

**IUCN BOTSWANA**

**Final Report**

**FINAL EVALUATION OF THE  
CBNRM MISSING LINK PROJECT**

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The World Conservation Union

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## Acronyms

CBNRM	Community Based Natural Resources Management
CEAP	Community Environmental Action Plan
CIM	German Centre for International Migration and Development
CUPE	Canadian Union of Public Employees
CBO	Community Based Organisation
DED	Deutscher Entwicklungsdienst (German Development Service)
DSWM	Department of Sanitation and Waste Management
ecosan	Ecological Sanitation
EcoSanRes	Ecosan Research Programme (SIDA/SIE)
EIA	Environmental Impact Assessment
GOB	Government of Botswana
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation)
GWP	Global Water Partnership
HCES	Household Centred Environmental Sanitation (“Bellagio Principle” approach from WSSCC)
HH	household
IS-WD	Directorate for Infrastructure Services – Water Division (SADC)
ITN	International Training Network
IUCN	The World Conservation Union
IUCN-ROSA	IUCN-Regional Office for Southern Africa
NGOs	Non-government organisations
PTB	Permaculture Trust of Botswana
RADP	Remote Area Development Programme
SADC	Southern Africa Development Community
SOMATIKO	Somarelang Tikologo (Environment Watch Botswana)
TOR	Terms of Reference
UDS	Urine Diversion System
VDC	Village Development Committee
VIP	Ventilated Improved Pit (Latrine)
WARSH	Water Resources, Sanitation and Hygiene Fair
WEDC	Water Engineering Development Centre, Loughborough University, UK
WSSCC	Water Supply & Sanitation Collaborative Council ( <a href="http://www.wsscc.org">www.wsscc.org</a> )

## Executive Summary

The CBNRM Missing Link project was launched in June 2001 and is currently scheduled to run until the end of December 2004. The project is managed by IUCN Botswana and implemented in partnership with Permaculture Trust of Botswana (PTB). It is financed by GTZ, under the umbrella of the GTZ / GOB 'Waste and Waste Water / Sanitation Management Project' (1993 – 2004). Project coordination support staff is provided by DED, and seconded to IUCN. A Reference group chaired by the DSWM and composed of other local NGOs, local and central government departments and the project staff has provided guidance on project activities.

The Log Framework for the Missing Link Project describes the overall goal as being “...to develop, test and demonstrate a holistic / integrated approach to environmental management, sanitation and waste management at household and community level in selected communities”. The expected results are the development and testing of community based environmental management approaches and methodologies at household level, and subsequently develop and pilot an environmental management approach at community level through the design and implementation of a community environmental action programme.

The project design divided the implementation activities into three phases. They are a mobilisation phase (Phase 1 – Research and Planning, an assessment and implementation phase (Phase 2), and an advocacy and capacity building phase (Phase 3). Phase 2 was divided into two stages designed to focus first on the household level and then subsequently on the community level. At the household level particular emphasis was placed on the design and implementation of environmental management, sanitation and waste management activities. At the community level the plan was to transfer lessons learnt from the experiences at the household level into the design and implementation of a Community Environmental Action Plans (CEAPs). As of July 2004 the project had completed Phase 1 and had extensively implemented household level related activities of Phase 2. In 2002 a decision was made to give more time to the household stage and postpone the community level activities. Hence, the latter are at a very early stage of development.

The overall purpose of the final evaluation of the CBNRM Missing Link project is to assess the performance of the project and to suggest improvements where necessary for the remainder of the project period. The focus is on project management, implementation strategy, and project impact at the household level. The terms of reference for the evaluation give particular attention to assessing the extent to which Project Objectives 1 and 2 have been met, and how the planning and decisions made in the mobilisation phase (Objective 1) have influenced the effectiveness of the project in the household level implementation phase (Objective 2).

The evaluation was carried out, in August 2004, by an interdisciplinary team of four comprising of: representatives from IUCN-ROSA (social), DED-Lesotho (agriculture/ ecosan technical/local), and GTZ-ecosan (ecosan technical/global/networking), and a local consultant (team leader/socio-economic). For GTZ the evaluation is a final evaluation, since the IUCN / GTZ contract does not include a Phase 3. From the IUCN perspective the evaluation is a mid-term evaluation.

The project is being implemented in the three communities of East and West Hanahai, in Ghanzi District, and Paje in the Central District. The evaluation notes that in the context of

the overall project goal, i.e. *“to develop, test and demonstrate a holistic / integrated approach to CBNRM and environmental management sanitation and waste management at individual homestead / household and community level in selected communities in Central and Ghanzi Districts”*, the choice of communities was less the ideal. Whilst East and West Hanahai may be representative of many communities in western Botswana, they are not typical of most communities in the country. The three communities are ‘remote’ in terms of interested stakeholders, and in particular the Department of Sanitation & Waste Management, having access to the demonstration sites and observing at first hand the impact of the project. Thus, from a demonstration perspective there were disadvantages in not having at least one project site close to Gaborone.

However, the overall conclusion of the evaluation is that the project, at the household level, has had a positive impact. In terms of on-site ecosan approach the Urine Diversion System (UDS) combined with pre-dehydration chamber/container and on-site composting of faecal matter mixed with ash and other organic matter is an acceptable and manageable approach for rural households. The majority of households with a dry UDS toilet were making use of it, although in many instances this was restricted to adult members of the family. This restriction has an impact on the hygiene aspect for children’s sanitation.

Households, when they are able to observe and understand the ecosan approach, accept that it is possible and potentially beneficial to use treated human waste. In all the participating households there has been an acceptance of the UDS, pre-dehydration and composting of faecal matter, and there was no observable evidence that household members were resisting using the toilets because they have to empty the collection containers.

Thus, the following has been proved:

- The loop between sanitation and gardening can be closed on HH plot systems in rural areas.
- The ecosan concept can compete economically with other on-site sanitation technologies.
- The ecosan concept, if linked to the promotion of backyard gardening can have an impact on a household’s diet, and therefore nutritional and health status.
- A participatory implementation approach can build commitment from households.
- The behaviour of neighbouring households can be influenced by demonstration activities at another household.

In short, in terms of demonstrating the feasibility of an ecosan approach the project has been effective. Note, however, is again made of the fact that the impact of this demonstration on decision-making stakeholders might have been greater if at least one of the project communities had been closer to the capital, Gaborone.

In terms of methodology, the focus on the household level, and the use of backyard gardening as an entry point for the introduction of ecosan, and eventually community-level environmental planning, has been very effective. A key feature of this has been the participatory methodologies and on-site training activities. However, whilst it was part of the project’s piloting and demonstration strategy to assist households with sanitation and gardening inputs, this seems to have been over done in the Hanahai communities. A greater balanced between a ‘supply’ approach and self-contribution is needed. This has been fully achieved in Paje.

Overall the IUCN / DED-DSWM, the IUCN - DED, and the IUCN/DED- PTB partnership have worked well. The skills and confidence of the CLOs have been developed through the project activities. There are aspects of project management that need to be strengthened, including time management and planning and monitoring.

Based on the evaluation findings, and within the framework of the policy context outlined above, the following four main recommendations are made:

- That support for Phase 2, Stage 2 and Phase 3 of the CBNRM Missing Link Project be solicited.
- That the experience of the Missing Link project be documented in a planning guideline / manual.
- That the demonstration of relevance and feasibility of ecological approaches to sanitation be broadened to include other technologies, such as the water-borne urine separation, low flush toilets, black or brown water vacuum sewerage collection, compostable bag collection system, grey water filtering and sanitation cycling, biogas reactor tanks, neighbourhood, semi-centralized and village level oriented nutrition and recycling loops, productive wetlands gardening, etc.
- That a regional networking project (SADC) on ecological sanitation be established.

# 1 Introduction

The CBNRM Missing Link project implementation started in June 2001 and is currently scheduled to run until the end of December 2004. The project is managed by IUCN Botswana and implemented in partnership with Permaculture Trust of Botswana (PTB). It is financed by GTZ, under the umbrella of the GTZ / GOB 'Waste and Waste Water / Sanitation Management Project' (1993 – 2004). Project coordination support staff is provided by DED, and seconded to IUCN. A Reference Group, chaired by the Department of Sanitation and Waste Management (DSWM), has provided guidance on project activities. The Reference Group members include representatives from various central government departments, Ghanzi and Central District Councils, NGOs, and the project staff.

The Log Framework (see Appendix B) for the Missing Link Project describes the overall goal as being “ ... to develop, test and demonstrate a holistic / integrated approach to environmental management, sanitation and waste management at household and community level in selected communities”. The expected results are the development and testing of environmental management approaches and methodologies at household level, and subsequent development and piloting of an environmental management approach at community level through the design and implementation of a community environmental action programme. The project was expected to design, implement and monitor environmental-sanitation-waste management activities, as far as possible using dry, sanitised and/or composted matter in a manner that would improve household/community food security and income generation as well as natural resources management”.

The project is being implemented in the three communities of East and West Hanahai, in Ghanzi District, and Paje in the Central District. The project design divided the implementation activities into three phases:

- **Phase 1 – Research and Planning** (12 months, extended by 2 months): A mobilisation phase that included the setting-up of necessary project structures and introduce the project to relevant stakeholders/potential participants.
- **Phase 2 – Assessment and Implementation** (24 months, extended by 6 months) focusing on the design, implementation and monitoring of environmental-sanitation-waste management activities. Phase 2 is divided into two main stages:
  - a) **Household level.** In this stage particular emphasis was placed on the design and implementation of environmental management, sanitation and waste management activities at household level.
  - b) **Community level.** At the community level it is intended that lessons learnt from the experiences at the household level will then be transferred to a community level for the design of Community Environmental Action Plans (CEAPs).
- **Phase 3 – Advocacy and Capacity Building** (24 months): It is intended that Phase 3 will focus on the dissemination of lessons learnt and experiences gained to a broader constituency and at a national level.

As of July 2004 the project had completed Phase 1 and had extensively implemented household level related activities of Phase 2. In 2002 a decision had been made to give more time to the household stage and postpone the community level activities, and latter are at a very early stage of development.

The purpose of the evaluation of the CBNRM Missing Link project is to assess the performance of the project and to suggest improvements where necessary for the remainder of the project period. The focus is on project management, implementation strategy, and project impact at the household level. Particular reference is made to assessing the extent to which Project Objectives 1 and 2 have been met, and how the planning and decisions made in the mobilisation phase (Objective 1) have influenced the effectiveness of the project in the household level implementation phase (Objective 2).

The terms of reference (TOR) state that a key output of the evaluation will be guidance on the implementation of the CEAPs and Phase 3 of the project, i.e. to develop and pilot a environmental management approach at the community level (stepping up from the household level) and to use the project experience to build capacity in environmental management, environmental sanitation and waste management relevant institutions. In short, the overall thrust of the evaluation is to review activities to-date and assess the impact of the project on the participating households, and, based on this assessment, provide guidance on how the remainder of the Phase 2 activities might be implemented, and how Phase 3 might be developed.

The TOR (see Appendix A) lists 13 evaluative criteria. In order to focus the evaluation activity these criteria have been consolidated into the following five key evaluative areas:

- A Evaluate the impact of the project in terms of the benefits derived by participating households, and in terms of their continued commitment to the use of environmental management activities.
- B Evaluate how the project has been implemented and the usefulness / effectiveness of specific project implementation activities and the overall implementation strategy.
- C Evaluate the planning of the project and the strategic choices made in Phase 1 and 2, and the present validity of those choices in relation to project implementation.
- D Assess the validity of project objectives 3 and 4 in terms of the experience to-date (based on the findings in relation to evaluation objectives 1 – 3), and provide guidance on the implementation approach for the finalisation of Phase 2 and development of Phase 3.
- E Evaluate the management and steering of the project and collaboration between the two implementing agencies.

The evaluation was carried out, in August 2004, by an interdisciplinary team of four comprising of: representatives from IUCN-ROSA (social), DED-Lesotho (agriculture/ ecosan technical/local), and GTZ-ecosan (ecosan technical/global/networking), and a local consultant (team leader/socio-economic). For GTZ the evaluation is a final evaluation, since the IUCN / GTZ contract does not include a Phase 3. From the IUCN perspective the evaluation is a mid-term evaluation.

This report describes the evaluation methodology (Section 2), gives a brief overview of the project activities (Section 3), documents the findings of the evaluation team (Section 4), and on the basis of the findings details the team's conclusions and recommendation (Sections 5 and 6).

## 2 Evaluation Methodology

The evaluation findings, conclusions and recommendations are based on data collected from a review of the project literature, site visits, and interviews with four categories of project stakeholders. There are project stakeholders at the community level (participating households, neighbouring households, and community leaders), project implementation staff (Project Coordinator, PTB management and field supervisors, and Community Liaison Officers), Project Partner Agencies (DED and IUCN), and other stakeholders at the national level (DSWM, NCSA and others). A list of persons interviewed is given in Appendix D.

The fieldwork at the district and community levels focused on collecting evaluative data from those who are directly involved in project implementation. This included the Field Supervisors, Community Liaison Officers, Village Development Committees, and participating households. In each project community the following data collection activities were scheduled:

- A meeting / discussion was held with the Village Development Committee
- A focus group discussion was held with participating households.
- Site visits and individual interviews with participating households.
- Interview with the Community Liaison Officer.
- Interview with community headman

There were some variations on this. In the East and West Hanahai communities many of the participating households were also members of the Village Development Committee (VDC), and a separate focus group meeting with participating households were not held. It should also be noted that the field work coincided with the Ghanzi Agricultural Show and a number of the participating households were absent when the consultants visited the two Hanahai communities. In these instances it was only possible to collect observational data and discuss a households involvement in the project with the Community Liaison Officer.

Two to three days were scheduled for fieldwork in the two project sites. Site visits to the plots of the participating households formed the core of the evaluation activity. In East and West Hanahai nine (9) of the ten participating households were visited. In Paje 17 households out of the 36 participating households were visited.

The interviews with stakeholders mainly took a semi-structured discussion format. Interview guidelines were prepared as tools to help focus the interviews on the key issues, and to ensure consistency in data collection.

Prior to the start of the fieldwork the following activities took place:

- A meeting with the Project Coordinator (IUCN/DED) and other involved IUCN personnel. The Project Coordinator gave a short presentation to the evaluation team, followed by an open discussion.
- An interview with the Department of Sanitation & Waste Management (Ministry of Environment, Wildlife & Tourism). The interview primarily focused on the Department's perspectives on the project, project management, and future strategies (including financing options) for expanding the project / ecosan technology to other parts of the country.
- An interview with the DED Country Coordinator for Natural Resources Management. DED is a partner in the project and the Project Coordinator is a DED professional volunteer

seconded to IUCN. The interview focused on their perspectives on the project, project management, assessment of the project, and DED's future input in terms of the future expansion of the project / ecosan technology to other parts of the country.

