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NATIONAL GOVERNMENT INTERVENTION IN FINANCING LGU PROJECTS WITH ENVIRONMENTAL OBJECTIVES

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Market failures due to, among other factors, the presence of externalities, incomplete arkets and ill-defined property rights provide a rationale for government intervention since ivate market provision will tend to lead to inefficient allocation and use of natural resources and e environment. Another rationale for government intervention is income redistribution which s have significant environmental impact. The paper explores the roles of the national governnt and local government units in financing local projects with environmental objectives. To strate the concepts, the cases of municipal solid waste management in Metro Manila and small tershed protection are analyzed. The rationale for national government intervention and proed cost-sharing schemes for the different levels of government are presented for the specific jects.

1. Market Failures, Environmental Degradation, and Government Intervention

Much of the problem of environmental degradation can be traced to marfailures which lead to greater than socially optimal use of natural resources d environmental services. The environment serves several functions: (1) natul resource products such as land, timber, and water are used as inputs to oduction processes; (2) some products such as crops and fuelwood are directly d in consumption activities; (3) the air, water, and land environment gener- waste disposal services as sinks of the wastes resulting from production and nsumption activities; and (4) the environment is also a source of amenity rvices such as recreational services from parks and beaches. There has been owing recognition of natural resources and the environment as scarce reurces and hence, the greater concern about the sustainability of development hich can be constrained by environmental and natural resources in the fure. The costs of environmental damage to humans take the form of losses in alth, productivity, and amenity.

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Market failures are quite pervasive in the natural resource sectors. Among these market failures are the presence of externalities; the public good nature of some environmental goods; incomplete markets with some resources unpriced or having prices not reflecting their social opportunity cost; ill-defined or non-existent property rights; information failures and high transaction costs; and failure of competition. Market failures can be interrelated. The absence of well-defined property rights may prevent markets from emerging. Transaction costs including the costs of information, negotiating, monitoring, and enforcement can inhibit private market formation even with well-defined property rights. The government through its collective and coercive power may be able to internalize externalities at a lower transaction cost than the free market.

Natural resource conservation and sustainable development involve a tradeoff between present consumption and future benefits. Individuals may have myopic time horizons and high discount rates that discourage conservation. Due to imperfections in the capital market and ill-defined property rights, subsistence or small farmers and fishermen can have difficulty obtaining institutional credit at the market rate of interest. A sufficiently high market rate of interest and a low natural growth rate of a species may lead to its extinction. With the continuity and risk-pooling capacity of society, the government can intervene to induce longer time horizons and lower discount rates. Biases against environmental projects with long gestation periods can also arise due to environmental and market uncertainties. There can be uncertainties about ownership of and access to natural resources, natural resource commodity prices which can be volatile, and threats of technological change which can provide cheap substitutes. Another factor that should be taken into account in environmental planning is the possible irreversibility of decisions, such as in logging a tropical rainforest, that may foreclose alternative uses of the resource in the future.

The presence of market failures provides a rationale for government intervention since private market provision will tend to lead to inefficient allocation and use of the natural resources and the environment. However, the presence of market failures is a necessary but not sufficient condition for government intervention. The government should step in only if it can do better than the market and the net social benefits, taking into account the costs of planning, implementation, and enforcement, are positive. Another rationale for government activity is income redistribution which can have significant environmental impact. Poverty underlies or at least contributes to some of the serious environmental problems such as those associated with upland farmers, coastal fishermen, and slum dwellers.

2. National Government and Local Government Roles

The Local Government Code passed in 1991 devolves the planning, financing, and implementation of local projects to local government units (LGUs). In essence, the responsibility of the provision of local public goods lies with the LGUs. This decentralized approach has the advantages of greater adaptability to local needs and preferences and greater incentives to provide services efficiently.

The Department of Environment and Natural Resources (DENR) was the least devolved among the central agencies (DA, DOH, DSWD, DBM). In 1992, only 4 percent of personnel and 2 percent of agency appropriation were devolved whereas the figures for the other agencies were in the ranges of 45-60 percent for personnel and 25-50 percent for agency appropriations (Diokno, 1994). Functions devolved to cities and provinces are the enforcement of social forestry laws, pollution control laws, small-scale mining laws, and other laws protecting the environment, and the responsibility for mini-hydroelectric projects for local purposes. Functions devolved to municipalities are the implementation of community-based forestry projects including integrated social forestry projects, the control of community forests not exceeding 50 sq. km., and the establishment of tree parks and greenbelts.[1] Concerns raised at the local level over the implementation of the devolution are the financing problem, the lack of technical capability at the local level, rent-seeking by local officials, the optional nature of having an environment and natural resource officer (ENRO), and the problems of accessing the technical resources of the DENR by the LGUs. The most affected offices of the DENR are the Forest Management Bureau (FMB) with the devolution of the integrated social forestry program and the Environmental Management Bureau (EMB) with the devolution of the enforcement of pollution control laws.

The rest of the paper focuses on identifying local environmental projects and the appropriate role of the national government. National government intervention in financing local projects can be justified on the basis of efficiency, equity, and stabilization objectives of the national government. Specifically, the economic rationale are benefit spillover, minimum standards for services, and

[1]According to Cebu and Bohol local government officials in an interview in May 1995, the DENR has devolved only functions pertaining to sand and gravel, and some social forestry. With respect to forestry projects, those with regular government funding were devolved while those that are foreign-funded are retained by the DENR. More relevant to urban areas than to rural areas is the devolution of vehicular emission control and other pollution control laws.

fiscal equalization (Shah, 1991). The form of the intergovernmental transfer, whether block grants, nonmatching categorical aid or matching grants, should vary according to the justification for national intervention.

A necessary condition also for a local government project to be undertaken is the existence of some market failure or a redistributive objective. Some government responses for redistribution and macroeconomic stability are most effectively done at the national level. The effects of stabilization policies are not local by nature. Labor migration limits the extent of redistribution feasible at the local level. National cohesion requires centralization of some policymaking and regulation. With the devolution, the national government agencies (NGAs) are expected to concentrate on policymaking, monitoring, and providing technical assistance to LGUs. It can be less costly for the national government to obtain information, and replication of research efforts can be avoided. The low transaction costs lend technical and monitoring assistance systems developed at the national level public good aspects redounding to national benefit.

The lack of technical capability at the local level (provincial, municipal and city) has hampered the devolution process and the effectiveness of local governments in environmental management. It has been observed from field visits in the provinces of Bulacan and Cebu that there are personnel with engineering degrees who have the potential to grasp and the willingness to learn the technical knowledge needed for project implementation. The problem of technical capability is more severe at the municipal level that local monitoring and enforcement possibilities can be quite limited. Because of budget constraints and the salary standardization law governing public employment, municipalities and cities may have problems hiring qualified personnel. An alternative is the private provision of public services. There are qualified and trainable people in nongovernmental organizations who can offer their services to several LGUs.[2] The scientific nature, technical requirement, and cost of equipment for monitoring environmental projects constrain the LGUs' monitoring capacity.

There is a need for both national and decentralized participation in resource and environmental management. Some environmental problems and spillover effects are local in nature or at most affect a group of LGU jurisdictions. The LGUs may also have different preferences over environmental quality and private goods. In this case, as occurs in the Laguna Lake area, a mech-

[2] In the same manner, solid waste management can be publicly provided at the local level but some suboperations like garbage collection and hauling can be subcontracted to private firms

tem for LGU coordination has to be established such that the authority to ake and enforce environmental decisions is well-defined. The national or pro-incial government, whichever is appropriate, may facilitate coordination ef-rts.

Due to differences in environmental conditions and local tastes, the opti-al level of environmental quality can differ across localities. For example, in pollution problem, the optimal level of pollution is that for which the mar-nal social damages of waste discharges equal the marginal abatement cost. marginal social damages, related to individuals' willingness to pay to avoid damages associated with given levels of waste discharges, depend on the references and income of the people, the size of the affected population, and assimilative capacity of the environment in the affected area. Abatement sts can vary with the industrial composition and factor price configuration in area. Hence, local differentiation in environmental programs can be opti-al.

Analogous to the case of tax competition among local government units, re can be interregional competition by reducing standards and relaxing regu-tions for environmental quality to encourage business investment, promote al economic development, and enlarge the local tax base. If the competition ong communities takes the form of rent-seeking behavior such that there is increase in social output but merely a shift from one community to another, n excessive environmental degradation can result. In this case, the tradeoff tween environmental quality and additions to real output for the community d the society will differ. This kind of interregional competition may lend sup-rt in setting national minimum standards for environmental quality and some rm of resource regulation at the national level.

The national government is expected to have a wider social perspective d a longer time horizon in planning than the local governments. The respon-bility of promoting the efficient functioning of a common internal market lies marily on the national government. Hence, there can be differences in pri-ities or degree of importance of objectives in environmental management be-een the national government and the local governments.For example, locat-g pollutive activities such as power generating plants, cement plants, and ndfills in their jurisdiction may be resisted by the local people. On the other nd, national economic development may entail increases in such activities. problem may be approached in the context of an externality and public od problem. There can be social benefits not fully captured by the localities oulddering the costs of such activities. A similar problem can also arise with

respect to the sustainability issue; the rates of time preference of the nat... government and the local governments may differ and result in conflicts ... the rate of extraction and use of natural resources.

Poverty has been considered an important factor in environmental de... radation. Slash and burn techniques of upland farmers and fuelwood gath... by marginal and subsistence groups, coupled with population pressure (hi... population density in some areas), have imposed greater pressure on envi... mental resources leading to problems of flooding, water supply, erosion, ... siltation. Regional income inequality has induced migration to urban areas ... sulting in congestion and waste disposal problems in urban areas. The lo... income people are also said to have higher discount rates that lead to a ... towards present consumption over future use and higher than socially opti... rates of resource use. The higher discount rates of poorer people may also ... plain their lesser concern about the health problems due to pollution and ... pational hazards (for example, from pesticide use for farmers and use of ind... trial chemicals for factory workers). Studies have also shown that higher ... come people have a greater willingness to pay for environmental quality, ... is, environmental quality is a superior good. Hence, poverty alleviation ... grams can contribute to higher demand for environmental quality.

