

# Policy options

**This section aims to identify feasible policy options that target key components identified in the Causal chain analysis in order to minimise future impacts on the transboundary aquatic environment. Recommended policy options were identified through a pragmatic process that evaluated a wide range of potential policy options proposed by regional experts and key political actors according to a number of criteria that were appropriate for the institutional context, such as political and social acceptability, costs and benefits and capacity for implementation. The policy options presented in the report require additional detailed analysis that is beyond the scope of the GIWA and, as a consequence, they are not formal recommendations to governments but rather contributions to broader policy processes in the region.**

The Policy options analysis (POA) present a series of policy options that address the main root causes discussed in the previous section. Also, experience from the region, e.g. Mauritius and Seychelles, shows that many of these root causes can be turned into advantages to address the problem of solid wastes, which is becoming an increasingly important transboundary issue since wastes are transported to and across the open sea. It is important to note, however, that there are significant differences between all four countries in the region, and whilst some policies may work in the majority of cases, they may not necessarily work in all instances. The analysis only attempts to provide insight into which policy options may work and under particular conditions.

## Problem definition

The problem can be defined as:

Lack of management of solid wastes in the Indian Ocean Islands region leading to serious environmental and health problems on land and sea

resulting in economic collapse of resources. The issue is transboundary since solid wastes are transported to sea by run-off and river discharges, and to other countries by ocean currents.

### Establishment of preliminary hypotheses

The development of preliminary hypotheses was facilitated by the identification of, possible areas for implementation (Table 26) and the subsequent consolidation into the following hypotheses:

- 1) The increased generation and improper disposal of solid wastes has caused an increase in marine debris with ecological and economic consequences in the region.
- 2) The situation can be reversed through the implementation of legal, economic (market) mechanisms, and proper investments/technology transfer in the causal sectors.

**Table 26** Summary of possible areas to explore in the Policy option analysis.

| Subject: Reducing the transboundary impacts of solid waste     |   |
|--|---|
| Issues that can be addressed:                                  |   |
| Sources of solid waste   | Economic approaches to solid waste management                       |
| Clean-up effort and costs                                      | Legal frameworks for solid waste management                         |
| Efficiency of collection system                                | Investment policies for solid waste management                      |
| Lack of funds for implementation                               | Community behaviour/change in attitudes                             |
| Waste reduction, recycling, reuse policies                     | Investments in properly engineered disposal systems                 |
| Monitoring of marine activities                                | Reducing health threats   |
| Per capita consumption of wastes                               | Treatment technologies  |
| Provision of solid waste management infrastructure and support | Dealing with potential hazardous wastes and its degraded components |

These two preliminary hypotheses will be vital components in the development of the policy options analysis. In this case, the hypothesis will be tested using a qualitative assessment of quantitative data in

the form of proxy indicators. Whilst explanations can be given on the assumptions (also with reference to peer reviewed and published documents in other regions) in such a case, it is not possible to quantitatively determine the relevance of these hypotheses. However, the exercise will identify existing gaps and suggest how this additional information may be acquired in the future.

Finally, although a number of cases policy development is done in the absence of hard scientific information, it is equally important that the several principles enshrined in Agenda 21 are maintained in the review process; for example, the precautionary approach and the polluter pay principle.

## Construction of policy options

In the following section, a series of policy options aimed at addressing each root cause is presented and analysed.

### Root cause 1: Lack of investment planning and priorities

#### Agency budgets

- Add/Increase budget allocation for solid waste management;
- Shift allocation from another item in the budget to the use for solid waste management;
- Use budget allocation to raise additional financing for solid waste management.

The Government budget is usually the first point of consideration for any investment programme and service. Usually, this comes out of management plans or through political will. Unfortunately, solid wastes do not attract attention until they become an acute problem. Countries with solid waste infrastructure in place need the budgets for maintenance of the facilities and also the collection services. This could result in an increase in the budget (mostly unlikely, given current economic situations). In many instances, governments in the region are now using their budget, both capital and operating costs, as counterpart funding to raise funding (in loan and grant form), particularly from the World Bank and the GEF, for development projects. The risks involved include tying up limited funds in project work, but the benefits include achievable targets beyond what might be funded using annual budgets.

#### Modify framework of economic activity

- Provide the service contract to several operators;
- Provide specialised services to only one operator;
- Set the price for purchase of recyclable materials and compost;
- Increase employment opportunities.

As with any environmental problem, there is a need to link the issue with economic policies. These options attempt to introduce competition in the market in a structured manner: competition encouraged for certain components. Employment opportunities will be the likely outcome of any creation of new services.