Interviews were scheduled with the Department of Environmental Sanitation in each of the two District Councils (Ghanzi and Central), but these did not materialise, due to weekend absence of the officials. At the village level health and sanitation-responsible authorities were contacted.

After the fieldwork the interviews with other stakeholders were held. A second meeting with the DED country office was organized to discuss the third phase strategy and an internet-based search was done on existing policy and promotional work of IUCN. Follow-up discussions were also held with the Project Coordinator

The preliminary findings of the evaluation were presented and discussed with the Reference Group.

### 3 Overview of the CBNRM Missing Link Project

In the context of the Missing Link Project ecological sanitation (ecosan) is defined as a crossing-cutting concept that has “*a three step process: containment, sanitation and recycling/recovery of human excreta*”. This in turn is defined as having three main aims of (1) protecting health and environment, (2) reducing (conserving) the use of water in sanitation systems, and (3) recycling excreta as conditioners and fertilisers for agricultural purposes to improve agricultural productivity (Wirbelauer 2004, p2)<sup>1</sup>

The project’s terms of reference defines the overall **goal** of the project as “ *...to develop, test and demonstrate a holistic / integrated approach to environmental management, sanitation and waste management at household and community level in selected communities*”<sup>2</sup>. The Inception Report (January 2001) details four implementation objectives. These are given in Box 1.

<p><b>Box 1</b></p> <p><b>Project Implementation Objectives</b></p>
<p><b><u>Objective 1:</u></b> <i>Past and present utilisation of natural resources and environmental management, waste management and sanitation practices at household and community level documented – by the end of Phase I (12 months)</i></p>
<p><b><u>Objective 2:</u></b> <i>Participatory and sustainable environmental management approach at household level developed and piloted through the design and implementation of a household extension programme which includes addressing waste management and sanitation issues – by the middle of Phase (12 months)</i></p>
<p><b><u>Objective 3:</u></b> <i>To develop and pilot an environmental management approach at community level through the design and implementation of a community environmental action plans - by end of Phase II (12 months)</i></p>
<p><b><u>Objective 4:</u></b> <i>To impart project approach, methodology and experience, and build related capacity of relevant institutions and extension staff in CBNRM, environmental management, environmental sanitation and waste management - mainly Phase III (24 months)</i></p>

The goal and objectives are spelt out in the log framework (Inception Report, pp 9 –11), along with the verifiable indicators (targets / outputs) for the project.

The project’s terms of reference describe the missing link project as focusing on households and “*..... on such issues as natural resource management, waste management, environmental sanitation – including the use of sanitised matter for growing purposes - , water (re-) use, etc*” and “*providing a better appreciation about environmental management and natural resources [and how they can] be developed for the ‘bigger’ community picture.*” For implementation purposes the project team has defined the task at the household and community levels in terms of five inter-linked ‘pillars’:

- Backyard gardening that includes vegetable production, chicken rearing, and veld product domestication.

<sup>1</sup> Wirbelauer, C., Ecological Sanitation: a cross-cutting option for water management, sanitation, and food security in Botswana. A paper prepared for the International Water & Sanitation Symposium, Zimbabwe, July 2004

<sup>2</sup> See Contractor’s Project Report, Report n.2, June 30<sup>th</sup> 2002, Annex d

- Water and wastewater management, including water conservation and harvesting.
- Ecological sanitation toilet system (UDS dehydration)
- Composting of organic matter
- Waste management, re-use and recycling.

In practice the project has promoted the use of dry Urine Diverting System (UDS) linked to the use of grey water and composted excreta/organic waste for use in backyard gardening and tree planting. Both gardening for subsistence purpose and micro-commercial purposes was promoted. There was also emphasis on rainwater harvesting and conservation. Water harvesting and backyard gardening, in fact, became the entry points for the introduction of ecosan technologies.

As noted in the Introduction, the project design envisaged three implementation phases. **Phase 1: Research and Planning** has been completed. **Phase 2: Assessment and Implementation** was divided into two main stages. In the first part of Phase 2 the emphasis has been on the design and implementation of environmental management, sanitation and waste management activities at *household level (Stage 1 of Phase 2)*. The intention was that in the second part of Phase 2 the lessons learnt from the household level experiences would then be transferred to a *community level* for the design of CEAPs. Implementation at the household level, in fact, took longer than expected, and the project has yet to move into the community level and the formulation of CEAPs. It is intended that **Phase 3: Advocacy and Capacity Building** will focus on disseminating lessons learnt and experiences gained to a broader constituency and at a national and regional level.<sup>3</sup>

The project has been implemented in three communities – Paje, East Hanahai and West Hanahai. A total of 20 initial households were targeted – 10 in Paje and 5 in each of the two Hanahai communities. In all three communities the selection of participating households was mainly a community and individual household decision. It was a requirement that interested households had to have the means to contribute to the cost of developing the ecosan technologies in their yards. Gender was not specifically set as a criterion for the selection of households. The emphasis was on ‘volunteerism’ and ‘self help’.<sup>4</sup> A higher number of HHs registered to participate in the project than the pilot project could accommodate. In East and West Hanahai the final selection was made through a raffle, and in Paje the selection was made by the VDC.

A summary of the main village-oriented activities in Phase 1 is given below:

- Regular planning meetings with project staff.
- Ecological Sanitation Workshop (August 2001) for project staff, DSWM and local health staff, supported by ecosan and sanitation experts from Zimbabwe and South Africa.
- Introduction of the project to the communities (October 2001) and training workshops on ecosan with the selected communities (February 2002)
- Selection of households (February – March 2002) followed by a sequence of workshops, as follows:
  - a) General meeting with selected households (HHs) to explain the project in detail.
  - b) Meeting / training with the HHs to explain technical details of ecosan.

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<sup>3</sup> The project designed envisaged a five year implementation period for the three phases. It was planned that Phase 1 and 2 would be implemented in years one to three. The actual implementation of Phase 1 and 2 (excluding the formulation of CEAPs) was extended by 6 months.

<sup>4</sup> Contractor’s Progress Report No .2, pp 5

- c) Individual HH meetings to identify the specific needs of each HH.
- Study visit to ecosan projects in South Africa for project staff and some HHs (April 2002). A report of the visit is given in Annex I, Progress Report No 2.
- Phase 2 Planning Workshop (March 2002) with reference group members and other stakeholders.

A summary of the main activities in Phase 2 is given below:

- Monitoring (in August - December 2002) of backyard gardening, tree planting, and basic waste management activities that were started in Phase 1.
- Finalising the building of ecosan systems.
- One day workshop on water harvesting prior to the start of the rainy season for HHs in East and West Hanahai, and a one day workshop on saving run-off water in Paje.
- A four day awareness workshop in East and West Hanahai for HH involved in drought relief projects and how they might participate in the project.
- Composting workshop and a follow-up workshop on water harvesting for HHs in Paje.
- A veld product processing workshop.
- One week indigenous knowledge workshops in Paje and in the Hanahais. These workshops used a PRA approach to identify natural resources that might be integrated into the project.<sup>5</sup>

In the latter part of Phase 2 the project has:

- Worked on refining and further developing the ecosan technologies in relation to the needs of the pilot communities, i.e. water erosion control measures, assisting HHs test different approaches to composting using waste from the toilets.
- Undertaken community assessments in East and West Hanahai, focusing on the past and present management and use of natural resources.
- Undertaken community resource assessments in Paje and shown HHs how to domestically grow and process veld products (like melons, squashes, beans, and herbal teas). This was undertaken in collaboration with Veld Products Research & Development (VPRD).
- Organised training workshops on moulding concrete pedestals; and on garden care and maintenance.
- Facilitated exchange visits between the participating communities.

Based on the narrative in the Progress Reports the emphasis has been on a participatory approach, with the project staff taking on board the views of the communities on how the project should be implemented. The project has also placed emphasis on a 'learning by seeing' approach, and educating and building community and HH awareness about ecosan through tangible activities undertaken in all HHs<sup>6</sup>. These activities included demonstrating how to use grey water, prepare compost, manage and re-cycle waste, and build ecosan systems.

Project monitoring has been undertaken, in part at least, through the preparation of periodic progress reports. Each of these progress reports provides a description of project activities in the reporting period, draws conclusions on the project experience to-date, and makes recommendations for future action. These reports have emphasised the importance of the participatory approach, and in particular in Phase 1 the importance of "*involving*

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<sup>5</sup> Fuller information on these activities are given in CBNRM Missing Link, Phase 2 Project Reports 1 & 2

<sup>6</sup> Contractor's Progress Report No. 2 pp10

*communities, introducing and explaining the project as well as gathering reactions, needs and fears of possible participants*”, and adopting a flexible implementation approach in terms of each individual HHs capacity to implement specific activities. The progress reports highlight a number of constraints, including:

- slow implementation of activities by some HHs because of their involvement in drought relief projects;
- delays in project implementation during the ploughing season;
- household financial constraints delay the construction of superstructure of toilets;
- Lack of fencing to protect gardens against goats and chickens; and
- Acceptance of the concept of using waste for composting purposes.

The results to-date of the project at the community level are described<sup>7</sup> as:

- An increase in the number of participating HHs from 20 to 43 in the three communities. This excludes HHs who are not active participants in the projects but have, at their own initiative, adopted and implemented some of the technologies.
- Construction of UDS dehydration toilets. In the Hanahais all 10 participating households have completed their toilets and in Paje 9 out of 10 initial households have completed. In addition, in both the Hanahais and Paje HHs all the old toilet structures with deeper pits have been improved by adding sand and cement to make them shallower. In addition 5 improved ground structures of the newest model have been built in Paje. Other improved ground structures are under construction.
- Simple water reticulation systems for the retention of rainwater around trees, crops, and other plants in 25 HHs. Erosion control measures (mini-dams) have been set up in some yards as demonstration sites.
- Use of grey water to water trees and plants by almost all HHs, and 21+ HHs have established composting heaps or pits that are used on a regular basis..
- Use of urine for fertilisers in virtually all participating HHs in Paje. In Paje the nine households that have been provided with brick composting boxes are using them regularly, and these households are being used as demonstration sites.
- Harvesting and selling of surplus vegetables and fruits in almost all of the participating HHs in the three communities.
- Training of household members. In 2004 action plans were developed for both Paje and the Hanahais through meetings and workshops, and a training course on water harvesting/soil erosion was held in Paje.
- Assessment of natural resources-based livelihood strategies in the participating communities. PRA workshops were held in 2003 to collect information on past and present livelihoods so as to better understand the value of natural resources in the daily lives of the households in East and West Hanahai and Paje.

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<sup>7</sup> Extracted from Wirbelauer, C, 2004, pp 5 and IUCN / PTB, Phase 2, Project Report n.4 1<sup>st</sup> January – 30<sup>th</sup> June 2004, pp 4 - 7

## 4 Findings

### 4.1 Introduction

The evaluation findings, based on the literature review, community visits and discussions with various stakeholders, are outlined below. These findings are presented under the five main evaluation objectives that are listed in Section 1. A brief discussion of the activities and events related to the design of the project and the selection of communities is also provided.

The findings of the evaluation need to be considered in the context of the socio-economic environment of the three project communities. Paje, and East Hanahai and West Hanahai, both in terms of the socio-economic and physical environment, are two contrasting situations.

Paje is located in the more fertile eastern part of Botswana, close to the large semi-urban centre of Serowe. It is situated on a river and nestled between two hills. Soil erosion is a problem in the village, and there are concerns that household pit latrines are polluting the groundwater. Settled in the early 1900's, Paje is a community with a long history and well established village institutions. In spite of the village's proximity to such urban centres as Serowe and Palapye unemployment, particularly amongst the youth, is a problem. Livestock rearing and arable agriculture continues to be the main economic activities for many households, although vulnerable households, such as the aged, orphans and AIDS victims are dependent on government social welfare programmes.

The Hanahais are located in the drier western part of Botswana. They are situated some 80kms from Ghanzi Township. They are small settlements, and all households are in close proximity to the bush. The sandy conditions of the Kalahari mean that soil erosion is not a major problem, but there has been de-forestation of the area around each community.

The communities were established by the government in the late 1970's. They have been settled mainly by Basarwa who were working and living on the cattle farms. In the early 1980's, both communities formed Village Development Committees and elected a chief. Historically Basarwa are hunter/gathers. Whilst households still gather veld products for medicinal and subsistence purposes, hunting and gathering is no longer the dominant lifestyle. Through various government schemes, households have been assisted with agricultural inputs, such as seeds and draught power. However, the climatic conditions of the Kalahari make agriculture a marginal activity. Various studies on the Hanahais and other similar settlements in the Kgalagadi and Ghanzi districts have highlighted the harsh socio-economic conditions of these settlements. Employment opportunities in the settlements are virtually non-existent. Projects aimed at creating income generating opportunities and improving livelihoods, such as the government supported Economic Promotion Fund, have had very limited impact.<sup>8</sup> For many households government welfare schemes are an integral part of their livelihood strategies. Indeed, a characteristic of these kinds of settlements is a "dependency syndrome" – a reflection of their historical development and the socio-economic environment, and the impact that has on the culture of the Basarwa.

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<sup>8</sup> The Missing Link's "Natural Resources-based Livelihood Strategies in the Villages of EH, P and WH" study made note of the fact that a large number of households in the Hanahais are beneficiaries of the government's destitute programme. The challenges of creating sustainable livelihoods in settlements, such as East and West Hanahai, are highlighted in such studies as the '*Report on the Review of the Remote Area Development Programme (RADP)*', Botswana Institute for Development Policy Analysis, December 2003, and the reports from '*Accelerated Remote Area Development Programme Monitoring Project*', undertaken for the Ministry of Local Government, Lands & Housing in 1990 - 1991 and 1993 - 1994 by PEER Consultants and Environmental Services. However, it should be noted that this challenge is not unique to these kinds of communities.

It is reasonable to assume that the different cultural, socio-economic, and physical environment of the project communities have had a bearing on how the project has evolved in Paje and the Hanahais. In fact, this is reflected in the level of project activities. In the Hanahais the number of participating households has not increased beyond the original ten households selected. In Paje there are now 36 households involved in the project, 28 of them are very active.

