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Economic Commission for Latin America and the Caribbean

**COMMENTS TO CHAPTER 21 OF AGENDA 21
"ENVIRONMENTALLY SOUND MANAGEMENT OF
SOLID WASTES AND SEWAGE-RELATED ISSUES"**

This document was prepared by Mr. José Miguel Arteaga between 1st April and 31st May 1993, in his capacity as consultant to the Joint ECLAC/UNEP Development and Environment Unit of the Environment and Human Settlements Division, under the project on "Guidelines and consultancy services on controlled environmentally sound waste management. Phase II", carried out by ECLAC with the support from the German Agency for Technical Cooperation (GTZ). The views expressed in this document, which has not been formally edited, are the sole responsibility of the author and may not coincide with those of the Organization.

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Foreword

The purpose of this paper is to analyze chapter 21 of Agenda 21, which was adopted at the United Nations Conference on Environment and Development (UNCED), in the light of the ECLAC/GTZ project on "Guidelines and consultancy services on controlled environmentally sound waste management. Phase II". Thus, the transcription of the various sections of the chapter is followed by a comment either where the activities and objectives set forth in the document coincide with those of the project, or where the principles and aims postulated by UNCED have not been taken by the project.

INTRODUCTION

21.1. The incorporation of the chapter on environmentally sound management of solid wastes within Agenda 21 is in response to General Assembly resolution 44/228, section I, paragraph 3, in which the Assembly affirmed that the Conference should elaborate strategies and measures to halt and reverse the effects of environmental degradation in the context of increased national and international efforts to promote sustainable and environmentally sound development in all countries, and to section I, paragraph 12 (g), of the same resolution, in which the Assembly affirmed that environmentally sound management of wastes was among the environmental issues of major concern in maintaining the quality of the Earth's environment and especially in achieving environmentally sound and sustainable development in all countries.

Comment: The topic of waste management is said to be among the environmental issues "of major concern" in achieving sustainable development in all countries. Thus, concern for the sustainability of development should serve as the basic conceptual framework for approaching the problem of managing all types of waste.

21.2. Programme areas included under the present chapter of Agenda 21 are closely related to the following programme areas of other chapters of Agenda 21:

- (a) Protection of the quality and supply of fresh water resources (chap. 18);
- (b) Promoting sustainable human settlement development (chap. 7);
- (c) Protecting and promoting human health conditions (chap. 6);
- (d) Changing consumption patterns (chap. 4).

21.3. Solid wastes, as defined in this chapter, include all domestic refuse and non-hazardous wastes such as commercial and institutional wastes, street sweepings and construction debris. In some countries, the solid wastes management system also handles human wastes such as night-soil, ashes from incinerators, septic tank sludge and sludge from sewage treatment plants. If these wastes manifest hazardous characteristics they should be treated as hazardous wastes.

21.4. Environmentally sound waste management must go beyond the mere safe disposal or recovery of wastes that are generated and seek to address the root cause of the problem by attempting to change unsustainable patterns of production and consumption. This implies the application of the integrated life cycle management concept, which presents a unique opportunity to reconcile development with environmental protection.

Comment: The concept of waste management proposed in Agenda 21 is fundamentally linked to changing production patterns and the environmental sustainability of development, and therefore unequivocally relates the topic to the basic ideas of the ECLAC proposal. According to this conception, waste management must seek to change "unsustainable patterns of production and consumption". In this sense, the concept even goes beyond the ECLAC proposal,^{1/} which aims only at changing production patterns without seeking, as yet, a simultaneous change in consumption patterns. It should be noted that Agenda 21 has a chapter (number 4) expressly devoted to "changing consumption patterns". The integrated approach proposed by Agenda 21 in these areas has been taken by the ECLAC/German Agency for Technical Cooperation (GTZ) project since its inception.

21.5. Accordingly, the framework for requisite action should be founded on a hierarchy of objectives and focused on the four major waste-related programme areas, as follows:

- (a) Minimizing wastes;
- (b) Maximizing environmentally sound waste reuse and recycling;
- (c) Promoting environmentally sound waste disposal and treatment;
- (d) Extending waste service coverage.

Comment: The order of the four areas is significant. The first area involves minimizing wastes at the source; then come waste reuse and recycling, which are ways of minimizing the end outflow of wastes to be treated and disposed of as useless (and eventually polluting) substances. The third step is the treatment and disposal of the remaining outflow of wastes. The order of these areas is also intended to indicate the emphases of an integrated waste policy. However, since not all such policies have reached the point of "integration", countries that have integrated policies —and that can therefore go on to the

^{1/} See Economic Commission for Latin America and the Caribbean (ECLAC), Sustainable Development: Changing Production Patterns, Social Equity and the Environment (LC/G.1648/Rev.2-P), Santiago, Chile, May 1991. United Nations publication, Sales N° E.91.II.G.5.

more sophisticated stages of those policies— must be distinguished from those whose policies are still at a more basic level. As progress is made in the region towards more sophisticated and integrated policies in this area, greater emphasis should be placed on the first two areas mentioned above. Because the ECLAC/GTZ project operates at the regional level, with the aim of formulating and implementing more consistent waste management policies—and must, therefore, assume that what exists in the area of waste policies is highly precarious—it has been unable to place much emphasis on these first two areas, although it has incorporated all four areas into its actions. As the region progresses in this regard, the more sophisticated aspects of waste management policy should be given more weight. It is when the issues of minimizing, reusing and recycling wastes are addressed that the importance of the link between these policies and the ECLAC proposal on changing production patterns becomes most evident. Since minimizing wastes, saving resources and energy and making more intensive use of all kinds of materials require new, state-of-the-art technologies, they undoubtedly call for changes in production patterns.

21.6. The four programme areas are interrelated and mutually supportive and must therefore be integrated in order to provide a comprehensive and environmentally responsive framework for managing municipal solid wastes. The mix and emphasis given to each of the four programme areas will vary according to the local socio-economic and physical conditions, rates of waste generation and waste composition. All sectors of society should participate in all the programme areas.

PROGRAMME AREAS

A. Minimizing wastes

Basis for action

21.7. Unsustainable patterns of production and consumption are increasing the quantities and variety of environmentally persistent wastes at unprecedented rates. The trend could significantly increase the quantities of wastes produced by the end of the century and increase quantities four to fivefold by the year 2025. A preventive waste management approach focused on changes in lifestyles and in production and consumption patterns offers the best chance for reversing current trends.

Comment: The aforementioned ECLAC/GTZ project, which is the only project implemented by ECLAC on this topic, takes a preventive approach within the scope of its actions. However, a more ambitious preventive approach that seeks "changes in lifestyles and in production and consumption patterns", as

proposed in Agenda 21, calls for an institutional commitment that goes beyond the parameters of a project. These parameters, as noted earlier, are defined in part by the ECLAC proposal on changing production patterns, social equity and sustainability, and should translate into a clearer commitment on the part of the Joint ECLAC/UNEP Development and Environment Unit and the Environment and Human Settlements Division.