#### Taxes

- Introduce taxes on consumer products;
- Reduce taxes on waste separation and treatment technologies;
- Tax the disposal of solid wastes by industry;
- Reduce tax on recycled materials;
- Introduce refundable deposits on containers.

Taxes may provide the required funds to put in place proper waste management services. Introducing taxes on certain consumer products, i.e. those that are not biodegradable and designed to be disposable, would cause a reduction in the import of such products and also provide funds for the establishment of proper disposal facilities, assuming that a sufficient amount continues to be imported. Reducing taxes on waste control technologies would provide the incentive for industries and consumers alike to invest in these technologies, with reduction in solid waste generation required for disposal. Polluters would be made to pay for the amount of waste they generate. There are several advantages and disadvantages in practice of this policy option. Reducing tax on recycled consumer products would allow those types of products a bigger share of the market, thus encouraging producers to buy such products, as well as raising the awareness for more recycled products. The recycled product should also be evaluated according to its biodegradability or "recyclability" after use. Refundable deposits on containers such as bottles have worked for over 20 years in the Seychelles. The Seychelles Brewery uses glass bottles at least 8 to 10 times through a bottle refundable deposit system. This has brought about cuts in imports and reduction in wastes.

#### Subsidies and grants

- Introduce subsidies for all commercial operators that have a waste collection service contract;
- Introduce subsidies to the municipality for solid waste collection;
- Provide grants for further research in the solid waste generation and collection.

This option is more complicated in the context of solid wastes in the region. The introduction of subsidies to encourage all commercial operators to have waste collection contracts will provide some funding for a solid waste company to start operations and, through additional subsidies to the local municipality, provide funding for the collection of public wastes.

Grants and financial support for proper research is required to assist in the development of best collection and disposal practices and strategies.

## **Root cause 2: Lack of effective mechanisms, inadequate institutional structure, laws and capacity**

### **Regulations**

- Establish waste management regulation to address: legally designated areas for solid waste disposal, specific environmental conditions/criteria for siting of landfills, and provide enforcement powers to officers;
- Adopt new standards for the construction of landfills, leachate discharge, air quality at landfill sites and disposal of solid waste by marine vessels;
- Identify and close loopholes in the law to improve on enforcement against littering and dumping of wastes at sea;
- Explore more creative means of using the law to ensure compliance to existing laws/standards for solid waste disposal;
- Improve enforcement capacity through training, more legal powers and redevelop patrol strategy;
- Improve levels and convictions and reduce court time;
- Effective follow-up of complaints by the public.

Command and control approaches are still very common options adopted by governments in addressing a problem. In Comoros and Madagascar a legislative framework for solid waste management is lacking. Standards can be adopted, noting that many countries have several years of experience in the commissioning and management of landfills. Technology transfer experience would be required especially with the introduction of new standards. In existing laws and regulations, the need to identify and address loopholes is an ongoing exercise designed to improve effectiveness of the laws as well as motivate those who implement them. In view of the nature and complexity of the waste management problem, more creative approaches need to be explored to ensure compliance; for example, reduction of enforcement demand through involvement of the public in enforcement by giving

them special powers or titles. One of the biggest hurdles in policing regulations is building up a good enforcement team and keeping it. Enforcement is one of the most serious problems facing countries the world over. Working with the judiciary is also required to improve effectiveness of the prosecution process and also to ensure that cases are dealt with efficiently. The public presents a good opportunity to learn what is happening, as enforcement officers cannot always be present at every location all the time. However, it is important that public complaints are taken seriously and proper follow-up is ensured.

### **Modify structure of private rights**

- Re-assign/modify property rights to assign responsibility for collection of wastes;
- Introduce liability duties to protect against ground water pollution;
- Amend constitution to provide for a “right to enjoy a safe and clean environment”;
- Improve labour laws to ensure there are sound occupational health standards for the handling, collection and disposal of solid wastes;
- Upgrade corporate and company law to allow companies to use recycled waste materials in their products.

Improper allocation of property rights is often a root cause of several problems, including dumping of rubbish all over the place. Since solid waste management involves a degree of risk to the environment and the welfare of people, introduction of liability funds (or compulsory insurance) may provide for those affected in the future by improper disposal of solid wastes. This may also include compensation to fishermen for loss of catch as a result of marine debris.

## **Root cause 3: Lack of adequate facilities, services for collection and management of wastes**

### **Financing and contracting**

- Provide loans (soft or low-interest) for investment in new equipment and facilities;
- Setup a public enterprise to address the problem of wastes;
- Privatised viable components of waste management;
- Reduce out-of-contract claims.

