



Name : Teuk Saat 1001

Branding Name : O-we

Date of creation : July 2007

Location : Battambang
Cambodia

Nb staff : 45 people

Nb of plants launched : 80 sites

Beneficiaries :
Over 150 000

Business model :
Drinking water selling model
through franchise

Price of the Water : €0.01/L

CASE STUDY

Teuk Saat 1001, partner of the French “1001 Fontaines” NGO, is a NGO acting as a not for-profit social enterprise that supports community water-filtration plants through local franchisees in rural Cambodian villages (approximately 800 inhabitants).

EXECUTIVE SUMMARY

Teuk Saat 1001, partner of the French “1001 Fontaines” NGO, is a NGO, acting as a not for-profit social enterprise, that support the operation of community water-filtration plants by local franchisees in rural Cambodian villages (approximately 800 inhabitants).

They were established in 2007 to develop the project “1001 fountains for tomorrow” in Cambodia and provide support and future sustainability to all future operating sites that would be created in Cambodia. Their objective 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. Their 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. Their mission is to make pure drinking water accessible and affordable for everyone. And because of the prohibitive costs of extending running water and sanitation facilities to the small rural communities they believe that the purification of water should be done in a decentralized way and thus be as close to the customer as economically feasible.

Date of creation :	2007
Operation area :	Offices: Battambang, Cambodia Franchisees: Operating in rural villages around Battambang, around Siem Reap and around Phnom Penh, Cambodia
Nb staff :	45 employees - 80 franchisees
Production capacity / unit:	For each Teuk Saat purification units: between 600 to 800 liters per hour.
Total beneficiary :	More than 150 000 persons
Business model :	Drinking water selling model through social franchise (provision of purification system)
Supplier:	Locally available source of water, usually from rivers or pond belonging to the community
Technology type :	Filtration processing followed by UV disinfection
Source of revenue:	For the franchisee: sales of water For Teuk Saat platforms: percentage of water sales revenue
Target Market :	Villages (+600/800 HH) spread over a radius of 15km of distance
Funding sources :	Project from 1001 Fontaine french NGO
Legal Incorporation :	Cambodian NGO - Brand name : O-we

Economical impacts

At user level

- **Monthly consumption:** 6 to 8 liters/day/HH
- **Monthly expenses:** In average €2 with a per liter cost of KHR 1000 to 1200 (€0.01/L) (in comparison to ~€0.3/L for bottled water)

At franchisee level

- **Cost of installation :** Free - purification plant belongs to Teuk Saat & the first 500 20l container are also given for free
- **Water purification system lifetime:** 7 - 8 years
- **Total revenue :** In average €6000 per year
- **Total cost :** In average €5000 per year
- **Breakeven :** in average in 2 to 4 years when a franchisee reaches a sales' volume of around 1,200 litres/ day during the dry season (for the new franchises, it usually takes less time to reach break-even - in average 1 year)

Social impacts

- Access to reliable, safe and clean water for 72k beneficiaries, via a growing number of franchisees (80 water plants in 6,5 years).

Environmental impacts

- **Energy:** Solar Powered purification plant
- **Chemicals used:** Chlorine to clean recipient (not toxic or environmentally dangerous).
- **Hardware recycling:** Refurbishment and repair of end-of-life machines, re-tested before going back to the field. All old parts recuperated by Teuk Saat 1001.
- **Container:** No plastic disposable container adding onto plastic pollution

Innovations

- **Water Treatment Plant :** Low cost solar UV purification treatment plant assembled by Teuk Saat 1001 - easy to maintain and adapted to local context