Objectives

21.8. The objectives in this area are:

(a) To stabilize or reduce the production of wastes destined for final disposal, over an agreed time-frame, by formulating goals based on waste weight, volume and composition and to induce separation to facilitate waste recycling and reuse;

(b) To strengthen procedures for assessing waste quantity and composition changes for the purpose of formulating operational waste minimization policies utilizing economic or other instruments to induce beneficial modifications of production and consumption patterns.

21.9. Governments, according to their capacities and available resources and with the cooperation of the United Nations and other relevant organizations, as appropriate, should:

(a) By the year 2000, ensure sufficient national, regional and international capacity to access, process and monitor waste trend information and implement waste minimization policies;

(b) By the year 2000, have in place in all industrialized countries programmes to stabilize or reduce, if practicable, production of wastes destined for final disposal, including per capita wastes (where this concept applies), at the level prevailing at that date; developing countries as well should work towards that goal without jeopardizing their development prospects;

(c) Apply by the year 2000, in all countries, in particular in industrialized countries, programmes to reduce the production of agrochemical wastes, containers and packaging materials, which do not meet hazardous characteristics.

Comment: The objectives listed are also those of the ECLAC/GTZ project. Nevertheless, the recommendation that developing countries should seek them "without jeopardizing their development prospects" points to a controversy that is not easy to resolve. It is by no means certain that the costs of a policy of environmentally sound waste management are always or usually "dead" or irrecoverable costs. The applied research conducted under the ECLAC/GTZ project has included various case studies showing evidence that enterprises

that decide to control their wastes through radical technological changes obtain positive economic returns on their investment within a relatively short time.^{2/}

Activities

(a) Management-related activities

21.10. Governments should initiate programmes to achieve sustained minimization of waste generation. Non-governmental organizations and consumer groups should be encouraged to participate in such programmes, which could be drawn up with the cooperation of international organizations, where necessary. These programmes should, wherever possible, build upon existing or planned activities and should:

(a) Develop and strengthen national capacities in research and design of environmentally sound technologies, as well as adopt measures to reduce wastes to a minimum;

Comment: The method used in the region, which appears to be the most feasible, has been to complement research and development in the area of environmentally sound technologies with the transfer and adaptation of technologies from developed countries. This point is closely linked to the idea of developing an "endogenous centre" of science and technology in the region as part of the process of changing production patterns, according to the proposal put forward by ECLAC in its documents. The joint UNEP/UNIDO project on creating national cleaner production centres, pursuant to the recommendations of the UNEP Ministerial Meeting and Second Senior Level Seminar on Cleaner Production, held at Paris in October 1992, could represent a "bridge" proposal for meeting these objectives.

(b) Provide for incentives to reduce unsustainable patterns of production and consumption;

Comment: Although the activities suggested in this paragraph are very wide-ranging, since the problems of "unsustainable patterns of production and consumption" can be approached from many angles, the following can be said with respect to the waste-related pollution in question. Recognizing that incentives in this regard are practically non-existent in the region, the ECLAC/GTZ project is approaching the topic from various angles: (a) study

^{2/} See Bustos, Liborio (consultant) (1993), Transformación productiva ambientalmente sustentable en pequeñas empresas: el caso de dos fundiciones y una planta de tratamiento térmico en la Región Metropolitana (Chile) (LC/R.1250), Economic Commission for Latin America and the Caribbean, Santiago, Chile; and Ilabaca, Patricia, "Análisis económico de alternativas no contaminantes para curtiembres en Chile", Santiago, Chile, unpublished.

of incentive systems (basic concepts, objectives, instruments of application, etc.) to minimize waste in developed countries, especially Germany; (b) study of the instruments, especially of an economic or legal nature, applied in the countries covered by the project (Argentina, Brazil, Chile, Colombia, Costa Rica and Ecuador) for the treatment of both household and industrial waste, and analysis of the objectives sought through their application; and (c) an informal survey of the region's national, state and local governments to determine their interest in introducing these types of stimuli and possible ways of doing so. To date, it appears that the instruments in use do not include—or include only in very rudimentary form, and exclusively in the case of household waste—mechanisms to encourage minimal waste generation, such as making the cost of household cleaning services proportional to the volume of waste generated. In general, the objective of minimizing waste has not yet been included in legislation or in regulations that determine systems of rates and charges for the collection, management and final disposal of wastes. The topic is even less developed in relation to industrial wastes, where legislation is either non-existent or not enforced.

(c) Develop, where necessary, national plans to minimize waste generation as part of overall national development plans;

Comment: The ECLAC/GTZ project works with its counterparts—municipal, state or national governments—in formulating its plans for environmentally sound waste management, which include minimizing the amount of waste generated. These integrated plans are being formulated and designed in detail at the community and municipal levels, but not yet at the national or regional levels. Work at the national level on plans to minimize waste generally concerns specific economic sectors (mining, agriculture, etc.). This area of activity has recently begun to be included in the legislation and national institutional systems of the countries of the region, and to become a State policy objective. Moreover, national plans to minimize waste—where they exist—have not yet been clearly and expressly linked to the design of national development plans. The latter are not yet explicitly incorporating the prevention principle into the area of waste management. The ECLAC/GTZ project generally has access to the levels of government in charge of waste management policies, but not yet to those responsible for designing macroeconomic or development policies. Reaching the levels where national development plans are designed, and convincing them to integrate environmental concerns into those designs, should be a long-term objective of the project.

(d) Emphasize waste minimization considerations in procurement within the United Nations system.

Comment: ECLAC is carrying out this activity through the Joint ECLAC/UNEP Development and Environment Unit of the Environment and Human Settlements Division, in particular under two projects: the aforementioned ECLAC/GTZ project and the ECLAC/UNEP project "Application of economic policy instruments for environmental management and sustainable development in selected Latin American and Caribbean countries". Activities under these projects are linked to efforts along these lines by other United Nations bodies, especially UNEP.

(b) Data and information

21.11. Monitoring is a key prerequisite for keeping track of changes in waste quantity and quality and their resultant impact on health and the environment. Governments, with the support of international agencies, should:

(a) Develop and apply methodologies for country-level waste monitoring;

(b) Undertake data gathering and analysis, establish national goals and monitor progress;

(c) Utilize data to assess environmental soundness of national waste policies as a basis for corrective action;

(d) Input information into global information systems.

Comment: ECLAC has done little to develop ad hoc methodologies and specific activities in the areas of collecting, processing and disseminating data and information on minimizing waste, especially data gathered by monitoring stations and systems. Networks for monitoring air quality have been set up in some Latin American cities, mines and specific industries. Water and soil quality are also sporadically monitored in some places. In general, these systems are introduced in response to critical situations (air pollution in cities, water pollution in urban areas, etc.) and are administered by various government bodies, but the region has no structured, complete, nationwide systems for monitoring pollution caused by waste. Where no such systems of continuous and systematic monitoring are in place, it is difficult to design measurable objectives for the reduction of pollution levels. This situation is especially serious in the monitoring of water quality (surface or groundwater, fresh or salt water) and soil quality. In the future, this sphere of activity should be developed in the context of the work of the Joint ECLAC/UNEP Development and Environment Unit.