Due to labor mobility, the redistribution function is best handled by ... national government. There are two approaches to the redistribution probl... The first is through some fiscal equalization mechanism to eliminate or red... differential net fiscal benefits among the local government units (Shah, 199... This assistance is in the form of a block grant. The internal revenue allotm... (IRA) for local government units mandated in the Local Government Code ... be partially serving this function. The IRA formula for LGU entitlement ... be reviewed; the equalization standards must also be defined.[3] The second ... proach is assistance to target groups such as upland farmers, small fishermen ... and the urban poor. The Social Reform Agenda (SRA) of the Ramos Administ... tion can be considered as an example of this approach. When there is heteroge... neity in income within a local community, assistance to a local government ... or block grants to the community may simply result in lowering the effe... tax rate for all individuals in the community. Since the poor are less likely ... pay taxes than the rich, block grants may benefit wealthier taxpayers.

[3] Ex-post, some fiscal equalization may be occurring in the current IRA system. How... it may be preferable to have a deliberate and more transparent formula for equalization, whi... different from equal sharing which is being used. Additional information such as area-spe... human development indicators are needed to implement fiscal equalization.

3. A List of Local Environmental Projects

The following is a partial list of possible local environmental projects classified as either mainly rural or urban.[4] Projects can also be overlapping in coverage.

Rural projects: watershed protection; water supply; water pollution control from rural industries and small-scale mining; soil conservation; forest management; protected area management; wildlife conservation; municipal fishery management; coastal resource management; ecotourism.

Urban projects: water supply; sanitation and sewerage; drainage and flood control; solid waste management; low-income settlements and slum upgrading; neighborhood parks; river rehabilitation; vehicular emission control; traffic engineering; air and water pollution control.

Most of these projects, though basically local in nature, have inter-LGU spillovers and may require expenditures beyond the capacity of individual LGUs. Prior to devolution, some of these projects were under the following national government agencies: DA, DENR, DPWH, DOTC, MWSS, LWUA, and HLURB.

The extent of spillover effects is project- and site-specific. Based on the externality argument alone, higher-level government participation to coordinate joint LGU efforts may be warranted for optimal provision of the local public good or service. National government intervention may result in lower transaction costs of coordination and the national government can have economies of scale in providing technical assistance. Financial assistance for specific LGU projects can also be used to influence LGU project choices towards national priorities. The national government can also ensure the provision of basic needs at minimum levels of provision. Some LGU projects can have income redistribution objectives or have significant implications on the smooth functioning of the internal common market; in these cases, national government financing assistance may be justified.

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[4] A representative of the City of Mandaluyong, Metro Manila noted that though they do not have forests in their city, they still have a forestry problem because the watersheds from where the source their water are denuded. This comment exhibits a good grasp of the externality problem in environmental projects. A councilor of Iloilo City reported that their city government has approached and volunteered assistance to the municipality where their watershed is located.

In evaluating whether national government intervention in a local project is warranted, a more efficient approach is to assume, as a starting point, that the environmental project is local in nature and therefore must be financed by the LGU, and then examine arguments why there should be national government intervention. The optimal level of higher level government participation is not necessarily national and the Coasian solution of inter-LGU negotiation, cooperation, and implementation must be encouraged. Following are possible considerations with respect to specific environmental projects.

The scale and externality factors can be important in watershed protection and forest management projects. The benefits, especially indirect effects on ecological services such as flood control and productivity of downstream fisheries, and the benefits from power generation, irrigation and water supply, can spill outside the LGU jurisdictions. The same factors are relevant in biodiversity conservation and coastal resource management projects; the nonuse values such as option values and existence values may not fully accrue to local residents. The lack of technical expertise at the local level can hamper the enforcement of pollution control laws. If private services for monitoring and laboratory services can be bought by the LGUs, the national government need not step in for monitoring. As the country advances to higher stages of economic development and markets for environmental services become more established, the need for national government intervention can be reduced. A case for standard setting by the national government can be made due to the possibility of LGU competition for business investment. The peculiarity of megacity problems resulting from the diseconomies of agglomeration and the technical requirements of metropolitan projects such as solid waste disposal management and pollution control necessitate, at this period of capability-building by the Metro Manila Development Authority, technical and financial assistance from the national government. There is also an equity aspect to the megacity problems related to the population and migration issues.

The institutional mechanism for inter-LGU cooperation to support local environmental projects must be established with a clear definition of powers and responsibilities. National government assistance may be critical at the early stages of devolution to provide incentives to develop these mechanisms. Depending on the project scale and requirements, the coordinating body can either be a generic joint LGU authority covering several operations or a project-specific authority. Examples of the former are the Regional Development Councils (RDCs) and the Metropolitan Manila Development Authority (MMDA). An example of the latter is the Laguna Lake Development Authority (LLDA) which is an attached agency of the DENR. Due to the cost of bureaucracy, overhauling

restructuring of existing institutions must be first explored and creation of new institutions must be resisted except in extraordinary circumstances. Incentive mechanisms must be devised for LGU cooperation and nonshirking of responsibilities within a coalition of LGUs.

The national government, on the other hand, must define its priorities, set minimum standards for services, strengthen its policymaking and monitoring roles, and lend technical assistance to LGUs. For example, there should be movement away from DPWH implementation of local public work projects but the agency can provide planning and project coordination assistance. For the effectiveness of the devolution process and overall efficiency in the allocation of the country's resources, the national government must also strengthen its technical capacity and performance of its functions.

4. Illustrative Cases

Two local environmental projects, solid waste management and watershed protection, are discussed in greater detail to illustrate the use of the principles of expenditure assignment among various levels of government. Municipal solid waste services in Metro Manila and small watershed protection in rural areas are taken as illustrative cases.

Municipal Solid Waste Services in Metro Manila

The provision of solid waste management services has been often marked by severe operational deficiencies resulting in environmentally unacceptable disposal of wastes. In addition to aesthetic considerations, the solid waste disposal problem has been associated with health risks and productivity losses, flooding problems due to clogging of drainage systems by dumped garbage and refuse, and pollution of water resources near dumping sites.

The solid waste management services can be decomposed into three components: collection, hauling, and disposal. Many municipalities finance solid waste services from general revenues, which results in efficiency losses since waste generators effectively face zero marginal costs. An argument for financing solid waste services from general revenue is that the externality costs of illegal disposal are large compared to the efficiency gains from marginal cost pricing. In urban areas, typically with relatively higher incomes and population density, increasing levels of production and consumption activities have imposed greater stress on the assimilative capacity of the environment to render

its waste disposal function. The solid waste management problem in urban areas is also affected by the high incidence of poverty as reflected by the presence of slums and squatters in cities.

Earlier studies have noted the following findings with respect to solid waste management systems (Bartone, 1991). There are limited economies of scale for collection in districts with population greater than 50,000; hence responsibility for collection has been mostly with the local government unit. There is also greater scope for privatization in the collection and hauling of solid wastes. Transfer stations may be desirable when haul distances from the collection area to the disposal site are greater than 15 to 20 km. Compared with larger vehicles, small collection trucks entail a larger cost per kilometer to move each cubic meter of waste from collection area to disposal site. With rising land prices in urban areas, landfill areas within the metropolis are becoming more scarce. There is generally a "not in my backyard" (NIMBY) syndrome in the siting of disposal operations due to the greater concern of individual households in getting their wastes collected and keeping their neighborhoods clean, and the perceived negative externalities of disposal sites. Some of these externalities are noise, odor, litter, extra traffic; health risks due to flies, rats, and other vectors; surface and groundwater pollution from leachate; air pollution from gases and fumes; and danger of gas explosions. There are considerable economies of scale in transfer and disposal operations. Hence, some large metropolitan areas have a regional authority that has the primary responsibility for transfer and disposal functions.

When the private cost of waste services to individual water generators is less than the social cost to society, then the externality problem leads to a greater than optimal rate of waste generation. Conceptually, users of environmental services should face prices reflecting the scarcity value of the environment. For efficiency, waste generators must face prices that internalize the externality costs. When municipalities finance solid waste services from general revenue or when waste generators are charged flat fees for waste services, there is no economic incentive for waste reduction and recycling since waste generators effectively face zero marginal costs.

The economic literature has yielded the following results on optimal policy instruments for waste generation (Fullerton and Kinnaman, 1995; Strathman, Rufolo and Mildner, 1995). With only two disposal options, garbage and recycling (including waste minimization), the optimal garbage collection fee equals the marginal direct resource cost (to pay for use of scarce resources such as labor, capital, and land used in the collection, hauling, and disposal of wastes)

plus the marginal external environmental cost (for example, for damages to residents near disposal sites). When illegal disposal such as illicit dumping or burning is a third option and enforcement is difficult, the optimal structure is a subsidy to legal disposal together with a consumption tax reflecting a good's possible externality cost when illicitly dumped or burned. The subsidy to legal disposal (both garbage and recycling) is to help mitigate the environmental cost of illegal disposal. The form of a consumption tax combined with a subsidy to legal disposal is equivalent to a deposit-refund system with the deposit returned as a subsidy to legal disposal.

These findings are particularly relevant in developing countries, where financial constraints result in enforcement and monitoring difficulties, though the move towards strengthening local governments and increasing their accountability can partly alleviate the problem. If marginal cost pricing increases illegal disposal and if its externality costs are high, then the efficiency losses from underpricing waste services may be the smaller cost to bear. However, there is scope for some form of consumption tax. The optimal policy entails a different tax rate for each good depending on the externality cost if it is illegally dumped. In practice, target goods can be specified or goods can be categorized in different levels of tax rates. A form of the deposit-refund system takes place with softdrink bottles in the Philippines. Consumers are charged an explicit bottle deposit, which may not include the possible externality cost of illegal dumping, at the retail level which is refunded upon bottle return. The actual policy mix would entail a move towards the marginal cost pricing of waste collection services supplemented by consumption taxes taking the form of a deposit-refund system.

A related issue to solid waste management is the pricing of natural resource goods such as minerals and wood products which generate recyclable wastes. Recycling reduces disposal costs, and the use of recycled materials as part of the feedstock in manufacturing a product, as in steel, glass, and paper manufacturing, can result in less energy and water consumption, air and water pollution, and waste generation. However, for recycling or resource recovery to succeed, a market must either exist or can be established for recovered or recycled products. Markets can be created and recycling can become profitable for some waste products if materials from primary resources and disposal of unrecycled waste were appropriately priced. The economic environment can often be biased towards primary resource extraction over resource recovery and recycling.