PROBLEM TACKLED AND MAGNITUDE OF THE PROBLEM

World overview

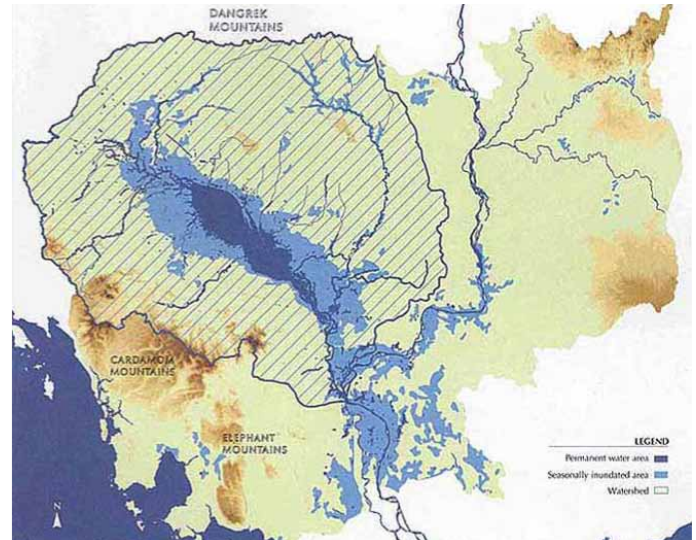
Drinking water - Sanitation & Impact on health

Over large parts of the world, humans have inadequate access to potable water and use sources contaminated with disease vectors, pathogens or unacceptable levels of toxins or suspended solids. Drinking or using such water in food preparation leads to widespread acute and chronic illnesses and is a major cause of death and misery in many countries.

As a direct consequence:

- 1.6 million people die every year from diarrhoeal diseases (including cholera) attributable to lack of access to safe drinking water and basic sanitation and 90% of these are children under 5, mostly in developing countries;
- And hundreds of million people are infected either with worms or hepatitis A, causing elevated risks of blindness and tens of thousands of deaths yearly...

Reduction of waterborne diseases is a major public health goal in developing countries.



In spite of the high availability of drinking water sources in Cambodia, the lack of infrastructure development means the country faces serious challenges with respect to safe drinking water.

ABOUT 2.6 BILLION PEOPLE – HALF THE DEVELOPING WORLD – LACK EVEN A SIMPLE ‘IMPROVED’ LATRINE AND 1.1 BILLION PEOPLE HAS NO ACCESS TO ANY TYPE OF IMPROVED DRINKING SOURCE OF WATER.

Access to drinking water: The case of Cambodia

Cambodia is the poorest country in Southeast Asia and has the least developed infrastructure in the region, due partly to the recent history of genocide and conflict from the 1970s–1990s and the associated loss of investment and human capital. The Khmer Rouge regime massacred from 2–4 million Cambodians, many of which were of the educated class, leaving the country with a lack of doctors, lawyers, engineers, teachers, and other trades that require formal training. Foreign investment and development has slowly returned to Cambodia, but 35% of Cambodians still lives below poverty line. Infrastructure development and access remain slow compared with neighbouring countries.

Availability & quality of water

In Cambodia, where water is available abundantly, both surface water and groundwater are used for drinking water. The Mekong River and the Tonle Sap Lake are the predominant sources of surface water, with the Mekong serving the east and the Great Lake serving the more westerly populations. Available surface water resources are subject to large yearly fluctuations, as the country experiences the cycle of dry and rainy seasons.

The river system provides abundant drinking water. Pathogens are however commonly found in surface water. But applying the WHO standards, these resources require only basic treatment including disinfection.

Groundwater is also widely available in most areas of the country, and has been accessed through both hand-dug wells and the more advanced drilled wells with hand pumps. Nonetheless groundwater is increasingly suspect as a source of drinking water in some areas due to arsenic contamination.

Access to drinking water in Cambodia: Figures

Access to an improved water source:

- During the rainy season: almost 80% of households have access to an improved water source (94% in urban areas and 76% in rural areas).
- During the dry season: only 59% of households have access to improved water (87% of urban households and 53% of rural households).

Water sources used by Cambodian households:

- Free water sources like rainwater, water from unprotected drilled wells or water that comes from rivers or ponds. Typically, individuals collect the water themselves in buckets or other containers, or have water delivered to them by a tank vehicle.
- Or bottled, push-cart or piped water that need to be bought (the average tariff of water in Cambodia is about 2,200 Riels per cubic meter (0.6 US\$).)

Drinking water and Health Impacts in Cambodia

The danger of this lack of access to clean drinking water is manifested in the Kingdom's through the under-five mortality rate of 42 per 1000 live births. 8% of under-five deaths in Cambodia are attributed (at least partly) to the onset of diarrheal caused by the consumption of unhealthy water. Diarrheal disease is the number five cause of death in children under 5 years of age in Cambodia. In addition, chronic diarrheal exacerbates malnutrition and impairs the immune system's ability to fight off infection and disease. Among adults, diarrheal reduces productivity, with macro-economic consequences. Exposure to diarrheal-causing agents is frequently related to the use of contaminated water and to unhygienic practices in food preparation and disposal of feces.

