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A COMPREHENSIVE APPROACH TO DOMESTIC RESOURCE
MOBILIZATION FOR SUSTAINABLE DEVELOPMENT *

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EXECUTIVE SUMMARY

A comprehensive approach to domestic resource mobilization for the benefit of sustainable development, which focuses on economic growth while minimizing any social and environmental impacts, still remains to be developed. Any approach to domestic resource mobilization that focuses only on taxation is far too limited. A comprehensive approach should cover not only general taxes but also user charges and fees and environmental taxes as well as potential "savings" that can be realized from public expenditure reforms, such as curtailing unproductive expenditures, reducing subsidies and containing military expenditures. In addition, the comprehensive approach should take into account the potential effects of macroeconomic and structural reforms on resource mobilization, if any.

Based on a review of the literature and of country examples of successful domestic resource mobilization efforts, the paper highlights the large scope that exists for domestic resource mobilization and that remains to be tapped.

Domestic resources for sustainable development can be mobilized in several ways:

●   Reform of the present tax systems--including the broadening of the base of personal income tax and corporate income tax, elimination of widespread exemptions from customs duties, the levy of payroll, social security taxes, income and consumption taxes (whenever they do not exist); and the strengthening of tax and customs administration--can help mobilize additional fiscal revenue. The example of **Uganda** in recent years is worth examining closely.

●   Elimination of underpricing of resources by increasing user's fees and charges, especially for energy, water, forests, fisheries, and other mineral resources, is a second major source of mobilizing additional revenue. Examples of **Indonesia** (for energy), the **Philippines** and **Honduras** (for forestry), and **Mauritania** (for fisheries) need a special mention in this regard.

●   Imposition of adequate environmental taxes, especially on petroleum products, carbon emissions, and other pollutants, can mobilize additional resources. **Sweden** and **China** offer useful examples in this regard.

●   Reducing unproductive expenditures and government bureaucracies that are excessively large, especially in developing and transition economies, can mobilize resources. Civil servants are often paid salaries and benefits far in excess of their productivity levels and would be better utilized by redirecting them toward essential social and environmental needs.

●   Large distortions in production and consumption patterns are created through budgetary subsidies which take many explicit and implicit forms. Targeting subsidies that are desirable, e.g., for poverty alleviation and basic food, and curtailing (and even eliminating) the subsidies that are undesirable can generate additional resources as well as reduce social inequities and

environmental damage. Examples of **Jordan** and **Sri Lanka** (in respect of targeting), and of **China** (in respect of coal), **Argentina** (in respect of urban transport), **Indonesia** (in respect of pesticides), and **Bangladesh** (in respect of fertilizers) are worth a closer examination.

● Although military expenditures have been curtailed in recent years, they are still too large. Further curtailing these expenditures can greatly improve the prospects of economic growth as the recent examples of **Ethiopia**, **Namibia**, and **Uganda** demonstrate.

● Reforms of macroeconomic policies, such as monetary policy, exchange and trade policies, and external debt management policy, can help foster economic growth and improve the availability of domestic resources. Recent examples of **Bolivia** and **The Gambia** bear this out.

● Structural reforms relating to financial sectors, capital markets, privatization of parastatal enterprises, and pricing policies can greatly enhance the availability of domestic financial resources (and help attract foreign capital) particularly if they are accompanied by macroeconomic policy reforms.

The authors believe that if all these avenues are fully exploited, globally domestic financial resources in excess of US$1,200 billion can be raised, more than double the amount that was estimated to be required to finance the programs of action set forth in Agenda 21, and this is a relatively conservative estimate. Availability of finance is, thus, nowhere near as much of a constraint for the achievement of sustainable development. Much larger constraints are the lack of political willpower, well-designed and feasible action plans, and the effective institutional frameworks for the achievement of sustainable development.

A COMPREHENSIVE APPROACH TO DOMESTIC RESOURCE MOBILIZATION FOR SUSTAINABLE DEVELOPMENT

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Any discussion of a comprehensive approach to domestic resource mobilization for sustainable development must establish at the very outset the boundaries of this subject, i.e., adopt a viable and pragmatic definition of sustainable development and indicate what domestic resource mobilization would mean. This is done in Section 1. Section 2, then, highlights the scope of raising government revenues through tax reform, user fees and charges on natural and environment resources, and environmental taxes. Section 3 identifies the potential of "mobilizing" domestic resources through public expenditure reform, such as curtailing unproductive expenditures, reducing undesirable and harmful subsidies, and containing military spending. The role of macroeconomic and structural reform in fostering economic efficiency and growth and further enhancing the scope for mobilizing domestic resources is described in Section 4. An "order of magnitude" estimate of available domestic resources to finance sustainable development is given in Section 5. Section 6 contains the main conclusions of the paper.

1.   Scope of the paper

This section attempts to define the scope and objectives of the paper.

a.   *Sustainable development: taking a pragmatic view*

Since the Brundtland Commission developed the concept of "sustainable development" in 1987 in connection with the use of environmental resources, it has proved to be a seductive phrase and has attracted many definitions. Sometimes, it has meant sustainable growth, at other times sustainable resource use, and at still other times sustainable development. Many times the concept of sustainability has been related to stock of capital (natural, physical, human, and social) and weak and strong sustainability rules have been enunciated. Sometimes the reference is made to the sustainability of quality of life. At last count, in 1992, Pezzey counted as many as 33 different definitions, while admitting that his compilation of definitions of sustainability given in the literature

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was "not exhaustive" by any means[1]. Some writers believe that the phrase "sustainable development" has come to mean whatever suits the particular advocacy of the individual concerned[2] and has led many writings on the subject to be "hopelessly wrong."[3]

Since 1992, the staff of the World Bank has been attempting to develop an operational definition of "sustainable development." The concept of sustainable development, according to the World Bank, needs to cover the simultaneous achievement of three separate sets of objectives: economic objectives (growth, equity, and efficiency), social objectives (empowerment, participation, social mobility, social cohesion, cultural identity and institutional development) and ecological objectives (ecosystem integrity, carrying capacity, biodiversity, and protection of global commons). In a broader sense, then, sustainable development means the simultaneous achievement of economic, social, and ecological development--a task requiring the knowledge and expertise, according to the World Bank staff, of economists, sociologists and ecologists at the same time[4]. This is a tall order by any means.

A narrower definition of sustainable development (this time from an economist's point of view) would cover all three sets of objectives but with fewer elements--economic objectives (growth and efficiency), social objectives (equity and poverty reduction), and ecological objectives (natural resource management).[5]

The definition used by the Commission on Sustainable Development (CSD) also has been shifting over the years and has broadened its definition of sustainable development over time. During the first year or two after the Earth Summit, its focus was primarily on environmental objectives (protecting natural and environmental resources); in the next stage, economic objectives (economic growth and resource efficiency) were brought under the umbrella; and, lately, social objectives (including poverty alleviation and social equity) have become paramount. So today the CSD's definition of sustainable development practically converges with that of the World Bank.

In the opinion of the authors of this paper, the concept of sustainable development is still too broad. It incorporates multiple objectives, many of which are conflicting, and it is unclear if all of

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[1] Pezzey, J. (1992).

[2] Pearce, D., A. Markandya and E. Barbier (1989).

[3] Instead of utilizing and advancing the emerging literature on intertemporal welfare economics and the theory of optimal development, the literature on sustainable development has, in fact, "displayed.... intellectual regress." See Dasgupta, P. and K-G. Mäler (1993).

[4] Serageldin, I. and A. Steer (eds.) (1994).

[5] Ibid, p. 2. Lately, in the World Bank, the staff have come up with yet another definition "Sustainability is to leave future generations as many opportunities as we ourselves have had, if not more." See Serageldin, I. (1996).

them can be ever achieved simultaneously with equal efficiency or effectiveness. For the limited purpose of this paper, we, therefore, side with the economist who has the interest of the sociologist and the ecologist at heart. We will assume in this paper that economic growth and resource efficiency are and have to remain paramount objectives, but that these must be achieved in ways that, (i) have minimal (nil if at all possible) negative effects on the poor and social equity, (ii) have minimal (none at all if possible) irreversible effects on air, water, and land quality, and (iii) do not deplete natural resources available to the economy at an unacceptable rate.[6]

While this admittedly narrower view of sustainable development may not be acceptable to many, it recognizes the very real tradeoffs that, in our opinion, the policy makers must accept between multiple objectives. It focuses on economic objectives but without giving up other goals.[7] In fact, we believe in the adoption of complementary policies, such as targeted social safety nets (as compensation for the effects, if any, on the poor and the vulnerable), protection of essential public expenditures on education and health care and implementation of fiscal and regulatory measures for conserving natural resources and controlling air, water and land pollution, which, in our opinion, should be important components of a pragmatic strategy of sustainable development. This is essential to minimize any negative social and environmental impacts that the aggressive pursuit of economic objectives may have. Ultimately, sustainable development requires a set of economic, social, and environmental policies which, in a mutually consistent fashion, all aim at economic growth with social equity and environmental protection and the way domestic resources should be mobilized and utilized should be important components of such a policy framework.

b. Domestic resource mobilization: taking a comprehensive view

When economists talk about domestic resource mobilization, they usually have in mind the mobilization of resources by the government, from the domestic economy, primarily through taxation. While tax policy is certainly the most important instrument of domestic resource mobilization, this is a rather narrow view. Even though ignored in the past, nontax revenues of the government, in the form of user fees and charges for the use and consumption of natural and environment resources, can be important tools of domestic resource mobilization, as can be environmental taxes which aim to limit air, water, and land pollution.

Domestic resources can also be mobilized through "savings" of inefficient and unnecessary public expenditures, e.g., the reduction of unproductive expenditures, removal of undesirable subsidies, and reduction of military expenditures. Many government expenditures, including subsidies, are often wasteful. They do not further any economic or social objectives, and in fact actually promote natural resource exhaustion and environmental damage.

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[6]As should be apparent, the focus here is not with global environment, only national and local environments.

[7]This view of sustainable development is consistent with the objective of "high quality growth" that the Managing Director of the IMF has often spoken about in his public speeches.

The mobilization of domestic resources to finance sustainable development need not be limited to what can be raised by government budget alone. Resources available to the private sector of the economy can also be redirected to meet the needs of sustainable development--through the reform of macroeconomic policies, such as monetary and credit policy, debt management policy, exchange and trade policy, as well as through structural reforms of the economy. This is particularly true for developing and transition economies, but also for some industrial countries. Among these structural reforms one should consider the reform of the financial sector, development of the capital market, privatization of parastatal sector, and the reform of pricing policies.

A comprehensive approach to domestic resource mobilization for sustainable development must, therefore, cast the net as wide as possible and examine the potential scope for not only raising financial resources through the budget but also for saving budgetary resources and redirecting the financial resources available to the private sector of the economy toward sustainable development.

c. Objectives of the paper

This paper makes an initial "broad brush" attempt at estimating the potential that seems to exist in respect of each of the foregoing forms of financing in developing, transitional, and industrial countries of the world. In addition, it provides specific examples of countries where this potential has been successfully exploited. Finally, it makes a heroic "order of magnitude" estimate of the potentially available financial resources for sustainable development and compares it with the financial costs of Agenda 21 for the developing countries as estimated at the time of the Earth Summit in Rio.

2. Scope for raising additional fiscal revenues

The scope for raising additional resources seems to exist in most countries of the world in at least three forms: (a) through the reform of existing tax systems often containing taxes on incomes, consumption and international trade; (b) from existing and nonexisting user fees and charges for public services and natural and environmental resources; and (c) from existing and potential environmental taxes.

a. Reforming present tax systems

The tax systems of the three types of economies (developing, transition, and industrial) vary widely in terms of tax to GDP ratios as well as the relative importance of different taxes in their revenue structures. **Table 1** below highlights these differences: First, the ratio of tax to GDP in industrial countries of the OECD is much higher than in developing countries (both low income and middle income), primarily because of their heavy reliance on broad-based income taxes (individual and enterprise), consumption taxes (value-added and sales), and other taxes (payroll and social security). Second, developing countries, particularly the low income African countries, rely heavily on narrowly-based international trade taxes and their tax to GDP ratios are low and show little buoyancy over time.