These options are the most common and are implemented in a number of instances, for example the creation of the Solid Waste Cleaning Agency (SWAC) in Seychelles. Provision of loans to all operators in the solid waste sector would allow them to prioritise areas of need and also respond

to the improvement and performance reviews done to consistently improve the level of service. Reducing claims outside a contract is often one of the largest sources of over-expenditure in a project.

#### **Bureaucratic and political reforms**

- Decentralise service to the municipalities;
- Improve collection frequency and coverage;
- Reduce time for issuance of solid waste disposal permits;
- Increase opening hours of landfills.

The centralisation process is more pertinent in larger countries, but in small countries, the public can play the role in monitoring the service provided by the state or a contracted company. Providing a better service with less bureaucratic loopholes would interest the private sector and encourage foreign investment in the country.

#### **Provide a service**

- Introduce a waste collection service to cover the entire country, or add to an existing service to cover other towns;
- Improve public use of the service by conducting outreach events;
- Improve relationship among all service providers within the sector to keep costs down and increase efficiency.

Providing a new service or extending on an existing service is a requirement in the region, since in some areas there is no service at all. In some states, such as Madagascar, the best service is confined to the capital, where less than 1% of the population lives. Activities can be organised to improve public perception and effective use of the service. For example, in Seychelles, there is a recurrent problem of how the public should use the public bins provided. Improving the relationship among all operators within the sector is critical in keeping costs down and reducing cases where wastes are not collected over extended periods of time.

### **Root cause 4: Lack of education and awareness**

#### **Information**

- Monitoring and information sharing;
- Collection of data on waste consumption, disposal (by type and source).

The use of information in the implementation of solid waste management is vital as it can improve understanding and management of the solid waste issue. In fact, many studies have shown that costs can be cut and the service improved if appropriate information for management is obtained.

#### **Education and consultation**

- Education campaign to inform consumers about littering, accumulation of solid waste stockpiles along the road;
- Consultation activities to obtain citizen views on how the collection service should be done and how the service can be improved;
- Develop a series of guidelines for the management of solid wastes;
- Training and capacity building programme.

Public education is a vital component of any solid waste management strategy, as the population needs to be educated in the proper use of the waste receptacles, undertake home recycling schemes and so on. Consultation is also vital to understand public preferences and behaviour. A solid waste management system is heavily dependent upon the co-operation of the public. Improvements in the service should be a continuing activity to reduce the amount of waste not collected. If a new service is being provided a dedicated training programme needs to be established, and existing service staff needs retraining and upgrading from time to time.

## **Identification of the recommended policy option**

The identification of the recommended policy options was based upon the analysis of the policy option against three main criteria: efficiency, equity and practicality. The analysis is summarised in Table 27. It is once again important to stress that the analysis is based upon the views of the experts involved in the GIWA Task team and not necessarily the views of the Governments, nor should it be implemented without proper in-depth analysis of the local conditions. This exercise has however, attempted to narrow down the potential policy areas which may be further explored in future work.

Twenty-six policies were selected using this initial screening process. The discussion and analysis in following sections will further refine that list to develop a feasible policy framework to address the issue of solid wastes in the region.