ID CARD

General information

Name & creation:

- Teuk Saat 1001
- Brand name : O-We (“O” for the water symbol and Asian lucky circle and “We” for our commitment to **community** development)
- Creation in 2007

Location:

- **Head Office** : Battambang
- **Franchisees**: In rural villages around Battambang, Siem Reap and Phnom Penh, (+12 other provinces in Cambodia) (800+ households per village)

Context:

“1001 fontaines” was founded, in 2004, in Paris when Chay Lo, a young and brilliant Cambodian engineer studying at “l’Ecole Nationale des Eaux et Forêts” met François Jaquenoud, ex-partner at Accenture, and Virginie Legrand, who had spent a year in Cambodia with “Les Enfants du Mékong” and was convinced of the need to create bridges between the world of business and the world of humanitarian aid. Together, they pooled their complementary skills and experiences behind a single goal: strive to improve the long-term health of poor and isolated communities in developing countries, using a social enterprise model which enables them to produce their own, safe drinking water. A pilot Project was launched in 2005 and the first concrete results started to be observed in villages of Cambodia. After almost a year of observation, the results proved positive enough to consider an initial deployment of these solutions in the country.

Human Resources

Employment:

- 45 employees, split over 3 different teams: Project Development (15 people), Project Follow-up (10 people in Battambang and 10 people near Phnom Penh), Support (5 people)
- 80 Rural Franchisees in total.

Kiosk level job creation :

1-3 employees/ water point (more than 30% of which being women)

Franchisee profile and identification process:

Franchisee’s profile: selected by the community

Main product

Water treated at village level by Filtration and ultra violet rays, under a franchise model creating local employment at a price of KHR 1000 - 1200 (€0,01) per liter

Acceptance & usage: Variable acceptance, depending on the taste of the raw water notably.

Business Model

Teuk Saat 1001 has an **hybrid business model**, which combines to separate funding models:

• Donations

- » Based on solidarity funding through donations or on equipment loans in rural areas.
- » Mainly used to finance the initial investment costs due to the development of new plants in the villages and cover the regional platform initial operating deficit.
- » Fund-raising realized by the french of 1001 Fontaines

• Social Franchise

- » Based on a traditional business model that seeks economical viability.
- » Mainly used to cover the initial operator and the local platform’s operating costs until both reach financial viability.

Social Franchise

Teuk Saat 1001 Social Franchise Business Model is based on 3 levels of intervention:

• The village level composed of:

- » A village community that fixes the price of the water and the future entrepreneur among villagers

NB: the community is systematically sought for the provision of land and the construction of a local.

- » The franchisee, a private operator that pays a monthly fees to Teuk Saat 1001 for its support services (maintenance, quality monitoring, management advice and marketing support fee) (a % of the water sale), operate the water treatment plant and sell water to villagers in 20L containers, with a basic delivery service for free.

NB: After a training period of a duration of at least 12 months, the operator become a real franchisee, through a contract of «transfer of exploitation rights» license agreement under which it undertakes to respect the rule of community service and product quality it provides. He is assisted in the operation of its business by technicians, gathered in a platform supporting platform on which it pays a monthly fee (20% of revenue generated by the sale of water).

- **The regional platform level:** The “regional platform” employs local technicians to support the operators in the surrounding villages. The support includes initial assembly, and installation at the village community’ premises of a ready to use water UV filtration plant, 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.

NB: While sites are franchisees, platforms act as licensees of the central structure, the franchisor. Indeed, the deployment of this type of solution in many small villages need to have on-site teams properly trained to support these projects.

- **The national head-office:** Teuk Saat 1001 is in charge of launching filtration plants in new villages and supporting regional platforms (R&D, tools development, marketing...)
- **The central structure in France has four main objectives. :**
 - » Conduct (R & D) research and development program
 - » Capitalize and share methodologies and “best practices” based on feedback of installed sites.
 - » Support the major financial burden of the overall system (financial support during the initial development platforms and local franchises, and that for several years until they reach self-financing.

- » Find funding for purely social projects such as schools, orphanages and hospitals, which can only be based on solidarity funding.

