

Discussion paper

Waste Management on Atolls

Atolls represent a special challenge for waste managers. The lack of physical space, the very porous substrate of coral, the use of the groundwater and the excessive quantities of packaging arising from imported goods all make disposal in sanitary landfills problematic. Sometimes, goods that have already been substantially exhausted, such as older cars, are imported due to their lower purchase price for the consumer but a high and unfunded cost for government in disposal. However, the shortened usable life only places more pressure and cost on the resultant waste disposal. The lack of financial resources and technical capacity also reduces the application of incineration as a viable disposal option. This issue with disposal forces atolls to concentrate on minimizing waste as a focus for an integrated cost-effective management strategy.

Car Bodies
Some countries are using car bodies for land reclamation but eventual corrosion means this “land” will be unstable and erosion prone.

Which Wastes?

Some wastes have a far greater impact on atolls than others. Hazardous wastes (Persistent Organic Pollutants) such as pesticides or used motor oils can be impossible to retrieve once released into the environment and with consequences far in excess of their physical volumes.

POPs in PICTs
This successful recovery program has eliminated the legacy volumes of liquid hazardous wastes but on-going management is required for all the new chemicals being imported onto atolls.

Bulky wastes such as car bodies or tyres, while far less polluting, can be a problem just from their size. Disposable nappies can lead to water contamination when animals scatter the lining around settlements. Plastic bags can discourage tourism, kill marine life and reduce the amenity of the residents. Waste managers on atolls would be sensible to prioritise the minimization of these types of goods depending on their particular circumstance. Wastes, that are both easy to reduce and highly visible, can be a good starting point to build community confidence and political momentum.

How to minimize?

Atolls usually have very limited import points & controls at Customs are relatively cost-effective. Controls can take the form of outright bans, import taxes to discourage purchase, bonds to encourage repatriation or export when the goods have completed their useful life, levies to fund the costs of export & disposal, or laws requiring a waste management mechanism BEFORE the goods can legally enter onto the country. The most appropriate mechanism will depend on issues such as urgency, strength of existing institutions controlling imports onto the atoll, & attitude of other government agencies.

Any economic instruments will need some careful quantification of the costs of the intended consequence and of the administrative cost of enforcing the controls. For example, if a bond is placed on an imported car that is recoverable on export of the body, how will the bond be charged, where will the funds be securely held, how will export be verified. There may have to be extra customs officers, new computer systems & the bond will need to be high enough to ensure that importers don't simply forfeit & leave the car on the atoll. Other mechanisms such as refundable deposit schemes on bottles & other packaging can minimize those wastes.

Container Deposit
Kiribati has a 5c levy on cans & PET bottles – 4c is refundable to encourage collection, 1c goes to administer the scheme. This encourages refillable bottles and can fund export of the plastic for recycling.

The politics of outright bans are often very difficult. There are sometimes international trade agreements, consumer pressure and strong vested interests who may oppose such a ban. It is wise to consider very extensive consultation and transitional provisions to soften the effects.

Some success can be made with voluntary agreements with high volume importers. Changes to transport packaging, back-loading or even an approved waste management plan can be negotiated as part of an import licence or in return for some publicity about the environmental responsibility of the product. Voluntary agreements can be cheap, quick & provide industry a chance to fix up their own problems without government interference. Some agreements have been made subject to acceptable outcomes – in other words, if the voluntary way is not sufficiently successful, governments then have a clear rationale for regulation or taxation.

Organic Wastes

Waste characterization surveys have shown that organic wastes on Pacific Islands are usually well over 50% of the disposed waste and often even higher if paper and cardboard are included. Burying this material in a landfill only increases dangerous leachate and methane generation, consumes valuable airspace and wastes a potential compost and soil additive. Atolls rarely have fertile soil for growing fruit and vegetables.

Banana Circles

Kiribati's Kaoki Mange! (Return the Rubbish) community project has been successful in encouraging villagers to place organic wastes in shallow pits within rings of banana or papaya trees. The organics compost and increase the yield of the fruit trees and can also manage household quantities of washing (grey) water which helps both the composting and tree growth. No collection costs, no landfill costs & there is an incentive for the householder.

Compost made from recovered organics can increase food yields, a positive human health benefit whilst reducing health and import costs. Even if compost is contaminated with other wastes, it can be used as a day cover for the landfill rather than dredging up coral. Composting at the household level through simple schemes are the cheapest & best option. Centralised collection & composting can produce commercial quantities, which can have a value to partly offset the production costs.

Re-use

Re-use shops both reduce material going to disposal & provide cheaper goods for the less affluent. Used household goods, building materials, and some packaging can often be used for different purposes to the original use. Waste managers need to reserve sufficient space to allow for storage of these wastes until a user can collect them. These shops are usually co-located with landfills and it is vital that landfill users segregate their rubbish so as to avoid dangerous scavenging. Waste segregation can be encouraged by reduced disposal fees, simple rewards (often more effective as they go to the people actually delivering) or outright bans on allowing non-segregated wastes to be admitted to the site for disposal.

Disposal

Landfill or incineration both have serious issues for atolls. Landfilling may require the construction of bunds around waste cells using bulky wastes such as tyres or car bodies, to keep them up out of the water table. Artificial liners (clay or plastic), if they can be kept intact, may reduce leachate escape but an atoll's occasional heavy rainfall can overwhelm most low cost leachate treatment systems. In those cases, the trade-off must be made between a 100% solution and cost-effectiveness. The very efficient semi-aerobic (Fukuoka) method also can reduce leachate quantities, strength and dangerous gas generation but will need to be above the water table. Cover materials are best sourced from composted organic wastes rather than dredging lagoons which can increase impacts such as ciguatera poisoning.

Incineration is a difficult and expensive technology to maintain in a remote atoll.

Environmental risks from the stack emissions are often reduced due to the dispersion but clean burning is difficult to maintain unless waste segregation is very good or the incinerator is fairly high tech. Mixed results have been achieved with the lower volume medical waste incinerators but poor combustion and dioxin production are on-going issues.