Municipal solid waste management in Metropolitan Manila

The Metropolitan Manila Development Authority (MMDA) has jurisdiction over 17 cities and municipalities. It has the status of a national government agency (NGA) attached to the Office of the President. In 1994, Metro Manila had an estimated population of 8.945 million with the daytime population increasing by about 10 percent. Occupying less than one percent of the national land, Metro Manila has a population density of 14,055 persons per square kilometer, or 62 times higher than the national average of 226 persons per sq. km. The population density of Metro Manila is much higher than that of Metropolitan Bangkok but nearer to that of Jakarta. In 1993, per capita gross regional domestic product in Metro Manila was about twice that of the national average. The Manila metropolis has a population growth rate of 2.9 percent annually over the 1980-1990 decade and about 30 percent of the population are living below the poverty line (Balisacan, 1994).

It is estimated that per capita waste production in Metro Manila is 0.651 kg per day generating about 5,831 metric tons of waste daily or about 17,66 cubic meters of waste. The per capita solid waste generation rate for Metro Manila seems to be average for metropolitan areas in developing countries and much lower than those of metropolitan areas in developed countries. Per capita generation has been observed to be heavily affected by the level of economic activity with economic recessions associated with declines in per capita generation. The rate of solid waste generation generally increases with income. Source reduction may slow the rate of growth of solid waste generated but population and income increases will likely increase the amounts of solid waste generated. The demand for solid waste treatment and disposal capacity will likely increase. Part of this demand will be satisfied by increased recycling.

A 1982 study showed that almost half of the solid wastes is generated by households. Since households are a significant generator of solid wastes, the policy responses should take into account the diffused nature of waste generation. Though there is potential use for each solid waste component, domestic solid waste tend to have a wider range of antagonistic impurities and variation in composition, generation rates, and quantity compared to industrial waste. The characteristics of domestic solid wastes can hamper recycling and resource recovery efforts.

With the creation of the MMDA[5] in 1994, municipal solid waste collection is the responsibility of the local government units. Though some municipalities

[5] The MMDA supersedes the Metro Manila Authority (MMA) created in 1990.

till maintain their own waste collection fleet, the common practice is for the cal government units to subcontract collection services to private firms. The ntractor is usually given full responsibility for waste collection in the con-acted area regardless of the number of trips it makes. Local collection efforts, pecially in poorer municipalities, are supplemented by the MMDA which was anted a total of 171 collection vehicles by the Japan International Coopera-on Agency (JICA) over the 1987-1992 period. As of 1993, some 49 units or 29 rcent of these vehicles were completely unserviceable. There is also direct ring of private waste collectors by some large industrial firms, commercial nters, condominiums, and residential subdivisions. About 85 percent of the lid waste generated is collected with the remaining 15 percent either recycled, rned, or illegally dumped. The collection rate in Metro Manila may seem to mpare favorably with the national collection rate of only 19 percent for do-estic solid waste but the higher population concentration in urbanized Metro anila makes the waste disposal problem more severe (ENRAP Monitor, 1995).

Collected garbage is directly hauled to the final disposal sites by collec-on vehicles. An exception is solid waste destined for final disposal at the rmona sanitary landfill, one of two sanitary landfills operated by the MMDA. he Carmona sanitary landfill has a transfer station in Las Piñas; the hauling stance between the transfer station and the sanitary landfill is about 40 km th a trailer van completing a turnaround trip in 2.5 hours. Only 55-60 per-nt of the rolling stock (trailer vans) is operational yielding a daily capacity of 2 collector truckloads of wet waste or 240 collector truckloads of dry waste. he City of Manila itself generates more than 500 truckloads of waste collected ily. Because of government bureaucracy, rigidity, and financial constraints at have led to the neglect of maintenance of existing equipment and the fail-e to acquire necessary equipment, the privatization or private subcontracting hauling operations from transfer station to the sanitary landfill should be plored.

The status of final disposal sites for Metro Manila are given in Tables 1-3. he government has indicated plans for a build-operate-transfer (BOT) scheme r the construction and operation of future sanitary landfill developments in e San Mateo and Carmona sites. A 200-hectare landfill near San Mateo is o proposed. Of the solid waste collected in Metro Manila, approximately 30-percent is disposed in sanitary landfills and the rest in open dumpsites. The NR tends to favor the closure of open dumpsites and the development of nitary landfills.

Table 1 - Status of Sanitary Landfills for Metro Manila as of November, 1994

Disposal site	Area (hectares) Total	Usage	Date opened	Remarks
1. San Mateo, Rizal	57.7	7.5	1991	A new three (3) hectare area is being developed.
2. Carmona, Cavite	65.9	5.0	1993	Phase 4 to be completed by December, 1994

Source: Department of Environment and Natural Resources, Philippines (1995).

Table 2 - Summary of Infrastructure Expenditure, Current Peso (Excluding the social opportunity cost of land)

Year	San Mateo sanitary landfill	Las Piñas transfer station	Carmona sanitary landfill	Annual expenditu
1991	11,341,576		24,929,274	11,341,57
1992	50,709,133	14,989,540	62,362,102	90,627,9
1993	26,417,850	15,719,937	52,555,224	104,499,8
1994	9,700,877			62,256,10
Total per facility	98,169,436	30,709,477	139,846,600	268,725,51

Note: Phil. P26 = US $1 (1995)

1995 budget for personnel services, maintenance and other operating expenses, pesos

Office of the Project Director	P 3,745,000
San Mateo Sanitary Landfill	34,410,353
Transfer Operations	37,691,757
Carmona Sanitary Landfill	34,570,828
Total	**P 110,417,938**

Based on MMA operating expenses only:

estimated average disposal cost = P60.00/cubic meter
= P180.00/metric ton

Source: Department of Environment and Natural Resources, Philippines (1995).

Table 3 - Status of Open Dumps for Metro Manila, as of November, 1994

Disposal site	Area (hectares)	Date opened	Remarks
Camarin, Kalookan	30	1989	Local use only; rehabilitation proposed.
	–	1991	
Concepcion, Marikina	1.5	1994	Local use only; semi-sanitary landfill.
Payatas, Quezon City	20	1978	Closed; P2.53B rehabilitation proposed; privately owned.
Leonel Hauler's "transfer station" at R-10 Manila	1.5	1993	Local use only.
Pinagbuhatan, Pasig	15	1979	Local use only; closed; rehabilitation proposed.
Pulang Lupa, Las Piñas	–	–	Local use only.
Bacoor, Cavite*	–	–	Privately-owned.
San Pedro, Laguna*	7	1987	Privately-owned; ordered closed in 1988; still operating.
Dasmariñas, Cavite*	30	1988	Privately-owned.

*outside Metro Manila
Source: Department of Environment and Natural Resources, Philippines (1995).

Open dumpsites are managed by the local governments of the cities or municipalities where they are located; for example, the Payatas dump is managed by the Quezon City government. Some of the open dumps are on privately owned lots where fees of P50 to P300 a truck are collected. Some dumpsites that have been officially closed by the DENR, like Payatas and Smokey Mountain, are still being used due to the presence of "syndicates" or "colonies" of scavengers whose livelihood depends on the dumpsites. Immediate closure of dumpsites leaves them with few alternative sources of income. MMDA is responsible for the sanitary landfills at Carmona and San Mateo, both outside Metro Manila, and the Las Piñas transfer station. Maintenance and operating costs are shouldered by the MMDA. No tipping fees are collected from the municipalities nor does the DENR allocate funds for the operating costs of the landfills. Funds for development are also sourced from other national agencies like the Office of the President.

There is no formal waste separation activity nor mechanically operated systems for waste recovery in Metro Manila. Most of the recyclable materials are recovered manually by scavengers who are estimated to number about 17,000. Waste separation and recovery occur at the source before collection, during collection and at disposal. Recovered materials, such as paper, cardboard, plastics, aluminum, tin cans, bottles, scrap metal, and rubber are sold mostly to large manufacturers and factories. There is no estimate of the reduction in waste before final disposal due to waste recovery between collection and disposal.

Municipal solid waste management in the Municipality of Marikina

Based on an interview with the head of the Waste Management Office in Marikina, a municipality under the MMDA, the following information were obtained. For 1995, the Waste Management Office of Marikina has a budget of P34 million pesos which covers collection and hauling costs. Marikina has a population of about 400,000 and residential areas receive once-a-week garbage collection services. Special collections, for example, for oversized refuse, are done at least once a month per barangay. Only business establishments are charged garbage fees collected upon renewal of business licenses. Their office is looking into the feasibility of charging households garbage fees, even at a rate of P10 per household a month. A problem is the collection of these garbage fees especially in squatter areas where people do not pay property taxes.[6] Private garbage collection and wastepickers are discouraged because of problems of

[6] A flat fee does not address the issue of marginal cost pricing but can help raise revenue to finance operations.

garbage disposal.[7] There is also a project of the First Lady, Amelita Ramos, wherein wastepickers are provided pushcarts by the DENR; this project involves mainly wastepickers providing junkshops with recovered materials. The municipality has 10 working garbage collection trucks out of the 29 it obtained from the MMDA; these 29 trucks are part of the 49 completely unserviceable JICA-donated collection vehicles earlier reported. The municipality reconditioned the 10 collection vehicles to running condition which it has been using for the past two years. However, the maintenance cost of these vehicles has been increasing and the municipality is exploring whether it is more economical to buy newer collection vehicles. The municipality seems to prefer direct dealings with foreign assistance agencies since passing through higher levels of government usually leads to the municipality ending with a smaller portion of a grant. The municipality seems to have no complaint about having the responsibility of financing garbage collection and hauling. Marikina also embarked on an information and educational campaign on municipal cleanliness, sanitation, and proper waste disposal.

The municipality used to dispose much of their garbage in a privately-owned dumpsite, the Doña Petra open dumpsite. This dumpsite was formerly quarried and the homeowners in the subdivision approached the municipality with the proposal to use garbage as a landfill. The dumpsite, located about 100 meters from the Marikina River, has an open pit area of 1.5 ha. and a depth of 30 ft. The municipality used chemical disinfectants and soil cover when it was in operation. Due to opposition, which could have been politically motivated, from homeowners in the neighboring subdivision, the dumpsite was closed by the DENR-LLDA. The municipality still uses the dumpsite only for solid waste that do not generate odors or do not decompose easily such as tree branches and construction debris. Construction debris is also used as landfill for a proposed road site. Most of the garbage collected is then disposed at the San Mateo landfill. There is a municipal transfer station for smaller collection vehicles. The turnaround time for a garbage vehicle from Marikina to the San Mateo landfill is between two to three hours.

