Tingloy EcoSan Pilot Project

final project report
UWEP Plus Programme

Submitted by

'HILIPPINE CENTER FOR WATER AND SANITATION –
INTERNATIONAL TRAINIG NETWORK FOUNDATION
(PCWS-ITNF)
Susanne Boom

to

CENTER FOR ADVANCED PHILIPPINE STUDIES, INC.
(CAPS)

and

WASTE

April 2003

Table of Contents

List of Boxes

List of Annexes

1. Introduction

The Center for Advanced Philippine Studies (CAPS) is facilitating an Integrated Sustainable Waste Management (ISWM) program in the Municipality of Tingloy Island, Batangas province under the global Urban Waste Management Expertise Program (UWEP), coordinated and financed by WASTE (Advisors on Urban Environment and Development), a Dutch NGO. The latest extension of this program is called UWEP+. Initially, the *Tingloy EcoSan Pilot Project* started off as part of the UWEP+ program under a Carbon/Nitrogen pathway research titled "Local research on the environmental aspect of good waste management practice in four municipalities in Southern countries". However, during the course of project development and implementation the *Tingloy EcoSan Pilot Project* got a status of its own and the main objectives became to introduce the ecological sanitation approach and technology (urine diverting toilets) in the ISWM project area in the Philippines and to demonstrate it can be an attractive alternative sanitation technology for the situation in Tingloy. Overall the project can be seen as an effort in advocacy for the Ecological Sanitation approach in the Philippines.

CAPS contracted the Philippine Center for Water and Sanitation – International Training Network Foundation (PCWS-ITNF) for a period of six months (July – December 2002) with a budget of PhP 86,780.45. In reality the project activities and budget were spread out till the end of March 2003. Three development and implementing phases can be distinguished in the project, each with its own approach and outputs. In general, the project involved the following activities:

- Community organizing
- Training
- Design development and improvement
- Construction
- Information and reference material development
- Assessment of water and sanitation situation
- Monitoring
- Extraction of lessons learned

The initial project team consisted of: Mining Manguiat (CAPS), Boji Gendrano (PCWS-ITNF) and Susanne Boom[1] (PCWS-ITNF). During the second phase of project implementation Apol Jimenez (PCWS-TNF) took over the position of Boji Gendrano in the project.

2. Phase 1 of project implementation

2.1. Approach and output

During the first phase of the project (July – August 2002) the respective partner households and community representatives were insufficiently involved in the process of designing and constructing the toilets. Construction was not supervised carefully enough and went in a too rushed way and the construction method (ferrocement-technique) and materials used (moulds, ferrocement), were unknown in the project area. The outcome of this phase was that the three (3) toilet facilities constructed could not be used as dry ecological sanitation (urine diverting) toilets; they showed several operation errors and were inconvenient to use. During this phase training was conducted and information material was developed.

[1] Susanne Boom is a staff member of IRC International Water and Sanitation Centre. Her task of coordinating/managing the *Tingloy EcoSan Pilot Project* was undertaken as part of her assignments at PCWS-ITNF. She was stationed here for 14 months (March 2002 – April 2003) in the scope of the Junior Professional Officer (JPO) Exchange Program.

The approach and output of this phase does not subscribe to the common way-of-working and to the capacity of both organizations of PCWS-ITNF and CAPS but was the sum of circumstances (miscommunication, poor understanding of ecological sanitation concept, un-experienced project management, time pressure, etc.).

2.2. Activities

2.2.1. Initial site visit

The initial site visit was carried out in light of the Carbon/Nitrogen pathway research under which the project started off. A mixed group of people, PCWS-ITNF and CAPS staff together with staff from the Environmental Engineering Department of the University of the Philippines (handling the actual C/N research), visited the project area on June 22 to get familiar with the situation. The team met with the Rural Sanitary Inspectors (RSIs), Barangay Health Workers (BHW) and some of the Barangay Captains of the Tingloy community.

A sketch with the initial to-pilot design of the EcoSan technology was presented. In addition the ecological approach to sanitation was explained more in detail. The community representatives were asked when and where the EcoSan approach and technology (urine diverting toilets) could be tested. The scheduled date for the start of the EcoSan pilot project turned out to be July. The visit ended with a quick walk around in the project area.

Based on the outcomes of this orientation meeting with representatives from the Tingloy community it was decided to implement three (3) pilot ecological sanitation toilet facilities; i.e. one household in each of the three Poblacion barangays of the Tingloy municipality.

2.2.2. Community organizing

The community organizing activities during this phase were entirely carried out by Mining Manguiat. He organized teams consisting of Barangay Captains and Rural Sanitary Inspectors within Poblacion Barangays 13, 14 and 15. These teams visited several households within the respective communities asking them about their willingness to participate in the pilot project. The households visited were all poor households with no sanitation facilities.

The three households finally selected after invitation by the site selection team all participated on a voluntary basis and were willing to help construct the urine diversion toilet facility. The selection team generally and briefly informed the beneficiary households on the fitting in of this project in the UWEP+ program, the type of toilet, the construction and necessary training activities.

These initially selected (3) partner families can all be considered as part of the lower class (poor) people within the project area, 2 of these households are located in rural upland forest areas (Barangay 13 and 14) while 1 is located the urban centre (Barangay 15).

After these initial community-organizing activities, the project team undertook awareness raising on EcoSan, organizing for project and mobilization for the project activities among the partner households and community representatives.

2.2.3. Construction

For the urine diverting toilets a mould set was fabricated in the mainland by a hired foreman and supervised by engineer Boji Gendrano (PCWS-ITNF) and shipped to Tingloy Island. Ferro-cement was the construction method used. The construction of the first urine diverting toilet unit in Barangay 14 started in the last week of July, the unit in Barangay 13 was finished in the first week of August and the unit in Barangay 15 in the second week of August. The construction

activities were carried out by the hired foreman and partly supervised by PCWS-ITNF staff. Some people of the partner and surrounding households helped in the activities.

The direct costs for constructing 1 toilet facility were around PhP 2,800.00, excluding labour costs and costs for the mould used (PhP 3,500.00).

The photo documentation in Annex 1 provides some insight in the construction activities during this phase.

Box 1 Design of urine diversion toilet under Phase 1

The design included a cylindrical substructure with a height of 1 meter and a diameter of 1 meter, which is divided into two processing chambers of equal volume. Each chamber has an access door. The slab has two holes, one above each one of the chambers. On one of the holes a movable toilet bowl is placed. The other hole is covered with a lid. The bowl and lid can be shifted if the first chamber is full. The toilet bowl makes use of a urine diverter (a small hole plus separation device). Urine is transported to a covered bucket by a hose. The slab contains two holes for ventilation pipes, each connected to an individual processing chamber. Also the slab has two small openings to access the chambers with a slim stick for stirring. The superstructure is directly connected to the slab, is also cylindrically shaped and is about 2 meters high. The toilet has a tin door and an outside step in front of the door.

2.2.4. Training conducted

Training on ecological sanitation was conducted on August 24 and by that took place after the construction of the initial three urine diverting toilet units was completed. The training team entirely consisted of PCWS-ITNF staff.

The training module provided simplified information on the importance of sanitation, different sanitation (technology) options, the ecological sanitation approach, operation and maintenance of urine diversion toilets and hygienic practices in an interactive, visual art based way. Part of the training also was to consult the people on adjustments to be made in the design of the implemented toilet facilities.

The training covered 1 day. A total number of 25 people attended the training, excluding the facilitators. There were 10 persons from Barangay 14 (including 4 users), 9 persons from Barangay 13 (including 2 users) and 5 persons from Barangay 15 (including 1 user) plus 1 participant from Barangay Papaya (RSI).

Based on their observations during the transect walk, the experience of the users and what they learned about EcoSan in the training lectures, the participants gave comments on and recommendations for the designed and constructed toilet facilities.

Box 2 Feedback of training participants on constructed toilets

- The hole of the urine diverter needs to be adjusted (bigger, deeper and more to the centre)
- Women need to be consulted in making the design
- The hole in the toilet bowl for the faeces to drop in needs to be bigger and should be vertical
- Smoothen the toilet bowl (so it is easier to use, to clean, and it looks more inviting)
- Make the chambers/vaults easy to open
- The toilet should have windows (position above the head) for beauty, ventilation and light
- Make everything (including the walls) easy to clean
- Widen the superstructure
- The seat (toilet bowl) should be movable

The activity report of the training, including the list of participants, original training program and internal evaluation of the training by PCWS-ITNF staff can be found in Annex 2. See Annex 1 for photo documentation of the training.

The comment from the side of CAPS was that the training actually provided a lot of information already known by the training participants. People in Tingloy seem to have a high level of sanitation and hygiene awareness already, due to the work of the RSIs and BHW. The focus of the training should therefore more have been on the side of the approach and technology of EcoSan, how it differs from the ‘usual’ and ‘conventional’ sanitation practices in the area. The training was felt too general and to some extent too simple.

2.2.5. Monitoring, problems encountered and follow up

The construction process was only partly overlooked by PCWS-ITNF staff and monitored twice: one time during actual construction of the toilet units in Barangay 13 and 14, the one time after construction of the three units was completed already. During these monitoring visits Mining Manguiat and household members were tapped on the process of the project. The main findings of the monitoring visits were:

- The respective household and community representatives were insufficiently involved in the process of designing and constructing the toilets
- Construction was not supervised carefully enough and went in a too rushed way
- The toilet facilities constructed could not be used as dry ecological (urine diverting) toilets
- The toilet facilities constructed had several operation errors and were inconvenient to use

Regarding the above PCWS-ITNF decided to conduct in-depth consultations with the respective households to find out per household what needed to be done to improve the facilities and adjust them in such a way that they can be classified as dry ecological (urine diverting) toilets and are convenient to use.

Box 3 Technical errors in design of urine diverting toilets under Phase 1

- The processing chambers/vaults were half constructed under ground level
- The bottom of the vaults was not lined which can be problematic during rainy season
- The doors of the processing chambers/vaults were cemented so they were not accessible for emptying and monitoring purposes
- The toilet bowls were cemented to the slab and not movable anymore
- The holes in the toilets to drop the faeces into the pit were too small and a PVC pipe connected to the hole was placed under an angle.
- The toilet bowl was not smooth; therefore faeces could stay behind, with the risk of producing bad smell and attract flies. Further urine could be absorbed by the ferro-cement and can cause cracking of the material
- The lid attached to the PVC pipe connecting the hole in the toilet bowl only opens using pressure (water, stick), and further it only closed partly, which could cause the spread of bad odour and fly breeding

2.2.6. Information materials developed

The information materials developed during this phase were mainly materials targeted for the conducted training on ecological sanitation. Materials that were disseminated for use and reference after the training included:

- a colour poster with recommendations on how to use and maintain a urine diverting toilet
- a monitoring sheet on use and maintenance of urine diverting toilets (so the performance)

The poster was initially developed for the partner families but also given to the respective Barangay Captains and RSIs. Copies of the monitoring sheets were also given to the RSIs.
These materials were translated from the original versions found in two Spanish books (one for households, one for facilitators monitoring visits) titled *'La Letrina Abonera Seca, Manula de Educacion Sanitaria para la Persona Facilitadora/Visitadora Familiar'* published by UNICEF El Salvador, Agencia Sueca para el Desarrolo Internacional and Gobierno de El Salvador Ministerio de Salud Publica y Asistencia Social in October 1996 and developed for a programme on dry toilets in El Salvador.

