



A SOURCE OF WATER, A SOURCE OF HOPE

in the Democratic People's Republic of Korea

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WATER IN THE DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

Today in the Democratic People's Republic of Korea (DPR Korea) access to sufficient potable water is limited, threatening the health of many people, young children in particular. Although DPR Korea is blessed with abundant natural water sources, many remain inaccessible, high up in the mountains, which cover much of the country.

DPR Korea's current water distribution networks are mainly based on a pump system, which uses energy and machinery to bring clean water up from underground sources. Built during a period of economic growth, the systems have since fallen into a state of disrepair due to lack of maintenance.

Fixing the existing pump-based water system would require massive financial inputs for repairs and ongoing maintenance, as well as the costs of electricity. As a result these systems are failing across the country, severely limiting the quantity and quality of water available to the population.

The supply of water delivered to households is inconsistent and often of poor quality and can be dangerously contaminated due to seepage of fertilizers and human or industrial waste.¹

According to the 2008 census data in DPR Korea, more than 22 per cent of families nationwide have to use alternative sources of water to meet their domestic needs. That number is up to 41 per cent in some provinces and will only increase as the piped distribution system continues to decline.



¹ Strategic Framework for Cooperation between the United Nations and the Government of the DPR Korea 2007-2009, p. 12.



The effects on children's health

Lack of clean water has immediate and drastic effects on the health of children; leading to high rates of diarrhoea and pneumonia, the two main killers of children under five in DPR Korea. According to UNICEF and WHO almost 90 per cent of diarrhoeal deaths are due to lack of water for hygiene, unsafe water supplies and poor excreta disposal.

A 2004 nutrition survey² found a diarrhoea prevalence rate of 19 per cent, which is higher than the South and Southeast Asia average of 15 per cent and approaching the sub-Saharan average of 24 per cent.³

To make matters worse, both diarrhoea and pneumonia can lead to malnutrition. DPR Korea already suffers from high rates of child malnutrition.

The nutrition study in 2004 found that over one third of children (37 per cent) were stunted due to chronic malnutrition and nearly 24 per cent were underweight. These high rates are exacerbated by the perilous water situation.

Once a child is malnourished, his or her immune system is weakened and he or she is more susceptible to other diseases. This creates a vicious cycle of ill-health, lost educational opportunities, and compromised physical and mental development.

² DPR Korea 2004 Nutrition Assessment Report, Central Bureau of Statistics.

³ Data from recent Demographic and Health Survey (DHS), USAID.

Clean hands, clean health

According to the United States Centre for Disease Control and Prevention (CDC), “Hand washing is the single most important means of preventing the spread of infection.” Handwashing, when done properly (using soap before eating or preparing food and after using the toilet), can reduce diarrhoea rates by more than 40 per cent⁴ and the incidence of pneumonia by around 23 per cent.⁵ And handwashing is far more likely when people have easily accessible clean water.

The government of DPR Korea supports handwashing as a priority: a review of several studies shows that by encouraging handwashing in educational institutions, diarrhoea rates are reduced by an average of 30 per cent.⁶ Though the Government of DPR Korea provides for children to attend nurseries, kindergartens, primary and secondary schools, many of these institutions lack clean water for food preparation and drinking, much less for practising personal hygiene.

Access to greater quantities of water at the institutional and household level for proper hygiene and handwashing, along with better quality water for consumption, would be major steps towards improving children’s health and increasing their chances of a good quality of life.



Hand washing is the single most important means of preventing the spread of infection.

⁴ Curtis, V. and S. Cairncross. 2003. “Effect of Washing Hands with Soap on Diarrhoea Risk in the Community: A Systematic Review.” *Lancet Infectious Diseases* 3: 275–81.

⁵ Rabie, T and Curtis, V. (2006): Handwashing and risk of respiratory infections: a quantities systematic review. *Tropical Medicine and International Health*, 11(3), 258-267.

⁶ Cochrane 2008 - Ejemot RI, Ehiri JE, Meremikwu MM, Critchley JA. Hand washing for preventing diarrhoea. *Cochrane Database of Systematic Reviews* 2008, Issue 1. Art. No.: CD004265. DOI: 10.1002/14651858. CD004265.pub2.



Focusing national priorities on clean water

With the 2015 deadline for the Millennium Development Goals (MDGs) fast approaching, the UN Country Team and the Government of DPR Korea have signed the UN Strategic Framework (UNSF) for 2011-2015. This identifies the most pressing needs of the people and the country's national priorities for the coming years.

Given the high rates of diarrhoeal diseases in DPR Korea, stakeholders have agreed that water, sanitation and hygiene (WASH) must be given priority status in the UNSF. The positive effects of better water and sanitation would have significant impact on all of the other MDGs including decreasing child mortality, improving maternal health and reducing malnutrition.

