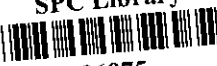


SOUTH PACIFIC COMMISSION

REPORT FOR WORKSHOP ON WATERLESS BIOLOGICAL TOILET

FIJI - 24 TO 29/11/96

WATER AND SANITATION PROJECT/SPC

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SPC
2002
FOLIO NO.:.....

FILE NO.: PRO 1/2/1

TO: MANHEAL	FROM: EHA
COPY TO: DG, DDG	DATE: 09/01/97
SUBJECT: REPORT FOR WORKSHOP ON WATERLESS BIOLOGICAL TOILET DEMONSTRATION AND CONSTRUCTION AT SUVA, FIJI - 25/11/96 TO 29/11/96	

This is the report of proceedings about above workshop. It was held in Vatuyalewa Settlement, Tovata, Suva, Fiji Islands. Also attached which is part of this, is a report from the consultant engineer and designer of the biological toilet system.

1. Engineer Consultant :

David Del Porto, the consultant who taught the technology is an ecological engineer for Sustainable Strategies, from Concord, Massachusetts, USA. Apparently he designed this technology for excreta disposal and first built the system in the Federated States of Micronesia for Yap, Pohnpei and Kosrae states. Greenpeace International and Centre for Clean Developments (CCD) provided supports in those projects. SPC had communicated with CCD since 1994 to introduce this biological toilet system in Tuvalu. Due to lack of funds there was no progress but we finally obtained assistance in 1996 from AusAID to do this project.

2. Construction Manuals :

We prepared 50 construction manuals and distributed them to the participants. Several of these students are from other pacific islands. This type of latrine would be recommended in situation where lack of water and contamination of water lenses are potential. These are common in small pacific island atolls. The manual is part of this report and provides all the technical information and notes descriptive of the design and construction of biological toilets. This is also known to be "*compositing toilet*" because the end-product, *humus*, will be used again to fertilise the soil.

3. Workshop Participants :

Participants who attended the workshop comprised the following groups :-

- (a) 25 final year environmental health students.
- (b) 5 Assistant Health Inspectors employed in rural subdivisional health stations.
- (c) 6 zone nurses and 1 Red Cross volunteer worker who are serving the communities of the project settlement and surrounding areas.
- (d) Community members from women, menfolks, youths and children.
- (e) Observers from Ministry of Rural Development, Ministry of Health and SOPAC.
- (f) 3 carpenters from Fiji School of Medicine, Mosquito Control Yard and SPC, Nabua.
- (g) Teaching staff members of Environmental Health at Fiji School of Medicine.

Our main focus is to have a broad coverage which is reflected in the different groups who participated. They would go to disseminate the information and promote skills of developing this technology in their own community groups.

4. Selection of Project Site :

/2...

9/12/96

This settlement is sited in a rural area of Nasinu district eight (8) miles out of urban Suva the capital city of Fiji. The access to the site is by farm road and it is bad for vehicles in wet weather conditions.

But the selection of site was considered upon the following reasons :-

(a) Currently community members who reside at Vatuyalewa Settlement migrated there about five decades ago. They are from the outlying islands in the Lau groups of Fiji. The geographical features of their home islands have similarities with island atolls such as in Tuvalu. It is assumed that biological toilets could be the best suitable latrine system in island atolls because of water problems. These types of toilet will be significant for introduction to their home islands in Lau.

(b) This settlement has no piped water supply and in 1995 the final year environmental health students constructed a ferro-cement rainwater tank for the community. There is a cooperative relationship and trust developed with the community to agree with this sanitation project to improve awareness of their health status.

(c) Water seal latrines had become insanitary due to the problems of water for flushing..

(d) The site is accessible to enable students attending CETC and Fiji School of Medicine take education visits during their training in community health. This is a pilot test project where the advantages and disadvantages will be regularly followed up and its usage is continuously recorded. Our aim that from the result of the pilot test experiment is to expand this technology to other SPC small island member countries in the region.

(e) More coverage is achieved involving different target groups such as other pacific island students studying at Fiji School of Medicine who participated. It is economical to promote the technology here compared of the costs to deliver the training to other island member countries.

(f) This is a problem area where incidence of diarrhoea is endemic amongst residing people as reported by the community health nurses.

(g) A school near the settlement was closed in 1996 because of water problems when the water flushing system of the toilets were affected.

5. Official Opening :

The workshop was officially opened by the *Minister for Urban Development, Housing and Environment, Hon. Vilisoni Cagimaivei at 10.00am on 25/11/96*. He used to be Environmental Health Officer before his election to the present Fiji parliament. The copy of his speech is attached for reference. The workshop coincided with passing of the a new Sustainable Development Bill by parliament in Fiji. This addresses various development issues and how we can protect our environment from degradation which result from improper developments. He was pleased to know that the workshop promotes sustainable development and a healthy environment which is supported by his ministry. Appreciation of his acceptance to open the workshop was remarkable and praised despite the busy schedule for parliament being in session at the same time.

6. Workshop Description :

All the different activities in the workshop programme can be seen in the consultant's report which is attached. There was rain during the week and delayed some activities of the construction. Our *workshop slogan or theme was " more do" and "less talk."* Practical construction started on 22/11/96 before official opening of the workshop and all works were finally completed on Wednesday 04/12/96.