**Table 27** Rapid screening of policy options based upon the main criteria for Policy option analysis.

|     | Policy options  | Evaluation |    |    |     |
|-----|---|------------|----|----|-----|
|     |   | Eff        | Eq | Pr | FPO |
| T1  | Introduce taxes on consumer products  | ✓          |    |    |     |
| T2  | Reduce taxes on waste separation & treatment technologies   | ✓          | ✓  | ✓  | ✓   |
| T3  | Tax the disposal of solid wastes by industry  | ✓          | ✓  |    | ✓   |
| T4  | Reduce tax on recycled materials  |            |    | ✓  |     |
| T5  | Introduce refundable deposits on containers   | ✓          |    | ✓  | ✓   |
| R1  | Establish waste management regulation to address: legally designated areas for solid waste disposal, specific environmental conditions/criteria for siting of landfills, and provide enforcement powers to officers | ✓          |    | ✓  | ✓   |
| R2  | Adopt new standards for the construction of landfills, leachate discharge, air quality at landfill sites and disposal of solid waste by marine vessels  |            | ✓  | ✓  | ✓   |
| R3  | Identify loopholes in the law to improve on enforcement against littering and dumping of wastes at sea  |            | ✓  |    |     |
| R4  | Explore more creative means of using the law to ensure compliance to existing laws/standards for solid waste disposal   | ✓          | ✓  | ✓  | ✓   |
| R5  | Improve enforcement capacity through training, more legal powers and redevelop patrol strategy  |            | ✓  | ✓  | ✓   |
| R6  | Improve levels and convictions and reduce court time  |            | ✓  |    |     |
| R7  | Effective follow-up of complaints by the public   |            | ✓  |    |     |
| S1  | Introduce subsidies for all commercial operators for waste collection service contract  |            |    |    |     |
| S2  | Introduce subsidies to the municipality for solid waste collection  |            | ✓  | ✓  | ✓   |
| S3  | Provide grants for further research in the solid waste generation and collection  |            |    |    |     |
| P1  | Introduce a waste collection service to cover the entire country, or add to an existing service to cover other towns  | ✓          | ✓  |    | ✓   |
| P2  | Improve public use of the service by conducting several outreach events   |            | ✓  | ✓  | ✓   |
| P3  | Improve relationship among all service providers within the sector to keep costs down and increase efficiency   | ✓          | ✓  |    | ✓   |
| B1  | Add/increase budget allocation for solid waste management   |            |    |    |     |
| B2  | Shift allocation from another item in the budget to use for solid waste management  | ✓          |    |    |     |
| B3  | Use budget allocation to raise additional financing for solid waste management  | ✓          |    | ✓  | ✓   |
| I1  | Monitoring and information sharing  | ✓          | ✓  |    | ✓   |
| I2  | Collection of data on waste consumption, disposal ( by type and source)   | ✓          | ✓  |    | ✓   |
| PR1 | Re-assign/modify property rights to assign responsibility for collection of wastes  | ✓          |    |    |     |
| PR2 | Introduce liability duties to protect against ground water pollution  |            |    |    |     |
| PR3 | Amend constitution to provide for a 'right to enjoy a safe and clean environment'   | ✓          | ✓  |    | ✓   |
| PR4 | Improve labour law to ensure there are sound occupational health standards for the handling, collection and disposal of solid wastes  |            | ✓  | ✓  | ✓   |
| PR5 | Upgrade corporate and company law to allow companies to use recycled waste materials for their use  | ✓          |    | ✓  | ✓   |
| EC1 | Provide the service contract to several operators   | ✓          | ✓  | ✓  | ✓   |
| EC2 | Provide specialised services to only one operator   |            |    | ✓  |     |
| EC3 | Set the price for purchase of recyclable materials and compost  |            | ✓  | ✓  | ✓   |
| EC4 | Increase employment opportunities   | ✓          | ✓  |    | ✓   |
| ED1 | Education campaign to inform consumers about littering, accumulation of solid waste stockpiles along the road   |            |    | ✓  |     |
| ED2 | Consultation activities to obtain citizen views to improve service  |            | ✓  | ✓  | ✓   |
| ED3 | Develop a series of guidelines for the management of solid wastes   | ✓          | ✓  | ✓  | ✓   |
| ED4 | Training and capacity building programme  | ✓          |    | ✓  | ✓   |
| FC1 | Provide loans (soft or low-interest) for investment in new equipment and facilities   | ✓          | ✓  |    | ✓   |
| FC2 | Setup a public enterprise to address the problem of wastes  |            |    | ✓  |     |
| FC3 | Dismantle a public enterprise   | ✓          |    |    |     |
| FC4 | Reduce out-of-contract claims   | ✓          |    |    |     |
| BP1 | Decentralise service to the municipalities  | ✓          | ✓  |    | ✓   |
| BP2 | Improve collection frequency and coverage   |            | ✓  |    |     |
| BP3 | Reduce time for issuance of solid waste disposal permits  | ✓          |    | ✓  | ✓   |
| BP4 | Increase opening hours of landfills   |            | ✓  |    |     |

Note: Eff = economic efficiency; Eq = equitability; Pr = practicality; FPO = Favourable Policy Option; ✓ = fits policy criteria; blank = does not fit policy criteria.

## Performance of the chosen alternatives

In attempting to develop a policy framework to address the issue of solid wastes in the region, it is important to emphasise two issues. Firstly, it is important that this framework is seen in the context of both market failure and government failure. Market failures occur due to the lack of value given to water bodies, the coastal and open seas. These areas are often perceived by the public to be infinite and thus are used as human dumping grounds. Adoption of a valuation and property assignment mechanism to those resources may provide some early proactive measures. Although the Government has intervened with laws and policies in an attempt to address the issue, they have not resolved the issues which is why an analysis of government failure is also an important part of this analysis.

Secondly, whilst the choice of policy instrument is based on the criteria given in the GIWA methodology for policy option analysis (and many environmental economics text books), there are nevertheless only three decision issues that need to be addressed in a policy design process. These are (i) the choice of the appropriate target to which the policy should be applied - emissions, production, exposure, etc.; (ii) the addressee - an individual, group of companies, the public, etc.; and (iii) the target area - a catchment, village, the EEZ, a regional sea, etc. These issues are discussed where relevant in the analysis but no specific details are provided.

