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**REPLICATING INNOVATIVE NATIONAL FINANCING
MECHANISMS FOR SUSTAINABLE DEVELOPMENT ***

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REPLICATING INNOVATIVE NATIONAL FINANCING MECHANISMS FOR SUSTAINABLE DEVELOPMENT

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EXECUTIVE SUMMARY

While literature on innovative financing is now substantial, it is surprising that it provides few clues as to what is meant by finance being 'innovative' or 'additional' or 'new'. In so far as environmental improvement and resource conservation constitute a sector, ie the environmental sector, additional finance is simply an increase in the sums available to it. Innovative or new finance, however, indicates that different methods of finance are being used to create the additional sources of finance.

It is important to recognise that the sources of additional finance, however raised, have an opportunity cost. In other words, innovative financing for the environmental sector is not a 'good thing' in itself: it is only good if it generates more social wellbeing than the alternative use of the money would have achieved. This implies that the standard cost-benefit criteria should for the appraisal of projects and policies should be applied to the uses of innovative finance, though this does not seem to be the common practice.

By definition, all sources of finance emanating from outside national boundaries are excluded from the analysis in this paper. Although international sources can generate much larger funds than national sources, the latter have a special importance because they are owned by the people and hence encourage participation. Three categories of national innovative financing have been discussed in this paper. Although this classification is probably not comprehensive, it serves to provide the platform for discussion.

The first category relates to sources of finance which arise from improvements in the *private cost efficiency* with which economic activity is carried out, whether by government or the private sector. In this category, privatisation of state services and enterprises will not only transfer environmental expenditures from public to private sector but can also reduce production costs when the private sector is more efficient than the public sector. These released funds can be used for further environmental improvement. Major privatisation programmes have been implemented in many developing countries and countries in transition. The advantages and difficulties attached to such programmes are well documented. In addition to privatisation, institutions and individuals can be given the right to take action against non-

compliance by private sector. This can facilitate the cost of enforcement to be paid by the polluter rather than the environmental agencies. However, such an action requires a well established and stable legislative framework and may not be replicable in all countries.

The second category relates to finance which comes from efforts to secure social efficiency in production and service provision by way of *correcting externalities*. The prerequisite for this action is the removal of price distortions such as input subsidies as searching for innovative sources of finance will be futile if the same funds are spent in financing environmental degradation. Given that market based instruments have the potential to generate revenues and command and control measures do not, the former is to be preferred for the purposes of generating funds. Such instruments include environmental taxes (emissions taxes, product charges, tax differentiation, user charges), deposit-refund schemes, recycling credits, performance bonds and tradable pollution and resource permits. Another point of concern is that certain economic, legislative and institutional requirements need to be in place for successful implementation of market based instruments.

The third category refers to *finance from national savings* whether those savings are corporate, household or government. Innovative features here especially include the efforts made to fund 'micro enterprises' through community savings and venture capital. Traditional ways of looking at the provision of services to communities has been to assume that such services should be provided by local or central government and provided either free or at very low cost. This approach ignores the fact that many households in developing countries already pay for services such as water and housing. The evidence also shows that the poor do save. However, there is a mismatch between prevailing institutions, such as commercial banks, and the ends of the poor: tailored finance is needed.

Although mainly a way of managing national savings, National Environmental Funds can be designed to collect, manage and spend earmarked revenues from any of the instruments mentioned in three categories above. They are set either as part of a government agency or independently to overcome the difficulties with inadequate financial markets as well as promoting political and community support for their activities. Despite theoretical and practical problems with their implementation, they have functioned successfully in several countries and can be replicated in others.

The general message that can be drawn from the discussions in this paper is that there are, in most cases, significant potential innovative sources of funds available at the national level. Moreover, the mechanisms through which such funds are collected can, in most cases, be replicated in other countries.

I. INTRODUCTION: THE NEED FOR INNOVATIVE FINANCE

The volume of official development assistance from rich to poor countries has remained fairly constant over the past decade, at an annual rate of \$55-60 billion in constant 1993 prices. Few commentators expect it to increase from this level in the coming decade: it may even decrease. The Development Assistance Committee (DAC) statement of 1995, *Development Partnerships in the New Global Context* (DAC, 1995), makes it clear that, while foreign aid will continue to be of critical importance, it is the indigenous resources of the developing countries that will provide the finance for investment and economic development¹. There is therefore a reorientation of development thinking towards capacity building and self-help, a trend reinforced by what has been called 'the retreat of the nation state' and the growing importance of business, non-governmental organisations (NGOs) and international agencies. This new focus on indigenous finance suggests the need for both greater efficiency in the use of existing resources, and the leveraging of resources wherever possible.

If sustainable development is to be achieved, it is clear that finance will be needed, even if more immediate and beneficial policies - such as subsidy reduction - are pursued. Indeed, correcting economic distortions is not only the prior need, but is also a source of funding for sustainable development policies. Removing subsidies, for example, releases government income for other purposes. Vincent and Fairman (1994) show that combining estimates of world wide subsidies in energy and agricultural inputs suggest an annual subsidy of perhaps US\$600-700 billion. Subsidies to water use fairly certainly ring this figure to over US\$1000 billion.

Charges on environmental degradation similarly yield new revenues for governments. Thus, finding 'innovative' forms of financing and removing economic distortions are closely related. To be clear, the demand for innovative financing has to be part of a much wider programme of financial reform in rich and poor countries alike. Superimposing 'new' sources of finance on financing structures that include massive and unwarranted price and property right distortions which destroy the environment will simply not work.

1 'Developing countries themselves are ultimately responsible for their own development. Their own earnings, savings and tax revenues are the most important source of investment in their economic and social progress. For development to succeed, the people of the countries concerned must be the 'owners' of their development policies and programmes'. DAC (1995, item 4).