Because these materials were directly translated and not adapted to the Philippine context and local situation of Tingloy, they were actually not appropriate enough and in some ways even sent out wrong messages. This later on was pointed out and explained to the partner families in household visits by the project team and the materials were not distributed any more.

3. Phase 2 of project implementation

3.1. Approach and output

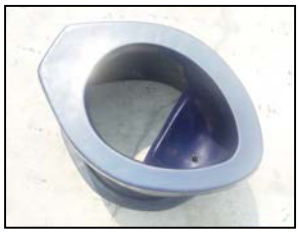
As a reaction to the process in the first phase of the project, during the second phase (September – October 2002) the community representatives were informed about scheduled activities taking place and in-dept consultations were held with the respective partner households to find out per household what needed to be done to improve the facilities and adjust them in such a way that they could be classified as dry EcoSan (urine diverting) toilets. The Rural Sanitary Inspector (Auring Arrelano) working in the project area participated in the in-dept consultations A new engineer (Apol Jimenez) was involved in the project and a new design was made. The outcome of this phase was that two of the existing toilet facilities were converted into pour flush toilets with leaching pit (Barangay 13 and 15) and 1 partner family agreed on building a new dry EcoSan (urine diverting) toilet facility, according to the new design (Barangay 14). The old toilet facility was planned to be converted into a bathroom facility. For all (re)constructing activities local labour and local available materials were used. During this phase reference material was developed.

Box 4 Prototype urine diverting toilet bowl

To tackle the problems of the toilet bowls constructed under Phase 1 of the project (rough surface, too small holes for faeces and urine, hole placed under an angle) a prototype urine diverting toilet bowl made from fibreglass was introduced in the project. This prototype came together with a mould and originated from Mexico, developed by the 'Centro de Innovacion en Technologia Alternative, A.C.' A total of 3 copies of the bowl were made, using the mould, by a fibre class workshop in Metro Manila (GRP Systems & Fabrications, Inc.). The copies were fabricated for the cost of PhP 1,800.00 each.

The prototype was well received by the people in the project area, the only concern they had was that it can be dangerous for children as the hole is quite big. This could be solved by covering it with a lid that has a smaller hole, made locally. In the course of the project the prototype turned out to be not appropriate as it was designed for a community of 'wipers' while the people in the project area are 'washers' and the design did not accommodate that. Further, the cost of the prototype cannot compete with the cost of the conventional pour flush toilet bowl / squat-type pan ranging between PhP 400 – 600. Besides, it cannot be locally made, as there are no fibre class workshops in the project area. A research trial to copy the prototype using cement was undertaken by PCWS-ITNF. Costs were low (PhP 300 per bowl) but the bowl turned out to be too heavy to handle and the surface could not be made smooth enough to be convenient.

The external advice from WASTE (during Phase 3) was to eliminate the use of the prototype urine diverting toilet bowl in the project as it only limited the development of an appropriate and convenient design.



3.2. Activities

3.2.1. In-dept consultations with partner households

A full week was spent in the project area (September 5 – 12) to conduct in-dept consultations with barangay officials and households on continuation of the project. First meetings were held with the Barangay Captain and Barangay Health Workers of respectively Barangay 13, 14 and 15.

The team of the RSI (Auring Arellano), CAPS and PCWS-ITNF informed them about: the in-dept consultation, the current status of the project, problems encountered and reasons for this, the options for continuation of the project, involvement of local masons/carpenters, using local available material, and showing the prototype of the urine diverting toilet bowl.

Visits to households were made together with the RSI (who functioned as a translator and sanitation resource person) and respective BHW. The households were informed about the same things as the barangay officials and were consulted about which option they preferred for continuation of the project:

- conversion of current toilets into good working dry EcoSan facilities
- construction of new dry EcoSan toilets
- pulling down of existing toilet
- conversion of existing toilet into bathing facility

Barangay 15
This partner family was visited twice; during the first meeting only the woman and her small children were present, during the second meeting the mother in law of the women joined. The family consists of 4 adults and 3 children. The toilet build was used but not so often and water was used to flush the toilet (otherwise faeces do not go into the vault they claimed), around 1.5 litres per person each time (cleaning and flushing). Water comes from private faucet outside the house. The toilet was dirty at time of visit (stripes of faeces where visible in toilet bowl). Problems that the family encountered were that it is too hot inside toilet (needs a window), difficult to clean (rough material) and faeces are not easily flushed. The bucket of urine was not emptied yet after construction. The woman of the family (who attended half of the training) found the EcoSan approach and operation & maintenance of EcoSan toilets hard to understand, and she did not explain other household members about EcoSan.

Although this partner family was initially selected, the impression was that there was no interest in EcoSan approach and household members were sceptic about the current facility. The PCWS-ITNF/CAPS team in support of the RSI decided for this household to convert the existing toilet into a pour flush toilet by changing the bowl for a squat-type pan (already provided before by the Municipal Health Office of Tingloy) and adding a leaching pit (which is locally also referred to as a septic tank). In this way the partner family at least has a working toilet facility that they can handle given their circumstances.

Barangay 13
The toilet was not used at the time of visiting the partner family because of bad smell; the family blocked all holes in the structure and covered the bowl with a lid to fight the smell. Before, the toilet was used once in a while, consuming a total of around 2 litres of water per person per time for cleaning and flushing. The family taps water from a nearby deep well. In principal the toilet will be used by three households (all relatives) with a total of 11 members: 6 adults and 5 children. The partner family expressed that they were still interested in the EcoSan project and understand the EcoSan approach. Therefore they preferred to build a new urine-diverting toilet and convert the existing structure into a bathing facility. The family preferred to use the prototype urine diverting toilet bowl as introduced by PCWS-ITNF in the project and making a trough for anal cleansing. The family agreed to contribute labour and preferred construction materials were discussed (hollow blocks, yero sheet).

The suggestion from WASTE (Gert de Bruijne) during a follow up visit to this partner family as part of the WASTE/CAPS mission (Phase 3) was to include the option of converting the constructed toilet into a pour flush toilet (with squat-type pan) in the range of options on how to continue the project given to this partner family. This because under the given circumstances (household located in hinterlands with lots of space available, neighbours relatively far away and no open water sources present around) any form of sanitation could be classified as ecological sanitation as ‘nature can easily take care of the human waste produced’ by the family and it would not contaminate any water source.

After informing the partner family about this option they indeed decided that they preferred the squat-type pan pour flush toilet instead of a urine diverting toilet facility.

Barangay 14
The status here was that the partner family was using the toilet, without water for flushing and they use toilet paper for cleaning. They feel comfortable with using toilet paper instead of water for cleaning as they are used to that before, when they defecated in the forest. The family encountered problems of bad smell that it is to hot and to dark inside the toilet, faeces to not easily fall into the chamber and it is hard to sprinkle them with ashes. The family consists of 10 members.

The family expressed to be interested in the EcoSan project and to understand the EcoSan approach. They preferred to build a new composting toilet and convert the existing structure into a bathing facility. The family preferred a structure made from hollow blocks and yero sheets. The separated

urine should be leached into the ground. The family was eager for reconstruction to start but it was agreed that first a cost estimate needed to be made together with a design before construction could start. The family committed to contribute labour.

Interesting: the colour poster, provided during the training conducted under Phase 1 of the project, with recommendations on how to use a dry compost toilet was taped to the inside wall of the toilet, so family members could look at it while using.

3.2.2. Design development

Learning from the errors in the design under Phase 1 and based on the information gathered during the in-dept consultations with the partner families, PCWS-ITNF made a new design for the urine-diverting toilet. The prototype urine diversion toilet bowl from Mexico was used as basic element in the design development. Detailed drawings were made, together with cost estimates using various combinations of construction materials. The drawings were given to the some barangay officials of Barangay 14 and to the partner family for feedback.

The design of the substructure was fixed to two chambers (vaults), which could be used alternatively by shifting the toilet bowl. The slab contained a hole for a ventilation pipe in the middle, two holes for placing the toilet bowl and a basin with a drain over which people could wash themselves by squatting over it. The vaults each had an access door. Urine from the toilet bowl is drained to an evapo-transpiration bed and the water used for anal cleansing is drained into a soak bed in the ground. The substructure consisted of a roof, walls, door and a vent pipe with fly screen. Part of the space under the roof was left for ventilation and for light to come in.
See Annex 5 and 1 for the design drawings and pictures. Construction costs were estimated about PhP 6,400.00, including the prototype toilet bowl of PhP 1,800.00 and excluding labour.

3.2.3. Construction

Barangay 15

As agreed the urine diverting toilet was converted into a pour flush toilet. The existing toilet bowl was removed and replaced by an elevated squat-type pan. The superstructure stayed intact. An infiltration pit (1.7 m x 0.85 m x 1.5 m) was connected to the pour flush device, costing PhP 3,776 (including costs for materials, transportation of materials, labour) to construct. Materials were party purchased in Tingloy and partly on mainland. The partner family dug the pit and constructed the squatting pan. A team of two carpenters constructed the infiltration pit in 1 day.

Box 5 Technically working but convenient?

Improving the design for EcoSan toilets in the project was really a learning experience. Although the design developed and constructed under Phase 2 of the project implementation (in Barangay 14) was technically working and could be used and maintained according to the EcoSan approach, it was not optimal in terms of convenience. The toilet bowl used, in combination with the basin on the toilet floor to facilitate anal cleaning using water, people could sit first but then have to squat down. Further, for men it was not so attractive to use the toilet for urinating as the design did not include a urinal and therefore they have to sit down for this. An added change in the operation of the toilet is to use buckets from palm leaves to collect the faeces. Therefore actually only one vault was needed, as there is space enough to store a full bucket next to a new-to-use one in the single chamber.

Barangay 13

Here the substructure of the existing toilet was used as septic tank (leaching pit) for the pour flush device and an overflow tank (soak pit) was constructed next to the structure. Like in Barangay 15 an elevated squat-type pan was used and the superstructure remained unchanged. A person from the partner family was hired to do the construction of the leaching pit in cooperation with the PCWS-ITNF engineer. Construction took up 1.5 days.

Barangay 14

The new design was constructed by a hired carpenter with help of PCWS-ITNF staff (who also supervised) and members of the partner family. All materials had to be transported manually to the construction site (far outside Poblacion area, up-hill), which was done by PCWS-ITNF staff, the partner family and some neighbours. The substructure was entirely made from hollow blocks, the

superstructure from coco lumber, kawajan/tadtad (bamboo) and nipa roofing. The vent pipe was made from PVC. Construction took up 5 days.

The family stated to be the one converting the Phase 1 constructed toilet into a bathing facility, using a soakpit to discharge the draining water. However, as of the point of writing the report it has not been converted yet and some of the family members actually still used it as a toilet.

Before, during and after construction the PCWS-ITNF and CAPS project team spend quite some time on explaining about EcoSan and how to use and maintain the urine-diverting toilet, on request of the partner family who still had questions. This was done in a very informal way (discussing while constructing etc.), sometimes using the information materials provided before to the family.

Real costs for the construction activities in Barangay 13 and 14 were about PhP 5,800.00, excluding labour (PhP 250/person/day)

The photo documentation in Annex 1 shows the construction activities during this phase.