## 4.2 Design of the Project

The Missing Link project evolved from a proposal prepared by DED and IUCN in March 1999. The focus was on the development of community environmental plans, based on PRA assessments, in a number of selected communities. The ‘missing link’ was described in terms of the disconnection “*between the short term economic gains offered through CBNRM and the long term environmental sustainability*”. Ecosan technology and intervention at the household level was not specifically addressed. However, following discussions with the Botswana-based GTZ Sanitation and Waste Management Project, the IUCN / DED concept paper incorporated an ecological sanitation component. The suggestions from GTZ (1<sup>st</sup> December 1999), proposed that the project “*test both the approach and available techniques in rural and institutional situations. An integral part of the pilot test is to develop awareness and ecological sanitation so that the approach is accepted by the communities and institutions which will take part in the trial*”. During the same period, GTZ-DSWM held a planning workshop for the last project phase and incorporated ecological sanitation as one activity, based on a short term study of Prof. Ralf Otterpohl, Technical University Hamburg-Harburg,

Whilst the revised IUCN Project Concept Paper (24 September 2000) still envisaged a broader CBNRM approach, leading to the formulation of community environmental action plans. It was further envisaged that the starting point would be at the household level, and that a picture would be built up of households’ environmental management practises. PTB was already identified as an implementing partner. Backyard gardening and other environmental management activities, linked with ecosan technology, were seen as the entry point. It was proposed that community environmental management plans would only be developed in selected communities. The communities would be selected based on their “*involvement in the ‘household phase’ and their relevance to CBNRM and wider environmental management significance ...*”.

A proposal was submitted to the Department of Sanitation & Waste Management in September 2000. The project idea was agreed in principle, and in October 2000 a contract between GTZ and IUCN for an Inception Phase was signed. The Inception Phase was completed January 2001. Based on the Inception Report a contracting proposal was formulated by GTZ, and although DSWM expressed concerns that the proposed project was not complementary to a WEDC study (undertaken by GTZ-short term consultants) on sustainable excreta disposal, two contracts were signed between IUCN / GTZ and IUCN /DED in March – May 2001.

In April 2000 IUCN identified the Permaculture Trust of Botswana (PTB) as an inception and implementing partner. The inclusion of PTB was instrumental in including Ghanzi District as a focus for the Missing Link project. PTB was already working with communities in Ghanzi District.

During the project design period a number of decisions were made that have had a significant bearing on the implementation of the project. These decisions relate to:

- Selection of the project sites – the inclusion of PTB, in April 2000, as an implementing partner resulted in Ghanzi District has been selected as one of the project areas. PTB has worked in the Ghanzi District for a number of years, and has various ongoing projects. However, the suitability of the project communities, and in particular the Hanahai settlements, for a demonstration project is questionable. This is discussed more fully in Section 4.3.
- Connecting the Missing Link Project with ongoing PTB activities – backyard gardening has been a feature of PTB activities in Ghanzi District, and it was decided to utilise this experience as a an entry point for the Missing Link Project. Whilst this was seen as a positive step by the project’s management team, the absence of any baseline data on the participating households, and in particular their involvement in ongoing PTB projects, makes it difficult to assess the impact of the Missing Link project. There were no previous gardening projects in Paje.
- Recruitment of a project coordinator – DED-headquarter in Germany began its recruitment process in mid-2000 based on the original concept paper from 1999. Eco-sanitation and related activities did not feature in the terms of reference fore the technical expert. Rather the terms of reference focused on CBNRM and in particular community-based environmental planning. Consequently the technical expert had to devote time to familiarising herself with eco-sanitation technologies. The Project Coordinator was given an initial introduction in a one-day briefing event in GTZ-headquarter by GTZ-technical ecosan staff in March 2001.

### 4.3 The Project Communities

The project log frame in the Inception Report lists Chobokwane (Ghanzi District) and Mogorosi (Central District) as the pilot communities. Based on advice from PTB the pilot communities were changed to East and West Hanahai in Ghanzi District and Paje in Central District. PTB had spent some time working with the Mogorosi community and felt that there was insufficient interest to support a pilot project. The Hanahai communities were chosen over Chobokwane because of the proximity to the PTB office in Ghanzi and because PTB had already field staff located in the two communities

As noted earlier the overall goal of the project is *“to develop, test and demonstrate a holistic / integrated approach to CBNRM and environmental management sanitation and waste management at individual homestead / household and community level in selected communities in Central and Ghanzi Districts”*. Whilst it is not stated specifically, it is understood that one of the key target agencies for the pilot and demonstration activities is the DSWM, and local authorities. District and municipal authorities are responsible for supervising and monitoring the implementation of environmental health policies and regulations.

If the selection of project communities is examined in the context of **“demonstrating”** an ecosan approach to DSWM and other agencies, the appropriateness of selecting communities far from Gaborone, and in particular Ghanzi District, must be questioned. That the project communities are far from Gaborone, makes it a time consuming exercise for interested departments to visit and obtain first hand knowledge of the ecosan approach. This also applies to Paje, although arguably to a lesser degree. In fact, it is noted that Gaborone-based members of the project Reference Group have not visited any of the project communities. **In**

**terms of ‘demonstrating’ an ecosan approach to DSWM it would have been better to have at least one pilot community or institution closer to Gaborone.**

However, in the context of ‘**developing and piloting**’ environmental management, sanitation and waste management strategies at household and community levels, the selection of Paje and East and West Hanahai offered two contrasting challenges. East and West Hanahai are not representative of most communities in Botswana but they are typical of the numerous Remote Area Development Programme (RADP) settlements in the Kgalagadi and Ghanzi Districts. However, as previously noted, households in these types of settlements are generally poor, in many instances reliant on social welfare programmes, and have a strong sense of dependency on government. The conditions in these communities do not readily comply with the assumption, made in the log frame, that “*households and communities are motivated to participate under the banner of self-help .....*”. To a large extent this has been borne-out by the project’s experience. There has been no expansion of the project in terms of the number of households participating in the project. On the other hand, relatively little attention has been given to developing and supporting CBNRM strategies in the RADP settlements in Ghanzi and Kgalagadi even though natural resource management is a dominant feature of the people’s cultural heritage. From this perspective it can be argued that the Missing Link’s focus on developing, testing and piloting a “*a holistic / integrated approach to CBNRM and environmental management sanitation and waste management*” might demonstrate new avenues for promoting sustainable livelihood strategies in these communities.

In the Paje community there was more conducive environment for demonstrating as well as piloting an ecosan approach. There was evidence that sanitation was a priority, and concerns about groundwater pollution served a strong motivating factor. On the other hand, utilisation of natural resources is not a strong aspect of the households’ livelihood strategies. Livestock rearing is a major economic activity; an activity that is at odds with conventional thinking on CBNRM. Paje offers the challenge of re-thinking the application of CBNRM.

#### **4.4 Evaluation Objective A: Impact on the participating households**

During the field visits a total of 26 households were interviewed. Nine households were interviewed in East and West Hanahai and 17 in Paje.

In East and West Hanahai a total of ten households (5 in each community) selected to participate in the Missing Link project. Each community was briefed on the project by PTB, and interested households were asked to register with the VDC. A considerable number registered. From these five households in each community were then selected through a raffle system. Of the ten original households, one dropped out, and one household has not completed the super-structure for their UDS toilet. The household that dropped out in East Hanahai was replaced.

Thus in the Hanahais there are nine households that have a functioning UDS, and can be considered to be following the ecosan approach promoted by the project. There has been no expansion of the project in terms of other households in the communities joining the project. There appear to be two underlying reasons for this:

## **Figure 1**

### **The Hanahais – Implementation of the five pillars**

#### ***Backyard Gardening.***

Eight (8) of the nine households visited had a functioning backyard garden, and this was clearly a major motivation for participating in the project. Shade netting is a necessity for gardening in the Ghanzi area. The gardens varied in size from 10m<sup>2</sup> to 64 m<sup>2</sup>. Consequently there are different designs in terms of garden layout, and different solutions for doors, sidewalls and roof support (height). Shade netting has been provided by the project, and in households with the larger gardens shade netting had also previously been provided through other PTB projects. The usefulness of the shade netting would probably have been maximised if there had been a more standardised approach to the construction of garden areas and guidance by PTB. Erection of the shading under the supervision of a trained person would result in longer lasting structures and better coverage of areas. **It is recommended that PTB look into this.**

The distribution of seed beds and walkways, amelioration of soils, and weeding look good, although there is ample room for improvement. The vegetables produced were entirely leafy vegetables, and in most gardens there was a section where mint is grown (for tea). All the beneficiaries had received a standpipe in their yard, and the watering of plants was well done. In some cases people stored water in buckets and other containers in case there was disruption in the pumping of water.

In at least four instances the households sell produce from the garden. The income is mainly used to pay their monthly water bill and buy food.

#### ***Wastewater Management***

Households reported that it has been their normal practise to use wastewater on trees in their compounds. In most households tree disks had been constructed at the base of trees to prevent soil erosion. However, the use of wastewater was not a given now that they have a standpipe in their yard. In some households it appears that the practise of using wastewater and collecting rainwater was no longer considered important, as they can obtain all the water they need from their standpipe.

Prior to the provision of standpipes it is unlikely that household's would have generated enough wastewater to water their gardens, hence their justification for requesting assistance with a water connection.

#### ***Toilets***

On-site closed loop ecosan dry toilets have been built in all of the nine households visited, and in all cases the households have built the superstructure. In one household the toilet had no door and it was not in use. The design of the toilets varied. In some cases the collection pit was below ground, and in other cases the toilet had a three-step elevation so that the containers collecting the urine and excreta are above ground.

The quality of the superstructures varied. In general simple improvements to the design of the superstructure could be made so that a household has a better facility. Attention, for example, needs to be given to the size of the doorway, and in some instances there were ventilation pipes that were unnecessary or not working. In some instances it was also observed that the urine pipes were unnecessarily long and bent in such a way that the urine could not flow by gravity feed. It is evident that households will benefit from more detailed guidance on toilet design. **It is recommended that PTB look into this.**

Hand washing facilities had been constructed in two toilets. Some toilets had children's seats, but most households reported that only the adults use the toilet. It is also likely that the toilets are not used by men when they are solely passing urine. This is evidenced by the amount of urine collected. In six households a urine collection of about 5 – 10 litres was visible. At the other sites the toilet was not in use, or the urine collection did not show signs of being taken seriously. In the case of faecal matter households reported that they had collected several buckets. However, given the fact that only adult household members used the toilet it is concluded that the amount collected is generally on the low side.

It is not evident that the participating households have developed a consciousness that they want to use the toilets and collect as much waste as possible.

#### ***Composting***

In all the households where the toilet was being used there were composting pits. The beneficiaries claimed that the composting pits contained solid toilet waste. Whilst this could not be proved, there was evidence that other organic matter, such as leaves and animal manure, was also being used in the compost pits. Some beneficiaries reported that they had planted trees on the spot where compost pits had been dug.

#### ***Solid Waste Management***

The two Hanahai communities showed very little evidence of littering. It is reasonable to assume that given the socio-economic status of households and the distance of communities from commercial centres that households do not generate a lot of inorganic waste. However, there was evidence that the waste utilisation practises promoted by the project have had an impact. Households were decorating the tree disks with bottles, and in two instances cans were being used to construct a kitchen area. In one instance, a household had constructed the toilet superstructure from cans.

## Figure 2 Paje – Implementation of the five pillars

### ***Backyard Gardening***

All of the 17 households visited have a garden. Eleven (65%) said that this was their main motivation for joining the project, and five (29%) households ranked gardening as the second motivating factor. Every household had received assistance with gardening (seeds, tools and in some instances fencing) and this was obviously a key motivating factor. The size of the gardens varied from 42m<sup>2</sup> to 800m<sup>2</sup>. The gardens were used for growing vegetables, herbs, spices, flowers and fruit trees. Most gardens were in good condition, and the trees were surrounded by tree disks to keep the humidity close to the roots. Twelve households were applying urine to their garden, after a storage period of 3 – 6 months. In most cases the urine is diluted with water on a 1:5 ratio. Households do sell produce from the garden but there are problems with bugs and pests. One household recently had its garden destroyed by chickens that had entered through a hole in the fence.

### ***Water Management***

Nine (53%) households said that water management was the fourth motivating factor for their participation in the project, and five households (29%) ranked it as the third motivating factor. Only one household said that improved waste water management had led to their participation in the project. This family also wants to have a private water connection installed by PTB. Water supply differs significantly from plot to plot:

- 6 families fetch water at public standpipes at a distance between 200 and 800m from their plots. They use 20 litre containers for transportation.
- 1 family has access to the standpipe on the neighbour's compound.
- 10 families enjoy water supply on their own plot through standpipes, 4 of them sponsored by the Missing Link project.

Wash and waste water in general is reused for irrigation of the vegetables, trees and pit compost by all families. Different techniques are used, for example channel irrigation. Rainwater harvesting and other water collecting measures are not commonly spread. This is partly due to the fact that not all roofs are constructed with appropriate material. In the households that do practise waste and rainwater management, it is the women who take on this responsibility

### ***Toilet***

The improvement of sanitation was the main reason for five (29%) households joining the CBRNM project. Three (18%) households ranked it second, 4 (24%) third, and 3 (18%) ranked it fourth reason. For 2 (12%) households sanitation was not a factor for in their decision to join the project.

Nine of the 17 households have a functioning UDS toilet with a Phoenix pedestal; and only one of these had a hand washing facility. In three households shower/washing places have been integrated in a comfortable super structure. In each of these households toilet maintenance is done by women. Four families are still waiting for the ground structure to be constructed. Six households have recently constructed ground structures which need to be completed with a superstructures and concrete pedestals. In 6 households a VIP and simple pit latrines are still maintained and in use. Nevertheless, among those households that have not yet had a UDS installed urine collection is in practise.

In some cases the delivered UDS-Phoenix pedestal kid cover (kiddie seat) was not installed, it seems that in some households children are not using the UDS. In none of the UDS toilets is there a urinal and men are not using the toilet to pass water.

The new concrete UDS pedestals do not have any cover, but standard plastic toilet covers are available on a commercial basis in nearby Serowe (10 km from Paje). The newest generation of UDS is combined with ash/faeces container (for about 20 kg), and a 30l urine container. Storage space for the containers is under the platform

### ***Composting***

Gardening was ranked as the main reason for joining the project, and composting is a related activity for soil improvement. In fact, 7 (41%) households said that learning about composting was the second most important reason for joining the project, a further 7 (41%) households ranked composting third, and 3 (18%) households ranked it fourth.

Based on the explanations of the interviewees, the compost consists mainly of organic products from toilets, kitchen waste, garden residues, and animal manure. Urine application is practised by more than 50% of the involved families.