A detailed analysis of each of the types of policy instruments as they apply to the issue is presented on the basis of their effectiveness, efficiency, equity, political feasibility, and implementation capacity. A definition of those criteria is given in the GIWA methodology document.

### Root cause 1: Lack of investment planning and priorities

#### Agency budgets

Allocation of budget resources is always the preferred approach to financing solid waste management. Whilst this may be important in the initial start-up phase, it is important that the costs of solid waste collection are passed in a transparent manner to the polluters. If the government is to pay for solid waste collection, then the public remain ignorant of the real costs, and thus are not inclined to take proactive measures to reduce the generation of wastes. Although there

are situations where the poverty levels are so high that they warrant government intervention, it is important that the financial implications and the benefits are emphasised in awareness programmes.

B3 - This policy option provides the best framework for capitalising on the use of the budget to secure additional funds that may be required at the beginning to obtain solid waste collection and handling equipment. Several banks, including the Asian Development Bank and the World Bank offer soft loans for the establishment of proper sanitary facilities. In Seychelles, the solid waste management plan has been financed jointly from a grant from the Government of Seychelles and the European Union country programme.

|    | Policy options   | Evaluation |    |    |     |
|----|--|------------|----|----|-----|
|    |  | Eff        | Eq | Pr | FPO |
| B1 | Add/Increase budget allocation for solid waste management                          |            |    |    |     |
| B2 | Shift allocation from another item in the budget to use for solid waste management | ✓          |    |    |     |
| B3 | Use budget allocation to raise additional financing for solid waste management     | ✓          |    | ✓  | ✓   |

Note: Eff = economic efficiency; Eq = equitability; Pr = practicality; FPO = Favourable Policy Option; ✓ = fits policy criteria; blank = does not fit policy criteria.

**Recommendation:** Governments should allocate sufficient budgetary resources for solid waste management and use it for counterpart fund-raising.

#### Modify framework of economic activity

Solid waste has the potential to provide revenue to government and employment if the national framework is designed accordingly. Often, governments are occupied with such grand schemes that the potential benefits of recycling and reusing solid wastes are sidelined. The two policies that will be considered here show that even in small economies some policy instruments can provide revenue in terms of waste management.

|     | Policy options   | Evaluation |    |    |     |
|-----|--|------------|----|----|-----|
|     |  | Eff        | Eq | Pr | FPO |
| EC1 | Provide the service contract to several operators              | ✓          | ✓  | ✓  | ✓   |
| EC2 | Provide specialised services to only one operator              |            |    | ✓  |     |
| EC3 | Set the price for purchase of recyclable materials and compost |            | ✓  | ✓  | ✓   |
| EC4 | Increase employment opportunities                              | ✓          | ✓  |    | ✓   |

Note: Eff = economic efficiency; Eq = equitability; Pr = practicality; FPO = Favourable Policy Option; ✓ = fits policy criteria; blank = does not fit policy criteria.

EC1 - This policy option appears conducive, but it promotes a contractual relationship, which does not include conditions for sorting

and recycling of solid wastes. Under this arrangement, there are no incentives to the contractor to minimise on wastes, as more wastes mean more business.

EC 4 - The solid waste service can provide jobs in various areas of integrated solid waste management, from landfill operators, waste collectors and operators of composting plants, sorters and so on. It is important however, that certain occupational health and safety procedures are put in place to safeguard the health of those workers.

**Recommendation:** Explore opportunities for increasing revenue and employment from solid wastes.

### Taxes

Taxes are designed to target the person/organisation responsible for the environmental problem; in this case, the problem of solid wastes. Taxes can be applied on each unit of consumption/emission (for example a tax could be put on plastic bags, to reduce consumption and hence disposal of plastic bags) or tax incentives could be provided to encourage reduction of waste generation (for example no collection taxes should be applicable to companies who keep their solid waste output at 10% of their production output). The rapid screening process identified the following policies as being feasible for implementation in the region:

|    | Policy options  | Evaluation |    |    |     |
|----|---|------------|----|----|-----|
|    |   | Eff        | Eq | Pr | FPO |
| T1 | Introduce taxes on consumer products                      | ✓          |    |    |     |
| T2 | Reduce taxes on waste separation & treatment technologies | ✓          | ✓  | ✓  | ✓   |
| T3 | Tax the disposal of solid wastes by industry              | ✓          | ✓  |    | ✓   |
| T4 | Reduce tax on recycled materials                          |            |    | ✓  |     |
| T5 | Introduce refundable deposits on containers               | ✓          |    | ✓  | ✓   |

Note: Eff = economic efficiency; Eq = equitability; Pr = practicality; FPO = Favourable Policy Option; ✓ = fits policy criteria; blank = does not fit policy criteria.

