



ECOSAN - ecological sanitation

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BY ECOLOGICAL SANITATION we in SUDEA mean a non-mixing toilet system which enables the recycling of human waste. In the process some wastewater and the organic household waste are also composted and turned into something useful and valuable. The process of recycling human- and household waste does not pollute the environment or misuse any other natural resource. While introducing the ECOSAN system community participation, cultural sensitivity, cost benefit effectiveness and behavioural changes are essential.

This paper describes the experience of an integrated environmental sanitation and urban agriculture-based pilot programme under introduction in Ethiopia. The programme attempts to address two interdependent problems: the disposal of human- and organic household waste, and overcoming malnutrition through sustainable, small-scale urban agriculture in the cities and extended household agriculture in the rural areas where vegetables are produced close to the house. Participation enables the whole family to learn, produce and use home-grown vegetables.

The programme is based on the ECOSAN concept (economy, ecology and sanitation) — a system that integrates sanitation and agriculture, by using human waste as fertiliser and soil conditioner. Urine is used diluted with water or undiluted. The faeces are stored and composted before use. In this way we believe, ECOSAN promises a clear advantage over the traditional water borne sanitation systems and other dry sanitation systems.

While this system appears sound, its actual feasibility has yet to be empirically verified. It was with this in mind that

the Society for Urban Development in East Africa embarked upon the pilot programme in Ethiopia.

We have so far constructed, and now manage some 100 units. A number of constraints and favourable conditions have been identified. The initial phase of introducing this innovation was smoothed thanks to its enthusiastic acceptance by the beneficiaries. At the next phase, that of maintaining the introduced units, two types of problems of different order were encountered: technical and behavioural problems. On the other hand, the increased yield of vegetables due to the intervention has contributed towards its continuation.

Urban agriculture or household gardening

Bio-intensive gardening or urban farming has become a steadily growing industry in many parts of the world. In recent years it has become a means of livelihood for hundreds and thousands, while millions more supplement their meals with fresh, nutritive food. A piece of land of 15 m² can produce most vegetables needed for a small family (3-5 persons) and 40 m² allows an income generating activity. Bio-intensive gardening is also water-saving but labour intensive.

For several reasons urban agriculture responds positively to initiatives which are on the global agenda including the fight against pollution, malnutrition, hunger, poverty, and unemployment. Out of about 100 simple, inexpensive, environmentally sound and culturally sensitive techniques, SUDEA is implementing four: FAITH gardening, double digging, container gardening and growing walls, even in

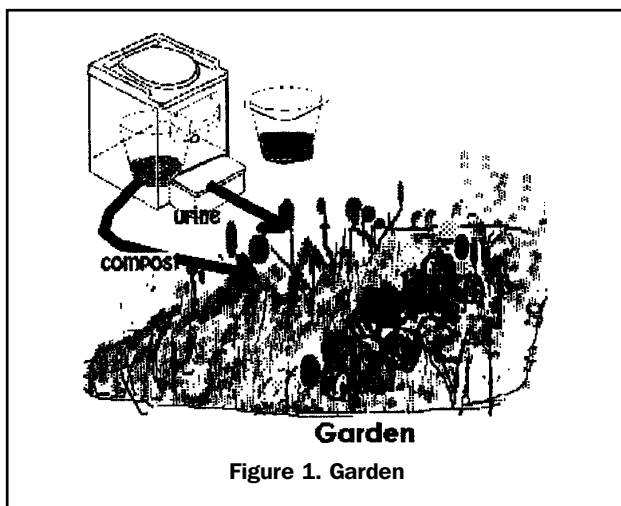


Figure 1. Garden

The ECOSAN toilet is an important partner for household gardening since it produces a clean, natural fertiliser and soil conditioner. Household gardening is important for the ECOSAN project since it makes use of the products since it makes use of the products from the ECOSAN toilets and the organic household waste and some wastewater.

areas where land is scarce. When available combined with drip irrigation.

