

Improved Waste Management in Kiribati: A Case Study

Background

By the late 1990s Kiribati was in a waste crisis. The primary problem was on South Tarawa, the capital, and home of approximately one half of the country's people. There were no engineered landfills, and litter was extremely common and thick, in all built up areas and surrounding beaches. Piles of waste often remained uncollected in the streets for weeks. Programmes were instituted by the Ministry of Environment, the ADB, and SPREP to turn the situation around. By 2002, a programme called SAPHE¹ was underway, building two landfills, funded through an ADB loan to the Government, and FSP Kiribati had completed a programme called KEEP (Kiribati Environmental Education Programme) which focused on home waste management, and laid the basis for a more integrated approach. The Ministry of Environment coordinated closely with both these projects. Some analysis of these programmes was conducted by SPREP in the report for the WASTE project [Community-Based Waste Management](#).

Feasibility Study

In early 2003 FSPK funded a [feasibility study](#) to investigate how recycling could be improved in Kiribati. At that time about 20% of empty aluminium cans on South Tarawa were collected and crushed for export. The study concluded that a Container Deposit Legislation (CDL) system using a 5c deposit at import, and a 4c refund on return, could achieve the desired outcome. The outstanding 1-cent goes to the operator of the system as a handling fee to ensure the financial viability of the system. The system would require setting up a Materials Recovery Facility (MRF), and would process aluminium cans, PET and HDPE bottles, and lead-acid batteries (at \$5 deposit/refund). The study also identified that diversion of organic wastes from the waste stream, along with recyclable cans and bottles, could lead to a reduction of the existing waste stream of about 75%. The study showed that using a Container Deposit model, a recycling operation could be run as a profit generating business, so that constant injection of funds would not be required. The system as designed also provided that the high value of the aluminium cans could be used to internally subsidise the recycling of less valuable plastics, scrap metals, and lead-acid batteries.

The study identified the potential quantities of recyclable materials available, the costs of collection, processing and export, the value of the materials once exported, and the overall financial viability of the programme proposed.

The study produced an outline plan for a project stretching over two years in three phases, and a budget to implement the whole programme. However, the study did not identify where those funds might come from. Some money remained from the initial study funding of \$15,000, and this was used to hire a local project officer for an initial six months, to commence work, and provide some small funding for activities. This project officer, working around local community groups in the early stages of the project, developed the name *Kaoki Mange!* for the CDL project. The name means 'Return the Rubbish!'

Fund Raising

Funds were sought from the traditional Kiribati donors of Australian Aid and NZ Aid, and also any other possible sources. In May 2003 the Snowy Mountain Engineering Corporation Foundation provided \$4,000 to assist in initial work focused on schools. An Australian agency, the Australian Foundation for Asia Pacific provided \$15,000 to continue the work.

¹ Sanitation And Public Health and Environment.

Proposals were submitted to NZAID and AusAID, and the UNDP. These proposals all produced funding, but not until early 2004. In the meantime, for most of 2003, money was very tight. However, some other projects working on waste were operational and funded², and this led to a cooperative approach. Another aspect of the FSPK programme having to raise funds as it went along was that funding proposals could be produced in the light of experience. This led, in time, to a more responsive project with better targeted funding.

The 'Kiribati Te Boboto' Coalition

There were now three projects working in some part on waste in South Tarawa: the FSPK project Kaoki Mange! the SAPHE Project CDSP³ component, working on public awareness, and the IWPK⁴, which was just rolling out. These three were joined by the Women's organisation AMAK, which was running part of the Kaoki Mange Project directed at improving waste management in the home. The situation of tight funding in some areas and strong planning in others led to the formation of this coalition of projects, where activities were coordinated and implemented cooperatively in areas where they overlapped. This proved to be the greatest strength of the entire effort to improve SMW in Kiribati. The ability to share resources, to brainstorm together, and ensure that common themes ran across several projects, was crucial to the success achieved in Kiribati. In the early stages of this collaboration, sitting around together and brainstorming developed a common slogan: 'Kiribati Te Boboto' (loosely: 'Make Kiribati Beautiful'). This slogan was attached to all efforts to improve SWM in Kiribati, and within about a year had become a part of the language. 'Kiribati Te Boboto' provided simple overall coherence to the various components of the efforts to improve waste management: the introduction of a container deposit system, the introduction of biodegradable garbage bags with regular garbage collection days in different areas, and the efforts to encourage people to utilise organic wastes rather than piling them up in the streets with inorganic wastes awaiting collection for landfill.

The formation of the coalition also allowed coordinated activities to continue even where some projects might have temporary cash flow problems due to funds not arriving in time. These dips in cash flow can usually be predicted in advance, and through very regular meetings and daily coordination of coalition members, the overall programme could be maintained with the focus on the audience – the general public – rather than any internal management issues. This ability was essential when the coalition had big efforts around public holidays and similar such events where many people are collected together and can be reached at once. Also, ongoing publicity work such as radio spots and newspaper adverts were easily maintained, and paid for, on a regular basis through this cost-sharing arrangement.

Another very important aspect of the coalition was that regular meetings took place under one umbrella with the three projects sitting down together in one forum, instead of three different attempts to get stakeholders together. Of course the three projects each had individual implementation plans and objectives, and were not all working on exactly the same thing. But the ability to complement one another was excellent. For example the CDSP had regular monthly meetings with a wide range of stakeholders as part of its planning; the Kaoki Mange! was concerned primarily with recycling, and had a steering committee to set up the recycling system on which the CDSP and IWP sat, along with local businesses, Ministries of Commerce, Finance and Environment; and the IWP had regular access to public awareness professionals, photographers and economists from the Project Coordination Unit at SPREP.. This active working together on projects would amount to the single most important reason for the success of the SWM efforts in Kiribati.

