Purification of the water

The treatment method illustrated in the schematic below is the result of five years of experience. It has proven to work effectively in the villages and there is a constant focus by the "1001 fontaines pour demain" team and its supporting experts to find ways of continuing to improve performance.

A process that respects the environment

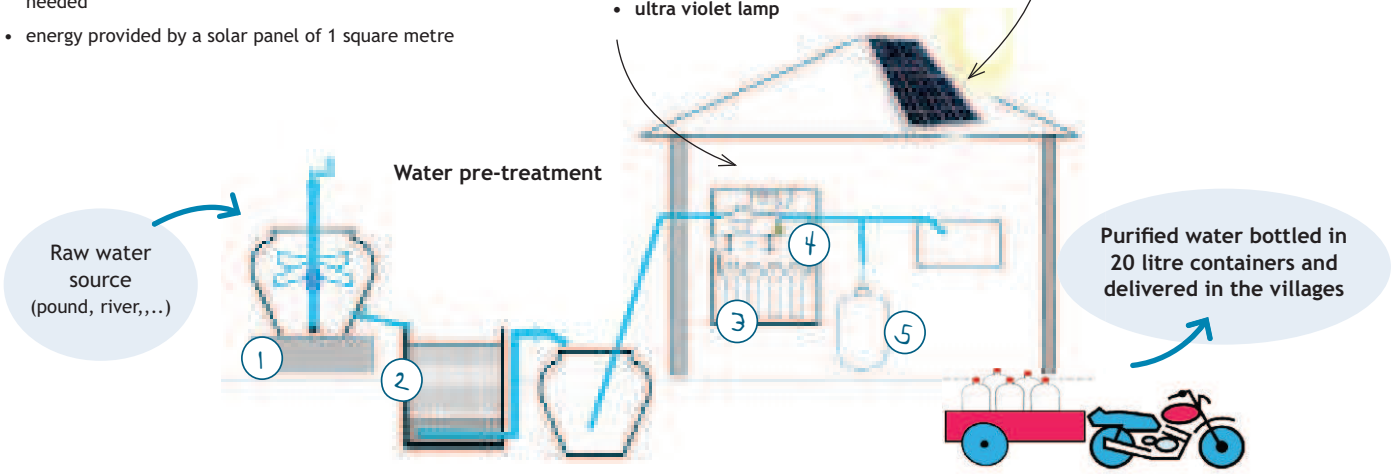
- limited use of chemicals (small amounts of chlorine to disinfect the containers)
- reusable plastic containers
- only a small percentage of the available sources of water needed
- energy provided by a solar panel of 1 square metre

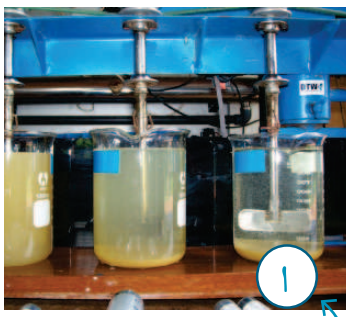
Ultra violet based treatment unit

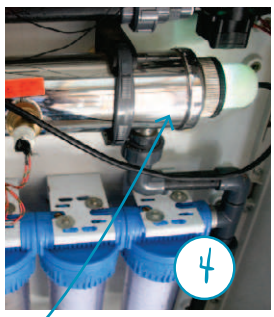
- **small electric pump (600 to 800 litres per hour)**
- **electronic control unit**
- **a series of polyethylene filters**
- **ultra violet lamp**

Powered by solar energy

- **panels supplying 85 to 100 Watts (charging a 12 volt battery)**







COAGULATION and FLOCULATION SETTLEMENT

Typically, the raw water is turbid due to the presence of small particles.To eliminate these, a process of coagulation and flocculation is used. The addition of aluminium sulphate accompanied by slow stirring causes aggregation of the particles into larger masses. Due to their weight, these particle masses fall naturally to the bottom of the vessel.

FILTRATION and MICROFILTRATION

Next the water is passed through a sand filter, which removes the majority of the remaining suspended particles. Then the water is passed through a series of micro-filters (diameters ranging from 60 to 1 micron). At the end of this step, the water is clear but is not yet potable.

