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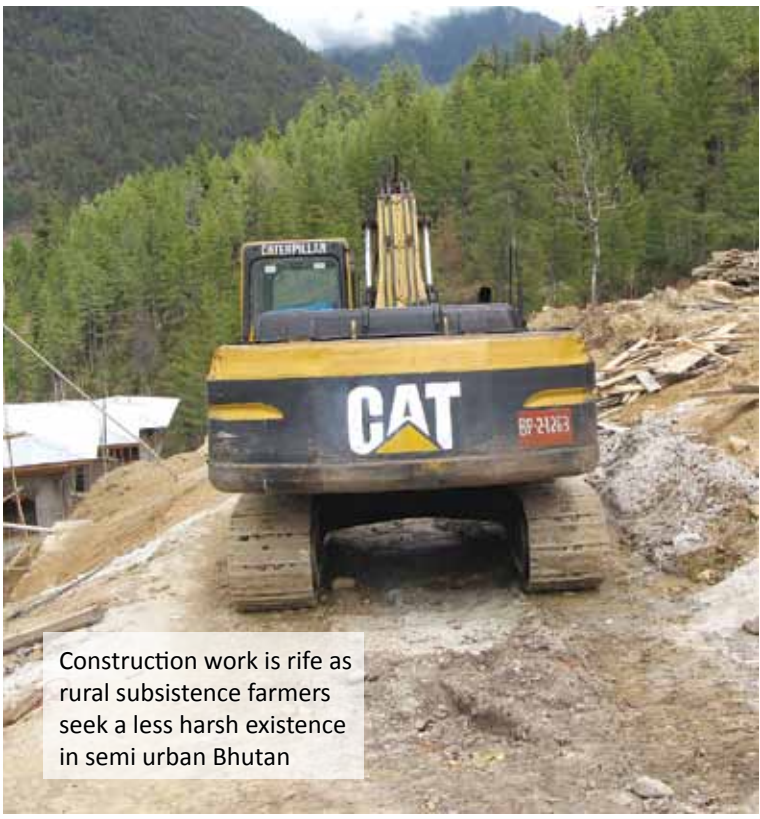
Bhutan — twin challenges of rural remoteness and creeping urbanization

Supplying safe water to remote, scattered communities is a challenge but rapid urbanization is also creating pressure points

The 670 000 inhabitants of the Himalayan kingdom of Bhutan enjoy many assets that their neighbours in South Asia lack. About 40 years of free universal healthcare, greater government commitment to environmental and cultural preservation and the pursuit of Gross National Happiness to name a few. But the country is facing many challenges.

"Water safety is under threat because of development. We're at risk and we're trying to adapt to a changing environment."



Construction work is rife as rural subsistence farmers seek a less harsh existence in semi urban Bhutan

Most Bhutanese (nearly 80%) live in remote villages and scattered settlements, often several days walk from the nearest road, making it very difficult to provide them with safe water. Nearly a third of this rural population lives in poverty, so many rural Bhutanese are migrating to urban areas in search of work and a less harsh existence. Rapid construction and growing populations are putting pressure on services, the environment and, of course, the water supply.

In some places water sources are beginning to dry up, making it hard to supply the growing urban population with adequate water. Another major challenge is the shortage of engineers and skilled workers with each subdistrict (Gewog) having just one engineer to oversee all engineering works in areas that are often inaccessible especially during the harsh winter months.

In the 1990s diarrhoea was a top killer especially of the under fives. But thanks to widespread hygiene and sanitation workshops and good healthcare provision, dysentery and diarrhoea have been replaced by the common cold as the main cause of sickness. Today diarrhoea very rarely kills but it is still a top ten disease.

“Safety of water is under threat because of rapid development and urbanization – we’re at risk and we’re trying to adapt to a changing environment,” warns Ugyen Rinzin, Executive Engineer in the Ministry of Health’s Public Health Engineering Division.