² Community Development and Sustainable Participation project (CDSP), part of the SAPHE program, and the International Waters Programme had chosen waste as its focus in Kiribati.

³ Community Development and Sustainable Participation

⁴ International Waters Programme Kiribati

In addition to the projects detailed above, the coalition was joined by the Kiribati Chamber of Commerce, representing the Business Community, which was a crucial aspect of keeping major players in close consultation. Close cooperation was also maintained with Government Ministries and the two urban councils on South Tarawa.

Three Point Strategy of the Coalition

The Coalition of FSPK, CDSP, AMAK and IWPK developed an overall three-pronged strategy to tackle waste, combining the various aspects of their project programmes. The Three Point strategy was this:

1. Legislate and set up a Container Deposit system – the **Kaoki Mange** - to maximise recovery of drink cans and bottles and so push them out of the waste stream. This part of the program was run by FSPK.

Container Deposit Legislation had already been identified as the most effective way to collect materials for recycling. A recycling operation needed to be set up, equipped to handle the materials collected and the public educated on why such a system was needed, and how to use it.

2. Promote the use of printed biodegradable garbage bags – the **Greenbag** – with clear promotion of what wastes should be put into the bags. This was primarily driven by the IWP.

The 'Greenbag' waste was synonymous with waste to landfill; thus, by detailing what does and does not go into a [Greenbag](#) the landfill waste stream was being analysed and controlled at the level of waste generator. This approach also meant that large organic wastes such as coconut fronds and branches would be pushed out of the collected waste stream as they do not fit in bags. The longer-term aim was turn the garbage bags into a user-pays system where the cost of waste collection was built into the purchase price of the bag, also known as a pre-paid garbage bag.

3. Promote simple composting methods that could utilise those organics, primarily the **Banana Circle** concept. This diversion and use of organics was run primarily by the CDSP. The CDSP ended in October 2004, and this component was continued by the IWP.

The diversion of organic wastes from the waste stream was identified very early as the largest potential waste reduction objective. Diversion of organics would not only decrease volumes of waste to landfill by an easy 50%, but also provide a valuable resource, if utilised, for people to use to grow their own local food (with better nutrition and no packaging). The simple tool to promote organic waste as a resource was the [Banana Circle](#).

Implementation of Kaoki Mange! Recycling System

The benefits of a Container Deposit Legislation system were clear at the outset:

- Operational day to day costs are not a cost of the Government;
- Economic incentive exists to return material for recycling;
- Landfill cost savings are substantial in reduced volumes to landfill;
- Increased cleanliness of the islands and waters, fresh and sea.

Implementation Timeline

The Kaoki Mange project implementation was divided into three phases, as detailed in the original Feasibility Study:

Phase I: Design and develop a public awareness programme promoting recycling, and [CDL](#) in particular; consult with the community and demonstrate community support for CDL; Construct [street recycling collection points](#), and operate a collection and recycling system; obtain a site for a Materials Recovery Facility; raise funding for Phase II.

Phase II: Draft Legislation, set up and equip a Materials Recovery Facility; set up and test a Container Deposit System trial, complete with monitoring systems; operate the system once the CDL passes into law, and oversee a tender process for a contracted private business operation.

Phase III: Handover to a private business, operating under contract to the Government; support that business with technical support for the first six months of operation, and facilitate any problem solving required. A description of exactly *how the CDL system works* is provided.

A spreadsheet used by the Project Officers, showing the various *tasks and their implementation* time is reproduced here; this chart shows actual implementation as opposed to planned. A copy of the planned *Phase II implementation* is provided for comparison, extracted from the UNDP Project Document.

Three Phase Implementation of the Kaoki Mange

Time	Activity
Phase I February 2003	Feasibility study for deposit refund system.
July 2003	Public awareness and CDL promotion programme commences.
June – December 2004	Construction of Phase 1 Recycling Collection Points on the streets of Tarawa. Collection by contracted local company.
Phase II April 2004	Government provides site for Materials Recovery Facility.
April-May 2004	Legislation drafted by Office of the Attorney General with assistance from the project.
October 2004 to Feb 2005	Trial of refund system – at 2c/can funded by UNDP – to clear up existing cans on the island
December 2004	Act passed by Parliament
3 rd February 2005	Act assented, passes into Law
February 2005	New systems at customs incorporating the deposits charged on import – money collected is placed in the Special Fund
February 2005	Advertisements for tenders in all newspapers to operate recycling system
Phase III May 2005	Tender winner – a local business – takes over recycling system operation under contract to Government.
June-Dec 2005	Ongoing support by project to contractor; improvements to scrap metal recycling operations.

Legislation

In December 2004 the Kiribati Parliament passed the Special Fund (Waste Materials Recovery) Act 2004. On the 3rd of February 2005, The President Assented to the Act. The Act has with it a set of Regulations which detail the items that require Deposits to be paid, when they must be paid, how much should be paid, to whom it should be paid, and the rate of Refund of those Deposits. The Regulations also contain the provision, in Part III, for the Republic to appoint a Waste Recovery Operator, to operate the system. Prior to the appointment of the Waste Recovery Operator, the Kaoki Mange project was the *de facto* Waste Recovery Operator, acting on behalf of the Government of Kiribati to pay out on any Refunds as described under the Act and associated Regulations. Once the Act came into force, the Kiribati Customs Service commenced to collect the deposits payable under the Act. The original design of the system and associated legislation had been conducted in close cooperation with the Kiribati Customs Service. The Customs were well prepared for the changes, with new Import Entry forms already drawn up and awaiting use, as they were included in a major Customs Tariff change that was instituted at the same time. Importers had previously been advised during workshops on the new Customs Procedures, that a

deposit on cans, bottles and lead-acid batteries was likely to come into force at the same time as the Tariff changes. Importers were also provided with information sheets detailing common items that would be required to pay a deposit at import.

