Accra, Ghana, 10-12 November 2009

WEST AFRICA REGIONAL SANITATION AND HYGIENE SYMPOSIUM

Ecological Sanitation (ECOSAN): A New Sanitation approach in Senegal

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Abstract

As a new approach, Ecological Sanitation has been introduced in Senegal since 2002. The population has accepted to use the urine diverting dry toilets as well as the sanitized products as agricultural fertiliser and soil conditioner. Initial efforts were concentrated on introducing Ecosan on a small scale in rural areas, but a dissemination including urban areas was recently started. The project has been implemented in urban areas through the construction of unisex urinals in some green areas where there are intensive urban agricultural activities.

Interesting results have been obtained so far in terms of research findings and achievements in the field. Ecosan has changed the life of farmers who accepted to use the products as fertilizers. Local and national actors have been trained in Ecosan precisely in the technology, treatment, collect, reuse of fertilizers and health and hygiene education,...The Ecosan concept and research findings have been shared with the population and integrated into the curricula of some Schools (Primary school of keur Daouda CISSE and research institutions (National School of Sanitary and Social Development).

In addition, the Ecosan technology has been adopted and integrated in the Manuel of the Millennium Water and Sanitation Programme initiated by the Senegalese Government to meet the Millennium Development Goal in Water and Sanitation, but some advocacy programme still needs to be done to implement it on the ground.

However some cultural constraints have been faced in the implementation of the Ecosan approach. For instance some traditional belief states that human excreta as well as domestic wastes are the shelter of supernatural beings such as "Djiins" then we should dispose them of in the quickest way.

INTRODUCTION

In Senegal, access to drinking water coverage is estimated at 77% (urban 93%, rural 65%), sanitation at 28% (urban 54%, rural 9%). **(UNICEF,2008)**. The vast majority of the country, mainly in rural areas, therefore lacks adequate systems for the collection, emptying and treatment of wastewater, excreta and solid wastes.

In this context, the CREPA (Regional Centre for low cost Water Supply and Sanitation) network in collaboration with the National Representative of Senegal, have initiated and introduced an Ecological Sanitation programme in 2002 which began with a research programme in 2 pilots sites in 2 regions of Senegal: Dakar and Thiès.

2006-2010 is the dissemination period.

This paper presents the aim and objectives, the sites, the research and dissemination phase, the technology promoted, the re-used of sanitized matter, **the social constraints**, the strategy implemented, the results obtained and the lessons learned.

AIM AND OBJECTIVES

The aim of this programme is to develop a strong expertise regarding Ecosan in Senegal.
The objective for the 3 first years (2002-2005) was to study the feasibility of an Ecosan system in a given socio-cultural context through pilot projects research.
The long term objectives are to:

- Improve the social, sanitary and economic living conditions of the population involved, by facilitating their access to appropriate sanitation strategies and systems that are adapted to their financial capacity, by training them on the concept of Ecosan and hygiene education, by building the capacity of already existing associations and organisations... in the collection, treatment and reuse of the sanitized human excreta in agriculture;
- develop tools for the promotion of Ecosan
- integrate Ecosan in local and national sanitation plans and strategies
- disseminate the Ecosan concept throughout the entire country

SITES

The sites are the villages of Mbéye; Wayembame; Déni sud; Bonoba ; Kanyak, Nguindouf, Pikine Niayes valley (Dakar Region) Keur Saib Ndoye, Keur Daouda Cissé, Keur Matar Arame, Keur Demba, Keur Karamokho, Keur Mor, Keur Saara, Mbayéne, Ndiréne, Hanéne, Keur ibra Niane; Mbodjiéne, Keur Madaro, Nbob gadiaga, Darou Diop, Ngatty yaram Tabi (Thies Region).
The overall population reached by the project so far is 150.227 persons. In fact, the combined total of the population in all the sites is estimated at 15.227 persons. People reached indirectly through 7 press articles, seminars, radio -broadcast, replicated training sessions by teachers, students or hygienist trained by the project, advocacy, sensitizing campaigns, items (flyers, T-shirt, cap) is estimated at 135.000 persons. It is considered as reached any people that has known or heard about the project by the sensitizing activities, training sessions, or other means. Therefore, it is very challenging the estimate the exact number of people reached.

RESEARCH PHASE

During the research phase, a research team that consisted of four researchers: 1technician, 1 agronomist, 1 sociologist and 1 hygienist was established. All had undergone training in the Ecosan concept and in action research methodology. Pilot sites were chosen on the basis of needs and success factors. The implementation process followed a participatory approach. The research activities had helped to determine the hygienisation period, the temperature in chambers, the nitrogen, phosphorus and potassium contained in the excreta, the quantity of ash that need to be added in the pit to minimise odours and fight fly breeding and to analyse the faecal coliform and streptococcus.
To summarize, research findings had shown that in the study areas in Senegal, the necessary retention time for pathogen in urine to die off is 45 days. Other pilot studies where the CREPA- network had carried out research had shown very good results after 30 days with at least 20°C. As for the faeces the time necessary for pathogen to die off was found to be 6 months. As far as adding ash or sand after defecation is concerned, the quantity of ash to add is 240ml per day which equals to 162,64g of ash **(CREPA, 2005)**. Adding ash not only improves the quality of the compost by increasing the pH, but also serves to cover the fresh faeces minimising odour and protecting against fly breeding.