T1 - Whilst the introduction of taxes on consumer products would have a significant impact on reducing pollution, since most of the population are within poor communities, and consumerism is not peaking, it was felt that this tax would hit the poorest the hardest. In terms of equity, a universal tax would impact in a similar manner both the urban and the rural lifestyles. Political feasibility is also questionable as it implies a general rise in the cost of living, without the public understanding exactly why. The UNDP human development report uses an index called public purchasing power to reflect ability, rather than the traditional GDP figures as a measure of wealth. The vulnerability of

small economies also needs to be taken into consideration, as often products are not imported in bulk and therefore do not attract the same prices. Secondly, government already imposes various levels of tax on consumer products to raise finances for government and projects. For example, taxes on consumer products in Seychelles range from 5% (e.g. computers) to 150% (cars), with general consumption products such as food taxed between 10 and 40%, although this has recently been superseded by a General Service Tax (GST) regime. In Mauritius, a VAT system applies in view of progress towards market liberalisation. The implementation capacity to administer a new tax is not considered to be a big issue as the institutional framework is in place for the management of taxes in the region.

T2 - Reduction of taxes on imports of waste treatment technologies was seen as a possible policy option for the region, on the basis of the following arguments: (i) to increase private sector investment in the area of solid waste management, incentives need to be created as such investments are costly; (ii) the tax foregone implies that there will be less waste generated and more wastes being treated cost effectively (cost of treatment of waste may be reduced); and (iii) government can put pressure on industries to comply with existing standards much more easily. The only draw-back with this policy is that it can mainly be applied to the private sector, leaving a large proportion of those who are polluting unregulated. This policy needs to be combined with other policies in order to bring about net benefits to the country. In fact, in the region (and within the international customs harmonised system), there is no separate category for waste minimisation technologies to allow this policy to be implemented easily without high administrative overheads.

T3 - Taxes imposed on industries exceeding permissible limits (calculated based upon their production and a benchmark for waste generation specific to that of industry) can be implemented based on similar reasons given for T2, although the same disadvantages exist in that they are restricted to large companies where administrative costs would be low. Application of the tax to small and medium enterprises and individuals is not feasible in terms of cost-effectiveness and implementation capacity. However, trials in the US, where individuals were given pre-sized containers and they pay according to the number of pre-sized containers used, have been successful in some areas and not in others. Experience shows that the system may cause an increase in illegal dumps or cheating by consumers. Such a policy will also depend upon the environmental awareness of the community to which the policy is being applied (reason why the addressee is an important consideration in policy development).

T4 - A reduction of tax on recycled materials would seem to be a good policy, but the initial screening indicated otherwise because: (i) the levels of recycling are not yet sufficiently high to address the problem adequately, although the benefits are clearly discernible; (ii) recycled products are usually produced inside the country and therefore do not attract a tax per se, but are protected against imports in some countries; (iii) consumer confidence in the quality of recycled products is lacking; and (iv) imported recycled products (such as paper) tend to be more expensive, implying either the production costs are still higher or the demand is still very low on the global market. It is clearly an area where more work needs to be done, so it is recommended that this policy option is modified to reflect more clearly the situation, vis:

T4 (revised) - Implement tax incentives to improve the quality and encourage use of recycled products.

T5 - A refundable system on containers has been tried and has worked in some countries of the region. Refundable deposits require an additional capital (for the deposit fund) and adequate technology to clean and allow the re-use of the container. However, in the case of PET bottles, these can be returned for shredding and recycling into other plastic products. Such a system has two basic advantages: (i) it ensures the waste is returned to the owner who is then responsible for its disposal and, as a consequence, part of the disposal cost is passed on to the consumer, so the polluter pays; and (ii) it saves the cost of sorting waste, as the containers have to be submitted free of other types of rubbish. It is important that the system is not only limited to certain companies or products. A nation-wide audit can yield interesting results. Having a huge proportion of wastes that are based upon the refundable deposit system can reduce the subsequent release of wastes into the marine environment. The refundable deposit should also be sufficiently high to make returning the container after use worthwhile for the consumer.

**Recommendations:** On the basis of the above critical analysis, the following tax instruments are proposed:

- A national survey of products/wastes that will form part of a refundable deposit system;
- Reduce taxes on waste separation and treatment technologies;
- Tax the disposal of solid wastes by industry;
- Implement tax incentives to improve the quality and encourage use of recycled products.