This is a pilot test project and during progress of construction amendments on various technical details were made in the plan. Some details which were not shown in the plans had to be redesigned to suit the circumstances during building. Estimation of materials provided a good exercise for participants to gain more knowledge and skills from the experience. It offered future assurance without the consultant engineer, participants are positive to carry out the construction by themselves. But the presence of the consultant was resourceful and an advantage in the achievements of tasks.

7.0. Technology - Soltran II Non-Polluting Biological Toilet and Washwater Garden :

This technology uses nature to decompose faecal matter and this is why the system has been called biological or compost toilets. Compositing is a process for decomposition of heterogenous organic wastes by a mixed microbial population in a moist, warm, aerobic environment. By gathering the wastes into heaps and conserving the heat of fermentation, the temperature rises and rates of degradation result which are far higher than those achieved under ambient conditions. The mature end product is "*humus*" consisting largely of humic acids. It is designed so that human excreta and other organic materials (toilet tissues, dried leaves, shredded coconut husks, small wood chips) are deposited in the digestion chamber with human excrement. Solid excretas are decomposed by air-breathing (aerobic) bacteria (*living machines*). Solid wastes land on woven coconut leaves on top of a fishing net suspended inside the chamber. Controlled air enters the chamber and aerate the suspended solid wastes mixed with other organic wastes. Urine is evaporated and any excess is withdrawn through drainage outlets to be used by plants in a washwater garden. People using the system will ensure that regular deposits of organic materials on to the net are carried out on daily basis. The chambers are constructed air and water tight and use of water is restricted. But air inlets and outlets are installed to enable regulated air flow into the chambers. The toilet seat has to be covered at all times and open only when it is in use.

More information for the technology are described in the manual.

8.0. Overview :

This is an overview when consideration is focused towards developments in water, sanitation and environment. If sanitation is considered to be a fundamental right. In theory without adequate sanitation measures, most efforts aimed at the prevention of environmental health related diseases and at the promotion of human health will fail, especially in the mid and long term and eventually will not have the expected impact.

Yet it has to be admitted that in most emergency situations, sanitation problems still last a few months after the outset of the emergency. Our Pacific Islands region is fortunate that we are not yet having the difficulties which are happening in various regions of the world. We must be prepared before the political changes may occur which is a result of poverty, ill-health and unsatisfactory living conditions. The key role of sanitation can be recalled as evidenced through the major consequences of unsanitary environment, namely :-

- (a) contamination of drinking water sources (surface or groundwater) with liquid and solid wastes.
- (b) swarming of disease vectors such as mosquitoes and flies, whose larval sites have increased both in terms of number and surface area because of poor drainage of domestic wastewater including runoff water.
- (c) Infestation in poor living overcrowded conditions with lice, bugs, fleas and other disease vectors or nuisance organisms because of non-compliance with the basic rules of body and clothing hygiene (personal hygiene).
- (d) Excessive numbers of rodents which may contaminate and reduce the available food stocks.
- (e) Contamination of soil and water with different types of wastes including faecal matter, which may give rise to all sorts of helminthiasis, and foster intestinal polyparasitism, in particular to children.

Most will likely feel that the above description applies to one, several example situations that can be experienced.

General consensus on the reasons for which sanitation is not progressing and at the same pace as other sectors. There is lack of political will, poor motivation from the staff concerned, either insufficient in number, or unqualified, or both (hence a possible lack of motivation), scarcity of materials and financial resources (when compared to sectors such as health, shelter or water), and lack of community participation. These reasons are put forward in an attempt to explain why so many deficiencies can be recognised when it comes to the sanitation sector.

It is also generally agreed that sanitation is, for the human being, is as vital as medical care, water supply and food. It is therefore quite amazing that no innovative and effective approach to sanitation problems has yet been proposed, adopted and implemented.

Therefore this workshop provides an innovative and alternative to conventional systems of excreta disposal for the region. To be effective it has to be a long-term involvement and various activities are to be implemented. Sustainable Strategies the agency involved with SPC for the running of this workshop have raised proposals recommended and based from our collaborative discussions in this technology of biological toilets. There are other sanitation issues which would be considered collectively if these proposals become effective.

Attached with this report are several proposals based from above, where funding is required and SPC's support will begin a new era on how sanitation problems are tackled in the future. Consultation has already begun and needs SPC collaboration with some of the North Pacific countries of the SPC's region. Information are attached.

9.0. Conclusions :

(a) In ensuring the efficient operation of the toilet system, a programme is to be developed of having regular revisits of the demonstration site on a 3, 6, 12 and 24 months basis. To design a questionnaire in determining or assessing social issues. The use of toilet will test the efficiency of this technology with regular monitoring for advice whenever needed. At the end of the period a book is to be compiled by SPC to be used in the region for biological toilet systems from our pacific experience and knowledge.

(b) There has been many interesting comments in favour of this toilet system. Conventional systems are associated with problems such as overloaded capacity due to population increase, siting and expansion of sites for treatment plants, maintenance and operation costs, excessive water requirements, offensive smell and contamination of air/land/water environment. Ecologically engineered technology should be encouraged in the region because it practises the utilisation of natural energy and is economically viable compared to artificial energy. Environmental conservation is an important issue such as in the *"WHO's Yanuca Island Health Declaration ."* To design programmes of similar workshops for small island states with *"more doing" and "less talking."*

(c) To develop system of having technical information available for all public health and environmental health officers when needed. This will provide innovative and alternative technologies which may offer more economical solutions. Establish modern communicating network through electronic mail and world-wide web to disseminate these technical information for regional member countries of SPC.

