

EASTER ISLAND: ON THE VERGE OF A SECOND ENVIRONMENTAL CATASTROPHE

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I FIRST ARRIVED IN RAPA NUI in September 2004 at the end of a long Pacific reconnaissance. Representing two not-for-profit, non-government organizations with development aid programs to Pacific Islands, I didn't really expect to be of much assistance to Rapa Nui because it is a province of Chile. But the naked hills of Rapa Nui still testify to one the greatest environmental disasters of recorded history so it was impossible to ignore the new but solvable ecological troubles looming over the Island today – such as a continued lack of tree cover, intensive overgrazing and soil degradation, overuse of agricultural chemicals, and the depletion of coastal marine resources. The greatest threat faced by Rapa Nui however, is contamination of the Island's fresh water supply. The implications of losing its drinking water are vertiginous and can be measured by the cost of a purification or desalination plant, water tanks at every home and building, importing water as some islands in the Pacific have had to do in times of drought, the affects on crop production, and in the possible loss of tourism.

The two main sources of pollution are the Orito landfill, which sits directly above the Hanga Roa aquifer, and the near-total absence of water sanitation facilities on the Island causing untreated sewerage to seep into the same aquifer, as well as into other water sources on the Island that lie beneath areas highly frequented by both tourists and locals. With 4,000 permanent residents and an average of 40,000 tourists, this is an immense amount of garbage and raw sewerage being dumped into the 166 square kilometers of Rapa Nui's environment every year. Yet to be measured is the level of chemical fertilizers, herbicides and pesticides filtering into the ground water from both subsistence and commercial agricultural activities.

The Orito Landfill was once an old quarry whose red *pukao hani hani* soil was used to pave the Islands' roads. In 1993, the former Mayor, Alberto Hotu, approved a proposal to fill the resulting crater back up with the Island's wastes. At the time, it was apparently not known to the Mayor that under this quarry lay the four wells that make up the Hanga Roa aquifer. In 1999 the EU donated a baler to the Municipality to compress the wastes so as to maximize space in the landfill. The municipality only began to use the baler in 2004, burying the resulting bales at Orito. The majority of waste today is first taken to "Vai a Ori," private land leased by the municipality, where recyclable wastes are separated from organic waste. What cannot be burned is transported to Orito, baled and buried, and the remainder is incinerated in the open air at "Vai a Ori".

Today more than 1,340 tons of combined general wastes need disposal annually. Added to this are 1,400 tons of green waste and 175 tons of scrap metal. Open-air incineration and baling garbage for burial in landfill is no longer best practice

because of the environmental contamination they cause. Incineration releases carcinogenic and mutagenic dioxins into the air and these are then washed back into the soil and ground water by rainfall, as are toxic chemicals when waste is buried. Emphasis worldwide is now on removing as many recyclables as possible from the waste stream for re-processing, and disposing of remaining non-recyclable wastes in a more safe and responsible manner. Of course, this is more costly at the outset.

When I discovered the extent of the problem I set about working with the Municipality – whose responsibility waste management is – to propose practical and immediate solutions to long term sustainability of the island's Waste Management System and, in so doing, keeping both costs and implementing time down by using existing studies, experience, templates and logic, and working within what was already being done on the island. I therefore solicited assistance from one of Rapa Nui's nearest neighbors. Tahiti has one of the most efficient island waste management programs in the Pacific. Related by blood, culture and language and being just five hours away by plane, Tahiti is in a perfect position to assist Rapa Nui. Thus began the joint program between our organizations, Internationaler Hilfsfonds (Germany), International Help Fund Australia, the Societé Environment Polyneisien (SEP) and the Municipality of Rapa Nui. The following January and February 2005 I returned to Rapa Nui with Guillaume Gay, chief engineer of the SEP, who worked closely with his homologue at the Rapa Nui municipality, Luz Sazzo, studying current waste management practices.

We launched our program with a first delivery of dedicated containers for the storage of car batteries, used motor oil and recreational batteries – flown out graciously by LAN-Chile Airlines – as a concrete solution to the collection and storage of these highly toxic wastes. With this one easy action we removed three contaminants from the waste stream and therefore potentially from Rapa Nui's drinking water. Using a series of existing Tahitian TV commercials we shot the relevant Rapanui components with the two competing Tapati queens, and likewise for the public information brochures and posters that were translated into Rapanui and Spanish. The *moai* face on the recreational battery containers was designed by local artist Petero Pakarati Araki and can be found at the supermarket, pharmacy, airport, hospital and new school.