Rationale for national government intervention

The various criteria for national government intervention in financing local government projects are evaluated for the case of municipal solid waste management in Metro Manila.

[7]This may be more a problem of providing government support and coordination with private collectors. For example, private garbage collectors may be provided access to the municipal transfer station as a disposal site, and wastepickers may be provided secondary collection points serviced by municipal garbage trucks.

(a) externalities/spillovers

A management system with collection decentralized to municipalities and cities, and transfer and disposal centralized to a regional authority, as currently practiced to some degree in Metro Manila, seems to be ideal. There can be differential waste collection fee systems across municipalities to reflect variations in demand and local preference for environmental quality, and variations in cost conditions. The collection and hauling components of solid waste management have spillovers that are more local in nature and benefits that can be captured, to a large extent, within specific LGU jurisdictions.

There are greater externalities in the disposal component. With rising land values in Metro Manila, hauling and disposal are increasing cost components of waste management services. Disposal sites are becoming more distant from collection areas. The externality factor becomes more important when we consider that the two sanitary landfills being operated by the MMDA are located outside its jurisdiction. If all the externalities or benefits of proper disposal (damages of improper disposal) can be internalized within the Metro Manila area, then the externality criterion does not provide justification for national government intervention. Though there is lack of data and information on the external environmental costs of solid waste disposal, the general public feeling is that the amenity, productivity, and health losses due to improper waste disposal has reached alarming levels. It is reaching this threshold level that can probably provide some basis for national government intervention in the same way that pollution hotspots and critical watersheds are given national government attention and aid. On this basis then, national government intervention is warranted only to the extent that the severity of the situation is brought down to manageable levels.

Even if the solid waste management situation is brought to manageable levels, some degree of national government intervention may be warranted since the sanitary landfills used by the MMDA are outside the Metro Manila area and presumably, the national government, through its stronger collective and coercive power, has a lower transaction cost in enforcing coordination between the MMDA and non-MMDA LGUs. Having disposal sites outside Metro Manila for Metro Manila residents can be efficient if the receiving LGUs have lower marginal social damages from the disposed waste relative to areas within Metro Manila, and Metro Manila pays these marginal social damages.

(b) economies of scale

Though there are economies of scale in the disposal function, the efficient scale does not seem to be beyond the size of Metro Manila. Hence, this criterion does not provide a justification for national government intervention.

(c) smooth functioning of an internal common market

Metro Manila has been a major center of trade, industry, finance, and arts in the Philippines. It has the major international airport and ports of the country. It is this importance of Metro Manila to the smooth functioning of the national economy, together with the externality threshold factor, that provides some justification for national government intervention. This argument may be found weak especially if based on the desire to project a good clean image of Filipinos to foreigners whose usual port of entry is Metro Manila.

(d) equity considerations

Income redistribution seems to be a weak argument for national government intervention in Metro Manila's municipal solid waste management problem considering that Metro Manila has a per capita gross regional domestic product about twice that of the national average. However, national aid can be argued on reverse discrimination grounds. It is the high income, its being a center of major economic activity, and the perception of greater employment opportunities in Metro Manila that attract migrants to the region. Rapid urban growth in Metro Manila has also generated substantial diseconomies of agglomeration in the form of congestion and pollution. Long-run solutions to the problem of excessive concentration of population in Metro Manila include some form of decentralization to reduce regional income inequality and appropriate pricing of the cost of congestion, pollution, garbage disposal and the like.

In the short run, the fact that a significant proportion of the Metro Manila population—about 30 percent—live below the poverty line must be faced (Balisacan, 1994). Urban poor households, due to income constraints, may be less willing to pay for housing components and sanitation services such as garbage collection and disposal, sewerage and pest control, that produce neighborhood externalities. In a study by Solon (1995) using a sample of the urban poor in Metro Manila and Metro Cebu, garbage collection is positively correlated with household health status and has a significant influence on housing rents indicating a willingness by some households to pay for solid waste services. Simulation exercises indicate that, on average, good housing conditions will

lead to a reduction of P37 in monthly medical expenditures but, if accessed through the housing rental markets, will entail an increase of P120 in monthly rents. The Solon study suggests that the self-help approach alone, where the government assumes a facilitative role, may lead to the underprovision of housing components with high health impacts and strong spillover effects. Government policy, in addition to enhancing the self-help approach, might also consider subsidizing the provision of such services or devising incentives for access by the poor to minimum levels of services. Such programs must target urban poor households and their design must not end up subsidizing the richer members of Metro Manila communities. There is a question though of whether such programs merely relax the scale constraint of the metropolitan area by increasing its capacity to absorb a bigger population.

Since the solid waste management problem in Metro Manila is related to the issue of regional income inequality, then there is a basis for national government intervention since redistribution of income is best handled at the national level.

(e) minimum standards

Due to the lack of enforcement of minimum environmental standards by the DENR, there has been inter-LGU competition to encourage business investment, promote local economic development, and enlarge the local tax base by reducing standards and relaxing regulations for environmental quality at the local government level. The monitoring and enforcement capability of the DENR is severely limited. Open dumps managed by LGUs are not regularly monitored by the DENR. The owner of one of the biggest aviaries in the country has reported that leachate from the nearby Payatas dumpsite has affected the groundwater; he has to treat the water from the deepwell used in the aviary. This is an example of a productivity loss due to improper waste disposal. The head of the office for waste management services in the Municipality of Marikina complained that leachate from the Payatas dumpsite, which is under the jurisdiction of Quezon City, another LGU, flows into a tributary that empties into an upstream portion of the Marikina River. This pollution imposes a negative externality on the river rehabilitation project of Marikina. Since the Municipality of Marikina does not have the technical resources for scientific monitoring, the waste management office just took colored pictures of the dumpsite, of scavengers washing plastic garbage bags in the tributary, and of leachate flowing to the tributary and the Marikina River. This illustrates a case of excessive damages from improper disposal in the absence of inter-LGU cooperation; transaction costs can be minimized by intervention of a government authority with stronger coercive powers.

It has been observed that local government officials sometimes lie low in enforcing environmental standards when a firm or industry contributes significantly to the local town economy. Purefoods, a food manufacturing firm with a plant on the riverbank of Marikina, has been observed to discharge waste into the river. It must be noted that food manufacturing, due to the decay of animal material, is one of the most pollutive industries. However, the local government officials have been lax with respect to environmental standards because of a threat that Purefoods might move its plant to Cavite. A consideration in the decision on where to locate the plant is the cost for Purefoods to satisfy the environmental standards. Instances of trading off environmental services analogous to tax competition can be found in Meycauayan, Bulacan with its tanning industry and in Balamban, Cebu with its shipwrecking industry. Though the primary source of the problem is the pricing of the waste disposal services of the environment, environmental quality in these instances could have been improved if minimum environmental standards are enforced. Whether environmental standards are the least cost method of attaining the desired environmental quality is another question.

Hence, minimum standards for environmental quality and the failure of the national government in the past to enforce such standards provide the basis for a positive level of national government financing of Metro Manila's waste management services.

(f) fiscal imbalance

Ideally, the question of fiscal imbalance or the capacity to pay for the local public services relative to the LGU's revenue potential should be evaluated at the optimal level and efficient provision of services. Due to lack of data and resources to do such analysis, crude calculations based on 1993 data are presented in this section to shed light on this question. Table 4 presents the calculations. Some of the findings are as follows.

(1) There is wide variation in municipal/city revenue per person ranging from the P300-P400 range in Malabon, Pateros, and Taguig to P2,225 in Makati. Those in the lower range tend to have a lower proportion of revenue from local sources; below 70 percent of the LGU revenues are from local sources. Pateros has the lowest proportion of revenue from local sources at 38 percent. In contrast, those with per person revenue greater than P1,000 have at least 70 percent of the revenues generated from local sources. Makati which has the highest per person revenue generates 94 percent of its revenue from local sources. (See Tables 5 and 6.)

Table 4 - Related Statistics on Solid Waste Management for MMDA Local Government Units

Municipality/ City	(1) 1993 Income	(2) 1990 Pop'n	(3) 1993 Pop'n (projected using 3% growth rate)	(4) 1993 Income per person (peso/person)	(5) Area (sq.km.)	(6) Population density (person/sq.km.)
Cities:						
Mandaluyong	374,715,077	246,131	268,954	1,393	26.0	10,344
Manila	1,774,772,551	1,735,472	1,735,472	1,023	38.3	45,313
Quezon City	2,581,928,309	1,662,950	1,817,150	1,421	166.2	10,934
Pasay	617,268,399	366,702	400,705	1,540	13.9	28,828
Caloocan	575,218,100	761,824	832,466	691	55.8	14,919
City Total	5,923,902,436	4,625,810	5,054,747	1,172	300.2	16,838

Table 4 (continued)

Municipality/ City	(1) 1993 Income	(2) 1990 Pop'n	(3) 1993 Pop'n (projected using 3% growth rate)	(4) 1993 Income per person (peso/person)	(5) Area (sq.km.)	(6) Population density (person/sq.km.)
Municipalities:						
Las Piñas	198,211,855	296,896	324,426	611	41.5	7,818
Makati	1,095,596,640	450,599	492,382	2,225	29.9	16,468
Malabon	113,789,848	279,808	305,754	372	23.4	13,066
Marikina	184,773,505	309,320	338,002	547	38.9	8,689
Muntinlupa	311,994,526	270,399	295,472	1,056	46.7	6,327
Navotas	85,289,490	187,322	204,692	417	2.6	78,728
Parañaque	422,170,930	307,384	335,887	1,257	38.3	8,770
Pasig	566,267,916	397,134	433,959	1,305	13.0	33,381
Pateros	17,761,711	51,367	56,130	316	10.4	5,397
San Juan	179,217,307	137,641	137,641	1,302	10.4	13,235
Taguig	115,606,985	290,228	290,228	398	33.7	8,612
Valenzuela	242,859,926	371,293	371,293	654	47.0	7,900
Municipal Total	3,533,540,639	3,281,576	3,585,867	985	335.8	10,679
Regional Total	9,457,443,075	7,907,386	8,640,614	1,095	636.0	13,586

Notes: (1) Income is municipality/city total revenue from local sources, aids and allotments.
(2) Population data is from the 1990 Census of Population and Housing.
(3) The 1993 population is estimated from the 1990 population assuming a 3% annual growth rate.
(4) The 1993 income per person is obtained by dividing the entries in column (1) by the entries in column (3).