3.2.4. Reference material developed

PCWS-ITNF developed a manual (in Tagalog) during this phase on how to construct, use and maintain a compost toilet and how to construct a soakpit. This as reference material for the partner families (mainly the one of Barangay 14), copies were also given to some of the barangay officials and to the two RSIs. The aim was to enhance and support the knowledge of people in operating and maintaining ecological sanitation facilities and to stimulate the families in constructing a soakpit for collection of draining water from washing.

Again, the manual was a direct translation of parts of an existing reference: *'Sanitation without Water'* from Uno Winblad and Wen Kilama, 1985. See Annex 6.

Box 6 Ecological sanitation: composting, dehydration and urine diversion

Ecological sanitation is all about sanitizing human excreta (turning it into safe products) and then recycling them back into the environment and into productive systems. Sanitizing can be done in two ways: through composting or dehydration. By *dehydration* all water is removed from the excreta (diverting urine, using heat, ventilation and addition of dry material). *Composting* is a biological process in which organisms (bacteria, worms, fungi etc.) break down organic substances (human excreta plus bulking agents) to make humus. In both processes, pathogens are killed due to a combination of factors: increasing pH (adding sawdust, ashes), increasing oxygen (ventilation), decreasing moisture content (no water used for flushing, separation from urine), increase of temperature (heating of vaults) and increasing the retention time (using double-vault or buckets). Both composting and dehydration toilets are referred to as *dry toilets* as no water is used for flushing. The composted or dehydrated material acts as a soil conditioner, the diverted urine acts as N fertilizer (after proper storage and dilution).

Throughout Phase 1 and 2 of the project the terms composting, dehydration and urine diversion were mixed. The constructed toilets were referred to as dry composting toilets, producing fertilizer why in fact they were explained to be operated as dehydration toilets, producing soil conditioner. The information material in Phase 1 (poster and training materials) were based on the concept of dehydration, the reference material in Phase 2 (manual) was based on the concept of composting. During Phase 3 the constructed toilets were explicitly referred to as dry EcoSan urine diverting toilets. Getting familiar with the (meaning) of these different terms and its appropriate use, was part of the learning process of the project team.

4. Phase 3 of project implementation

4.1. Approach and output

The third and final Phase (November 2002 – March 2003) of the project implementation started with a mission of a WASTE/CAPS team to the project area, partly joined by PCWS-ITNF staff, on analysing the present water and sanitation situation within the project area and monitoring/evaluating the project so far. This mission showed that the initially selected partner families were strategically not well chosen: the focus should have been on families living in the urban centres (build-up areas) of the project area as it is here that existing toilet facilities (poor flush with a leaching pit) are the main cause of groundwater pollution. It came out that the new (Phase 2) design was still not optimal and appropriate enough for the local situation. Another outcome was that the information and reference materials developed did not reflect enough on the situation and practices present in the project area. It was agreed that one (1) dry EcoSan (urine diversion) toilet unit would be designed and constructed (initially in Barangay 15) during this final phase. Further it was agreed that after this phase PCWS-ITNF as implementing organization would pull out and the continuation of ecological sanitation activities falls directly under CAPS coordination and management as a UWEP+ (ISWM) activity. A Terms of Reference was developed to shape and guide the process of project implementation during this phase.

4.2. Activities

4.2.1. WASTE/CAPS mission

From October 31 – November 10 Gert de Bruijne (Ecological sanitation Program Officer, WASTE) visited the Philippines to study the progress of the ISWM (UWEP+) program here, including a monitoring/evaluating visit to the Tingloy EcoSan Pilot Project area from November 3 – 5.

The WASTE/CAPS mission included visiting and walking around in several barangays on the island, visiting the controlled dump site, checking water sources, meetings with the RSIs and Municipal and barangay officials involved in solid waste management and sanitation activities and initiatives, visiting the partner families of the EcoSan pilot project, checking out the constructed toilet facilities and explaining a new potential partner family in Barangay 15 about the EcoSan approach, technology and involvement in the pilot project.

Through interviewing the RSIs and looking at their records it was concluded that it is in de build-up areas of the project area (the Poblacion) were tackling sanitation problems should get priority. This because is here that existing toilet facilities (poor flush with a leaching pit) are the main cause of groundwater pollution and the families of the 30% of the households who do not have toilets (Annex 4) play a major role in potential disease transmission. Water quality tests conducted over the years by the RSIs show that more than halve of all shallow wells in the Island are polluted (positive in E-coli) and that during rainy season, all shallow wells are found positive.

An outcome of the mission was that the initially selected partner families were strategically not well chosen: the focus should have been on families living in the urban centres of the project area as it is here were the EcoSan approach in sanitation would have the biggest impact.

Box 7 Selection of partner families

The initial selection of partner families under Phase 1 of the project actually created a wrong 'imago' of EcoSan in Tingloy. Because these families can all be considered as part of the lowest-income households within the project area and two of them live in the upland forest areas, EcoSan is seen as a sanitation option / solution for the 'poor' (only) and for those living 'out there in the forest'. It is not seen as an attractive sanitation option for the range of families (low-income, middle class to rich) in the built up parts of the Tingloy Poblacion. Paradoxical, it is actually here where the EcoSan approach can make a difference and should have its entry, given the current water and sanitation situation. If partner families (preferably middle class) from those build up areas would first have been selected for the project, perhaps EcoSan really would have taken off in Tingloy…

Further, the selection of partner families was not really based on a demand for (ecological) sanitation. The demand was assumed by Barangay officials and RSIs by tapping poor families without toilet facilities for the project. Only the partner family in Barangay 15 showed a demand, as they have small children, live in the densely populated area of the Barangay and there is pressure from the neighbours for them to build a toilet. The other partner families did not express a real need for sanitation. All families were provided a pour flush squat-type pan and two bags of cement before by the RHU but no toilets were not put in place. However, the partner family of Barangay 14 was interested in the EcoSan approach as water for cleaning and flushing in not available close to the house.

Another outcome was that the use of the prototype urine diverting toilet bowl was not appropriate for the situation in the project area as it was designed for 'wipers' and the people in Tingloy are 'washers'. The use of it hampered in developing an appropriate design for a urine-diverting toilet for the Tingloy situation. It was therefore advised to eliminate the prototype from the project (see Box 4). Further the WASTE/CAPS mission pointed out that, and in what way, the developed information and reference materials were not appropriate enough for the project area.

In addition, CAPS and PCWS-ITNF took the initiative to organize a Round Table Discussion (RTD) on EcoSan and used this opportunity to share the EcoSan experience of Gert de Bruijne with a larger public, to inform people on the pilot project, to discuss reference and information material on EcoSan and to learn about other initiatives in the Philippines. The discussion was held on November 7 in which a total group of 19 people participated.

4.2.2. Gathering information on the Tingloy water and sanitation situation

During the WASTE/CAPS mission it was agreed that PCWS-ITNF staff would gather additional information on the water and sanitation situation of Tingloy. This was done by interviewing the RSIs

and collecting reference material that they use in their work. Besides support to project, this information could be used for other purposes, i.e. development of case studies and used as reference material by CAPS, WASTE and PCWS-ITNF.

Two interviews were held, the first on December 16 focusing on the water situation and the second on March 24 focusing on sanitation, using an 'initial sanitation assessment' document developed by WASTE (Annex 4).

Background and Legislation used

The two RSIs of Tingloy are responsible for monitoring the implementation of the Code on Sanitation. Among others, for Tingloy this includes: control and monitoring of dengue and malaria, coordination of BHWs (107 in total), iodised salt promotion, solid waste management (monitoring garbage collection and dumpsite), toilet construction, health protection, monitoring water source development, providing Sanitary permits for shops, lots and beaches. Each RSI is responsible for a set of barangays (7-8). Legislation and guidelines used by RSI to execute their tasks include:

- The Code on Sanitation, PD No. 856 of the Philippines
- Environmental sanitation rules and regulations, provided by DoH
- Additional information through workshops, conferences and trainings

Water situation

Water in wells (deep and shallow) and springs in available year-round. Some people also collect rainwater (like in Barangay Sto.Thomas) if springs and wells are located far away from the houses. Well construction/spring development is carried out under supervision of RSI (they have to be consulted on forehand) by barangay officials. Lately new sources have been developed in Barangay Gamaw and Papaya. All water sources in Tingloy are operated as point sources (Level I), except in Poblacion and Papaya where people have individual house connections (Level III). In Poblacion LWUA is the one providing the water and pipelines are metered. People in Tingloy are aware and informed about water pollution issues and cases: as of last year the RSIs held monthly meetings with Barangay Captains on this. More than 50% of all shallow wells are positive (polluted) with E-coli. This is also the case per barangay. During rainy season all shallow wells are positive. Deep wells are not polluted. Up to the year 2001 shallow wells/springs were monthly tested by the RSI on E-coli and bacteriological pollution. If a well/spring was labelled positive (in E-coli) the RSI chlorinate the source by putting in granules. In areas were wells/springs are not chlorinated, the RSI educate the people how to make disinfection liquid (using chlorine) to use at home.

Over the years two trends are visible: on the one hand people became aware of water pollution through unclean source surroundings and they took action on that. Nowadays almost all sources are protected and their environment is clean and maintained. On the other hand water resources became more polluted (through leaking septic tanks and infiltration pits, garbage disposal, wastewater production, etc.) because of the increased population and increased toilet construction. The RSIs are aware of the link between water source pollution with Ecoli, a high ground water level in the areas (especially at sea shore sites) and the presence of pour flush toilets with septic tanks and infiltration pits.

Despite the above, people do not get sick of the water sources used, i.e. diarrhoea or cholera is not prevailing in the area. Reasons most probably are that people are resistant already and sources are chlorinated. However, during heavy rains some cholera cases are found.

Annex 4 gives an overview of the number and kind of water sources present at each of the barangays in Tingloy.

Sanitation situation

Pour flush toilets are the common type of sanitation systems in Tingloy. A limited number of toilets are public toilets (5 in Barangay Papaya, 2 in Barangay San Juan, 3 in San Isidro and 2 in Poblacion).

The majority of the pour flush toilets use toilet bowl, which is the feature people seem to prefer over a squatting plate. On average, 40% of the households present in the municipality of Tingloy do not have a toilet facility. In Barangay 13, 14 and 15 the current figures respectively are: 24%, 37% and 31% (see Annex 4). Families living in the hinterlands of the island defecate in the forest areas, families living in the built-up areas of the island store their excreta in pans and buckets (especially during nighttime) and throw it into the sea or defecate on paper, put this in a plastic bag and give it to the garbage collector who then brings it to the dumpsite or they bring it there themselves. The main reason for people not having a toilet is lack of money. However, new toilets are built every month by families who saved money for that. The type of toilet they go for is a pour flush toilet using a ceramic bowl.

The PHO distributed 300 squat-type pour flush systems (+ 2 bags of cement) among low-income families under a sanitation promotion program: 20% of these toilets were not put in place. When people decide to construct a toilet, the RSIs visit the respective family/household and give health education. Reuse of produced wastewater is not common on the island; it is mainly discharged into the sea or directly absorbed by the soil. Some people use this water (grey water) to water their plants.