ULTRA VIOLET PURIFICATION

In the next step the water is exposed to ultra violet radiation. The particular range of the ultra- violet spectrum that is used is UV-C (wave-length less than 280 nm), which kills germs. The main advantages of ultra violet filtration are as follows:

- the electromagnetism technique preserves the taste and chemical characteristics of the water
- low maintenance costs (the average life of the lamps is 8000 hours, which is equivalent to 12 years of production at the rate of 1200 litres per day).

BOTTLING and QUALITY CONTROL

Before filling and sealing, the containers are washed and disinfected with a chlorine solution.

The quality of the water is controlled based on microbiological criteria, such as the coliform bacterial index.

Ensuring sustainabiliy...

The « 1001 fontaines pour demain » projects fulfil a critical social need (safe drinking water) in a sustainable manner by establishing social enterprises within each village. This document describes the approach and structures, which ensure the durability and scalability of the solution.

The objective of the "1001 fontaines pour demain" initiative is to create local facilities to produce safe drinking water for the benefit of villagers living in rural villages, which do not currently have access to clean water. The "1001 fontaines" solution uses simple technology that purifies water from local sources (rivers, swamps wells), bottles it in closed, sealed 20 litre containers and then delivers it to the homes of the beneficiaries.

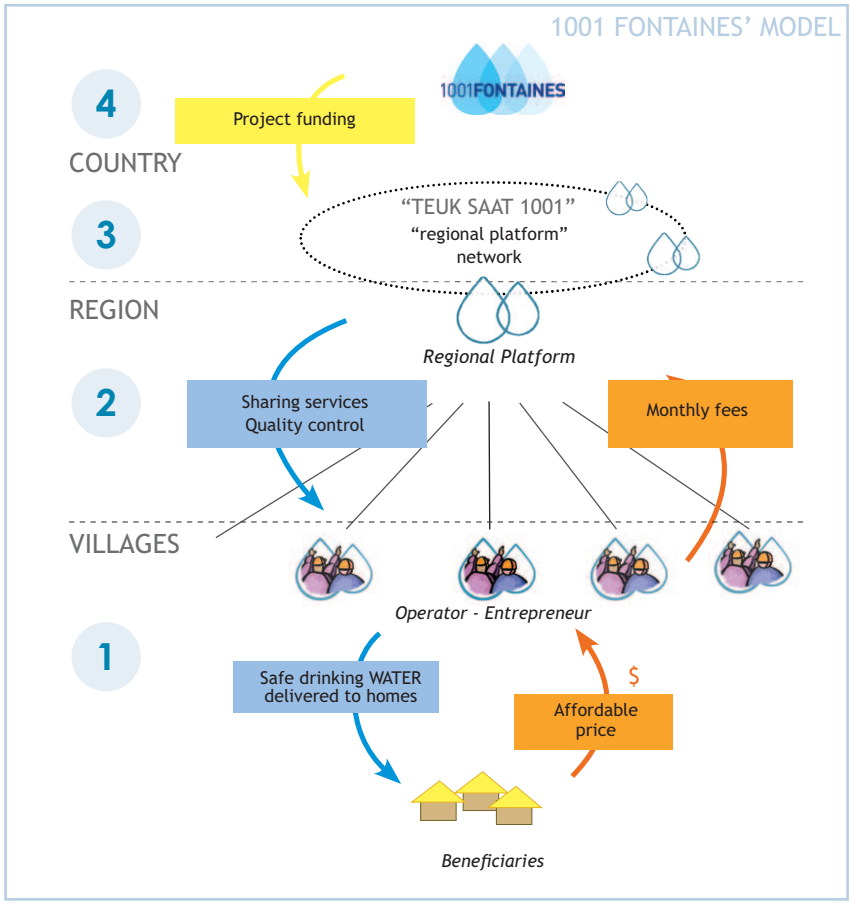
1 Sustainability of the solution within each village

In order to ensure the sustainability of this solution and, hence, ongoing improvements in the health of the villagers, the daily operation of the system is performed by a villager, via the creation of a social business enterprise based on this activity.

In order to remunerate the operator in each village the approach adopted is one based on social entrepreneurship. The water is sold within the village at the lowest possible price (less than one cent of one euro per litre) to make it affordable for the villagers. The revenues generated by these sales are sufficient to cover the operating costs of the production unit, as well as generate an income for the operator. Thus, after an implementation project lasting 12 to 18 months, the village is self-sufficient in meeting its needs for safe drinking water both from a capacity and economic point of view.