In this paper we take the need for additional finance for sustainable development for granted, whilst acknowledging that there is extensive scope for improving the efficiency with which existing resources are used. New finance can come from two sources: external flows of funds and internal flows of funds. We focus on the latter. Our aim is to survey the forms of innovative national financing and to ask how replicable these mechanisms are. Replicability offers a 'blueprint' for other nations to imitate. Additional national sources of finance may be dwarfed by innovative international financial sources if they come about, for example, with income from the sale of tradeable carbon permits or by the 'greening' of the \$100 billion or so per annum of private net investment in developing countries. But national sources have special importance because they are 'owned' by the people whose aspirations for sustainable development the finance is designed to serve. With ownership comes participation and involvement and hence the incentive to make things succeed. This is our justification for the exclusive focus on national financing schemes.

II. WHAT IS INNOVATIVE FINANCING ?

While the literature on innovative financing is now substantial, it is surprising that it provides few clues as to what is meant by finance being 'innovative' or 'additional' or 'new'. Probably the best way to conceptualise what is intended is to think of each individual economic sector within an economy as having a separate budget. In so far as environmental improvement and resource conservation constitute a sector - call it the environmental sector - which is now widely regarded as being a critical ingredient of sustainable development (Pearce *et al*, 1996), then this sector too has a budget allocation. It is widely appreciated that in developing economies and economies in transition these budgets are highly constrained - see Table 1(a). Even in rich countries, environment is often some way down the political, and hence the budgetary, agenda. Pollution abatement tends to be financed by public and private sources - see Table 1(b). Conservation tends to be financed mainly from public sources which in turn can be divided into government and non-government sources. In these contexts, what is meant by additional finance is simply an increase in the sums available to the environmental sector. Innovative or new finance, however, indicates that different *methods* of finance are being used to create the additional sources of finance.

III. THE OPPORTUNITY COST OF INNOVATIVE FINANCE

While the definitions in Section II may seem obvious, it is important to recognise that these sources of additional finance, however raised, have an opportunity cost.

What is 'new' finance for the environmental sector must come from somewhere, and this means that the relevant source is forgoing using the finance for something else. New money is not simply magically created. The relevance of recalling this notion of opportunity cost is that innovative financing for the environmental sector is not a 'good thing' in itself: it is only good if it generates more social wellbeing than the alternative use of the money would have achieved. As we shall see, this is of some importance when looking at sources of funds which are 'dedicated' to the environmental sector. For it is always possible to argue that the funds should be dedicated (hypothecated, earmarked) for some other socially worthy cause. The standard cost-benefit criteria for the appraisal of projects and policies should be applied to the uses of innovative finance. It is far from clear that this is any sense the common practice. There are, however, arguments in favour of hypothecating particular kinds of innovative finance.

Social choice theory tends to argue that hypothecated funds are seen as being more 'accountable' by taxpayers who like to know what their money is being used for. The basic idea is that earmarking establishes a formal link between willingness to pay, taxes and public expenditures, this link reducing the disincentive effects (eg on willingness to work) of conventional taxation (Bailey, 1995). This 'connectivity' of taxes and willingness to pay also reduces the excessive centralisation of government and restores a larger element of democracy and public control over central government. The implicit model of democracy in this view is subject to debate, however, since it assumes (a) that people should vote issue-by-issue rather than on packages of policies in a wider manifesto, and (b) that governments have a lesser role of acting in the 'public interest', overriding public preferences where the public interest requires it.

Panayotou (1996) argues that money raised from taxes on environmental externalities should be used for environmental purposes - sometimes called 'functional earmarking'. Functional earmarking is quite widely practised in many countries. The obvious problem with this argument is that it could give rise to inefficiencies if the earmarked money goes to uses with lower social value than other uses. There may also be some losses arising from management inefficiency due to lack of public scrutiny (Lovei, 1995) although it is unclear if this is a peculiar feature of earmarked funds. Indeed, some of the experience with national Environmental Funds (NEFs) suggests the opposite. Issues of inefficiency and 'mismatch' between environmental expenditures and environmental needs are arguably more serious the more developed the economy. At lesser stages of development the environment is likely to be significantly underfunded and earmarking has a rationale in terms of forcing increases in expenditure on the environment that would otherwise not take place (McCleary, 1991).

There appears then to be a trade-off between social efficiency in the traditional sense of maximising the social returns to expenditures and the accountability of public expenditures.

The same point about opportunity cost also serves to remind us that precisely what it is that should be financed by innovative finance is open to debate. While the focus of the literature has tended to be on the environmental sector, we could just as legitimately argue that there is a need for innovative financing in housing, water, sanitation, primary health care and education. Indeed, this was one of the observations from the *Third Expert Group Meeting on Financial Issues of Agenda 21* (See-Yan, 1996). As is well known, environment is pervasive to all economic sectors, so that a focus on innovative financing for environmental issues only is likely to be counterproductive.

In what follows we make no further reference to the *optimal use* of innovative funds and confine ourselves to what those innovative sources are and how successful they can be regarded as being.

IV. NATIONAL INNOVATIVE FINANCING: A TAXONOMY

Table 2 sets out a taxonomy for classifying national sustainable development financing. By definition, all sources of finance emanating from outside national boundaries are excluded. External sources include the many forms of international payment for environmental services rendered, whether through debt-for-nature swaps, joint implementation, biodiversity prospecting or whatever (Pearce, 1995; Panayotou, 1996). In practice, the distinction between national and external sources of finance is blurred, not least because of the potential for fusing both sources and the leveraging of external finance by internal finance. Nonetheless, we try to maintain the distinction as far as possible. The categories of finance need to be distinguished from the conditions which will be favourable to their use. It is widely acknowledged, for example, that better functioning capital and financial markets facilitate not just greater flows of funds generally but also better market discipline and hence better efficiency in the use of funds (Lovei, 1995). We return to this issue in the context of funding for small and 'micro' enterprises (Section VII).

The first category relates to sources of finance which arise from improvements in the *private cost efficiency* with which economic activity is carried out, whether by government or the private sector. Private efficiency here refers to the conventional accounting costs of production and service provision, i.e. land, labour, and capital costs. As the costs of engaging in productive activity or in the provision of

government services are lowered, so resources are released and these resources can, in principle, be allocated to activities with high and sustainable social returns. Notable in this category is privatisation as a means of lowering production costs.

