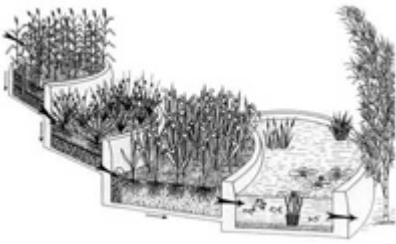


Ecological sanitation in Cambodia
'The dry toilet for a natural environment'



PRESENTATION OF THE ASSOCIATION EAU VIVANTE (Living Water)

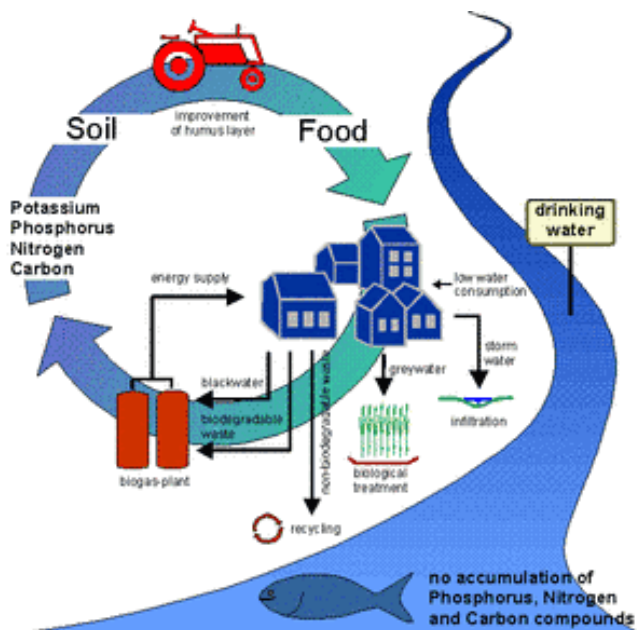
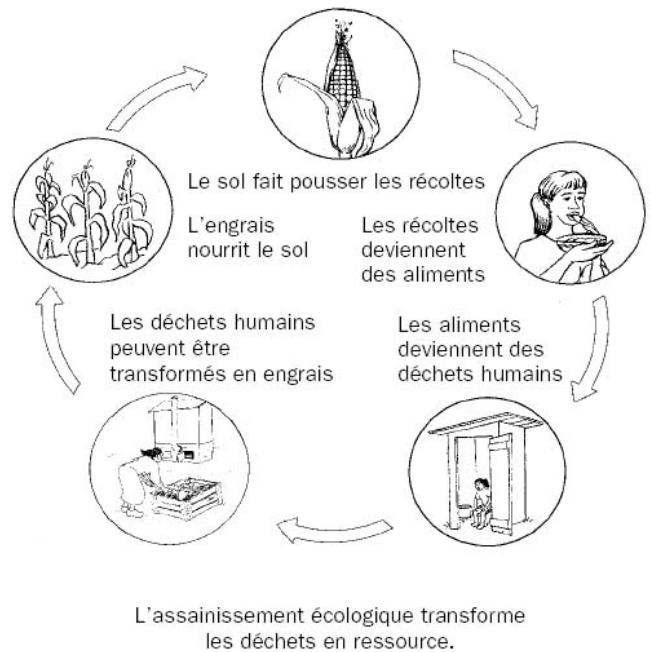


Association by law 1901 established in 1997, it promotes and supports any concept aimed at improving relations between man, its habitat, its lifestyle and the Earth. Eau Vivante has created and led a community for 7 years while experimenting the many technical and ecological alternatives to live in harmony. Nowadays the organization spends most of its time and energy protecting the water in France and abroad. In particular it promotes 3 concepts of ecological water management: dry toilets, recycling of rain water and autonomous waste water treatment by reed bed (phyto-purification). Its main activity is communication

(organizing conferences, training courses, stands on fairs ...). Since a couple of years we are able to notice an accelerated and more general awareness concerning the importance of respecting our water resources. The associations are mobilizing and many partnerships are being set up with politicians, being aware of water issues and the relevance of the solutions provided by Eau Vivante.

INTRODUCTION

Environmental management of water should help people to improve their lifestyle in order to reduce diseases and improve the fertility of the soil while preserving the natural resources. Promoting a clean and cost effective sanitation, promoting good hygiene and improving access to clean water supplies helps people to live in better health. Young children and infants are particularly susceptible to infection and illness due to poor sanitation, poor hygiene and dirty water. Currently, more than 1.7 million children under the age of five die from diarrhoea each year (World Health Organization). Many of these deaths could have been avoided if a proper hygiene had been practiced. A good understanding of the mechanisms processing waste helps people reflect on the specific challenges that affect their own living conditions and which make it difficult to have access to effective sanitation and guaranteed water supplies. Low cost ideas are proposed and could be used in most situations, adapting to the specific cultural restraints of each country. People are encouraged to discuss and reflect on the beliefs and traditions that may have influence on the health of individuals, households and communities.



In many situations, expensive facilities are subsidized and installed by different organizations to try to resolve environmental issues related to bad habits. When the grants come to a stop these installations are abandoned for lack of finances and health problems emerge again very rapidly in the poorest populations. This development is achieved in spite of social and economic context and is not sustainable. We want to encourage people to be responsible for their own existence on the basis of a good understanding of the mechanisms of destruction and regeneration of our environment. This helps people to make appropriate decisions regarding waste management, which has a major impact on health, the lives of their families and in broader sense their community.

THE DRY TOILET

Basic concept :

The dry toilet, litter toilet or bio controlled litter toilet (TLB) is a system that does not use water. The collection of excreta can be done in a toilet (bucket) or in a sealed pit in accordance with the desired autonomy.

These toilets do not smell, are very low cost and help to fertilize the soil.