### ***Solid Waste Management***

Solid waste management is not regarded as a pressing problem for the families. 15 (88%) households rated it as the last motivation for participation in the project, 2 (12%) listed it or ranked it as the fourth reason for joining the project. The households collect tins and bottles, in general for use as tree disks and anti-erosion measures, construction and decoration purposes.

- (a) A household toilet is not a priority, given the limited economic resources that households have. At the start of the project very few other households had any type of latrine. It is reasonable to assume that building a pit latrine was beyond the economic means of most households, and that easy access to the bush meant that the ‘convenience factor’ was not a strong motivation.
- (b) A ‘dependency attitude’. Discussions with the VDCs suggests that other households would expect to be assisted in the same way as the ten project households, including being assisted with a water connection. Inadvertently the project has added to the ‘dependency syndrome’. Given that households are used to being “assisted” there is little precedent for taking the lead.

The situation is different in Paje. As Table 1 shows, in Paje the project has expanded from the original ten households selected by the VDC, and there are now 28 other households participating in the project in one way or another. Nine of the ten original households have a functioning dry UDS, one of the additional households has already a functioning dry UDS, and four of the additional households have a recently constructed UDS ground structure without or with superstructure.

<b>Community</b>	<b>No HHs initially selected</b>	<b>No HHs dropping out</b>	<b>No of inactive or not yet active HHs</b>	<b>No. of additional HHs</b>	<b>Total HHs currently active</b>
West Hanahai	5	0	0	0	5
East Hanahai	5	1	1	1	5
Paje	10	2	6	26	32

A detailed assessment of each household visited in both the Paje and the Hanahai communities are given in Appendix C. The data from the household level shows that the project has had a positive impact on the participating households. In terms of on-site ecosan approach:

- The UDS combined with pre-dehydration chamber/container and on-site composting of faecal matter mixed with ash and other organic matter is an acceptable and manageable approach for rural households. The majority of households with a UDS were making use of it, although in many instances this was restricted to adult members of the family. This restriction has an impact on the hygiene aspect for children’s sanitation.
- Households, when they are able to observe and understand the ecosan approach, accept that it is possible and potential beneficial to use treated human waste on gardens. However, in the Hanahai communities it is not yet evident that the participating households have developed a consciousness that they want to use the toilets and collect as much waste as possible.
- Households recognise that treated waste (urine and excreta) can be used as manure on gardens. The evaluation data shows that approximately 75% of all households visited were using treated urine on their vegetable gardens, although this could not be visually verified. Several households have planted trees on compost pits or emptying these pits after one year for its reuse. However, the fact that in many households, in both the Hanahais and Paje, restricted use of the toilet to adults, and the fact that men’s urine was not collected, does mean that the quantity of treated urine and

compost produced from a household's UDS is limited and this reduces the impact on gardening.

- Project planning did not focus on gender specific issues. However, implementation shows that gender related needs are relevant for long-term success. Men do not accept sitting on the pedestals and prefer urinating "at the fences". This has an impact on the urine collection and therefore on the quantity of available fertilizer. It should be recommended to enlarge the constructed upper structure in order to provide additional space for separated urinals.
- The majority of households participating in the project are female-headed households. This is a strong indicator for the positive impact that ecological sanitation systems may have in family economy, nutrition, and poverty reduction. Given the demonstrated commercial potential of backyard gardens it is also significant in terms of local economic development and the role played by women.

Furthermore, there is a perception, in Paje, that the ecosan approach has a positive impact on the environment. Community leaders feel that there is now the possibility of household sanitation without the risk of polluting groundwater. The community leaders also noted that household utilisation of other waste, in particular drink cans, has resulted in a cleaner environment. This was observable at the kgotla (the community meeting place), where flowers have been planted and disks have been created around trees.

The evaluation data also shows that backyard gardening is a priority for many households, and that the potential for economic gain is recognised. All the participating households in East and West Hanahai and virtually all households in Paje have a vegetable garden. At least three of the households in West Hanahai and two households in East Hanahai were selling produce from their gardens to other households. In Paje four households were selling garden produce on a regular commercial basis. Furthermore, it is reasonable to assume that in those households with a vegetable garden there has been a positive impact on the household's nutritional status.

There is evidence to suggest that the project has impacted on households' awareness of methods of preventing soil erosion. Many of the participating households, in both the Hanahais and Paje, have created disks around the base of trees.

#### **4.5 Evaluation Objective B: Usefulness of specific project implementation activities**

The log frame in the Inception Report outlines, in broader terms the type of activities that will be undertaken in the pilot project. As noted earlier, the implementation of the project in the communities was designed in two stages – household level and community level. The focus to-date has been on the household level, and the approach has been based on the Household Centred Environmental Sanitation (HCES) approach described in the "Bellagio Principles" of WSSCC.

The focus on the household level has worked well. Only a few households (three) have dropped out, and the approach of demonstrating the ecosan technology by focusing on 'volunteer' households has served to create a broader interest in the communities. This is particularly the case in Paje, where an additional 26 households have actively shown interest in implementing in their own yards the activities that are being promoted by the project.

The household level approach is clearly a strategy that needs to be considered by other projects and programmes that are promoting sanitation and sanitation related activities.

The log frame and the activity chart in the Inception Report list the key implementation activities. Included are household assessments, and an environmental sanitation attitudinal study. The household assessments were done but no report was compiled. A separate attitudinal study was not undertaken as it was felt that this type of information had been collected in the household assessments.. This does not appear to have had a significant impact on the implementation of household level activities.

In assessing the overall effectiveness of implementation activities, the evaluation team has focused on a number of specific activities in terms of assessing the effectiveness of the project implementation.

- **Training of Project Staff** – In August 2001 a three day training workshop on ecological sanitation was held for PTB staff. The workshop was also attended by four representatives of the DSWM, the local GTZ adviser on waste, and the Central District Environmental Health Department. The trainers were drawn from the Centre for Scientific and Industrial Research in South Africa, and the Mvuramanzi Trust, Zimbabwe. The workshop covered such topics as the principles of ecological sanitation, technology development and practise, socio-cultural issues, taboos and beliefs in Botswana, health issues related to ecological sanitation, promotion and education of ecological sanitation, and indicators for monitoring the use of ecosan toilets.

During the evaluation the training workshop was discussed with PTB staff. The general comment was that the workshop had been useful but more in depth training is required. It was felt that the workshop was too short and too theoretical, and that a one-off training event was an insufficient introduction to ecological sanitation. Similar comments were made about other training activities. The PTB Community Liaison Officers (CLOs) feel that more training is needed on urine use and composting. In this latter case the CLOs attended the same training workshop as the participating households, and are not, particularly in the Hanahais, significantly better informed than the households that they are assisting.

- **Ecosan Study Tour** – This was a useful activity. At the start of the project the project staff (including the Project Coordinator) had only a limited knowledge of eco-sanitation. The possibility of actually seeing ecosan toilets in use was considered by PTB and IUCN as a turning point in the early stages of project development for both the project staff and the community representatives from Paje and the Hanahais. It is noted that the study tour was limited to South Africa and focused only on the UDS-VIP and dry UDS-container toilets. In this respect it was not a sufficient basis for enabling people to make an informed choice about different ecosan approaches. There had been plans to also visit ecosan projects in Zimbabwe but because of the security situation at that time the trip to Zimbabwe was cancelled.

Whilst the study tour was effective in informing PTB staff and community leaders, the opportunity to participate was not extended to other project partners, in particular DSWM and the Environmental Health Departments in the two district councils. With hindsight more effort should have been made to bring them on board the project in the early stages. The study tour might have been a useful tool for doing just that.

- **Training of households** – The training of households has generally been on-site, i.e. in the communities and in the yards of the participating households. The positive impact of this approach is observable at the household level. It is an approach that needs to be maintained, and applied to other ecosan demonstration projects. However, more attention needs to be given to the capacity of households to learn and apply the knowledge and skills conveyed in these training activities. The indications are that one-off training interventions are not sufficient. Households in both the Hanahais and Paje feel that they need more training on the use of urine in their gardens. In Paje households feel that more training on garden management, including controlling bugs and pests, is needed. Either the capacity of CLOs needs to be strengthened so that they can provide follow-up training, or repeat training needs to be provided.
- **PRAs** – In 2003 participatory rural appraisals (PRAs) with a focus on natural resources-based livelihood strategies were conducted in each of the three communities. PRA exercises were a feature of the initial IUCN / DED concept paper and the project Inception Report. The Inception Report describes the PRA in terms of *“laying a basis for further work with households and communities in addressing the needs of community-based environmental management. Activities will be designed on the basis of needs and opportunities as expressed by the communities. Ecosystem well-being would need to be merged with human well-being and the activities will be focused on overall holistic environmental management”*. (p. 6)

The results of the PRAs are documented in ‘Natural Resources-Based Livelihood Strategies in the Villages of East Hanahai, Paje and West Hanahai’ (IUCN, 2004). Whilst the document provides a detailed record of the PRA exercises and data collected, there is only a limited link to “community-based environmental management” and no concrete suggestions on how the information generated during each PRA can be used by the community and PTB / IUCN / CBOs to take action on managing their sanitation environment.

Whilst the CLOs feel that their participation in the PRAs has broadened their skills, this particular activity is one of the weaker features of the project. The PRAs appear to have been undertaken prematurely, and so did not achieved the purpose set out in the Inception Report.

- **Local economic development and concrete pedestal production** – A training workshop on how to make concrete pedestals was held in Ghanzi for CLOs and selected community representatives. Prior to this workshop households were being supplied with expensive plastic pedestals. The introduction of the concrete pedestal and training PTB and community members how to produce them is a significant step forward in terms of making ecosan technology more accessible to households and creating commercial opportunities (beside gardening and handicraft) in the communities. The production of pedestals has now been localised, and the pedestals made are more affordable for households. The training has had an immediate impact in Paje. Pedestals are now being made and sold in the community. In the Hanahais this is not the case, since there has been no increase in the number of participating households.

- **The National Ecosan Awareness Raising Workshop (Sept 2003)** – The workshop was organised to provide an opportunity for community members, government officials, NGOs, private companies and others to “*share knowledge and experiences on sanitation in an attempt to increase awareness on Ecological Sanitation*”. The workshop was well attended and there are indications that it had a significant impact on some participating agencies. Following the workshop Botswana Technology Centre, SOMATIKO (eco-park), Department of Water Affairs, and other Governmental Agencies and private companies have expressed interest in the Missing Link project and attended some reference group meetings. The workshop was also influential in introducing other ecosan technologies to DSWM, and paved the way for discussing the possibility of other ecological sanitation projects. For example, Orbit Pumps, Botswana, and Roediger Vakuumtechnik, Hanau, Germany, with the backstopping support of GTZ-ecosan, have drafted a proposal on the ‘Re-Use of Grey Water from Domestic Installations in Urban Areas’.

However, there is a need to make more effort in this direction. District councils have not, as yet, shown significant interest in ecological sanitation. The district councils, through their Departments of Environmental Health, are key players in the implementation of national sanitation policies. At a strategy and planning workshop for District Councils, organised by the DSWM in August 2004 – a week before the evaluation took place - considerable resistance was encountered to the dry on-site ecosan approach which was presented through the Missing Link. It was described as “taking us backwards”. In the same vein, it is noticeable that the Environmental Health Officers at Ghanzi District Council have reportedly not visited the project sites in East and West Hanahai. Phase 3 of the project is focused on Advocacy and Training. It would appear that it is an essential part of the project if the experience and lessons learnt from the Missing Link project are to be understood by other significant stakeholders.

- **Young Professional Support** – In September – December 2003 a GTZ-ecosan Young Professional was assigned to the Missing Link project to assist with research and implementation. The Young Professional was based in Paje. His terms of reference included assisting with monitoring and evaluation activities, studying the reaction and attitude of neighbours not involved in the project, the development of low cost superstructures, testing the quantities of by-products that should be used on gardens, and introducing soil erosion and water reticulation methods. The presence of the Young Professional was beneficial in strengthening the project in Paje. Working alongside the CLO on a day-by-day basis helped to develop the CLO’s skills and confidence. In turn the CLO was better equipped to mobilise households. The work of the Young Professional also benefited the project as a whole. For example, due to intensive demonstration work, the collection, storage and application of urine and the handling of pre-dried and pos-composted faecal matter is now accepted by more than 95% of the active households.

A short-term input of this kind can be beneficial to a pilot project. It is an approach that might be considered for other pilot and demonstration projects. This could even be helpful for the final months of the ongoing Phase 2 and during Phase 3.

- **Regional Networking** – In addition to the study tour, and developing links with CSIR (RSA), the Missing Link Project has taken steps to network with other organisations in the ecological sanitation area. PTB staff has been supported to participate in a one

week ecosan training workshop held in South Africa and organised by ecosan Research Programme from Sweden. PTB–CLO staff and community based toilet builders have also participated as successful trainers in an ecosan toilet design and box composting workshop in Namibia (June 2004). In addition a study tour to Lesotho for the CLO-Paje was organised so that he could learn about waterborne ecosan systems in peri-urban areas, constructed wetlands and intensive grey water gardening. The Missing Link Project Coordinator (IUCN/DED) has participated in other national (Zambia, Zimbabwe) and international (Lübeck, Germany, April 2003) ecosan workshops and conferences to present the Botswana experience.

The project has also assisted local organisations. An example is given in the box below

#### **The Missing Link project and the Gaing-O Community Trust, Mmatshumo**

In 2002 the Gaing-O Trust through the DED development worker Stefan Ille expressed their general interest in the Missing Link project approach and particular interest in the UD toilet pedestals. In fact, The Gaing-O Trust (based in Mmatshumo, Central District) on the edge of the Magkadigadi Pans, was managing two simple bush campsites at Kubu Island (Historical Site) that needed urgent attention regarding sanitation. The campsite had no sanitation facilities at all and had incurred health hazards as well as esthetical nuisance especially during high seasons, when tourists would use the bushes around the campsites up to saturation.

The UD system was looked at as an option to Pit Latrines for different reasons: simple maintenance, simple structures, no smell and nuisances for the tourists who would use it, the campsite area was very rocky and made it difficult to dig a deep enough pit that would last for long. The UD-system was thus looked at as a purely sanitation option (no closed-loop but rather “drop and store”) that would address their need. The idea was also that by separating urine and faecal matter the volume of the faecal matter in the pits would be little enough to allow the use of a relatively shallow pit for a longer period.

The Trust very quickly, through the Missing Link project, ordered first 12 units with kiddie seat (May 2002) and “How to use a Urine diversion toilet” that was inserted in each of the toilet structures, and received a number of illustrating documents for the use and maintenance of the toilets.

The campsite was visited by the Missing Link Project Coordinator in December 2002 and recommendations were made to the trust on how to improve those technical issues that had been observed as well as advise on questions that came up during the meeting.