(c) International and regional cooperation and coordination

21.12. The United Nations and intergovernmental organizations, with the collaboration of Governments, should help promote waste minimization by facilitating greater exchange of information, know-how and experience.

Comment: ECLAC carries out these types of activities on an ongoing basis under the ECLAC/GTZ project. Its activities in the area of disseminating information, know-how and experiences on minimizing waste, through the elaboration and distribution of documents, the conduct of seminars and training courses, and other activities, are a central and permanent part of its work.

The following is a non-exhaustive list of specific activities that could be undertaken:

(a) Identifying, developing and harmonizing methodologies for waste monitoring and transferring such methodologies to countries;

Comment: As indicated above, this area is not being addressed systematically by ECLAC. In general, these activities are centralized in government technical bodies (the Environmental Sanitation Technologies Company (CETESB) in Brazil, the Centre for Mining and Metallurgical Research (CIMM) in Chile, etc.) and, owing to their high degree of technical specialization, have not been included among the technical cooperation activities of the ECLAC/GTZ project. Joint activities have been implemented with these institutions, but only in the areas of training and policy formulation.

(b) Identifying and further developing the activities of existing information networks on clean technologies and waste minimization;

Comment: Currently, a study is being carried out under the ECLAC/GTZ project to evaluate the effective information and data resources available in the main information networks on clean technologies and the minimizing of waste. Moreover, efforts are being made to make those data more accessible to ECLAC and to the region's Governments. The databases being evaluated include those of the UNEP Industry and Environment Office (Paris), the UNEP International Referral System for sources of environmental information (INFOTERRA), the Environmental Protection Agency (EPA) (United States), the World Health Organization's Pan American Network for Information and Documentation in Sanitary Engineering and Environmental Sciences (WHO/REPIDISCA) and CETESB (Brazil).

(c) Undertaking periodic assessment, collating and analyzing country data and reporting systematically, in an appropriate United Nations forum, to the countries concerned;

Comment: Since data on the generation, treatment and final disposal of waste in the region are usually not very plentiful, it seems appropriate here to distinguish among different types of waste. Partial data on solid household wastes are available in the region, and are being gathered and assessed on an ongoing basis under the ECLAC/GTZ project; the results of these studies are provided to the project counterparts. The project does not cover the topic of sewage. With respect to industrial wastes, whether solids, liquids or gases, very little information is available in the region. The main objective in this regard is, first, to encourage each country to design policies on the generation of such data and records —under concrete programmes and specific control measures, wherever possible, rather than through largely inefficient methods of preliminary monitoring using background of little relevance— by demonstrating their importance for an overall waste control policy. Once that stage is concluded and an ongoing flow of information is being generated which covers the entire field of interest, at least in general terms, permanent activities can be developed to evaluate and improve the quality of the records and data generated. Under the ECLAC/GTZ project, quantitative evaluations have been carried out on industrial wastes, using indirect means and the INVENT and WHO methods.^{3/}

(d) Reviewing the effectiveness of all waste minimization instruments and identifying potential new instruments that could be used and techniques by which they could be made operational at the country level. Guidelines and codes of practice should be developed;

Comment: As indicated above, the ECLAC/GTZ project is working on reviewing and, where applicable, proposing improvements in the instruments used in waste management policies. Since instruments which expressly seek to minimize waste are practically non-existent, studies on this subject under the project tend to evaluate the interest of Governments and the possibility of introducing new instruments to meet that objective.

(e) Undertaking research on the social and economic impacts of waste minimization at the consumer level.

^{3/} See Durán, Ana Luz (consultant) (1991), Análisis comparativo entre dos métodos de cuantificación de la producción de desechos industriales para cuatro países: Argentina, Colombia, Chile y Ecuador (LC/R.1007 (Sem.61/14)), Economic Commission for Latin America and the Caribbean, Santiago, Chile.

Comment: Some information in this regard, derived from the experience of developed countries, is being made available to the project counterparts. Chile, with the support of the ECLAC/GTZ project and assistance from German and Canadian experts, has begun to introduce an "environmental recognition seal" which, once in place, will provide consumer information on the environmental quality of a wide range of products. The experience of this project will be disseminated in other countries of the region. More studies are needed on the social and economic impact of minimizing wastes at the consumer level in the region.

Means of implementation

(a) Financial and cost evaluation

21.13. The Conference secretariat suggests that industrialized countries should consider investing in waste minimization the equivalent of about 1 per cent of the expenditures on solid wastes and sewage disposal. At current levels, this would amount to about \$6.5 billion annually, including about \$1.8 billion related to minimizing municipal solid wastes. Actual amounts would be determined by relevant municipal, provincial and national budget authorities based on local circumstances.

(b) Scientific and technological means

21.14. Waste minimization technologies and procedures will need to be identified and widely disseminated. This work should be coordinated by national Governments, with the cooperation and collaboration of non-governmental organizations, research institutions and appropriate organizations of the United Nations, and could include the following:

(a) Undertaking a continuous review of the effectiveness of all waste minimization instruments and identifying potential new instruments that could be used and techniques by which instruments could be made operational at the country level. Guidelines and codes of practice should be developed;

(b) Promoting waste prevention and minimization as the principal objective of national waste management programmes;

(c) Promoting public education and a range of regulatory and non-regulatory incentives to encourage industry to change product design and reduce industrial process wastes through cleaner production technologies and good housekeeping practices and to encourage industries and consumers to use types of packaging that can be safely reused;

Comment: The ECLAC/GTZ project includes industry representatives in its training and technical cooperation activities on an ongoing basis, and constantly provides them —through their trade associations— with relevant information on the need to minimize waste and on how to achieve that objective. The topic is analysed from various angles in many project documents.

(d) Executing, in accordance with national capacities, demonstration and pilot programmes to optimize waste minimization instruments;

Comment: The project is supporting pilot programmes at the municipal level to minimize household solid wastes. The initial phases of waste control programmes to minimize industrial solid wastes are also being implemented—in Chile, the initial record-keeping and inventory stage of a plan relating to industrial solid wastes is being executed in the Metropolitan Region—, which will lead to the determination of objectives and methods for minimizing this type of waste.

(e) Establishing procedures for adequate transport, storage, conservation and management of agricultural products, foodstuffs and other perishable goods in order to reduce the loss of those products, which results in the production of solid waste;

Comment: These activities, which concern agricultural production, have so far remained outside the scope of the project.

(f) Facilitating the transfer of waste-reduction technologies to industry, particularly in developing countries, and establishing concrete national standards for effluents and solid waste, taking into account, inter alia, raw material use and energy consumption.

Comment: Regarding the first point, the project's ongoing work with industry representatives has already been noted. The project is also active with regard to the establishment of concrete national environmental standards, especially through cooperation in legal and institutional matters. However, these efforts generally concern standards and regulations on the maximum allowable levels of contaminating substances in effluents; work has not yet been done on defining standards for the use of raw materials and energy.