Three out of the ten leading causes of morbidity are sanitation related: parasitism (rank 3rd), skin problems (rank 4th) and diarrhoea (rank 8th) (MHU 2001 figures).

Annex 4 gives an overview sanitation situation at each of the barangays in Tingloy.

4.2.3. Development of Terms of Reference

Based on lessons learned from the previous project phases and the outcomes of the WASTE/CAPS mission, a Terms of Reference (ToR) was developed in December to shape and guide the process of project implementation during (the remaining of) this phase. This ToR provided for the objectives and responsibilities of different people involved in the project and the approach, output and tasks within the final phase of the Tingloy EcoSan Pilot Project to be carried out and facilitated by the PCWS-ITNF/CAPS project team.

The ToR acted as an attempt in reaching the main aim for this phase of the project implementation: for EcoSan activities to have a self-replicating effect under the UWEP program. It was agreed that after this phase PCWS-ITNF as implementing organization would pull out and the continuation of EcoSan activities (including toilet construction) falls directly under CAPS coordination and management as a UWEP+ activity.

Approach

The approach agreed on in the ToR focused on participatory involvement of all actors in design development, review and project implementation, closer cooperation between the community developer (CAPS) and technical designer (PCWS-ITNF), to involve the participating families really as project partners, to search for local available industries, craftsmen and materials that could be applied in EcoSan activities and the chosen design and materials to send out an (environmental) health and hygiene promotion message

Outputs

The EcoSan activities should meet the needs of the stakeholders group in general, and the users in particular; they should have a self-replicating effect and should be an attractive option for the ranges of classes (low-income, middle-class to rich). Further, to create a social platform for the EcoSan approach in Tingloy and to get insight in, an overview of the opportunities for small entrepreneurs in this.

Actors

The actors identified in the project were: Partner Families (both men and women), Barangay Captains, RSIs, BHW and the Project Team (2 PCWS-ITNF staff 1 CAPS staff), each having their specific involvements.

Annexes
The ToR included four appendixes (A-D) on general procedures and guidelines for EcoSan projects. They were originally developed by Aussi Austin and the dry sanitation project team of the Palestinian Hydrology Group in 2002 and later reviewed and adjusted by Gert de Bruijne (WASTE) for this Ecosan project in Tingloy. The appendixes describe the general procedure for practical implementation of the project, design and construction guidelines for urine diverting sanitation systems, operation and maintenance (user) guidelines and a checklist for monitoring.

The ToR was drafted and finalized by PCWS-ITNF, reviewed by WASTE and approved by CAPS before any design improvement and construction activities were started.

Annex 3 shows the complete contents of the ToR and its Annexes.

4.2.4. Design improvement
During the WASTE/CAPS mission the basics for an improved design were found. To overcome the inconvenience of squatting for washing after using the toilet, the improved design used an elevated seat with two holes. One vault was assumed to be sufficient, in the case of using buckets to collect the excreta. The drop hole is covered by a commercial standard toilet lid, as these are designed in such a way that air can flow through. Other improvements include: vault cover is placed under an angle and made from metal sheet painted black (to increase temperature inside the vault), a water container and sink for hand washing are installed and optional urinal is added.

It is recommended that the substructure is made from hollow blocks (so no animals can enter the vault); materials to use for the superstructure are flexible. For beautification and making the EcoSan toilet attractive it is suggested to tile the elevated seat (crazy cut style for instance), put up a mirror etc.

PCWS-ITNF made a scale model of the design was made to facilitate feedback from the stakeholders and to visualize the improvements. See Annex 1 for pictures and see Annex 6 for the drawings.

4.2.5. Community organizing activities
The community organizing activities during this phase of the project consisted of a day of hand-over ceremony for the (re)constructed toilets under Phase 2, two stakeholder meetings and identifying new potential partner families.

Hand-over ceremony
On December 16 the project team officially handed over the under Phase 2 constructed toilets (1 urine diverting and 2 pour flush) to the respective families. This to especially stimulate and encourage the family of Barangay 14 to start using the EcoSan toilet facility, as up to then they were a bit hesitated to do that because they saw the toilet as PCWS-ITNF/CAPS property. The official handover included reading and signing a letter (by the partner family representative, project team representative and respective RSI), handing out a certificate with user guidelines and picture taking. It was agreed and explained that monitoring activities would be done by the RSI under CAPS coordination.

The documents handed out during the ceremony can be viewed in Annex 6.

Stakeholder meetings
The project team conducted two stakeholder meetings (first on January 26, second on February 2) in which the respective partner family (of Barangay 15, first approached for involvement in the project during the WASTE/CAPS mission in early November) Barangay Captain, RSIs and BHW were brought together. The meetings tried to tackle the following issues:

- objective and importance of stakeholder meeting

- project status and experience so far (sharing of experience amongst partner families)
- ToR approach, outputs and responsibilities of different actors for further activities
- improved design
- strategic planning
- expression of commitment

The meetings were not optimal, i.e. not all stakeholders were there, there was not enough time to address everything, stakeholders did not give their (personal) feedback on the proposed design. During the first stakeholder meeting the woman of the Barangay 15 partner family expressed some doubts in the project and therefore it was decided that the stakeholders should have a meeting among themselves finding out if and how they want to continue with the project in Barangay 15 and what they thought of the improved design. The outcome of this was that they were willing to participate in the project.

Construction of the urine diversion toilet in Barangay 15 was scheduled for the first week of March. CAPS used the remaining time left before for facilitating a series of preparation activities, facilitated by CAPS, in which the EcoSan principles, feedback of the design, the ToR and responsibilities, guidelines on use and the actual 'commitment' towards the project would be discussed.

In reality these activities were postponed and construction in Barangay 15 was cancelled as the respective partner family pulled out of the project. The main reasons were that the women of the family was not interested in having an EcoSan toilet, she is happy the way things are now (the family uses the toilet of the neighbours). Although her husband was still interested he informed CAPS to look for another family as he is out of Tingloy most of the times for temporary carpenter jobs in Batangas and the husband and wife did not discuss about their involvement in the project.

Identifying new partner families
After the partner family in Barangay 15 pulled out of the project, the project team agreed to move on as followed: to first identify a group of potential new partner families (initially coming from Barangay 15 and 13 as both Barangay Captains were still interested and willing to cooperate with the project team in the project). Together with the other actors they would then participate in a meeting facilitated by the project team to inform and explain them about EcoSan and the project involvements. Based on this a new partner family could be selected (other interested families could perhaps participate later, directly under CAPS coordination and UWEP Program activities). If the family is ready, construction could start, handled by PCWS-ITNF in cooperation with the partner family. In all this the process noted down in the ToR would be followed.

CAPS handled the identification of new potential partner families. The captain of Barangay 15 was first asked to look for options. As no interested family was found in this barangay the Captain decided to hand over the ‘lot’ to Barangay 13. Also in this barangay no new potential partner families are found yet. A request from the Captain to involve the day-care centre in Barangay 13 in the project has been rejected as the experience with EcoSan is only limited in Tingloy and the risks that things might fail or go wrong are big. The project team does not want to take up that responsibility at this stage.

4.2.6. Reference material developed
Reference materials developed during this Phase aimed to support the stakeholder meetings and served as handouts. They included the Tagalog translation of Appendix C of the ToR (operation and maintenance user guidelines for urine diversion sanitation systems), short ToRs for the different actors, a feedback sheet on the design and a fact sheet with EcoSan principles.

Materials can be viewed in Annex 5.

4.2.7. Monitoring framework
Before the official handing-over ceremony PCWS-ITNF visited the respective partner families of the project each time they came to Tingloy as a form of monitoring. During these visits the toilet facilities

were checked on use and maintenance, damages, errors etc. The families were invited to express their comments and suggestions. At the point of handing over the facilities to the partner families it was agreed with the RSIs that they would follow up the monitoring, in particular for Barangay 14 were the urine diverting toilet was constructed. In case of design problems it was agreed that PCWS-ITNF would still assist during the remaining project time.

Part of ToR was to arrange the responsibility of the RSIs for monitoring of the use and maintenance of constructed urine diversion toilets under the UWEP+ program and or under the MHU. Although agreed with the MHO there seems to be a need to enforce this as it is not sure if monitoring is actually happening. At the stage of writing this report this remains unclear. During last visit of PCWS-ITNF to the project area (March 24) the EcoSan toilet in Barangay 14 performed well and the family does not experience problems.

Box 8 Monitoring the use of the urine diverting toilet in Barangay 14

The family of Barangay 14 was hesitant in starting to use their urine EcoSan toilet facility, despite of the fact that everything was put in place for usage. Asking why not was answered carefully that they felt ashamed that the project team (read Susanne Boom, being a girl, young and of Dutch nationality so white) came to inspect their toilet and their produced excreta products. As that seemed to be the bottleneck in the project, measures were taken to over come this (official hand-over, agreement that monitoring would be done by RSIs and that PCWS-ITNF staff would not show their face in that area for a while).

During the first stakeholder meeting the Barangay 14 family was invited to share their experience in the project to the stakeholders in Barangay 15. The family expressed that everybody was using the toilet, that it convenient, does not produce any bad smell, is easy for children to use etc. However, this was contradicting with an actual field visit to the location that same day (showing no hard evidence of the family using the toilet) and statements of neighbours that the family is not using the toilet. In order to clarify this, later on the project team paid a surprise visit to the family and this time they were present. The real situation turned out to be as follows:

- The new urine diversion toilet is used by the family, however not by everybody. It is mainly the women using it. They face no problem in using and maintaining it (and also there is no smell). When we asked for an explanation the man of the family expressed that it really has to do with *'what you are used to'*. Especially the men are used to do their *'things'* outside, along the way when they go out in the forest for different activities. The wife expressed that she is trying to convince the others to use it also.
- It is hard for small children to use it, as the hole in the toilet bowl is (too) big. The project team suggested the family to make a smaller lid for the children.
- The old urine diversion toilet (Phase 1) is also still used by the family, mainly by the men during nighttime. No water is used, they sprinkle ashes and if excreta get stuck, they use a stick to push it through. It only gives problems during rainy season as then water enters the vaults and sometimes even overflows. Then the toilet also starts smelling.
- The family removed the bucket that was in use when they heard that the project team was coming for a visit during the day of the stakeholder meeting. They buried the bucket and its contents. The project team suggested to make more buckets and convinced them that a used bucket should stay in the vault for some months before burying it. But actually it was really more the presence of the project team (read Susanne Boom), which caused the removal of the bucket and therewith partly the evidence on using…

5. Follow up of EcoSan activities by CAPS

Given the situation during this phase, CAPS and PCWS-ITNF agreed that the process of finding interested families, willing to implement the improved design (Phase 3) to further pilot EcoSan, should not be pressured and therefore should not be time bound. Further, that this would be handled by CAPS (Mining Manguiat), as an integrated part of their activities in Tingloy. Therefore it was decided that the involvement of PCWS in the project stops at this point. CAPS might decide to tap PCWS again in the future, either when a partner family is identified in Tingloy or for other EcoSan activities but arrangements for that will not (and can not) be made now. CAPS wants to stay involved in EcoSan activities in the long run; this can be in Tingloy but it does not have to be.

