

The potential of Smart Tecs to reach MDGs

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Context

Over 70% of the people without access to safe water and sanitation live in rural areas. An important condition to improve their situation is the choice of Appropriate Technologies (ATs) that people can manage and afford. Developments in the past 10 years have drastically reduced cost and improved sustainability of a number of technologies in water and sanitation. In some publications these new options are also called **SMART TECS**. In several countries these **smart tecs** have proven to be efficient and have reduced the cost for water and sanitation (watsan) to 15-30 Euro/Capita. Under some information and recommendations that can help to reach water related Millennium Development Goals (MDGs) 1, 4 and 7

MDG # 1: Eradicate extreme poverty and hunger

Although rural development offers excellent opportunities to eradicate extreme poverty, in many developing countries there is still insufficient attention for it. Rural families, who can produce more and in a more effective way, do contribute to local and national development. Besides that, rural development reduces migration to larger cities. While striving for the eradication of hunger, the *Green Revolution* has substantially increased the world food production and raised the income of thousands of farmers. The category of small farmers, however, owning 0,1 to 5 hectares - constituting 70% of the rural population in developing countries – have hardly if at all benefited from it, due to the lack of basic knowledge, adequate tools and micro-irrigation. If these farmers would have access to micro-irrigation and the others aspects they could double the world food production¹.

Access to water reduces poverty

Research shows that the income of poor rural families doubles when they can avail of their own water well² and investing in small-scale irrigation systems can be very effective. An example is an irrigation pump of 15 dollars (the *treadle pump*) that has been introduced in Bangladesh many years ago by development aid. At present, there are more than one million small farmers in Bangladesh using this pump to irrigate their fields, generating 100 dollar extra net income per year on average. With an investment of 7 million dollars in the introduction and promotion, the GDP of Bangladesh increased with 100 million dollar per year³. After Asia, Africa and Latin America are slowly witnessing similar developments.

Technology is the key to more and safer water

Previously water wells, pumps and irrigation systems were unaffordable to small farmers but recent technological innovations have reduced cost drastically. These days, water wells and pumps are yet available at 30 dollars, and drip irrigation systems yet at 200 dollars per hectare. Many a 'new technology can be locally produced and repaired and this involvement of the local private sector has proven to be essential for its sustainability³. Although not all "new" small-scale options are applicable in every situation, they can be applied in many regions in developing countries.

One of the reasons for the limited dissemination and use of new innovative options is 'ignorance' of potential users, organisations and policy makers. It is therefore of utmost importance to bring across knowledge and proper examples of new technologies to all stakeholders to enable them to make the best choice in their situation. Experience shows that spreading 'simple' technology is not simple, but requires focus and long term coaching.

Recommendations

1. Large-scale propagation of innovative and affordable technologies for *micro-irrigation for small-scale farmers* in order to stimulate rural economic development.
2. Allocate *one percent* of the aid funds for rural development in *Research and Development*, in order to improve or further reduce the cost of farming implements and irrigation technology.
3. Allocate *two percent* of the aid funds for the promotion of low-cost farming implements and low cost irrigation technology to stimulate local businesses and to "*create a market*" for products that are affordable for *small scale farmers*.

MDG # 4: Reduce child mortality

The main cause of child mortality (under 5) is diarrhoea contracted by drinking contaminated water. Recent research shows that by improving the quality of drinking water, with 'points-of-use'-(POU) options, in combination with sanitary education, the number of cases of diarrhoea reduce by 40-70%. PoU options are methodologies to purify water at household level. Relatively new and simple technologies are SODIS (disinfection by sunlight), sand filters and ceramic-silver filters⁴. The costs for these options are *one to five dollars per family per year*. In other words, **drinking water free of bacteria for less than one dollar per person per year**. In situations where installation, operation and maintenance of conventional water supply and central water treatment systems are too costly or too complicated, these options are a suitable intermediate solution to ensure water free of harmful bacteria, thus reducing diarrhoea and child mortality.

Recommendation:

Large-scale introduction of new, affordable point-of-use options to purify water at household level such as SODIS and ceramic water filters.

MDG # 7, Target 10: Sustainable access to safe drinking water

Next to water quality, the mere access to water often is a problem. In rural Africa and in many regions in Asia, women or children have to walk many kilometres to fetch water from communal water sources. One way to improve this situation is to reduce cost of wells so more wells can be made with the same budget. An example is the Njombe district in Tanzania where the cost of a well plus pump have been reduced from 3,000 to 600 dollars. This was achieved by making use of hand-drilled boreholes and locally fabricated hand pumps rather than machine-drilled bore wells and imported pumps.

In Nicaragua rural water supply has been doubled in 10 years. A switch from imported hand piston pumps of 600 dollars to locally fabricated hand rope pumps of 60-80 dollars has made this possible. Evaluations show that 90% of the rope pumps remain in operation after years, because the spare parts are cheap, locally available and the users can repair the pumps themselves⁵. In contrast to this, . 40% of the imported piston pumps are out of order in African countries due to the complexity and "high" cost of maintenance.

Water empowers women

When the water technology becomes less expensive, water supply 'in your own yard' comes within reach of individual families. A well or storage tank at home increases the use of water, which has a positive effect on the hygienic situation. Having more water available can boost the economic development. On the yard (patio, shamba) it becomes possible to grow fruits or vegetables, or to rear chicken or goats for home consumption and local market. Direct access to more water usually strengthens the position of women. Income generated in the own yard traditionally remains in women's hands, so that she becomes less dependent on her husband. Usually she invests in sustainable issues, such as education for children and improved living conditions; men often have other 'priorities'.

Investing in water has a high 'Return on Investment'

Generally, investments in water appear to be very cost-effective. The World Health Organisation (WHO) recently published the results of a study, showing that **every dollar invested in improved water and sanitation facilities, yields 5 to 28 dollars**². When products, needed for this improvement such as pumps and filters are manufactured and sold by local small and medium size enterprises, the chance of sustainable development increases considerably.³

Recommendation

Widespread dissemination of knowledge on manual drilling of bore holes and manual water pumps that can be locally manufactured and repaired.

¹ P. Polak, Director of IDE, the organisation behind the introduction of the Treadle irrigation pump in Bangladesh

² Based on a study with 5025 families in Nicaragua (CESADE /ICCO)

³ *Poverty alleviation as a business*, SDC (Swiss Development Cooperation)

⁴ Based on NWP publication *Smart Water Solutions*. See also info@NWP.nl or www.practicafoundation.nl

⁵ Based on an IRC evaluation done in 1995 of the Nicaraguan rope pump

⁶ WHO research, "Evaluations of the cost and benefits of water and sanitation at global level", Sept 2004