The second category relates to finance which comes from efforts to secure *social efficiency* in production and service provision. Social efficiency allows for the external costs of production (eg environmental pollution), the unappropriated benefits from public provision of resources, (eg the free benefits that industry secures from the public provision of infrastructure and for which the taxpayer tends to pay), or the capture of natural resource rents. Correcting social inefficiency need not generate revenues if traditional 'command and control' policies are adopted, but can easily do so if market-based instruments are adopted, eg auctioned tradeable permits, environmental taxes etc.

The third category refers to *finance from internal national savings* (forgone consumption) whether those savings are corporate, household or government. Innovative features here especially include the efforts made to fund 'micro enterprises' through community savings and venture capital.

This threefold classification is probably not comprehensive but it serves to fix the basic ideas of innovative national finance. Such national sources might be contrasted with some of the innovative international (external) financial sources whereby funds might be thought to have low or zero opportunity cost to the country in question. Thus, the opportunity cost of a joint implementation scheme or debt-for-nature swaps may well be close to zero for the country in question since the funds are unlikely to be forthcoming for some purpose other than that specified in the particular bargain being sought. Thus, funds from a debt-for-nature swap aimed at forest conservation would not be forthcoming if the forest conservation option is ruled out.

V. COST REDUCTIONS

While it is tempting to think that rational economic agents, whether they are households, governments or corporations, act to minimise costs for any given level of activity, in practice we know this is not the case. Substantial levels of 'X inefficiency' exist in all economies, i.e. average costs of production or of providing services are higher than they need to be. In terms of replicability, then, cost reducing measures have fairly universal application.

(a) Privatisation

Privatisation of state services and enterprises can serve a valuable role in encouraging innovative financing. If public and private provision were equally efficient then privatisation would simply transfer environmental expenditures from the state to the private sector: there would be no overall net gain in terms of national flows of finance. In practice, however, private enterprise tends to operate at a lower cost than state enterprise due to the market rigours of competition, and accountability to management and shareholders. The resulting release of resources could, of course, be directed to any purpose including retained and distributed profits, but the context tends to be one in which the before-privatisation state enterprise failed to observe prevailing environmental standards, partly because of lack of management incentives but also because state ownership tends to be accompanied by below-cost pricing in many cases. Hence the resources released with privatisation permit the opportunity to ensure that those standards are met in practice. In this way, the environment benefits from the privatisation process. The introduction of rational cost-recovery pricing also tends to benefit the environment since below-cost pricing encourages not just excessive use of polluting inputs, but also inefficient management. Munasinghe and Cruz (1995) note, for example, that in Poland:

'energy intensity and excessive pollution... is [sic] due not only to the undervaluation of coal in the centralised price system but more importantly, to the entire system of state ownership that encourages output maximisation rather than cost minimisation.' (Munasinghe and Cruz, 1995, p23).

Recognising the practical difficulties of rapid privatisation, Poland instituted a case-by-case privatisation programme with measures designed to improve the efficiency of state enterprises. As a result, Pinto *et al* (1993) found that the energy and materials intensity of these state enterprises declined. Munasinghe and Cruz (1995) find similar effects for tea plantations (Sri Lanka), electricity generation and urban and industrial water supply. They rightly caution that privatisation is not *necessarily* the environmentally correct solution if the prior property rights system is one of efficient communal management, a point stressed elsewhere in the literature on the links between property rights and environmental improvement (eg Bromley, 1991).

(b) Private Enforcement

A growing area of interest in contexts where government regulation of the environment may be inefficient or simply impractical because of lack of resources is the area of private enforcement. Simply put, private enforcement means that private

individuals, eg an NGO, can sue for compliance with a regulation, or adopt other means to achieve compliance. Article 6 of the North American Free Trade Agreement actually contains the provision that interested parties must have access to information and enforcement proceedings. The link to innovative sources of finance is indirect: private enforcers may take action against the offending polluter or against the regulatory authority for failing to take the appropriate measures. If the 'loser pays' principle exists in the country in question, then enforcers can secure reimbursement of their costs. Otherwise, of course, they must pay the costs. Private enforcement is familiar in developed economies, but it also exists in a number of developing economies. Tietenberg (1996) cites examples of metallurgical plant discharges and waste dumps from Chile (where the constitution guarantees citizens the right to live in an environment free of contamination) and from Mexico. Loser-pays rules, as Tietenberg notes, have the effect of raising the costs of non-compliance for the polluter (since he or she has to meet the costs of the complainant if they are successful). This loser-pays principle contrasts with the American situation where each side pays its own costs, and encourages actions with a high probability of success. Overall, then, private enforcement, especially with a loser-pays principle, encourages cost minimising behaviour on the part of polluters by making non-compliance more expensive. More directly relevant to innovative financing is the potential for penalties resulting from private enforcement to be earmarked for environmental purposes. Naysnerski and Tietenberg (1992) found that from 1983 to 1986, 80% of private enforcement cases involving penalties in the USA dedicated the revenues to an environmental fund.

The potential for replication of private enforcement depends in significant part on the presence of legal provision, either in the constitution or through the development of common law. This will limit the scope somewhat. A second limitation lies in the ability of private enforcers to overcome corruption in the legal process used to secure the enforcement. Third, the environment benefits most if there is provision for earmarking penalties if they are imposed and this may not always be possible. Tietenberg shows, however, that private enforcement has made some headway in Central and South American countries, although the empirical evidence is admittedly limited.

VI. EXTERNALITY CORRECTION

Externality correction provides perhaps the most discussed set of examples of innovative financing. The basic principle is straightforward: methods to correct externalities can be devised in such a way that revenues are generated, and those revenues can be earmarked for environmental purposes. Given that market based

instruments have the potential to generate revenues and command and control measures do not, the former is to be preferred for the purposes of generating innovative finance. We take externality correction here to include removal of subsidies to avoid the under-pricing of scarce natural resources such as forests, national parks, wetlands etc.