As a result of discusson with Sustainable Strategies for the above, a proposal is attached and titled *" Public Information Campaign for Innovative/Alternative Waste Treatment Technologies."* This provides an outline on the different methods of approaches to be used for the achievement of our aims. It involves publication of information materials, media campaign, training, workshops, seminars, courses, presentation and technology transfer exhibits, and demonstration sites. Please read the attachment of above included with this report.

Ceri
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Isimeli Naulumatua Masi
Environmental Health Advisor

Attachments :

- × **Opening Speech extract.**
- × **Consultant Engineer's report**
- × **Commendation correspondence from communities.**
- × **Public Information campaign proposal - Sustainable Strategies**
- × **Proposal - Pohnpei Small Scale Piggery Prevention System**
- × **Proposal - Mini-grant request for Innovative & Alternative Technology
Palau, Pohnpei, Yap, Kosrae, Chuuk**

**SPEECH BY THE MINISTER FOR URBAN
DEVELOPMENT, HOUSING & ENVIRONMENT
HON V CAGIMAIVEI, AT THE OFFICIAL OPENING
OF WORKSHOP ON BIOLOGICAL TOILET,
VATUYALEWA SETTLEMENT, TOVATA - 25/11/96,
9.00 A.M.**

Invited guests, participants, ladies and gentlemen, I am honoured to be here today to officially open this Workshop which addresses an important issue of my Ministry, the prevention of environmental pollution by using appropriate and affordable technology.

Last week, I launched a new Sustainable Development Bill which will be widely circulated to various parts of our community for comments before the final bill is put together for the Parliament approval sometimes next year. The bill addresses various developmental issues and how we can protect our environment from degradation resulting from various improper developments in our country. I am pleased to note that this Workshop promotes sustainable development and a healthy environment and is fully supported by my Ministry.

This Workshop looks at a new method of disposal of human excrement which I understand has zero-discharge, avoids pollution and contamination and provides fertiliser.

Pollution from sewage is one of the urgent concerns in Fiji. Nearly all of our major centres have identified

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environmental and public health problems resulting from the disposal of human excrement. These have included eutrophication in our water ways, contaminated drinking water and outbreaks of gastrointestinal disease. The causes of this pollution include overflowing privies, water seal toilets, septic tank systems, sewage treatment plants as well as the complete lack of facilities in some places.

Conventional on-site sewage treatment options such as septic systems and water sealed toilets, which have been encouraged as a way to address public health concerns, are often a threat to ground and coastal waters. These technologies essentially place harmful pathogens and nutrients from human wastes directly into and over the water table. Although in certain soils and under the right conditions, some treatment can take place. However, nitrogen and other pollutants still generally remain in a form which present potential health and environmental hazards.

In addition to the threat of contamination, the use of water to flush away human excreta wastes valuable and limited fresh water resources. Also, when underground water supplies are over-used on low-lying atolls and coastal areas, salt water can be drawn in and contaminate the water table.

3.

The best solution to any problem is not to create the problem in the first place. Avoiding or preventing pollution problems is always less expensive than attempting to control the problem through treatment.

When the materials which would be treated and discharged to the environment are instead used as a resource, then waste is prevented. This toilet system has been designed to prevent pollution problems through the use of waterless biological toilet combined with an innovative Wash Water Garden. Biological toilets have been in use around the world for many years and is now being used in some countries in the Pacific especially in Federated States of Micronesia and Kiribati.

I understand that one of the aims of this workshop is to promote this biological waterless toilet in Fiji and the toilet you will build with this community will be the first of this type of toilet in Fiji. I have been told that there are some participants here from other parts of the Pacific studying at Fiji School of Medicine who will also be required to promote this type of environment friendly toilet in their countries.

In closing I would like thank you for your commitment to protect our public health and environment by supporting sustainable development with ecological integrity.

With those words, ladies and gentlemen, I have much pleasure in declaring your Workshop open.

Project Report

With attached
Manual for the Soltran II Non-polluting Biological toilet and
Wash water garden™
A Project Book of Plans, Specifications, Operation and
Maintenance instructions

**Dated
December 3, 1996**

Submitted by:

David Del Porto, Consultant

President
Sustainable Strategies, LLC
Ecological Planning, Engineering and Design

Concord, Massachusetts USA 01742
Phone: 1-508-369-9440 · Fax: 1-508-369-2484
E-mail: ddelporto@igc.apc.org
World-wide web: www.ecological-engineering.com

Submitted to:

Isimeli Naulumatua Masi
Environmental Health Advisor
South Pacific Commission
B.P. D5, 98848 Noumea Cedex
New Caledonia

Workshop Title:

Waterless biological Toilet and Wash water Garden Design and
Demonstration Workshop at Tovata Rural Settlement, Suva, Fiji

Date of workshop:

November 25 through November 29, 1996

Description of the Workshop:

The workshop was a two part program wherein the participants both received classroom instruction complemented with hands-on participation in the actual construction of the Soltran II Non-polluting Biological toilet and Wash water garden™ at the Tovata/Vatuyalewa settlement in Nasinu, Fiji

The complete description of the project can be found in the attached manual titled The Soltran II, Non polluting Biological Toilet and Wash water garden™ dated November 25, 1996. 42 manuals were provided. This manual is organized in seven sections:

1. Introductory summaries of the project to include:
 - Introduction
 - Agenda
 - Overview
 - Vocabulary
 - Key Factors
 - Construction and Long-term Responsibility
 - Recommendations for attendees
 - Where to get more information
2. Detailed conceptual basis, installation, operation, maintenance and do's and don't related to the Soltran II Non-polluting Biological toilet and Wash water garden™
3. Detailed plans, construction specifications, required materials & tools, construction notes and parts fabrication for the Soltran II Non-polluting Biological toilet
4. Detailed plans, construction specifications, required materials & tools, construction notes and parts fabrication for the Wash water garden™
5. Sustainable Strategies capabilities.
6. Carousel Composting Toilet System technical brochure.
7. The ECOS catalog of tools and products for low water and waterless living.