### Subsidies and grants

The adoption of subsidies or grants as a policy option for the management of solid wastes is important for two main reasons: (i) to facilitate transfer of technology; and (ii) to reduce the cost of

initiating a solid waste collection/management service. Of the three subsidies suggested (Table 27), only one was considered feasible for implementation.

S2 - Introducing subsidies for the municipality is critical to obtaining support from the municipality, but clear deliverables will need to be specified and could be used as indicators such as, collection service once a week, placement of receptacles within 100 m of each household, etc. Provision of subsidies could also be provided to the private sector but only in the case for the introduction of a new solid waste minimisation or treatment technology. This will also offset costs of complying to the standards and ensure rapid implementation.

**Recommendation:** Subsidies are provided (a) to the municipality to commence a waste collection service, and (b) to the private sector to facilitate investment in waste minimisation/treatment.

## Root cause 2: Lack of effective mechanisms, inadequate institutional structure, laws and capacity

### Regulations

Regulations have been the traditional approach adopted by governments to address the growing problem of solid wastes, opting to fine those that fail to respect designated areas for solid waste disposal and refuse to make use of the facilities offered. On the other hand, without those facilities, government cannot enforce the law, even though these are in place.

|    | Policy options  | Evaluation |    |    |     |
|----|---|------------|----|----|-----|
|    |   | Eff        | Eq | Pr | FPO |
| R1 | Establish waste management regulation to address: legally designated areas for solid waste disposal, specific environmental conditions/criteria for siting of landfills, and provide enforcement powers to officers | ✓          |    | ✓  | ✓   |
| R2 | Adopt new standards for the construction of landfills, leachate discharge, air quality at landfill sites and disposal of solid waste by marine vessels  |            | ✓  | ✓  | ✓   |
| R3 | Identify loopholes in the law to improve on enforcement against littering and dumping of wastes at sea  |            | ✓  |    |     |
| R4 | Explore more creative means of using the law to ensure compliance with existing laws/standards for solid waste disposal   | ✓          | ✓  | ✓  | ✓   |
| R5 | Improve enforcement capacity through training, more legal powers and redevelop patrol strategy  |            | ✓  | ✓  | ✓   |
| R6 | Improve levels and convictions and reduce court time  |            | ✓  |    |     |

Note: Eff = economic efficiency; Eq = equitability; Pr = practicality; FPO = Favourable Policy Option; ✓ = fits policy criteria; blank = does not fit policy criteria.

R1 - In Madagascar and Comoros, a framework for waste management is definitely required. Such regulations should also make the provision for an environmental impact assessment to be undertaken prior to establishment of the landfill.

R2 - Standards to control emissions from landfills are important to protect landfill workers and to reduce pollution of the surrounding environment. Standards, however, need to be supported by an adequate monitoring programme, something that is lacking in the region, except for Mauritius, which has advanced facilities for pollution monitoring.

R4 - Ironically, exploration of creative legal means is not possible without the involvement of stakeholders. Stakeholder input in the legal development process is often ignored but it can be useful in brainstorming around potential legal problems and in many cases come up with practical, but unorthodox, solutions to impending problems.

R5 - This option is a definite necessity because, without adequate training, cases are usually not prepared very well, and successful prosecutions are rare.

**Recommendations:**

- Establishment of regulatory framework;
- Development of emissions standards for landfills, etc.;
- Improve compliance through stakeholder involvement;
- Training in legal enforcement.

**Modify structure of private rights**

The structure of property rights in the island states of the region can be complex, since the islands were colonised by the French and British and, in the case of Comoros, have a strong influence of Islamic customs and laws. In Madagascar and Comoros, traditional precedence occurs, whereas in Mauritius and Seychelles, land tenure is based upon the British system. However, a number of areas are declared as government state land or as “public domain” that is belonging to the state for the enjoyment of the public. These include river banks, wetlands, beaches and the sea. Consequently, solid wastes are most associated with those areas that have been labelled “public domain”. So the dilemma is how to use existing land tenure frameworks, which differ across the region to address this problem. A number of options are presented and briefly explored below.