After Guillaume Gay completed his study, Luz Sazzo then traveled to Tahiti to gain first-hand experience there and to see what can be applied to Rapa Nui. Acting upon Guillaume's advice and training, Luz Sazzo oversaw the cleaning of Rapa Nui's baler and successfully experimented with baling dry recyclables such as paper, plastic and aluminum, in preparation for exportation, as is done in Tahiti.

In May of 2005, we sent Australian specialist from Sims

Pacific Metal, Terry Adams, to compile a similar report of how to treat scrap metal waste on the island. Sims Pacific Metal donated, to the municipality, occupational health and safety gear and a Harris Torch Gun for efficient oxy-cutting of old heavy machinery into smaller pieces for exportation. Old cars, white goods, sheet roofing and other light gauge scrap metal can be crushed with the island's front loader. Both can be shipped back to Chile in outbound containers that are usually empty. Creating an artificial reef with the islands scrap metal has been canvassed. While metal itself is not a pollutant, the risk is more in human error should vehicles, machinery and white goods not be stripped properly of all contaminants. Thus, exportation is preferable.



Petra Campbell stands next to one of the containers for used auto batteries as a Rapanui deposits a dead battery. The containers were flown to the island by LANChile Airlines, *gratis*.

In September 2005, we presented our joint project to the Municipality and the Governor's office. In summary, the program has two stages. The first stage also has two components. The first is to supply all households with home recycling bins for the collection of plastic, bottles, paper, and aluminum. Sorting in the home, as opposed to voluntary disposal points, maximizes collection. The second is a green waste composting program. Off cuts from trees and gardens represent 70% of the waste going into the Orito landfill. While green waste is natural, large quantities of it going into the water supply is toxic. Composting has both the benefits of removing the green matter from Orito and creating carbon nutrients to enrich Rapa Nui's depleted soil. The composting program needs only a grinder to shred bulky vegetation such as tree branches, as the Island has everything else required.

Zero waste is, in theory, achievable the day when everything is made of recyclable material but that is not the case today, so the next stage of the waste management program is to decide on how the unavoidable non-recyclable waste can be disposed of. The alternatives proposed by our program are a sanitary landfill or a medium to high-tech incinerator. In the latter option, a small incinerator is being installed on the Island of Manihi in Tahiti in a location not visible to islanders or visitors, and where prevailing winds are offshore. This

type of technology does require skilled technicians in the operation and maintenance and also still necessitates a small sanitary landfill. The risk with incineration is that while today's level of acceptable dioxins in the environment has decreased by 10 in a decade, who is to say that in another decade it might not be significantly reduced again?

A sanitary landfill is a big basin lined with thick plastic into which is dumped garbage. When full, it is sealed with more plastic. A system of pipes and water purifying stations treat the leachate until it is safe to be released into the environment. Earthquake aside, this system lasts as long as it takes the plastic lining to biodegrade, around 120 years. By that time much of the waste will be inert, but there will still be contamination from substances that take longer than 120 years to degrade, therefore if this system be chosen it could not be put at the Orito Landfill or future generations will be affected. There is also the suggestion of sending waste back to Chile, which has some favor but was not figured in our proposal and requires a feasibility study. It would also mean using the baler in a way that would damage it prematurely while preventing the baling of recyclables.

Solid waste management is not a polemic free task anywhere in the world, but especially so on an island. Authorities concerned have done well with the resources available to them. However, regardless of the option taken, the Orito landfill must be closed to solid waste disposal and rehabilitated so as to protect the Hanga Roa aquifer from continued contamination resulting from past disposal of toxic wastes. If a sanitized landfill is the ultimate choice, a new site of least possible impact needs to be found elsewhere on the island. This raises further questions, most notably where could that site be installed between ownership of land and decision-making of responsible authorities, and where the money is going to come from. Of the 16,600 hectares, 41% is National Park, 27% the Vaitea State-owned ranch, 13% is private property, 1.75% the Mataveru Airport, 0.40% is public buildings. It is the general opinion on the island that neither private Rapanui property or National Park land be touched unless it is imperative, leaving the Island's Development Commission, CODEIPA, to give up part of its state-owned land. The Municipality is considering possibly purchasing the "Vai a Ori." This of course would be dependent on an environmental feasibility study.

More challenging than providing solutions to the removal and storage of recyclables is what to do with them. Only glass, which can be granulated in the Island's rock grinder, can be re-used on Island for drainage material or smelted and used for artistic and income earning purposes. A proposal has come from Hawai'i to this effect. The rest must be exported. In early 2005, Chile did not accept any recyclables from Rapa Nui because they feared importing dengue fever from the eggs of the *Aedes Aegyptis* mosquito.