Sources of revenue for franchisees:

Franchisee operates the machine and sells water in 20L batch for US\$0.3, keeps 100% revenues until they reach break-even point, then gives back 20% of water sales to Teuk Saat 1001 and <5% to the community (~US\$20).

Revenue Model

Source of revenue for the Teuk Saat 1001:

- **Capital & launching project expenditure:** All these costs are covered by fundraising done by 1001 Fontaine's team in France.
- **Operational costs of each regional platform:** should be covered through monthly fees paid by each production site but if not are covered by fundraising done by 1001 Fontaine's team in France.

Average billing:

- Average households costumer

consumes 6 to 8L per day

- An average household pays ~US\$2,25 per month
- In the dry season, average billing is ~US\$ 750

Target Market

Teuk Saat is only targeting 60% of the total drinking water market of its operating areas. It does indeed not target:

- 30% of the population that is below poverty line and therefore can not afford to pay for water,
- The top 10% that can afford to buy a domestic water purifier or buy bottled water because they dislike the taste of the water

Economic Sustainability

Penetration rate:

Initial penetration rate is generally between 12% and 15% of the total population of a village. In mature villages (after 5-6 years), it usually raises to 50% penetration among total market.

At franchisees' level:

- **Capital expenditures:** None
- **Operational costs:** Franchisee bears distribution costs (~US\$0,1 per

bottle, average US\$80/month - 15%), HR costs (average \$200/month - 40%), support fees to Teuk Saat 1001 (average 120\$ - ~25%), a fee paid to the village community (~ US\$20) and miscellaneous expenses

NB: He bears no cost of electricity - solar powered, no cost for marketing/awareness activities, no cost for maintenance and spare parts

- **Average net Revenues:** from US\$65 to US\$150

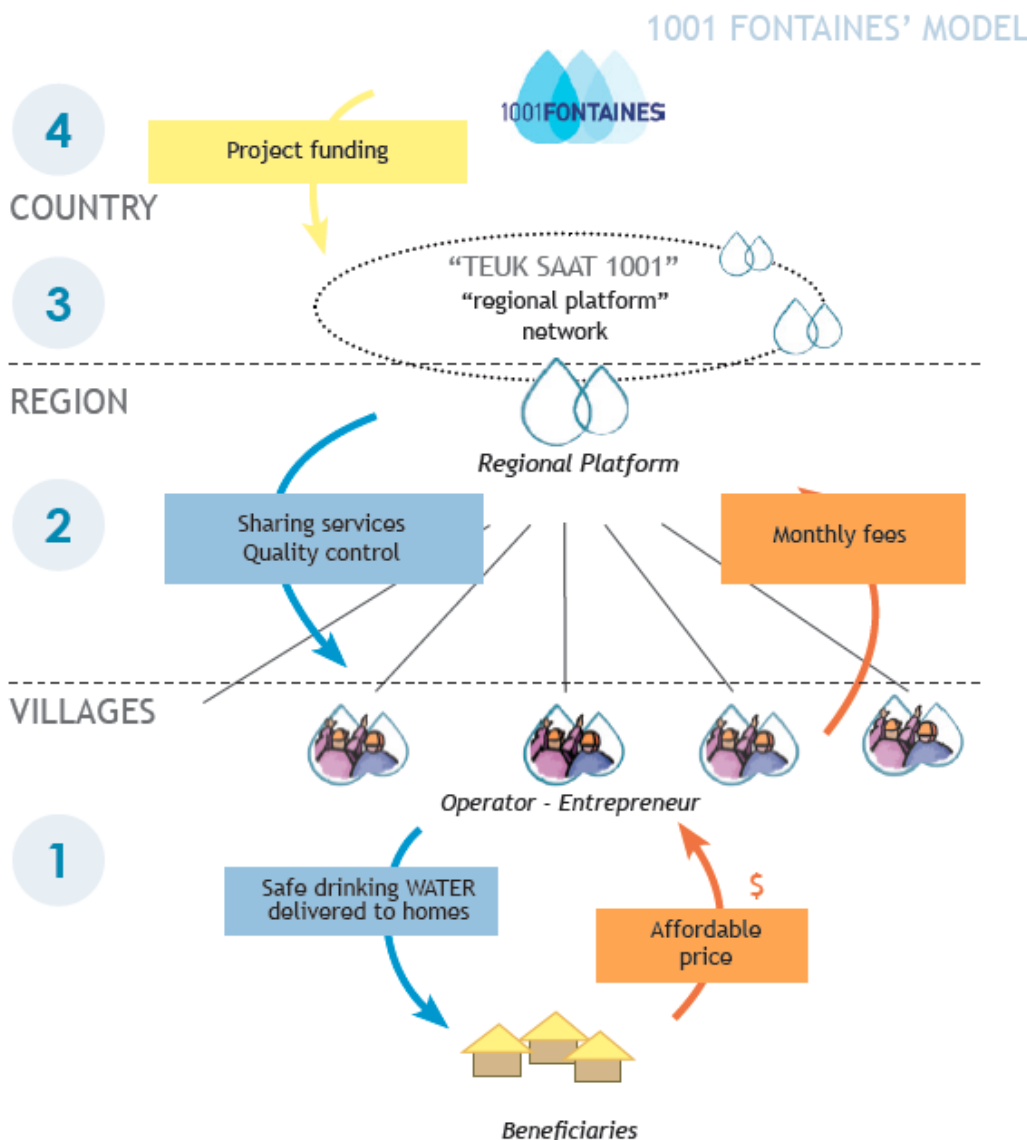
Franchisees typically reach breakeven when they succeed in selling in average 1,200L/day during the dry season (approx. 1000 beneficiaries). This usually take 2 to 4 years after the commissioning. For the newest franchisee, with the improvement of the process, it generally takes less, around 1 year.