PR3 - Providing a constitutional right to a clean and safe environment is one of the most important activities, especially for small island states. Although this policy may not be entirely feasible in the short-term in some countries, it is important to have it on the agenda as and when

|     | Policy options   | Evaluation |    |    |     |
|-----|--|------------|----|----|-----|
|     |  | Eff        | Eq | Pr | FPO |
| PR1 | Re-assign/modify property rights to assign responsibility for collection of wastes   | ✓          |    |    |     |
| PR2 | Introduce liability duties to protect against ground water pollution   |            |    |    |     |
| PR3 | Amend constitution to provide for a right to enjoy a safe and clean environment  | ✓          | ✓  |    | ✓   |
| PR4 | Improve labour law to ensure there are sound occupational health standards for the handling, collection and disposal of solid wastes |            | ✓  | ✓  | ✓   |
| PR5 | Upgrade corporate and company law to allow companies to use recycled waste materials for their use                                   | ✓          |    | ✓  | ✓   |

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the constitution is revised to provide a clear mandate and constitutional stand on issues of environmental rights.

PR 4 - Improvements in the quality of life for those who handle solid waste is an important consideration, but that can be considered part of the operational procedures for the waste collection service.

PR 5 - Allowing use of recycled products by the private sector will be an important step forward but will not address the root cause associated with property rights.

Recommendation: Citizens should be given the constitutional right to a clean and safe environment, as well as a clear definition of existing property rights.

**Root cause 3: Lack of adequate facilities, services for collection and management of wastes**

**Provide a service**

The provision of consistent and adequate services is the backbone of any successful solid waste management policy. Whatever policies are put in place, solid wastes will still be generated and these will need to be disposed of in the most sustainable manner. Recycling, reuse etc., can occur at local level, but residual wastes will always remain, and those often end up in the environment. For example, on the refundable bottle there is a cap, and since there is no refund for the bottle caps in Seychelles, they end up at the beaches. A bottle-top competition was organised in 1994/1995 which resulted in the collection of more than 500 000 bottle tops.

P1 - Following establishment of the municipal waste service, opportunities to extend the service to rural areas must be explored. This

|    | Policy options   | Evaluation |    |    |     |
|----|--|------------|----|----|-----|
|    |  | Eff        | Eq | Pr | FPO |
| P1 | Introduce a waste collection service to cover the entire country, or add to an existing service to cover other towns | ✓          | ✓  |    | ✓   |
| P2 | Improve public use of the service by conducting outreach events  |            | ✓  | ✓  | ✓   |
| P3 | Improve relationship among all service providers within the sector to keep costs down and increase efficiency        | ✓          | ✓  |    | ✓   |

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could be done through public-private sector initiatives with financial support from the central government. In providing funds for the waste collection service, one should weigh the costs of return on tourism and the cost of solid waste management.

**Recommendation:** Put in place an efficient solid waste collection system for the municipalities in the first instance with plans to extend the service to rural areas of the country.

## Root cause 4: Lack of education and awareness

### Information

Information forms the basis of any policy development, and without adequate information policy alternatives cannot be adequately considered. This report identified a number of areas where data is lacking.

|    | Policy options   | Evaluation |    |    |     |
|----|--|------------|----|----|-----|
|    |  | Eff        | Eq | Pr | FPO |
| I1 | Monitoring and information sharing                                     | ✓          | ✓  |    | ✓   |
| I2 | Collection of data on waste consumption, disposal (by type and source) | ✓          | ✓  |    | ✓   |

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I1 and I2 - Having in place a solid waste collection, disposal and performance of the landfill is important for policy and technical reasons. Sharing of information is a requirement, especially when all stakeholders including the private sector are becoming involved in this new type of business. The cost of implementing this policy can be rather long-term as the impacts of awareness campaigns are not immediately noticeable.

### Education and consultation

This is neither a cost-effective nor efficient policy, but is needed to ensure long-term involvement of stakeholders in maintaining the solid waste management system. Whilst the initial stage of a management

system may include collection of wastes in a mixed state, later developments in the service would require the public to start sorting their waste into plastic, paper and glass. Without proper education this is unlikely to be successful. For example, in Seychelles, individual waste sorting schemes are being pilot tested in one small village before the initiative is launched nationwide. Piloting will allow lessons to be learned and also gauges public response to the new approach.

|     | Policy options  | Evaluation |    |    |     |
|-----|---|------------|----|----|-----|
|     |   | Eff        | Eq | Pr | FPO |
| ED1 | Education campaign to inform consumers about littering, accumulation of solid waste stockpiles along the road |            |    | ✓  |     |
| ED2 | Consultation activities to obtain citizen views to improve service  |            | ✓  | ✓  | ✓   |
| ED3 | Develop a series of guidelines for the management of solid wastes   | ✓          | ✓  | ✓  | ✓   |
| ED4 | Training and capacity building programme  | ✓          |    | ✓  | ✓   |

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**Recommendation:** Put in place an education programme to increase awareness and action.