shown in Table 1. This cost estimate spans the project implementation period of 2003–2008 and includes the cost of agricultural interventions.

Table 1: Average system project cost 2003–2008

Average direct MUS costs	**Nepalese Rupees**	**GBP**
Cash costs	142,500	1,345
Non cash costs[2]	95,500	900
Total (A)	**238,000**	**2,200**
Average staff costs/ Technicians	60,000	565
Operational expenses (overheads)	20,000	190
Total (B)	**80,000**	**755**
Total direct/ indirect cost per MUS (A+B)	**318,000**	**3,000**
Average households per MUS system =36		
MUS cost per Household	8,833	83
Average cost per household for agriculture interventions	4,400 – 6,300	42-61
Overall cost per household of MUS (including agriculture interventions)	**13,233 – 15,133**	**125 - 144**

Source: IDE MUS project data

Almost all materials for a MUS project are sourced locally. Land, labor and local materials like sand, stone/ rock, mud and other materials are provided by the locals. While the cash costs includes the purchase of cement, metal mesh wire, plastic and metal pipes and some components of the off-take units like taps, washers and bolts. Some of the materials for agriculture interventions are bought from major market areas within Nepal like drip irrigation and sprinkler systems but they too are manufactured domestically.

A major component of this system is the local's contribution which needs to be highlighted from the beginning. Not only does this reduce the cash cost of the system but it also bring communities together cohesively and develops an ownership of the system from the initial phase of the process.

[2] Includes labor contribution from the communities and local materials like sand, rock etc.

Photo 2: Locals gathering rocks and other materials for an irrigation system. These types of community based labor contribution are quite popular for MUS systems.

MUS Construction Phase

The construction of a MUS system is divided into 4 distinct phases: (1) Pre construction phase, (2) Construction phase, (3) Post construction phase and (4) Evaluation phase. Typically, it requires anywhere from 8 months to 12 months to complete the first three phases and additionally 2-3 months for the final evaluation of the system. Incidentally, the construction phase is the shortest and can be completed within 3 months barring any inclement weather condition.

Figure 1 below is a detailed step-wise diagram of the 4 phases of the MUS system developed by IDE Nepal. This will further help explain the phases in details.