Generally the maintenance of the toilets was seen as difficult when undertaken by tourists (especially during the high season) and campsite rangers took over. When the campsite was visited again in mid-2003 the maintenance had improved considerably. In the same occasion the Trust even mentioned that in their visitors book there had been several notes on the toilets and that one of these read that they were “the best toilets seen in Botswana”.

In 2003 the Trust started developing a proper office in Mmathsumo where tourist would have been expected to stop for their campsite bookings and for further information. Seeing the trust had more and more block bookings by safari companies they decided to use the 2 additional toilet pedestals for demonstration purposes and education of the bigger groups.

The Campsite has not been visited in 2004 nor did the Trust contact the project for further technical issues.

Overall the project activities have been well organised, and there has been a conscious effort to build capacity at the local level. It is evident that more effort needs to be put into training field staff that are directly dealing with households in gardening and ecosan technology

components. It is also evident that PTB and IUCN need to make more effort to involve partner organisations, in particular the district and municipal authorities.

#### **4.6 Evaluation Objective C: Planning of the project and the strategic choices made in Phase 1 and 2**

The focus on the household level as an entry point has worked well. This is particularly evident in Paje where there has been a significant increase in the number of participating households and a gradual building of momentum within the community to look at broader environmental issues.

In Phase 1 the project management team made a number of decisions that have had a bearing on the overall implementation of the project. One of those decisions was to **pace the project implementation** at a *“speed that was manageable for the households”*. This in part was influenced by the need to train and build the confidence of project staff. It has meant that there has been considerable revision to the implementation schedule outlined in the Inception Report. The time frame in the Inception Report envisaged that the implementation of activities related to the Community Environmental Action Plans (CEAPs) would have begun in the first quarter of 2003. In 2001 there was a re-scheduling of the project. GTZ approved a six month extension to the Research and Planning Phase (Phase 1) without any additional commitment of funds. The Phase 2, Stage 1 household level activities in effect commenced in July 2002, and has been spread over 24 months as opposed to the envisaged 12 months. There was, however, no increase in budget.

A comparison between Paje and the Hanahais suggests that where there have been constructive community mobilisation interventions the pace of project activities quickened. Whilst the project activities have stagnated in the Hanahais, in Paje the project is now working with a third group of households. In the Hanahais there has been no expansion of the project beyond the initial ten households. A study visit from the Hanahai communities to Paje in December 2003 had no or very limited impact.

Whilst the difference between the two situations might be partially attributable to the difference in cultural and socio-economic conditions, there are other factors. Key amongst these is the commitment of PTB staff. The Project Supervisor in Ghanzi estimated that 10% of his time is allocated to the Missing Link Project, and whilst the CLOs are supposed to be working full time on the project they reported that this is not the case. Furthermore, the Project Supervisor in Ghanzi has never attended reference group meetings. The PTB office in Serowe attended most of the reference group meetings, often with the CLO from Paje. In Paje the CLO is working on the project full time, and there was regular contact between the CLO and Project Supervisor on weekly basis. These differences have not been noted in project reports, and have not surfaced in the discussions between IUCN and PTB.

The project also opted for a **supply approach**, providing such inputs as the toilet substructure, seeds, shade netting, gardening tools gum poles, and water connections in the Hanahais. In Paje shade netting and gum poles were not provided. In Botswana the supply approach is a feature of many development projects, including those implemented by government. In the sanitation sector it is the norm to assist individual households with the cost of constructing the sub-structure of a latrine. In this context it is recognised that providing some inputs to stimulate activity in a pilot project is necessary – particularly when an unknown technology is being introduced.

The intention was to temper the provision of materials with contributions from households. In the Hanahais this has mainly been in the form of constructing their shade netting, building the toilet superstructure, and digging trenches for water pipes. All households have been given the same supplies, irrespective of whether or not they had previously received such support from PTB. PTB field staff appear to have given no consideration to what inputs each household actually needed. For example, in Hanahai water connections were given to all households irrespective of the level of their demonstrated commitment to gardening. This has added to the community's expectation that the project will assist other households in the same way in the future. It is also noted that at least one of the CLOs in the Hanahai community has received the same inputs as other households, even though she earns a regular income from PTB.

In Paje there has been a more rational approach in terms of the assistance given to households. The level of support has been reduced with each successive group of households, and self-contribution given more emphasis. The introduction of localised production of the pedestals is also a positive development. These are now been sold in Paje on a semi-commercial basis.

The project opted to allow the communities to choose the participating households in a manner that they saw fit. In the Hanahais households were selected through a raffle process held at the kgotla.

The involvement of the district council Environmental Health Departments, particularly in Ghanzi, has been very limited. Whilst both district councils were invited to be members of the reference group, there has been no deliberate strategy for involving them beyond this. Given the general perceptions about ecosan this has been a weakness.

Given the goal of the project, the decision to limit the project activities to two areas was realistic, but as noted earlier (see Section 4.2) the choice of locations is questionable. The inclusion of a peri-urban site close to Gaborone would have been useful.

#### **4.7 Evaluation Objective D: Guidance on the implementation approach for the finalisation of Phase 2 and development of Phase 3**

Phase 2 of the project includes the development and implementation of Community Environmental Action Plans. The project management – in coordination with GTZ - postponed this aspect of the project, feeling that more time was needed to consolidate household level activities.

Based on the findings outlined above, there is little justification for undertaking CEAP activities in the Hanahais. Insufficient interest has been generated at the household level, and based on discussions with the VDCs broader environmental issues appear not to be a priority. Whilst the existing participating households should continue to be supported and other interested households advised and assisted through PTB's ongoing projects in the two communities, the development of CEAP should be put on hold.

In Paje the project has expanded to include a further 30+ households and the community has begun to discuss broader environmental issues. Steps are being taken to form a CBO with linkages to PTB. In this context, assisting the community to plan and implement a CEAP

will be beneficial. However, PTB and IUCN should ensure that as they develop the CEAP with the community's steps are taken to inform and involve the local and district authorities.

The Missing Link project has demonstrated that ecosan approaches do have a place in household sanitation in Botswana. Even the selected model with the separation of urine and faeces, dehydration and post-composting has shown to be successful. In the National Master Plan for Wastewater and Sanitation a similar ecosan component model applied in Durban, South Africa, was reviewed and it was recommended that this ecosan-based technology be piloted and reviewed in terms of its applicability in Botswana. This piloting is now done.

Nonetheless, ecosan approaches are still relative new to Botswana, and misconceptions and resistance to this kind of on-site technology persists. DSWM does recognise the potential value of ecosan alternatives, and there is a basis for promoting and extending ecosan activities. There is a DSWM approval and review mission – as noted in the Master Plan - envisaged for October 2004. In this respect, the Advocacy and Capacity Building phase (Phase 3) of the project is important.

IUCN has drafted a proposal aimed at generating financial and technical support for the implementation of Phase 3 and the further promotion of ecosan approaches. The proposal outlines four areas of activity:

- Continuation of work in the three existing project sites and development of Community Environmental Action Plans. As noted above, it is recommended that the preparation and implementation of a CEAP should be concentrated on the Paje community.
- Expansion to a peri-urban site. The evaluation findings support the focus on a peri-urban area in Gaborone, and that future strategy minimise the supply approach and maximise a commercial approach. Further work at the household level should be linked to the technical assessment and endorsement by DSWM of the ecosan technical components.
- Development of implementation manuals and training of facilitators on pre-selected feasible ecosan options (including waterborne low-flush ecosan components), systems and technologies, implementation methodologies, and system operation. This is based on Phase 3 of the Inception Report, and is an essential part of the planned advocacy and capacity building strategy.
- Establishment of a Regional Ecological Sanitation Advisory Network for the collection and sharing of information and for the provision of local / regional qualified assistance to implementers and governments. In this context, IUCN propose to create the position of an integrated expert as regional ecosan networker with support from the German Centre for Migration and Development (CIM). Links will need to be established with the German GTZ-supra-regional ecosan project and the Swedish EcoSanRes programme

#### **4.8 Evaluation Objective E: Management of the project**

The concept paper and the Inception Report were developed by IUCN and DED. IUCN is contracting partner of DED, and contracting partners with GTZ. There was no GTZ – DED

contracting, although it is usually the arrangement when projects are jointly implemented. PTB is a sub-contractor to IUCN. The roles and funding arrangements for PTB are outlined in an initial Memorandum of Understanding 28<sup>th</sup> August 2001, and a contract extension signed in November 2002. These contracts are for a 3½ year period for Phase 1 and 2.

In essence, contractually PTB have been cast in a supporting role, whereas it has been a major implementing partner. Nonetheless, the working relationship between PTB and IUCN has, on the whole, been constructive. The Project Coordinator has visited PTB and each community on a regular monthly basis. PTB was involved in the inception phase and in the planning of Phase 2, but as yet not in the planning of Phase 3.

PTB Project Supervisors were expected to provide up to 30 days support in 2002, 70 days in 2003, and 60 days in 2004. The job description for a CLO states that a CLO will work with the households on a daily basis. There are indications that these inputs have not been met, and that the commitments of PTB field staff have been less than might have been expected. The Project Supervisors have not monitored the project activities on a regular basis, and to some extent CLOs have been working in isolation. There are no specific terms of reference for Project Supervisors, beside the description in the MoU between IUCN and PTB, and individual work plans defining their inputs over a 6 – 12 month period, based on the projects overall work plan, have not been developed, although annual action plans were prepared with each community. Time sheets detailing what inputs were made and when have not been introduced. This is an aspect of the programme management that needs to be strengthened.

Project Supervisors have been required to prepare short briefing notes on project activities at six-monthly intervals and reports on specific training activities. A household status report has been prepared on an annual basis. Whilst the monthly visits by the Project Coordinator have provided the opportunity to assess progress with the field staff, there has been no mechanism for systematic team reviews of project implementation. This is an aspect of the programme management that needs to be strengthened.

A reference group was convened at the start of the project. The reference group is chaired by DSWM. It has met regularly and been regularly updated on project activities. However, it should be noted that the reference group has not visited any of the project sites. As noted earlier, in Section 4.3, this, again, has been one of the shortcomings of the project.

## 5 Conclusions

The overall goal of the project was “*to develop, test and demonstrate a holistic / integrated approach to CBNRM and environmental management, sanitation and waste management at individual homestead / household and community level in selected communities in Central and Ghanzi Districts*”. At the household level one of the specific project objectives was “*to develop and pilot a participatory and sustainable environmental management approach at homestead / household level through the design and implementation of a homestead extension programme ..... which includes addressing waste management and sanitation issues.*”

At the household level the Missing Link project has effectively demonstrated that:

- The loop between sanitation and gardening can be closed on HH plot systems.
- Contrary to the general held view, toilet waste is a product that can be managed by HHs in relation to gardening and agricultural activities, and that the ‘acceptance factor’ is not a major obstacle to ecosan in Botswana.
- The ecosan approach can compete economically with other on-site sanitation technologies.
- Ecosan, if linked to the promotion of backyard gardening can have an impact on a households diet, and therefore nutritional status.
- A participatory implementation approach can build commitment from households, and that other households can learn from and be influenced by the activities of another household.

In short, in terms of demonstrating the feasibility of an ecosan approach the project has been effective. It is, however, noted that the impact of this demonstration on other stakeholders might have been greater if at least one of the project communities had been closer to Gaborone.

The project has had a positive impact on the participating households in both Paje and the Hanahais. Where households have made a real commitment to gardening, for example, there have been tangible benefits in terms of household food supply. In some instances, households have used their garden as an income generating activity.

Thus, the focus on the household level, and the use of backyard gardening as an entry point for the introduction of ecosan, and eventually community-level environmental planning, has been effective. A key feature of this has been the participatory methodologies and on-site training activities. However, concern must be raised about the level of inputs. Whilst it was part of the project’s piloting and demonstration strategy to assist households with sanitation and gardening inputs, this seems to have been over done in the Hanahai communities. No attention was given to what inputs a household had received under previous PTB projects. The Hanahai communities are economically disadvantaged, and there is a strong element of dependency on government and NGO programmes. The Missing Link, in terms of the inputs made, has inadvertently contributed to this dependency. This could have been partially avoided if assistance to households had been done on a case-by-case basis.

On the other hand, in Paje there has been a more balanced approach between the supply inputs by the project and household contributions. As the project in Paje has extended to new households the level of inputs by the project has decreased. In addition, now that toilet pedestals can be produced locally at a reasonable cost, households are now expected to contribute to the cost of a pedestal. The experience in Paje needs to be noted in terms of any

further development of the Missing Link project and future pilot / demonstration ecosan projects in Botswana.

The future development of the project needs to take note of the fact that the project has developed differently in the Hanahai communities and in Paje. The Paje community has embraced the ecosan approach as a positive development, and there is now a strong community momentum behind the project. There is a good basis for implementing the planned Stage 2, Phase 2 (Community Environmental Action Plans) activities with the Paje community. There is a need to re-visit this aspect of the project in East and West Hanahai.

The IUCN / DSWM, IUCN / GTZ, IUCN / DED and the IUCN / PTB partnerships have overall worked well. The skills and confidence of the CLOs have been developed through the project activities. IUCN has made an effort to ensure that PTB has been involved in project planning. This approach needs to be extended to the Phase 2, Stage 2 and Phase 3 activities. The recent appointment by IUCN of a local professional to work alongside the IUCN/DED project coordinator should help to strengthen these linkages.

There have been weaknesses in the project management. The level of input by the PTB Project Supervisors has been variable. It is an area that PTB and IUCN need to review. Monitoring and review of project implementation by the project partners could have been stronger, particularly in terms of utilising the monitoring data collected. The delays in implementation, particularly in Phase 1, were for sound reasons but in some respects there has been a lack of urgency in implementing project activities. This applies particularly to the Hanahai communities.

## 6 Recommendations

The CBNRM Missing Link project in terms of its implementation to-date has had a positive impact on the participating households, and it has demonstrated that the dry UDS ecosan system could be a viable option for improving sanitation at the household level. In the Paje community the impact of the project has gone beyond the originally ten participating households. A significant number of other households have shown practical interest in the ecosan approach to the extent that the community is considering forming a Permaculture Association as a CBO in Paje.