At community level:

In average, the community gets around US\$ 20 - 25/months and a share of the profits at the end of the year.

At Teuk Saat 1001:

- **Capital & launching project expenditure:** Teuk Saat bears the up-front cost of villages identification, of purchase and assembly of the equipment (€ 2000 for a water treatment plant), of installation of the equipment, of the operator's training and of the awareness and marketing campaign
- **Operational costs of each regional platform:** HR costs (local technicians employed to support the operators in the surrounding villages) + recurring costs for franchisees including expenses for parts, maintenance, marketing/awareness campaigns and business development support are supported both by the fund-raising and the support fees paid by the franchisees.
- **Break-even for a regional platform:** Around 50 production sites are required per regional platform to ensure that the platform is self financing



VALUE CHAIN OF BUSINESS

Input

Water sourcing:

Locally available source of water, usually from rivers, ponds that belong to the community. This sources usually have a high level of organic contamination, particularly faecal causing frequent waterborne diseases. Applying the WHO standards, these resources require only basic customized treatment including disinfection.

Space:

The community has to allocate a dedicated space that will be used by the chosen “operator - entrepreneur” to set up the water purification plant.

R&D & Innovation

Technological Innovation: UV Water Treatment Plant

In 2004, as part of his dissertation study, Chay Lo adapted a solar UV water purification system, originally developed for rural inhabitants settled in France, to the Cambodian context. This represented a real advance in the treatment of drinking water, with easy to carry and operate modules.

Nowadays, Teuk Saat 1001 uses Chay Lo invention which allows the technician team to source, for the main part, local low cost equipment and to assemble it itself to keep costs down. By doing this, they have lowered technology costs to US\$2k per machine (instead of a cost of \$10,000 in the U.S) and build an easy to maintain purification system.

Lifespan: 7/8 years

Management Model Innovation: Social Franchising

Ensure the sustainability of the model:

- By allowing the recovery of the operator’s operating costs for the operator: revenues of the franchisee are related to its involvement. The operator is thus encouraged to maximize its effort and maximize performance which ensures after a while the recovery of its operating costs.
- By allowing the recovery of the regional platform’s operating costs through monthly fees paid by each production site.

Overcoming cultural barriers & Adapt to the local context:

Through his intrinsic knowledge of the local environment, the local operator is able to, gain the trust of the community and adapt its activities to the specific needs and conditions of his community.

Pooling the services of unaffordable water experts: Being part of a franchise, franchisees share the costs of specialist services normally reserved for large water operators. They can as well enjoy the support of a mentor with a high level of expertise while providing quality water to the community.