Table 1. Existing Revenue Structures, 1975-1992

(Averages in percent of GDP)

Country Category	1975-80	1981-85	1986-92	Income Taxes	Consumption Taxes	Trade Taxes	Other
OECD	27.3	29.2	30.4	(10.5)	(9.8)	(0.6)	(9.5)[1]
African	17.2	17.9	17.7	(5.7)	(4.8)	(6.1)	(1.1)
Non-OECD Asian	13.2	14.2	14.1	(4.9)	(4.5)	(4.0)	(0.7)
Middle Eastern	15.7	14.9	13.6	(4.7)	(3.4)	(2.7)	(2.8)[2]
Non-OECD Western Hemisphere	16.9	17.3	16.5	(3.7)	(5.3)	(4.2)	(3.1)[1]
Former Soviet Union	10.1	32.4	27.3	(10.1)	(11.5)	(1.8)	(3.9)[2]

Source:International Monetary Fund (unpublished data).

[1] Mainly payroll taxes and social security taxes.
[2] Mainly oil-related royalties and taxes.

While the taxable capacity in most developing countries is admittedly limited, and their tax to GDP ratio is likely to remain lower than those of industrial countries, there is certainly some scope for increasing their tax ratios. The scope for mobilizing financial resources from the present tax systems of countries of various groups exists in the following five respects:

(1) Often the base of individual income taxes in developing countries is limited not only by low levels of incomes and the basic exemption which is justified by the relatively low level of individual incomes but also by the non-taxation of housing allowances, car allowances, and other fringe benefits, which benefit mostly the relatively well-off. The limited capacity of tax administration, weak monetary penalties for tax evasion, and other loopholes in the existing income tax laws generally allow the relatively well-off and higher income people in developing countries to avoid and evade taxes on incomes.

(2) The base of enterprise income taxes in developing countries, and even in transition economies, is eroded by the relatively generous tax depreciation and investment allowances (primarily as an incentive to capital formation), liberal income tax reliefs and complete holidays from taxation for up to 10 or even 20 years (primarily as an incentive to new investments). The income tax base

is also eroded by relatively low withholding taxes on interest, dividends, and other payments to nonresidents (primarily as an incentive to foreign investment) and residents. While there is significant loss of revenue due to these tax incentives, there is little evidence that these incentives actually generate a noticeable increase in investment. In fact, these incentives to capital tend to be at the expense of labor and work against the social objectives associated with sustainable development.

(3)   The base of customs duties, especially in developing countries, tend to be narrowed by the exemption of raw materials and capital goods (to encourage domestic industry), food and other essential goods (to protect the poor and middle income groups) and government and non-governmental organizations (to support public services and public welfare). The non-taxation of imported capital goods obviously provides an "implicit" subsidy to capital and encourages capital at the cost of labor. The non-taxation of imported food discourages domestic food production and hurts small farmers. The non-taxation of imports of governments and non-governmental organizations breeds abuse and perpetuates tax inequities. None of these are in the interest of sustainable development.

(4)   Many Middle Eastern oil-producing countries rely heavily on oil revenues and do not have broad-based income and consumption taxes. Many developing countries lack payroll and social security taxes. These are serious gaps in the existing tax systems and limit the capacity of the governments to provide for social insurance and other welfare expenditures.

(5)   Tax and customs administrations in most developing, and in many transitional countries, suffer from outdated organizations and procedures which limit their capacity to improve tax compliance, increase tax collections, and ensure equity among taxpayers. Besides, in most developing and transitional economies, growth often takes place in the difficult-to-tax agricultural, informal and trading sectors and these go untaxed especially where tax and customs administrations fail to adapt to changing economic structures.

There is, thus, some scope for increasing the revenues from, and the buoyancy of, the present tax systems, especially in the developing and transition countries. In fact, many countries of Sub-Saharan Africa, the poorest amongst the developing countries, have been able to raise their tax to GDP ratios by significant amounts during 1990-94 period, as Table 2 shows.

Even among countries not covered Table 2, many were able to raise their tax to GDP ratios by more than 1 percent in one recent year or another, but were not able to maintain that increase. Here examples abound: Botswana from 27.0 to 29.5 percent between 1992 and 1993; Burkina Faso from 27.0 to 29.5 percent between 1992 and 1993; Cameroon from 14.7 to 15.9 percent between 1993 and 1994; Cape Verde from 10.9 to 12.2 between 1991 and 1992; Comoros from 10.9 to 13.8 between 1991 and 1992; Côte d'Ivoire from 14.9 to 16.3 percent between 1993 and 1994; Ethiopia from 8.2 to 10.7 percent between 1993 and 1994; Gabon from 16.9 to 18.1 between 1990 and 1991; Gambia from 20.4 to 21.8 percent between 1992 and 1993; Madagascar from 6.8 to 8.7 percent between 1991 and 1992; Mali from 9.8 percent to 12.1 percent between 1990 and 1991; Mauritania from 16.5 to 19.1 percent between 1992 and 1993; Sao Tome and Principe from 10.2 to 13.4 percent

Table 2. Sub-Saharan Africa: Tax to GDP Ratio of Selected Countries, 1990-1994

(In percent)

Countries	1990	1994
Angola	22.4	35.7
Benin	7.9	10.8
Burundi	13.1	15.9
Djibouti	25.4	28.1
Ghana	10.8	16.2
Guinea	4.0	6.6
Kenya	19.5	26.0
Lesotho	18.9	26.3
Sierra Leone	8.6	13.6
Tanzania	12.1	13.5
Uganda	6.5	7.7

Source: International Monetary Fund (unpublished data).

between 1991 and 1992; Senegal from 15.6 to 16.7 percent between 1991 and 1992; Togo from 8.6 percent to 11.3 percent between 1993 and 1994; Zambia from 13.9 to 18.1 percent between 1993 and 1994; and Zimbabwe from 25.8 to 27.7 percent between 1992 and 1993.

While a part of the increase in tax ratios of these countries is explained an increase in the international prices of their exports and/or liberalization of their exchange and trade regimes, in many cases, they were the result of strong commitments of country authorities to carry out tax reform and make genuine efforts to mobilize revenues. The example of Uganda, given in Box 1, amply bears it out.

It would seem, then, that if countries committed themselves to genuine reforms of their present tax systems and made strong efforts at mobilizing additional resources, they might be able to raise their tax to GDP ratios by, at least, 1.0 percent. As the recent experience of even the low income Sub-Saharan African countries shows, this should be quite feasible. Obviously, this is only an approximation and individual countries would differ greatly from this "average" or "norm."

Box 1. Uganda: Tax System Reform

With the sharp decline in export duties from the coffee sector in 1988/89, when Uganda's tax-to-GDP ratio was only 4.5 percent, the authorities embarked upon a major tax reform and revenue mobilization effort. In 1989/90, a number of measures were taken to streamline and broaden the tax base: these included increases in import duties, sales taxes, and excise duties, a raising of the income tax threshold, and a reduction in the maximum marginal rates for personal and corporate income taxes.

The fiscal effort during 1990/91-1992/93 was aimed at building a stronger foundation for generating a substantial improvement in the revenue effort. Accordingly, several measures were introduced in the 1990/91 budget: the number of customs duty rates was reduced to five standard rates and a surtax was imposed on imported goods similar to domestic excisable goods; the number of sales tax rates was reduced to four; and the specific duty rates were raised on petroleum, with a stipulation that the rates were to be periodically reviewed to ensure a full pass-through of costs.

A number of important revenue measures were taken in 1992/93 and 1993/94 as well, all of which sought to rationalize and expand the revenue base even further:

- In relation to income tax, the Government imposed a 20 percent tax on 80 percent of gross rentals in excess of a threshold, and further enlarged coverage, with the inclusion of allowances and benefits as a part of taxable income, while reducing the number of tax brackets and the top marginal rate from 40 percent to 30 percent.

- Investment incentives were streamlined and combined with a reduction in the level of corporate income tax from 35 percent to 30 percent, that is, the same maximum marginal rate as for personal income taxation.

- Import duties were also rationalized with a reimposition of a minimum 10 percent tariff on raw materials, while rates were reduced from 0-50 percent to 0-30 percent and the number of rate bands was cut from six to four.

- Taxes on cigarettes, beer, soft drinks, and spirits were increased, as was the sales tax on imports and local products, together with a 50 percent increase in the tax on services.

- Tax on coffee exports was abolished, thereby eliminating all taxes on exports and providing significant incentives to producers and exporters.

Major efforts were also made during this period to improve tax administration and collection:

- In the 1990/91 budget, the Government decided to set up a tax authority to improve the revenue effort. The Uganda Revenue Authority (URA) became operational in March 1992. Such an arrangement had a number of advantages and allowed the URA to offer enhanced benefits to its employees, reduce corruption, and improve efficiency. The powers of the URA have been progressively widened since its inception.

- Other elements of the improved tax administration included the introduction and expansion of the Taxpayer Identification Number system; implementation of a computer system to monitor import duty calculations and exemptions; tightening of customs documentation procedures and preshipment inspection of imports; and improvement of auditing and computerization of tax records. These administrative measures were also designed to facilitate the introduction of a value-added tax (VAT), which has been introduced in July 1996.

Source: Sharer R., H. DeZoysa and C. McDonald (1995).

b.   Levying appropriate levels of user charges and fees

Non-tax revenues of the Government in the form of user charges and fees can be yet another important source of revenue to help finance sustainable development.[8] In many countries, particularly developing and transition economies, these user fees are generally set too low. The underpricing of natural resources (e.g., mineral, water, forest, and fishery resources) is generally a reflection of the governments failing to set user fees at appropriate levels. This leads to rent-seeking behavior, excessive exploitation, and low government revenue. Capturing economic rents--by imposing optimal user fees and royalties on mineral resources, water use charges, stumpage fees, and fishing license fees--can help not only generate revenue but to also improve economic efficiency and reduce resource depletion. The scope for increasing user fees and charges for energy, water, forests, fisheries and mining resources in many countries of the world is significant as indicated below:

Energy

Most oil producing countries impose royalties on the extraction of crude oil.[9] While many countries have improved the prevailing fiscal regimes for petroleum taxation, in some cases, royalties and taxes are levied that are far below the optimal level that would allow governments to capture the full economic rent. An example of the possible revenue potential from the energy sector is that of **Venezuela**. In Venezuela, oil consumption has been heavily subsidized and royalty payments are low. According to a report of the World Bank (1995a), if petroleum product prices were increased to the world price level, the royalty rate on oil production could be raised significantly from the present low level to US$12 per barrel with an overall increase in revenue of up to US$700 million (6 percent of total government revenue). On the other hand, **Indonesia** has been successful in instituting a stable and efficient fiscal regime for petroleum and minerals (see **Box 2**).

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[8] User fees are payments for services provided by the public sector which yield a direct benefit to the user or consumer. Examples include royalties on natural resources, lease and rental payments, charges on recurring sales of resources (e.g., water and forests) and products (e.g., power), road tolls, services, land and park use etc.

[9] The royalty rate usually ranges from 10 to 20 percent of the wellhead value or oil extracted. Some countries have royalty rates on onshore oil production and on offshore oil production differently. For example, **Australia** imposes a royalty of 10 percent of gross production on onshore oil extraction but zero percent on offshore oil extraction. Some other countries have sliding scale royalties that vary with production. **Ecuador**, for example, imposes a royalty of 12.5 percent up to 30,000 barrels of oil per day (bopd), 16 percent up to 200,000 bopd, and over 20 percent over 200,000 bopd.