The legal material comprises:

Special Fund (Waste Material Recovery) Act 2004

The Act set up a framework that allows the Minister of the Environment to charge a deposit on materials when they are imported. The Act set up a Special Fund at the Ministry of Finance into which the deposits are paid, and held whilst awaiting refund. The Act also allows for the Minister to make regulations determining how the deposits are paid back to the people when the materials are returned for recycling. The Act allows the Special Fund to use any excess funds that accrue for other Waste Management purposes. It is expected that 'Unredeemed Deposits' remaining in the Special Fund will slowly accrue to provide capital for recycling equipment replacement over time. These should accumulate, as there will not be a 100% return rate of cans, bottles or batteries.

Deposits Order 2005

This order sets out the deposits that are paid when certain materials are imported – 5c for aluminium cans and PET bottles, and \$5 for lead acid batteries.

Special Fund (Waste Material Recovery) Regulations 2005

This regulation defines the procedure for paying deposits when materials are imported, and also sets out how the refunds are paid to people when material is returned for recycling. The Regulations allow for the Government to enter into an agreement with a private operator to manage the deposits where materials are returned for recycling.

Contract between the Government and a Waste Operator

A private operator was selected through a tender system to ensure that a competent and sufficiently capitalised, operator is running the recycling system. The private operator is responsible for paying out refunds to people who return material for recycling. The private operator is also responsible for exporting recyclable material, and is required to do so; it cannot be dumped. The contract includes the provision, that claims on the Special Fund cannot exceed the amount of money in the fund, thus insulating the Government from potential fraud in the system, and ensuring the contracted operator monitors the system well to avoid non-refundable payouts. The contractor pays out refunds at 4c each on cans and bottles (\$5 on batteries) and then claims the refunds back from the Special Fund at the rate of 5c each for cans and bottles (and \$5 for batteries). This gives the contractor a 1c Handling Fee on each can and bottle, as well as the value of the materials collected.

Private Contractor as 'Waste Recovery Operator'

The Government contracts out the operation of the system to a specified "Waste Recovery Operator". The contractor takes on the legal obligation to pay out on the cans, bottles and batteries presented for deposit refund. The Government, by letting the contract, gives the right to operate the system to the contractor. The contractor can make money by efficient operation of the system. This contract is unusual in that the contract is not won by a price bid. Under the contract, the Government provides equipment with which to conduct the operation, and a Materials Recovery Facility where waste materials are processed. The Government receives waste management services at minimal cost, but at great savings to Government in 'Avoided Landfill Costs' (approx. \$20 saving for each cubic metre of waste kept out of the landfill). Also, intangible benefits of a cleaner environment, less ground water pollution, and improved health clearly result.

The only direct cost to the Government will be the cost of collecting the Deposits at Customs (collected when import duties are paid); and the cost to Ministry of Finance of processing Refund Claims from the Special Fund to the contractor (as allowed under the Act) once a week. These costs are not great, involving no extra positions and little additional workload to existing positions. The Ministry of Environment, the Government contracting party, monitors performance of the contractor. Tenders for the contract were advertised through a conventional Government tender process, and were evaluated by representatives of Government Ministries and the Local Chamber of Commerce representative, with technical advice provided by Project Staff.

Materials Recovery Facility

In April 2004 Cabinet approved the setting up of a Materials Recovery Facility (MRF) in the area next to the port, occupied at that time by Dai Nippon Construction during their work on the SAPHE project. This allocation was made on the understanding that should a fish processing plant – or some other requirement – be made on that land, the MRF would move to an alternate location. The setting up of the MRF was an essential component of a recycling system for Kiribati. The Kaoki Mange started work storing recycled materials in the MRF in May 2004, and Dai Nippon left the area in June 2004 at the end of their SAPHE works. The yard area was approximately 90m by 75m, and was plenty big enough to manoeuvre container trucks and place shipping containers on the ground. It had a derelict portable building that was refurbished by the project as *an office*, and a simple *open-ended shed* was erected to provide cover for machinery and workers from rain and sun. Before the shed arrived, two shipping containers were parked together and a *simple roof* made across the gap. The MRF was next door to the Kiribati Port Authority container wharf, and so materials collected from around the islands required very little additional movement to get them to the wharf for export. Containers were packed in the yard.

The MRF started crushing cans in early August, 2004 once electrical power was connected. In October 2004 the Project started a trial of the Container Deposit system where cans and plastic bottles were purchased at 2 cents each. The purpose of this trial was to develop the refund side of a Container Deposit system, and ensure that when a full, legislated system came into place that it would operate smoothly. The trials also provided hard information concerning the income and expenses of a recycling operation, and also were instrumental in removing the existing can litter from the streets of South Tarawa. Five shipping containers were purchased and converted in the yard by recycling system staff and other contracted labour, into *Collection Points* and placed around South Tarawa for better access of the population.

All the equipment and infrastructure built through funds provided by the various donors who have participated in the project is provided for the use of, and maintained by, the Contractor. The equipment comprised: a 2 ton truck, a computer, printer and photocopier, a portable office building, a half-round shed, five converted shipping containers, two presses (for cans and plastics/cardboard), two water tanks, various hand tools, steel frames, and woosacks. All equipment remains the property of the Government of Kiribati. The contractor wins the right to use the equipment to operate the system, but takes on the responsibility to maintain the equipment and replace consumable items on an ongoing basis as required to operate the system. With regard to the provision, maintenance and replacement of equipment the contract contains clauses which detail:

- That equipment must be returned in reasonable working condition at the end of the contract, or replaced to similar specification;
- That the truck must be fully comprehensively insured;
- That the contractor maintain equipment in good working order with regular service intervals for the truck as specified by the manufacturer;
- An allowance for normal wear and tear.