Table 4 (continued)

Municipality/ City	(7) 1993 Imputed collection and hauling expense (peso/person)	(8) Percent of income	(9) Volume of waste disposed in landfills (1994, cu.m.)	(10) 1993 Imputed disposal cost	(11) Percent of income	(12) 1993 Estimated total garbage cost	(13) Percent of income
Cities:							
Mandaluyong	20,171,549	5.38	77,046	4,391,622	1.17	24,563,171	6.56
Manila	130,160,422	7.33	459,702	26,203,014	1.48	156,363,436	8.81
Quezon City	136,286,277	5.28	1,452	82,764	0.00	136,369,041	5.28
Pasay	30,052,888	4.87	179,345	10,222,665	1.66	40,275,553	6.52
Caloocan	62,434,924	10.85	26	1,482	0.00	62,436,406	10.85
City Total	379,106,061	6.40	717,571	40,901,547	0.69	420,007,608	7.09
Municipalities:							
Las Piñas	24,331,971	12.28	138,178	7,876,146	3.97	32,208,117	16.25
Makati	36,928,627	3.37	197,820	11,275,740	1.03	48,204,367	4.40
Malabon	22,931,532	20.15	26	1,482	0.00	22,933,014	20.15

Table 4 (continued)

Municipality/ City	(7) 1993 Imputed collection and hauling expense (peso/person)	(8) Percent of income	(9) Volume of waste disposed in landfills (1994, cu.m.)	(10) 1993 Imputed disposal cost	(11) Percent of income	(12) 1993 Estimated total garbage cost	(13) Percent of income
Municipalities (cont.)							
Marikina	25,350,174	13.72	120,242	6,853,794	3.71	32,203,968	17.43
Muntinlupa	22,160,422	7.10	28,682	1,634,874	0.52	23,795,296	7.63
Navotas	15,351,886	18.00	237	13,509	0.02	15,365,395	18.02
Parañaque	25,191,510	5.97	48,589	2,769,573	0.66	27,961,083	6.62
Pasig	32,546,928	5.75	2,620	149,340	0.03	32,696,268	5.77
Pateros	4,209,758	23.70	19,465	1,109,505	6.25	5,319,263	29.95
San Juan	10,323,074	5.76	8,471	482,847	0.27	10,805,921	6.03
Taguig	21,767,122	18.83	36,648	2,088,936	1.81	23,856,058	20.64
Valenzuela	27,847,000	11.47	3,257	185,649	0.08	28,032,649	11.54
Municipal Total	268,940,002	7.61	604,235	34,441,395	0.97	303,381,397	8.59
Regional Total	648,046,064	6.85	1,321,806	75,342,942	0.80	723,389,006	7.65

Notes: (7) The 1993 imputed collection and hauling expense, including expenses on open dumps maintained by the municipality/city, is calculated at P75/person. This is based on the Marikina 1995 expense of P85/person. The numbers in this column are likely to be underestimates. Cost variations across LGU units are ignored.

(9) Non-MMDA LGUs such as Cainta, San Mateo, San Roque, Antipolo, Muntinglupa and Carmona, and special EDSA operations account for about 5 percent of the total volume of 1,396,574 cu.m. disposed in the two sanitary landfills in 1994. LGUs such as Quezon City, Caloocan, Malabon and Navotas with access to open dumps tend to have a lower volume of waste disposed at sanitary landfills. The distance of these LGUs to the santary landfills is a factor in cost consideration.

(10) The 1993 imputed disposal cost are based on 95% of 1994 volume of waste and a charge of P60/cu.m.

Table 5 - Income of MMDA Local Government Units, 1993
(in million pesos)

	Manda.	Mla.	Q.C.	Pasay	Cal.	City Total	Las Piñas	Mkti.	Mal.	Mkna.
LOCAL SOURCE	344.10	1,261.96	1,985.14	465.90	296.20	4,343.31	162.65	1,031.37	78.29	147.10
REVENUE FROM TAX.	284.43	1,055.99	1,076.04	160.79	227.76	2,805.00	102.78	812.38	58.24	106.62
Real Prop. Tax	119.61	557.86	481.02	84.38	73.69	1,306.57	59.12	318.10	35.36	47.92
Business Taxes	164.81	498.13	595.02	76.41	154.06	1,488.44	43.66	494.29	22.88	58.69
NON-TAX REVENUES	59.68	205.97	909.10	305.11	58.45	1,538.31	59.87	218.99	20.05	40.48
Receipts from Eco. Entt	3.70	86.51	26.87	16.83	7.86	141.75	4.81	61.21	4.22	3.85
Fees/Charges	29.44	105.42	101.14	23.85	49.18	309.04	14.30	103.58	9.61	10.56
Loans & Borrowings	20.00	0	700.00	262.00	0	932.00	0	0	0	0
Other Receipts	6.55	14.04	81.09	2.43	1.41	105.52	40.76	54.20	6.21	26.07
AIDS AND ALLOTMENTS	30.61	512.81	596.79	151.37	289.01	1,580.59	35.57	64.23	35.50	37.68
IRA	30.61	512.81	596.79	150.37	289.01	1,579.59	35.57	53.32	35.50	37.68
Other National Aids	0	0	0	1.00	0	1.00	0	10.90	0	0
TOTAL INCOME	374.72	1,744.77	2,581.93	617.27	575.22	5,923.90	198.21	1,095.60	113.79	184.77

Table 5 (continued)

	Muntin.	Nav.	Pque.	Pasig	Pat.	S. Juan	Tag.	Val.	Mun. Total	Reg. Total
LOCAL SOURCE	275.33	58.78	386.79	439.13	6.83	143.67	78.37	199.08	3,007.38	7,350.69
REVENUE FROM TAX.	206.76	49.18	349.39	365.62	4.46	125.82	63.62	115.45	2,360.32	5,165.32
Real Prop. Tax	85.09	23.59	170.80	151.48	1.63	39.94	34.61	52.76	1,020.40	2,336.97
Business Taxes	121.67	25.58	176.60	214.13	2.83	85.87	29.02	62.69	1,339.91	2,828.35
NON-TAX REVENUES	68.57	9.60	37.39	73.52	2.37	17.86	14.75	83.62	647.07	2,185.38
Receipts from Eco. Entt	10.17	2.32	11.63	18.90	.29	4.34	2.78	2.32	126.85	266.60
Fees/Charges	15.68	5.97	22.68	51.46	.99	6.83	7.66	35.41	284.72	593.76
Loans & Borrowings	0	0	0	0	0	0	0	0	0	982.00
Other Receipts	42.72	1.32	3.08	3.16	1.09	6.69	4.30	45.89	235.50	341.02
AIDS AND ALLOTMENTS	36.67	26.51	35.38	127.14	10.93	35.55	37.23	43.78	526.16	2,106.75
IRA	36.67	26.51	35.38	42.77	7.93	16.53	37.23	43.78	408.88	1,988.47
Other National Aids	0	0	0	84.36	3.00	19.01	0	0	117.28	118.28
TOTAL INCOME	311.99	85.29	422.17	566.27	17.76	179.22	115.61	242.86	3,633.54	9,457.44

Source: Metropolitan Manila Development Authority (MMDA).

Table 6 - Percentage Shares
Income of MMDA Local Government Units, 1993

	Manda.	Mla.	Q.C.	Pasay	Cal.	City Total	Las Piñas	Mkti.	Mal.	Mkna.
LOCAL SOURCE	91.83	71.11	76.89	75.48	49.76	73.32	82.06	94.14	68.80	79.61
REVENUE FROM TAX.	75.90	59.50	41.68	26.05	39.59	47.35	51.85	74.15	51.18	57.70
Real Property Tax	31.92	31.43	18.63	13.67	12.81	22.22	29.82	29.03	31.08	25.94
Business Taxes	43.93	28.07	23.05	12.38	26.78	25.13	22.03	45.12	20.11	31.76
NON-TAX REVENUES	15.93	11.61	35.21	49.43	10.16	25.97	30.21	19.99	17.62	21.91
Receipts from Eco. Entt.	0.93	4.67	1.04	2.73	1.37	2.39	2.43	5.59	3.71	2.08
Fees/Charges	7.86	5.94	3.92	3.86	8.55	5.22	7.21	9.45	8.45	5.71
Loans and Borrowings	5.34	0.00	27.11	42.45	0.00	16.58	0.00	0.00	0.00	0.00
Other Receipts	1.75	0.79	3.14	0.39	0.24	1.78	20.56	4.95	5.46	14.11
AIDS AND ALLOTMENTS	8.17	28.89	23.11	24.52	50.24	26.68	17.94	5.86	31.20	20.39
IRA	8.17	28.89	23.11	24.36	50.24	26.66	17.94	4.87	31.20	20.39
Other National Aids	0.00	0.00	0.00	0.16	0.00	0.02	0.00	1.00	0.00	0.00
TOTAL INCOME	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 6 (continued)

	Muntin.	Nav.	Pque.	Pasig	Pat.	S. Juan	Tag.	Val.	Mun. Total	Reg. Total
LOCAL SOURCE	86.25	68.92	91.62	77.55	38.47	80.17	67.79	81.97	85.11	77.72
REVENUE FROM TAX.	66.27	57.66	82.76	64.57	25.11	70.20	55.04	47.54	66.80	54.62
Real Property Tax	27.27	27.66	40.46	26.75	9.20	22.29	29.94	21.73	28.88	24.71
Business Taxes	39.00	30.00	42.30	37.82	15.91	47.92	25.10	25.81	37.92	29.91
NON-TAX REVENUES	21.98	11.26	8.86	12.98	13.36	9.96	12.76	34.43	18.31	23.11
Receipts from Eco. Entt.	3.26	2.72	2.76	3.34	1.64	2.42	2.40	0.96	3.59	2.84
Fees/Charges	5.03	6.99	5.37	9.09	5.58	3.81	6.63	14.58	8.06	5.28
Loans and Borrowings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.38
Other Receipts	13.69	1.54	0.73	0.56	6.14	3.73	3.72	18.90	6.66	3.61
AIDS AND ALLOTMENTS	11.75	31.08	8.38	22.54	61.53	19.83	32.21	18.03	14.89	22.28
IRA	11.75	31.08	8.38	7.55	44.64	9.22	32.21	18.03	11.57	21.03
Other National Aids	0.00	0.00	0.00	14.90	16.89	10.61	0.00	0.00	3.32	1.25
TOTAL INCOME	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

(2) Poorer LGUs under the MMDA tend to have a greater proportion of their income spent on garbage collection and hauling. LGUs such as Pateros and Taguig are reported to receive MMDA assistance in garbage collection and hauling. Since there are income inequalities among the municipalities and even within richer municipalities there are pockets of poor households, it should be clarified whether MMDA and national assistance programs should be targeted towards poorer municipalities or poorer households. It might be suggested that the MMDA, through its collections from member LGUs, focus on assistance towards poorer municipalities and national assistance be targeted at poorer households.