Box 2. Indonesia: Fiscal Regime for Petroleum and Minerals

Indonesia is rich in natural resources including valuable deposits of oil, gas and numerous hard rock minerals. The Indonesian Government has exhibited flexibility and innovation over the years in developing fiscal regimes for petroleum and minerals which provide incentives for foreign investors while capturing a large portion of the natural resource rent for the Government.

In 1967, Indonesia pioneered the production-sharing contract ("PSC") which has now been adopted in many parts of the world. In addition to royalties, under a PSC the petroleum production is shared between the investor and the Government, with ceilings on the amount of oil received by the company for cost recovery purposes. Profit oil is split on a progressive basis in favor of the Government. One of the benefits is the sensitivity of this system to cost variations and investors share the price risk. In 1995, revenues from oil and gas accounted for 3 percent of GDP and over 23 percent of tax revenues.

The Government also uses another type of arrangement called "Contract of Work" for petroleum and for most hard rock minerals. Royalties frequently vary with the variation in market prices and sometimes "additional royalties" are included.

In Indonesia, the fiscal regimes for petroleum and minerals have provided a framework which has lead to stable relations with investors while capturing rent for the Government and discouraging excessive rates of depletion.

Source: Otto, J. (1995)

In many transition economies, there seems to be a significant scope for increasing taxation and revenues from the energy and mineral sectors. The transition countries of the **Former Soviet Union (FSU)** and **Central and Eastern Europe (CEE)** have a large capacity to supply energy and mineral inputs to the industrial sector and for the government to mobilize substantial resources. More efficient pricing, restructuring, commercialization and privatization, can not only reduce the environmental damage from the energy sector but also provide significant fiscal resources from taxation, user charges, and conversion of utility equity to debt.

An example of this potential is that of the gas sector in **Russia** where royalty and tax payments from the integrated gas production and transmission company, Gasprom, are low and the government is capturing only part of the natural resource rents and natural monopoly rents. It is estimated that in FSU and CEE, additional government revenue of between US$10-20 billion could be generated from energy sector (Gray, 1995).

Water

Underpricing of water is common place around the world. This usually takes place because of the belief that is essential to life and it has positive externalities. Even in most developed countries, water prices are based on the unit cost of operation and are not based on the true value of the water resource or the negative environmental externalities resulting from its excessive use. Underpricing of water resources below the costs of supply often results in severe financial drain on the government budget and causes the excessive use of water. While the governments have now begun to take action against this policy failure, they still have a long way to go.

The experience of **Germany** with a water resource tax has shown that the tax can help capture economic rent as well as improve water use efficiency.[10] This experience should be instructive to other industrial countries.

Pricing public water services below the unit cost of operation is also common in the developing world (Xie, 1996b). **Table 3** presents the unit cost of and tariffs on the drinking water supply in a number of representative countries. This table shows that many countries do not even recover the operating costs of water services. The average operating cost of water in **Brazil**, for example, is US$0.15 per cubic meter but the average water price is only US$0.13 per cubic meter. **Egypt, Nigeria, Mexico, Bangladesh, Iraq,** and **Jordan** also price water below the average operating costs.

Table 4 provides, for the 19 largest Asian cities, the cost of and charges for the water supply and the operating ratio at the city level. An operating ratio greater than one represents an excess of costs over billing revenues or a deficit (and, therefore, an "implicit" subsidy). The table shows that nine out of 19 Asian cities covered in this table do not recover their annual water supply cost. This, once again, shows ample scope that exists for raising water charges.

Forestry

Forestry is yet another natural resource sector in which government policies fail to recover the economic rent. Underpricing of concessions to logging companies, usually in the form of low stumpage prices and license fees, is common in many forest-rich developing countries.

A World Resources Institute study (Repetto, 1988) showed how, between 1979 and 1982, the government rent capture on logs as a percentage of the actual rent (difference between the actual market value of wood products and all the production and transportation costs) was only 11 percent in the **Philippines** and 37 percent in **Indonesia.** These low percentages showed that, for Indonesia and the Philippines, respectively, almost US$2.8 billion (about 4 percent of total government revenue)

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[10] See IISD (1994) for details.

and US$500 million (about 2.7 percent of total government revenue) of potential revenue was sacrificed to logging concessionaires over those years. A most recent World Resources Institute study estimates that, in **Suriname**, the government earns only US$48,000 per year for 2.4 million hectares currently in forest concessions (Sizer and Rice, 1995).

Low rent capture in the 1970s and 1980s has also been reported by various authors (see the summary table given in McMorran [1996]). Low stumpage charges in **Burundi, Cameroon, China, Kenya, Nigeria, Portugal,** and **Senegal** have been identified as serious problems by the World Bank in the context of its forestry loans projects (World Bank, 1994a).

In recent years, some timber-exporting countries have obviously successfully reformed their forestry pricing policies in an attempt to capture more economic rent and the preliminary results from such reforms are encouraging. (see the examples of the **Philippines** and **Honduras** in **Box 3**). More developing countries need to follow their examples.

Table 3. Selected Countries: Unit Operating Costs of Water Supply and Water Tariffs

	(a) Average Operating Cost of Water Supply (US$/c.m.)	(b) Average Water Tariff (US$/c.m.)	(c) Effective Subsidy Rate* [(a)-(b)]/(a)
Africa			
Botswana	0.75	0.54	0.28
Egypt	0.10	0.05	0.50
Mali	0.57	0.29	0.49
Nigeria	0.02	0.01	0.50
Zaire	0.40	0.43	-0.07
Latin America			
Brazil	0.15	0.13	0.13
Colombia	0.26	0.33	-0.27
Cuba	0.08	0.10	-0.25
Mexico	0.71	0.44	0.38
Asia			
Bangladesh	0.10	0.07	0.30
China	n.a.	0.07	n.a.
Indonesia	0.14	0.25	-0.79
Iraq	0.20	0.10	0.50
Iran	0.20	0.20	0.00
Jordan	1.35	0.36	0.73
Philippines	0.15	0.16	-0.07

Source: World Health Organization (1992).

Note: The ratios in column (c) do not take into account of capital subsidy.

Table 4. Selected Asian Cities: Unit Costs, Tariffs, and Operating Ratios of Water

City	Unit production costs[1] (US$/c.m.)	Average tariff (US$/c.m.)	Unaccounted water (%)	Annual water Billings (million US$)	Gross Annual O&M costs[2] (million US$)	(Gross) Operating ratio[3]
Dhaka	0.024	0.084	62	6.5	7.5	1.14
Beijing	0.032	0.03	28	13.8	20.3	1.47
Guangzhou	0.017	0.038	n.a.	29.2	14.3	0.49
Shanghai	0.018	0.013	25	14.8	28.4	1.92
Tianjin	0.043	0.039	12	18.6	23.4	1.25
Hong Kong	0.315	0.371	26	239.9	337.6	1.41
Bombay	0.035	0.069	24	47.1	30.9	0.66
Calcutta	0.034	0.049	36	11.7	12.9	1.11
Delhi	0.021	0.046	30	21.3	17.3	1.52
Jakarta	0.066	0.363	57	50.3	21.2	0.42
Seoul	0.131	0.23	42	240.9	289.5	1.20
Yangon	0.023	0.169	60	9.5	3.3	0.34
Karachi	0.036	0.047	30	19.3	21.5	1.11
Metro Manila	0.037	0.232	58	89.1	47.9	0.54
Singapore	0.174	0.442	8	176.9	117.1	0.66
Colombo	0.034	0.266	51	17	4.4	0.26
Taipei	0.071	0.244	24	124.9	80.1	0.64
Bangkok	0.071	0.242	31	173.7	156.4	0.90
Ho Chi Minh	0.016	0.045	41	6.7	6	0.90

Source: Asian Development Bank (1993).

Notes:

[1] These unit costs in general are much smaller than those reported by WHO in Table 4.
[2] Gross operations and maintenance (O&M) costs include depreciation, loan interests, provision for bad accounts and foreign exchange loss.
[3] Gross operating ratio = gross O&M costs billings.

Fisheries and mineral resources

As in the forestry sector, low user charges in fisheries and mineral resource sectors are also common place and they erode the government revenue base and result in the over exploitation of natural resources (overfishing and overmining). Raising user charges and fees for these resources is an effective way to increase government revenue and correct a serious policy failure as the example of **Mauritania** (see **Box 4**) shows.

**Box 3. The Philippines and Honduras: Capturing the Potential
Forest Revenue Through Reforms**

After a long history of low rent capture on its forestry resources, the **Philippines** government began to change its pricing policy in the early 1990s. In 1990, the government raised the charge on each cubic meter of timber cut from a mere 1 percent to 25 percent of the market price. The policy change implied a significant increase in rent capture from 11 percent to about 50 percent of economic rent. The total charge on logs harvested, thus, rose significantly from 92 million pesos (0.06 percent of government revenue) in 1989 to 460 million (0.26 percent) in 1990, and further to 806 million (0.37 percent) in 1991 (DENR, Philippines, 1994).

Prior to 1992 in **Honduras**, stumpage charges and timber prices were set by the government at a very low level. Realizing tremendous loss of economic rents and the inefficiency in the forestry sector induced by government intervention, the Honduras government began to reform the pricing policy in 1992. A new policy which aims at raising timber prices to international levels through the sale of timber at auction has been adopted. Although the policy has not yet been implemented nationwide, due to the difficulties in operating a system of public timber auctions, it is considered a great potential for capturing a significant amount of economic rent. According to the experiment on a small portion of forest areas, the stumpage price rose from US$5 (30 lempiras) per cubic meter of timber in 1992 to US$11 (72 lempiras) in 1993, and to US$33 (280 lempiras) in 1994. Given the price of US$70 per cubic meter of timber in the US market, the stumpage price could go up as high as US$60 per cubic meter. This implies the potential for raising the state revenue from stumpage charges by 10 to 18 times from the 1994 level (World Bank, unpublished data).

Sources: DENR, Philippines (1992) and DENR, Philippines (1994).

Although industrial countries have imposed natural resource taxes, and raised user charges and fees, there is significant potential for increasing government revenue even in those countries. For example, a recent study conducted by the Norwegian Green Tax Commission (1996) showed that in **Norway** alone, the potential revenue from economic rent capture could be NKr 1.4 billion in the hydropower sector, NKr 2 billion in the fishery sector, and NKr 1.6 billion in the forestry sector, for a total of NKr 5 billion (US$0.7 billion), or 1.5 percent of current government revenue and 0.7 percent of GDP.

To sum up: the potential for globally increasing revenues from user fees and charges on energy, water, forestry, fisheries and mineral sectors, is thus, quite substantial, particularly in developing and transition economies, but also in industrial countries.

Box 4. Mauritania: Government Fisheries Revenues and their Potential

The fishery industry plays an important role in the Mauritanian economy. It contributes to 5 percent of GDP and more than 50 percent of total exports. The sector is also one of the largest sources for government revenues even though the level of the fishing charges has long been lower than that required to ensure a sustainable catch. In 1995, for example, the government's income from the sector constituted about 22 percent of the total government revenue.

Prior to 1996, the Mauritanian government charged those who fished in its 200-mile exclusive economic zone a tax on fish exports and a license fee for the right to fish. The export tax rate was in a range from 5 to 20 percent of export value, depending on species exported and the processing site of products (i.e., at sea, on shore, or as fresh product). Given the fluctuation in catch, the export tax revenue varied from year to year. It peaked at US$31 million (16 percent of government revenue and 3.7 percent of GDP) in 1986 and was only US$19 million (8 percent of government revenue and 1.8 percent of GDP) in 1994. In addition to export tax revenues, the government collected considerable revenues from foreign operators through royalties and license fees on a species-by-species, vessel-by-vessel basis. The total of license and penalty fees rose, again with wide fluctuations, from US$7 million (3.5 percent of government revenue and 0.8 percent of GDP) to US$27 million (12 percent of government revenue and 2.7 percent of GDP) between 1985 and 1995.