(c) Human resource development

21.15. Human resource development for waste minimization not only should be targeted at professionals in the waste management sector but also should seek to obtain the support of citizens and

industry. Human resource development programmes must therefore aim to raise consciousness and educate and inform concerned groups and the public in general. Countries should incorporate within school curricula, where appropriate, the principles and practices of preventing and minimizing wastes and material on the environmental impacts of waste.

Comment: Training is one of the main activities of the ECLAC/GTZ project. Thus far, it has mainly targeted government officials and industry representatives responsible for waste management policies. The specific training of other social groups has not yet been addressed. However, one area of technical cooperation under the project has been environmental education for authorities in charge of that topic in national and/or municipal educational systems, with a view to the formulation of national or municipal environmental education plans, teacher training in these subjects, incorporation of the topic into school curricula, execution of pilot projects, etc. These activities, which seek to change habits and patterns of behaviour in the long term, develop human resources in the broadest sense, by covering the entire population. However, owing to a lack of resources, this activity has not been sufficiently emphasized under the project.

B. Maximizing environmentally sound waste reuse and recycling

Basis for action

21.16. The exhaustion of traditional disposal sites, stricter environmental controls governing waste disposal and increasing quantities of more persistent wastes, particularly in industrialized countries, have all contributed to a rapid increase in the cost of waste disposal services. Costs could double or triple by the end of the decade. Some current disposal practices pose a threat to the environment. As the economics of waste disposal services change, waste recycling and resource recovery are becoming increasingly cost-effective. Future waste management programmes should take maximum advantage of resource-efficient approaches to the control of wastes. These activities should be carried out in conjunction with public education programmes. It is important that markets for products from reclaimed materials be identified in the development of reuse and recycling programmes.

Comment: This paragraph touches upon a number of essential policy elements that should be analysed separately. The grounds for action in this sphere specified in Agenda 21 are, in general, the same as those of the project: the generation of ever-growing amounts and varieties of wastes, the rising cost of their disposal and their environmental impact. Another point highlighted is the emergence of a new economic reality: the increasing cost-effectiveness

of recovering used materials and recycling waste. This translates into a powerful economic influence that pulls in the right direction.

Studies have been done under the project to evaluate the economic feasibility of industrial recycling of the most common household solid wastes: paper, glass and plastic. The scarcity of scientific information on the economic potential of recycling this type of waste in Latin America leads to the over- or under-estimation, as the case may be, of its environmental and economic potential.

As an additional basis for action in this field, the social impact of recycling household solid wastes in the region should be highlighted. A significant volume of informal employment is linked to this activity in all large and medium-sized cities. If local governments design recycling programmes for these materials, this sector of the population can be incorporated into them, with some type of formalization of their employment. This is an area in which inter-divisional work with the Social Development Division is expected to be done in the future.

With respect to the recycling of industrial waste, a topic of great importance owing to Latin America's growing industrialization and the scarcity of recycling efforts, little information is available in the region. Government policies to encourage the practice are also lacking. It is therefore highly probable that this field has great environmental and economic potential. The ECLAC/GTZ project has not, as yet, conducted studies to learn more about local realities in this area.

Despite the importance of the topic of reusing materials (containers, wrappers, etc.), information on these practices has not yet been systematized in the region, and no policies that expressly encourage them have been introduced. This aspect of waste policy should therefore be considered deficient and in need of remedial action in the future.

The importance of environmental education efforts, to complement and reinforce policies for environmentally sound waste management, has already been emphasized. Schoolchildren, particularly in the lower grades, are especially receptive to the idea of recycling and reusing materials. Various experiments are being conducted at the municipal level in the region; the project, to the extent possible, monitors them and carries out some type of support activity. In late 1993 a regional seminar will be held on environmental teaching materials, with support from the Pan American Center for Sanitary Engineering and Environmental Sciences (CEPIS)/GTZ project; the United Nations Educational, Scientific and Cultural Organization

(UNESCO) Regional Office for Education in Latin America and the Caribbean is also expected to support the seminar.

No specific measures have been taken under the project to identify and develop markets for products made of reclaimed materials, although some case studies have been done on household solid wastes in the six countries covered by the project.

Objectives

21.17. The objectives in this area are:

(a) To strengthen and increase national waste reuse and recycling systems;

(b) To create a model internal waste reuse and recycling programme for waste streams, including paper, within the United Nations system;

Comment: An initial analysis of the internal situation of ECLAC has been elaborated.

(c) To make available information, techniques and appropriate policy instruments to encourage and make operational waste reuse and recycling schemes.

21.18. Governments, according to their capacities and available resources and with the cooperation of the United Nations and other relevant organizations, as appropriate, should:

(a) By the year 2000, promote sufficient financial and technological capacities at the regional, national and local levels, as appropriate, to implement waste reuse and recycling policies and actions;

(b) By the year 2000, in all industrialized countries, and by the year 2010, in all developing countries, have a national programme, including, to the extent possible, targets for efficient waste reuse and recycling.

Comment: These objectives are shared by the ECLAC/GTZ project, but it would be useful to define more precisely the timing and pace of efforts to meet these objectives in the various countries of the region. Reuse and recycling do not have the same priority in the industrialized countries as in the developing countries. It would be helpful to gather background material and to elaborate a case-by-case analysis of the timeliness of investing resources to pursue these goals in Latin America and the Caribbean. The ECLAC/GTZ

project's economic assessments of recycling projects have noted high rates of profitability for the industrial sector, which seems to indicate that this business that will grow in the future, with consequent environmental benefits. The topic is being monitored in the areas covered by the project.

Activities

(a) Management-related activities

21.19. Governments and institutions and non-governmental organizations, including consumer, women's and youth groups, in collaboration with appropriate organizations of the United Nations system, should launch programmes to demonstrate and make operational enhanced waste reuse and recycling. These programmes should, wherever possible, build upon existing or planned activities and should:

(a) Develop and strengthen national capacity to reuse and recycle an increasing proportion of wastes;

(b) Review and reform national waste policies to provide incentives for waste reuse and recycling;

(c) Develop and implement national plans for waste management that take advantage of, and give priority to, waste reuse and recycling;

(d) Modify existing standards or purchase specifications to avoid discrimination against recycled materials, taking into account the saving in energy and raw materials;

(e) Develop public education and awareness programmes to promote the use of recycled products.

Comment: Thus far, it has been the market which has spontaneously developed activities to reuse materials and recycle waste. Only in very few cases have government policies encouraged those efforts. Colombia's National Institute for Renewable Natural Resources and the Environment (INDERENA) is one such case; at the level of local government, examples include the municipalities of Campinas (in the State of São Paulo, Brazil) and La Reina (in the Metropolitan Region of Chile). The population's sensitivity to the issue is growing, but is still largely confined to some non-governmental organizations and specific social groups (women and young people). It is among young children that the highest level of sensitivity is found, and where, through education, the best results can be expected. These results will, undoubtedly, be seen only in the long term. The activities here

recommended to promote the reuse and recycling of materials indicate a line of action that should be developed with more emphasis in the future.