Selecting the families

SUDEA is co-operating with national NGOs. The beneficiaries are selected by the local NGO and the local authority (Kebele) according to certain criteria: new sanitation is needed for the family, willingness to try this new system, not more than 10 persons in the family, and a piece of land for the household gardening. Willingness to assist in the building process and to learn about household agriculture is also a factor in selection.

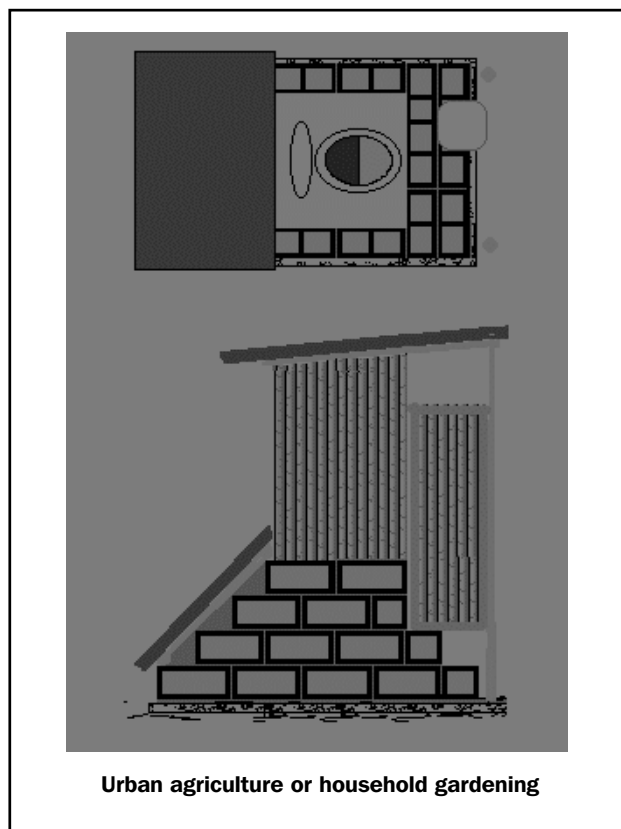
Technical problems

Some technical problems have occurred. Since the materials available on the Ethiopian market often are of low quality, especially plastic items like toilet seats and plastic pipes produced locally, this is reflected on the quality of the toilets built.

The ECOSAN toilet is a urine-separating or non-mixing system that enables the separate storage of urine and faeces. The urine is led through a pipe from a urine collector into a special container, are then mixed with ashes, soil, leaves, grass, sawdust or any other suitable material available. By not mixing the urine - "the natural fertiliser" - with the faeces, which contain most of the pathogens, the bad smell from the latrines is very much reduced. It also means that the treatment of the two ingredients can be done in a proper way - urine supplied to the fields as fertiliser, and faeces kept under control to minimise the effects of pathogens and intestinal parasites, and later used in the fields as soil conditioner.

Social constraints

As far as we understand, sanitation awareness campaigns have always been of low priority in Ethiopia. Thus it is rather difficult to convince people to keep the toilet as clean as any other room in the home. As the system of ECOSAN demands relative cleanness, due to the use of the sitting position, and carefulness, to avoid mixing the urine with faeces, implementation demands a continued follow up. In many places this process has created a close relationship between SUDEA and the beneficiaries, while in some cases a very sensitive discussion takes place, when it is necessary to tell grownups: "Please clean your own toilet!" In many cases the difficulty of keeping the toilet clean is due to lack



of water and soap. What we have learned so far is the importance of clean water and raising countrywide awareness on environmental sanitation.

Advantages

Tests made on the fertilising effect of the urine indicate an increased yield of 50 - 200 per cent the "normal" yield. In a home garden of 15 m² the production of vegetables is estimated to provide an average Ethiopian family with about 75 per cent of the vegetables and fruits needed. At the same time the system can also make use of the organic waste produced in the home and recycle it into edible products. This type of dry sanitation needs very little water, only for cleaning the toilet once a day. The water needed for irrigation is about 25 litres and compared to a WC, which consumes at least 100 litres a day in an average Ethiopian family, the saving is considerable. The ECOSAN agriculture system can also make use of some of the wastewater from washing and cleaning.

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