“We have to eliminate diarrhoea completely. At any time the outbreaks of the disease can go up without a proper system in place. It may be safe in winter and spring but in the summer it will spike. Therefore, our aim through safe water supply is to reduce the health burden. With a regular system in place there will be a positive impact on health.”

The Government of Bhutan’s ninth five-year plan, derived largely from demands expressed by rural communities through their elected local governments, includes the provision of safe water to every household as one of three priorities (along with roads and electricity) aimed at reducing poverty. Why? Because the government recognizes that waterborne illnesses can prevent children from attending school and parents from working or caring for their families, thus locking them in a cycle of poverty.

The Ministry of Health oversees Bhutan’s rural water supply with the Ministry of Works and Human Settlements overseeing urban supply. The emphasis is very much on decentralization, shifting responsibility for water safety to communities to inculcate a sense of ownership and shared responsibility.

“Water supply is done through government community partnership programmes,” explains Health Minister Lyonpo Zangley Dukpa. “We provide the technical support to the community and the community provides free labour. This government believes in not fishing for the people but teaching them how to fish.

Supplying water to the 80% of Bhutan’s population living in isolated, remote places is a major challenge

The Government provides technical support for water supply to communities - but they provide free labour

"We want to make people feel they own that water supply," adds the Minister. "There's a lot of debate about whether the people should provide free labour for certain activities such as rural water supply, but at the end of the day we realise that people should participate in such activities because they directly benefit from them. The only way we can empower them to look after their own infrastructural facilities is to involve them right from the beginning."

"We provide technical support to the community and the community provides free labour. This government believes in not fishing for the people but teaching them how to fish."
Health Minister Lyonpo Zangley Dukpa

However he explains that many of the user group committees are stagnating and are in need of revitalization, which is why the Ministry is working closely with WHO to implement the AusAid funded water safety plans (WSP). Bhutan has a total of 20 administrative districts (Dzongkhags) with the bigger ones divided into subdistricts and all ten sectors of central government represented in each. Dzongkhags are further divided into 205 development blocks (Gewogs) which have elected local leaders. So if communities are unable to afford major works in their WSP they can approach the Gewog, which may have to pass the request on to the Dzongkhag, which in turn may have to seek extra financing from central government.

Rural WSPs were piloted in three regions initially and then upscaled in six districts in spring 2011 with training of trainers and 50 rural workshops, ten of which are in schools. Urban WSPs have been piloted in five towns – Paro, Punakha, Gelephu, Phuntsholing and Haa.

Ichharam Dulal, the water specialist engineer at the Ministry of Works and Human Settlement emphasises the challenges of coping with rural migration, population growth, climate change and the damage inflicted on fragile terrain during monsoon floods and landslides: "WSPs are a great help to us because they identify all the hazards and risks which towns then take into account when making their management investment plans.

"If a particular town is expected to grow very fast it can predict its water requirements in the short, medium and long term and plan its strategy. It can start mobilising resources and rectifying hazards. Once we cover the whole country both in terms of the rural and urban areas that will give us a water master plan for Bhutan from the present to say 50-60 years from now."

Power to the people

In Haa Town, no one pays a water tariff and investment in water safety is minimal, so the community has to step in

There is just one full time member of staff overseeing the sluice and filter water treatment plant built four years ago for the 3000 or so people living in Haa town in far western Bhutan.

Phurba Tshering is uneducated and unskilled but he is usually on site 24 hours a day and working hard – particularly in the monsoon when he may have to clear debris from the source every hour. He is supported by a plumbing technician but the latter's time is limited since he has to oversee all 16 rural schemes as well as the two urban schemes in the district. Keeping on top of the job is simply too much. For instance, because of lack of funding and his inability to read the instructions for the chlorine dosage, he abandoned the practice when people started reporting skin complaints. Until now lack of manpower and community participation mean the safety of drinking water in Haa cannot be relied upon. Users pay no tariff, so water safety investment is minimal at no more than BTN 50 000 (US$ 1118) a year, leaving no budget to invest in tools. What's more an increase in the size of the population, which currently ranges between 2000 and 4000 according to the season, is putting more pressure on the system.