(b) Data and information

21.20. Information and research is required to identify promising socially acceptable and cost-effective forms of waste reuse and recycling relevant to each country. For example, supporting activities undertaken by national and local governments in collaboration with the United Nations and other international organizations could include:

(a) Undertaking an extensive review of options and techniques for reuse and recycling all forms of municipal solid wastes. Policies for reuse and recycling should be made an integral component of national and local waste management programmes;

(b) Assessing the extent and practice of waste reuse and recycling operations currently undertaken and identifying ways by which these could be increased and supported;

(c) Increasing funding for research pilot programmes to test various options for reuse and recycling, including the use of small-scale, cottage-based recycling industries; compost production; treated waste-water irrigation; and energy recovery from wastes;

(d) Producing guidelines and best practices for waste reuse and recycling;

(e) Intensifying efforts, at collecting, analyzing and disseminating, to key target groups, relevant information on waste issues. Special research grants could be made available on a competitive basis for innovative research projects on recycling techniques;

(f) Identifying potential markets for recycled products.

Comment: In this section, Agenda 21 outlines activities for the systematic gathering and processing of data and information on waste reuse and recycling. The ECLAC/GTZ project fully endorses the formulation of this work programme, and has partially implemented it (see Ana Luz Durán, "Evaluación técnico-económica de los procesos de reciclaje de desechos domésticos: los casos del vidrio, papel y plásticos" (to be published shortly)). The collection, processing and analysis of data and information on reuse and recycling, as a way of stimulating the intensification and spread of these processes in the region, is largely a pending task. This is true not only under the project, but also in a more general sense. The Governments of the region

have no programmes that systematically cover all the activities listed in this section. This part of the work programme of Agenda 21 should be considered fully valid and open to future projects.

(c) International and regional cooperation and coordination

21.21. States, through bilateral and multilateral cooperation, including through the United Nations and other relevant international organizations, as appropriate, should:

(a) Undertake a periodic review of the extent to which countries reuse and recycle their wastes;

(b) Review the effectiveness of techniques for and approaches to waste reuse and recycling and ways of enhancing their application in countries;

(c) Review and update international guidelines for the safe reuse of wastes;

(d) Establish appropriate programmes to support small communities' waste reuse and recycling industries in developing countries.

Comment: The preceding comment also applies to these aspects.

Means of implementation

(a) Financial and cost evaluation

21.22. The Conference secretariat has estimated that if the equivalent of 1 per cent of waste-related municipal expenditures was devoted to safe waste reuse schemes, world-wide expenditures for this purpose would amount to \$8 billion. The secretariat estimates the total annual cost (1993-2000) of implementing the activities of this programme area in developing countries to be about \$850 million on grant or concessional terms. These are indicative and order of magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific programmes proposed by international institutions and approved by their governing bodies.

(b) Scientific and technological means

21.23. The transfer of technology should support waste recycling and reuse by the following means:

(a) Including the transfer of recycling technologies, such as machinery for reusing plastics, rubber and paper, within bilateral and multilateral technical cooperation and aid programmes;

(b) Developing and improving existing technologies, especially indigenous technologies, and facilitating their transfer under ongoing regional and interregional technical assistance programmes;

(c) Facilitating the transfer of waste reuse and recycling technology.

Comment: According to the information gathered by the project, recycling technologies are generally available in the region. What is lacking is more complete and widespread information on the economic aspects of the recycling business, reuse of materials and government policies that encourage these processes. In the case studies conducted, these businesses showed high rates of return.

21.24. Incentives for waste reuse and recycling are numerous.

Comment: Our preliminary conclusion is that, in view of the high profitability of these projects, the best way of providing incentives to industry to undertake these activities is to give them all available information on the topic. One problem in this area is that of collecting and selecting recyclable materials at the local level, which often is done on an informal basis.

Countries could consider the following options to encourage industry, institutions, commercial establishments and individuals to recycle wastes instead of disposing of them:

(a) Offering incentives to local and municipal authorities that recycle the maximum proportion of their wastes;

(b) Providing technical assistance to informal waste reuse and recycling operations;

(c) Applying economic and regulatory instruments, including tax incentives, to support the principle that generators of wastes pay for their disposal;

Comment: One important way of stimulating these activities is to improve financing systems for small- and medium-scale enterprises that normally have little access to credit. Special guarantee funds, leasing systems and other methods could be more widely used.

(d) Providing legal and economic conditions conducive to investments in waste reuse and recycling;

(e) Implementing specific mechanisms such as deposit/refund systems as incentives for reuse and recycling;

(f) Promoting the separate collection of recyclable parts of household wastes;

(g) Providing incentives to improve the marketability of technically recyclable waste;

(h) Encouraging the use of recyclable materials, particularly in packaging, where feasible;

(i) Encouraging the development of markets for recycled goods by establishing programmes.

Comment: In general, the wide range of mechanisms to provide incentives for the reuse and recycling of materials, listed here in Agenda 21, must be implemented more systematically in the region. Some of these mechanisms exist in municipalities, and a growing trend towards making use of them has been observed. However, it would be useful to implement specific programmes to promote the widespread use of the various incentive mechanisms mentioned.

(c) Human resource development

21.25. Training will be required to reorient current waste management practices to include waste reuse and recycling. Governments, in collaboration with United Nations international and regional organizations, should undertake the following indicative list of actions:

(a) Including waste reuse and recycling in in-service training programmes as integral components of technical cooperation programmes on urban management and infrastructure development;

(b) Expanding training programmes on water supply and sanitation to incorporate techniques and policies for waste reuse and recycling;

(c) Including the advantages and civic obligations associated with waste reuse and recycling in school curricula and relevant general educational courses;

(d) Encouraging non-governmental organizations, community-based organizations and women's, youth and public interest group programmes, in collaboration with local municipal authorities, to mobilize community support for waste reuse and recycling through focused community-level campaigns.

Comment: Human resources training is one of the basic spheres of action of the ECLAC/GTZ project. The topic of recycling and reuse of used materials is included in the courses given under the project. The groups targeted for training are in the government (national and municipal) and private-enterprise sectors. Actions in this area could be broadened through cooperation between the ECLAC/GTZ project and the Joint ECLAC/UNCHS Unit on Human Settlements of the Environment and Human Settlements Division, to include the topics of waste recycling and reuse in that Unit's technical cooperation projects on urban management and infrastructure development. Joint activities could also be carried out with the Social Development Division in those same areas.

(d) Capacity-building

21.26. Capacity-building to support increased waste reuse and recycling should focus on the following areas:

(a) Making operational national policies and incentives for waste management;

(b) Enabling local and municipal authorities to mobilize community support for waste reuse and recycling by involving and assisting informal sector waste reuse and recycling operations and undertaking waste management planning that incorporates resource recovery practices.