Minimize the need for financial resources and risks incurred by operators by providing free water purification treatment plant and a proved model and concept to the operator

Facilitate the replicability of the model for a bigger impact



Production

Production capacity:

Teuk Saat 1001 UV purification units are deliberately designed and limited to process 600/800 liters per day. This decision is motivated by two considerations:

- Ultraviolet purification technology powered by solar energy is undoubtedly the one which has the lowest cost/liter on these “small” volumes.
- 600/800 liters per day is the capacity that best suits the type of target villages (around 5000 people) and a “close proximity consumption” target, thereby limiting distribution costs up

On average, Teuk Saat 1001 franchises produce between 2,000 – 4,000 liters of potable product water per day during peak dry season, and around 400 – 1200 liters during non-peak months.

Sales & Distribution

Access to the treated water at a fixed, affordable price:

- By purchasing it directly at the franchisee’s plant
- On call through the distribution system put in place by the franchisee (no additional fees)
- By buying directly to the delivery man



Billing & Payment

Daily for each new and sealed 20L unit (switching one empty bottle with a full one).

Marketing

- Awareness/advertisement campaigns led by Teuk Saat 1001 to educate the village community about hygiene and the links between safe drinking water and health.
- Marketing training and support for franchisees during his apprenticeship phase, for more than one year.

Consumer financing

Consumer financing :

None - But the really low price of the water allows a lot of villagers to purchase it.

Franchisee financing :

None as the water treatment plant belongs to Teuk Saat and the 500 first 20L bottles are given to the franchisees.

After sales services

Water quality control :

Bacteriological controls carried out monthly at the outlet of the water purification process and after the bottle disinfection by someone from the project follow-up team of Teuk Saat 1001. All collected data are manually reported for a monthly compilation and analysis by the management of Teuk Saat 1001.

Maintenance :

- In case of breakage or malfunction, franchisee can call Teuk

Saat 1001 to ask for an Operator. The interventions of the Teuk Saat 1001 maintenance teams usually occur within 48h. Technology is local so spare parts are mostly easily available (Phnom Penh).

- In addition, through preventive maintenance visit (every 3 to 6 month), throughout the lifetime of the site, the team helps the operator to guarantee the quality of the water that is produced. (1)

New franchisee's installation process

Area for a new water purification plant: Unoccupied public space provided by the community

Village's selection process: a 3 months process

1. Identification of villages through partners NGO or through the Ministry of Rural Development
2. Study of the villages based on predefined criteria: annual availability of a water source, will the town, market size, land to build the local, absence of competition
3. Selection of villages
4. Assist the village community in its tasks: designating the entrepreneur, fixing the sales' price and organizing its contribution (generally the land and the premises) to the project.

Teuk Saat 1001 engagements: Teuk Saat's marketing & sales team provides each new franchisee with a free water purification system and the first 500 20L Bottles. (2)

1. Some spare parts can't be found on site. They must, in this case, be purchased in Phnom Penh or imported.
2. When required, the operator will have to buy new bottles with the revenues from its water sales



IMPACT TO DATE

Social impact

Scale and reach:

- 80 water plants in 5,5 years,
- More than 200,000,000 litres of clean drinking water served,
- More than a 150,000 beneficiaries,
- 50% penetration rate among Teuk Saat target market in mature villages

Health Impact

Before buying water from Teuk Saat, the villagers drank water either from home filtration system provided by NGOs (no maintenance or replacement) or boiling water from rivers/ponds. This has a direct impact on the health of the villagers diarrhea risks and abstenteism. A study of Teuk Saat health impact is being realized by Langley University & Indochina research and the results should be published beginning of 2014.

CSR program

“Parraine-moi une Fontaine” program:

A “Water in School” sponsorship program that aims to provide safe drinking water, on a daily basis, to primary schools in villages where a site has been established.

- More than 48 000 children impacted in Cambodia
- An immediate impact on the health of the children which means that they are able to avoid contracting diarrhoea – the main reason for absenteeism at school –
- An opportunity to communicate educational messages about the importance of consuming healthy drinking water to families, using their children as intermediaries.
- Additional revenue for the site operators to supply the beneficiaries directly, according to their needs (one or two water containers per class).

1001 Fontaines Academy:

To meet the challenges of scaling 1001 Fountains in Cambodia, 1001 Fountains and Accenture France Foundation have decided to create the Academy 1001 Fontaines, a real training tool (accounting and finance, marketing, water treatment, etc.) for future entrepreneurs with low education and income.