Panayotou (1996) and Lovei (1995) have provided fairly extensive lists of market based instruments and the arguments for and against their introduction have been extensively discussed (Pearce *et al*, 1989; OECD, 1994, 1996). This section offers only a brief overview.

(a) Environmental Taxes

Emission Taxes

Taxes can be levied on pollution and other forms of environmental degradation. It is usually argued that taxes should be directly related to the actual emissions of pollutants, although, more strictly, the ideal tax should be related to damage done. The links between emissions and damages can be complex and will depend on site-specific factors such as airborne diffusion characteristics, buffering capacities of soil, avertive behaviour by individuals suffering the pollution, and so on. Since damage varies with location, ambient-damage taxes tend to be rare, and the focus is on emissions. Emission taxes tend to be further confined to stationary sources due to the complexities of monitoring mobile sources. Such taxes have clear revenue raising capabilities, although revenues will decline through time, other things being equal, as polluters adjust to the tax by introducing abatement measures, thus reducing their tax liability.

Product Charges

A product charge is levied on the product 'containing' the pollution. Some classifications (eg OECD, 1996) regard carbon taxes as product charges on fossil fuels, while other classifications would regard the carbon tax as an emissions charge (since the carbon is necessarily emitted on combustion). Product charges may be materials or energy charges (input taxes) or consumer product charges (consumption taxes). Again, the potential for revenue raising is significant, although the desired behavioural effect, one of reducing demand for products that are taxed, will reduce revenues through time, other things being equal. In practice, economic growth tends to 'take up the slack' of such reductions in revenues. Cheong (1995) records a number of product charges in Korea, ranging from butane gas and insecticide containers through to batteries, antifreeze containers, diapers, fluorescent lamps and

even chewing gum. Interestingly, the revenues from these product charges are earmarked for projects relating to waste reduction and recycling. The potential for replication of product charges would appear substantial: all economies make use of the kinds of products in question.

Tax Differentiation

Differentiated charges may be applied to products that are, from the consumer standpoint, generally regarded as being the 'same' in the sense of being substitutable. Less polluting products may then be taxed less than the equivalent but more polluting product. One of the most widespread examples is the tax on leaded and unleaded gasoline. The potential for revenue raising arises here from the tax on the more polluting product. As such, the reduction in pollution levels and revenues over time are similar to those of any emission or product tax. The basic difference is that the differentiated tax sends a clear message to the user (consumer) as to what the substitute product is.

User Charges

User charges relate to charges for an environmental service. Effluent treatment for example can be financed by a charge on effluent. Water charges are a payment for the provision of water. Entry charges to wildlife parks are charges for the use of a scarce resource, and so on. The revenue raising potential is obvious. Korea experimented with a household waste collection charge in 1994, and formalised it in 1995. All waste is charged for except briquette ash and recyclables. Other waste has to be placed in special collection bags or it is not collected at all. The bags are sold in supermarkets and the charge for the bags is designed to reflect at least part of the true cost of collection (Cheong, 1995). Kenya has raised entry fees to national wildlife parks substantially after surveys revealed that visitor willingness to pay was significantly in excess of the entry prices (Pearce, 1996)

Tax Relief

Tax relief may be granted for 'environmentally friendly' activities such as investment in pollution control equipment. Accelerated depreciation is one such measure and investment tax credits another. Strictly, there are no revenue implications here depending on how the 'baseline' is viewed. Thus, if the baseline is taken to be 'normal' taxation or normal depreciation provision, the effects of tax relief are essentially those of reducing rather than increasing revenues. Korea practises tax exemption and low interest loans for recycling companies (Cheong, 1995).

Tax-Subsidy Schemes

Tax-subsidy, or deposit-refund schemes can be used to encourage re-use and recycling. They have been in common use for glass bottles and metal cans for a long time, have been extended to plastic containers, and less successfully, to car hulks. The basic idea is simple: a tax (deposit) is levied on the product at the time of sale and is recovered when the container or product is returned at the end of its useful life. Deposit-refund schemes exist for beverage containers in sixteen OECD countries, plastic beverage containers in twelve, and car hulks in three (OECD, 1994). In many cases, deposit-refund systems existed independently of government and governments subsequently took them over or extended them. Cheong (1995) shows that deposit-refund schemes exist in Korea for some forms of batteries, car tyres, lubricating oil, white goods and beverage containers. Again, the potential for replication appears large, even though in some developing countries the sheer scarcity of the resources in question produces a market in which return and re-use is already encouraged, eg by being unable to purchase a new product without return of the original product, as with some beverage containers.

Recycling Credits

Recycling credits can be thought of as a form of tax-subsidy scheme but in effect they amount to financial transfers between different parts of the waste disposal system. The basic idea is simple. If waste has to be disposed of by a local authority then the cost of disposing of that waste is avoided if it is recycled by another agent, such as an NGO or another local authority. Since the recycler 'saves' the disposal authority the cost of disposal, the disposer simply pays that avoided cost (or an amount less than this) to the recycler. The disposal authority is then no worse off (and could be slightly better off) while the recycler now receives not just the revenues from sales of recycled material but also the 'recycling credit'. This scheme exists in the United Kingdom where the credit can be substantial (up to UK £35 per tonne of recycled material), transforming the economics of recycling. This simple principle would appear to have general applicability.

Performance Bonds

Industries seeking permission to, say, extract minerals, pay for a bond that gives them the right to engage in the extraction on condition that the land is returned to some agreed state after mining has ended. There are at least two ways in which a performance bond can be paid for: in lump sum cash payment equal to the estimated cost of rehabilitation and contributions to a trust fund which also receives the revenues from the royalty payments. The capital value of the bond is then redeemed

but the interest is used to fund environmental schemes in the meantime and to act as an insurance policy against default by the mining company. Examples of performance bonds in the mining sector are seen in Australia and is replicable in other countries provided that financial arrangements are well in place to account for the inflationary effects on the value of the bond over time.