The findings of the evaluation suggest that there is merit in both supporting the implementation of Phase 2 and 3 of the Missing Link project, and broadening the focus of the ecosan approaches in Botswana. In terms of a broadened focus there is a positive policy context. Note is taken of the

- Botswana Policy for Wastewater and Sanitation Management provides for management of water and sanitation in according with Agenda 21 and the principles: providing for prevention, polluter pay, public consultation and economic participation. The national policy aims to promote the health and well-being of the people of Botswana through the provision of appropriate and sustainable wastewater/sanitation management and the introduction of mechanisms for the protection and conservation of water resources.
- Botswana National Master Plan for Wastewater and Sanitation has fully recommended criteria to be satisfied for sanitation technologies. These provide a useful basis for the planning and evaluation of sanitation systems. The criteria are: proven operational effectiveness and reliability, minimal health risks to the user, culturally and socially acceptable, affordable, freedom of offensive smells and unsightly conditions, prevention of the spread of disease by insects or other vectors, no contamination caused to drinking water supplies, little water required (in areas with water scarcity), should be able to be maintained by the user (on-site-systems).
- Technological findings in the Master Plan: During the preparation of the Master Plan various sanitation technologies were examined. Basic pit latrines are not considered “adequate sanitation” by the DSWM Policy. Shallow sealed (double) chamber Ventilated Improved Pit latrines are an acceptable form of adequate sanitation, especially “*when they are combined with urine diversion and urinal to allow the faeces to dry out more rapidly*”. Anaerobic systems (single and two steps) combined with dry or low flush pans as on-site solution or combined with small-bore sewer systems are also defined as adequate by the Master Plan, especially for institutions. Another system - positively mentioned - in the Master Plan is the liquid-solid separating biodegradable sealed foil bag toilet system. On the other hand, the designs for the septic tanks constructed in Botswana was founded that the pollution from septic tanks and soak-aways is significant where groundwater is vulnerable.
- IUCN: Founded in 1948, The World Conservation Union brings together States, government agencies and a diverse range of non-governmental organizations in a unique world partnership: There are over 1000 members in all, spread across some 140 countries. As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. The World

Conservation Union builds on the strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels.

In an article from the IUCN international web page it is stated that “*The Missing Link project is part of the Community-Based Natural Resources Management Programme (CBNRMP), carried out by IUCN Southern Africa Regional Office. CBNRMP seeks to strengthen communities’ knowledge and capacity to manage natural resources. The project comes out of a broad cooperation between various organizations, including IUCN, the Department of Sanitation and Waste Management of the Government of Botswana, the Permaculture Trust of Botswana, the German Agency for Technical Cooperation (GTZ), and the Deutscher Entwicklungs Dienst. Links between Health, Poverty and Conservation will be explored at the upcoming 3rd IUCN World Conservation Congress, to be held from 17-25 November 2004 in Bangkok, Thailand.*”

IUCN has taken steps towards incorporating the water resource, supply, sanitation and hygiene issue in their policy. For example, The Water Resources, Sanitation and Hygiene Fair (WARSH) is a Southern Africa exhibition and trade fair on water resources, supply, sanitation and hygiene to be held in Harare in September 2004. The focus of the fair is to address poverty issues and building bridges between and among various users within the water sector. WARSH is a regional collaborative effort by the International Training Network (ITN) represented by IS-WD, the SADC Directorate for Infrastructure and Services-Water Division, and other regional bodies such as IUCN ROSA, and the Global Water Partnership (GWP).

Based on the evaluation findings, and within the framework of the policy context outlined above, the following four main recommendations are made:

**Rec 1: That support for Phase 2, Stage 2 and Phase 3 of the CBNRM Missing Link Project be solicited.**

Stage 2, Phase 2 of the project is focused on the community level and the preparation of Community Environmental Action Plans. The notion of an CEAP is not defined in any detail in the project’s Inception Report.. In this respect there is an opportunity to undertake some creative thinking. The CEAP concept, particularly in the case of the Hanahais, needs to be re-visited. In terms of raising funds for Phase 2, Stage 2, there is a need to re-examine:

- Whether indeed it is a community action plan, or whether it will be better, for example, to focus on specific groups and / or individual households.
- Potential existing entry points of action; are there existing CBNRM-type activities that can be strengthened and built on.
- Building on these entry points, what are the potential impacts of this aspect of the project and monitoring indicators.

Consideration might also be given to the appropriateness of the term ‘community environmental action plan’.

The evaluation team concluded that whilst the project has had a positive impact on most of the participating households in East and West Hanahai there has been insufficient attention given to determining what is an appropriate level of support to

individual households. There is a need to continue to provide advice to the participating households, and to advise other households that want to build on the ecosan concept. PTB, through its existing extension network, be the responsible implementing agency in both Hanahais, continuing activities on household level as requested by them. In the meantime, IUCN and PTB, along with interested households, undertake a detailed review of how the project might be further developed in these communities.

In the Paje community there has been considerable momentum at the household level, and it is judged that there is sufficient justification to assist the community develop and implement an environmental action plan. In this respect, it is proposed that IUCN and PTB, in collaboration with PTB-member group in Paje, continue the work of the Missing Link project in Paje.

For all three communities, it is proposed that the type of inputs provided at the household level be reviewed. The evaluation has noted that a 'supply approach' may have been necessary to stimulate interest and activity in the pilot stage, but it is also noted that the strategy of partial household contribution was minimal. The implementing partners need to find a balance between 'supply' and 'contribution', and a balance that is compatible with GOB policy on assisting households with water, sanitation and food security services and the GOB environmental policy on ground water protection.

**Rec 2: That the experience of the Missing Link project be documented in a planning guideline / manual.**

The research, development, piloting and demonstration activities of the project have been extensively documented. However, the information about the project strategies and the various activities is spread over a number of documents. There is a need to consolidate the information into one concise document. This, in fact, is one of the activities / outputs specified in the project's log frame in the Inception Report, and primarily the responsibility of the IUCN and the Project Coordinator.

There is now sufficient data to prepare a manual on the household level ecosan activities, and it is proposed that this be given attention in Phase 3 when funding is available. A separate manual on the community level activities (dissemination) can be prepared when the time is appropriate.

**Rec 3: That the demonstration of relevance and feasibility of ecological approaches to sanitation be broadened to include other technologies, such as the urine separation low flush, black or brown water vacuum sewerage collection, compostable bag collection system, grey water filtering and flush cycling, biogas reactor tanks, neighbourhood, semi-centralized and village level oriented nutrition and recycling loops, productive wetlands etc.**

In support of the above recommendation, it is proposed that DSWM obtain short term technical assistance to both organise demonstration sites and to train relevant personnel at the ministry and local authority levels, and in the NGO / CBO sector in sanitation technologies.

As part of the preparation for these demonstration projects, it is proposed that a southern Africa (SADC) regional study tour of available and already demonstrated ecosan technologies (and components) be organised that will include appropriate personnel from DWSM, IUCN and other potential partner agencies.

It is also proposed that the demonstration of these technologies be undertaken in communities in or close to Gaborone to both facilitate the monitoring of the demonstrations, and to ensure that they can easily be seen at first hand by decision-makers at the ministry and local authority levels, and by the private sector and other relevant stakeholders.

**Rec 4: That a regional networking project on ecological sanitation be established.**

Interest in ecological sanitation within the region is growing. Ongoing ecosan activities in South Africa, Lesotho, Mozambique, Namibia, Zambia; Zimbabwe, Swaziland and Malawi show a certain interest of stakeholders and decision makers. There is a need to facilitate the exchange of information between existing ecosan activities, and to provide advice and support to new initiatives. There is also a need to provide policy makers and planners with appropriate information, and to develop implementation capacity.

Both GTZ and IUCN are strongly committed to supporting ecological sanitation dissemination. It is proposed that these two agencies work towards developing a joint project for the establishment of a network in the Southern Africa region.

In support and addition of these recommendations it is proposed that:

**IUCN Botswana**

- (c) Review with DSWM and DED the feasibility of obtaining continued technical expertise for the Missing Link project under the new DED / GOB arrangements.
- (d) Liaise with the IUCN Regional Office (IUCN-ROSA), with GTZ-ecosan and GTZ/CIM to develop a project for the establishment of an ecological sanitation network in Southern Africa.
- (e) Build up internal structures to internalise ecosan concepts in other selected suited country offices and other suited projects as eco-tourism etc.
- (f) Review and solicit support for the CBNRM-Missing Link Community Environmental Action Plans (CEAP).
- (g) Continue to search operational funding for the CBNRM-Missing Link phase 3.

**Permaculture Trust Botswana (PTB)**

- (a) Support and maintain, as part of its ongoing work, the ecosan approach in the three pilot communities.
- (b) Assist, as appropriate, with the review and implementation of the Stage 2, Phase 2 activities.
- (c) Emphasize ecological sanitation in all its community-based projects, making it a feature of permaculture strategy.
- (d) Maintain the demonstration of sustainable agriculture and gardening by utilisation of the ecosan recyclates.
- (e) Consider promoting ecosan components on a more and more commercial basis.

## **DED**

- (a) Review the available support options (i.e. Development Workers, Young Professional Programme, Support of Local Organisations, and Local Experts) to continue support to the Missing Link Project, recognising that ecological sanitation is a feature of DED's area of programme emphasis, i.e. Natural Resource Management.
- (b) Review with DSWM the feasibility of providing further technical expertise support to the Missing Link project under the new arrangements with GOB.

## **DSWM**

- (a) Consider, with DED and IUCN, the feasibility of supporting further technical assistance to the Missing Link Project under the new DED / GOB arrangement.
- (b) Support the establishment of demonstration projects on other ecosan technologies.
- (c) Establish and maintain close cooperation with PTB to further promote the link between sanitation and agriculture, and in particular urban sanitation, backyard gardening and up-scaled fertilizer production based on ecosan recyclates.
- (d) Based on DSWM's technical assessment of ecosan approaches, encourage local authorities to view ecological sanitation as a viable option for household level sanitation, institutions and public buildings and eco-tourism.
- (e) Continue to host a reference group on approaches to ecological sanitation.
- (f) Promote a study tour for decision makers and stakeholders on ecological sanitation in the Southern Africa region.

## **GTZ**

- (a) Liaise with IUCN to develop a project for the establishment of an ecological sanitation network in Southern Africa.
- (b) Continuing with supraregional support for integrated ecosan-trained Young Professional, ecosan backstopping services and conference support
- (c) Support the contacts and organisation of a decision maker study tour

## **IUCN Regional Office (IUCN-ROSA)**

- (a) Liaise with IUCN Botswana, GTZ-ecosan and GTZ/CIM to develop a project for the establishment of an ecological sanitation network in Southern Africa.
- (b) Send request for an integrated ecosan expert to CIM.

## **VDCs**

- (a) Develop and support CBO related project proposals to disseminate approved ecosan approaches in their communities.
- (b) Maintain contact with IUCN, PTB, district water, sanitation and agricultural authorities and other ecosan stakeholder agencies and potential CBO supporting donors.
- (c) Invite their population for demonstrating field days to successful piloting households

## **Appendices**

- A Terms of Reference for the Final Evaluation**
- B Missing Link Project Logical Framework**
- C The Five Pillars – Summary of activities by household**
- D Persons and organisations interviewed**
- E References**

## Appendix A

### Terms of Reference final Evaluation of the CBNRM Missing Link Project

Final Version May 2004

#### Background

The CBNRM Missing Link project was launched in June 2001 and will run until the 31<sup>st</sup> of December 2004 (Phase 1+2). A third phase should be undertaken from 2005-2006 (Total of 5 Years). The project is managed by IUCN Botswana and implemented in partnership with PTB (Permaculture Trust of Botswana). A Reference group chaired by the DSWM and composed of other local NGOs, local and central government departments and the project staff also guides project activities. The project (Phase 1 and 2) is financed by GTZ. At present and for the remainder of the project period the staff is composed by 1 project coordinator (IUCN/DED) and 2 supervisors and 2 Community Liaison Officers from the PTB offices in Serowe and Ghanzi.

The overall **goal** of the project is “...to develop, test and demonstrate a holistic / integrated approach to environmental management, sanitation and waste management at household and community level in selected communities”.

The Expected overall **results** are “the development and testing of community based environmental management approaches and methodologies at household (later community) level. This includes the design, implementation and monitoring of environmental-sanitation-waste management activities, as far as possible including the use of dry, sanitised and/or composted matter in a manner that would improve household/community food security and income generation as well as natural resources management”.

The final evaluation of the CBNRM Missing Link project will take place towards mid 2004 through a consultancy and is expected to assess the performance of the project and to suggest improvements where necessary for the remainder of the project period. As intended in the project proposal some activities will be considered “finished” at the end of phase 2, some will still have to be fund raised for and implemented by both IUCN and PTB.

#### Information on the Missing Link project

The project was conceived by IUCN, PTB and DED with the aim of piloting a new approach to Community Based Natural Resource Management (CBNRM) at household and community level by broadening the traditional ‘species perspective’ to one of integrated environmental management.

It defined the concept of environmental management as “... the implementation of a set of activities / measures which pursue sustainable natural resource utilisation and safe environmental sanitation at household and community level”. In fact all partners felt that in order to address long-term environmental sustainability, there was a need to get a better handle on how households and communities utilise their environment and to identify an integrated way forward.

The project was divided in three main phases:

**Phase 1 – Research and Planning (12 months):** activities to be implemented within this phase mainly covered mobilisation, set-up of necessary project structures and introduce the project to relevant stakeholders/potential participants.

**Phase 2 – Assessment and Implementation (24 months):** Activities of Phase 2 are a direct continuation and extension of Phase 1 and include the design, implementation and monitoring of environmental-sanitation-waste management activities. Ecological Sanitation aspects will be tested towards improving household/community food security. They will include the use of dry, sanitised and/or composted matter for growing purposes (e.g. Planting fruit trees, shade trees, growing backyard gardens etc).

Phase 2 will be divided in two main stages:

a) Particular emphasis on the design and implementation of environmental management, sanitation and waste management activities at **household level** will be given during the first part of Phase 2. For sustainability purposes, households are motivated to participate under the banner of self-help rather than expecting funding or financial handouts.

b) Lessons learnt out of those experiences will then be transferred to a **community level** for the design of Community Environmental Action Plans, towards the end of Phase 2.

Fund raising for Phase 3 will have to be initiated towards the end of phase 2.

**Phase 3 – Advocacy and Capacity Building (24 months):** **The third and last Phase of the project should mainly look at disseminating lessons learnt and experiences gained to a broader constituency and at a national level.** Funds for the third Phase will have to be raised in due time.