Since June 2012:

- 50 Cambodian operators formed
- Transfer of the ownership of the Academy to the Cambodian team in progress

Economical impact

Household :

- **Average beneficiary household income per month:** US\$50-60. Assuming 6L/day/household, monthly water expenses US\$2,25 represent less than 4% of the average household's income.

Cost of alternative: Water bottle costs US\$0.5/L - Extortionate for most of beneficiary households

Business - Job creations :

- 164 jobs (2-3 employees/ village among which more than 30% are for women) that encourage clean water in communities
- 10-15% of water treating plants launched during the pilot phase are self-sustainable (in 2007/2008). This result is improving with Teuk Saat gaining experience.
- **Monthly revenue:** in average US\$ 100 (from US\$75 to US\$150 according to their sales) for the operator & US\$90 for the assistant (to be compared with 60\$ minimum salary in the garment factory)

Village community:

The community receives US\$20 - 25 per month from the operator, which represent an extra US\$240 per year, with a share of the operator's profits at the end of the year, if this is the case.

Environmental impact

Energy consumption:

- **Solar powered Water Purification System:** Energy for the whole purification system provided by a photovoltaic panel of 85 to 100 Wc
- **Transport:** Container delivery transportation depends on franchisee - during rainy season (so low selling season), an average consumption of 60L/month

Water consumption: very low volume of water used compared to the amount of raw water sources available

Chemicals used: Very limited use of chemicals - small amounts of chlorine (not toxic or environmentally dangerous).

Hardware recycling: Refurbishment and repair of end-of-life machines, re-tested before going back to the field. All old parts recuperated by Teuk Saat 1001.

Container: Use of reusable bottles (no plastic discarded after the firsts usages)- lifespan of a reusable bottle varying according to the frequency of usage (in average 6 - 8 months)





ECOSYSTEM CONDITIONS

Corporate finance

No shareholders - working fully with donations

Legal / Regulatory

The existing regulations only cover urban/semi-urban water distribution. Water distribution in rural communities (as Teuk Saat is doing) is not yet regulated and this could in the future represents a risk. To lower it down, Teuk Saat is regularly lobbying in order to influence the ministry of sustainable development in its legislative process.

Competitive environment

For sites that are close to cities, competition comes from urban distributors of 20L bottles.

For rural areas, 2 NGOs (Racha and Lien Aid) are following a similar model of water distribution as Teuk Saat, but with a focus on floating villages. Instead of seeing them as competitors and because the needs of rural areas are so huge, Teuk Saat is in the process of cooperating with these other actors in order to create synergies.

Key factor of success

Selection of entrepreneurs:

It can be a bit hard to find, within a village, persons that have time to operate water treatment plant. They indeed usually all have a work. In addition, they usually lack basic entrepreneurial skills. To overcome this, Teuk Saat has

developed entrepreneurial training. Finally, even when Teuk Saat finds a village where this entrepreneurial mindset exists, they usually have to insist on the importance of **quality** (concept that they are usually not familiar with).

Research & Development:

Research and development need to be continuous in order for Teuk Saat to be constantly adapted to local context. Indeed, with the increase in revenue (due to the generalisation of communication means, of television, of means of transport that allow rural inhabitant to go to cities and children that study and work in cities), level of life in rural community is improving. As a direct consequence, the level of rural community expectations rises and they regard, each time more, quality.

Support of regional platform:

Regional platform support is essential for the development of rural water treatment plant. They are, among others, in charge of controlling water quality every 2 weeks.

NB: The testing kits have been developed in partnership with the Institute of Technology from Phnom Penh and financed by UNICEF. Initially, Teuk Saat started testing water quality on a weekly basis but this ended being too expensive.

GROWTH GOALS

Until 2018/2020, Teuk Saat is aiming at serving 0.5/1 million beneficiaries through 250 water filtration plants. To achieve this ambitious goal, they will collaborate with organisations such as Oxfam, World Vision, UNICEF or even ICS. For the good realisation of their projects between 2014 and end of 2016, they will require financial support of 2 million euros.

In the future, Teuk Saat is also considering to use its rural franchisees as a mean to distribute other products necessary for the health of rural communities. It could be for example, products related to health and hygiene.

TECHNOLOGY OVERVIEW

Teuk Saat treatment schematic

1. A simple stand-alone purification plant installed in each village, adapted to the locally available water resource (ponds, river, etc.)