(3) The biggest cost component of municipal waste management services is collection and hauling. The member LGUs of the MMDA seem to have the capacity to pay for these services except probably for those with per person revenue less than P400. The revenue potential of LGUs can be enhanced by the collection of garbage fees from households, businesses, and industrial establishments with differential pricing for groups such as market vendors identified as generating relatively more garbage. The problem of illegal dumping in vacant lots, riverbanks, and water streams, and the problem of improper waste disposal in squatter and slum areas must be addressed. The MMDA should provide technical assistance for the collection and hauling functions of the cities/municipalities.

(4) Even with no tipping fees for disposal at the sanitary landfills, municipalities with access to open dumps tend to have less use of the sanitary landfills. Examples of these LGUs are Quezon City with its Payatas dump site; Caloocan, Malabon, and Navotas with the Catmon open dump site. As long as minimum environmental standards are not imposed on open dumps, the introduction of tipping fees for disposal at sanitary landfills may result in less volume of waste disposed at the landfills, now accounting for 30-35 percent of the total waste disposed, and may thus further exacerbate the disposal problem. With the traffic congestion and bad road conditions, hauling garbage to the sanitary landfills imposes higher transportation costs for the municipalities. Hence, introduction of tipping fees for sanitary landfills only makes sense with stricter enforcement of environmental standards for open dumps; otherwise, the high transport cost in hauling garbage to the sanitary landfills makes open dumps a more economical disposal alternative for the municipalities/cities.

(5) A tipping fee of P60/cu.m., at 1993 levels of disposal at landfills, will raise the municipal solid waste expenditure share on the average by 1 percent. With appropriate environmental standards and policies enforced, the expenditure share will likely rise to the range of 10-20 percent of revenue. A poor municipality like Pateros, whose garbage expenditure share might rise to over 30 percent of its revenue, may need financial assistance.

(6) The tipping fee of P60/cu.m. was calculated by the DENR to cover personnel services, maintenance, and other operating expenses of the Office of the Project Director, the Las Piñas transfer station, and the San Mateo and Carmona sanitary landfills. Infrastructure expenditures since 1991 on these facilities have totalled P269 million by 1994 (Table 2). Development of the sanitary landfills is done in phases. Since the landfills have Metro Manila as the main user, part of the infrastructure costs must be borne by the MMDA and its member LGUs.

Generally, fiscal imbalance does not provide a strong argument for national government intervention in financing municipal garbage collection, hauling, and disposal at sanitary landfills at tipping fees of P60/cu.m. The MMDA should provide technical assistance and support services to its member LGUs. Areas of technical assistance can be in collection vehicle routing and maintenance, and procurement of equipment and spare parts. Major problems faced now by the MMDA are the evaluation and design of alternative disposal options, the siting of disposal sites, and the technical and financial sustainability of disposal operations. The DENR, in addition to its monitoring and enforcement function, can provide technical assistance to the MMDA on the disposal component. With increasing urbanization in other growth centers in the country, the DENR can have economies of scale in providing technical assistance.

Financing of the MMDA

The sources of financing of the MMDA are: national government subsidy in the form of regular appropriations, grants, and other contributions as provided in the General Appropriations Act (GAA); internal revenue allotment (IRA); mandatory contributions from component LGUs, equivalent to 5 percent of the total annual gross revenue of the preceding year, net of the internal revenue allotment and after deducting the share of barangays from the real property and other local taxes; fines, fees, and charges; proceeds from sale, lease or rental of real property and assets owned by the Authority; and grants and loans.

Table 7 presents the projected MMDA income and expenditure for 199 The IRA of the MMDA is 23 percent of its total income which is comparable the IRA share in the income of its component LGUs. The IRA is the only sour of tax revenue for the MMDA. The 5 percent statutory contribution of its co ponent LGUs account for 19 percent of its income. A significant percentage the MMDA income comes from the national government. Of the MMDA come, 55 percent is in the form of national aid. Therefore, the national gover ment subsidizes over half of the MMDA operations. In contrast, its compone LGUs, on the average, raise at least 70 percent of its income from local source The projected MMDA 1996 income is about 10 percent of the combined incom of its component LGUs.

Table 7 - Projected MMDA Income and Expenditure for 1996 (in million pesos)

	Amount	Percentage
Income		
A. Revenue from taxation	308.44	23.34
internal revenue allotment	308.44	23.34
B. Earnings and other credits	1,012.88	76.65
5% statutory contribution	252.04	19.07
national aid	735.00	55.62
traffic violation	17.81	1.34
parking fees		0.00
zoning fees	2.62	0.19
garbage fees		0.00
other income	5.40	0.40
Total	1,321.33	100.00
Expenditures		
personal services	875.11	66.23
maintenance and other operating expenses	315.80	23.90
capital outlays	130.41	9.87
Total	1,321.33	100.00

Source: Metropolitan Manila Development Authority (MMDA).

The proposed national aid of P735 million for 1996, as listed in the expenditure program of the national government, is a block grant (not project-specific) allocated for maintenance and operating expenses. However, the allocation proposed by the MMDA for the national aid is 39 percent for personal services, 43 percent for maintenance and other operating expenses, and 18 percent for capital outlay. The current operations of the MMDA are traffic and transport management, solid waste disposal management, flood control and sewerage services, environmental protection and pollution control, health and sanitation, public safety and disaster control, and urban planning and development. The major expenditures are in the first four areas of operations. In view of the scope of services of the MMDA, a national subsidy of 55 percent in the long run seems to be on the high side.

With respect to the solid waste disposal problem, the financing constraint for the MMDA can be relaxed by charging tipping fees for the sanitary landfills but this has to be accompanied by enforcement of minimum environmental standards for open dumpsites and improved traffic and road conditions to minimize transportation costs. Garbage fees collected at the municipality level must to some degree incorporate the final disposal costs. Increasing waste collection fees in the direction of marginal cost pricing will encourage waste reduction and recycling. Alternative disposal options should also be explored. More efficient use of existing resources should be encouraged. Hence, a higher subsidy rate to the MMDA in the short run can be justified on the basis of the failure of the enforcement mechanism and supporting infrastructure such as an efficient transport network.

For a proposed cost-sharing scheme, in the short run, from about three to five years for the adjustment period for environmental policy reform and enforcement, a national government share of 30-40 percent may be warranted. Beyond five years, the national government contribution may be lowered to 20-30 percent. Financial assistance shall be mainly for the final waste disposal component of municipal solid waste services, and for the income redistribution aspects of the solid waste management program.

During the adjustment period, the following objectives must be targetted: (1) planning and setting up a metrowide municipal solid waste management system; (2) minimizing technical inefficiencies (such as double billing by private contractors of garbage collected); (3) financial reform for the provision of waste services; and (4) environmental policy reform and improvement of monitoring and enforcement of environmental standards.

Infrastructure should not be constructed and capital equipment should not be purchased without assurance of the MMDA and the component LGUs capability to maintain these investments.

Other Considerations

(1) Problems with devolution at the local level

Relative to other national line agencies like the DA and the DOH, the performance of the DENR before the devolution has been rated generally poor by the LGUs. This is reflected in the reservations of LGUs, both in rural and urban areas, to work with the DENR and the reported hesitancy of donor agencies to have the DENR as lead agency in foreign-assisted projects. The mushrooming of nongovernmental organizations in this sector can be interpreted as a response to this government failure. There seems to be also an overreliance by the DENR on community organizing in carrying out its functions. The DENR has to recognize the appropriate role of community organizing. In technical works, community organizing may be an inefficient approach. Though there are isolated success cases, the NGO performance in the Philippines has been marked by lack of continuity and replication of project benefits once a project has ended. The devolution of functions to the local governments can then be beneficial in the light of the unresponsiveness of the national agency, and close coordination between LGUs and NGOs can lead to the institutionalization of project processes and benefits.

Among the national agencies, the DENR probably devolved functions the least in terms of personnel and agency appropriations. Foreign-assisted projects were not devolved and hence, the LGUs are left with responsibilities for which they have to source their own financing. There are also complaints from the LGUs about the competence of devolved DENR personnel. In areas with strong local initiative, the DILG, DBM, and the DOF should help set up financing mechanisms to support the LGUs. Another possible advantage of the devolution, if LGUs are allowed access to foreign assistance such as loans and grants or if the national government enters into cost-sharing schemes with LGUs whereby LGUs shoulder at least part of the repayment obligations, is greater accountability for financial resources by the government.

With the devolution, the role of the DENR vis-à-vis the LGUs should focus on policymaking, monitoring and enforcement, and providing technical assistance to the LGUs. This would require a strengthening and restructuring of the current DENR. A difficulty faced by the DENR is the nature of the services which it oversees. Unlike the DA where most agricultural goods have

ablished markets, environmental services such as waste disposal services and ther ecological services are generally nonmarketed and have a public good spect. The contributions of the mining and forestry industries to GDP have en declining in recent years. Hence, the market by itself does not provide centives for resources to flow into the environmental sector. However, there as been greater concern from the international agencies like the World Bank, DB, and the UN to channel resources towards nonbankable environmental rojects. A question is: Can the DENR make optimal use of these resources?

A contributing factor to the weakness in the technical capability of the ENR seems to be the low morale among its technical personnel resulting from he lack of direction from the top regarding environmental policies and priori-es, and the low pay due to the government salary standardization law. Tech-ical personnel tend to leave eventually for employment in the private sector. oordination and the settling of disputes among LGUs with regard to environ-ental matters would require data, information, and technical assistance from he DENR which in its current state lacks the technical and financial capabil-y.[8] This problem can be partly alleviated by the recognition and acknowledg-ent by the DENR of its budget constraint, having stronger and more clearcut rioritization of its operations, more effective and efficient implementation of s projects, and possibly subcontracting to private bodies some of its monitor-g operations.