Because of the difficulties of managing fisheries based on export taxes, the government decided in January 1995 to replace it with a license system. The rate of license fees was increased in 1996. As a result, the license fee collection is expected to be tripled from US$27 million in 1995 to an estimated US$83 million in 1996. Even with the removal of the export tax, the government's fisheries revenue is expected to increase by 73 percent.

Although the fisheries sector already contributes significantly to the government revenue, it has the potential for generating even more revenues. After many years of the low fishing charges and the expansion of fishing capacities, the country has been faced with overfishing for years. For example, in 1990 the Catch-Per-Effort in the case of cephalopod species was 55 kg per hour, below the fishing effort necessary for financially sound vessel operations or satisfactory for a well-managed stock. Its total catch plummeted after the peak of 591,000 metric tonnes in 1986, to 446,000 metric tonnes in 1990, and, as an extreme, to 306,000 metric tonnes in 1994. Under the circumstance of overfishing, an even higher charge on fishing may help curb overfishing and rehabilitate fish stocks.

Such a policy will be not only an environmentally-sound solution for the overfishing problem but also the potential for increasing government revenue.

Source: World Bank (1994b); and World Bank (1995b).

c.   Imposing environmental taxes

Environmental taxes are one of the major economic instruments for pollution abatement.[11] There is an increasing use of such taxes in industrial countries, along with other market-based mechanisms, such as tradeable permits.

Environmental taxes have been introduced, though at relatively low levels, so far primarily in the industrial countries and in some developing countries (see, for example, McMorran and Nellor (1994); OECD (1995); OECD (1996); and Lovei (1995)). All OECD countries tax pollution emissions and pollution-related activities, through both direct taxes on pollution emissions and indirect taxes on environment-related productive inputs and consumption products. The revenue from these taxes is significant and is of growing importance in government tax revenue in most of the OECD countries.

Table 5 presents the share of the environmental tax revenue in total tax revenue for 20 OECD countries in 1990 and 1993. The table shows that, in a couple of countries, the proportion has exceeded 10 percent of the total tax revenue (11.5 percent in Portugal and 10.7 percent in Norway). It also shows that 17 of the 20 OECD countries had an increasing trend in environmental taxes from 1990 to 1993. Taxes on energy (fuels, oil products, coal, and electricity) are responsible for the largest share of environmental tax revenues in OECD countries (see **Box 5**). Taxes on pollution emissions and on other polluting products have also played an increasingly important role in OECD countries in revenue raising and pollution control as the example of Sweden shows (see **Box 6**).

Gasoline taxes

A primary focus of environmental taxes thus far has been on energy-related indirect environmental taxes, such as gasoline. Gasoline is highly taxed in many countries, particularly oil importing industrial countries, and it raises significant amount of revenues and reduces pollution.

Nevertheless, there is even greater scope to increase gasoline taxes (including those on diesel) in many countries. If developing and transition countries were to raise taxes on gasoline and diesel, given their present consumption of 557 billion liters and 151 billion liters, respectively,[12] the revenue generated would be of the order of US$7.2 billion for each US$0.01 (one cent) per liter of tax. In industrial countries, where the consumption is 1,344 billion liters, the revenue generated would be US$13 billion for each US$0.01 (one cent) per liter of tax.

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[11] The classic textbook solutions to resolving environmental problems are Pigouvian taxes that are specific rate taxes levied on the emissions or on the units of damage generated by an activity. Implementing Pigouvian taxes create well-known difficulties--monitoring, measurement, difficulties in measuring social cost, and compliance. (For these reasons, Piguovian taxes are used on a limited scale even in Europe and practically nowhere else.) In view of these difficulties, a second best solution is to levy indirect environmental taxes, taxes on inputs or consumption goods where the use of those goods is related to emissions and environmental damage.

[12] IEA (1996).

Table 5. Selected OECD Countries: Environment-Related Tax Revenues

Country	1990	1993	Change
	(In percent of total tax revenues)		
Austria	4.00	4.35	0.35
Belgium	3.83	4.49	0.66
Canada	2.87	3.44	0.56
Denmark	7.08	7.30	0.22
Finland	4.72	5.40	0.68
France	4.88	4.92	0.04
Germany	5.46	6.12	0.66
Greece	7.43	11.85	4.42
Ireland	10.35	8.98	-1.37
Italy	7.82	6.52	-1.30
Japan	5.11	5.49	0.38
The Netherlands	5.12	6.12	1.00
New Zealand	5.08	4.76	-0.32
Norway	9.40	10.75	1.35
Portugal	10.63	11.52	0.89
Spain	5.82	7.54	1.72
Sweden	5.77	6.34	0.57
Switzerland	4.26	4.65	0.38
United Kingdom	7.35	8.23	0.88
United States	2.88	3.24	0.36
Average (unweighted)	6.02	6.67	0.65

Source: OECD (1995); also Morgenstern (1996).

Box 5. OECD Countries: Examples of Taxes on Motor Fuels and Vehicles

Taxes on fuels and vehicles in OECD countries include VAT or general consumption taxes, excise taxes (quantity-related), special taxes associated with environmental costs incurred by fuels, fuel storage, public work funding, and research and development, sales taxes on motor vehicles, and annual charges or fees for motor vehicle registration. The revenue from the taxes represents the largest share of environment-related tax revenue in those countries. For example, in Norway the total revenue from gasoline taxes (including CO_2 taxes) was NKr 9.6 billion (26 percent of the total green tax revenue) in 1993. In Denmark, the vehicle registration tax provided a revenue of DKr 8,000 million (26 percent of the total green tax revenue) in the same year.

Compared with developing countries, OECD countries tax gasoline and other oil products at a much higher rate.

Petroleum Products: Average Tax Rates, 1991
(As percent of tax exclusive retail price)

Country Group	Premium gasoline	Regular gasoline	Kerosene	Automotive diesel	Heavy fuel oil
Africa[1]	79	86	27	53	48
Asia	37	53	13	21	4
Eastern Europe	115	125	...	82	...
Middle East	23	23	8	6	1
OECD[2]	175	141	64	90	36
Western Hemisphere	70	62	19	36	25
All countries	87	79	30	49	28

Source: Author's estimates.

[1] Excluding Algeria, Angola, Senegal, and Zimbabwe, there is no difference between average tax rate for premium gasoline in 1990 and 1991.
[2] The 1990 and 1991 data for regular gasoline pertain to unleaded regular.

Sales taxes on motor vehicles in many countries are higher than on other goods, or are imposed in addition to a general sales tax. For example, in the United Kingdom, the VAT on a new car is 17.5 percent, and the vehicle excise duty is set at £135 for private cars. The United States levies a special car tax on the sale of new cars with above-average fuel consumption. This so-called gas-guzzler tax ranges from US$1,000 to US$7,700 per car.

Source: OECD (1995).

Box 6. Sweden: Pollution Emission Taxes

Sweden introduced a series of emission taxes on carbon dioxide, sulphur, and nitrogen dioxide in the early 1990s. These taxes are levied on the content of carbon, sulphur, or nitrogen and others potential for emissions rather than directly on emissions. A rebate system has been implemented to refund the tax revenue to those firms abating emissions. The purpose of these new taxes is to switch some government revenues from income taxes to better-targeted environmental taxes in an attempt to reduce pollution emissions.

A carbon dioxide tax calculated at SEK 0.25 (US$0.04) per kg carbon dioxide released came into force at the beginning of 1990. In the energy sector, the tax is constructed as an excise tax on oil, coal, natural gas, and liquefied petroleum gas. In the transport sector, the carbon dioxide tax is imposed on petrol, motor fuel (diesel), and domestic air traffic. The tax generated about SEK 12 billion (US$1.8 billion and about 2 percent of total government revenues) in 1994/95.

A tax on sulphur in coal and peat used for fuel and in oil was introduced in the early 1991. On coal and peat, the sulphur tax corresponds to SEK 30 (US$4.55) per kilogram of sulphur in the fuel, and for oil the sulphur tax is payable at SEK 27 (US$4.09) per cubic meter of oil, for every 1/10 percent by weight of the sulphur content in such oil. The total revenues are about SEK 500 million (US$76 million) per year from the tax on sulphur in oil and about SEK400 million (US$61 million) per year from the tax on sulphur in coal and peat. In addition to the carbon dioxide and sulphur taxes, a nitrogen oxide tax at the rate of SEK 40 (US$6.05) per kg nitrogen oxide emitted came into effect in the early 1992.

The introduction of emission taxes has made a contribution to the reduction in fuels use and pollution emissions. The use of motor fuels was reduced by 2 percent in the first half of 1990 after the introduction of the carbon dioxide tax. Nitrogen oxide emissions were 35 percent lower in 1992 than in 1990. Coal has become less competitive due to the carbon dioxide tax and the sulphur tax. Within the district heating systems a number of coal-fired installations have switched over to other fuels, especially biofuels.

Source: Swedish Ministry of the Environment (1991).

Carbon taxes

Interfuel price distortions, which are often large, can be reduced if carbon taxes (taxes on carbon contents of fossil fuels such as fuel oil, coal, and gas) are applied. Carbon taxes were introduced in industrial countries in the early 1990s as an instrument to reduce CO_2 emissions and a potential source of government revenues. **Finland** became the first country in the world to introduce a tax of US$6.10 per ton of carbon on all fossil fuels in 1990, followed by **the Netherlands and Sweden**.

Based on a model developed in the World Bank, Shah and Larsen (1992) have estimated the revenue potential of a carbon tax of US$10 per ton of carbon on fossil fuels in selected but major countries of the world. This estimate is given in **Box 7** and adds up to about US$55 billion (an average of 0.31 percent of their GDP) in the first year of its operation.

Their results also show that the potential revenue from carbon tax varies from country to country. For some countries, like **China, Russia** and **Poland**, such revenues would reach as high as *2 percent of GDP*.

Other environmental taxes

Although environmental taxes have been implemented in OECD countries and have contributed to government revenue, there is still scope for improvement in government revenue and pollution reduction. For example, Repetto et al. (1992) have estimated that in the **United States** alone, the total revenue from carbon taxes and congestion tolls on urban highways could yield at least US$100 billion in annual revenue for federal, state, and local governments. A recent study by the Norwegian Green Tax Commission (1996) estimated that in **Norway** environmental tax revenue could be increased by up to Nkr 820 million (0.26 percent of total government revenues) from broad-based CO_2 tax of 50 NKr/ton.

Some transition economies do have small Pigouvian type environmental taxes, these have not been effective due to low rates applied to state-owned enterprises that have also had soft budget constraints. Still, other taxes function as earmarked taxes channeled to extrabudgetary funds. **Table 6** presents the data on environmental tax revenues that are mobilized through the national environmental funds in selected transitional economies.

Environment taxes have not been widely adopted in developing countries, although their use is increasing. **Brazil, Mexico, Colombia, Malaysia, India,** and **Indonesia,** among others, seem to have taxed pollution emissions (Lovei, 1996). Pollution levy system of **China** has also been successful and is described in **Box 8**.

Given the general lack of environmental taxes in developing countries, and lax enforcement of those that do exist, environmental taxes can be viewed as offering a major potential source of government revenue and an effective means for pollution control. Taxes on gasoline equivalent to the

Box 7. Revenue Potential of Carbon Taxes in Major Countries of the World

Based on a model developed in the World Bank, Shah and Larsen (1992) estimated the potential revenue from a carbon tax of US$10 per ton of carbon on fossil fuels by country. The estimates of tax revenues in major countries are listed in the table below.

Potential Revenue of a Carbon Tax in Selected Countries, 1991

	In millions US dollars	Percent of government revenue	Percent of GDP
Germany	1,773	0.54	0.16
Japan	2,371	0.73	0.10
United States	12,461	1.37	0.28
Brazil	503	0.50	0.17
China	5,699	8.81	1.87
India	1,454	3.85	0.57
Indonesia	263	1.62	0.35
Mexico	772	3.16	0.55
Nigeria	90	2.33	0.37
Poland	1,257	5.07	1.97
Former Soviet Union	10,129	--	--
World	54,810	--	0.31

Source: Shah, A. and B. Larsen (1992).