6. Reflection, lessons learned and recommendations

6.1. Reflection

6.1.1. Going through the project phases

The project went through development phases encountering problems for which appropriate solutions had to be found. When looking at the project cycle of the project it can be said that the focus has been on the implementation of the project. The foregoing steps of identification, preparation and approval did not get much attention and were left out in a way. This resulted in e.g. improper costing of the project, not knowing the water and sanitation situation of forehand, improper site selection, inappropriate designs and reference materials. Further, operation, monitoring and evaluation activities where implicit within the project. However, the working process and the outputs improved over time (i.e. increased participation, more appropriate designs, better understanding of situation) due to efforts of the project team and CAPS and PCWS-ITNF as organizations.

Strengths and weaknesses

Under the given circumstances this pilot project in short had the following strengths and weaknesses:

Strengths

- CAPS' long term and good relationship with the Tingloy community served the project
- Existence of support from Local Government Officials, Barangay Captains, Rural Sanitary Inspectors and Barangay Health Workers
- As it was a pilot project, the design of the toilets could be adjusted over time

Weaknesses

- The pilot project was created by PCWS-ITNF and CAPS for technology demonstration and advocacy, not as a respond of sanitation demands within the Tingloy community
- The partner households were not given options for alternative sanitation technologies.
- Project coordination was sometimes difficult with two NGOs involved in different activities.

6.1.2. Partnership with Tingloy community and stakeholders

During the project preparation and implementation of Phase 1, the Tingloy community and stakeholders could be typified as 'beneficiaries' as they did not have a say in process of designing the EcoSan (urine diverting) toilets and construction. During Phase 2 and 3 of the project it was tried to involve them more in the project and increase participation. In the ToR (Phase 3) stakeholders were explicitly defined and the users involved seen and approached as 'partners' as this refers to the common way of working (and ideology) of both PCWS-ITNF and CAPS.

However, the people in Tingloy have always been supportive to the project staff and the involved partner families were accommodating. Especially during Phase 2 & 3 the project team tried to keep things as open as possible and people were encouraged to give their feedback on the designs made and to express their concerns and needs. This resulted for example in converting two of the three initial constructed toilets into pour flush toilets and one family being able to pull out of the project.

6.1.3. Partnership between CAPS and PCWS-ITNF

Initially the roles and activities of CAPS and PCWS-ITNF were carried out quite separately and followed up each other but in the course of the project the staff worked more simultaneously and as a team. During Phase 3 of the project tasks and responsibilities were most clear as written down and agreed on in the developed ToR. PCWS-ITNF responsibilities within the project team were that of technical designer and project coordinator/task manager and technical designer and CAPS was responsible for community organizing/development issues. CAPS also always has been very supportive to the PCWS-ITNF staff although it was sometimes hard for Mining Manguiat to commit and allot time to the project due to heavy involvements in various activities in Tingloy.

For both organizations the pilot project really has been a learning experience, especially on the content issues of EcoSan.

The fact that the PCWS-ITNF staff working for the project was relatively inexperienced in project management, community organizing and facilitating did not always contributed the project implementation process. Fortunately, CAPS has been very flexible in this.

6.1.4. Achieving outputs of ToR

EcoSan meeting the needs of stakeholders and users

On an overall scale it is doubted if EcoSan is really meeting the needs of people in Tingloy. This should actually be investigated in more dept. Perhaps demand first needs to be created and awareness raised (on pour flush toilet polluting ground water sources). Families without having a toilet are mainly interested in getting a pour flush toilet as that is what is common in Tingloy. There seem to be no incentives to look into alternatives. However, the design for a urine diversion toilet system as it is developed now seems appropriate for the situation and people in Tingloy as this is verified in the stakeholder meetings conducted. Most probably the interest in EcoSan could be stimulated if a partner family in Poblacion or another built-up area is found which is willing to pilot the design.

Self-replicating effect of EcoSan in Tingloy

As of now the project activities carried out did not create a self-replicating effect of EcoSan in Tingloy. The partner family in Barangay 14 lives too far out in the hinterlands to stimulate this effect, besides EcoSan most probably is seen as a poor-men's solution. A first start to change this would again be the construction of an EcoSan toilet (according to the improved design) in another part of Tingloy, preferably in a more built-up area and at the home of a middle-class family.

Social platform for the EcoSan approach

There somehow exists a social platform for the EcoSan approach, as the two RSIs, the Barangay Captains and some of the BHW are still interested in this issue. The question is: how to keep this active and alive under the given circumstances?

Opportunities for small entrepreneurs

No real insight is gained in this. On Tingloy there are only carpenters working. Again, perhaps these opportunities become more visible when the first urine-diverting toilet is constructed according to the improved design.

6.2. Lessons learned

Project preparation

- Staff on the project needs to spend time on reading on the subject and share/discuss examples and cases from other countries and regions.
- At site there should be a clear picture of the water resources and sanitation situation in order to find the 'niche' were EcoSan could fit in.

- Investigate the demand/incentive for EcoSan by carrying out an Initial Sanitation Assessment including the views of people from different sectors (health, users, agriculture, government etc.).
- The partner families of the project should be involved in the project because of their sanitation demand and should preferably be part of the 'middle class' to stimulate a self-replicating effect.

Project implementation

- Allot time and effort for technical design development together with the partner family and community.
- Use local material and expertise so the design becomes the product of the community.
- Besides the partner families, also involve people from the 'enabling environment' like Barangay Captain, Rural Sanitary Inspectors, health workers, mayors, etc.
- Organize a training or workshop on EcoSan in an early stage of the project (after the partner families are on board) to inform a larger public on EcoSan.
- Training needs assessment on sanitation in general and ecological sanitation in particular should be conducted before an actual training program is designed.
- Be careful on the use, mixing and confusion of terms like: composting, dehydration and urine diversion as it might create misunderstanding and wrong implications.
- Information and reference materials should not be direct translations from materials used in other countries. They should first be checked on appropriateness and should be adapted to the (local) situation of the project area/country.
- Be careful with using a prototype urine diverting toilet bowl from another country (different sizes, designed for 'wipers' in stead of 'washers') in your project as it only limits the development of an appropriate and convenient design.

Monitoring and evaluation

- The outcome of the design process should be: a nice and affordable toilet facility that is sending out a hygiene promotion message and is easily replicable and adaptable by other families.
- Being an advocate for EcoSan does not automatically make you suitable for implementation of activities.
- Do not scale up too fast: first create appropriate, 'sellable' toilet devices, eyes are watching you!

6.3. Recommendations

The EcoSan approach and urine diverting toilets as a technology option prevents pollution, fights infections, saves water, promotes zero waste management and encourages food production. However, if the facilities are not sufficiently operated, maintained and monitored these can: increase (in stead of decrease) health hazards for the people and the environment, give EcoSan (and the organizations involved in the project) a bad reputation and create a burden for the households involved.

To 'introduce' EcoSan in the Philippines it is recommended to spend more time on project and (technology) design development for pilot projects on this. This report, in which the implementation process of the *Tingloy EcoSan Pilot Project* is documented, should serve as a basis for it. The experience and lessons learned of this project should be taken into account.

It would be good as this project somehow gets a follow up, which can be done in different ways:

- write project proposals
- start new pilot projects

- develop case studies
- invest in design development and fabrication of urine diversion devices
- develop appropriate information and reference materials on EcoSan
- other

In order to design (better) projects and to implement projects in a better way it is recommended to follow a methodology or approach like the Strategic Sanitation Planning (SSP) or the Household Centered Environmental Sanitation Approach (HCES) for example. As these approaches consist of (logical) steps, they may prevent implementation errors due to lack of insight in the current situation, improper costing of the project, improper site selection, and inappropriate designs and reference materials.

CAPS and PCWS-ITNF should maintain their partnership on EcoSan as they share the same experience and built capacity within their organizations to work on this topic.

7. References

Books

- *'The Composting Toilet System Book'*. David Del Porto and Carol Steinfeld, 1999. CEPP, Concord, Massachusetts.
- *'Sanitation Without Water'*. Uno Winblad and Wen Kilama, 1985. Macmillan Education LTD, Hampshire, London.
- '*Ecological Sanitation'*. Steven A. Esrey et al, Uno Windblad (editor), 1998. Sida, Stockholm, Sweden.
- *'Towards an Ecological Approach to Sanitation'*. In Sanitation Promotion Kit. WSSCC, WHO, 1997.
- *'The Ecological Sanitation Alternative'*. Published report on First Orientation Workshop, PCWS-ITNF, 2002.
- *'La Letrina Abonera Seca, Manula de Educacion Sanitaria para la Persona Facilitadora/Visitadora Familiar'*. Published by UNICEF El Salvador, Agencia Sueca para el Desarrolo Internacional and Gobierno de El Salvador Ministerio de Salud Publica y Asistencia Social, 1996.

Internet

Organizations	
http://www.undp.org/seed/water/	UNDP
http://www.sida.se	Sida
http://www.wkab.se/	SANRES China Conference, reports China, Mexico etc
http://www.laneta.apc.org/redseco/	Latin American Network on ecological sanitation
http://www.laneta.apc.org/esac/drytoilet.htm	National NGO - ecological sanitation in Mexico
http://www.riles.org/photos.htm	Resource, Boston based NGO working in C America
http://user.tninet.se/~gyt516c/ECOSAN.html	Ecological sanitation in Ethiopia, Swedish NGO
http://www.tema.liu.se/tema-v/	Tema V - Sida course on ecological sanitation
http://www.gtz.de/ecosan/	GTZ on ecosan
http://www.iees.ch/news.html	International Ecological Engineering Society
http://www.ecological-engineering.com/	The closed loop approach to eliminate

	waste
http://www.cepp.cc/index.html	Center for Ecological Prevention Pollution
http://cityfarmer.org/comptoilet64.html	City farmer, Int.NGO on urban agriculture
http://www.i-s-w.org/ecosanitation1.htm	International Secretariat for Water, Int. NGO
http://www.mvula.co.za/work.htm#Sanitation	Mvula Trust, South African NGO
Ecological Sanitation publications/articles	
http://www.ruaf.org/1-3/35-37.PDF	Article in Urban Agriculture Magazine on "Closing the Loop"
http://www.compostingtoilet.org/10articl/esac1.htm	Article about ecosan in Mexico
http://www.undp.org/seed/water/	UNDP papers on ecological sanitation
http://www.gwpforum.org/gwpef/wfmain.nsf/Publications	Sida publication: Ecological Sanitation (E,F,S,C,Vie)
http://oneworld.org/cse/html/dte/gobertimes/may1999/gtimes.htm	Ecological Sanitation for children, CSE, India
http://www.i-s-w.org/ecosanitation1.htm	Case studies from Mexico and Zimbabwe.
Composting Toilets	
http://www.compostingtoilet.org/	
Products on the Market	
http://www.clivus.com/	
http://www.wost-man-ecology.se/index.html	
http://www.ecosan.nl (The EcoSan Market Place)	

Organizations involved in project

PCWS-ITNF
P-3 Minnesota Mansion
267 Ermin Garcia
Cubao, Quezon City
Philippines 1108
Telephone: +63 (0)2 9115783
Fax: +63 (0)2 9115783
E-mail: itnphil@compass.com.ph
Internet: www.itnphil.com.ph

CAPS
Room 202 Loyola Heights Condominium
Esteban Abada corner F. Dela Rosa St.
Loyola Heights, Quezon City
Philippines 1108
Telephone: +63 (0)2 9298429
Fax: +63 (0)2 4345954
Website: www.caps.ph
E-mail: danlapid@caps.ph