(b) Tradeable Pollution Permits

Tradeable permit systems increase the flow of finance in two ways. First, there is a consensus that they reduce industrial compliance costs significantly. Second, if their initial allocation is auctioned, then there are proceeds from the auctioning process². Estimates of compliance cost savings in the USA under the 1970s Clean Air Act trading programme are of the order of billions of dollars per year (Hahn and Hester, 1989). Rico (1995) quotes US EPA regulatory impact analyses suggesting that the 1990 Clean Air Act Amendments will save over 60% of the costs of a conventional command and control system for sulphur emissions. Tradeable permits in water quality (as opposed to abstraction) have been less successful, although they exist in several US states. No examples appear to exist of pollution permits being auctioned.

The replicability of tradeable pollution permit systems is open to question. Where a fairly detailed inventory of emissions exists, and where monitoring and enforcement is feasible, such systems can be replicated. In many developing countries these conditions do not yet exist and one would not therefore expect substantial replication of pollution trading schemes. Panayotou (1995) reports one limited experiment with tradeable permits in Poland and another planned one in Almaty, Kazakhstan. Tradeable emission credits have been enabled in Santiago, Chile for particulate matter but trades have yet to take place (O’Ryan, 1996).

(c) Tradeable Resource Quotas

Tradeable resource quotas work in the same way as tradeable pollution permits but the permit in this case relates to extraction, abstraction or harvesting of a resource. One of the most extensive applications of resource trading is in fisheries, with the aim of reducing the widespread problem of overfishing. The New Zealand system is fairly typical and involves the ‘grandfathering’ of quotas according to past catches by individual fishermen. Fees charged for the issue of quotas provide a source of revenue to the government, one use for which is the purchase of quotas from

² Even non-tradable quotas can generate revenues if their initial allocation is auctioned.

fishermen who decide that they do not wish to stay in the industry. More generally, fees and a general shifting of industry costs to the fishermen reduces public expenditure on the industry and thus releases resources. Bought-back quotas can be held so as to reduce the overall catch, or released at a future date in the event of fishery population recovery. Quotas retained by fishermen can then be traded. In the New Zealand case, actual revenues are generated by the fees on the quotas rather than through any auctioning system. The system has been accompanied by changes in the methods of recording catches so as to provide greater assurance to fishermen about fairness. The system progressed from annual tradeable quotas (ATQs) in 1983 to individual tradeable quotas (ITQs) in 1986. Assessments of the success, and hence the replicability, of ITQs vary. Cullen (1995) cautions against over-enthusiasm based on the New Zealand system since it met with many problems ranging from 'data fouling' (incorrect data records), to ethnic minority interests, to 'quota busting', plus problems of dealing with fish species whose populations are not stable over time (in some cases even fairly short periods of time). Even the quota revenues have been controversial, especially when flat fees were replaced with rentals set at a percentage of the traded prices for quotas. Revenues proved insufficient for management and research and in 1994 the New Zealand government announced it would cease all rental charges, transferring costs to the fishing industry (Cullen, 1995). Other commentators appear to be generally favourable as regards the New Zealand experience, perhaps the most sophisticated ITQ system in existence.

Far more positive assessments for tradeable quota systems in Iceland, Canada and Australia are given in Scott (1992), Crowley (1992) and Arnason (1992). Torres (1995) reviews the experience of Chilean fisheries, noting that in 1991 ITQs were introduced for some species. He gives a cautious welcome to ITQs in the Chilean context, but notes a significant number of problems relating to the way that ITQs were introduced, notably the exclusion from the ITQ system of fisheries where major over-exploitation problems exist, and the use of different ITQs for fisheries in different 'states' (eg fully exploited, under recovery or infant industry). But auctioning of quotas is included in the Chilean scheme, thus providing some revenues.

Experiences with tradeable water rights appear to have been very successful according to most commentators. Such systems generate finance in a number of ways. First, Schleyer and Rosegrant's (1996) study of Chile's system stresses the release of public resources, previously used for subsidies, arising from the introduction of tradeable rights in the 1981 Water Code. Most transactions have been between farmers and urban water and sewerage companies, but when considered in *volume* terms, most trades were between farmers. Second, tradeable rights should generate improvements in income for buyers and sellers. Hearne and

Easter (1995) found evidence of substantial 'gains from trade' in the form of raised property values in the Elqui and Limarí valleys. Securing water rights raises the value of the relevant land and hence the potential for taxation. While this should be a source of improved financing for government as well, Brehm and Quiroz (1995) note that the combination of lack of registration and 10 year tax breaks means that this finance effect of water rights is not significant. Sturgess and Wright (1993) estimate that rural income gains in New South Wales, Australia amounted to A\$ 10 million in 1990-91 because of tradeable water rights. The same claim is made for the water rights system in Victoria, Australia, despite the limited number of trades (Stringer, 1995). Clearly, however, evolving a water rights system is complex and there are as many pitfalls as in tradeable fisheries quotas. The fact that Chile has managed to introduce a system of some significance perhaps reflects the 'crisis' opportunity of wholesale government reform, an opportunity that is replicable perhaps only in a few other countries.

VII. MOBILISING NATIONAL SAVINGS

The final source of 'innovative' finance comes from the mobilisation of savings or expenditures. Two features of this 'new agenda' for financing sustainable development are addressed here: (a) mobilising resources from local communities, and (b) the creation of 'National Environmental Funds'.

(a) Mobilising Local Resources - Micro enterprises

The traditional way of looking at the provision of services to communities, especially poor communities, has been to assume that those services should be provided by local or central government and provided either free or at very low cost to the community. Apart from the overwhelming demands that such a view places on limited public finances, it does little to foster involvement by the community. The 'new' view stresses the fact that communities often are willing to pay at least some of the cost of services, and that the act of payment gives them a stake in the service, ensuring that those who provide it are held accountable to the community for the level and quality of the service. Examples of innovative action are numerous. The Orangi Pilot Project in Karachi, Pakistan, for example, has utilised community resources - both finance and labour - to construct sanitation services for over 600,000 people, forging a partnership with the municipality whereby the community builds the connecting sewers and the municipality constructs the main lines. The project emerged from a realisation that the Karachi Development Authority would not, and could not, meet the relevant demand (Briscoe and Garn, 1994). A feature of such ventures is the avoidance of 'high-tech' solutions in favour of first class but innovative measures. A municipal agency in Sao Paulo, Brazil, for example, found it could supply water and sewerage systems to the *favellas* using plastic pipes suitable for the narrow roadways and securing payment from the households. By demonstrating that the service could be supplied the pressure was put on the state water utility to do likewise, an obligation it had refused to assume beforehand.

