APPROPRIATE TECHNOLOGY FOR INTEGRATED WATER MANAGEMENT IN RURAL AND INDIGENOUS COMMUNITIES IN MEXICO.

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Abstract

To address the problems of rural communities in Mexico, the Mexican Institute of Water Technology (IMTA) transferred comprehensive packages of appropriate technologies to solve problems at home for water supply, pumping, purification, water treatment and recovery. These technologies are easy to install, do not generate technological dependence, prioritize the use of local materials, do not require skilled labor, require little investment and are adaptable to different cultural contexts, places and circumstances in addition to not harm the environment. A total of 2 300 technology are being transferred, in Municipality of Huitzilac.

Introduction

In Mexico, the rural population is 23.9 million (23.5%) and is distributed in 184 748 villages with less than 2 500 inhabitants, this means a high dispersion in addition to geomorphological conditions that causes 5.5 million people lack access piped water and 9.1 billion people lack drainage (CNA, 2009), which decreases the quality of life and causes the persistence of diseases of underdevelopment, such as intestinal infections, mainly in children under five years. To address this problem and improve the health and welfare in these areas, since 2003 the Mexican Institute of Water Technology makes the transfer of comprehensive packages of appropriate technologies for household level water supply and sanitation of water through capturing rainwater, water disinfection by solar box, kitchen garden with auto watering device operating, pumping pedal mechanical action by a person or bicibomba, ecological laundry consisting of aerobic–anaerobic systems for wastewater treatment gray and the composting of fecal matter by dry ecological toilet. Currently being carried out 2 300 transfer appropriate technologies in three rural communities Huitzilac Municipality, Morelos benefit of 1 900 inhabitants.

Methods

For the transfer followed the recommendations of the manual that was generated through the systematization of the experience of IMTA in Appropriate Technology Transfer in Environmental Recovery Program of the Lake Patzcuaro Basin, implemented from 2003 to 2008

in communities several municipalities in the basin. It identifies the steps to carry out the planning process to assemble a team, decide among various options, formulate strategies, make the transfer and take appropriate action to ensure the appropriation of technologies by the beneficiaries.

The technology package consisted of eight appropriate technologies (Figure 1), whose function described in Table 1.

Technology	Function
Rain water catchment system	Collection and rain water conduction
Tank	Water storage
Dry ecological toilet	management of fecal matter
Ecological laundry	laundry and gray water treatment
Solar box	Disinfection of drinking water by solar radiation
Kitchen garden	Productive use of water for vegetable production
Flush Tank Fund	Kitchen garden irrigation system auto operant
Pump bike	Pumping water without electricity

Tabla 1. Appropriate technologies and their functions.

The technologies were installed under the scheme of self-construction, following the process described step by step through the manual which was developed at IMTA for this purpose (Córdova et al., 2007).

Figura 1. Integrated package of appropriate technologies for water management.

Results

Capture and storage of 20 m^3 of rainwater (Fig. 2) has reduced the purchase of water pipe representing a saving in household spending, the solar disinfection of 6 liters per day decreased the need to buy bottled water for consumption, limiting purchase only on cloudy days; replaced the use of electric pumps for the bike pump impact on reducing power consumption. With regard to environmental protection, with the use of alternate sources for water supply was reduced extraction of surface water sources and / or groundwater, the treatment of wastewater and excreta avoided the contamination of soil and water (Fig. 3).

Figura 2. Rain water harvesting.

Figura 3. Ecological dry toilet.

Conclusions

The transfer of appropriate low cost and easy application has improved the livelihood of the inhabitants of the communities, creating a culture of supply with rainwater, pumping mechanical, food production and primary and secondary treatment of wastewater, all at the family level, without creating dependence on technology and respecting the customs of each community. During the transfer process, has sensitized the population has become aware of the serious and rapid deterioration of water quality in their regions, as well as the urgent need to manage water resources with a focus on sustainability in order not to risk to present and future generations.

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