During the period of the system being run by the Kaoki Mange Project, all workers in the MRF and at the collection points were employed by a local business operating under contract

to the Project. This arrangement allowed flexibility on the part of the Project Management agency, FSPK, as these workers were not FSPK staff. Up to 12 positions existed, including: foreman, truck driver, yard labourers, collection point operators, data entry/office administration, and night watchman. The MRF manager was the FSPK project coordinator until the contract was awarded to a private business. All staff employed in the recycling system passed into the employment of the new Waste Recovery Operator at point of handover. The annual wage bill, excluding the management position, was of the order of A\$75,000 per annum. Wages were based on Government pay scales for similar positions, providing what were, locally, well paid positions.

Refund System Trial

A crucial part of implementing a CDL system is to trial the refund side of that system. In Kiribati, a large quantity of can and bottle litter existed which would never have had deposits paid on it. Once a CDL system comes into force, it is not realistic to exclude all those cans and bottles that came in before the system started. Cans and bottles often have manufacture dates on them, or use-by dates, and these can be used to some extent to sort items out, but this is not really practicable. Where there is little litter, and where garbage is regularly collected to landfill, this issue is not so important as there are not a significant number of cans and bottles in circulation at any time. In Kiribati this was not the case. Thus the trial had two purposes:

- Test the refund system, and ensure that a sound monitoring system was in place that would cut down on potential fraud (cans being refunded twice);
- Remove existing litter prior to the full refund coming into operation.

These objectives were achieved by paying a 2c refund for aluminium cans and PET and HDPE bottles bought in for refund. This sent unemployed individuals and children out scouring the streets and beaches for cans and bottles. (One thing learnt quickly was that refunds should not be paid to school-age children during school hours, so that there was no incentive to not attend school, and this became system policy.) The 2c refund had been planned and budgeted for in the Project document for Phase II, with A\$30,000 being set aside to buy 1.5 million items. Much of these were aluminium cans which filled two containers of about 10 mt each, with a value of A\$27,000 (less costs of collection and shipping). This money came back into project funds. Thus the Trial funds were not entirely a cost. The trial allowed testing of the proposed accounting system, and problems over monitoring and tracking items in the system were resolved and tested prior to a mandated legal system coming into force. Once the Act was assented, and came into law, the transition to a 4c refund was a simple step. Also, during the trial it became apparent that to deal with HDPE in the CDL system would be difficult (the primary problem being identification at import, and also at refund to some extent), so HDPE was dropped. HDPE numbers were very small, and so this did not have a big impact. HDPE was still accepted for recycling, if brought in free, and was shipped in bales with PET. However, of note is that [inspection of water pools in the landfills](#) showed HDPE bottles being predominant in landfill waste as the PET was no longer going to landfill.

Battery Recycling

The Kaoki Mange Project steering committee approached the Kiribati Solar Energy Company (SEC) in October 2003 regarding the possible participation of the current SEC EU-funded programme of outer island solarisation in a deposit driven battery recycling scheme. The SEC enthusiastically joined with the project to bring this to fruition. In February 2004 all local importers of lead-acid batteries were consulted over the implementation of a deposit system for the recovery of batteries from the waste stream. During the following months, the project worked closely with the Kiribati Customs Service to develop the required system to levy the prescribed deposits at import; a new import form was drawn up, with boxes to note deposits required and paid. Battery recycling commenced in February 2005, with \$5 paid for any reasonably clean and complete lead-acid battery presented for refund, of any size, wet or

gel-cell. Lead-acid batteries can be recycled in this system as they do not comprise the primary activity of the business, and so can be handled at marginal cost along side the much higher volume beverage containers.

Batteries are comparatively long-lived, and there were many discarded batteries on South Tarawa already; it is not realistically possible to ensure that only batteries that paid the deposit get a refund. At \$5 each the refunds can amount to a significant sum, so it is very important to ensure that the Special Fund (a rolling fund) is sufficiently capitalised to absorb the shock of the initial run of many batteries. To assist in this, the Kaoki Mange Project capitalised the Special Fund – through not claiming money that the project paid out as refunds – to the tune of \$15,000.

Car Recycling

The Project coordinated with the Ministry of Environment and Ministry of Commerce during the last quarter of 2004 in order to commence recycling of vehicles. This built on earlier work by the Kaoki Mange in March 2004 that had investigated the [recycling potential of car](#) wrecking. The legislation to recover beverage containers and lead-acid batteries could also be used to recover and recycle cars, if the Government so desired, by adding to the regulations to include a deposit on cars (or fridges, air-conditioners, computers...).

Vehicles were processed to recover any useful materials; glass was removed from windows, and the plastic parts of the vehicles were sorted and stored where recyclable. Materials that should go to landfill were removed and sent to landfill. An M.O.U. was drawn up with Dai Nippon Construction, which agreed that the Project would take scrap metal from Dai Nippon in return for Dai Nippon providing use of one of its crane trucks for collection of dumped vehicles around South Tarawa, particularly those that are a pollution hazard in housing areas. Other businesses with quantities of scrap vehicles also found the MRF car recycling area very useful to relieve pressure on their yards. This also had the effect of making widely available, useful parts and materials that had previously been stockpiled in business yards. People regularly came to pick over the wrecks for spare parts. This was allowed at no charge and no cost to the Project was involved. The scrap metal provided a very useful resource to panel beaters, fabricators, repairers and even the general public looking for materials such as bits of reinforcing steel for pig pens. This reuse aspect of the metals and spares was most satisfying, as reuse is far more efficient than shipping offshore for true recycling. Automotive students from the Tarawa Technical Institute came every Wednesday for practical classes, and learnt how to remove and strip engines and gearboxes.