More generally, the traditional approach ignores the fact that many millions of households already pay for services such as water from vendors, boreholes and storage systems that have been constructed by 'micro-enterprise' agents and companies, often with the active participation of users. Households pay for their connections, blocks of households or flats pay for their block connection, the community pays for central provision and the municipality pays for the main infrastructure cost. Okpala (1994) notes that about 70-80% of housing finance in developing countries is still through non-institutional sources. In Tanzania, for example, over 98% of households in 1978 had used their own savings to finance housing. Generally, the top 'slice' of incomes use institutional means for financing

housing, whilst the rest, the great majority, use their own resources. Informal finance accounts for 60% of housing in Brazil and 74% in Pakistan. In many ways, then, the 'new' model of finance is a recognition of what has gone on for some time. Nonetheless, the importance of these financial resources indicates clearly the potential for funding other sustainable development activities through the same channels, facilitated by information, education and participatory experiments.

The same principle, that even the poor can and should pay for an identifiable part of the provision of the basic services needed for sustainable development, exists with other micro-enterprise provision. Probably the most famous example is the Grameen Bank in Bangladesh. Having started out with providing loans as small as \$1, today it has 2 million borrowers, 94% of them women (Yunus, 1996). The purpose of the loans is also wide-ranging, from credit to weavers to link to the international fabrics market, to finance for health insurance and village cellular telephones. On micro-enterprise in general, Barry (1996) remarks:

'Experience round the world has demonstrated that micro-entrepreneurs do not need subsidies and that micro-lenders cannot afford to subsidise borrowers... Most self-employed poor people and micro-enterprises borrow for short term and working capital needs, and the returns from their economic activities are usually sufficient to pay high interest rates for loans and still make a profit' (Barry, 1996, p42).

Rhyne and Otero (1992) set out the principles whereby micro-enterprise can be facilitated. These principles bear close resemblance to those that should be used by any financial institution. These include learning what the customer's needs and preferences are, and facilitating savings at least as much as credit since poor households often need secure locations for their savings, whilst borrowers need to be encouraged to save as a means of repayment. The other main principle is that the lending institution should be financially viable. Viability includes the avoidance of subsidies, low administrative costs, and incentives to secure repayments.

The overall message from savings mobilisation is perhaps a surprising one from an orthodox development analysis standpoint. First, even the poor are willing to pay for the provision of services that meet their needs. Second, even the poor save. Third, there is a mismatch between prevailing institutions, such as credit institutions, and the ends of the poor: tailored finance is needed. Fourth, the potential for resource mobilisation is substantial. Fifth, using such 'indigenous' resources provides a stake in the service for the household and the community, and development experience has already shown that where that stake does not exist, services are often underutilised and allowed to decay. The potential for replication is almost infinite:

there are no real limits to the provision of such finance, and the widespread role of household savings and informal finance in housing and other services is already testimony to this.

(b) National Environmental Funds

As developing and countries in transition continue to grow, a significant increase in the role of private environmental financing is envisaged. However, the transition period is generally marked by a number of institutional and market problems which constrain the development of an effective environmental financing system. These include (Lovei, 1995 and OECD,1995):

- weak environmental management, including poor enforcement of environmental requirements;
- severe financial constraints in industry, causing delay in the replacement of outdated, polluting technology;
- changing fiscal systems, leading to uncertainties in revenue-raising capabilities at various government levels, impeding the development of environmental services such as municipal services based on user-charges;
- slow pace of privatisation, hindering positive changes in management practices;
- inadequate banking systems leading to credit shortage and rationing;
- underdeveloped capital markets which constrain the use of advanced financing instruments;
- frequent lack of consideration of environmental issues in the political decision-making and budgeting process;
- inadequate information on the extent of environmental damage and the social costs incurred, and poor understanding of cost-effective solutions; and
- weak non-governmental organisations (NGOs) and citizen groups, unable to effectively influence the political decision-making process.

Many see national environmental funds as the means to overcome these problems and funding vital environmental programmes which otherwise would be neglected.

National Environmental Funds (NEFs) are institutions which are designed to collect, manage and spend earmarked revenues in the environmental sector, to support the objectives of sustainable development. Thus, they are intended to be partially independent of the main government budget, and provide guaranteed financing for priority public environmental programmes. Therefore, they provide a means of managing and allocating the funds which are generated by financing mechanisms, rather than providing a totally new source of finance. However, the setting up of NEFs may encourage, in the absence of sufficient funds from the traditional budget or from international sources, greater efforts at seeking new sources of finance such as the means of cost saving and externality correction discussed in Sections V and VI. The financial needs of NEFs may also encourage greater research into the development of further innovative financing mechanisms.

There are two distinct types of NEFs according to the way the funds are distributed: comprehensive funds and specific funds (OECD, 1995). *Comprehensive funds* provide finance for a broad range of environmental protection policies, and thus those managing the funds must decide how to distribute the funds amongst the various environmental 'causes'. On the other hand, *specific funds* provide finance for a particular programme and cannot be diverted to other environmental activities. Comprehensive funds exist mostly in the transition economies of Central and Eastern Europe, and are often seen as legacies of central planning. However, there is also a growing acceptance that these funds, if well-designed and managed, can provide important environmental financing to support sustainable development during the transitional period.