"In urban Haa town, water supply is becoming a challenge because of the increased population," says district administrator (Dzongdag) Rinzin Dorji. "Life in the remote mountains is becoming difficult to sustain so people are starting to settle in the valleys. We've tried giving responsibility for care of streams to schools and communities in order to maintain the quantity and quality of water in Haa. But the community sense of responsibility is weakening. The WSP is the only way to ensure that people have clean drinking water."

Untrained and unskilled, Phurba Tshering is the only employee at the Haa water treatment plant

Factfile for Haa town WSP

- Treatment plant built in 2007 with Government of India funding
- One of five urban WSPs that have been piloted in Bhutan (Paro, Punakha, Gelephu and Phuntsholing)
- It has one source which is too large to enclose and is contaminated by grazing animals
- The town has a population that varies between 2000 and 4000 because of seasonal migration
- Just one unskilled caretaker oversees the treatment plant under the guidance of a local technician who oversees the whole region
- WSP training took place in November 2010 for four days
- BTN 570 000 (US$ 12 700) is being invested in urgent corrections, which include replacing old and exposed pipelines and providing barbed wire fencing around the source and reservoir
- In June the community users group will plant trees around the source to help prevent it from drying up
- Monitoring is carried out by the Municipal or Dzongkhag on a monthly basis and verification by the WSP team quarterly

An eight member WSP team was formed during the training workshop consisting of the district engineer, local planning officer, district environmental officer, district health officer, police officer in charge, school principal, town users' representative and municipal in charge.

Kuenley Gyeltshen and Phurba Tshering unpack the new tools they need to make the ongoing repairs and corrections identified in the WSP

Many rural Bhutanese are moving to semi urban areas, increasing the pressure on water supply systems

A four day training programme took place in November 2010 and BTN 570 000 (US$ 13 000) has been granted for urgent corrective actions. "We learned about the general management of water safety," says municipal in charge Kuenley Gyeltshen. "But the new idea is public participation. Lack of engineers and skilled labourers means community participation is vital in Bhutan."

By raising community awareness about water safety and the need for shared responsibility, the WSP will hopefully give Tshering the much needed support he needs to ensure a safer water supply.

Urban trainer Dechen Yangden says: "During training, we manage to convince people that the existing water supply scheme provided by the government is not just the government's responsibility - but it is the people's water. They the beneficiaries should be the ones to take care of the water supply scheme. Before this training they never knew the location of the intake, source or water treatment plant. We have managed to shift the responsibility of keeping the infrastructure intact towards the community themselves."

Urban institutions such as the hospital, army barracks, Royal Bhutan police headquarters and the school, now have their own water safety management systems that include cleaning their tanks, mending their own distribution lines etc.

Each has been provided with a toolkit – but if repairs require greater investment they can apply to the municipality or fund it from their annual budget.

With some 600 pupils (a fifth of the town's average population) the school is particularly closely involved. At least twice a month teachers and students check the source and distribution pipeline and report back any hazards that require urgent attention. The school staff, students and caretaker are fully responsible and accountable for keeping water safe within the school, while at the treatment plant students help the caretaker clean the sand and tank and cut the grass surrounding it. The WSP includes BTN 60 000 (US$ 1340) to replace old, exposed pipes in the school.

Other plans include investing BTN 45 000 (US$ 1000) to buy rough sand from Phuntsholing to change the filtering media twice a year in an attempt to combat turbidity especially during the rainy season and constructing a cover for the vault chamber. The team is also seeking water testing kits.

Wastage is also an issue because there are no water meters installed yet and inhabitants suffer shortages in the monsoon when pipes get blocked. However, water meters will soon be installed. The existing water supply system has old pipes , leading to major leakages and water losses.