WASTE
Advisers on urban environment and development
Nieuwehaven 201
2801 CW Gouda
The Netherlands
Telephone: +31 (0)182 522625
Fax: +31 (0)182 550313
E-mail: office@waste.nl
Website: www.waste.nl

Acronyms

BHW	Barangay Health Worker
CAPS	Center for Advanced Philippine Studies
DoH	Department of Health
EcoSan	Ecological Sanitation
HCES	Household Centered Environmental Sanitation
ISWM	Integrated Sustainable Waste Management
MHO	Municipal Health Officer
MHU	Municipal Health Unit
PCWS-ITNF	Philippine Center for Water and Sanitation – ITN Foundation
PhP	Philippine Pesos
RSI	Rural Sanitary Inspector
RTD	Round Table Discussion
SSP	Strategic Sanitation Planning
ToR	Terms of Reference
UWEP	Urban Waste Expertise Program
WASTE	Advisers on Urban Environment and Development

ANNEX 1

PHOTO DOCUMENTATION

Phase 1 – Construction activities

Making the slab using ferro-cement technique

Construction of processing vaults and movable toilet bowl

Mould for processing chambers

Construction of superstructure

Toilet bowl with urine diverter

Urine collection bucket

Completed toilet units

Phase 1 – Training on EcoSan

Participants

Working on the F diagram

Group presentation

Transect walk

Sanitation technology options

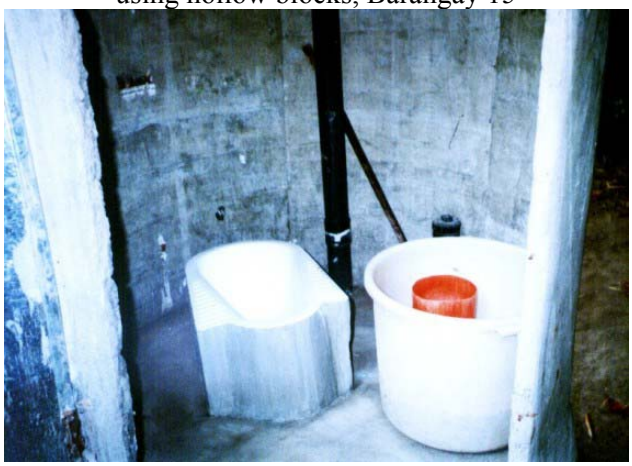
Sanitation checklist

Explaining the Ecological Sanitation approach

Phase 2 – Construction activities

Construction of leaching pit for pour flush toilet using hollow blocks, Barangay 15

Converted toilet: pour flush plus leaching pit (local septic tank)



Elevated squat plate, pour flush type, Barangay 13

Construction of vaults for EcoSan toilet using hollow blocks

Preparations for construction of toilet floor using cement

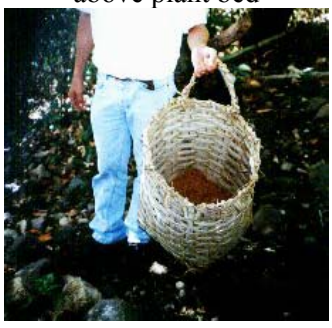
Completed EcoSan toilet in Barangay 14

A partner family member trying out the facility

Urine diverting toilet bowl and cleaning basin

Drain of urine collector ending above plant bed

Back of toilet unit - access doors to vaults and drain of cleaning basin



Bucket made of palm leaves to collect faeces

Phase 3 - Community organizing activities

Signing of hand-over certificate by Barangay 14 partner family

Presentation of signed certificate by Barangay official in presence of RSI, PCWS-ITNF and CAPS staff

Signing of hand-over certificate by partner family Barangay 13

Stakeholder meeting Barangay 15, discussing expectations of meeting

Rural Sanitary Inspector explains on EcoSan

Partner family member of Barangay 14 shares her experience with EcoSan toilet

Explaining operation of EcoSan toilet using scale model

Partner families sharing ideas and experience

Discussing the design

Phase 3 – Scale model of improved design EcoSan toilet

Front: toilet seat, cleaning seat and urinal

Side: washing basin

Back: processing chamber with collection buckets

Side: urine collection container

ANNEX 2

TRAINING ON ECOLOGICAL SANITATION

-

TRAINING PROGRAM
ACTIVITY REPORT
INTERNAL EVALUATION
ATTENDANCE

Training programme

Date:	August 24
Location:	Tingloy National High School, Barangay 15, Publacion, Tingloy
Participants: :	Minimum 36, Maximum 44
Organized by:	PCWS-ITNF/CAPS

1. Objectives

- After the training the beneficiaries and selected community representatives have a basic understanding of:

- The fitting in of the pilot project into the UWEP+ activities
- The importance of sanitation
- Different sanitation (technology) options
- The ecological sanitation approach
- Operation and maintenance of urine diverting ing toilets
- How the project will continue
- Hygienic practices (tentative, if there is time)

- The community/beneficiaries have a say in the adjustments to the design and construction of the implemented toilet facilities and the potential building of (at least one) urine diverting ing toilet facility

- An action plan is made on how to proceed with the project

2. Invited Participants

Who	**Function**	**Number**
Beneficiaries (at least 1 woman + 1 man per household, preferably 2 women + 2 men)	Participants	Minimum: 8 Maximum: 16
Barangay Captains	Officials	3
Barangay Kagawads	Officials	3
Local masons	Participants	2
Leader Municipal Sanitation Group	Participant	1
Sanitation Inspectors	Participants + assistant facilitators	2
Municipal Health Officers	Participants	12
CAPS Municipal Coordinator	Training coordinator assistant, resource person	1
PCWS Project Manager	Training coordinator, assistant facilitator	1
PCWS Technical Expert	Co-facilitator	1
PCWS Deputy Executive Director	Main facilitator	1
Mason/Constructor	Participant + resource person	1
	Total	**Minimum: 36** **Maximum: 44**

3. Training Program

Day 1 - Saturday August 24 *(9 am – 6 pm)*

Activity	Who	How	Materials needed	Time/Duration
			Start	**9.00 am**
Invocation	Barangay captain	Praying		9.00 am 5 minutes
Pambansang Awit	Barangay Kagawads	Singing		9.05 am 5 minutes
Welcome Address	Susanne, PCWS	Speech translated to Tagalog and read from paper	speech	9.10 am 5 minutes
Backgrounder of project	Mining, CAPS	Lecture style		9.15 am 10 minutes
Introduction of participants and facilitators	Mining, CAPS	Successively everybody tells their name and position, attendance list is circulated	attendance list	9.25 am 10 minutes
Objectives of the day	Lyn, PCWS	Lecture style		9.35 am 5 minutes
Ice breaker: Muskito clap	Susanne, PCWS	Everybody stands and claps around		9.40 am 5 minutes
Making of F diagram: importance of sanitation	Lyn, PCWS	Short introduction on relation between unhygienic/non-sanitary practices and diarrhea occurrence, group is split up in 5 sub groups and has to make the F diagram in picture style, comparison and discussion afterwards in main group, introducing hygienic practices	- 5 sets of F diagram pictures - 5 white cartolinas - F diagram on manila paper	9.45 am 15 minutes intro 45 minutes exercise 15 minutes comparison
Snacks	Caterer	Finger foods + drinks	snacks	11.00 am while walking
Transect walk: what kind of sanitation is present?[2] (including construction sites)	Lyn, PCWS	Short introduction and purpose of transect walk, split up in 4 groups (or more), each group fills up latrine observation scoring sheets while walking (including construction sites)	- 10 latrine observation scoring sheets	11.00 am 60 minutes
Lunch	Caterer	Lunch	lunch	12.00 am 60 minutes
Sanitation options and comparison	Boji, Lyn, PCWS	First a lecture presentation on manila paper of different (low cost, on site) sanitation options (link up with transect walk outputs), split up in 5 groups and compare different options with help of checklist within group, present 'correct answers' of checklist in main group	- manila papers with sketch of different (low cost) sanitation options - 5 checklists - filled in checklist on manila paper	1.00 pm 30 minutes lecture 30 minutes exercise 15 minutes comparison
Ecological sanitation/urine diverting ing toilets - Approach - Operation and maintenance	Lyn, PCWS	Introduction of EcoSan approach in lecture style, split up in 5 groups, focused group discussion on operation and maintenance pictures, recap by eliciting do's and do not's,	- manila paper with ecosan approach - 5 sets of pictures on operation and	2.30 pm 15 minutes introduction 30 minutes exercise 15 minutes

[2] Data on Tingloy shows that the following types of toilet facilities are being used: water sealed toilet + septic tank (used by 1 household), water sealed toilet + septic tank (used by several households), water sealed toilet + other depository (used by 1 household), water sealed toilet + other depository (used by several households), closed pit, open pit.

		discussion	maintenance - 10 copies of sheet with do's and do not's	recap + discussion
Snacks	Caterer	Finger foods + drinks	finger foods + drinks	3.15 pm during session
Status of project, what was done and why, how the project will continue, action planning	Lyn, Boji, Susanne PCWS	Give short overview of status of the project, review of construction, consensus voting (involvement participants) on the adjustments to be made to the design of the constructed toilets and potential building of new urine diverting ing toilet(s), arrangements for action planning (if required)	- voting sheet on manila paper - color stickers	3.30 pm 15 minutes status 15 minutes review construction 30 minutes consensus voting 15 minutes action planning
Break	For PCWS/CAPS staff to make decisions, based on group outcome, on how to proceed with the project			4.45 15 minutes
Arrangements + monitoring	Susanne, PCWS translation from Lyn, Mining	Monitoring visits (involvements Sanitary Inspectors), follow up, explanation of monitoring form	- monitoring form on manila paper - 10 copies of monitoring form	5.00 pm
Recap and evaluation of the day	Sanitary inspectors	Recap in lecture style, invite participants to mention ok's and non-ok's of the day	- 1manila paper or board to write up ok's and non-ok's	5.30 pm 15 minutes recap 15 minutes ok's + non-ok's
			Finish	**6.00 pm**

Activity report

The training took place at the Tingloy National Highschool in Barangay 14 on August 24, 2002 and started at 9.40 by an opening of Mining Manguiat (CAPS). He announced that the training would be very informal. The participants and facilitators introduced themselves. Mining Manguiat further gave a backgrounder of the project and how it fits into the UWEP+ activities. In addition Susanne Boom (PCWS-ITNF) spoke out welcome remarks. After this, Lyn Capistrano (PCWS-ITNF) explained the objectives of the day (to give background on sanitation, the ecological sanitation approach and planning of what to do next in the project).

For the first exercise on sanitation and hygiene (making the F diagram) the participants were split up in three groups. Each group received a set of pictures on transmission routes of feacal-oral diseases and hygiene practices. Purpose of the exercise was to identify disease transmission routes and summarize these routes in an F diagram. Pictures were put on a cartolina and each group had to present their findings. Mining Manguiat objected to a Rural Sanitary Inspector (RSI) or Barangay Health Worker (BHW) to do the presentation as they are already well-oriented on the subject. Plain people were invited to give the presentations which were satisfactory. The participants seemed to be conscious about sanitation and hygiene practices necessary in their daily life. They also addressed teeth brushing and trash and solid waste disposal. An F diagram on Manila paper was shown to the participants as a recap of the exercise. Participants asked about an explanation on solar disinfection/treatment of water which was given.