To sidestep this hopefully temporary impediment, following our joint press conference in Tahiti in February 2005, both the SEP and Alan Scotti of LANChile Airlines came to an agreement to temporarily import Easter Islands scrap electric, electronic goods and recreational batteries, until such time that Chile accepts these from Rapa Nui. In an eventual

plastic shopping bag minimization program for Rapa Nui, even the reusable recyclable plastic bags that would replace or compliment existing bags could be sent back to Tahiti on its way to a recycling market. During a September 2005 meeting with management at the local Cruz Vert pharmacy, management agreed that the pharmacy be the collection point for all used and obsolete medicine for expedition back to Chile along with its own outdated pharmaceuticals.

There are some recent signs of a breakthrough on the exportation front. In late 2005 a small trial was run shredding plastics and sealing them in sewn sacs. However the bails were rejected by Chilean authorities, and Chile incinerated the plastic. Negotiations are still ongoing. On October 4, 2005, Chile's Ministry of Health authorized the return of "low risk" recyclables such as used motor oil, car batteries, wires and cables, metallic and plastic buoys without holes, and with special storage and containerizing provisions. The *Aedes aegyptis* mosquito cannot lay eggs in these products. This still leaves Rapa Nui with its metal, aluminum cans, plastics, paper, and long-term, electronic and electrical scrap.

Tahiti also has dengue fever but it successfully exports its recyclables without exporting dengue fever. This is in part because of the fumigation facilities in importing countries such as New Zealand and Australia both of which have among the strictest quarantine regulations in the world¹. The chemicals used in fumigation kills the eggs on contact, according to Mario Bennet of the Australian Quarantine Inspection Service, who points to Australia's ongoing scrap metal importation: scrap metal is a happy hiding place for the *Aedes* Mosquito. A simple low-cost, low-tech fumigation facility of Australian standards at Viña Del Mar would both protect Chile's own environment and agricultural industry from other invasive species – not just the *Aedes* mosquito – as well as benefiting Rapa Nui. It would be preferable for Rapa Nui not to bring in any more chemicals, and even if they had their own fumigation facility, this is no guarantee that Chile would accept their wastes. We are currently looking at touring some key Chilean Ministry of Health officials through Rapa Nui, Tahiti, Easter Island, and Australia with this as an objective. Fumigation is surprisingly simple: containers are stacked on top of each other at the port and covered with a large hole-free tarpaulin anchored by sand bags. Chemicals are injected inside and the containers are left for 24 hours at the port before being discharged to the customer.

The release of raw untreated sewerage into the Rapa Nui environment is the second major problem threatening the Island's drinking water. A few hotels have septic systems but in general, 95% of toilets on the island are pit latrines. While there are several aquifers on the Island, what remains unclear today is how the aquifers are interconnected. Will the contamination of the Hanga Roa aquifer lead to the contamination of other aquifers it may be connected to? The aquifer at 'Anakena, one of the most visited and used spots on the Island, is now closed because it was contaminated by the pit latrines there. How many more aquifers can the Island afford to pollute?

The Ministry of Health is responsible for controlling the quality of the water; SASIPA is responsible for the supply and sanitation of it, and it is CONAF's job to provide public toilets in the National Parks. To start somewhere and in an effort to do something concrete about this dangerous situation, we invited Enrique Tucki from CONAF to come to Australia to see how our national parks handle wastewater sanitation. In Australia, a great many parks use modern Rotaloo composting toilets: attractive, waterless, odorless, low-tech, highly efficient systems that turn human waste into compost. As a result, we now have an agreement with CONAF to install the Maxi Rotaloo 2000 into the new 'Orongo Visitors Centre and on the right bank of 'Anakena Beach, replacing the existing pit latrine. Rotaloo donated a domestic model for trial that could be a solution for some of the properties on the outskirts of Hanga Roa. We also have a water engineer on standby to conduct a comprehensive independent study and to provide various budgeted solutions to waste water treatment, as we did for solid waste management.

Proper wastewater treatment is relatively new to other Pacific Islands as well, although perhaps the history of Rapa Nui's lack of development in this area is slightly more surprising given the level of development in the rest of Chile. Seventy percent of houses in Rapa Nui were built on subsidies. The subsidy system began in 1987 with the subsidy going to the building contractor who was apparently unable to stretch it to a wastewater treatment, leaving the job to the Island's highly porous volcanic soil. Around 1997, owners started to build their own homes and consequently got the subsidies themselves. But they, like the former contractors, also did not install treatment for household wastewater. Rapanui homes are very modest by anyone's standards, so it is hard to accuse the Rapanui of building larger houses at the expense of their sewerage systems.