Specific funds can take the form of trust funds. A trust fund is a sum of money that is legally set aside and whose use is restricted to specific purposes for designated beneficiaries. Such funds are usually set up in the legal form of a non-profit foundation (in civil law countries), or a trust fund (in common law countries), that is independent of government. The legal entity making up the trust fund can be founded in the recipient country or offshore and they can be established within or external to the framework of a governmental organisation. A board of directors controls the use of the trust fund's assets, and this board may include representatives from government agencies, NGOs, local community groups, scientific experts, the private sector, and international donor organisations. The board of directors usually hires an asset manager, either locally or off-shore, to directly invest its capital.

NEFs are used for a variety of objectives including pollution prevention, nature conservation, encouraging an environmentally benign economic structure; research and development; education and training and environmental monitoring (OECD, 1995). A number of advantages are associated with NEFs (based on Peszko (1996)):

- accelerate the pace of environmental improvement and help strengthen environmental enforcement;
- generate additional sources by demonstrating bankability of environmental projects;
- enhance domestic skills and capacities in the preparation and appraisal of environmental investment projects;
- (if designed with the right financial structure) avoid inflationary effects; and
- encourage local participation by involving NGOs, community groups and local government in the management and by providing funding to small scale project and enterprises.

In contrast to these benefits, there are some theoretical and practical problems associated with the adoption and replicability of National Environmental Funds. First concern is economic efficiency. The environmental charges can be set higher than abatement costs to encourage polluters to reduce pollution (correction of an externality) or lower than abatement costs so that polluters prefer to pay the charge but not reduce pollution (revenue raising). Theory suggests that the first aim of environmental charges should be correction of externalities. However, in practice due to political realities it has been much easier to set charges for revenue raising purposes. Lovei (1995) explains this low level of environmental charges as a "compromise between the affected main stakeholders (industries, municipalities and agriculture) and local environmental protection agencies". This is why their financing function is generally more important. Earmarking of funds for environmental improvements also makes the gradual increase of charges more acceptable, particularly if the funds are perceived to bring about positive environmental change.

Second point of concern is the trade-off between the use of environmental charges for revenue raising, and their potential in correcting for externalities by providing incentives to reduce pollution levels (also mentioned in Section VI). If the revenue raising role becomes the dominant one for NEFs, the implication is that pollution needs to continue at a reasonable level to provide such funds. If, on the other hand, the main role is that of providing incentives to polluters to reduce pollution levels, revenues should decline over time as more parties are able to invest in abatement technologies in preference to paying charges (Smith, 1993).

Thirdly, providing a certain level of environmental services with funds financed by earmarked revenues can potentially be problematic. For example, the level of environmental services supplied by the fund will depend on these revenues, instead of the demand for such services. Therefore, these services might either be undersupplied or oversupplied. In many countries, the latter does not appear to be a concern. However, some do argue that this has occurred in some OECD countries in connection with earmarked revenues set aside for building wastewater treatment facilities.

Finally, since many of the countries which are operating NEFs do not have a tradition of financial discipline, NEFs, with their guaranteed sources of finance leading to less accountability to government, are potential victims of wasteful management and poor expenditure choices. Also, without sufficient legal requirements to ensure public control over the actions of NEFs, there is a danger that earmarked funds could follow the priorities of special interests instead of national priorities (OECD,1995).

Therefore, there is a clear need for any NEF to have an explicit set of operating procedures, for selection and funding of projects. The Conference on Environmental Funds, held in St. Petersburg in October 1994, resulted in a set of guidelines (the "St. Petersburg Guidelines", OECD, 1995) being set out on the role and operation of environmental funds during the transition process. Amongst these are a need for clear environmental and economic criteria for spending decisions and that such decisions are made public and free from political interference. Accountability to the government, and ultimately the public, was also stated as an important requirement. The use of environmental funds can ultimately only be justified in terms of their success and efficiency in achieving environmental policy goals (OECD, 1995).

Another important requirement of NEFs, also stated in the St. Petersburg Guidelines, is that they must not undermine the 'Polluter Pays Principle'. There is a danger that NEFs might be seen as having the role of providing subsidies to polluters for abatement, leading to a continued dependence on state financing for environmental investments, instead of shifting such financing to private sources. Economic theory also shows that such subsidisation can lead to perverse results in that it can encourage an excessive number of firms to stay in or enter a polluting industry. The OECD (1995) emphasises that

'...environmental funds should try to avoid actions that hinder the development of market solutions: carelessly designed grant schemes, for example, for environmental investments could reduce interest in long-term borrowing and the development of a bond market. Rather, environmental funds should focus on addressing the specific market and institutional failures that hinder environmental investment.'

Despite the above concerns and cautions, environmental funds are generally viewed as useful temporary instruments to correct imperfections, particularly for countries in economic transition, and ensure that there is a stable source of revenue for environmental investments which are required to ensure sustainability of economic development.

Most NEFs in economies in transition have a two-part structure: a management unit and a decision-making body. The fund is often located within the ministry of the environment, though in some cases (eg Poland), the fund may be a separate agency. A supervisory board, often chaired by the minister of the environment, acts as the decision-making body for the fund. The majority of these NEFs rely on environmental taxes and charges for their revenues. For example, Bulgaria and Hungary raise funds through fines for non-compliance. China, Czech Republic, Estonia, Poland, Slovak Republic and the Russian Federation rely on emission charges. Other sources of revenue related to environmental damage are product charges (eg fuel taxes in Hungary), a transit traffic tax (also in Hungary), and import taxes (eg on used cars in Bulgaria) (Lovei, 1995).

NEFs have also been established in some developing countries, particularly where economic growth has been accompanied by serious environmental degradation, leading to government intervention. Revenue sources, however, tend to be different since environmental charges and taxes are not yet in place in most developing countries. Therefore, many NEFs rely on external sources to provide the bulk of their funds or other levies which are not directly related to the environment. The National Environmental Fund in Algeria, for example, is funded by a tax on airline tickets. Costa Rica is an exception, as it allocates two thirds of the revenue from a tax on petrol to a fund which finances infrastructure projects to reduce CO₂ emissions (UN Commission on Sustainable Development, 1995). The Government of Belize has established a Protected Areas Conservation Trust, that is financed by a US \$4 conservation fee collected from all foreign tourists, and which is expected to generate more than \$500,000 every year.