Shah and Larsen concluded that, at the global level, the revenue potential of the carbon tax could be as large as $55 billion (an average of 0/31 percent of GDP) in the first year of its operation. Their results also show that the importance in government budget of the tax revenues varies from country to country. For some countries, like China and Poland, such revenues would reach as high as 2 percent of GDP and would be sufficient to wipe out central government's budgetary deficit. On the averge, low-income countries could raise revenues exceeding 1 percent of GDP and over 5 percent of government revenue. For the OECD countries, comparable figues would be 0.2 percent of GDP and 1 percent of government revenue.

marginal health costs of pollution, alone have been estimated to have the potential of generating as much as 4 percent of total government revenue in **Indonesia** and about 7 percent in **Malaysia** (Hammer and Shetty, 1995).

Table 6. Selected Transition Economies: Environmental Funds in 1993

| Country | Size of environmental funds (US$M) | Emission taxes | Sources of environmental funds | | | | Percent of env. funds in total gov't revenues (Percent) |
| | | | Product taxes | User charges | Penalty and fines | Others | |
			(Percent of environmental funds)				
Bulgaria	2.30	--	33	--	58	9	0.06
Czech Republic	107	43	--	53	--	--	0.85
Estonia	1.7	88	--	--	--	12	0.27
Hungary	27.7	--	44	20	17	19	0.24
Poland	515	--	--	--	--	--	1.34
Russia	84	83	--	--	2	15	0.33
Slovak Republic	34.7	55	--	--	--	45	--

Source: Lovei (1996).

3.   Scope for mobilizing financial resources through public expenditure reforms

Government expenditure reforms can provide yet another source of domestic resources through (1) reduced spending on unproductive or wasteful government programs; (2) removal of government subsidies that are costly to the budget and, at the same time, are to the detriment of environmental or social objectives; and (3) reduced military spending.

Table 7 shows the composition of public expenditures by economic and functional components for countries at different levels of development. Several highlights of government expenditure components for the period 1983-1990 can be drawn from this table. Central government expenditure, by high-income, middle-income and low-income countries, on:

1) wages and salaries, on average, accounted for 3.7 percent, 5.5 percent and 2.5 percent of GDP, respectively;

2) subsidy and transfer payments accounted for a large share of GDP 17.1 percent, 7.2 percent, and 5.5 percent of GDP (as well as of total government expenditures, and 54.5 percent, 27.1 percent, and 25.2 percent of total expenditure), respectively;

3) capital outlays accounted for 1.8 percent, 3.8 percent and 4.3 percent of GDP, respectively;

Box 8. China: The Pollution Levy System

China began to experiment a levy on industrial pollution that exceeded emissions standards in a city in 1979. In the early 1980s a pollution levy system was officially incorporated into law and was gradually expanded to cover the entire country. Government revenues from the pollution levy have since increased rapidly, for example, from 1.2 billion yuan in 1986 to 2.7 billion yuan in 1993.

The pollution levy now provides about 15% of all capital expenditures for pollution control and is the principal source of funding for regulatory enforcement activities by local environmental protection bureaus.

According to the pollution levy system, 29 pollutants in wastewater, 13 pollutants in industrial waste gases, industrial solid waste, noise, and radiative waste are subject to a fee. Prior to 1993, the Chinese pollution levy system imposed charges only for pollutants that exceeded emissions standards and then only for the one pollutant most in violation of the standard. To provide incentive for enterprises to further reduce the "within standard" pollutant discharges into water, a fee charged on the total quantity of wastewater discharged was introduced in 1993.

Although the pollution levy system provides revenue for funding pollution control activities, it has been criticized for its low charge rates and weak enforcement. The charges are below the marginal costs of pollution control in most cases and are not indexed for inflation. A survey of industries in 13 cities by a government agency found about 120 million yuan in pollution levy underpayments in 1992 under weak enforcement. The pollution levy system continues to have the potential for much larger government revenues.

Sources: Xie, J. and H.K. Florig (forthcoming); Xie, J. (1996a).

4) health and education accounted for 5.3 percent, 4.0 percent, and 1.4 percent of GDP, respectively; and

5) defense accounted for 4.4 percent, 2.0 percent and 2.8 percent of GDP (and 14.2 percent, 8.2 percent and 15.3 percent of total expenditure) respectively.[13]

a. Curtailing unproductive expenditures

Unproductive public expenditures are obviously difficult to identify without detailed technical studies, and lacking detailed data, even more difficult to measure. Yet it is well known that government bureaucracies in many countries, especially developing and transitional countries, are excessively large and that quite often civil servants enjoy salary levels and fringe benefits which are far beyond their productivity levels.

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[13] See IMF (1995c).

Table 7. Share of Central Government Expenditure in GDP
and in Total Expenditure by Levels of Income, 1983-90
(In percent)

	High Income[1]		Middle Income[2]		Low Income[3]		All Countries	
	GDP	Total expenditure	GDP	Total expenditure	GDP	Total expenditure	GDP	Total expenditure
Expenditure by economic type	31.4	100.0	26.6	100.0	21.6	100.0	30.4	100.0
Current expenditure	29.1	92.9	20.9	79.0	14.0	64.7	27.5	90.5
Goods and services	8.4	26.9	8.8	33.3	5.4	25.1	8.3	27.4
Wages	3.7	11.9	5.5	21.2	2.5	11.5	3.9	12.8
Other goods and Services	4.7	15.0	3.2	12.2	2.9	13.6	4.5	14.6
Interest	3.6	11.5	5.0	18.6	3.0	14.0	3.8	12.4
Subsidies and transfers	17.1	54.5	7.2	27.1	5.5	25.2	15.4	50.7
Capital expenditure	1.8	5.7	3.8	14.5	4.3	19.9	2.2	7.1
Lending minus repayments	0.4	1.3	2.3	8.0	3.3	15.2	0.8	2.5
Expenditure by function[4]	30.9	100.0	24.3	100.0	18.4	100.0	29.5	100.0
Defense	4.4	14.2	2.0	8.2	2.8	15.3	4.0	13.6
Education	1.6	5.0	2.8	11.4	1.0	5.4	1.7	5.7
Health	3.7	12.0	1.2	5.0	0.4	2.2	3.3	11.0
Social security and welfare	10.6	34.4	3.6	14.9	0.1	0.8	9.3	31.5
Housing	0.7	2.2	0.6	2.4	0.7	3.8	0.7	2.3
Economic services	2.8	8.9	4.8	19.6	4.6	25.0	3.1	10.5
Other government services	3.8	12.2	4.4	18.1	5.7	30.8	3.9	13.2
Interest	3.4	11.1	5.0	20.2	3.0	16.3	3.6	12.2
Number of countries	26	26	36	36	18	18	80	80

Source: IMF (1995c).

Note: The sums of the components do not necessarily equal the totals because some minor components are not shown.

[1] Weighted average of data for Australia, Austria, Bahrain, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Korea, Kuwait, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, United Kingdom, and United States.
[2] Weighted average of data for Argentina, Barbados, Bolivia, Botswana, Brazil, Chile, Colombia, Costa Rica, Cyprus, Dominican Republic, Egypt, El Salvador, Fiji, Guatemala, Hungary, Iran, I.R. of, Jordan, Malaysia, Malta, Mauritius, Mexico, Morocco, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Swaziland, Thailand, Tunisia, Turkey, Uruguay, Vanuatu, Venezuela, and Zimbabwe.
[3] Weighted average of data for Burkina Faso, Cameroon, The Gambia, Ghana, India, Indonesia, Kenya, Lesotho, Liberia, Malawi, Maldives, Mali, Nigeria, Pakistan, Sierra Leone, Sri Lanka, Zaire, and Zambia.
[4] Does not include lending minus repayments.

Curtailing the shares of wages and salaries in the GDP by even a small margin can release, thus, large amounts of resources for social programs, environmental protection, and other elements of sustainable development

b.   Reducing subsidies

Significant budgetary resources can be saved through subsidy reforms. In doing this, one will have to accept subsidies that are justified on efficiency or equity grounds (to offset market failures, exploit positive externalities or meet social policy objectives), and these may not offer much scope. Even in respect of such subsidies, some resources can be saved through better targeting. The cases of **Sri Lanka** and **Jordan** (see **Box 9** and **Box 10**) amply bear this out.

Much larger scope of finding domestic resources for sustainable development, however, seems to lie in the reform of subsidies that lead to distortions in production and consumption decisions. These distortions sever the link between consumer prices and producer costs that result in an inefficient allocation of resources, including environmental resources. Reforming such subsidies cannot but help improve prospects for growth, by ensuring that resources are allocated more efficiently.

Such subsidies can include both "explicit" cash subsidies and "implicit" subsidies. Examples of such subsidies include: credit subsidies (i.e., low interest government loans); tax subsidies (i.e., reductions in tax liabilities); in-kind subsidies (i.e., government provision of goods and services at below-market cost); procurement subsidies (i.e., government purchases of goods and services at above-market prices); and regulatory subsidies (i.e., pricing policies).

That such distortionary subsidies are costly to government budgets is well-known. According to some estimates, cash subsidies to businesses for the period 1975 to 1990 averaged 2.5 percent of GDP for all countries, with industrial countries averaging approximately 3 percent of GDP and developing countries averaging approximately 1.5 percent of GDP. Moreover, total subsidies and transfers from central governments for the period 1975 to 1990 accounted for approximately 11 percent of GDP for all countries, with industrial countries averaging approximately 21 percent of GDP and developing countries approximately 5 percent of GDP. As a share of total central government expenditures and net lending for the same period, subsidies and transfers accounted for approximately 32 percent for all countries, with industrial countries averaging approximately 54 percent and developing countries averaging 25 percent.[14]

While the evidence on how large these subsidy and transfer payments are available now, there is little information on the share of total subsidies and transfers that are justified on efficiency or equity grounds and, therefore, need to be maintained. This is certainly an area that requires further research.

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[14] See Clements, B., R. Hugounenq, and G. Schwartz (1995).

**Box 9. Sri Lanka: Reform of and the Reduction in Government
Spending on Poverty Alleviation Programs**

Supported by the IMF and the World Bank during 1989-94, Sri Lanka undertook a reform aiming at restructuring government expenditures through a rationalization of a number of poverty alleviation programs. The reform successfully improved the targeting of these programs and, meanwhile, reduced government expenditures without reducing assistance to the vulnerable.

The main poverty alleviation programs in Sri Lanka are the Food Stamp Programs, the Midday Meal, and the JanaSaviya. The Food Stamp Program was introduced in 1979 to improve the nutrition of poor household. The Midday Meal Program and the JanaSaviya Program were established in 1989. The former aims at improving nutrition among children and increasing the returns to education and the latter aims at assisting near-subsistence households in establishing a permanent earning potential.

Since 1990, the government has sought to improve the targeting for these programs. For example, the government identifies the recipients in the JanaSaviya through community screening, inspections, community meetings, and a check of ownership, such as of durables, and through participation in productive activities, such as public works programs and self-employment projects. The Midday Meal program restructured in 1994 no longer covered the entire population but only those of food stamp program recipients with school-age children.

The reform has resulted in not only better targeting of these programs and but also a decline of government expenditure on these programs, for example, from some 3 percent to 1.9 percent of GDP between 1989 and 1994.

Source: IMF (1995a).

Obviously, not all subsidies are questionable on efficiency grounds--some are even strongly ejustified on social equity grounds--yet the potential for budgetary savings and, at the same time, mitigating environmental damage, minimizing waste, and ensuring a more efficient allocation of resources from subsidy reforms, must be significant. Jian Xie estimates the global resource cost of subsidies for energy, transportation, water, agriculture, and fisheries to be in excess of US$870 billion (see **Table 8** and **Annex** attached to this paper which describes the underlying methodology).