Venue:

The workshop was held both in the class room of the Fiji School of Medicine and in the Vatuyalewa/Tovata settlement in Nasinu, a rural and remote settlement comprising citizens from Lau, an outer island group of the Fiji nation. This settlement has no public utilities to include electric power, treated water, or reticulated sewer-to-

treatment plant system. This settlement typifies rural villages which are found on every island in the South and Western Pacific.

Target Group:

The Fiji School of Medicine has a three year program for the education and training of students preparing for careers as public health and environment inspectors. Following their graduation, they will return to their island states and nations to perform these key roles in their community. The entire third year class and other visiting health inspectors comprised a group of approximately forty, all of whom participated directly in the workshop. In addition, the members of the Vatuyalewa/Tovata settlement also participated at all levels of the program.

Schedule:

I arrived in Suva on Monday, November 18, 1996 and met with Mr. Masi from the South Pacific Commission and Mr. Navi Litidamu, head of the Department of Environmental Health, Fiji School of Medicine, the local host for the workshop. The purpose of this meeting was to introduce the players and to develop the preliminary schedule of activities.

I had earlier communicated by fax my concern that the preliminary site preparation to included pouring of the foundation slab be completed prior to the formal opening of the project on Monday, November 25th. This was due to the inadequate time for construction of the project. This schedule was firmed-up and the site preparation and slab construction was accomplished on following Thursday and Friday.

Tuesday, November 19th, I was transported to the water seal toilet and concrete pre-cast fabrication facility. I modified the plan to include the prefabricated riser and polyethylene insert to utilize existing materials and local capacity. This was followed by a visit to the settlement site and a meeting to calculate the materials and tools required for procurement at a local hardware and lumber store.

Wednesday, November 20th, we attended a briefing meeting with Epele Nasome, the Director of the Department of Environment for the Fiji nation. I presented the project manual and offered the economic arguments for utilising human waste and washwater on-site. This sustainable development strategy frees-up the capacity of the existing treatment plant for future industrial and center-Suva commercial development by conserving the capacity allocated to residential and small commercial users. Well over 60% of all the treatment capacity of the plant is dedicated to washwater management, which would be better conserved by irrigating the trees and shrubbery at each building site.

We then presented the purchase order for supplies and equipment to Francis Domoika, sales representative for Vinod Patel Ltd. of Centerpoint plaza, in Suva. Selection of materials and finding substitutions for specified materials that were unavailable.

Thursday, November 21st, conducted a classroom slide presentation and seminar for the 40 third year students of the health program of the Fiji School of Medicine and participated in further planning sessions with the staff.

Friday, November 22nd, supervised site preparation and slab construction at the construction site.

Saturday, November 23rd, provided the text to Navi Litidamu for his preparation of a speech to be given by the Honorable V. Cagimaivei, Minister of Environment.

Monday, November 25th, participated and the official opening ceremony for the project and conducted a lecture with slide presentation and distributed manuals to the dignitaries and community participants. Following the opening ceremony and luncheon, I supervised the construction of the Soltran II Non-polluting Biological toilet.

Tuesday, November 26 through Thursday, November 28th, I supervised the construction of the Soltran II Non-polluting Biological toilet.

Friday, November 26th, I conducted a briefing for the professional nurses to travel to the villages of Viti Levu island providing health care where no hospital facilities are available.

Attend the official closing ceremony of the project and presented a wrap-up lecture with key operation and maintenance issues featured.

During a meeting with Mr. Masi it was agreed that although my contract was funded only through this day, that an additional four days of per diem and two days of consulting plus out of pocket expenses would be paid to allow me to supervise the completion and start-up of the Soltran II Non-polluting Biological toilet on December 2nd and conduct a instructional lecture on Tuesday, December 3 for the villagers in the settlement.

Monday, December 2nd, I supervised the completion of the Soltran II Non-polluting Biological toilet.

Tuesday, December 3rd, I supervised the completion and start-up of the Soltran II Non-polluting Biological toilet. I also conducted an instructional lecture for the villagers of the settlement who would be using the toilet.

Wednesday, December 4th, 1996, my work and contract completed, I returned to the United States.

Observations:

1. The project was well conceived and organized by Mr. Masi, who, to his credit, participated in all aspects of the project including performing actual construction labor in order to keep the project schedule.
2. No significant problems were encountered. Field modifications were routinely

made to adjust to minor anomalies.

3. The members of the settlement were active participants, providing skilled construction management, labor, tools, lunch and general hospitality.
4. The staff of the Fiji School of Medicine, local and off-island health inspectors and students all participated in the various activities of the project by providing transportation, office facilities and manpower to insure the success of the project.
5. It is clear that a trained project manager, skilled in reading plans and specifications is needed to direct the construction supervisor who in turn supervises construction workers.

Recommendations

1. Technical information on the current best available alternative waste treatment technology must be made available to all public health and environment officers on an "as required" basis.

The present education program only provides information on conventional treatment processes that are dependent on large sums of capital and are not providing adequate protection of public and environmental health. Further, it does not report on innovative and alternative technologies that may offer more economical solutions.