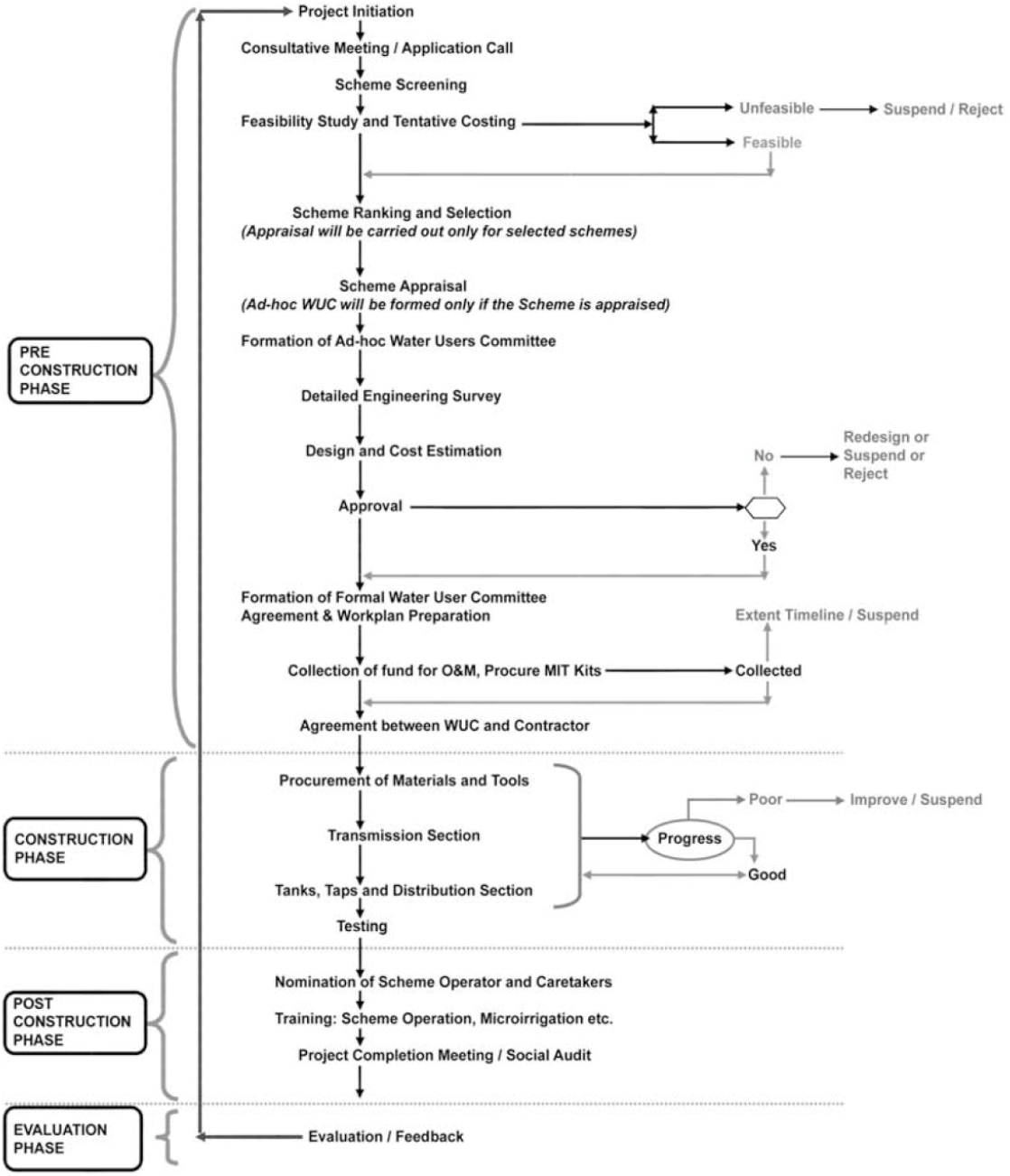

Figure 1: MUS Project implementation procedure as designed by IDE Nepal

Impact and benefits

MUS systems are one of the most effective ways to provide cost effective access to water for rural and remote communities where piped water facilities are not available. At an average cost of GBP 130, a household can benefit from access to clean drinking water, irrigation facilities and other uses like water for livestock and cleaning. It also reduces the drudgery for women and small children who typically are forced to travel long distance and in hazardous conditions to collect water.

Coupling micro irrigation systems with MUS also provides rural households with far more benefits than just access to drinking water. It promotes cash crop farming and with agriculture interventions of Practical Action it can provide supplementary incomes to small-holder farmers which can go towards essential household expenditures like health care, covering cost of education and increasing the nutritional intakes of women and children.

IDE Nepal's research in this shows that micro-irrigation systems like drips and sprinklers reduce water consumption by 50 percent water savings compared to flood or furrow irrigation and the use of drip or sprinkler systems enables the irrigation of a larger area[3]. This report goes on to state that micro-irrigation results in increased production and it improves the quality of the produce because it reduces the incidence of disease and damage while reducing labor costs for farmers by reducing irrigation and weeding time.

My inspiration:

When I met Dil Bahadur and his daughter Meena during my visit to Accham in winter on 2008, I was immediately overwhelmed by their resilience and their continuous courage in the face of adversity. The small plot of land they had seemed hardly adequate to feed a family of five, yet Dil Bahadur offered us lunch when we reached Sanani tired and hungry.

I spent around 30 minutes talking to him and his daughter trying to understand how they managed to eek out a living from this harsh and unforgiving terrain. It seemed that the fortunes had recently favoured him. His household was one of the beneficiaries of the newly constructed rain-water harvesting system by Practical Action and the limited water they were now getting for irrigation use seemed to provide them with new found energy to continue their struggle. I was a bit discouraged to find out from the expert that the water stored in rain-water harvesting system was almost depleted as this winter had been particularly dry and the alternate spring source was getting smaller every day. Yet, Dil Bahadur and his daughter had not lost hope and said, "Gods will be favourable to us. We have worked really hard this year".

This is what motivates me to find longer term solution for communities like these.

(Refer to Case- **Dil Bahadur's daughter**)

[3] Water service implementation in Nepal and India: Experience and lessons for scale up. Monique Mikhail and Robert Yoder (IDE 2008)

Photos

Photo 3: Rain water harvesting system being initiated by SABAL Project in Accham. Rain-water harvesting systems like these are very cost effective to build yet has little capacity and cannot provide adequate irrigation facilities to a large number of households. Typically, a system like this in only adequate to provide irrigation facilities to 7-8 households for a small plot of land.

Photo 4: Downstream beneficiary farm of the rain-water harvesting system. These harsh terrain of Accham districts are surprisingly considered an excellent location for off-season vegetable farming due to its temperate climate.

Photo 5: A typical off-take for the irrigation project are such micro-irrigation systems. In this case a local small-holder farmer is using a sprinkler system to water her crops. A medium sized sprinkler system can cover 250 sq. meter and costs USD 11.50 while a larger one that can cover 500 sq. meter costs about USD 22. It has been found that small-holder farmers are willing to pay for such micro-irrigation system as long as they are used for productive reasons and generate income.

Photo 6: A typical site in Accham. This mother and daughter duo has walked over an hour to fetch about 10-15 liters of water. In most areas of Accham, access to water is defined by the length it takes to carry a bucket from the nearest source.

Photo 7: Small holder farmer who is currently benefitting from one of the rain-water harvesting system in Accham. Man Bahadur has a small plot of land (less than 0.2 hectors) yet he grows a variety of vegetables like Radish (pictured), potatoes, cauliflower and spices like Chili and garlic to supplement his meager income as a farm labor.

Photo 8: This lady (name unknown) is a local and she is amongst the majority of the women in Accham who are left to fend for themselves with their husbands in India. This also leaves them highly vulnerable to economic hardships, shocks and exploitation at the hands of unscrupulous locals. Accham is also the district with the highest prevalence of HIV/AIDS in Nepal due to its high rate of migration to India.