Some OECD countries run NEFs. These are mostly specific funds, whereby revenues from environmental charges are earmarked to cover abatement costs so that public environmental services can achieve compliance with regulations. As well as from environmental charges such as effluent charges and waste disposal charges, some of the earmarked revenues for such funds may come from "sin-taxes" levied on tobacco and alcohol. An example of this is in Washington State, USA, who levy a cigarette tax which is earmarked for financing water quality programmes. (UN Commission on Sustainable Development, 1995).

Not all environmental funds are organised at the national level. In some countries, such as the Russian Federation and Poland, funds are at municipal and local levels. Brazil has also set up municipal environmental funds, which have been financed mainly by World Bank loans. In the UK, part of the revenues from the newly implemented landfill tax will be distributed to local environment trusts set up by the local communities and NGOs. Lovei (1995) emphasises the importance of earmarking at a local level in terms of gaining political support and compliance.

VIII. OVERALL CONCLUSIONS

The general message that can be drawn from the above discussion is that there are, in most cases, significant potential sources of funds available at the national level for the financing of environmental investments which are required to ensure sustainable development. Moreover, the mechanisms through which such funds are collected can, in most cases, be replicated in other countries.

First of all, efficiency improvements, through cost reductions, can free resources to be spent on pollution abatement to ensure the compliance with environmental standards. Privatisation of state services, in many cases, has been shown to achieve such cost savings through the increased rigour of competition in the market, and greater accountability to management and shareholders. Similarly, the introduction of rational cost-recovery pricing to replace subsidised pricing can benefit the environment as below-cost pricing encourages excessive use of polluting inputs and scarce resources, as well as inefficient management.

Secondly, much of the literature on financing mechanisms tends to focus on the role of market based instruments (e.g. emission taxes, product charges, user charges, tradeable pollution permits) for the correction of externalities, and providing revenues which are often earmarked for environmental expenditures. In nearly all cases where they have been practised, the reality is that such instruments have only been effective in providing revenues, as charges have generally been too low to provide incentives for abatement. While it is important to continue to stress the potential effectiveness of such instruments, we need to be aware that it has proved a much slower process than many expected to create the conditions required to introduce such charges and taxes, even at relatively low levels. Greater efforts need to be made for environmental charges and taxes to be accepted. Earmarking, whereby revenues are seen to be spent on environmental improvements, appears to be a way of achieving greater acceptability of market based instruments. However, as charges and taxes increase, revenues may well decrease, as polluters respond to the increases by reducing the level of pollution. Therefore, there are dangers in relying on revenues from market based instruments to fund future environmental investments.

Finally, probably the most important national source of financing is from national savings. However, these require proper mobilisation of such savings. In particular, it has become clear that local communities, even in very poor regions, *are* willing to pay at least some of the costs of environmental and other public services that are needed for sustainable development. Mobilising such payments will ensure higher and more sustainable levels of such services, and foster involvement by the

community. Those who provide the service will be held more accountable to the community for the level and quality of the service. In addition, the community will be part of the decision-making process and help to ensure that unsustainable uses of environmental and related public services can be avoided.

In fact, many poorer communities are used to having to use their own savings to pay for many services and do not have the provision of institutions providing credit facilities. For example, the great majority of households in developing countries have to use their own resources to finance housing. The provision of institutions to provide suitable credit facilities to the poor, and also secure locations for savings, should encourage further investment in environmental services, and greater levels of saving. Greater efforts to fund 'micro-enterprises' through community savings and venture capital can provide effective solutions which avoid wasteful expenditure on more 'high-tech' solutions.

The formation of national environmental funds can provide an institution for the collection and management of funds earmarked for environmental investments. These are particularly useful while economies are in transition, and ensure that there is a guaranteed budget for financing environmentally sustainable development. However, three main concerns related to the implementation of environmental funds should be kept in mind: (i) economic theory suggests that earmarking of public funds may not always be efficient, (ii) the fund management must be publicly accountable and (iii) the funds should not undermine the 'Polluter Pays Principle'.

Table 1(a): Total Expenditure on the Environment

Country	Total Expenditure on the Environment (US\$1990 million)
Bulgaria	32.9
Czech Republic	1070.0
Estonia	17.0
Hungary	251.8
Poland	887.9
Slovak Republic	173.5
Republic of Korea	2980.0
Singapore	>375.0*
China	3000*

Sources: Authors' calculations based on OECD (1993), OECD (1995), Lovei (1995), Park (1996).

Notes: 'Private' = corporate and household sectors unless indicated by * in which case it is corporate sector only.

Table 1(b): Public and Private Expenditures on the Environment

Country	Pollution abatement and control only as percentage of GDP (1990 unless otherwise stated)	
	public expenditure	private expenditure
Canada (a)	0.8	0.3*
USA	0.6	1.0
Japan	1.0	0.1*
Austria (b)	1.0	0.8
Denmark	1.0	-
France	0.5	0.6
(W) Germany	0.8	0.8
Italy (a)	0.2	-
the Netherlands (a)	0.9	0.7
Portugal (a)	0.4	0.4
Spain	0.6	-
Switzerland (a)	0.8	-
UK	0.4	1.1*

Sources: Authors' calculations based on OECD (1993), OECD (1995), Lovei (1995), Park (1996).

Notes: 'Private' = corporate and household sectors unless indicated by * in which case it is corporate sector only. (a) 1989, (b) 1988.

**Table 2: Innovative National Finance: a Typology
Sources of Finance**

Cost-reducing

eg,
privatisation,
private enforcement,
voluntary agreements
between private and
public sectors,
property rights.

Externality-correcting

correcting price distortions
eg,
removal of subsidies,
cost recovery,
rent capture.

market based instruments

eg,
emission taxes,
product charges,
user charges,
tax-subsidy schemes,
recycling credits,
performance bonds,
permit and quota
auctions.

National Savings

eg,
micro enterprises,
national environmental
funds.

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