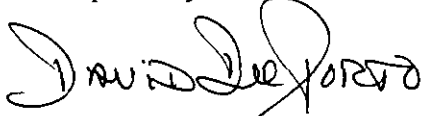
A program must be developed to distribute current technical, financial, operation, maintenance and evaluation protocol related to innovative and alternative technologies to all health inspection officers on a subscription basis, providing on-line written and graphic materials accessible from electronic mail and/or the world-wide web.

2. This aerobic ecologically engineered technology has been well accepted and should be made more widely available. Design a program of similar workshops for the small island nation-states in the Pacific. "Doing" and less "talking" workshops engage the participants and transfer more information than lecture and slide workshops. They also, leave a working demonstration that has been constructed by the participants and so will be maintained for the communities benefit.
3. Long term follow-up is not usually part of the short-term work shop. Develop a program to revisit the demonstration site on a 6, 12 and 24 month basis. A questionnaire will determine the social issues. Testing will determine the efficacy of the technology to protect public health and the environment.
4. High volume production will lower costs per unit to the community. Develop a viable manufacturing operation and provide financial assistance for fast-track commercialization.
5. While attending a briefing meeting with Epeli Nasome, the Director of the Department of Environment for the Fiji nation. I offered the economic arguments for utilising human waste and washwater on-site. This sustainable development strategy

frees-up the capacity of the existing treatment plant for future industrial and center-Suva commercial development by conserving the capacity allocated to residential and small commercial users. site. Well over 60% of all the treatment capacity of the plant is dedicated to washwater management, which would be better conserved by irrigating the trees and shrubbery at each building

THIS CONCLUDES MY REPORT

Respectfully submitted,

A handwritten signature in black ink, appearing to read "David Del Porto". The signature is fluid and cursive, with the first name "David" being the most prominent.

David Del Porto
President
Sustainable Strategies

Box 8865,
Nakasi,
Fiji Islands.
17 December, 1996.

The Secretary General,
South Pacific Commission
Noumea.

SOUTH PACIFIC COMMISSION
ACTION FILE PRO/2/1
7 JAN. 1997
ACTION OFFICER ERS

Dear Sir,

It is gratifying to note the generous gift donated to our settlement at Vatuyalewa by the South Pacific Commission for building a Waterless Biological Toilet.

We are grateful indeed to the Ministry of Health for the Government of Fiji for the approval of erecting the toilet in our settlement.

The project was preceded by a Workshop for a group of Public Health Inspectors for the Fiji School of Medicine. It was completed by Mr. Suresh Prasad from the SPC - Nakua. We are thankful to the Administration Officer for his release. His skill and diligence enable to complete the work on time.

We also wish to thank the following gentlemen for their cooperation and assistance throughout the construction of the project.

Mr. David Del Porto - Consultant

Mr. Isimeli Naulumatua Masi - Environmental Health Officer
SPC Noumea

Mr. Navi Litidamu - Environmental Health Officer
Fiji School of Medicine.

Your financial support is very much appreciated.

Yours faithfully,
Raratabu
A. G. Raratabu
Steward - Vatuyalewa Church.

**URGENT
FAX**

RUSH TO: Isimeli Masi, South Pacific Commission

FAX: 011 687 26 38 18

FROM: ECOS/SUSTAINABLE STRATEGIES

PAGES (INCLUDING THIS COVER): 7

Please use this copy of the proposal and not the earlier one
(has typos)

Best regards, David

Monday, January 19, 1997

SOUTH PACIFIC COMMISSION ACTION FILE <i>PRO 1/2/1</i>
20 JAN. 1997
ACTION OFFICER <i>Ehs</i>

Sustainable Strategies

Ecological Design and Engineering

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January 19, 1997

BY FAX

Isimeli Naulumatua Masi
Environmental Health Advisor
South Pacific Commission
B.P. D5, 98848 Noumea Cedex
New Caledonia

Dear Masi:

January 19, 1997

Dear Masi:

Here's an outline of information tools and methods that Carol Steinfeld (our communications and technical marketing specialist) and I think really are the best shot for getting out information about the Innovative and Alternative (hereinafter referred to "I/A") waste water treatment systems. Of course, this is very sketchy, as there are so many variables. But it's a start.

As I discussed, we would like to be considered for this work and this forms the skeleton for a proposal. Bottom line, however, is I'd like to see more awareness and consideration of alternative systems—I think something broadly significant has occurred in the South Pacific regarding better ways to manage wastes and not many have caught on yet. I also would like to stay connected to SPC activities in this realm, as they create potential projects for us. So, please keep us in the network.

Thanks.

All the best,

David Del Porto

(DRAFT) 19 January 1997

A Public Information Campaign for Innovative/Alternative Waste Treatment Technologies

The goal: To promote the awareness and consideration of appropriate innovative/alternative (I/A) technologies and corresponding health code changes. (Why: These systems can better protect public health and the environment, and, in many cases, save money for both property owners and municipalities, preserve the value of properties, and preserve resources.) A secondary goal is to present the alternatives in the better light they deserve, so the public understands them as a timely and inevitable means of protecting public health and resources. It is key to target *all* interested audiences—not just municipal officials or developers—with this information, so that everyone comes to the table better versed, a demand for information is created, and opportunities for conveying incorrect information are reduced. A one-sided effort will not be effective, and the market alone will not drive public demand for and provision of information.