» A small electric pump to pump raw water from an available and chosen natural source

NB: Water sources used by the villagers usually have a high level of organic contamination, particularly faecal causing frequent waterborne diseases. Applying the WHO standards, these resources require only basic customized treatment including disinfection.

- » Coagulation and flocculation processes to remove micro-particles
- » Filtration and microfiltration processes through a sand filter
- » A purification process through exposure to ultraviolet maintaining taste and chemical water quality
- » The addition of a controlled number of silver ions to obtain a non-volatile water protection

NB: Water quality is monitored by monthly through bacteriological analysis

2. Water transported to customers' homes in disinfected and heat-sealed 20 liters tanks

The whole purification system is thus only composed of:

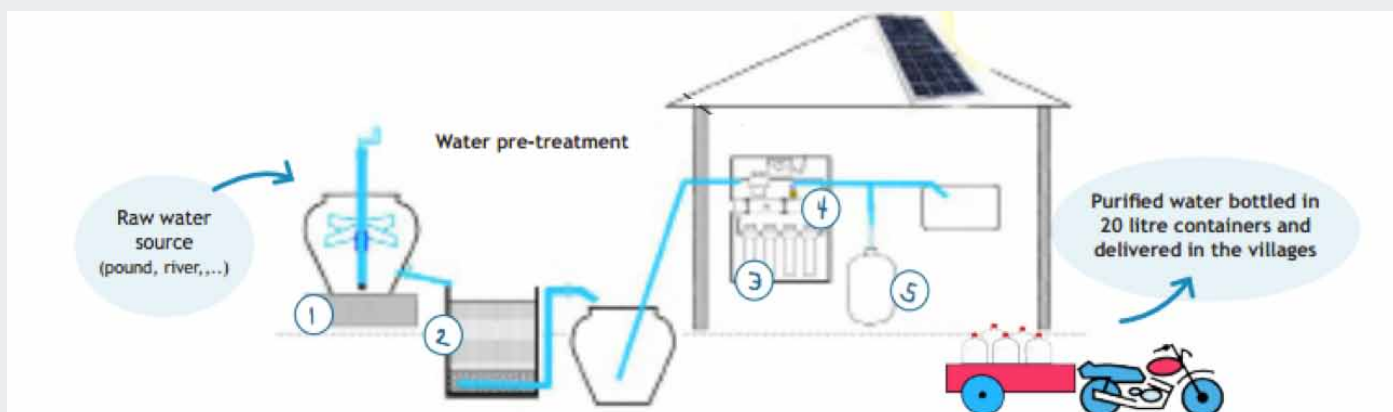
- » a small electric pump (600 to 800 liters / h)
- » an electronic control box
- » a series of filters in polyethylene
- » a UV lamp

All this powered solar energy : panels 85 to 100 Watts (charging a 12V battery)

How to ensure water quality at the point of consumption ?

When we aspire to provide quality water to customers, it is essential to consider the conditions of delivery. It is not enough to pay attention to the quality of the water distribution point. The conditions of transport and storage can indeed lead to a sharp deterioration in the sanitary quality of water actually consumed in the home.

Teuk Saat purification plant in the villages



1 - COAGULATION FLOCCULATION

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.



2 ET 3 - FILTRATION AND MICROFILTRATION

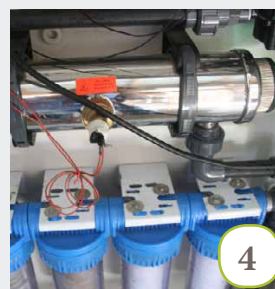
Next the water is passed through a sand filter, which removes the majority of the remaining suspended particles. Then the water is passed through a series of micro-filters (diameters ranging from 60 to 1 micron). At the end of this step, the water is clear but is not yet potable.



4 - UV 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 (wavelength 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).



5 - 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.



SEVEA – Synergie pour l'Echange et la Valorisation des Entrepreneurs d'Avenir - is a not-for-profit organisation that strives for an improvement of the answers brought to energy and water issues (from an environmental, a social and a societal perspective) in developing countries by supporting social enterprises from these sectors.

Our partners



Our references



Contact:

Sevea, Association Loi 1901

172 Chemin de Cugnet
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