The CBNRM-Missing Link project has 4 objectives and a number of intended results as follows:

**Objective 1:**

**Past and present utilisation of natural resources and environmental management, waste management and sanitation practices at household and community level documented.**

Intended Results
1.1 Past and present NRM and sanitation practices studied, analysed and documented
1.2 Attitudes and behavioural practices re sanitation & waste management assessed, studied and translated into change options and applications

**Objective 2:**

**Participatory and sustainable environmental management approach at household level developed and piloted (through the design and implementation of a household extension programme which includes addressing waste management and sanitation issues)**

Intended Results
2.1 Approach and methodology documented

- 2.2 Household extension programmes developed and implemented
- 2.3 Monitoring of HH actively involved in programme implementation undertaken

**Objective 3:**

**To develop and pilot an environmental management approach at community level (through the design and implementation of a community environmental action plans - by end of Phase II)**

Intended Results
3.1 Approach and methodology documented
3.2 Community environmental action programmes/plans developed and implemented (minimum 5 community activities per village undertaken over the project period)
3.3 Monitoring of the participants actively involved in programme implementation undertaken

Towards the end of Phase 2, an accurate planning of Phase 3 “Advocacy and Capacity Building” (objective 4) will also have to be undertaken and funding will have to be secured.

**Objective 4:**

**To impart project approach, methodology and experience, and build related capacity of relevant institutions and extension staff in CBNRM, environmental management, environmental sanitation and waste management - mainly Phase III**

Intended Results
4.1 Develop and publish manual on integrated resources management and Eco-San
4.2 Training workshops on integrated natural management and Eco-San held (4)

**Specific Terms of Reference for Phase 1**

1	Undertake Contractual negotiations
2	Identify Pilot villages and undertake general mobilisation
3	Recruit 2 Community Liaison Officer's and 2 Supervisors
4	Undertake desktop research in relevant areas
5	Undertake adaptive training/up-dating of project staff in relevant fields
6	Introduce the main aims of the project to the involved communities
7	Implement Research activities on the past and present natural resource management and management of waste and sanitation around the households and develop relevant project activities
8	Identify the pilot households (HH) willing to collaborate in the implementation of the Missing Link project
9	Accomplish HH assessments and trainings
10	Start relevant activities of natural resource management around HH
11	Whilst introducing eco-sanitation principles and sensitise the households to the use of dry/composted matter, identify the most suitable ecological sanitation system to be piloted and start a limited but significant number of activities
12	Identify the natural resources most suitable to be managed in an environmental friendly way towards income generation and food security improvement and start relevant activities
13	Organise a Phase 1 final Workshop for the planning of Phase 2 and Phase 3
14	Undertake planning and negotiations activities linked to phase 2

**Specific Terms of Reference for Phase 2**

1	Incorporate possible comments and recommendations from GTZ (based on the final report of phase 1) into the project execution strategy phase 2
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2	Further Design and implement environmental management, sanitation, water and waste management activities at household/community level
3	Further undertake and document household (HH) and community assessments (PRAs) in selected communities
4	Undertake research in relevant fields (e.g. PRAs, water conservation, waste management, ecological sanitation, community environmental action plan design etc.)
5	Undertake research on Natural Resources availability and uses (IKS)
6	Undertake adaptive training/up-dating of project staff/HH/community members in relevant fields (e.g. community participation / development, Participatory Rural Appraisals (PRAs), environmental/ecological sanitation systems, water and waste management, CEAP etc.)
7	Further develop, test, demonstrate and document Community-based environmental management approach and methodology (including sanitation, water, waste and natural resources management) at household and later community level. End 2004, at least 50% of the households in each selected community are motivated to be actively involved in a broader extension programme; some elements of the described, tested and demonstrated approach are already introduced in these households
8	Develop and apply environmental /Natural Resource Monitoring tools
9	Study and assess environmental attitudes and practices, including the social acceptance levels for the use of sanitation by-products and their contribution to increased food security at household and community level
10	Design and implement Community Environmental Action Plan CEAPs
11	Publish results of assessment studies and other relevant research
12	Carry out a final project evaluation mid 2004, if possible accompanied by an external evaluation
13	Participation in the II ecosan Symposium, organised for April 2003 in Luebeck, Germany
14	Develop project implementation plan for Phase 3 - Advocacy and Capacity Building
15	Reporting, as required by GTZ HQ and in communication with the supraregional GTZ-ecosan project

## Criteria/guidelines for the evaluation

### *Overall Project:*

- Evaluate the performance of the CBNRM Missing Link project (implementation of the 4 objectives in the project document).
- Evaluate the strategic choices for the main project components that were made during inception, the linkages between them and the present validity of the choices.
- Evaluate the possibility of attaining the 4 objectives of the project given the time left and the resources available (mainly objectives 1 and 2 as 3 has been postponed and 4 falls under Phase 3).
- Evaluate the efforts towards sustainability, replicability and capacity building of the project.
- Evaluate to what extent the CBNRM-Missing Link (within its scope) is embedded in the participating communities and assess the level of ownership of project activities by the various stakeholders (from HH level to Reference group members).
- Evaluate the management and steering of the project (including collaboration of the two implementing agencies)
- Evaluate the relevance and effectiveness of the documentation produced so far and planned publications

*Participatory and sustainable environmental management approach at **household level** developed and piloted (through the design and implementation of a household extension programme which includes addressing waste management and sanitation issues)*

- Evaluate the impact (direct/indirect) of the project at HH level (participating HH)
  - Evaluate the impact (direct/indirect) of the project on neighbours and at community level
  - Evaluate the capacity and commitment of involved HHs towards continued implementation of sustainable environmental management activities
  - Evaluate the social and economic impact of project activities
- Provide recommendations for specific activities to be strengthened during the remaining period.

*To develop and pilot an environmental management approach at **community level** (through the design and implementation of a community environmental action plans - by end of Phase II)*

*To impart project approach, methodology and experience, and build related capacity of relevant institutions and extension staff in CBNRM, environmental management, environmental sanitation and waste management - mainly Phase III*

- Evaluate Objective 3 and 4 against the results achieved under 1 and 2 and against the development and adaptive process that the project has undergone. Provide recommendations on the finalisation of Phase 2 and development of Phase 3.

## **The proposed approach of the final evaluation**

### **TOR and consultant**

The ToR have been finalised based on consultation between IUCN Botswana, PTB and GTZ.

Ecosan, especially the closed-loop approach, is a fairly new concept and only very few long-term experts are available within the Southern African Region. The combination of locally based experts with a GTZ-Ecosan expert from outside the Region is extremely important for the evaluation of technical aspects as well as for the positioning of the project/project contributions within a more wide and global perspective.

It is in this light that the final evaluation shall be carried out by an interdisciplinary team of four comprising of: **IUCN-ROSA** (socio-economic), **DED-Lesotho** (Ecosan technical/local), **GTZ-Ecosan** (Ecosan technical/global) and a **local consultant** (team leader/socio-economic).

For purposes of effective time- and financial management, the above team members will split tasks (see page 6). It is suggested (team will have to evaluate the best option) that, for the consultation and fieldwork in the project pilot sites, the team split into two groups (1 Ecosan expert and 1 socio-economic expert/group) each responsible for the evaluation within the respective project area (Central District or Ghanzi District).

For organisational/logistical purposes the local consultant will be the team leader and collect the inputs of both groups into the final draft report.

### **Inception report**

The team leader, in consultation with the other team members, will provide IUCN with an operational plan (inception report) before the review mission actually starts. This **inception report** should be short and indicate time frame and action plan for the evaluation process; it will be based on the analysis of available documentation (appendix 2) in conjunction with necessary site and stakeholder visits/interviews and will follow the terms already indicated in these ToR. The inception report needs the approval of IUCN/PTB before the mission can commence fieldwork.

### **Mission**

This mission will include a maximum of 5 days of preparation, max. 7 days of **fieldwork** (consultation/debriefing), and max. 3 days of report writing.

### **Reporting**

The last day of fieldwork (before the 4 team members split) should include a half-day debriefing meeting and report back to IUCN/PTB and the extended project Reference Group. Comments and recommendations from the meeting shall be included into a **draft final report** to be submitted to IUCN/PTB by the team leader within one week after the end of the fieldwork/meeting (see appendix 3 for the proposed structure). Shall there be any further comments on the draft final report (to be submitted by IUCN/PTB within 1 week) they will have to be included into the **final report** to be submitted not later than 20 days after the debriefing meeting in both paper and digital versions.

### **Time schedule**

Activity	No. of days	Timing	Action	Status
Establish TOR	0	December/May	IUCN, PTB, GTZ, DED	Done
Identify external inputs	0	December/May	IUCN, PTB, GTZ, DED	Done
Identify local consultant	0	May/June	IUCN, PTB	
Discussion and Approval of Inception Report and preparation of fieldwork	Max. 5	July	Team leader in consultation with other team members, approval by IUCN, PTB	
Mission/Fieldwork (incl. debriefing meeting)	Max. 7	August/September	Team	
Draft final report	2	September	Team leader in consultation with other team members, approval by IUCN/PTB	
Final Report	1	September/October	Team leader in consultation with other team members, approval by IUCN/PTB	

### **Appendix 1: Tasks and authorities of the team**

<b>Task</b>	<b>Team member responsible</b>
Become acquainted with assignment (TOR) and provide a qualified offer	Local consultant/Team leader
Acquire and read all the necessary documents relevant for the fieldwork/mission	All
Draw up an operational plan/inception report on the fieldwork/mission	Team Leader in consultation with all other team members
Responsible for travel documentation	All

(passports, ticket, visa, etc) when relevant	
Responsible for arranging logistics during the fieldwork/mission (excluding meetings/consultation)	Team leader eventually with support of the IUCN and/or DED Botswana
Responsible for arranging meetings/consultations during the fieldwork/mission	Team leader
Organise debriefing meeting	Team leader with support of the IUCN Botswana
Actively contribute to the debriefing meeting	All
Prepare draft final evaluation report	Team leader in consultation with other all team members
Responsible for the preparation of the final report after approval/comments on the draft final	Team Leader

### **Appendix 2: Provisional list of documentation to be studied**

- ◆ Inception Report CBNRM Missing Link 2000-01
- ◆ ToR in the contract with GTZ (Ph.1)
- ◆ CBNRM Missing Link Report Ph.1 n.1 Jun-Dec 01
- ◆ CBNRM Missing Link Report Ph.1 n.2 Jan-Jun 02 (Final)
- ◆ ToR in the contract with GTZ (Ph.2)
- ◆ CBNRM Missing Link Report Ph.2 n.1 Jul-Dec 02
- ◆ CBNRM Missing Link Report Ph.2 n.2 Jan-Jun 03
- ◆ CBNRM Missing Link Report Ph.2 n.3 Jul-Dec 03
- ◆ (CBNRM Missing Link Report Ph.2 n.4 Jan-Jun 04-when available)
- ◆ Eco-San workshop 2001
- ◆ Phase 2 Planning Workshop 2002
- ◆ Proceedings of an Awareness raising Workshop on Ecological Sanitation (2-4/09/03)
- ◆ Report on activities undertaken by T. Hanke (GTZ-intern) between September-December 2003.
- ◆ Past and present use of NR in Botswana, the example of three communities (final version)
- ◆ Other relevant files of the project (e.g. minutes of Reference group meetings) and material produced (leaflets, posters etc).
- ◆ Project Contributions to International Conferences/Symposia

### **Appendix 3: Structure of final report**

- Executive summary containing: brief introduction, conclusions, recommendations (maximum of 3 pages)
- Introduction with reflection of TOR, incl. possible questions (...2 pages)
- Description of methods used/problems encountered (...1 page)
- Overview of the CBNRM Missing Link project (...3 pages)
- Findings (...5 pages)
- Conclusions (...2 pages)
- Recommendations (...2 pages) (including strategies for Botswana and fundraising options)
- Appendices (unlimited)

**Annex B**  
**Log Framework for Missing Link Proposal**

Narrative Summary of Goal and Objectives	Objectively Verifiable Indicators	Means and Sources of Verification	Important Assumptions / Risk Assessment
<p><u>GOAL</u></p> <p><b>To develop, test and demonstrate a holistic / integrated approach to CBNRM and environmental management, sanitation and waste management at individual homestead / household and community level in selected communities in Central and Ghanzi Districts</b></p>	<p>Indicators</p> <ul style="list-style-type: none"> <li>• Communities actively engaged in natural resource management activities</li> <li>• Village homesteads (20) practice “around the home” environmental management, sanitation &amp; waste mgmt</li> <li>• Various households have improved levels of sanitation and food security</li> </ul>	<ul style="list-style-type: none"> <li>• Fieldwork progress reports on homestead extension programmes and community environmental action plans</li> <li>• Number of households / communities involved in the project</li> <li>• Household interviews and observations</li> </ul>	<ul style="list-style-type: none"> <li>• Selected households and communities motivated to implement project</li> <li>• Communities determined to manage their environment</li> <li>• GoB remains committed to the project</li> </ul>
	<ul style="list-style-type: none"> <li>• Natural resources and wastes increasingly used for income generation and employment creation (5 jobs per village)</li> <li>• CBNRM better understood and appreciated</li> </ul>	<ul style="list-style-type: none"> <li>• Number of jobs created</li> <li>• Number of households / communities involved in CBNRM activities</li> </ul>	

Narrative Summary of Goal and Objectives	Objectively Verifiable Indicators	Means and Sources of Verification	Important Assumptions / Risk Assessment
<p>OBJECTIVES</p> <p>1 To document past and present utilisation of natural resources and environmental management, waste management and sanitation practices at household and community level in Chobokwane and Mogorosi villages.</p> <p>2 To develop and pilot a participatory and sustainable environmental management approach at homestead / household level through the design and implementation of a homestead extension programme in Chobokwane and Mogorosi which includes addressing waste mgmt and sanitation issues.</p>	<p>Indicators</p> <p>Past and present NRM and sanitation practices studied, analysed and documented</p> <p>Attitudes and behavioural practices re sanitation &amp; waste mgmt assessed, studied and translated into change options and applications</p> <p>Approach and methodology documented</p> <p>Homestead extension programmes developed and implemented</p> <p>At least 10 households in each village actively involved in extension programme</p>	<p>Study reports prepared</p> <p>PRA's undertaken and PRA reports written</p> <p>Publication in IUCN / SNV CBNRM Support Programme best practice series</p> <p>Number of homesteads / households participating in studies / assessments</p> <p>Reports, publications etc.</p> <p>Homestead extension programmes and activities documented and monitored through progress reports</p> <p>Number of households with facilities and activities and number of households dropping out</p>	<p>Household and community members have collective memory to record past environmental practices and indigenous knowledge systems (IKS)</p> <p>People actively participate in PRA's and understand relevance of PRA's in pursuing improved quality of life in the long term</p> <p>Households and communities are motivated to participate under the banner of self-help rather than expecting payment for cooperation in the programme</p> <p>Consumption and marketing of backyard produce not hindered by traditional values re the use of grey, brown and/or yellow water and other recycling products</p>