How: To launch a five-part information campaign: 1) printed materials Internet e-mail and web page; 2) a media information campaign; 3) workshops, seminars and courses; 4) presentations and continued technology exhibitions; and 5) demonstration sites/homes.

Funding it: Financing can come from the SPC and perhaps with assistance from other funding sources known to the SPC.

(I've included some estimated costs, although pricing can be all over the spectrum and depends on a multitude of factors. All costs are very much estimated, based on similar projects, and are materials costs only—they do not include production and coordination costs. This is to give some idea of what the cost would be. Postage would be comparable to existing mailings, so I'll leave that out.)

i. Informational Materials

These serve as a beginning and continuing source of information for both health officials, those who sell building-related products and services, and the public.

1. **Information binder** for health agents, inspectors, and anyone who needs in-depth information. This is an individually numbered binder registered to the

An Ecological Planning, Engineering and Design Firm

recipient in which all information about I / A technology is placed. The various systems are described on separate numbered sheets. In this way, they can be replaced with updated pages as changes occur, and are easily photocopied for anyone who inquires about specific systems.

The components:

- A 1.5" binder
- A four-page four-hole-punched 8 1/2" x 11" booklet explaining the I/ A systems. Two color.
- A four-hole-punched specification sheet for each of the alternatives, with diagrams, permitting requirements and source information. Black and white

(Estimated cost for 4,000: about \$7,000.

Engineers and installers should pay for their copies, either directly or through their fees to the local government.)

And/or:

2. **Information booklet.** For the general public, a 16-page two-color booklet with friendly, clear language describing I/ A alternatives, with diagrams, permitting requirements and source information.

(Est. cost: 10,000 for \$3,000+)

This could also be made more technical and used instead of the binder. The advantage of the binder system, which costs more, is that it can be updated and allows for easy photocopying. It also invites users to keep information in one place.

3. **An I/A technology newsletter** much like any newsletter but clearer, better presented and with wider-ranging and with examples in the south pacific-wide information. May be a quarterly publication. Articles should cover updates on approval status, testing, training opportunities, demonstrations, courses and interesting applications of these technologies (reports from the field). This would also be three-hole punched to be included in I/ A binder, if the SPC has interest in that route.

This would be principally for officials involved in permitting. For a small fee, it could be available by subscription to engineers, installers and others.

(Est. cost: 4,000 newsletters, 2-color, would be about \$2,000)

NOTE: All of these materials can be supplied to public officials but offered at cost (to cover production) to anyone else directly from SPC.

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4. A Worldwide Web page describing these systems briefly, with links to manufacturers and demonstration sites with technical and design information. An integrated electronic mail component would permit subscribers with e-mail access to ask technical questions and receive immediate answers from a growing number of technical experts world-wide and discuss specific local issues with other subscribers in the south pacific region. This network would expand the access to current information on specific health and environmental issues, thus arming inspectors and interested parties with informational tools to continuously improve their capability.

(Est. maintenance cost: About \$45-\$150 a month)

ii. Media Campaign

A steady campaign to get the media to publish/broadcast positive, constructive information about appropriate alternatives.

1. An information packet to both broadcast and print media featuring:

- An upbeat rationale for tightening pollution regulations
- A brief description of appropriate I/A systems
- A story list promoting potential angles for news articles

2. Periodic press releases will feature more article promotions (to keep the positive angle alive) and updates on state activities and demonstration sites.

I think it's also worthwhile to send *some* article promotions to the international media.

3. A video presentation. Approach one of the larger community access (cable TV) stations to create a great half-hour video, which could be copied and promoted to other cable access channels, and sent to anyone conducting a presentation on alternatives. SPC could also produce its own, based on a SPC presentation, with footage from demonstration sites and equipment manufacturers cut in.

4. Advertising. An ad budget may be needed to fund announcements and other messages that can't get free coverage, especially in communities with big health and pollution problems.

(Est. cost: Give this a printing budget of at least \$3,000 for the year or year and a half. A SPC-produced video could cost a minimum of \$2,000--usually much more. An advertising budget for promoting I/A materials and events could run anywhere from \$1,500 for a small ad placed in each of 30 medium-sized newspapers. So \$7,500 to \$10,000 would cover more weeks and events and allow for a large news paper ad)

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iii. Training, Workshops, Seminars, Courses

Should be plentiful, well publicized and accessible. Construction of actual demonstration facilities by village participants in conjunction with traditional lecture format has better long-term results. These would be publicized through direct flyers, announcements to trade journals and the I/A newsletter. The publicity campaign generates interest in these workshops.

IV. Presentations and Technology Transfer Exhibits

This is to offer an opportunity for all audiences to hear about the I/A changes, and ask questions. This is primarily for the general public.

1. Create a "speakers bureau" list of knowledgeable associates who can talk to the public about I/A technologies. Include in the list representatives of manufacturers, installers and inspectors who would be part of presentations. The SPC should conduct some presentations—perhaps a minimum of six a year—and promote the speakers bureau list to trade organizations, developers, property owners associations, and communities with many failed conventional treatment systems.

(Est. cost: \$500 for printing a four-page list that's periodically updated.)

2. Continue technology exhibitions, but look for opportunities for trade and professional organizations to take on the onus of handling them by incorporating them in their events. Otherwise, count on two to four SPC-sponsored technology exhibitions, at a booth cost of no more than \$200 per show.