Comment: The project is providing technical cooperation to its counterpart municipalities for the development of more consistent waste recycling and reuse plans. In general, these programmes are still incipient and only precariously supported by the municipal institutional framework. Also, they represent local initiatives that are not components of national programmes, which do not exist in the region. The process of reuse and recycling is fragmented in the region's largest cities: the initial phases of collecting and sorting materials are carried out by so-called "carton collectors" or "scavengers" (independent workers), who operate in the informal sector. The later stages of the process are implemented by medium- and large-scale enterprises, with modern, costly facilities. In general, no local or municipal support programmes exist to enable informal collectors to complete the recycling process, including the industrial aspects, and perhaps would not represent the most suitable or feasible approach. The most practical measure in this area could be to encourage the design and implementation of appropriate policies and instruments, allowing the market to play a role in determining the various actors involved in the different phases of the process.

C. Promoting environmentally sound waste disposal and treatment

Basis for action

21.27. Even when wastes are minimized, some wastes will still remain. Even after treatment, all discharges of wastes have some residual impact on the receiving environment. Consequently, there is scope for improving waste treatment and disposal practices such as, for example, avoiding the discharge of sludges at sea. In developing countries, the problem is of a more fundamental nature: less than 10 per cent of urban wastes receive some form of treatment and only a small proportion of treatment is in compliance with any acceptable quality standard. Faecal matter treatment and disposal should be accorded due priority given the potential threat of faeces to human health.

Comment: Since, as noted earlier, policies still place little emphasis on minimizing waste in the region, and consequently few results are observed in this area, Governments usually must focus on designing waste management policies—especially measures for waste treatment and disposal—for currents or flows of waste that are not yet being minimized. This means that some countries are still in the initial phases of waste management policies and that, as a result, waste treatment and disposal take on paramount importance in government plans and programmes, especially at the local and municipal levels.

Agenda 21 itself emphasizes regional differences. However, heterogeneities among developing countries and within regions must also be considered. Latin America has made some progress in the treatment and disposal of liquid and solid household wastes, but almost none in the area of industrial wastes.

In view of this situation, the ECLAC/GTZ project has emphasized the activities noted here; i.e., environmentally sound treatment and disposal of wastes, especially urban and industrial solid wastes. In the second phase, special emphasis is being placed on industrial solid wastes, particularly hazardous ones, because they are the weakest link in the waste-management chain in the countries of the region, and because Governments are taking a more active interest in addressing the problem they present.

Objectives

21.28. The objective in this area is to treat and safely dispose of a progressively increasing proportion of the generated wastes.

Comment: The objective noted in this paragraph focuses on the idea of waste treatment (processing) and appropriate and/or safe final disposal, from the viewpoint of human and environmental health. The proposed objective is to treat and safely dispose of a progressively increasing proportion of the wastes generated, after applying the practices of minimization, reuse and recycling recommended in the previous two sections.

The text of Agenda 21 thus establishes a clear sequence to be followed in waste management policies, and at this point deals with the treatment and final disposal of those wastes which cannot be avoided. The ECLAC/GTZ project uses this same orientation and considers the various aspects of the topic. Once policies for the treatment and final disposal of waste have been designed and put into practice, the emphasis should shift to policies for minimizing wastes, as noted in previous sections.

Moreover, it is useful to distinguish clearly among different types of wastes, since the timing of the agendas of the countries of the region will differ in relation to each of them. One of the outputs of the project's activities is the mapping of the various stages through which waste management passes in each of the cooperating countries; this process allows technical cooperation to be better adapted to the countries' individual situations.

21.29. Governments, according to their capacities and available resources and with the cooperation of the United Nations and other relevant organizations, as appropriate, should:

(a) By the year 2000, establish waste treatment and disposal quality criteria, objectives and standards based on the nature and assimilative capacity of the receiving environment;

(b) By the year 2000, establish sufficient capacity to undertake waste-related pollution impact monitoring and conduct regular surveillance, including epidemiological surveillance, where appropriate;

(c) By the year 1995, in industrialized countries, and by the year 2005, in developing countries, ensure that at least 50 per cent of all sewage, waste waters and solid wastes are treated or disposed of in conformity with national or international environmental and health quality guidelines;

(d) By the year 2025, dispose of all sewage, waste waters and solid wastes in conformity with national or international environmental quality guidelines.

Activities

(a) Management-related activities

21.30. Governments, institutions and non-governmental organizations, together with industries, in collaboration with appropriate organizations of the United Nations system, should launch programmes to improve the control and management of waste-related pollution. These programmes should, wherever possible, build upon existing or planned activities and should:

(a) Develop and strengthen national capacity to treat and safely dispose of wastes;

(b) Review and reform national waste management policies to gain control over waste-related pollution;

(c) Encourage countries to seek waste disposal solutions within their sovereign territory and as close as possible to the sources of origin that are compatible with environmentally sound and efficient management. In a number of countries, transboundary movements take place to ensure that wastes are managed in an environmentally sound and efficient way. Such movements observe the relevant conventions, including those that apply to areas that are not under national jurisdiction;

(d) Develop human wastes management plans, giving due attention to the development and application of appropriate technologies and the availability of resources for implementation.

Comment: In various ways, and with various emphases, the ECLAC/GTZ project —within the scope of its objectives and activities— addresses these recommendations of Agenda 21, especially in relation to the design and improvement of national and/or local waste management policies and the development of the human and institutional resources needed to carry them out.

(b) Data and information

21.31. Standard setting and monitoring are two key elements essential for gaining control over waste-related pollution. The following specific activities are indicative of the kind of supportive actions that could be taken by international bodies such as the United Nations Centre for Human Settlements (Habitat), the United Nations Environment Programme and the World Health Organization:

(a) Assembling and analyzing the scientific evidence and pollution impacts of wastes in the environment in order to formulate and disseminate recommended scientific criteria and

guidelines for the environmentally sound management of solid wastes;

(b) Recommending national and, where relevant, local environmental quality standards based on scientific criteria and guidelines;

(c) Including within technical cooperation programmes and agreements the provision for monitoring equipment and for the requisite training in its use;

(d) Establishing an information clearing-house with extensive networks at the regional, national and local levels to collect and disseminate information on all aspects of waste management, including safe disposal.

Comment: While the definition, monitoring and follow-up of environmental standards is a growing activity in the region, it is still incomplete and fragmented, and heterogeneous among different countries, localities, types of economic activity, etc. and among different types of waste. Where environmental standards have been laid down, compliance with them is generally monitored and appropriate information thereby generated. But there are many places where no such standards exist and, therefore, no information is available. In the future, it will probably be necessary to define a specific area of work under the ECLAC/GTZ project to address the concerns noted in these recommendations.

(c) International and regional cooperation and coordination

21.32. States, through bilateral and multilateral cooperation, including through the United Nations and other relevant international organizations, as appropriate, should:

(a) Identify, develop and harmonize methodologies and environmental quality and health guidelines for safe waste discharge and disposal;

(b) Review and keep abreast of developments and disseminate information on the effectiveness of techniques and approaches to safe waste disposal and ways of supporting their application in countries.

Comment: As a project of a United Nations regional commission, supported by Germany's Federal Ministry of Economic Cooperation, the ECLAC/GTZ project represents an example of compliance with this recommendation of Agenda 21. The points noted here are among its main activities; i.e., improvement of environmentally sound waste management in the countries where the project operates.