According to **Table 8**, removing energy and water subsidies would offer the largest source of domestic financial resources for developing countries. In contrast, the largest source of potential financial resources for industrial countries would be the removal of agricultural and transportation subsidies.

Box 10. Jordan: Targeting of Food Subsidy and Resulting Savings

To protect the poor from the effects of its economic crisis in 1988-89, the government of Jordan allocated a large amount of government expenditure to subsidize the domestic food prices. Despite the government's best intentions, the generalized food subsidy was poorly targeted and made substantially greater transfers to the rich and the middle classes than to the poor. Moreover, the subsidy system was expensive with an open-ended budgetary commitment. Budgetary outlays for the food subsidy, consequently, rose to a peak of JD83.5 million (3.1 percent of GDP and 10 percent of central government current expenditure) in 1990.

To contain the rapidly growing food subsidy, a scheme has been introduced since September 1990 to ration sugar, rice, and powdered milk through food coupons. The food coupon system ensures the availability of fixed quantities of these food items at reasonable prices for all Jordanians and, meanwhile, allows additional quantities of these commodities available at a price generally higher than the full cost. By introducing the rationing scheme, the government essentially limited the open-ended budgetary commitment implied by a generalized subsidy. The total subsidy on milk, sugar, and rice declined significantly from JD43.8 million in 1990 to JD8.3 million in 1994 under the food coupon system and the influence of declining import prices for these commodities in the early 1990s. Correspondingly, the total food subsidy dropped from 3.1 percent to 1 percent of GDP during the same period. In 1994, the Jordanian government eliminated the households with any member earning more than JD500 from the benefits of the food coupon system. As a result, the targeting of the food subsidy has further improved and the amount of the subsidy has been further reduced.

Source: IMF (1996b).

Several countries have started to mobilize resources through subsidy reforms successfully:

• **China**, for example, has mobilized significant domestic resources through reductions in central government subsidies to state-owned coal producers. Their subsidies have been reduced from US$750 million in 1993 to US$240 million in 1995—a saving of over US$500 million over a two year period (see **Box 11**).

• **Argentina** has mobilized resources by privatizing the operation of urban transport and reducing government subsidies. Subsidies to the suburban rail system was reduced by about US$26 million, or about 0.1 percent of total government expenditures between 1993 and 1995 (see **Box 12**).

• **Indonesia** eliminated pesticide subsidies altogether over the period 1986 to 1989 and this helped save the government over US$100 million annually, or almost 1 percent of total government expenditure (see **Box 13**).

Table 8. Global Estimates of Subsidies
(In billions of 1995 US dollars)

	Global	Industrial countries	Transition economies	Developing countries
Energy				
Fossil fuels	82	9.9	23+	25+
Electricity	206+	94+		112
Road transport	112+	95+	5+	11+
Water	56+			56+
Agriculture	352	342		10
Subtotal	870+			

Source: Annex attached to this paper contains the basis of these estimates.

Box 11. China: Subsidy Reform in the Coal Sector

Since the middle of the 1980s China has made remarkable progress in reducing energy subsidies in its energy sector, especially in the coal sector which contributes to more than 70 percent of the country's energy production. Subsidy rates on coal have fallen from 61 percent in 1984 to 11 percent in 1995. The World Bank (1996) recently estimated that China's total economic subsidy (based on the difference between domestic and world prices) for fossil fuels fell from $16 billion in 1990/91 to $3 billion in 1995/96. It has also been reported that the budgetary subsidy from central government to cover the operation losses in state-owned coal mines decreased significantly from, for example, US$750 million (1.09 percent of the total government expenditure) in 1993 to US$240 million (0.26 percent) in 1995 (Wang, 1996). Meanwhile, the economic performance of coal mines was improved with estimated operating losses of state-owned mines dropping from US$1.4 billion in 1990 to US$0.23 billion in 1994 (Wang, 1996).

These achievements have been made by removing energy price controls and opening collective and individual coal mines (operating alongside state mines). Currently about 50 percent of production is carried out by these private mines (Wang, 1996) and about 80 percent of coal is now sold at international prices (Gray, 1995). End-user prices for electricity and petroleum products are also near or even above long-run economic cost.

The reform in the energy sector has reduced the large amount of government spending and also, along with the structural adjustment and technological change, contributed to energy conservation and environmental protection. Energy intensity in China has fallen by about 30 percent since 1985. This implies that energy consumption (in oil equivalent) and CO_2 emissions are now respectively 0.3 billion metric tonnes less and 1.1 billion metric tonnes less than would be the case if no reform took place.

Sources: (Gray, 1995); World Bank (1996d); the World Bank (1996f) and Wang, X. (1996).

Box 12. Argentina: Privatizing the Transport Sector and Reducing Government Subsidies

Public enterprises had been inefficiently managed and had become a large financial drain in Argentina. In recent years, the Argentina government has made important progress in privatizing these enterprises and reducing government subsidies. One example is that the government signed with a private company a concession contract, by which the concessionaire will operate and maintain the metropolitan railway systems of the Buenos Aires metropolitan region and will be paid annual subsidies on a declining scale. The preliminary results demonstrate that the concession is successful in terms of improving economic efficiency and reducing government subsidies.

In 1993, the year prior to the concession, the total subsidy for the suburban railway systems of Buenos Aires was US$143 million (about 0.36 percent of total government expenditure) per year. Through the concession, the number of passengers served by the system increased significantly from 210 million to 360 million persons per year between 1993 and 1995. The total amount of the government subsidy, however, dropped to US$117 million (0.25 percent of total government expenditure) during the same period (see table below). The operating subsidy per paying passenger was halved and the subsidy per car-kilometer was reduced by 35 percent. According to the contract, the total subsidy on the railway system will be phased out in 5 to 7 years from the start of the private operation.

Impact of Subsidy Reduction and Privatization of Suburban Transport in Argentina, 1993-95

	1993	*1995*
Total passengers (million)	210	360
Car-kilometer (million)	63	76
Employee (persons)	18200	8404
Total subsidy (US$m)	143	117
Share of total gov't expenditure (%)	0.36	0.25
Subsidy per passenger (US$)	0.68	0.32
Subsidy per car-kilometer (US$)	1.52	1.03
Subsidy per kilometer (1000 US$)	173	142

Source: Rebelo, J. (1996).

Box 13. Indonesia: Eliminating Pesticide Subsidies

Prior to 1986, the Indonesian government heavily subsidized pesticides in an attempt to boost agricultural production. The pesticide subsidy rate (the amount of the subsidy paid per unit of costs) was as high as 85 percent in the early 1980s (Pincus, 1994). The heavy pesticide subsidies were a financial burden to the government budget: for example, 179 million of 1995 US dollars (about 0.17 percent of GDP and 0.8 percent of the total government expenditure) in 1986 and nearly US$1.5 billion over the decade of 1976-87 (World Bank data).

The huge subsidies resulted in excessive and inefficient use of pesticides and, consequently, caused economic loss and environmental damage. The domestic pesticide production soared from 6,000 tons in 1972 to 53,100 tons in 1985 (Indonesian National IPM Program, undated, and Pincus, 1994). The country's total consumption of rice insecticides was about 20 percent of the world market in the middle of 1980s (Kenmore, 1991).

One of the well-known environmental problems related to the overuse of pesticides in the country had been the outbreak of brown planthopper (BPH). Back to the time when agricultural production was traditional and less intensified with little use of pesticides, BPH which is usually controlled by its natural enemies in rice fields, was not considered a pest. However, as the applications of insecticides went up, so did the BPH infestation. In 1976, the country's loss to an outbreak of BPH was recorded over one million tons of rice, an amount enough to feed more than 2.5 million people (Kenmore, 1991). Research indicates that the overuse of rice insecticides which kill the natural enemies of BPH, together with the intensification of rice production, was directly attributed to the outbreak. In addition to the BPH problem, pesticide pollution was a major cause for concern in Indonesia's densely populated village communities, particularly where water for drinking and bathing was in limited supply.

These problems led Indonesia to drastically modify its pesticide policies in 1986. Many pesticides on rice were banned and direct subsidies for pesticides were phased out during 1986-89. The policy shift not only saved over US$100 million per year in government expenditure but also made the country economically and environmentally better off. Pesticide production dropped to 22,100 metric tonnes in 1990 and pesticide imports fell to a third of mid-1980s levels.

Although no data exist to quantify the environmental impact of the subsidy elimination, the significant drop in pesticide use is thought to have alleviated damage to the environment— particularly to public health and to biological diversity. The reduction in pesticide use also has been accomplished without adverse effects on rice production. Total milled rice production rose from 27 million metric tonnes in 1986 to 30 million metric tonnes in 1990.

Sources: Pincus (1994); Kenmore (1991); and the World Bank data.

• **Bangladesh** gradually deregulated fertilizer prices and reduced subsidies over the period 1978 to 1990, saving about US$100 million annually, or about 2 percent of government expenditure (see **Box 14**).

There is, thus, much scope for subsidy reforms which could help mobilize significant amount of resources for the budget and, at the same time, serve the economy and the environment simultaneously. While equity considerations may require that social safety nets should be targeted and expanded, moving prices for energy, water, and agricultural inputs, to better reflect market prices and costs of supply, should ensure more reliable and sustainable supplies while mitigating excess use and environmental degradation.

Box 14. Bangladesh: Reducing Fertilizer Subsidies

Until 1978, the Bangladesh government had a monopoly on fertilizer production, procurement, and distribution. Three basic types of subsidies existed in this period: a direct price subsidy when border prices exceeded government sales prices, an indirect production subsidy when ex-factory prices exceeded border prices, and an indirect distribution subsidy when distribution costs exceeded private sector costs.

Although these subsidies contributed to the promotion of fertilizer use, they imposed heavy financial burdens on the government. By the late 1970s, fertilizer subsidies accounted for 4 percent of the national budget (Mokarrum, 1994). In 1978, for example, the total fertilizer subsidy was US$93 million 1995 dollars, with 54 percent of the average subsidy rate. The government's control of the fertilizer market also resulted in misallocation of resources and inefficient production and distribution.

In 1978, Bangladesh began experimenting with partial deregulation of urea sales. Retail prices were deregulated completely in 1983. The savings resulting from the removal of fertilizer subsidies were estimated at US$294 million in 1990-93: US$253 million from saving in fertilizer transportation and movement, US$33 million from reductions in direct subsidies, and US$7 million from procurement through private sector imports (Mokarrum, 1994). The savings represent over 2 percent of total government expenditures per year.

Despite the abolition of price control and the reduction in subsidies, real prices for urea have declined over time due to improved efficiency in distribution, increased domestic production, and decreases in world urea prices in the mid-1980s. Together with a substantial increase in the area planted to improved varieties, this has resulted in a sustained increase in fertilizer use of 10 percent annually from 1970 to 1990.

Sources: Mokarrum, S. (1994); and Renfro, R. (1992).

c. Containing military expenditures

Reductions in the relatively large military spending that exist in practically every country of the world can be yet another significant source of domestic resources for sustainable development. Reduced military spending will also have indirect benefits for the economy by encouraging capital formation and by improving resource allocation more generally.[15] Moreover, some spillover benefits may accrue even to other countries as military threats are reduced, thereby encouraging military spending cuts in other countries.