V. Demonstration Sites

These show the systems in use—a valuable tool for all audiences. Those who use or operate the systems can answer questions, and perhaps contribute further information about their use to the SPC and others. This is a crucial component, and SPC involvement can range from merely publicizing the sites through its existing materials, to actually installing and operating these systems at sites open to the public. This may mean only working with manufacturers to install at cost their systems in publicly-owned buildings. These sites would be promoted in SPC materials and open to the public at least once a week.

These are crucial. I/A systems will seem theoretical and untested to many until they see them successfully in use.

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(Base expense for this is mostly the person making the calls and visits. Additional costs would be materials promoting the sites, signage, information sheets, etc. In its full-blown execution, the SPC could spend thousands to get something going, but, again, I'm sure there are plenty of publicly-owned properties whose waste treatment systems are failing and would pay the bill for an alternative system, especially if it is the least-cost solution or its cost was subsidized in some way.)

Execution (Who): Ideally, this campaign is run by an experienced communications specialist. Sustainable Strategies would train these individuals. Parts i to iii represent a month of initial work (about 120 hours) and then minimum weekly work of about 15 hours, depending on how much of this proposal is adopted.

Coordination of the presentations, seminars and demonstration projects could be either incorporated in the communications specialist role, handled by an existing staff person or given to a technical information specialist. This last position could be a part-time position. The local government salary scale can be used to compute the cost of these positions (with additional consideration for expertise that falls outside of the scale).

Justification: Again, all costs are estimated, and may in fact be low. However, the potential cost savings these systems offer easily justify the expense of this effort. With water and waste treatment costs rising, the islands population growing (especially in coastal areas) and current and potential threats to water supplies increasing, the appropriate I/A systems also represent an opportunity for saving money and resources over the long term. They represent far more than an alternative to replacing a septic tank or installing a holding tank. To not sufficiently promote the results of the significant work that SPC undertook in promoting these systems negates the reasoning behind taking this huge step and sabotages the intent.

Also, doing a better job in getting the word out about what may be precedent-setting solutions to vexing problems also shows the SPC's efforts to ease the burden of complying with growing new regulations to protect public and environmental health.

A public information campaign is a crucial component of this effort to protect ground and surface water and public health.

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FAX

DATE: Tuesday, December 24, 1996
TO: Ismell Masl, South Pacific Commission
FAX: 011 687 26 38 18
FROM: ECOS/SUSTAINABLE STRATEGIES
PAGES: 7

MEMO

SOUTH PACIFIC COMMISSION
ACTION FILE *PRO 1/2/3/5*
- 6 JAN. 1997
ACTION OFFICER *Ewa*

Sustainable Strategies

David Del Porto, Principal

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Tel: 508-369-9440
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E-mail: watercon@igc.apc.org
ddelporto@igc.apc.org

web: www.ecological-engineering.com

To: Isimele Masi
South Pacific Commission

December 24, 1996

From: David Del Porto

Subject: Pohnpei Small-Scale Piggery Pollution Prevention System

Description

A low cost zero-discharge treatment system for wastewater from small-scale piggeries will be designed and tested in a pilot project on Pohnpei. The system will utilize the Wastewater Garden™ technology developed by Sustainable Strategies, of Massachusetts, USA, to convert the nutrient rich pig waste into plants in a specially designed contained garden bed. This technology evaporates and transpires excess water into the air, avoiding wastewater discharge. Among the plants grown in the Wastewater Garden will be kangkon and water hyacinth, to be used for pig feed. It is hoped that the production of feed from waste will create a valuable incentive for use of this technology by off-setting the high cost of commercial pig feed. The system will also be designed to minimize transmission of Leptospirosis through pig wastes.

The basic design concept of the pig waste treatment system will involve a two stage process starting with a small septic or composting tank to partially digest the waste and settle out solids. From there, the effluent will flow into a sheltered Waste Water Garden™, a polyethylene-lined garden trench or bed filled with a layer of gravel underneath a layer of sand. A distribution pipe which carries the effluent into the garden will be specially designed to create aerobic conditions in which further treatment of the waste will occur. The plants grown in the garden will be specially selected to grow in these conditions and take up the wastewater.

The project should be conducted jointly by the USDA-NRCS, Pohnpei EPA and the Pohnpei Agriculture Department, with participation by the Kolonia town government. The project will include the development of design plans and an operation manual for a Wastewater Garden system suitable for

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adaptation to existing small pig pens with limited land area, and public education on the health and environmental impacts of wastewater from piggeries.

Background

The widespread practice of raising pigs for sale and slaughter has great cultural importance and provides a source of locally produced protein and income for many families in Pohnpei as well as on many islands throughout the Pacific. While the total pig population on Pohnpei is not known, it has been estimated that there are over 400 piggeries in the capital of Kolonia alone.

In recent years the use of pig pens has been encouraged as a public health measure. However, the pens have been recognized as a significant source of pollution from pig excrement. Most pens are small, with ten or fewer pigs. Typically, their sloped floors are washed down regularly with water, causing pig wastes to run-off into nearby water resources. Some pens are constructed directly over surface water with a grated floor which allows the pig waste to fall directly into the water. It has been estimated by the UNDP that up to 30 gallons of wastewater per pig per day is discharged, although this figure may be a bit high.

This pig waste can contaminate ground water reserves, mangrove systems and coastal resources. As with human sewage, potential problems include the transmission of disease and overloading with nutrients contained in the waste. Pohnpei State has identified piggeries as a significant contributor to the degradation of water resources. Also, of particular concern is the potential spread of Leptospirosis through contact with water contaminated with pig wastes.