(2) Public-private sector coordination

The municipal solid waste management problem needs an integrated pproach involving the various levels of government, nongovernmental organi-ations, the private sector, and waste generators. Given existing resources, effi-ency gains in the waste collection component, which accounts for about 60 rcent of the total time cost of solid waste services, can be made through rivatization of some collection services, organizing and formalizing itinerant aste pickers and scavengers into a low-cost collection network with the sup-rt of NGOs and LGUs, and an increase in garbage fees towards marginal cial cost pricing. The benefits of privatization, specifically the subcontracting collection and transportation by municipalities to private contractors, are ustrated by Sinha (1993) for the case of West Malaysia. It is reported that

[8] As an illustration of the lack of monitoring capability of the DENR, only one of five air ality monitoring stations on major streets in Metro Manila established under a technical assis-ce program from the ADB remains operational under the Environmental Management Bureau MB) of the DENR.

private contractors provided the services at a cost 32 percent less than the local authorities. Important factors for successful privatization are competitive bidding, reasonable work contract, and effective supervision and monitoring of the contractor's performance and enforcement of contract conditions. As reported in West Malaysia, local authorities do not feel inclined to contract out 100 percent of waste collection to maintain a competitive threat to the private contractors.

Local government units, with the help of nongovernmental organizations, can develop community-based approaches to solid waste collection, particularly in lower-income and middle-income communities. A system involving waste pickers and scavengers formally into a community solid waste management system can be explored. The pushcart system of waste pickers for primary collection can be a substitute for the use of collection trucks. The NGOs can help in organizing work teams and area assignments, and assist the waste pickers in recycling activities. For this system to work there should be close coordination and mutual support among the waste pickers, NGOs, and local authorities. Secondary collection depots and hauling services for final disposal must be provided by local authorities. Support of the local government through institutionalizing and formalizing such a system may help counter the continuity and replication problems often encountered by NGOs. Such an appropriate technology, probably crude by Western standards, may be a more cost-effective method of waste collection given the financial constraints of local governments and the high unemployment rates in the cities. It has been demonstrated to be a success in Surabaya, Jakarta (Indrayana and Silas, 1993).

The MMDA together with the DENR must formulate a coherent and pragmatic solid waste management plan that can be realistically implemented and which recognizes the financial and technical constraints faced by the government. At present, there is a question of the level at which the sanitary landfills are being operated. The government's policy has often been immediate closures of open dump sites without careful analysis of alternative disposal sites. The MMDA can learn some lessons from the government of Malaysia which in 1988 formulated an evolutionary approach to the conversion of open dumps to sanitary landfills, instead of immediate closure of open dumps (Zulkifli, 1993). The improvement target levels are: controlled tipping (level 1), sanitary landfill with bund and daily cover (level 2), sanitary landfill with leachate recirculation (level 3), and sanitary landfill with leachate treatment (level 4). The cost efficiency of the alternative use of waste landfills for land reclamation projects, particularly in the City of Manila which accounts for about a third of the wastes disposed in Carmona and San Mateo, must be explored. The MMDA-DENR plan has proposed build-operate-transfer (BOT) schemes for the development of sanitary

landfills. However, if the infrastructure and maintenance costs of sanitary landfills are beyond the capacity of the people to pay, the BOT scheme will not address the financing problem and will result in unsustainable disposal operations.

The national government should supplement local initiatives with appropriate environmental policies, and monitoring and enforcement services; some subsidies to local government since full marginal social cost pricing can lead to illegal dumping; and technical assistance to LGUs in the formulation and implementation of solid waste management plans. In the long run, since environmental quality is a superior good, economic growth and higher incomes can lead to greater demand and increased willingness to pay for environmental quality. Hence, national government programs to increase the efficient functioning of the economy and to reduce regional income inequality can greatly contribute indirectly to better solid waste management services.

Small Watershed Protection

Watershed protection in the Philippines

A watershed is defined as a land area, drained by a stream or fixed body of water and its tributaries, having a common outlet for surface runoff (P.D. 1559, DENR). According to a DENR brief on watersheds, about 70 percent of the total land area of the Philippines of 30 million hectares can be considered as watersheds, comprising 421 river basins. Of these river basins, 18 are major river basins with drainage areas ranging in size from 5,000 hectares to 2.5 million hectares. There are 112 proclaimed watershed forest reserves[9] covering a total area of about 1.36 million hectares. Of these, 90 percent are categorized as hydrologically critical due to their state of physical degradation and their use for hydroelectric or geothermal power generation, irrigation, and water supply.[10] Watershed forest reserves have been included as initial components of the Integrated Protected Areas System. An estimate of the cost to the government of the erosion of watersheds due to productivity losses and damage to infrastructure is P6.7 billion a year.

[9] A watershed reservation is defined as a forest land reservation established to protect or improve water yield or reduce sedimentation.

[10] Examples are four major river basins in Luzon—Bicol, Magat, Pampanga, and Agno—which are in critical condition due to severe soil erosion and sedimentation.

Several factors contribute to the degradation of watersheds. Increased population pressure has led to greater upland agricultural activities and fuelwood gathering (on the supply side of watershed protection) and greater water use for domestic and industrial consumption, irrigation, and power generation (on the demand side of watershed protection).[11] Destructive practices include shifting cultivation or kaingin farming, uncontrolled logging, and improper land use practices (such as the absence of cover crops during the rainy season). Other activities are unscientific mining and improper mining waste disposal, road construction on steep slopes, and the occurrence of forest fires.

Watershed degradation has resulted in decreased productivity of upland areas, accelerated soil erosion, downstream sedimentation, floods, and reduced water supply. Watershed protection activities can be averting, mitigating or defensive measures. Major activities are reforestation, the protection and development of natural forests, the development of tree or forest plantations, community forestry projects, the promotion of sustainable agricultural practices and soil management and erosion control projects including structural and vegetative measures. Supplementary services cover institutional capacity building and the provision of social services, livelihood training and support, roads, and other infrastructure.

Ideally, an extended benefit-cost analysis incorporating the valuation of the environmental impacts of a watershed protection project and detailing the incidence of benefits and costs of the project will clarify the financing assignment. For the optimal level of provision of the watershed protection service, the financing assignment should be according to the net social (including private) benefits accruing to the agent. The results of such a project evaluation exercise will also be site-specific. The benefits and costs of watershed protection can be on-site or off-site. Information on costs, which are tangible expenditures, are easier to obtain than the benefits of the project. Off-site benefits, particularly on the smooth functioning of ecological processes such as flood control and productivity of fisheries, need physical quantification and monetization or valuation. The benefits are also likely to be nonmarket economic impacts spread over many individuals and economic activities.

On-site benefits include the avoided losses in crop yields due to soil erosion and loss of fertility, the value of the increase in crop yields from ecologic

[11]Hence, the inward shift of the supply curve and outward shift of the demand curve for watershed protection may imply that consumers or beneficiaries of watershed protection are not facing a higher price for the service.

nefits (for example, more soil moisture retention), the value of timber and ntimber products from tree planting, and the value of enhanced livestock oducts from improved pasture or fodder from trees. Note that these on-site nefits are more directly reflected through the market system. Off-site benfits, which tend to be ecologic in nature, include irrigation benefits, hydroelecic power benefits, benefits to domestic and industrial water quantity and qualy, flood damage avoided, productivity gains to fisheries, navigation benefits om more predictable river channels, tourism and recreational benefits, microimatic benefits, and biodiversity conservation benefits.

The national government, through the DENR which has overall jurisdicon over the country's forests and responsibility for watershed conservation, as focused on the rehabilitation of so-called critical watersheds in a state of vere degradation and supporting water-based infrastructure. The DENR lists 00 proclaimed watershed reservations, at least six of which cut across differnt provinces and about half cut across different municipalities. The proclaimed atershed reservations range in size from 12 hectares to over 180,000 hectares. t is not clear what the DENR prioritization is with respect to these watersheds hich are deemed critical.[12] In view of the limited resources, an overall assessent by the DENR of the country's watersheds is warranted for planning, proramming, and prioritization purposes.[13]

Funding for the DENR watershed operations takes the form of regular ppropriations for central and regional operations, locally-funded projects and reign-assisted projects. Soil conservation and watershed management, which ainly involves the construction of structural and vegetative measures, is unr the forest management operations. Since watershed protection requires a

[12] The DENR should also clarify and disseminate information on their policies regarding tivities in critical watersheds and proclaimed watershed reservations. In addition to making plicit the distinction, if there is any, between these two classes of watersheds and reviewing and vising these lists, the DENR must also rectify conflicting policies. A DENR brief says that the gging ban is imposed also in proclaimed watershed reservations, along with other critical areas fined as areas with slope of 50 percent or more, areas above 1,000 meter elevation and areas oclaimed for ecological and environmental protection. There are proclaimed watershed areas here the logging ban is inconsistent with the watershed policies of multiple-use, sustainable eld and socioeconomic development of local communities. Another DENR publication says that a itical watershed is closed from logging until it is rehabilitated. In some watershed areas with ature timber stands, the logging ban has led to foregone timber income for the local residents nd forest charges for the community.

[13] In view of the lack of government resources for research to support planning and olicymaking, the watershed assessment is an area where technical assistance grants from forgn donors to the DENR can have a significant impact.

system approach, other suboperations of forest management and other DENR operations (land management to handle tenure security issues, protected areas and wildlife management, mines and geoscience development, environmental management, and ecosystems research and development) are necessary components of watershed protection. The locally-funded special projects are the rehabilitation of riverbanks and lakeshore areas in the National Capital Region, the Lon-oy Watershed Development Project in Region I and the rehabilitation of the Maasin Watershed in Region VI.

A much bigger source of funding for DENR watershed protection projects is foreign-assisted projects. For 1996, the biggest watershed-related projects are the ADB/OECF-financed Forestry Sector Project Loan II[14] and the IBRD-financed Environment and Natural Resources Sector Adjustment Loan Project (Budget of Expenditures and Sources of Financing, FY 1996). An EEC-financed watershed project is the Aurora Integrated Area Development Project. In these projects, counterparting by LGUs agreed upon through negotiations between project implementors and local officials has been taking place.