Project Management

To oversee the implementation of Phases II and III of the project, the setting up of a commercial-scale recycling operation, a steering committee called the Solid Waste Recycling Committee (SWRC) was set up in September 2003. A Ministry of Commerce representative chaired this committee, with representation from Ministry of Environment (Vice Chair), Kiribati Chamber of Commerce, FSP, CDSP, SAPHE and Ministry of Finance representatives. The Committee met on a monthly basis, and served the project until completion. This regular forum allowed close cooperation with the key stakeholders, and avoided many problems that can arise when some stakeholders are not kept informed. Where stakeholders had a passing interest in some aspect of the work, the SWRC provided a forum to include those representatives until they no longer felt the need to remain closely involved. The SWRC also ensured that a strong link through Government Ministries to Cabinet was maintained, which was very important as at several points in the project implementation, papers were required for Cabinet perusal, and decisions were required from Cabinet. Clearly, any project based on introducing new laws cannot hope to succeed without very close cooperation with the highest levels of Government. A vital part of such cooperation is ensuring that high-level Government officials are adequately briefed by their staff on the project activities and plans, the benefits to the nation of full implementation, and the constancy of project aims and objectives with

existing Government plans. Lastly, it is vital that politicians see the political benefits in the improved living conditions of their constituents, and that their constituents' approval is communicated to the politicians, especially if sectional interests are lobbying against implementation.

Financial Management

Financial management was conducted with a dedicated bank account that only held project funds dedicated to the Kaoki Mange. This allowed a simple accounting regime, with all payments from the account only occurring through cheques requiring two signatures (four people were able to sign cheques, but only two were required for any cheque). A set of guidelines was drawn up for operation of the account. Good accounting is essential; a project of this nature, operating essentially as a business once the CDL system was in place, must be able to generate sound financial reports at any time. This is particularly important where donor funds come on a quarterly basis, and release of next quarter funds is relying on a financial report of the last quarter spending. Use of accounting software such as MYOB is very useful in this situation, and allows up-to-date financial reports to be generated at any time. Funding requests for the next quarter Project funds were made that allowed sufficient buffer to allow for delays in funds reaching the Project Account.

Even so, the Project came perilously close to running out of cash on about three occasions. Operation of the system was a challenging process, as it required major cash-flow management, requiring weekly expenditures of cash in excess of A\$8,000 some weeks. By early April 2005 the Project had received the last of its donor funds under the UNDP project, and was required to operate on its income generated. The project was receiving income of 1c per can and bottle processed, except that some of that income had to remain in the Special Fund in order to capitalise the fund to create the necessary buffer for a rolling fund to operate. The Special Fund had received no initial capitalisation, and in hindsight, some initial funds to ensure the rolling fund was immediately operational should have been made (this point should be carefully noted by anyone planning to implement a CDL system along these lines). Also, considerable delays exist, in that cans refunded and packed and exported receive no income from overseas for several months after first refund. There is also the problem in the early stages of the refund system: cans and bottles returned will be in excess of the deposits paid, and this will put the refund side under great pressure. The initial trial conducted at 2c for each can and bottle, rather than the full refund, was critical.. In areas with significant litter problems the removal of existing litter is very important prior to implementing a full system.

Another problem that required financial acrobatics was that the Project itself was operating as a business, and businesses should have capital to draw from. The Project had no capital allowance, and effectively 'borrowed' from budget lines for activities that had not yet taken place. This point is very important for future designers of a CDL implementation plan: make sure that either the plan contains some element of capital funds from which to draw (although this can be very difficult with conventional donor arrangements), or that there are sufficient funds made available for future activities that can then provide the effective capital pool to draw from. A development project cannot usually borrow money from a bank. One approach that could be taken would be to use funds earmarked for other projects that might be in the same account; however, this approach is very dangerous as cash-flow problems in the CDL implementation could cause cash-flow problems throughout an agency's entire project portfolio, and even impact on daily administrative operations. For these reasons, it is highly inadvisable to operate funds implementing a CDL based refund system alongside funds earmarked for other projects, and this should be avoided at all costs.

Media Activities

Extensive use was made of local media available in Kiribati. Radio spots were made by the project, and newspaper adverts produced and placed in each of the three available newspapers. All these materials were produced either by project staff or with assistance of local skilled individuals, who were paid for their contributions. Radio spots and newspaper adverts were changed regularly to keep them fresh and relevant. Extensive use was also made of a local theatre group, *Te Toamatoa* who produced two plays during the course of the project. The use of a play was very effective in two key areas of public work: presentations to schools and community groups; and at large public gatherings, such as Independence Day celebrations, where many *hundreds of people might see a single performance*. See the section on *Media Campaigning* for details of using these kinds of tools.

Monitoring, Evaluation and Reporting

The project worked in three-month planning cycles, within the overall project documents on which funding was raised. This three month process allowed project staff to regularly evaluate actual activities against planned activities; this then allowed better planning for the next three month period, with activities and goals remaining realistic and achievable. This proved to be a very useful motivational tool to keep staff orientated towards the overall goals. An example of a *Planned Implementation* sheet against an *Actual Implementation* sheet is provided. Also, planned activities that might prove to be unnecessary or unrealistic could be appraised and plans adjusted to suit. This process was conducted using a simple spreadsheet arrangement of months against activities, each one a three-month sheet. By producing two such sheets for each quarter, one of the planned activities produced at the start of the quarter, and one showing actual activities at the end of the quarter, a very clear picture is built up over time of how implementation is actually progressing. In projects that are working across two or three years this kind of exercise is very useful to keep the project activities on track.

Quarterly reports were also produced every three months. Four-page *Annual Reports* were produced annually, for general release as a way of keeping donors – past and present – up to date on the project. The project also produced a *Newsletter* during Phases II and III as a means of keeping other organisations and people in the region updated on activities. This Newsletter also proved a useful media tool and lead to some media stories on the project.