Different types of treatment exist :

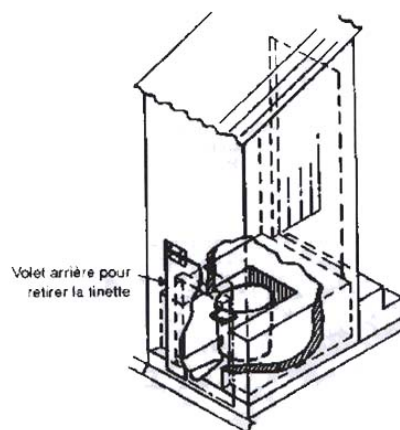
- External Composting: This type of toilet is the most basic since it only exists of a bucket. It involves mixing organic matter (faeces and urine) and paper, a dry ground of plants such as chips, sawdust and / or ash in order to achieve a balance of carbon and nitrogen in the mixture and to block the anaerobic fermentation which allows the start of composting. The presence of water provided by the urine is involved in the formation of a mixture suitable to decompose. The absence of smell also depends on the humidity of the mixture, an excess resulting in anaerobic and smelly decomposition in the bottom.
- Neutral Dehydrating Composting: This system accelerates the dehydration of faeces by taking advantage of solar energy for heating and wind energy for ventilation. An electric fan can also accelerate the process. Once dehydrated the excreta are a neutralised waste that must be evacuated regularly (a few months to several years depending on use and capacity).
- Worm composting: With this system the urine is separated from the faeces by the user. The worms quickly transform the faeces and reduce the volume in a considerable manner. The urine, which is water containing nitrogen, minerals and residues, is a good fertilizer. To make fertilizer, dilute urine in water: mix 3 containers of water for each container of urine. (The fresh undiluted urine is too strong and could damage the plants.) You can fertilize the plants with diluted urine up to 3 times a week.

Each kilogram of vegetable and animal biomass that is not reintroduced in a joint way in the process of soil formation weakens the capacity of the ecosystem and becomes a threat of water and /or air pollution.

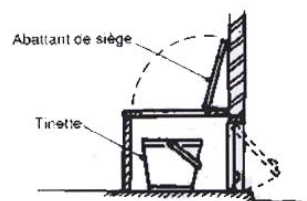
The result is always a disruption of the major natural cycles such as nitrogen, phosphorus, carbon and also from the water.

LITTER TOILET

The toilet is filled with a mixture of excreta, soil, ash, leaves or sawdust. At first the dry matter is placed at the bottom of the toilet before adding after each passage, ash, soil and dry leaves. No trash such as plastic, rags and bottles should be discarded.



Latrine à tinette



Adding material to cover the excreta

You can also use the toilet inside the house, without nuisance of odour while keeping the possibility of using the urine as a fertilizer.



Cover



Hole



Bucket

EXTERNAL COMPOST

The golden rules for obtaining a good compost :

- Find a balance between animal and vegetable components
- A suitable degree of humidity
- A sufficient time to mature



Technically, the composting area consists of bins of 1 m³. The first container receives everything coming in (kitchen waste, toilet litter, dead leaves ...) which is covered with dry matter at each input. When the first tank is full, the second will be used to expand with various inputs and provide a lot of oxygen to the compost of which the temperature will increase in the following weeks (up to 70 ° C). The compost will mature during a period ranging from several months to a year to be spread afterwards.



The texture and the colour of the latrine compost vary greatly depending on the amount and type of materials introduced. In extreme cases when it is done with the sandy soil, it takes the same appearance and contains almost no humus. When fertile soil and leaves is introduced, it gets more like compost of humus. This sample was sieved to make an excellent soil to be used for planting seeds.

Demonstrating that human excreta can be converted into these types of earth and humus could be an important step in convincing people that we can easily obtain organic fertilizer through that practice. Once fully prepared, compost is pleasant to the touch and can safely be used. It can considerably increase soil fertility and can also be used for potting plants or be placed in the grounds of vegetables and flowers.

Humus is an organic material composed of large molecules (humic acids) whose elements are present in vegetable and animal biomass. Vegetable biomass provides the carbon skeleton, whilst the animal biomass provides the "pieces" of protein containing nitrogen and phosphorus. After synthesis, the humic acid molecules form what is known as the "clay-humic complex".



Compost of the sandy dry toilet



Compost of the dry toilet resembling humus

SENSIBILIZATION TOWARDS AN ECOLOGICAL SANITATION

Purpose: To motivate, empower and educate towards the management of a dry toilet and treatment by composting.

1st phase : Introduction (duration : 1 week)

Acquisition of knowledge: Waste and health risks / Solid Waste Management

Material: Construction of a latrine with a bucket / settlement of a composting area / supply of materials for composting of excreta

2nd phase : Initiation (duration : 2 weeks)

Using the dry toilet with testing different materials available locally.

Starting several compost heaps according to the used materials.

3rd phase : Follow-up of the experiment (duration : 1 week)

Optimization of the working of the toilet.

Monitoring and management of the compost.

Introduction to the recycling of waste water (grey water only).

4th phase : use of excreta as fertilizer (duration : 4 weeks)

Using compost to plant fruit trees.

Using urine as fertilizer in the vegetable garden.

Comparison with a control area without fertilizers, comparative measurement of the biomass produced.

The introduction of this new concept is accomplished with a small group (a class) in order to empower users. Once the concept established, understood and accepted, wider dissemination can be done easily, while easing the management (larger, more toilets, double tank,).

Acquiring this knowledge should enable a wider awareness, especially for families of students and thus benefit the whole community.

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PICTURES OF DRY TOILETS

WORLDWILD



IN FRANCE



Inside the house



Outdoor



Dehydrating system



Public Toilet