Means of implementation

(a) Financial and cost evaluation

21.33. Safe waste disposal programmes are relevant to both developed and developing countries. In developed countries the focus is on improving facilities to meet higher environmental quality criteria, while in developing countries considerable investment is required to build new treatment facilities.

21.34. The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme in developing countries to be about \$15 billion, including about \$3.4 billion from the international community on grant or concessional terms. These are indicative and order of magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

(b) Scientific and technological means

21.35. Scientific guidelines and research on various aspects of waste-related pollution control will be crucial for achieving the objectives of this programme. Governments, municipalities and local authorities, with appropriate international cooperation, should:

(a) Prepare guidelines and technical reports on subjects such as the integration of land-use planning in human settlements with waste disposal, environmental quality criteria and standards, waste treatment and safe disposal options, industrial waste treatment and landfill operations;

Comment: Beyond the general nature of this recommendation, the project has adopted this criterion, since one of its areas of work involves the interrelationship between waste management and land use planning. The two activities undoubtedly have much to contribute to each other, and their potential for mutual reinforcement should constitute a specific objective of government policies. Moreover, the Environment and Human Settlements Division should carry out more of these activities, since its projects approach the same problem from both angles. The approach concerns the area where urban management and waste management overlap; i.e., what is called environmental urban management.

(b) Undertake research on critical subjects such as low-cost, low-maintenance waste-water treatment systems; safe sludge disposal

options; industrial waste treatment; and low-technology, ecologically safe waste disposal options;

Comment: For the most part, very little independent research is being done on critical subjects relating to waste management; most of the technologies used are adaptations of those used in developed countries. There are no special funds or specific areas of research (in universities or in State or private research foundations) related to pollution and environmentally sound waste management. As in other fields of research and in technological development, the region is highly dependent on the developed countries. Other critical aspects of these problems could be detected, apart from those noted, where it is necessary to invest resources and support research projects. This specific output could have a future place in the ECLAC/GTZ project in the areas in which it operates.

(c) Transfer technologies, in conformity with the terms as well as the provisions of chapter 34, on industrial waste treatment processes through bilateral and multilateral technical cooperation programmes, and in cooperation with business and industry including large and transnational corporations, as appropriate.

Comment: Private enterprise and market forces are the main catalysts of technology transfer in these areas. To date, no known programmes outside these sectors have specifically sought the transfer of technology in this field. As long as there are no government programmes in this area, the participation of private enterprise and the transparency of the market will remain crucially important for achieving an ongoing transfer of technology for waste treatment and disposal.

(d) Focus on the rehabilitation, operation and maintenance of existing facilities and technical assistance on improved maintenance practices and techniques followed by the planning and construction of waste treatment facilities;

(e) Establish programmes to maximize the source segregation and safe disposal of the hazardous components of municipal solid waste;

(f) Ensure the investment and provision of waste collection facilities with the concomitant provision of water services and with an equal and parallel investment and provision of waste treatment facilities.

(c) Human resource development

21.36. Training would be required to improve current waste management practices to include safe collection and waste disposal. The following is an indicative list of actions that should be taken by Governments, in collaboration with international organizations:

(a) Providing both formal and in-service training, focused on pollution control, waste treatment and disposal technologies, and operating and maintaining waste-related infrastructure. Inter-country staff exchange programmes should also be established;

(b) Undertaking the requisite training for waste-related pollution monitoring and control enforcement.

Comment: Initial and ongoing human resources training in the area of urban and industrial waste treatment and disposal is one of the main activities of the ECLAC/GTZ project. In 1992, the first International Course on Hazardous Waste Management for Environmentally Sustainable Development was held at Santiago, Chile; the same course was repeated at the regional level in Campinas and Limeiras, in the State of São Paulo, Brazil. The first course was conducted in cooperation with the Institute of Technology and Modelization (ITEMA) of the University of Catalonia, and the second, in cooperation with Brazil's CETESB. Currently, two training and professional development courses—one regional and one national—are being prepared for the second half of 1993, and will train a total of 120 students from the six countries participating in the project. The experts conducting the courses and workshops will come from ECLAC, some environmental technical organizations in the participating countries (CETESB and INDERENA), the Governments of those countries and the Polytechnic University of Catalonia, Spain, through ITEMA. In these courses, technical and government staff from the counterpart countries are trained in the formulation and implementation of the waste management policies needed in the countries. The courses under way focus on industrial solid wastes, with special emphasis on hazardous wastes.

(d) Capacity-building

21.37. Institutional reforms and capacity-building will be indispensable if countries are to be able to quantify and mitigate waste-related pollution. Activities to achieve this objective should include:

(a) Creating and strengthening independent environmental control bodies at the national and local levels. International organizations and donors should support needed upgrading of manpower skills and provision of equipment;

(b) Empowering of pollution control agencies with the requisite legal mandate and financial capacities to carry out their duties effectively.

Comment: The institutional framework for environmental issues is making progress in the region, as legislation, institutions, equipment and personnel are being modernized. The project, in so far as its resources allow, contributes to this modernization in various ways, as indicated in previous comments.

D. Extending waste service coverage

Basis for action

21.38. By the end of the century, over 2.0 billion people will be without access to basic sanitation, and an estimated half of the urban population in developing countries will be without adequate solid waste disposal services. As many as 5.2 million people, including 4 million children under five years of age, die each year from waste-related diseases. The health impacts are particularly severe for the urban poor. The health and environmental impacts of inadequate waste management, however, go beyond the unserved settlements themselves and result in water, land and air contamination and pollution over a wider area. Extending and improving waste collection and safe disposal services are crucial to gaining control over this form of pollution.

Comment: These circumstances are part of the background and basis of the ECLAC/GTZ project. However, as noted earlier, the project currently does not address the problem of controlling sewage-related pollution, where a broad field of action does, in fact, exist in the region. With regard to this programme's objective of extending the coverage of waste management services, especially to the poorest sectors, it would be interesting to conduct research involving the compilation and analysis of data on the coverage and the various levels of quality of waste management in the countries where the ECLAC/GTZ project operates (the objective of quality was addressed in previous programmes). This mapping would provide the information needed to plan both the extension of the coverage of current services and the improvement of their quality. This study would yield interesting data on quantitative and qualitative shortfalls—in the topics covered by the project—in urban and industrial waste management within the geographical area covered by the project in the six countries.

Objectives

21.39. The overall objective of this programme is to provide health-protecting, environmentally safe waste collection and disposal services to all people. Governments, according to their capacities and available resources and with the cooperation of the

United Nations and other relevant organizations, as appropriate, should:

(a) By the year 2000, have the necessary technical, financial and human resource capacity to provide waste collection services commensurate with needs;

(b) By the year 2025, provide all urban populations with adequate waste services;

(c) By the year 2025, ensure that full urban waste service coverage is maintained and sanitation coverage achieved in all rural areas.