The next activity in the training was the sanitation transect walk. Three groups received a sanitation observation list in which they had to score visited sanitation facilities on quality of construction, operation and maintenance and use. During the transect walk the newly constructed Ecological Sanitation (urine diverting) toilets in Barangay 13 and 14 were visited. It turned out that all the participants went out as one group. On the spot the participants checked out the urine diverting toilets and discussed the design. Suggestions for improvements came out like putting in a window (because it is too hot inside the toilet). During the walk some people asked about rainwater harvesting techniques and providing potable water to uphill communities. In the end the urine diverting toilets were the only sanitation facilities visited as the neighboring houses do not have toilets.

During the lunch break Rosalie Castro and Susanne Boom went out to invite the household members of the constructed urine diverting toilet in Barangay 15 with help of Aurora Arrelano (RSI) because they were not present during the morning session. They were able to convince Olivia Manalo to attend the training.

At 1.30 pm the training continued (outside, under a big mango tree) with a session on different sanitation technologies presented by Boji Gendrano. Respectively the pit (Antipolo), VIP and pour flush toilet was discussed, as well as the septic tank and urine diverting ing toilet (Vietnamese double vault) technology. After the presentation the participants were asked to (in three groups) analyze the different technologies on a number of aspects. This seemed to be a somewhat difficult exercise. The different groups presented their findings and expressed their preferred technology. Group 2 choose the VIP toilet but had considerations on cost. Group 3 had the same preference but was concerned about the soil absorbing leach water. This group also had a preference for the pour flush technology but found these not easy to build, although they know of plastic bowls that exist and use little water. Group 1 had a preference for the urine diverting toilet technology but expect pour flush toilets to be cleaner because of the use of water. A filled in sheet on manila paper with the “correct outcome” of the exercise was shown as reference. It seemed that people still did not fully understand or were confused about the characteristics of the different technology options but this was not addressed anymore because of lack of time.

During the session on ecological sanitation that followed, Lyn Capistrano gave an introduction to the concept and discussed the characteristics of urine diverting ing toilets with help of two scale models.

Pictures were distributed in groups on the preparation, use, and maintenance of urine diverting ing toilets and on family participation. These pictures were classically clarified by Susanne Boom.

After this the participants automatically went on to discussing and expressing the adjustments that need to be made in the design of the constructed toilet in order to classify them as urine diverting ing toilets and to address their needs.

The participants gave the following comments/recommendations:

- The hole of the urine diverter needs to be adjusted (bigger, deeper, to the center of the bowl)
- Women need to be consulted in making the design
- The hole in the toilet bowl for the feaces to drop in needs to be bigger and should be vertical
- Smoothen the toilet bowl (so it is easier to use, to clean, and it looks more inviting)
- Make the chambers/vaults easy to open
- The toilet should have windows (position above the head) for beauty, ventilation and light
- Make everything (including the walls) easy to clean
- Widen the superstructure
- The seat (toilet bowl) should be movable

From PCWS-ITNF side an additional recommendation is to put a fly screen on top of the ventilation pipe. PCWS-ITNF committed to address the comments and suggestions raised by the participants.

The participants were asked to make on action plan on how to continue with the project. This action plan should also include how to go about the construction of a fourth urine diverting ing toilet which PCWS-ITNF decided to add to the project. The reaction of the participants was that there was no need from their side to make an action plan. As they are always in Tingloy and ready for reconstruction of the three existing toilets and willing to cooperate any time, it is more up to PCWS-ITNF when to do this. For the fourth toilet they allocated Barangay 13 and advised PCWS-ITNF to first consult the Barangay officials and interested people before the actual construction takes place. They expressed that as a community they want to have a say in the design of the superstructure and are willing to contribute materials and expenses for that, while PCWS-ITNF can design and construct the substructure of this urine diverting ing toilet. So a counterpart between the community and PCWS-ITNF will be created.

With these agreements the training came to its end and participants were invited to evaluate the training. In general they were happy with the training because they like training and they were interested in the EcoSan approach. One comment (of course) was that next time there should be more food (…). Certificates of participation were handed out by Lyn Capistrano and Susanne Boom. The training ended around 5.00 pm.

Internal evaluation by PCWS staff

General impression

- Training should be longer
- Active participation of the group
- People were not afraid to talk
- People were supportive about the project and appreciate that PCWS will address the errors in the design of the three constructed urine diverting ing toilets
- Participants had a high interest in the information material distributed
- Participants were taking notes
- Not all participants returned to the training in the afternoon
- PCWS facilitated as a group
- Humor played an important role in the training
- It was nice to have a training outside under a mango tree
- The participants had a big say in the proceedings of the training

Improvements

- Allow women to bring their children to the training (especially when they are breast feeding)
- Include a manila paper with sketches of a septic tank and biogas toilet
- Exercise on comparing different sanitation technologies: explain more
- There should be a copy of the group handouts for every participant (especially because the training addressed a new topic)
- More copies of posters (for Health Office etc.)
- Supply notebooks and pencils
- More copies of posters (for Health Office etc.)
- Training should be longer
- More users should attend the training
- Arrange a pick up of invited participants in the morning and evening to increase number of attendances
- Invite teenagers to the training

Follow up of project

- Make turn over official -- on paper
- Hold pre-construction meeting
- Invite Municipal Budget Officer, Municipal Accountant, Municipal Treasurer, Mayor, Municipal Engineer, Barangay Health Workers, Barangay Captains
- Discuss design
- Arrange counterpart from community
- Contract local masons through signed letter by Mayor

Attendance

Name	Designation	Barangay
Maricel S. Mandanas	User	14
Alicia B. Mandanas	User	14
Pablo Mandanaz	User	14
Lourdes Mandanaz	User	14
Imelda G. Hernandez	Barangay Health Worker	14
Simeona A. Abad	Barangay Health Worker	14
Anna Riza Manongsong	Barangay Health Worker	14
Margarita Maravilla	Brangay Kagawad	14
Rolando Hernandez	Barangay Chairman	14
Ermelito Gutierrez	S.B. Member	14
Remedios Roblo	User	13
Merly Napeñas	User	13
Mercedita V. Gracia	Barangay Health Worker	13
Edna C. Adalia	Barangay Health Worker	13
Angelita F. Hernandez	Barangay Health Worker	13
Teresa R Mandanas	Barangay Health Worker	13
Marisol Masangkay	Barangay Treasurer	13
Delagia D. Onda	Barangay Kagawad	13
Eufemia M. Base	Barangay Chairman	13
Olivia J. Manalo	User	15
Lilia Aldovino	Barangay Health Worker	15
Paulina Manolo	Barangay Health Worker	15
Aurora C. Arellano	Rural Sanitary Inspector	15
Elgene Cabiteño	Barangay Kagawad	15
Melia H. Datingaling	Rural Sanitary Inspector	Papaya
	Total	**25**
Dominador Manguiat	UWEP coordinator Tingloy	-
Lyn Capistrano	PCWS Deputy Executive Director	-
Carmelo Gendrano	PCWS Technical Expert	-
Rosalie Castro	PCWS Junior Program Officer	-
Susanne Boom	PCWS Junior Program Officer	-
Mitchell van Doren	PCWS Documenter	-

ANNEX 3

TERMS OF REFERENCE (ToR)

URBAN WASTE EXPERTISE PROGRAMME PLUS (UWEP+)

TERMS OF REFERENCE
(ToR)

DESCRIBING ROLES AND RESPONSIBILITIES OF DIFFERENT ACTORS AND THE APPROACH TO FOLLOW DURING FINAL PHASE OF 'TINGLOY ECOSAN PILOT PROJECT' UNDER PCWS-ITNF/CAPS PROJECT TEAM

December 13, 2002

1. Introduction

This Terms of Reference (ToR) provides for the objectives and responsibilities of different people involved in the project and the approach, output and tasks within the final phase of the 'Tingloy EcoSan Pilot Project' to be carried out and facilitated by the PCWS-ITNF/CAPS project team on under the WASTE coordinated UWEP+ Programme.

The project went through development phases encountering problems for which appropriate solutions had to be found. The project takes place in the three Publacion Barangays (Barangay 13, 14 and 15) of Tingloy, Maricaban Island, Batangas Bay Area. The initially three selected families can all be considered as part of the lowest-income households within the project area. Two of these households are located in rural upland forest areas (Barangay 13 and 14) while one family is located in the urban center (Barangay 15).

During the first phase of the project the respective households and community representatives (Barangay Captains, Rural Sanitary Inspectors, Barangay Health Workers) were insufficiently involved in the project preparation and process of designing and constructing the toilets. Construction was not supervised carefully enough and went in a too rushed way and the construction method (ferrocement-technique) and materials (moulds, ferrocement) used, were unknown in the project area. The outcome of this phase was that the three toilet facilities constructed could not be used as dry EcoSan (urine diversion) toilets; they showed several operation errors and were inconvenient to use and maintain. During this phase a training was conducted and information material was developed (see Mid-term Project Report on this).

As a reaction on the above, during the second phase of the project community representatives were informed about scheduled activities taking place and in-dept consultations were held with the respective partner households to find out per household what needed to be done to improve the facilities and adjust them in such a way that they could be classified as dry EcoSan (urine diversion) toilets. The Rural Sanitary Inspector working in the project area participated in the in-dept consultations. A new engineer was involved in the project and a new design was made. The outcome of this phase was that two of the existing toilet facilities were converted into pour flush toilets with leaching pit (Barangay 13 and 15) and 1 partner family agreed on building a new dry EcoSan (urine diversion) toilet facility, according to the new design (Barangay 14). The old toilet facility will be converted into a bathroom facility. For al (re)constructing activities local labor and local available materials were used. During this phase reference material was developed (see Mid-term Project Report).

The third and final stage of the project started with a mission of a WASTE/CAPS team to the project area, partly joined by PCWS-ITNF staff, on analyzing the present water and sanitation situation within the project area and monitoring/evaluating the project so far. This mission showed that the initially selected (three) partner families were strategically not well chosen: the focus should have been on middle class families living in the urban centers of the project area as it is here that existing

toilet facilities (poor flush with a leaching pit) are the main cause of groundwater pollution. Water quality tests conducted over the years by the RSIs show that more than halve of all shallow wells are polluted (positive in E-coli). It came out that the new (phase 2) design was still not optimal and appropriate enough for the local situation. Another outcome was that the information and reference materials developed did not reflect enough on the situation and practices present in the project area. It was agreed that a dry EcoSan (urine diversion) toilet unit will be designed and constructed in Barangay 15 during this final phase. After this phase PCWS-ITNF as (implementing) organization will pull out and the continuation of the project falls directly under CAPS coordination and management as a UWEP+ activity. A partner family for this phase is already approached by the project team.

The current project team is consisting of: Mining Manguiat (CAPS), Apol Jimenez (PCWS-ITNF) and Susanne Boom (PCWS-ITNF) with overall supervision and guidance of respectively Dan Lapid (CAPS), Rory Villaluna / Lyn Capistrano (PCWS-ITNF) and Gert de Bruijne (WASTE).