<b>Narrative Summary of Goal and Objectives</b>	<b>Objectively Verifiable Indicators</b>	<b>Means and Sources of Verification</b>	<b>Important Assumptions / Risk Assessment</b>
<p>3 To develop and pilot an environmental management approach at community level through the design and implementation of a community environmental action programme in Chobokwane and Mogorosi</p>	<p>Approach and methodology documented</p> <p>Community environmental action programmes developed and implemented (minimum 5 community activities per village over project period)</p> <p>Chobokwane and Mogorosi communities actively involved in programme implementation</p>	<p>Report, publications etc.</p> <p>Action programmes and activities documented and monitored through progress reports</p> <p>Household interviews, observations, progress reports, mid-term review</p>	<p>Institutions and extension staff are keen to learn from project experience</p>
<p>4 To impart project approach, methodology and experience, and build related capacity of relevant institutions and extension staff in CBNRM, environmental management, environmental sanitation and waste management</p>	<p>Develop and publish manual</p> <p>Training workshops (4)</p>	<p>Publications</p> <p>Progress reports and workshop proceedings</p>	

**APPENDIX C  
ASSESSMENT OF THE IMPLEMENTATION OF THE FIVE PILLARS BY  
HOUSEHOLD**

**Table 1: Paje Households**

Name	(1) gardening	(2) water management	(3) sanitation	(4) composting	(5) waste management	subjective impression	order of intervention (motivation)
1 Moetelela Pelokgosi (grand son and grand mother), start with first call in 2001	One seasonal fruit garden of about 50m <sup>2</sup> , one permanent vegetable garden of 36 m <sup>2</sup> (good conditions), 1 large tree rounded with soil bank and stones, all other 8 small tree disks all over, urine/water (1:5) applied already two times	Wash water reuse for trees and pit composting, no rainwater harvesting (roof is able), fresh water from public standpipe in 30 l containers (200 m), no specific shower place	Old pit latrine broke down, Phoenix UDS with containers in use, no kid cover installed, systematic urine collection, storage in bottles and containers since one year	4 pit composts with faeces and organic waste, 1 box composter, soil conditioner only based on ecosan recycles (compost out of faeces, kitchen waste, leafs and garden residues), stored urine (3 – 6 month)	Few collecting of tins and bottles, few use against soil erosion or decoration	No animals, producer of UDS cement seats, no urinal for man-prefer fences or bottles, all maintained by himself as PTB-CLO, got PTB incentive package (tools, seeds, wheelbarrow)	3-2-1-4-5
2 Otsholeditse Olebile (f with 3 children), start with third call 2004	120 m <sup>2</sup> vegetable garden (good condition), not yet started with urine fertilizing, but interested to do it	Wash water reuse for trees and pit composting, no rainwater harvesting (roof not able), fresh water from standpipe in 30 l containers (800 m), no shower place	No toilet (using bush), waiting for ground structure	Pit composting with cow manure and garden residues, cow dung transport from far away	-	Goats stable, participates in all PTB-meetings, all maintained by handicapped lady, got PTB package (fence, tools, seeds)	1-4-2-3-5
3 Barobi Ragaowe (f with 4 children), start with third call 2004	100 m <sup>2</sup> vegetable and fruit garden, already applied urine/water mixture	Wash water reuse for trees, no rainwater harvesting (roof not able), water from public standpipe in 30 l containers (300 m), no shower place, wants on-plot water tap	No toilet (bush), waiting for ground structure	one small pit composting in the garden, one large scale pit composting (Cow manure, chicken droppings, leafs) outside of the yard, needs container for urine collection and storage	Recycling of tins for tree disks and other anti-erosion measures	Lady is ill, but maintains gardening, participates in all PTB-meetings some chicken and goats, got PTB package (fence, tools, seeds), wants wheelbarrow	1-4-2-3-5

Name	(1) gardening	(2) water management	(3) sanitation	(4) composting	(5) waste management	subjective impression	order of intervention (motivation)
4 Dipuo Radithoa (f with 2 children), start with first call 2001	60 m2 vegetable garden, urine, urine/water application since 2004	Wash water reuse for trees, no rainwater harvesting (roof not able), fresh water from standpipe in neighbours compound (20 m, sister), shower place incorporated in the superstructure with a pebble bed filter	UDS-Phoenix with kid cover in use, urine container storage, comfortable superstructure since one year	Pit composting of cow manure, chicken droppings, garden residues	Recycling of tins for construction and bottles for decorations and anti-soil erosion measures, tree disks	Participates only in first years in PTB-Training up to finalising toilet structure	1-4-2-5-3
5 Kelebetse Sesemi (f), start with first call 2001	42 m2 vegetable garden, some fruit trees, problems with bug and pest control, pure urine application before seeding	Own stand pipe on plot (not from PTB) (P50 p/month), waste water use for trees	UDS Phoenix without kid cover in use, urine container	New box compost filled with faeces, cow manure and watered with urine,	Few decoration with tins and bottles	Wants a shade net	3-1-4-2-5
6 Rosinah Kenaope (f) (was not at home, only here sister), start with first call 2001	50 m2 vegetable garden (poorly maintained), problems with beetles and pest control, had done urine trials	Own stand pip on plot (not from PTB), waste water reuse on tree disks, no rainwater harvesting (80 m2 metal roof)	New UDS ground structure not yet in use, upper structure recently finished, old pit latrine	Both: pit and box compost in use	Some tins and bottles for tree disks	Received PTB package (fence, tools, seeds, wheelbarrow), now active in bakery for schools (3 ovens & is their main income)	1-2-4-3-5
7 Goitsehang Letia (f with 7 children), start with first call 2001	500 m2 large garden with vegetables (40 m2) and fruits and herbs (good conditions), intensive papaya production, urine/water use	Stand pip on plot (PTB) (P650 for 4 month), complete waste water reuse through infiltration channels beside vegetable seed beds, bucket shower available, small scale water harvesting techniques	UDS Phoenix without kid cover, comfortable upper structure, urine collection and storage	Box and pit compost with kitchen waste and faeces, urine application, wants cow dung transport (soil improver)	Waste recycling (tins and bottles for construction and decoration and tree disks, beekeeping (veld products supported) and chicken	Participates in all project activities, got PTB package (fence, tools, seeds, wheelbarrow, standpipe)	3-1-2-4-5

Name	(1) gardening	(2) water management	(3) sanitation	(4) composting	(5) waste management	subjective impression	order of intervention (motivation)
8 Onkamile Molodi (f), start with second call 2003	60 m <sup>3</sup> vegetable garden (good conditions), applying urine/water	Public stand pipe 200 m, shower place, waste water use for composting	Old pit latrine still in use, but already urine collection in container, waiting for UDS ground structure	Pit compost with cow manure and kitchen waste, urine storage container	Reuse of cow manure for pots, and some tins as erosion limiting measures, no tree disks	Artist for pots and cookers (her main income), got PTB package (fence, tools, seeds)	1-4-3-2-5
9 Atsenje Kabelo (f), start with second call 2003	200 m <sup>2</sup> vegetable and fruit garden (good conditions), a lot of flowers in the compound problems with buck and pest control, is applying urine/water	Water tap on plot (P156 for 2 month), seasonal rainwater harvesting with metal roof 60 m <sup>2</sup>	No toilet (bush), new UDS substructure finished, but already urine collection in container	Pit compost with cow manure and garden waste and urine, urine application	Few bottle recycling	Artist for pots out of dry manure and clay (her main income)	3-1-4-2-5
10 Babedi (Lelemopedung) Masephe, start with first call 2001	120 m <sup>2</sup> vegetable garden (bad conditions), destroyed by chicken in July 2004, some flowers in the compound	Water tap on plot (PTB) (P260 for 6 month), seasonal rainwater harvesting with metal roof 60 m <sup>2</sup> , fresh water pipe is leaking before the counter (!)	UDS with Phoenix in use	Box composting with kitchen waste, faeces and manure, urine collecting, storage and had applied it	Few bottle recycling	Received PTB package (tools, seeds, wheelbarrow, stand pipe (10/2003), want fence support	1-3-4-2-5
11 Rose (Gaanope) Nanatshane (Maseti) (f), start with first call 2001	600 m <sup>2</sup> garden with vegetable, fruit trees and beekeeping (veld products support), in addition intensive vegetable garden surrounding fences of compound (good conditions)	Water tap on plot (PTB) (P1600 for /3 month), all year rainwater harvesting, 30% of the metal roof (120 m <sup>2</sup> ) is used	UDS Phoenix with kid cover, under cleaning, ground structure is in reconstruction from UDS-VIP to UDS-Container system (newest design), urine storage in some 30 l containers and bottles	Box and pit compost with goat manure, faeces, garden residues, kitchen waste, urine application	Bottle and tin recycling for anti soil erosion measures, contour lines in the garden	Selling vegetable (her main income), received PTB package (tools, seeds, wheelbarrow, stand pipe), used as demonstration plot for field days	1-3-4-2-5

Name	(1) gardening	(2) water management	(3) sanitation	(4) composting	(5) waste management	subjective impression	order of intervention (motivation)
12 Mothatswi Rapontsho (f, 3 children), start with third call 2004	80 m <sup>2</sup> vegetable garden (good conditions), managed with daughter, planning to have income with gardening	Public stand pipe (100 m), no roof able for rain water harvesting	No toilet (bush), waiting for ground structure	Pit compost with cow manure	-	We have made no photo from inside of the compound, daughter (secondary school) was alone at home, interview with the lady was done on the way in the village, family wants to have water tap by PTB, got PTB package (fence, tools, seeds)	2-1-3-4-5
13 Florah Olwetse (f), start with third call 2004	One 200 m <sup>2</sup> garden with shadow net on neighbouring plot, one new 100 m <sup>2</sup> garden (good conditions)	Public stand pipe 200 m distance, rain seasonal water harvesting 120m <sup>2</sup> metal roof	Old pit latrine and new UDS substructure	Pit compost with goat manure	-	Received PTB package (fence, tools, seeds), sells vegetable	1-3-4-2-5
14 Nagano Samonnana Martin, start with second call 2003 (but was already selected during first call 2001)	Two 60 m <sup>2</sup> vegetable garden (good conditions), one of them fenced, other with strong shadow of a big tree, flowers and tree disks all over the compound, seasonal rainwater harvesting with 100 m <sup>2</sup> roof, doing urine trials	Own stand pipe on plot (P110 for 3 months - P2,4 p/m <sup>3</sup> (2002))	New UDS ground structure and super structure in use, old pit latrine, urine collection in containers and bottles	Compost box and pit, cow manure, kitchen waste, urine storage and application	Recycling of bottles for anti erosion measures and tree disks, contour lines	Community headman family, received PTB package (fence, tools, seeds), is selling vegetable	3-1-4-2-5
15 Otlwaetse Kealebale (f), start with third call 2004	120 m <sup>2</sup> vegetable garden (bad conditions), problems with buck and pest control, is doing urine/water application	Own stand pipe on plot (11 P/2 month - 2,2 P/m <sup>2</sup> )	New UDS ground structure, and old VIP latrine, shower place integrated in old VIP super structure	Pit compost with goat and donkey manure and garden residues	Tree disk	Received PTB package (fence, tools, seeds), ask for cow dung transport, wanting more gardening training and leaflets and wheelbarrow	1-4-3-2-5

Name	(1) gardening	(2) water management	(3) sanitation	(4) composting	(5) waste management	subjective impression	order of intervention (motivation)
16 Otlwaetse Garerketsi (Baodube) (f), start with third call 2004	100m <sup>2</sup> vegetable garden (good conditions), problems with bugs and pest control	Own stand pipe on plot since 10/2003 since never got the bill	Old pit latrine, now UDS-concrete with used metal superstructure (but too small), is waiting for the concrete UDS pedestal	Pit compost with goat and donkey manure and garden waste	Bottle recycling even before project start for anti soil erosion measures and contour lines	Received PTB package (fence, tools, seeds), is selling vegetable, want a hosepipe and wheelbarrow	1-4-3-2-5
17 Tetetelo Samonnana (f, 1 child), start with first call 2001	800 m <sup>2</sup> vegetable and fruit garden (good conditions) plus fruit trees and a separate 12 m <sup>2</sup> herb and spice garden, combined with a rainwater storage soil tank, applying urine/water	Stand pipe (PTB) (400 P/one year), she can not pay it at once (got first bill in July 2004), shower and bathroom combined with toilet superstructure, grey water collection, rainwater harvesting 120m <sup>2</sup> metal roof	UDS-Phoenix with kid cover (in use) and old VIP latrine	Some compost pits and compost box with goat manure, faeces, urine collection, storage and application	Large scale waste recycling (tins, cans, bottles) for construction, all over tree disks, anti soil erosion measures, and arts, contour lines on the plot	Artist for pots out of dry manure, other handicrafts, stone design, paintings, marula jam production, is selling vegetable, got PTB package (tools, seeds, wheelbarrow, stand pipe), demonstration plot	1-4-2-5-3

**Table 2      West Hanahai Households**

**INSERT EXCEL DATA**

**Table 3      East Hanahai Households**

**INSERT EXCEL DATA**

## **APPENDIX D PERSONS AND ORGANISATIONS INTERVIEWED**

Mr R Clark	Permaculture Trust Botswana
Ms A Kanego	Principal Natural Resources Officer, NCSA
Ms G Ndada	Project Supervisor - Serowe, Permaculture Trust Botswana
Mr D Lewycky	Communication Representative of the Canadian Union of Public Employees (volunteer in PTB)
Mr D Makwati	Project Supervisor - Ghanzi, Permaculture Trust Botswana
Mr M Thumpe	Coordinator, Veld Product Research & Development (VPR&D)
Mr S Pathmanathan	Chief Engineer, Department of Sanitation and Waste Management
Mr M Pelokgosi	Community Liaison Officer (Paje), CBNRM Missing Link Project
Ms G Petroes	Community Liaison Officer (East Hanahai), CBNRM Missing Link Project
Mr M Stone	Environmental Officer, Somarelang Tikologo
Ms X Thamae	Community Liaison Officer (West Hanahai), CBNRM Missing Link Project
Mr C De Wolf	Country Coordinator for Natural Resource Management, DED
Ms C Wirbelauer	Project Coordinator, CBNRM Missing Link Project, IUCN/DED

## **APPENDIX E REFERENCES**

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## **ANNEXES**

**I      ECOSAN State of the Art in 2001**

**II     GTZ Impact Evaluation Form**

**ANNEX I**

**ECOSAN STATE OF THE ART IN DECEMBER 2001 (during the Inception Phase)**

**ANNEX II**  
**GTZ IMPACT EVALUATION FORM**