It should be noted that this project arose from the grassroots, from the clear expressed desire of the community - through FSP Kiribati and its daily interaction with the community - for improved solid waste management. This aspect of the project coming into being via community initiative rather than being handed down from a regional institution as a ready-made project is rather unusual. It is also unusual as far as UNDP is concerned in that it was implemented through an NGO. The validity of this approach is explicit in the results achieved. In the formulation stage presentations were made to a variety of groups and Maneabas, and the proposed system explained. Participants were then asked if they felt that this was a viable option to Kiribati waste problems and invited to write a short letter of support. A large number of these letters were written by different groups and provided a clear bedrock of support for anyone who questioned the community acceptance of the overall concept.

The Greenbag

The coalition had become aware of a system used by some New Zealand Local Governments that utilised a specific, locally purchased garbage bag for their waste collections. This system meant that the cost of the waste collection was attached to the bag at time of purchase, and so, any bag put on the street for collection had already had the cost of collection paid.

Promoting Acceptance of the Green Bag

The Greenbags were first promoted by FSPK/CDSP to the population of South Tarawa in September 2003, once a shipment of 10,000 bags had been received from NZ. The aim from the beginning was that by getting people to use garbage bags, some of the large organic waste that was being picked up by the councils could be pushed out of the waste stream. This potential was graphically demonstrated at a workshop with the TUC garbage collectors in November 2003, when a typical pile of waste near the TUC office was separated out into plastic bottles and aluminium cans, organic (Green Waste), and other inorganic waste (for landfill). A large pile of waste that might take 15 minutes for the collectors to pick up was converted into two bags of inorganic waste in garbage bags, which could be picked up in seconds. This was a demonstration of the three-stream strategy being formulated and promoted at that time by the coalition. Greenbags were distributed free from FSPK and the CDSP offices, and also through women's Non-Government Organisation (NGO) AMAK and the TUC offices and local Councillors.

More bags were imported in 2004, and as the Kaoki Mange recycling system was established and satellite Collection Points also distributing bags, the Greenbags were distributed widely. The Greenbag was incorporated into the Waste Play performed by Te Toamatoa theatre group, and *Te Kiriin Baeki* became part of the language. Te Toamatoa visited all South Tarawa schools with the play, many twice, and each time a box of 250 Greenbags would be delivered for school use and distribution after the performance.

Developing the Greenbag User- Pays Scheme

The International Waters Programme took over the promotion and development of the Green Bag as a major part of its strategy, and commenced selling Greenbags through local NGOs and stores in May 2005 at a price of 20c each.

The 20c each bag price was useful as a leader to move the population to the idea of purchasing Greenbags for waste collection (plastic shopping bags are typically 20c on South Tarawa). With the costs of importing and distributing Greenbags a retail price of 50c will be required to generate sufficient funds to replace the Council's Household Waste Collection Charge, and in effect, ensure full local government participation. Once people can easily access Greenbags, and once the benefits have spread across the TUC area, the price needs to be lifted incrementally to 50c. To do this, the new importer/distributor and the councils must coordinate efforts. The landed cost of a bag is about 14c, whilst both the importer/distributor and the retailer need to make 5c each on a bag, giving a total retail cost price of 24c. This would allow a 26c collection fee to be directed to the council from each bag. (At the time of writing the programme is still underway.)

An arrangement was made whereby a local grocery wholesaler, BKL Ltd. would distribute Greenbags to the small stores strung across South Tarawa. At 50c each retail price, BKL indicated that 5c each mark-up for them, with 5c each mark-up for the stores, would provide a pricing structure that they felt would be acceptable to all parties, given their experience in the retail/wholesale business in Kiribati. BKL could be the importer of Greenbags. This approach would remove IWPK from any logistical involvement in the programme, and also allow a potential 26 cents to be sent direct to the Councils from BKL. In this way IWPK facilitates the program into operation, and then steps back, as it should.

It is to be expected that if the people buy the Greenbags, but the Council do not collect them, then people will stop buying Greenbags, which will decrease Council income. This longer-term effect should mitigate any potential short-term disincentives that might exist that may discourage the Council from picking up Greenbags. It is hoped that when the population finds that Greenbags are an effective, cheap, solution to their waste problems, and people come to appreciate the cleaner surroundings, more waste will end up in Greenbags, so increasing sales, and thus revenue to the Councils. This increase in revenue to Council would be dependant on Council picking up Greenbags.

Overall, some 147,000 Greenbags had been imported into Kiribati by the end of 2005, and virtually all of these have been used in South Tarawa

It can be clearly seen that the Greenbag programme is having a very marked effect on the waste going to landfill in South Tarawa. The actual impact is measurable at the landfill, and the potential financial advantages are great, both in savings in landfill costs, but also in providing much needed resources to improve waste collections in South Tarawa. [A survey](#) of the Nanikai landfill in December 2005 showed that use of the Greenbag had pushed organic waste levels down to 1-2%, with the vast majority of Greenbags having zero organic content.

Early Media Promotion

The Greenbag was first promoted by the coalition through A4 adverts stuck on shop doors and other public noticeboards, and through adverts in the newspapers and on the radio. This wider programme of promoting the Greenbag commenced in April 2004, as funds became available for this work. This blanket exposure approach has resulted in the term 'Greenbag' becoming ubiquitous in Tarawa, and it is hard to find someone who does not know the term. The IWPK has continued this use of media and radio, with extensive exposure of the Greenbag in both media. The IWPK has also pioneered new ways of promoting the Greenbags. Also, the SAPHE landfill project had **Use the Greenbag** Printed on the side of the new [garbage collection trucks](#).