Furthermore, research findings had shown that the Ecosan approach could be accepted by the population and had proven to be feasible in Senegal. In other words the researchers pointed out that in spite of the natural reticence in the study sites, some people who had accepted to use not only the Ecosan toilets but also the sanitized excreta as agricultural fertiliser and soil conditioner. Besides that, interesting results had been obtained in the experimental plots through some Ecosan agricultural practices conducted by the Agronomist and some local farmers.
Considering all these factors, the researchers stated that the Ecosan approach could be feasible in Senegal **(CREPA, 2005)**.

DISSEMINATION PHASE

Initial efforts were concentrated on introducing Ecosan on a small scale mainly in rural areas. However, a dissemination was recently started with the introduction of Ecosan in urban areas and in some schools.

A pilot Ecosan project has been carried out in the primary school of Keur Daouda Cissé which faced scarce water, money and food resources. The Representative of the Regional Education Department and the school staff have been trained in Ecosan concept precisely in the utilization, operation and maintenance of the technology, the treatment and use of Ecosan fertilizers and health and hygiene education. In addition an urine diverting toilet of 4 units (two for girls and two for boys) has been constructed (see photograph 1).

Photograph1. - Ecosan school latrine

The teachers have integrated the Ecosan concept in their curricula and replicated the training for pupils. To close the loop an Ecosan school garden has been developed and managed by a committee mainly composed by pupils and teachers (see photograph 2).

Photograph2. - Pupils and teachers working in the Ecosan garden

Satisfactory results have been obtained at school and community levels.

At the school level, the sanitation facilities contributed to improve the health learning environment and enabled children to save money which has been used to restore classrooms' roofs.

At the community level, as effective sensitization vectors, children have played a key role to change the attitude of their parents towards the use of the sanitation facilities, the handling of excreta and the consumption of agricultural products from crops fertilized by urine and feaces. This, hence, has helped address some constraints in the community based upon religious and/or cultural beliefs.

For dissemination purposes, the Ecosan concept has been introduced in the National School of Sanitary and Social Development (ENDSS), the trained teachers have integrated the Ecosan concept in their curricula to train hygienists.

In addition, the project has been recently implemented in urban areas through the construction of urinals in Pikine Niaye Valley where there are intensive urban market gardening activities.

TECHNOLOGY PROMOTED

Urine diverting dry toilet is the systems that have been demonstrated in Senegal, the system promotes the on-site option and is based on three fundamental aspects: rendering human excreta safe, preventing pollution rather than attempting to control it afterwards and using safe products of sanitized human excreta for agricultural purposes (**Winblad, 1998**). Two types of urine diversion latrine have been used: The Vietnamese and the Tecpan model. In all 232 toilets have been constructed so far. In addition, twelve (12) urinals have been constructed: two (02) in schools and ten (10) to introduce Ecosan in urban areas (see photograph 3, 4, 5).

Photograph3. - Urine Diversion Toilet

Photograph4. -Unisex urinal, a man crouching to urinate

Photograph5. - Unisex urinal, a girl testing the urinal

RE-USE OF SANITIZED MATTER

The type of reuse adopted so far is the use of sanitized faeces as an organic input in agriculture. Some people use the sanitised excreta in their garden, but other people pour urine in abandoned fields or give it to users. The use of sanitized human excreta remains low compared to the number of Ecosan latrine owners. This can be explained by the local perception or social constraint about human excreta.

SOCIAL CONSTRAINTS

People could not easily accept the necessity to separate urine and feaces. They did not see the use of separating “two things that go together in the same hole”.

The fact of handling human excreta is perceived as something against the tradition because people have always considered human excreta as a waste that should be disposed of as far as possible. A traditional belief states that human excreta as well as domestic wastes are the shelter of supernatural beings such as “Djiins”. Then we should stay away from them.

Moreover, some people can not get over the fact of seeing certain farmers using the sanitized excreta as manure therefore they don’t hesitate to denigrate them. “ I was victim of verbal harassment during a naming ceremony from some people against my Ecosan agricultural practices” stated a farmer.

In spite of the tremendous sensitizing efforts some latrine owners keep on using their toilets as a luggage store (see photograph 6).