That military spending absorbs a significant portion of world output is well-known. As **Table 9** shows, in 1990, military spending averaged 3.7 percent of GDP worldwide (3.2 percent for industrial countries, 5.2 percent for developing countries and 8.8 percent for transition countries). Encouraged by the end of the cold war era, countries are already starting to recognize that significant resource savings can be achieved through military cuts. As a result, military spending in 1995 averaged 2.4 percent of GDP worldwide (2.4 percent for industrial countries, 2.6 percent for

Table 9. Military Expenditures, 1990-95

	1990 (In percent of GDP)	1995 (In percent of GDP)	Change 1990-95 (In billions of US$)
All countries	3.7	2.4	-136.1
Industrial countries	3.2	2.4	-14.2
Developing countries	5.2	2.6	-121.9
Africa	3.0	2.1	-2.8
Asia	2.8	2.3	15.3
Middle East and Europe	8.8	7.0	-0.2
Western Hemisphere	1.3	1.2	6.4
Countries in Transition	8.8	3.0	-140.5

Source: IMF (1996a).

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[15] See Knight M., N. Loayza and D. Villanueva (1996).

developing countries and 3.0 percent for transition countries). This dramatic reduction in military spending has implied a large and growing worldwide saving of resources. Indeed, had military spending been maintained at 1990 levels as a share of GDP, spending in 1995 would have been over $300 billion higher than actually observed.

In 1995 military spending was in excess of US$700 billion. Given that national security is a necessary public good and political leaders will never feel safe curtailing it substantially over a short period of time, perhaps only a small fraction of this amount can be saved in the short-term.

How far can the reduced military spending benefit the budgets can be illustrated by an examination of three countries in Sub-Saharan Africa that have gone through the transition from war to peace (see **Box 15**). Experiences in **Ethiopia**, **Namibia** and **Uganda** demonstrate how significant resources can be mobilized from reduced military spending which can then be directly devoted to priority social and economic needs. Moreover, economic growth can be stimulated and the allocation of resources can be improved as the example of **Uganda** shows.

4.   Scope for redirecting financial resources through other reforms

a.   Macroeconomic reforms

Macroeconomic policy reforms can help redirect economy's resources to economically efficient uses in support of sustainable development. It can also help generate additional resources. These resources are, however, likely to be generated indirectly, rather than directly, through fostering economic growth which mobilizes resources for the public sector through buoyant tax systems and through higher savings and investments in the private sector. This important note of macroeconomic policies, was also recognized in Agenda 21.

Achievement of the objectives of price stabilization and sustainability of balance of payments requires a coordinated use of variety of macroeconomic policy instruments, including: (i) monetary policies, (ii) exchange rate policies, (iii) trade policies, and (iv) external debt management policies. The role of each of these policy measures for domestic resource mobilization is highlighted below.

Monetary policy

Monetary policy's primary role is to reduce or minimize high and variable inflation which adversely affects the poor and hinders economic growth. In a broader sense, monetary policy also plays an important role in the efficiency of resource use of financial resources available to an economy and the mobilization of private sector financial resources.

Monetary policy reforms that remove credit ceilings and liberalize economy-wide interest rates mobilize resources by: (i) increasing competition in the banking sector, (ii) reducing distortions to lending portfolios; and (iii) encouraging financial intermediation and growth of the formal sector lending.

Box 15. Sub-Saharan Africa: Reducing Military Expenditures

Since the late 1980s a number of countries in Sub-Saharan Africa have gone through the transition from war to peace. The transition has successfully helped these countries cut their military expenditures and provided financial and economic benefits from the "peace dividend." It has been reported that regionwide there was a decrease in military expenditures from US$3.5 billion in 1987 to US$1.9 billion in 1993 (Colletta et al., 1996). The significant declines in defense expenditures and budgetary savings as percentage of total government expenditures took place in Ethiopia, Namibia, and Uganda. For example, defense expenditures as percentage of total government expenditures dropped from 46.6 percent to 16.4 percent (three-year average before and after demobilization) in Ethiopia, from 12.4 percent to 6.3 percent in Namibia, and from 34.9 percent to 25.0 percent in Uganda (see Table below).

Impact of Reduction of Defense Outlays on Economic Growth
and Fiscal Deficits in Three African Countries

	Ethiopia	Namibia	Uganda
GDP war growth rate (percent)	-1.2	2.6	1.7
GDP postwar growth rate (percent)	6.7	3.9	5.8
Defense expenditures as % of total government expenditures			
War	46.6	12.4	34.9
Postwar	16.4	6.3	25.0
Budgetary savings as % of total government expenditures	30.2	6.1	9.9
Budgetary savings in relation to the demobilization and reintegration costs	5.2	3.6	0.9

Sources: Colletta, N. et al. (1996); and Sharer, R., H. De Zoysa, and C. McDonald (1995).

To see the economic benefits of reducing defense spending, take Uganda as an example. The country demobilized a total of 33,000 soldiers in 1992/93 and 1993/94 in order to reduce defense expenditures and free up domestic resources to priority social and economic needs. The "peace dividend" resulting from the demobilization has been substantial and come about in two ways. One is the direct reduction in the size of military expenditures. Military expenditures as percentage of GDP declined from 2.4 percent in 1991/92, to 1.6 percent in 1992/93, to 1.3 percent in 1993/94 (Sharer et al., 1995). The other is the economic activity generated through the reintegration of soldiers to the civil production sectors, mostly to agriculture. These soldiers have brought new land into production, produced foodstuffs for local markets, and are introducing new crops into their villages. As a result of the demobilization and reintegration, the growth rate of GDP increased from 1.7 percent (an annual average of the three years before demobilization and the first postwar year) to 5.8 percent (an annual average of the four years after demobilization) (Colletta et al., 1996). In particular, the growth rate of agriculture improved from -1.4 percent in 1991/92 to 9.2 percent in 1992/93 (Sharer et al., 1995).

Exchange rate policies

In circumstances where a country is facing an unsustainable current account imbalance (either deficit or surplus), exchange rate reform may be an effective means of improving the country's balance of payments.

An exchange rate devaluation can help mobilize resources for sustainable development in three ways: (i) through a significant expansion of exports, (ii) through import substitution, especially for food and energy products; and (iii) by improving the prospects for growth, as inflation is decelerated (provided that monetary expansion is also kept under control).

Trade policies

Trade policies provide resources for sustainable development by improving the prospects for growth. This comes about through increased competition in domestic markets, increased pressure on enterprises to innovate, and allowing firms to fully exploit comparative advantage and economies of scale. For many countries, trade is the engine of growth, with gains from trade playing a crucial role in expanding their real incomes. Reducing trade barriers is a means of ensuring that countries gain from increased efficiency and growth.

External debt management policies

Effective debt management can be used to promote high and stable rates of economic growth but only if the use of borrowed funds generates an adequate future stream of resources to permit timely debt servicing.

In recent years, a growing number of countries have demonstrated that macroeconomic policies of the kind described above, aimed at bringing about macroeconomic stability, result in higher economic growth (see **Box 16**). Moreover, with timely, sustainable, and consistent macroeconomic policy reform, countries can see benefits in terms of increased trade volumes, reduced inflation, higher government revenues and lower debt ratios. Clearly, all these factors can combine to provide substantial additional resources for sustainable development.

b.   Structural reforms

Structural reforms can also help redirect financial resources available to the economy and improve efficiency to help meet the needs for sustainable development. Structural reforms are most successful, however, when undertaken along with effective macroeconomic stabilization (see the examples of **Bolivia** and **The Gambia** in **Box 16**).

Box 16. Structural Adjustment Reforms and Macroeconomic Performance: the Experiences of SAF/ESAF Countries

In early 1980s, many developing countries faced acute economic crises: low or even negative economic growth, large government deficits, high inflation, and deteriorating terms of trade. In response to these difficulties, IMF set up the Structural Adjustment Facility (SAF) in 1986 to provide balance of payment assistance on concessional terms to these countries. The SAF initiative was taken a step further with the establishment of the Enhanced Structural Adjustment Facility (ESAF) in 1987. ESAF programs support a broad spectrum of macroeconomic reforms aimed at reducing inflation and strengthening the balance of payments while also improving efficiency and fostering economic growth.

Although specific measures adopted in and the results from macro-economic policy reforms in the SAF/ESAF-supported programs vary from country to country, the reforms in general are viewed as successful according to an evaluation of 19 ESAF countries (Schadler, et al., 1993). The ESAF countries have on average seen a strengthening in wide range of macro-economic indicators including real GDP growth, trade volumes, inflation, government revenues, and debt ratios (see table on the next page).

The review also found a positive relation between the improvement in macroeconomic performance and the forcefulness of structural reforms implemented in the ESAF programs. In order to provide more details on economic achievements of structural reforms, the experiences of Bolivia and the Gambia where financial adjustment and structural reforms are perhaps the most successful are presented as follows.

Bolivia undertook structural reforms under a one-year SAF arrangement in 1987 and four annual ESAF arrangements starting from 1988. The major components in the reforms included: (a) freeing most prices, including interest rates; (b) unifying the exchange rate and liberalizing capital flows; (c) simplifying the tax regime and strengthening tax administration; (d) reforming the financial sector; (e) privatizing small commercial public enterprises; and (f) liberalizing trade and reforming customs and registration procedures (World Bank, 1993). The reforms succeeded in terms of price stability, economic growth, and government revenue. Prices became stable after a significant drop of inflation from 664 percent per year pre-SAF to 8.5 percent in 1993. The negative economic growth (-1.1 percent per year pre-SAF) was reversed to 4.1 percent per year in 1993. And, government revenues as percentage of GDP rose significantly from 4.8 percent in 1984 to 22.7 percent in 1993.

In **The Gambia**, in response to the rapidly deteriorating macro-economic situation in the middle of the 1980s, the government in 1985 began to implement structural reforms. The reforms have been supported by IMF through two annual SAF arrangements in 1986/87-1987/88 and then a three-year ESAF arrangement during 1988/89-1990/91. The key elements of Gambian structural reforms were represented by (a) removing price distortions and government controls; (b) establishing a flexible exchange rate system; (c) broadening the tax base and strengthening tax administration; and (d) introducing complementary structural reforms, particularly in the trade sector and the public enterprise sector (Hadjimichael, et al., 1992). The implementation of these policy reforms resulted in an impressive improvement in the Gambia's economic and financial performance. A steady growth of real GDP was reported. Inflation fell into the target of the reforms. The overall balance of payments balance switched from deficits to a sizable surplus. Government revenues in percentage of GDP increased from 24.4 percent to 26.0 percent between 1986 and 1991.

Sources: Hadjimichael, M., et al. (1992); Nashashibi, K., et al. (1992); Schadler, S., et al. (1993); World Bank (1996a).

The largest potential for structural reforms, of course, exists in the transition economies, but it also exists in many developing and some developed economies. Important structural reform measures generally relate to financial sector policies, domestic capital market development, pricing policies, and privatization. Such structural reforms are necessary for well-functioning markets as well as for equitable and sustainable development.

Sound **financial sector policies** not only improve the allocation of capital and boost growth in an economy but prevent costly banking crisis. It has been estimated that the resolution costs of banking crises in developing and transition economies from 1980 to 1996 were US$250 billion (Honohan, 1996). Development of a sound financial system, effective regulation, and establishment of system of early warning indicators, obviously to prevent or reduce the severity of such crises, is a prerequisite for sustainable development.

Efforts by developing and transition economies to develop efficient **domestic capital markets**, along with effective regulatory frameworks, are necessary to improve the allocation of resources, facilitate the flow of foreign capital and improve the prospects of economic growth. Today more than 60 developing countries have stock markets and their capitalization has increased tenfold, from US$171 billion in 1985 to US$1.9 trillion in 1995. Emerging market mutual funds have played an increasingly important role in channeling portfolio investment to developing countries in recent years and more recently to transition economies. In 1984, there were only a few emerging market mutual funds and these totaled less than $1 billion, but by end-1994 US$100 billion from nearly 100 funds was targeted in emerging markets (IFC, 1996). Domestic capital markets also have important potential linkages by channeling domestic savings in infrastructure and other projects with high rates of return.