The water supply situation in health and education facilities is precarious. In the absence of clean running water and safe sanitation, health service delivery is compromised. Hence international support for healthcare in DPR Korea should be focused on making sure that facilities have adequate and safe water supplies to effectively treat and prevent disease and illness. Likewise, the water supply situation in educational facilities needs to be immediately addressed to provide clean safe drinking water, which will help stop the spread of diarrhoea and pneumonia among school children.

Focusing attention on improving the water supply within the DPR Korea will lead to immediate and profound impacts on the health, development and wellbeing of children and the entire population.



FINDING THE SOLUTION IN GRAVITY-FED SYSTEMS

The water situation in Democratic People's Republic of Korea is problematic, yet there is a simple, effective and easy to implement solution. The failing pump-based systems can be replaced with Gravity-Fed Systems (GFS): a cost-effective and environmentally-sound means of providing clean water to the majority of people in DPR Korea. The outcome of the first pilot programme has shown that GFS technology is highly suitable to the landscape of the DPR Korea, is sustainable, and leads to significant improvements in the wellbeing of children.



As the name suggests, GFS uses gravity to bring fresh water down from the mountains, filtering it through natural sand and gravel purification ponds. Once the water is free of impurities, it is channeled through a series of PVC pipes where gravity, not electricity, transports the water into homes, schools and hospitals. GFS is 100 percent emissions free, and if designed and built properly, can generate enough pressure to reach the highest floors of apartment buildings 24 hours a day.

GFS is a logical choice in DPR Korea where 80 per cent of the country's landscape consists of mountains. It has already been proven to work in countries such as Nepal and Bhutan where the technology provides communities with a reliable source of clean water. The pilot programme in DPR Korea, run in a partnership between UNICEF and the Government, including the Ministry of City Management (MoCM), has been extremely successful, building GFS for rural communities and towns that service 2,000 to 50,000 people. The Government has requested UNICEF support in developing provincial and national plans for expanding GFS across the country wherever feasible.

Gravity-Fed Systems are a simple, cost-effective and environmentally-sound means of providing clean water to the majority of people in DPR Korea



More water, less cost

One of the major appeals of GFS is its low cost. On average, it costs only \$500,000 to design and construct a standard GFS in a medium-sized county town (20,000 people). That's roughly \$25 per person. This includes a protected water source, a pipeline to the distribution tank and extensive rehabilitation of the existing distribution network. The renovated network will provide water to each and every household, hospital and school in the town or city. As technicians gain experience building these large-scale GFS networks, the process will become increasingly refined and cost effective, even as the water quality improves.

Compared to the pump systems in place currently, GFS is a low-maintenance technology that requires minimum running costs. The main maintenance requirements are the routine cleaning of tanks, the protection of pipelines and a few simple spare parts.

Initially, building a GFS requires labourers, often working in remote and rocky locations, for digging trenches, refilling and providing protection once completed. The process also requires substantial quantities of sand, gravel, stone and timber, which are local materials. These are collected, sieved, prepared and transported by local people. The labour and material costs can be provided by the local authorities and from the communities that benefit from the new GFS. In DPR Korea, this local contribution typically covers around 25 per cent of the cost of the project.

GFS provides continual access to fresh, clean water for \$25 a person.



Clean water for children and more

Over the last three years (2007-2009), UNICEF supported the Government of DPR Korea to install GFS in ten focus counties. This pilot programme provided clean water to more than 228,000 people (58,500 families). The water supply connections were provided to all public institutions including health centres, schools, nurseries and kindergartens. As a result, children in the serviced areas now have access to clean, safe water for drinking and hygiene in these institutions.

The anecdotal information from health workers, parents, caregivers and teachers all tell the same story: the improved water supply has made a tremendous impact on the health and wellbeing of the vulnerable population, and most especially the children. Children are getting sick less often and are learning the importance of hygiene and handwashing in these schools that are now connected with running water.



Moreover, parents do not have to spend as much time collecting water to fulfil household needs and are therefore able to spend more time taking care of their children or pursuing other tasks at home and in the community.



GFS and the way forward

In the county towns now serviced with GFS, people have access to a regular supply of water in sufficient quantities to meet domestic needs. These communities no longer suffer from unreliable sources of water nor do they need to seek alternative sources. The use of GFS in these communities has also significantly benefited the environment and agriculture, protecting forests, helping to prevent soil erosion on the mountains, protecting river infrastructures and ultimately improving soil fertility of the flatland.

Due to the success of the pilot programme, the Government of DPR Korea has embraced the use of GFS and is nearly at the full technical capacity for replicating the projects nationally. A dedicated project management unit within the MoCM, in collaboration with international experts, has developed a GFS design and implementation manual and trained technicians on its use in conjunction with computer-based software.

Ultimately, replicating GFS on a national scale depends on the help of international donor assistance and aid. Though the Government of DPR Korea is enthusiastic, substantial development will only be achieved with sufficient financial resources. With help and funding, clean water can become a reality for towns and cities, supplying water to communities, families and children who need it the most and fulfilling the most fundamental need of people across the country.

Please contact UNICEF DPR Korea for more information.

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