Haa is considered an urban scheme because it has a treatment plant but most of the users face tough lives as subsistence farmers

The community comes together to make repairs to the leaking and exposed pipeline

Rudimentary repairs to the pipeline mean water is contaminated

Community spirit

A remote subsistence farming community is working hard to combat waterborne illness - but can they maintain the effort during the harsh months?

Just one month after attending a two day WSP workshop a group of local men from Balamna village in Haa voluntarily gather to clean their communal water tank and mend the fencing that surrounds it.

At the workshop they discovered how repeated rough repairs to the pipeline – which they often cut in an attempt to identify blockages – is allowing drinking water to become contaminated. They learned about the health dangers posed to the village's 250 inhabitants by the leaks in the reserve tank and by cattle and wildlife grazing near the source and other exposed areas.

But the most pressing need is to move the village's one water source which has become contaminated by a temporary summer settlement above it. This is leading to chronic outbreaks of diarrhoea especially in children. With materials supplied by the Gewog (subdistrict) local volunteers will carry out this task by June.

"Because we are farmers we didn't realise all the illness was because of poor quality water," says village representative Tshering Dorji. "But when we went to the basic health unit doctors told us our water was impure. All the sickness is because of water contamination. They advised us to filter the water and drink it.

"We would like to apply what we learned at the training workshop and try to stop water contamination and waterborne diseases," he adds.

Chhogyal Tenzin, the administrative officer of the Gewog says: "The WSP is very useful. The people have developed an awareness that it's a joint effort to maintain the water. People have been rather passive, very much dependent on the Government – now they are discovering community participation is very important. This was very much an adult learning interactive workshop that taught the people to be more responsible. We hope the diarrhoea they suffer from in the monsoon will be alleviated."

WSP factfile for Balamna village

- There is one source
- The village has 250 inhabitants though this drops to 41 in the winter
- It has 15 tapstands
- The WSP committee has five members including a caretaker, but others are keen to help out with repairs
- It is currently carrying out the urgent corrections identified in the plan such as mending fencing, replacing damaged and exposed pipes.
- The Gewog is spending BTN 200 000 (US$ 4475) on new materials for repairs such as cement, new pipes and fittings
- The next step is for the WSP committee to verify the completion of the source extension and look at its benefits and the safety measures.
- The WSP committee will monitor twice a year

During the monsoon Balamna village residents suffer from chronic outbreaks of diahorrea which they hadn't realised was caused by poor quality water

The major share of the Gewog's budget is invested in water because of the Government commitment to provide safe drinking water by 2013. It is spending BTN 200 000 (US$ 4475) on materials such as new pipes, cement and fittings required to move the source.

For now the newly formed WSP committee is enthusiastic about its plan and role in making water safe to drink. But life for the subsistence farmers in Balamna, like that of so many living in remote high altitude settlements, is tough. Because of the lack of cultivatable land for cash crops and the harsh climate they depend on livestock, moving between high and low pasture with the seasons. They may find a couple of months of work as porters with their mules during the orange season and they may sell some butter and cheese. But it's challenging work.

This daily struggle to eke out a livelihood may sometimes supplant the tasks of maintaining a safe water supply system. What's more in the harsh winter months when temperatures plummet as low as -9 degrees Celsius and pipes freeze and burst, just 41 people remain in the village while more than 80% migrate in search of work, leaving very few to carry out maintenance.

Upscaling WSPs throughout Haa dzongkhag is also a tall task. Two thirds of the district's 12 000 population lives in scattered communities, some a three day walk from the nearest road. One district engineer oversees all engineering work, managing one engineer in each Gewog.

Kezang Tshering is a Gewog engineer who is also the focal person for the entire district rural water supply, overseeing training of trainers: "It's a lot of work to train the others as I am also responsible for all engineering work in my Gewog," he says. "One Gewog is a five day journey on foot and another is a three day journey. I will train five engineers who will implement WSPs with my support."

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