Activities

(a) Management-related activities

21.40. Governments, according to their capacities and available resources and with the cooperation of the United Nations and other relevant organizations, as appropriate, should:

(a) Establish financing mechanisms for waste management service development in deprived areas, including appropriate modes of revenue generation;

(b) Apply the "polluter pays" principle, where appropriate, by setting waste management charges at rates that reflect the costs of providing the service and ensure that those who generate the wastes pay the full cost of disposal in an environmentally safe way;

Comment: One of the specific subjects which the ECLAC/GTZ project studies in its applied research and discusses with its counterparts is the application of the "polluter pays" principle. This topic takes on particular relevance in the legal and institutional spheres and in the application of regulatory and economic instruments. The studies being conducted will determine the extent and rigour of the application of this principle in the countries covered by the project, as well as the Governments' level of interest in enforcing it more decisively.

(c) Encourage institutionalization of communities' participation in planning and implementation procedures for solid waste management.

(b) Data and information

21.41. Governments, in collaboration with the United Nations and international organizations, should undertake the following:

(a) Developing and applying methodologies for waste monitoring;

(b) Data gathering and analysis to establish goals and monitor progress;

(c) Inputting information into a global information system building upon existing systems;

(d) Strengthening the activities of existing information networks in order to disseminate focused information on the application of innovative and low-cost alternatives for waste disposal to targeted audiences.

Comment: As noted earlier, the project may, in the future, place more emphasis on gathering, processing and disseminating—to targeted audiences—data and information on environmentally sound waste management, given the importance of the topic. What has been done to date with available project resources is neither as complete nor as focused as what is being proposed in this and previous sections on the subject.

(c) International and regional cooperation and coordination

21.42. Many United Nations and bilateral programmes exist that seek to provide water supply and sanitation services to the unserved. The Water and Sanitation Collaborative Council, a global forum, currently acts to coordinate development and encourage cooperation. Even so, given the ever-increasing numbers of unserved urban poor populations and the need to address, in addition, the problem of solid waste disposal, additional mechanisms are essential to ensure accelerated coverage of urban waste disposal services. The international community in general and selected United Nations organizations in particular should:

(a) Launch a settlement infrastructure and environment programme following the United Nations Conference on Environment and Development to coordinate the activities of all organizations of the United Nations system involved in this area and include a clearing-house for information dissemination on all waste management issues;

Comment: ECLAC could—as a project involving the two units of the Environment and Human Settlements Division—carry out an initiative like the one suggested in this section of Agenda 21.

(b) Undertake and systematically report on progress in providing waste services to those without such services;

(c) Review the effectiveness of techniques for and approaches to increasing coverage and identify innovative ways of accelerating the process.

Means of implementation

(a) Financial and cost evaluation

21.43. The Conference secretariat has estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be about \$7.5 billion, including about \$2.6 billion from the international community on grant or concessional terms. These are indicative and order of magnitude estimates only and have not been reviewed by Governments. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

(b) Scientific and technological means

21.44. Governments and institutions, together with non-governmental organizations, should, in collaboration with appropriate organizations of the United Nations system, launch programmes in different parts of the developing world to extend waste services to the unserved populations. These programmes should, wherever possible, build upon and reorient existing or planned activities.

21.45. Policy changes at the national and local levels could enhance the rate of waste service coverage extension. These changes should include the following:

(a) Giving full recognition to and using the full range of low-cost options for waste management, including, where appropriate, their institutionalization and incorporation within codes of practice and regulation;

(b) Assigning high priority to the extension of waste management services, as necessary and appropriate, to all settlements irrespective of their legal status, giving due emphasis to meeting the waste disposal needs of the unserved, especially the unserved urban poor;

(c) Integrating the provision and maintenance of waste management services with other basic services such as water-supply and storm-water drainage.

Comment: The project has carried out various initiatives like those noted here with respect to household solid wastes. Perhaps more emphasis could be placed on targeting low-income sectors that lack appropriate waste

management, and on taking full advantage of the informal, low-cost technologies used in those sectors. Except for initiatives to incorporate informal collectors (scavengers) into more formal waste-recycling actions and institutions, no work of this kind has been done under the ECLAC/GTZ project. Joint activities with the Social Development Division and non-governmental organizations could be launched in this area.

21.46. Research activities could be enhanced. Countries, in cooperation with appropriate international organizations and non-governmental organizations, should, for instance:

(a) Find solutions and equipment for managing wastes in areas of concentrated populations and on small islands. In particular, there is a need for appropriate refuse storage and collection systems and cost-effective and hygienic human waste disposal options;

(b) Prepare and disseminate guidelines, case-studies, policy reviews and technical reports on appropriate solutions and modes of service delivery to unserved low-income areas;

(c) Launch campaigns to encourage active community participation involving women's and youth groups in the management of waste, particularly household waste;

(d) Promote intercountry transfer of relevant technologies, especially technologies for high-density settlements.

Comment: Despite the importance of the topic, little research has been done in the region on cost-effective methods of waste management that make use of indigenous experiences, nor have any special programmes been launched to promote citizen participation—especially among women and young people—in waste management. However, activities are being carried out to promote the transfer of experiences and technologies in waste management, which include, to a limited extent, the experience and specific features of the region. The particular problem of waste management in poor communities has not been targeted as a specific area for the transfer of technology. Consideration should be given to the appropriateness of zoning urban and rural areas—by income level, availability of other basic services, type of waste or other suitable indicators—for the purpose of designing and implementing waste management policies. This could serve to determine the goals and stages of the effort to achieve total population coverage in waste management services. The latter could be gradually introduced and steadily upgraded, so that only the final stages would include minimizing waste, recycling and other measures for reusing wastes that require better quality both in the waste itself and in the community's awareness and facilities.

(c) Human resource development

21.47. International organizations and national and local Governments, in collaboration with non-governmental organizations, should provide focused training on low-cost waste collection and disposal options, particularly techniques for their planning and delivery. Intercountry staff exchange programmes among developing countries could form part of such training. Particular attention should be given to upgrading the status and skills of management-level personnel in waste management agencies.

21.48. Improvements in management techniques are likely to yield the greatest returns in terms of improving waste management service efficiency. The United Nations, international organizations and financial institutions should, in collaboration with national and local Governments, develop and render operational management information systems for municipal record keeping and accounting and for efficiency and effectiveness assessment.

Comment: As stated earlier, training is an ongoing activity of the ECLAC/GTZ project, and waste management is one of the main topics of the courses offered. In all of the participating countries except Costa Rica, human resources training is provided at both the municipal and national levels.

(d) Capacity-building

21.49. Governments, institutions and non-governmental organizations, with the collaboration of appropriate organizations of the United Nations system, should develop capacities to implement programmes to provide waste collection and disposal services to the unserved populations. Some activities under the programmes should include the following:

(a) Establishing a special unit within current institutional arrangements to plan and deliver services to the unserved poor communities, with their involvement and participation;

(b) Making revisions to existing codes and regulations to permit the use of the full range of low-cost alternative technologies for waste disposal;

(c) Building institutional capacity and developing procedures for undertaking service planning and delivery.

Comment: As noted earlier, building institutional capacity, especially at the municipal level, is one of the project's ongoing activities.