Through executive orders or letters of instructions, jurisdiction over some watersheds, covering about 900,000 hectares, has been transferred to the National Irrigation Administration (Pantabangan-Carranglan, Magat), National Power Corporation (Ambuklao-Binga, Buhi-Barit, Caliraya-Lumot, Angat, and Makiling-Banahaw), and Philipppine National Oil Company (Tongonan, Palimpinon, and Bacman). Primary use of the watershed services is the major consideration in the transfer. The National Irrigation Administration (NIA) has undertaken a watershed assessment to prioritize critical systems for catchment management planning under the World Bank-assisted Water Resources Development Project (WRDP). The watersheds were evaluated according to performance (average irrigated service area during the dry season), size of catchment (ratio of service area to watershed area), land use (forest, grassland, cultivated, built-up), and soil erosion classification.

Responsibility for small watersheds, defined as forest lands identified and delineated by the DENR as sources of water supply for specific communities, has been devolved to the LGUs (DENR Manual of Operations for Devolved Forest Management Functions, 1995). The DENR should have identified the small watershed areas not later than June 30, 1995. Enforcement of forestry laws within community-based project areas, small watershed areas, and com-

[14]According to a DENR brief, priority watersheds have been identified for rehabilitation under this project.

unal forests within their territorial jurisdiction has been devolved to provces and cities. Implementation of forestry projects in the given areas has been volved to municipalities and cities. Municipalities may enter into Forest Land anagement Agreements (FLMAs) with families or communities over certain rest lands. Subject to the concurrence of the financing institution, community restry projects may be foreign-funded. The exercise of the devolved functions main subject to the supervision, control, and review by the DENR. Reforestan projects in protected areas and critical watersheds remain with the DENR.

Rationale for national government intervention

An evaluation of the criteria for cost sharing between levels of government follows.

(a) externalities/spillovers

The provision of watershed protection services, through off-site benefits ecological processes, generates externalities and has a public good nature. here are both spatial and temporal externalities. Benefits accrue downstream nd to urban areas, and may be realized not immediately but five to ten years the future. At the level of the individual or household in the watershed area, e private net benefits are less than the social net benefits of watershed protion; therefore, this service tends to be underprovided.

Soil conservation techniques may not be adopted because of the length of me before soil depletion and land rent may exceed the value of nutrients lost om soil erosion. Some indicative data on soil depletion and land rent for the hilippines are given in Tables 8 and 9. In Region VII, it can take 27 to over 100 ars to deplete the soil. It can be cheaper for farmers to compensate for the loss fertility due to soil erosion by using fertilizers. Marginal upland farmers can so have a higher private discount rate than the social discount rate and may en tend to prefer present consumption to future consumption for survival day. These factors lead to underinvestment in soil conservation.

The presence of externalities provide a justification for watershed protecn to be subsidized but not necessarily by the national government. The area d magnitude of spillover effects are watershed site-specific. The spillover efts of small watersheds (as defined by the DENR) will tend to be limited in pe within the municipality or several nearby LGU jurisdictions. Small wahed protection may then call for joint financing by LGUs benefitting from e service. The LGUs sharing contiguous small watershed areas are encourged to develop and implement plans jointly.

Table 8 - Time Required to Deplete Soils of Given Depth and Bulk Density by PEZ

Region	PEZ*	Effective soil depth (cm)	Average bulk density (gm/cc)	Weight of soil (ton/cm)	Soil loss (ton/ha)	Depth of soil loss (cm/ha)	No. of yrs to deplete Soil depth	1 cm
VII	I	75	1.24	124	114.04	0.92	106	1.00
	II	100	1.28	128		0.90	27	1.00
	III	112	1.24	124		0.92	139	1.40
	Ave.	96	1.25	125		0.91	91	1.11
Phil.	I	95	1.18	118		0.75	136	1.43
	II	91	1.18	118		0.75	121	1.43
	III	104	1.16	118		0.75	148	1.44
	Ave.	97	1.18	118		0.75	135	1.43

*pedo-ecological zone
Source: Environment and Natural Resources Accounting Project (ENRAP), Philippines.

Table 9 - Land Rent and Nutrients Lost Through Soil Erosion, Philippines, 1993 (1988 Prices)

Region	Agricultural land area (ha.)	Land rent (pesos/ha.)	Value of soil nutrients (pesos/ha.)
CAR	96.989	6,622.0	563
I	73,316	28,501.2	444
II	293,924	2,205.0	612
III	108,857	12,668.2	779
IV	1,109,567	4,204.9	441
V	824,733	2,963.1	887
VI	630,983	2,323.1	941
VII	589,446	5,787.6	1,134
VIII	809,724	1,898.4	1,134
IX	681,366	1,747.2	592

Table 9 (continued)

Region	Agricultural land area (ha.)	Land rent (pesos/ha.)	Value of soil nutrients (pesos/ha.)
X	755,128	2,825.2	689
XI	936,818	2,190.3	501
XII	480,741	3,308.9	1,673
Total/Ave.	7,391,501	3,416	805

Source: Environment and Natural Resources Accounting Project (ENRAP), Philippines.

(b) economies of scale

The DENR is mandated to provide technical assistance to LGUs for devolved functions. The national government can have economies of scale in rendering such assistance. During the transitory phase of the devolution process, the demonstration effect of successful small watershed management by LGUs can be significant. Strengthening the institutional capacity of LGUs may address the problems of sustainability and replication of previous upland and coastal management projects. However, even with national government assistance, LGUs should have primary responsibility for the implementation of small watershed projects. To elicit proprietary feelings over the project, conditional matching grants are proposed.

(c) national objectives

The national objectives that can be addressed by national government intervention in small watershed protection are equity and poverty alleviation, enhancement and sustainability of water supply, and to a lesser degree, environmental protection. It has been estimated that about a quarter of the population in the Philippines were living in upland areas in 1980 (Cruz, 1986).[15] Upper watersheds are frequently inhabited by socially and politically marginalized people. Subsistence farmers generally operate outside the market system; hence, community-based projects may be needed to reach these groups. Since the poor

[15] The estimate of the upland population may be an overestimate due to the definition of upland areas.

usually do not pay taxes, targeted assistance can be more effective than block grants which may implicitly lower the tax rate for the general local population. Also, since environmental quality is a superior good, increased incomes for the poor can lead to greater demand for environmental protection and subsequently higher levels of provision of such services and better resource management in the long run.

Resource mismanagement is manifested in the severity of the country's current water supply problem. Economic development and population growth have led to greater demand for water for use both in production and consumption activities. However, the supply is constrained by declining water yield, damage to infrastructure such as dams and reservoirs, and diminished productivity of fisheries and other water resources due to soil erosion and downstream siltation and sedimentation. Compared to the power crisis faced by the country in the early 1990's, the water supply problem requires a longer-term planning horizon. Results of remedial actions to the water supply problem may not be as immediate. The national government can have a longer time horizon than local governments.

(d) fiscal imbalance

Most upper watershed areas are covered by 4th, 5th, and 6th class LGUs with low revenue potential. After netting out the externality considerations and joint LGU financing to address the spillover effects, the residual fiscal imbalance may be best addressed by fiscal equalization through the IRA formula. The national government may opt for a more targeted assistance to induce LGUs to choose projects supporting national government objectives.

Therefore, the basis for national government intervention in small watershed protection projects is the pursuit of national objectives—equity and poverty alleviation, enhancement and sustainability of water supply, and to a lesser extent, environmental protection. National government intervention can also be justified secondarily by fiscal imbalance, economies of scale in providing technical assistance and coordination, and externalities. Indicators that may be used to determine the level of national government support are poverty measures (income of direct project beneficiaries, potential gain to said beneficiaries, project cost per beneficiary, etc.), LGU class, willingness of LGU to participate in the project and share in costs, the state of degradation of resources, and measures of the degree of spillover effects (service area and value).

Proposed cost-sharing scheme

Since the management of small watersheds is a devolved function, and the nature of spillover effects of local public projects, the national government's share in financing should be at most 50 percent. Financial assistance other than technical assistance may be limited to 4th to 6th class LGUs. The suggested range of national government share in project financing is 20-50 percent, with the actual sharing determined by site-specific characteristics.

Some LGUs may wish to participate in projects for watersheds proclaimed as critical. This may arise as a local initiative or as a response to DENR deficiency in its project implementation. More funds are also available in foreign-funded projects for critical watersheds which are DENR-administered. The national government share in this case should be at least 50 percent, with the national government share going up to at least 80 percent for 4th to 6th class LGUs.

Other considerations

Like most environmental projects, effective watershed management requires a system or multilevel approach. In watershed projects, whether in small or critical areas, the DENR plays an important role in settling property rights and tenure security issues such as in the awarding of stewardship contracts. During the transitional phase of the devolution, the DENR is also tasked to assist in LGUs' institutional capacity building. These two functions of the DENR may provide further justification for national government sharing in small watershed project financing. To determine the appropriate level of national government support, it can be helpful to identify the project components or activities that either are the responsibility of the national government or warrant national government assistance.

The DENR must establish its priorities, strengthen its technical, enforcement, and monitoring capabilities, review and revise conflicting policies, and devise mechanisms to resolve administrative conflicts between LGUs and the DENR in the enforcement of environmental laws. An overall assessment of the status of the country's watersheds is needed to identify critical and small watersheds. This information is needed to program the efficient allocation of the limited resources of the country for watershed protection. The imposition of the logging ban in some small watershed areas can have adverse impacts on the income of the local communities. In rural areas, natural resources may be their major asset; the sustainable use of these assets may be their means of socioeconomic development. The mechanism for the issuance of environmental compli-

ance clearances (ECCs) and the approval of environmental impact asse (EIAs) must be reviewed to minimize delays in the approval/disappro cess, facilitate resolution of conflicts between the DENR and LGUs, and nate conflicts of interest (such as DENR personnel moonlighting in writing Increasing the water yield of watersheds is only a partial solution to the problem. There should also be appropriate water charging for users as tive for water conservation. An important aspect of implementation is in tion dissemination.[16] In simple words, the DENR should get its job done

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[16]An example is the lack of information dissemination about narra extraction poli Contrary to general perception, the logging of narra is not banned (DENR Administrative Or 58, 1993). There is a logging ban on some tree species but not on narra which is suitable for plantations.

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