2. Approach

The approach to follow during the (remaining) of this third and final phase of the project subscribes the general procedures and guidelines listed down in Appendix A-D[3] and should therefore be carefully read. More specifically this entails the following:

- All stakeholders (actors) should be involved in the process of design development and review.
- Preparation meetings with stakeholders should be carried out by the community developer and technical designer together.
- The participating family should be approached as a project partner and therefore has rights and duties.
- The use and maintenance of the constructed (urine diversion system) toilets needs to be monitored in the form of house visits in which the guidelines of Appendix A-D are followed.
- Explore Maricaban Island and its surrounding cities on local industries, workshops or craftsmen and materials that can be applied in the design development in Barangay 15 and in the scaling up of the EcoSan activities in Tingloy and Maricaban Island.
- The chosen design and materials should send out an (environmental) health and hygiene promotion message.
- Scale model and technical drawing of the (draft) design of the dry, urine diversion toilet unit need to be made for stakeholders (actors) to easily give their feedback, suggestions and comments.
- Information should be gathered on the water resources, water supply and sanitation situation and practices in the project area.

3. Output

Involving all stakeholders (actors) and following the approach above should lead to the following outputs:

- The - to built - dry urine diversion toilet unit meets the needs with respect to the convenience, safety, cleanliness, aesthetics and affordability according to the stakeholder (actors) group in general, and the users in particular.
- The approach followed, activities undertaken and toilet design have (the potential for) a self-replicating effect among neighbor Barangay households, i.e. are promoters for EcoSan developments in Maricaban Island.

[3] Originally developed by Aussie Austin and the dry sanitation project team of the Palestinian Hydrology Group in 2002 and later reviewed and adjusted by Gert de Bruijne (WASTE)

- The urine diversion toilet unit is an attractive option for middle-class families in the project area.
- A social platform for the EcoSan approach is created in the project area.
- There is insight in /overview of the opportunities for small entrepreneurs in Maricaban Island or surrounded cities to get involved in EcoSan construction/fabrication activities.
- EcoSan development activities in Maricaban Island fall directly under the UWEP+ program with CAPS as the (single) driving force behind these.

4. Actors and their roles and responsibilities

Listed are the roles and responsibilities of the actors (stakeholders) that need to be involved in the last phase of the project:

Partner families
Role: users
Responsibilities:
- Both the man and the women of the household will give their inputs for the design and/or give their feedback, suggestions and comments on the design made and materials chosen by the technical designer for the urine diversion toilet unit;
- they (to the extend possible) will be the builder of the toilet unit;
- they give suggestions for local materials to use;
- they (to the extend possible) purchase materials;
- they use and maintain the constructed toilet unit according to the guidelines provided by the project team;
- they explain these guidelines to the other members of the family, guests and neighborhood and make sure they also apply these, and
- allow appropriate signs to be posted strategically as part of advocacy for replication.

Barangay Captain and the local council
Role: supportive government bodies
Responsibilities:
- Approve the EcoSan activities taking place in their respective Barangay;
- facilitate purchase of materials and appointment of carpenters (if needed);
- give their inputs for the design and/or give their feedback, suggestions and comments on the design made and materials chosen by the technical designer for the urine diversion toilet unit, and
- assist the promotion of the ecological approach to sanitation (i.e.) trough appropriate local legislation, if required.

Rural Sanitary Inspectors (RSI)
Role: EcoSan advocates, monitoring persons
Responsibilities:
- Give their inputs for the design and/or give their feedback, suggestions and comments on the design made and materials chosen by the technical designer for the urine diversion toilet unit;
- monitor use and maintenance of constructed (pour flush, urine diversion) toilet units through house visits (that have to be coordinated in the context of the UWEP+ programme, or under the Municipal Council);
- support CAPS in further (extension of) EcoSan development activities, and
- provide information about the water resources, water supply and sanitation situation and practices in the project area.

Barangay Health Workers (BHW)
Role: advocates, monitoring persons
Responsibilities:

- Give their inputs for the design and/or give their feedback, suggestions and comments on the design made and materials chosen by the technical designer for the urine diversion toilet unit, and
- support CAPS in further (extension of) EcoSan development activities.

Mining Manguiat (Municipal Coordinator, CAPS)
Role: community developer
Responsibilities:
- Coordinate the involvement of different actors in project;
- facilitate preparation meetings with different actors;
- monitor (or coordinate monitoring of) use and maintenance of constructed (pour flush, urine diversion) toilet units through house visits;
- explore Maricaban Island and its surrounding cities on local industries, workshops or craftsmen and materials that can be applied in the design development in Barangay 15 and in the scaling up of the EcoSan activities;
- facilitate social platform for EcoSan within project area, and
- take over lead in EcoSan development activities in Tingloy after implementation of the urine diversion toilet facilities in Barangay 15.

Apol Jimenez (Sanitation Engineer, PCWS-ITNF)
Role: technical designer
Responsibilities:
- facilitate discussion on and make final draw for urine diversion dry toilet unit to be constructed;
- attend preparation meetings with different actors;
- facilitate making of scale model and technical drawing (preferably in AutoCAD)of dry, urine diversion toilet unit;
- collect feedback, suggestions and comments of different stakeholders on the design made and materials chosen;
- assist (if necessary) in purchase of materials, and
- supervise construction activities.

Susanne Boom (Project Officer, PCWS-ITNF)
Role: task manager
Responsibilities:
- Facilitate process of ToR development and approval;
- coordinate and communicate between on ground project team and CAPS/PCWS-ITNF head offices in Manila (and WASTE office in Gouda, Netherlands);
- carry out project management activities (bookkeeping, meetings, field visits, inform/contact project team, trouble shooting) for project;
- gathered information on the water resources, water supply and sanitation situation and practices in the project area, and
- write the necessary reports and documents.

Rory Villaluna / Lyn Capistrano (Executive Director, PCWS-ITNF)
Role: overall supervision and guidance
Responsibilities:
- Approval of developed ToR;
- supervise, support and guide PCWS-ITNF project staff;
- reflect on project approach and design developed, and
- approve reports and documents written.

Dan Lapid (Executive Director, CAPS)
Role: overall supervision and guidance
Responsibilities:

- Approval of developed ToR;
- supervise, support and guide CAPS project staff;
- reflect on project approach, and
- approve/accept reports and documents written.

Gert de Bruijne (Program Officer Ecological Sanitation, WASTE)
Role: EcoSan expert, guidance
Responsibilities:

- Review draft ToR;
- review and adjust ToR annexes (A-D, containing guidelines for EcoSan projects), and
- review final design, (information) materials and reports and documents selected for urine diversion toilet unit.

5. Planning and schedule

Task	Deadline
Development and approval of ToR	December 2002
Collection of WATSAN information	December 2002
Investigating useful local industries, workshops and /or craftsmen for EcoSan developments	January 2003
Design development and review	January 2003
Construction	February 2003
End-report and project closure	February 2003

ANNEX 4

FIGURES TINGLOY WATER AND SANITATION SITUATION

-

SEPTEMBER 2002
DECEMBER 2002

ENVIRONMENTAL SANITATION AT TINGLOY ISLAND

- Situation as of September 2002 -

BARANGAY			1. Barangay 13	2. Barangay 14	3. Barangay 15	4. Sto. Thomas	5. Talahib	6. San Pedro	7. Gamaw	8. Pisa	9. Corona	10. San Isidro	11. Papaya	12. San Juan	13. Makawayan	14. Marikaban	15. San Jose	TOTAL
POPULATION			597	874	854	1741	1419	850	1507	1409	1004	1802	1849	2027	1011	1261	1111	**19316**
No. of HOUSES			116	171	173	302	232	123	229	230	146	298	314	358	183	168	184	**3227**
EXCRETA DISPOSAL	Sanitary	WS	87	108	118	178	125	61	157	129	110	136	147	298	91	93	98	**1936**
		W/out	29	63	55	124	107	62	72	101	36	162	167	760	92	75	86	**1291**
WATER SUPPLY	Deep Well	Pub								1					1	2	1	
		Priv								2		3	1		10	3	2	
	Shallow Well	Pub	5	6	4	10	4	6	10	4	11	21	52	22	10	4	4	
		Priv	4	10	3	28	9	18	44	34	23	50	22	67	9	3	18	
	OPD	Pub	4	9	3	1	2						1			5	4	
		Priv	11	17	20	3	1											
	D. S..*																	
	Level I		24	43	30	42	16	24	54	41	34	74	76	89	20	17	29	**613**

***D.S.= Deep Spring**

ENVIRONMENTAL SANITATION AT TINGLOY ISLAND

- Situation as of December 2002 -

BARANGAY			1. Barangay 13	2. Barangay 14	3. Barangay 15	4. Sto. Thomas	5. Talahib	6. San Pedro	7. Gamaw	8. Pisa	9. Corona	10. San Isidro	11. Papaya	12. San Juan	13. Makawayan	14. Marikaban	15. San Jose	TOTAL
POPULATION			611	1008	822	1781	1452	870	1542	1141	1027	1843	1892	2073	1034	1290	1290	**1290**
No. of HOUSES			116	171	173	302	232	123	229	230	146	298	314	358	183	168	184	**3227**
EXCRETA DISPOSAL	Sanitary	WS	88	108	120	180	126	64	162	132	110	139	148	300	92	95	99	**1963**
		Newly constr.	1	0	2	1	3	5	3	0	3	1	2	2	1	2	1	**27**
		W/out	28	63	53	122	106	59	67	98	36	159	116	58	91	73	85	**1264**
WATER SUPPLY	Deep Well	Pub								1					1	2	1	
		Priv								2		3	1		10	3	2	
	Shallow Well	Pub	5	6	4	10	4	6	10	4	11	21	52	22	10	4	4	
		Priv	4	10	3	28	9	18	44	34	23	50	22	67	9	3	18	
	OPD	Pub	4	9	3	1							1			5	4	
		Priv	11	17	20	3	2											
	D.S.*						1											
	Level I		24	43	30	42	16	24	54	41	34	74	76	89	20	17	29	**613**

ANNEX 5

DESIGN DRAWINGS

-

PHASE 2
PHASE 3

- Will be added next week -

ANNEX 6

INFORMATION AND REFERENCE MATERIAL DEVELOPED

-

POSTER → added
MONITORING SHEET → not added
MANUAL COMPOSTING TOILET→ not added
INITIAL SANITATION ASSESMENT→ not added
HAND-OVER LETTER→ not added
HAND-OVER CERTIFICATE→ not added
ANNEX C OF ToR – TAGALOG → not added
ToRs FOR STAKEHOLDERS→ not added
FEEDBACK SHEET ON DESIGN→ not added
FACT SHEET ECOSAN PRINCIPLES→ added

Poster

PRINCIPLES ECOLOGICAL SANITATION (ECOSAN)

Fundamental aspects:

- **Turn human excreta into safe products**
- **Prevent pollution**
  (instead of trying to control the situation after polluting)
- **Use the safe products for agricultural purposes**

Criteria for (ecological) sanitation system:

- **Prevent disease (safe, clean)**
- **Affordable**
- **Protect the environment**
- **Acceptable (cultural convenience, looks, beautifulness)**
- **Simple**

Design characteristics

- **Vaults are build above ground**
- **Urine is diverted from feaces**
- **No water is used for flushing: contents of the vaults are dry**