Objectives

- To develop and field test a practical, low-cost technology for preventing wastewater discharges from small-scale piggeries that can be applied to new and existing facilities.
- To grow plants suitable for use as pig feed with the wastewater from piggeries.
- To produce design plans and instructions for the pig waste prevention technology.
- To educate the public about the health and environmental impact of wastewater from washing down piggeries.

Project Outline

1. Develop design plans for a Wastewater Garden system, construction and maintenance instructions for a piggery of up to 10 pigs, based on design criteria supplied by the implementing agencies.
2. Purchase materials for three units.
3. Select demonstration sites.
4. Conduct training workshop for construction and maintenance. (technical assistance from USDA)
5. Construct and start use of demonstration units.
6. Monitor and evaluate performance of pig waste prevention demonstration units.
7. Develop and conduct public education program.
8. Evaluation of pilot piggery waste systems and preparation of written report.

Cost Estimates

Design and license for Wastewater Garden™ system.....	\$5,000
Materials and labor (partially supplied by demonstration hosts).....	\$3,000
Construction and maintenance manual.....	\$2,000
Public education materials on impacts from pig wastes.....	\$3,000
Consultant (2 persons) for training workshop (20 days @ \$300).....	\$6,000
Consultant (2 persons) per diem (28 days @ \$150.00/day).....	\$4,200
Consultant (2 persons) travel for training workshop.....	\$4,400
Consultant (2 persons) for evaluation and report (20 days @ \$300).....	\$6,000
<u>Consultant (2 persons) travel for evaluation and report.....</u>	<u>\$4,400</u>
Total	\$38,000

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Tasks Necessary for Proceeding

Contract with Sustainable Strategies, developers of the Wastewater Garden, prior embarking on the project.

Comments

Pohnpei EPA staff and Andolino Lawrence, Chief Agriculture Officer, feel strongly that wastewater pollution from piggeries is a priority problem and are enthusiastically supportive of this project. According to EPA, pig waste is considered to be a more significant problem than human sewage in many areas. The state agriculture station is planning to soon begin raising pigs with funds anticipated from the Chinese government, and the idea of constructing one of the demonstration units there was endorsed by both agencies. The most severe impacts of pollution from piggeries is believed to be in Kolonia, because of the high population density (presumably both the swine and their keepers). The Kolonia town government have the local authority to regulate piggeries along with the EPA, and they have also expressed support of the project and an interest in participating.

Mr. Lawrence also believed that there was a good possibility that kankong and water hyacinth would make good pig feed, and that farmers would be interested in using it, because of the high cost of commercial feed. He estimated that commercial feed currently sells on island for about \$0.20-0.25/lb., and that an average pig is fed 5 lb. a day. Given this expense (over \$350 per pig per year), the cost of constructing a Wastewater Garden might be returned over a relatively short period of time if plants grown in the garden can replace a substantial amount of commercial feed. Water hyacinth in particular is known to grow extremely fast in nutrient rich conditions.

Potential Factors That Could Lead To Failure

Potential causes of project failure include:

- * quality of construction;
- * adequacy of maintenance of the garden;
- * viability of the plants grown in the garden as pig feed.
- * Price of pig feed becomes competitive.

The Wastewater Garden technology identified for this project is in successful operation on a number of different types of wastewater in North America, and is based on several decades of research at the University of Toronto. Although it has not been specifically applied to piggery waste, there is no

reason to believe that it would not work. Proper construction and maintenance of the wastewater gardens will be enhanced through the training workshop and oversight of initial construction by the designer/consultant. Care in selecting demonstration locations will also help ensure that conditions facilitate rather than hinder proper maintenance. Some amount of experimentation may be required to come up with a nutritious and appetizing mix of plants grown in the garden for pig feed. However, the selection of plants that are already used in some parts of Micronesia for feed will maximize the chances for early success.

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Resources for Technical Assistance

Since Wastewater Garden is a proprietary technology owned by Sustainable Strategies, Concord, Massachusetts, USA, they or their licensee are required to be the consultant, and a license agreement for use of the technology would have to be negotiated. It is anticipated that this will not present a problem and that agreement can be reached on a reasonable fee.

Isimele Masi - SPC

From: David Del Porto[SMTP:ddelporto@igc.apc.org]
Sent: 12 December 1996 07:37
To: Isimele Masi - SPC (MSMail Noumea)
Cc: carolstein@aol.com
Subject: Mini grant request

Good morning Masi:

I hope you are happy now that you back in New Caledonia.

I hope my report was well received at SPC.

I have a request:

I would like to begin the process of applying for a grant to increase the information on innovative and alternative technology to all health and environment officers in the SPC area. That was my number one recommendation on page 5 of my report.

I would like the first phase of this new project to overlap my Carbusel installation project on Palau in February or March. The agreement with Koror calls for two people, myself and my general manager to perform the tasks.

However, if I could get some funding from the SPC, I would bring my information and communications person and begin the new project by visiting Pohnpei, Yap, Kosrae and Chuuk on the way to Palau.

In this first phase, we would hold meetings with each government and introduce the new innovative and alternative information project and research the various issues relating to developing island nations. A report would be generated as a result of this trip, detailing the exact requirements for the information system and the final schedule and budget for production of that information.

For this extra person, I would estimate \$2,500 air fare, two weeks of \$115/day per diem or \$1,610 and \$200/day consulting or \$2,800 for a total of about \$7,000.00

I would participate in all the meetings and manage this phase of the project for free, as the Palau project is paying me anyway!

What do you think of this concept?

All the best,

David Del Porto