Photograph6. – Latrine used as a luggage store

STRATEGY

Overall strategy implemented

Participatory approach is used. People are assisted to analyse their own situation and to come up with solutions that are most appropriate for their circumstances. The communities have been trained in the Ecosan concept and Hygiene education and they are operating and maintaining the infrastructure. In fact, 2 female animators have been trained in each site. Their role is to convey the message to the population. Health and hygiene and other capacity building trainings have been organised for the community particularly existing local associations.
The capacity building programme aims to increase knowledge on Ecosan concept and demand. In addition, the population contributed either financially by giving 10% of the cost of the toilet or in nature by providing local materials.
To reach and involve everyone particularly women in terms of mobilisation and training, the needs and concerns of people from all social groups or walks of life: women, men, children, old, young, disabled people are considered when designing capacity building and awareness campaign and in constructing the toilets. Everyone is considered as a major stakeholder, actor and change agent in both households and communities.
For more visibility, some advocacy activities have been carrying out in seminars, symposiums,…. for the local and national authorities and professional in Water and Sanitation sector.

Strategy used to address the social constraints

To address the social constraints mentioned upwards, the following strategy has been mapped out:

- Community meetings have been organised to sensitize the population about the advantages that can be drawn from sanitized and recycled human excreta. In addition, social animators carry out twice a week house to house visit to continue the awareness campaign. The Ecosan team organised demonstration in communities concerned about the safe way of handling and using Ecosan products as manure in agriculture.
- Research findings have been shared with the population in order to keep them posted as well as to reassure them about the safe aspect of sanitized human excreta.
- A key element in the strategy to address social constraints is the “Make do”. The association Takku Ligguey Ecosan that gathers all the trained farmers and animators has been created. They, among others, realize a sensitizing programme in all the sites. In fact, they move from sites to sites according to a well planned programme to sensitize their fellow on Ecosan in order to make them adopt it. By doing so, they, hence, replace or represent CREPA in those sites, and then start taking the ownership of the programme.
- Furth more, on each site at least an Ecosan field is cultivated by local and trained farmers members of the TLE Association. The aim is to promote Ecosan products and convince the reluctant people to change their mind. Some site visits are also organized for people eager to know more about Ecosan because as stated by some local ethnic groups: “Seeing is Believing”.

RESULTS OBTAINED

The interesting results obtained so far are as follows:

- Increase of agricultural crops for farmers who have accepted to use the Ecosan fertilizers in their lands. As shown by the comparative figures, one of them has harvested 75.395 tonnes of onions per hectare with urine as fertilizers against 47.573 tonnes per hectare with chemical manure.

Photograph7. - Onions fertilized with urine

- Improvement of the sanitation (environment cleaner and healthier)
- Reduction of malaria and diarrhoeal diseases rate
- Local expertise (trained people in Ecosan and hygiene education)
- Strong expertise on Ecosan acquired by the Research team
- Research findings integrated into the curricula of some Schools (Primary school of keur Daouda CISSE and research institutions (National School of Sanitary and Social Development);
- 23 teachers, 420 pupils and 439 students have been trained in Ecosan concept
- The Ecosan technology adopted and integrated in the Manuel of the Millennium Water and Sanitation Programme initiated by the Senegalese Government to meet the Millennium Development Goal in Water and Sanitation,
- The creation of a national association named Takku ligguey Ecosan that gathers all the 50 farmers and 38 animators trained in Ecosan

CONCLUSION (Lessons learned)

The lessons learned from these practical experiences can be summarized as follows:

- Even though many people are reluctant to adopt Ecosan, the Ecosan approach has proven to be feasible in Senegal because there is a growing minority that has accepted to use the toilets as well as the products. They are all muslim. Therefore, one may state that Ecosan approach can be applicable in Moslem countries where people use water for anal cleansing. The problem of anal washing water can easily be solved through an appropriate construction, which incorporates a direct drainage system;
- Social study sites or diagnostic studies are very important before implementing Ecosan project. Because if we are enable to clearly understand the motivating and constraining factors of the community, it is easier to develop suitable Ecosan systems with them that will address both their needs and concerns,
- Awareness programmes through mass media to reassure people about the fact that there are no threats to human health in using sanitized Ecosan products are very important mainly in urban areas. However, people must be made aware that sanitized is essential, and that the use of untreated or partially treated products is a healthy risk;
- It takes a long process to make some people change their attitude about handling and using sanitized human excreta;

- The combination of sanitation and reuse of human excreta in agriculture particularly in gardening is a promising approach for both agricultural development and sanitation and can motivate people to adopt Ecosan;
- Capacity building is vital for the dissemination and sustainability of Ecosan projects;
- Participatory approach is vital to introduce Ecosan project in urban area so as to be able to develop suitable Ecosan systems that will address both needs and concerns of people;
- Site visit is very important to promote and make people adopt Ecosan because "Seeing is Believing";
- The use of sanitized ecosan products can be of a great help in the development of urban agriculture Thus to contribute to the improvement of the economic and environmental living conditions and to the prevention of health risks related to the consumption of vegetables fertilized with untreated domestic waste water;
- The sustainability of Ecosan approach depends on the political will by its introduction in local and national sanitation plans and in its implementation in urban areas through an appropriate technology such as urinals;

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Keywords: Ecological Sanitation (Ecosan), Urban agriculture, Unisex urinal

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