Pricing reform and privatization are essential for growth and sustainable development. A recent survey of the effects of privatization shows how the post-privatization performance of 61 companies in 18 countries increased profitability 45 percent, efficiency 11 percent, investment 44 percent, output 27 percent, employment 6 percent and dividends 97 percent (World Bank, 1996f). To fully realize the potential benefits of privatization, policies are needed to encourage competition and to effectively regulate natural monopoly industries. Innovative ways to privatize, such as through the "voucher" system for the entire population pioneered by the **Czech Republic**, and the privatization of assets directly to pension funds as in **Bolivia**, may be useful models to promote equitable and sustainable privatization.

5.   **"Order of magnitude" estimates of domestic resources available for sustainable development**

This paper has carried a rather comprehensive review of the possible sources of domestic financing of sustainable development—on the revenue side of the public budgets, through tax reform, levy of appropriate levels of user fees and charges, and the imposition of environment taxes, and on the expenditure side of the public budgets, through the reduction of unproductive expenditures, targeting and reform of subsidies, and the curtailment of military spending.

Indicators of Macroeconomic Performance in SAF/ESAF Countries

(In percent)

	Real GDP growth		Inflation		Government revenues as % of GDP		External debt as % of exports	
	Pre-SAF or pre-ESAF	Most recent year	Pre-SAF or pre-ESAF	Most recent year	Pre-SAF or pre-ESAF	Most recent year	Pre-SAF or pre-ESAF	Most recent year
Annual average for 19 countries	2.1	2.9	16.9	17.6	--	--	--	--
Bolivia	-1.1	4.1	664	21.4	4.8	22.7	84.3	49.2
The Gambia	-1	4	23.9	11.5	24.6	26	27.2	15.3

Sources: Nashashibi, K. (1992) and Schadler, S. (1993).

Prima facie, it is unclear how much of the present total global subsidies of over US$870 billion and present total military spending of about US$700 billion can be cut. Similarly, it is difficult to estimate how much can be generated in government revenue through the reform of existing tax systems, imposition of fees and charges on publicly provided services or leases of natural and environmental resources, or the levy of taxes on petroleum or carbon emissions—these can, at best, be only guesses. Finally, how far can macroeconomic and structural reforms contribute, though indirectly, to the financing of sustainable development also cannot be quantified.

Yet, based on the analysis and information on country experiences presented above, one is left with the distinct impression that globally enough domestic financing should be available to meet the challenges of sustainable development. **Table 10** below gives what must be considered only a "broad-brush" and "order of magnitude" estimate of the global potential of various sources of domestic financing, based on assumptions noted in the footnotes to that table. These assumptions and therefore, the estimates, in the author's opinions, are not wild by any means; if anything, they are conservative. Obviously, a large part of the estimated domestic financing will be realized in industrial countries and a smaller part in developing and transitional economies.

The foregoing estimate domestic financing identified in **Table 10**, is derived, in large part, from gains in improved efficiency and higher economic growth. In part, some financing would also come from a reduction in unproductive rent-seeking and environmentally damaging activities. Yet another portion of such financing will come from taxes and revenues raised from the private sector, these are not all transfers from the private sector which must be costly to the economy, some of these will be derived from the growing pie which would benefit both the private and public sectors.

The challenge of sustainable development is to use selected fiscal and economic policy instruments which would raise domestic resources in the most equitable and efficient manner and which would improve private sector and public sector investments in an incentive framework consistent with the objectives of social equity and least environmental damage. It is hoped that the comprehensive approach toward mobilizing domestic financing for sustainable development proposed in this paper would be seen as melting this test in a satisfactory manner.

6.   Conclusion

Agenda 21 called for a massive effort in developing countries in practically sphere of human need—poverty alleviation, population control, human settlements, deforestation, desertification, fresh water, solid waste and sewerage, health, education and training—and these needs were estimated to cost annually about US$560 billion for developing countries[16]. About US$140 billion of this amount was estimated to be needed as concessional external financing and the remainder was to come from domestic financing.

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[16] United Nations (1993), p. 417, and Keating, M. (1993), p. 53.

Table 10. "Order of Magnitude" Estimates of Domestic
Financing Available for Sustainable Development

Measure	Authors' Estimate (In billions of US$)
1. Public revenue mobilization	
a. Reforming the tax systems	300[1]
b. Levy of user fees and charges	150[2]
c. Imposition of environmental taxes	
- Petroleum excises	100[3]
- Carbon taxes	55[4]
- Others	+?[5]
2. Public expenditure savings	
a. Reducing unproductive expenditures	90[6]
b. Eliminating and better targeting of subsidies	435[7]
c. Curtailing military expenditures	70[8]
3. Other reforms	
a. Macroeconomic reforms	+?
b. Structural reforms	+?
Total	1,200+

Source: Authors' estimates.

[1] It is assumed that, as in Sub-Saharan Africa in recent years, all countries should be potentially able to raise their tax to GDP ratio, by about 1 percent of GDP through tax reform. According to IMF (1996a), global GDP in 1996 is estimated at US$29.9 trillion as follows: industrial countries: US$22.3 trillion; transition economies: US$1.2 trillion; and developing countries: US$6.5 trillion. With a global GDP of US$30 trillion, the estimate of US$300 billion in the table is made.

[2] It is assumed that, given the very wide scope that exists in relation to this measure, the countries should be able to mobilize globally at least 0.5 percent of global GDP.

[3] This estimate is based on an assumed increase of US$0.05 (5 US cents) per liter, and the worldwide consumption of 2,053 billion liters of gasoline and diesel.

[4] See text.

[5] These include water effluent taxes air emission taxes, land degradation taxes, waste disposal taxes, etc. that are aimed at internalizing the social costs of water, air, and land pollution.

[6] It is assumed that 10 percent of global expenditures on civil service wages and salaries (these are estimated at about 3 percent of GDP, see **Table 7**) can be saved.

[7] It is assumed that about 50 percent of US$870 billion of present global subsidies can be eliminated or government finances redirected to uses in support of sustainable development.

[8] It is assumed that only about 10 percent of US$700 billion of global military expenditures can be redirected towards sustainable development.

If the estimates of **Table 10** below are anywhere near realistic, the domestic financing required to meet the needs of Agenda 21 would seem to be within easy reach, provided, of course, countries make an all-out effort and exploit every possible source of domestic financing identified in this paper to the fullest.

Perhaps the authors have painted a rosy picture of the domestic financing available globally and that the domestic financing available, particularly to developing countries is nowhere near what is required to meet all their needs. Nonetheless, the fact remains, and hopefully this paper has shown it abundantly, that developing countries do have the potential of mobilizing substantial additional resources for sustainable development. This would certainly be so if they did not "waste" those resources on unproductive expenditures, undesirable and inefficient subsidies, and in excessive military spending and, instead, allocated them to meet the essential social and ecological needs of sustainable development.

What is really needed in most developing and transition countries now is the political willpower on the parts of their authorities, the development of well-designed and feasible action plans, and the establishment of effective institutional frameworks to achieve sustainable development. After this rather lengthy survey, one is tempted to conclude that finance is nowhere near such a constraint for the achievement of sustainable development in developing and transition countries, and also in industrial countries.

ANNEX

Basis of Global Subsidy Estimates[17]

Based on estimates drawn from various documents and sources, more than US$870 billion (in 1995 dollars; all other values are in current US dollars unless otherwise indicated) in resources are shown in **Table 8** to be forgone annually on energy, transportation, water, agriculture, and fishery subsidies worldwide. This Appendix describes the basis of subsidy estimates by individual sectors.

Energy subsidies

According to a recent World Bank study (1996d), the total world subsidy for fossil fuels in 1995-96 was US$82 billion, with an average subsidy rate of 18 percent. The subsidy was estimated by multiplying the quantity of fossil fuel consumption by the gap between domestic prices and border prices for tradable goods, or between domestic prices and long-run marginal costs for non-tradable goods. Using the same methodology, the World Bank has also recalculated the total fossil subsidy in 1990-91: US$196 billion in 1995 dollars. The significant decrease in the subsidy is due largely to the drop in energy use (by more than 25 percent) in the Former Soviet Union and recent declines in world prices for natural gas and petroleum products.

Larsen and Shah (1994) reported that the total subsidy by OECD countries for electricity was US$80-85 billion in 1990-91. The subsidy by developing countries could be even larger. According to World Bank (1990) and World Bank (1996), there is a large gap between the average cost of and the average tariff on electricity in developing countries. For example, in 1987 the average cost of electricity in 60 surveyed developing countries was $0.07 per kilowatt hour (kWh) while the tariff was only $0.04/kWh. The gap enlarged in the early 1990s, when the average cost reached $0.10/kWh but the average tariff was almost unchanged. Therefore, the electricity subsidy in developing countries (measured as the difference between the annual cost of and annual revenue from electricity) was estimated at about US$100 billion per year in the early 1990s (World Bank, 1996b). At the country level, Gutierrez (1995) reported that the percent of electricity subsidies in GDP ranged from 0.2 percent in **Malawi** to 2.7 percent in **Poland**.

Transport subsidies

An estimate of global transport subsidies has yet to be made. However, drawing on some estimates for various countries some conclusions can be drawn on the extent of transportation subsidies. MacKenzie et al. (1992) estimated that the total transport subsidy in the **United States** amounted to US$174 billion in 1989. Based on the same reference, but with different assumptions, European Communities (1994) estimated that the total subsidy in 1990 to be about US$55 billion.

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[17] This Annex draws heavily on the research done for this paper by Jian Xie.

Even among OECD countries, government intervention in the transportation sector varies significantly. In **Japan** and **Germany**, the transport subsidy is US$17 billion, and respectively, while in **France** and **the Netherlands** the transport sector is taxed (de Moor, 1996). Based on the existing estimates, the total transport subsidy in OECD countries ranges from a minimum of US$85 billion to more than US$200 billion.

In the developing world, no estimate of global transport subsidy can be directly estimated, although some country studies have shown a low percentage of cost recovered through road-related charges in total spending. Examples of low recovery rates include: 19 percent in **Bangladesh** and **Tanzania**, 26 percent in **Bolivia**, 42 percent in **Mexico**, and 47 percent in **Argentina** (Heggie, 1995). In **Zambia**, because road users pay negligible sums for the use of the road network, the government is spending a large share of its revenue to subsidize the transport sector (e.g., US$100 million and 12 percent of current government revenue in 1991) (Swaroop, 1994).

The budgetary subsidy is common in subways and commuter/suburban rail systems in metropolitan areas. Rebelo (1996) pointed out that none of them have been seen to cover their operating costs. For example, Rio de Janeiro spends US$100 million per year to subsidize its subway and US$180 million to subsidize its suburban rail system. The World Bank (1996c) has reported that poor road maintenance has cost developing countries about US$15 billion per year.

Agricultural subsidies

Both developed and developing countries subsidize their agricultural sector. In developed countries, the subsidies are provided mainly for agricultural outputs and rarely for agricultural inputs. In 1994 the total subsidy for agriculture in OECD countries was as high as US$335 billion (OECD, 1996b). Most of the subsidy was used for market price support measures, such as minimum entry and intervention prices, import taxes, and export subsidies. Developing countries, however, tend to subsidize agricultural inputs (mainly fertilizers and pesticides) but tax agriculture outputs. According to the annual surveys of ESCAP/FAO/UNIDO Fertilizer Advisory, Development & Information network for Asia and the Pacific, India allocated US$1.7 billion in its 1994 government budget to fertilizer subsidies. In 1992, the fertilizer subsidies in Indonesia and Iran were US$250 million and US$730 million, respectively.

It is almost impossible to estimate the total subsidy in the developing world because of the variety of agro-chemical products and the complexity of their use. Vincent and Fairman (1995) roughly estimated that the total subsidy in developing countries for agro-chemical inputs was US$10 billion in 1994 (by assuming that the average subsidy rates are 25 percent for fertilizers and 30 percent for pesticides). Based on the same assumptions, he also estimated that the agricultural input subsidy in OECD countries is US$24 billion per year.

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