2 Self- financing regional platform

The "regional platform" employs local technicians to support the operators in the surrounding villages. The support includes assistance in resolving technical issues, sourcing spare parts, providing management expertise and conducting campaigns to educate the local populations about hygiene and the links between safe drinking water and health. The operating costs of this "regional platform" are covered through monthly fees by each production site. (Around 50 production sites are required per regional platform to ensure that the platform is self-financing).



3 Scalable model

This structure - regional platform supporting a number (about 50) of local sites - is designed to be replicated across multiple regions within a country, in order to address a maximum number of beneficiaries. Under the auspices of the non-governmental organisation (NGO) established by "1001 fontaines pour demain" in each country, the regional platforms are networked to ensure the transfer of knowledge and experience from one region to another.

4 Proven approach and strategy

"1001 fontaines pour demain" is a registered French charity as defined by regulation 1901. In each country, where it operates, it creates local non-governmental organisations (NGOs), such as "Teuk Saat 1001" in Cambodia, or "Saint Gabriel" in Madagascar.

The central team, which is kept to the minimum size possible, determines the technologies to be used, performs the overall programme management of the initiative, ensures that experience and knowledge is shared among the teams in the field and conducts ongoing research and development aimed at continual improvement of the processes used by the operator-entrepreneurs in the villages. This team is also in charge of raising the funds required to support the initial project investments.

1001FONTAINES

Focus on drinking water

This document is a summary of the guiding principles of "1001 fontaines pour demain". It explains the rationale for our decision to focus on drinking water and to make sustainable improvements in the health of rural populations by giving them access to safe drinking water.

Access to drinking water...

- Every year, contaminated drinking water kills **1.6 million** children **under the age of five**. This is equivalent to **4,000** such deaths per day.
- Almost **3 billion** people do not have the running water in their homes that would give them access to the 20 to 50 litres of water per day, defined by the World Health Organisation as "access to improved water". About **900 million** of these people live in rural communities and have no choice but to drink ... swamp water.

Given the large investments required to construct the piped infrastructure for running water and sanitation, it is likely that small rural communities in developing countries will have to wait a long time for access to such facilities. Meanwhile, the best solution for these communities is to undertake their own initiatives to improve their situation.

Many villagers continue to satisfy their needs for drinking water, as they have done for centuries, by consuming water from nearby rivers, lakes and swamps. These water sources typically have a high level of bacterial contamination, especially from faecal matter, and are a frequent cause of water-borne diseases, such as diarrhoea.

Water-borne diseases account for 20% of infant mortalities in developing countries.

Water quality

In 2005 a comprehensive review of epidemiological studies revealed that there was a 34% reduction in the incidence of diarrhoea when the quality of the drinking water could be assured up to the **point of consumption**. Previous studies, which claimed that water quality had little impact on health, only took account of the quality of the water at the point of distribution. Since 2005, however, it has been clearly demonstrated that transport and storage conditions can cause significant degradation in the quality of the water before it is consumed.

"1001 fontaines" water...

The *1001 fontaines* initiative is specifically focused on delivering safe drinking water to the consumer's home. By treating the water and ensuring that the purified water is transported and stored under the proper conditions, the quality of the water is guaranteed at the point of consumption, which is critical to improving the health of the poorest rural populations, especially the health of children.

In order to provide safe drinking water **at the point of consumption**, the water production sites utilise the following:

- self-contained treatment unit, capable of adapting (due to the relatively small quantities of water treated per day) to the best local source of treatable water. The installation of the unit is performed by a team trained in water treatment. This team conducts analyses of the different local sources of raw water and adapts the treatment process to use the best local water source, as necessary
- **quality control** of the treatment of the water and the bottling. This is done via a defined quality control process that includes regular and frequent bacteriological analyses throughout the life of the operation of the unit
- **delivery to the consumer's home** in disinfected, closed and sealed containers
- storage managed by a trained operator, such that the water is stored in **disinfected containers** rather than simply in any available vessel
- maintenance of the water quality via the addition of a micro quantity of silver ions that prevent re-contamination
- focus on taste, such that the water is appealing to consumers, and containers that are easy to use. These factors ensure **satisfaction** for the consumers.

Water is vital for life and has a fundamental impact on an individual's health. The recommended quantity of drinking water for adults is 2 litres per day.