In 2004, finally acting on advice from various authorities over the years in regard to the contamination threat to the Island's drinking water supply, the Island's Provincial Government and SASIPA Ltd, brought in experts from Fundación Chile, which proposed individual or shared septic systems for the management of waste water in Hanga Roa.

Under government regulations it was impossible for existing houses that had already received their building/water sanitation subsidy to get a second subsidy for the installation of a septic system when they were supposed have to put one in the first time around. With a little legal maneuvering, a second subsidy of US\$2,000 became available under the Rural Environment Sanitation Program to install septic tanks in old homes. But a difference of opinion between various Island authorities over this plan has hitherto prevented its implementation.

A new "Autoridad Sanitaria" was created by the Chilean Ministry of Health in 2005 with the well-being of the Island's environment at heart. Pit latrines are now prohibited in the construction of new houses. Contractors must install toilets connected to septic tanks or they do not get a compliance certificate from the Ministry of Health. Without a compliance

¹Australia once had Dengue Fever from far northern Queensland down to the Bega Valley on the East Coast, but improved regulation and hygiene, storage and transportation practices have marginalized the *Aedes* mosquito to sparsely inhabited far north Queensland.

certificate, builders do not receive the combined building/water sanitation subsidy of US\$12,750 that is now being issued *after* construction, on the back of a bank loan.

This is well short of ideal and would make Australian health authorities shudder – and fine anyone here who used this system – but it's a start. It is our view and that of a visiting Chilean Ministry of Health Expert in 2005, that should money not be the issue, a proper and mixed sewerage system be installed on the Island, with septic systems or composting toilets in use only on distant properties outside the communal system. This is, of course, much more expensive than the current budget per individual septic system.

This brings us to the next problem: there is currently no adequate process foreseen for the treatment of septic sludge on a wide scale once the septic tanks are full and require emptying. At the moment, sludge from the few properties that have septic systems is collected from one private operator and is being dumped into the environment, untreated.

There is no doubt that, with a full understanding of the real and imminent threat to the sustainability of the Island's environment as these problems present, all authorities concerned would not want to equip the Island pronto with the best possible systems and technologies. Indeed, money is the greatest obstacle. A sanitary landfill of the type we are proposing costs US\$1,100,000; the incinerator US\$1,286,000; and a sewerage system that much again. The Chilean base budget for Rapa Nui, estimated at only US\$7 million, covers everything on the island not earned by islanders from tourism. There are special additional budgets that are used for projects such as renovating Mataveru Airport (\$US1.5 million), a third fire truck for the airport (US\$500,000), paving the road for the still-unfinished new high school that costs US\$1.5 million from previous special funds, the future building of a wharf and a new hospital: all projects of equal importance. The new 'Glosa Insular' or the Autonomous Fund (US\$550,000) is specifically for public service and municipal projects. SASIPA has its own state budget as well as what it earns from income derived from its services.

The Island can also apply for funding from regional accounts on mainland Chile. It would appear that none of these funds are enough to provide Rapa Nui with safe and sustainable waste management or water sanitation facilities.

Added to this, Rapa Nui does not qualify for international funding because, firstly, it is not independent. Other autonomous Pacific Islands have benefited from multi-millions of dollars of development aid funding from international and foreign funding bodies for such projects. Secondly, even though by any international criteria Rapa Nui would be considered 'developing,' it is a state of Chile which, as a whole, has a Human Development Index (HDI) of 37 making it too developed to qualify for international funds where independence is not a criterion: an HDI of over a hundred is the prerequisite this type of funding. Even when there are ways of bending the rules, no foreign government wants to offend Chile by stepping in and doing for Rapa Nui what Chile should be doing for it, especially being a UNESCO listed World Heritage National Park.

Our pursuit for funding and solutions to Rapa Nui's

immediate problems has been relentless but without this usual source of international funds, we are running out of options except to go the international community at large: private foundations, corporate companies, philanthropists – why not Oprah Winfrey and Kevin Costner? – to work with both Chilean and Municipal authorities to help save one of the world's most unique Islands from yet another monumental environmental catastrophe.

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1. US\$25,000 for 1,200 garbage bins for non-recyclable wastes (140L @US\$22.00)
2. US\$16,000 for 2,300 recycling crates, 2 per household @US \$6.00 per crate
3. A green waste shredder, or US\$80,000 to buy one
4. US\$26,000 for 2 industrial Biobins for the rapid composting of organic waste and septic sludge (\$US13,500 per bin).
5. US \$2,000 for a ticket for a water sanitation specialist
6. US \$11,000 for 2 Maxi 2000 Composting Toilets (US\$5,500 each) to be installed in the National Parks.

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