Use of Media by IWPK for Greenbag Promotion

The IWPK conducted a major media push during 2005 to promote the Greenbag. Half of the project expenditures were going on public communications work by late 2005. A journalist with experience of print and radio was hired on a short-term contract to assist in this work. Two songs were recorded and regularly played on the radio, using both stations, AM and FM.

The Project also used posters to good effect. The poster art has grown through an evolution of four different designs and messages that has taken place over more than a year. Posters got to the point where a locally designed high quality artistic product was produced, printed in Fiji. Many projects suffer from attempting to print a beautiful poster early on in their projects, only to find that experience would have had them do it differently later. The IWPK team have taken on board very well the lesson of their Social Marketing exercises of 2004, and developed and tested their messaging carefully, building their experience as they went.

Local Council Acceptance of the Greenbag

The user-pays arrangement was familiar to Tarawa Councils through the ongoing contact between Local Government and the Kiribati Te Boboto Coalition; indeed, Council representatives had attended most working group sessions of the CDSP programme, where the Greenbag idea was developed. FSPK and the CDSP held several workshops with Council garbage workers and management staff during 2004. Thus the underlying concepts behind the Greenbag, and the overall intended direction of moving to a user-pays system was very familiar to the council workers and management by the end of 2004. This acceptance was demonstrated by the readiness of the Councils to encourage Greenbag use by designating Tuesdays and Thursdays as Greenbag Collection Days.

Towards the end of 2004 and in early 2005 a strong flow of Greenbags were available as funds were channelled into Greenbag purchases. On the ground, the effect of the freely available bags was really showing up in positive impacts around South Tarawa, with piles of uncontained rubbish rapidly decreasing. This Greenbag activity coincided with the introduction of the full Container Deposit based recycling system, and this too removed a large quantity of cans and PET bottles from the streets and lands of South Tarawa.

IWPK Promotional Competitions

The IWPK used the tool of competition to promote to households the Greenbag and improved waste management. Previously, The Kiribati Te Boboto coalition had run a Tarawa Tidy Towns contest around Christmas 2003, which had been effective in promoting a general clean-up, and this had used free Greenbags as an incentive.

From October to December 2004 the IWPK ran the Akeatemange (Zero Waste) Competition in the IWPK Pilot Area. This competition encouraged people to separate wastes into recyclable, organic and landfill. Organics were directed to Banana Circles, the recyclables to the Kaoki Mange, which had recently opened the Materials Recovery Facility, and other materials into the Greenbags. This competition was primarily aimed to get people to look at what was in their waste stream, and start identification and separation of wastes. The Greenbag was only a single component of this competition, and the emphasis was on the Banana Circles and the recyclables as identifiable resources in the waste stream. Prizes were given for the best household waste management, and this included things like use of wastewater and organics use for compost and gardening.

As the Akeatemange Competition finished in December, it became clear from roadside monitoring that Greenbag use was dropping off. So the Local Project Committee (LPC) in the Pilot Area, and IWPK, decided to hold another competition in February, targeted solely at Greenbags. Part of the aim was also to conduct a big clean up of the Pilot Area, so as to give the whole community a sense of real achievement, and create a benchmark that could be maintained for the future. The objectives of the Greenbag Competition were:

- To promote the use of Greenbags for the safe collection and disposal of inorganic rubbish;
- To clean up Bikenibeu West and give the area good 'facelift';
- To drive the people of Bikenibeu West to collect inorganic rubbish beyond their household boundary, in the streets, on the beaches and the informal rubbish dumps;
- To ensure the message on the use of Greenbag is retained in people's minds, i.e. "for Kiribati Te Boboto, use the Greenbags for unusable rubbish"

This competition collected 2,333 Greenbags in ten days from February 14th to 24th. A total weight of around 14 tonnes of waste was collected, with 47 households participating, each household producing an average of fifty Greenbags. The effort was also measured by community grouping, mostly along religious lines, so that individual household amounts also counted in group totals. The collection system provided by the TUC was overwhelmed by this competition.

Organic Waste Diversion: Banana Circles

To encourage people to separate out their organic wastes, there needed to be an incentive. In most places in Kiribati it is hard to grow bananas, and where they do grow, they may be hard to fruit. Kiribati Te Boboto promoted the concept of the Banana Circle in order to provide an incentive for people to use their organic wastes close to their homes: to see their organic waste as a resource.

A Banana Circle is simply a hemispherical pit lined with flattened cardboard boxes, filled with organic waste, and with bananas planted around the edge of the pit. The rain flows down through the organics, makes the cardboard wet, which then forms a carpet under the organics and moisture barrier, so stopping all the water run away too fast in the very porous soil of an atoll. The banana roots grow along the cardboard carpet and into the organic material, which composts and feeds the bananas. The bananas then grow and fruit much better. All organic sweepings up from around the house, as well as any household organic wastes, can be put in the Banana Circle. Pawpaws can be grown instead of bananas, or even some other plants, but pawpaws and bananas cannot be grown around the same circle as they compete.

The Banana Circle thus provides an incentive – fruit – for people to separate out their organic wastes. The idea even builds on an existing traditional behaviour on atolls which is to sweep up the leaves every day from around the house, and sweep them either into a pit, which subsequently has a tree planted on it once it is full, or sweep the leaves around the base of an existing large fruit tree, usually a breadfruit.

The Banana Circle was promoted through workshops – using demonstrations – and also through the media of radio and newspapers. In 2004, in conjunction with CDSP, the project paid for a *centre page double spread* in each of the three newspapers, so that the centre pages effectively could be pulled out and used as a poster. The IWP has taken the programme further, by printing and distributing a colour poster of how to make a Banana Circle, using the picture developed by the Kaoki Mange Project, and has also commissioned, and regularly played on the radio, a Banana Circle Song, which describes, during the song, the steps required to build a Banana Circle.

Banana Circles have become ubiquitous in Tarawa, and are widely reported in the outer islands too, where they have become very popular as a means to encourage fruit trees.

Impact of these Measures on Waste Generation and Nanikai Landfill

The Nanikai Landfill, one of two engineered landfills in South Tarawa open in 2005, was surveyed and data regarding the quantity and characterisation of waste going to landfill collected. This process was conducted in May and December 2005 in order to try and gain some information regarding the changes in waste to landfill that the above measures had achieved. This could also be compared with the waste surveys from 2004 and 2000 and also some analysis and photos from Nanikai produced over the life of the landfill. This material provides excellent reference material so that actual changes and progress can be clearly measured. This information comprised part of a report from IWPK on the impact of the Greenbag on South Tarawa, completed in January 2006.

The Nanikai Landfill has been open for a year and a half, and during that time, by far the greater part of the waste disposed there has been from Greenbags, as the TUC – who operates the landfill – has used it almost exclusively for disposal of Greenbags collected, and access has been closely controlled during most of that time, preventing other dumping.

The findings were primarily:

- The household waste to landfill has dropped around 60% in about two years, through the removal of organics and recyclables;
- The organic content of Greenbags is at a residual level, of about 1% organics in bags (previously around 50% of the waste stream);
- Recyclable materials content (that of items recyclable in Tarawa under the Kaoki Mange) is under 1% (previously this was around 10% of the waste stream).
- Use of the Greenbags has the potential to save 60% of Landfill space, that is up to A\$100,000 per year in landfill Avoided Costs, if all waste was collected and used Greenbags;
- The two TUC blue garbage trucks have sufficient capacity to collect all the Greenbags produced by the population of the TUC area, should all household waste be in Greenbags;
- The average weight of a Greenbag is 5kg each;
- The Greenbag system has already saved at least \$14,000 in landfill space through waste reduction;
- Comparison with historical data indicates continual improvement in waste reduction;
- Composition of Greenbags studied indicates a growing awareness by the public of the materials in the household wastes stream; this is a direct result of the public education

programme which the Kaoki Mange Project initiated in partnership with the CDSP, AMAK and the IWP back in 2003.

In early 2006 an analysis of the material flows through the Kaoki Mange system during 2005 was conducted, and these numbers were compared with the import data for the relevant materials, namely aluminium drink cans, PET bottles, and lead acid batteries. Whilst numbers of cans, bottles and batteries moving through the refund system are well monitored, Customs data is collected in litres for drinks, and so requires estimations, especially as not all drink containers are in the same sizes. With that caveat, this analysis showed that:

- Aluminium can recycling had gone from around 25% in 2003 to 90% in 2005;
- PET recycling had gone from 0% in 2003 to 90% in 2006;
- Lead-acid batteries recovered during 2005 represented about three years total imports into Kiribati.

When combined with the information from the landfill survey, it is very clear that the measures instituted during the three years 2003 – 2005 have had a dramatic effect on waste on South Tarawa.

Final Evaluation

The IWPK program working with Greenbags is still ongoing at the time of writing; however, at the end of the Kaoki Mange project, in the *Final Report for UNDP*, the project aims and objectives were evaluated against the actual outcomes, as summarised below. This brief evaluation effectively includes the impact of all three parts of the overall SWM program of the Kiribati Te Boboto Coalition on the waste situation in Kiribati.

Overall Desired Outcome:

Access to services – improved access to essential services [solid waste services] and improving the ability of Kiribati to deal with environmental vulnerability [water and land pollution caused by uncollected and uncontained wastes].

Expected Outcomes and Indicators

- **Outcome 1:** A broad-based consultative and coordinating solution to deal with the environmental issues developed and implemented.
- **Indicator :** Development, passage and enactment of legislations, regulations and contracts related to waste recycling in Kiribati.

Actual Indicator: The Waste Materials (Recovery) Act was passed in December 2004 by the Kiribati National Parliament, and the Act and associated regulations came into force on February 3rd 2005. A contract to operate the Container Deposit system, with a privatised 'Waste Operator' came into operation on May 27th 2005, at which point the project ceased to operate the can and bottle recycling system.

- **Outcome 2:** Reduced land and sea pollution.
- **Indicator :** Pre and Post Project Photos.

Actual Indicator: [See Photos](#)

- **Outcome 3:** Increase useful life of landfills on South Tarawa.
- **Indicator:** Useful life of landfills increased by at least 50% over current projections.

Actual Indicator: Measurements of the landfill in December 2005 indicate that waste has been reduced by 60% over the quantities measured in a waste survey in March 2004. Recyclable aluminium cans and PET bottles in the landfill wastes stream have been reduced to a residual 1%

Conclusion

The partnership with other development projects of other institutions in Kiribati: Government, NGO and Private Sector, was a crucial and defining element of the successes achieved.

The results speak for themselves. In Kiribati ten full-time jobs have been created on South Tarawa as a direct result of Container Deposit Legislation (CDL), with an estimated 30 people deriving their main source of income from can and bottle collection through their own efforts. With only around 3,000 people having cash employment in Kiribati outside of the Government, that represents something like 1% of non-government employment. Also, the value of recycled materials exported from Kiribati per year is around \$100,000 per year, in a country with an export income of about A\$13 million (2002), that equates to about three quarters of one per cent of annual exports (0.77%) through exporting what was before just rubbish! The system could easily be replicated throughout the Pacific providing high quality recycled material for remanufacture, as well as stable local jobs.

It can be seen that all the hard work detailed above produced some very real results. If there are simple lessons to be drawn, they might be:

- Work together and the result will be greater than the sum of the parts;
- Don't be afraid to take on big problems – persistence will always win;
- Plan well, but be prepared to change your plans if you see you got it wrong.
- Don't listen to the people who tell you that 'it can't be done', because it *can* be done!