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Expenditures, Investment and Financing for Sustainable Development in Brazil

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Executive summary

The objective of this study is to examine the evolution and characteristics of the financing for the environment in Brazil, in order to identify the advances and retreats after the Rio 92 Conference. Brazil has a very decentralized administration, composed of three independent levels of public administration: the federal government, 27 state governments, and more than 5000 “municipios,” or municipalities; all of them with specific environmental institutions. However, at the time of the completion of this report, there were no indicators that aggregate information from these different institutional levels for the 1992-2001 period.¹ Thus, this study was a first effort to generate this kind of figures. Given the very short time for its completion, the main priority was to identify the resource flows from the federal government and some selected states. Efforts to estimate spending on pollution control and other environmental activities by the private sector were also made. In addition, the issue of funding sources is also discussed.

Despite many methodological problems involved in the elaboration of these indicators, it was possible to identify trends and conclusions for environmental spending. At the federal government level, it was estimated that environmental expenditures were between 0.4% and 1% of the federal spending. Another important finding was that, although there was an official commitment to increase efforts in this area after the Rio 92 Conference, the overall federal government expenditures in environmental issues did not increase during the 1993-

¹ After the completion of this research, the Brazilian Institute of Geography and Statistics (IBGE) published estimates of public spending for the 1996-98 period (IBGE 2001). Whenever relevant, these figures were also added to the analysis, but with an alert that they were obtained using different methodological procedures.

2000 period. Moreover, a matter of concern was the declining quality of this spending, with fewer resources directed to end-activities and more money diverted to means-expenditures. An important cause of this was the increasing share of debt related expenditures (interests and amortization) in the total budget. On the other hand, investments suffered cutbacks, particularly in the more recent period, and the expenditures in personnel fell systematically by 25% in constant prices during the second half of the nineties.

Environmental projects are the most important single element in international cooperation agreements. However, the flow of foreign resources presented a declining trend since 1994, oscillating between 6% and 17% of total expenditures. Most of these resources come from external credit operations (loans), which means that in the long term, they represent an extra pressure of financial expenses in the budget. The proportion of international donations/total expenditures in 2000 fell to the lowest level in the series (2.0%), clearly indicating the decline of international support for environmental projects in Brazil.

Results for the 1996-98 period show that, if sanitation costs are included (an overestimate since it also considers water supply), environmental expenditures are relatively more important for local governments: around 9% of the total public spending in the sample of *municípios* considered. State governments are in the second position, spending around 1.5% of their budget on environmental issues, in contrast to the less than 1% of the federal government. For this reason, there remains a clear need to generate better aggregate figures for the states and *municípios* for the whole period. The methodologies used for public budgeting and expenditure control vary widely, making it very hard to supply compatible aggregate numbers. In the three states where longer time series were estimated (São Paulo, Paraná and Rio Grande do Sul), there was no consistent trend of increasing expenditures on environmental objectives.

Another gap that needs to be fulfilled refers to the private sector environmental spending. There were positive signals which indicated that the private sector is getting more concerned with the environmental issues, particularly those agents that have interests/responsibilities at the international level. It was calculated that the environmental spending of the industry sector was around R\$ 160 million per year, slightly less than 1% of its value added. Although it is expected that this number will increase in the future, it is considerably lower than the public sector spending on environmental issues.

It is very difficult to aggregate all these figures, but assuming for the year 2000 that the public spending on environmental issues was of 1.5% of the total, the public environmental spending would be of 0.33% of GDP, and an annual expenditure per capita of R\$ 22.9 per capita (US\$ 9.2 per capita). If the estimated industrial environmental spending (R\$ 160 million) is added, the total spending becomes R\$ 4.1 billion (0.34% of GDP), or R\$ 23.9 per capita (US\$ 9.6 per capita).

Most of the funding for environmental projects comes from the government (mainly federal, through BNDES), international development agencies, or from companies' own resources. The private financial sector has a minor role on the financing of environmental expenditures but, again, there are signals of positive changes, with the creation of innovative private funds specialized in environmentally friendly projects that combine financial and "green" interests as an example. The consolidation of economic instruments in international environmental agreements, particularly the Kyoto Protocol on greenhouse gases emissions, may accelerate this new financial market.

Another potential source of funding for environmental projects is connected to the implementation of economic instruments in the environmental management system. Command-and-control procedures, such as licensing and emission standards, largely dominate the environmental regulation in Brazil. However, some interesting experiences, such as the “green” tax rebound (*ICMS verde*) and the recent changes in the water resources policy adopting the user/polluter-pays principle, indicate that the role of economic instruments will increase and, consequently, that there is potential for developing self-sustained financial mechanisms to sponsor environmental expenditures.

I. Introduction

Until the Rio 92 Conference, the environmental question in Brazil was mainly seen as antagonistic to the objective of economic growth. The adoption of pollution control procedures and other environmental protection measures were considered to increase production costs, thus reducing the international competitiveness of the economy. The lax environmental controls were even used by some policy makers as an incentive to attract emission intensive industries. After the occurrence of serious environmental disasters, such as the several health problems around the Cubatão industrial area (in the state of São Paulo) in the mid 1980s, there was more political interest for the adoption of more effective controls.

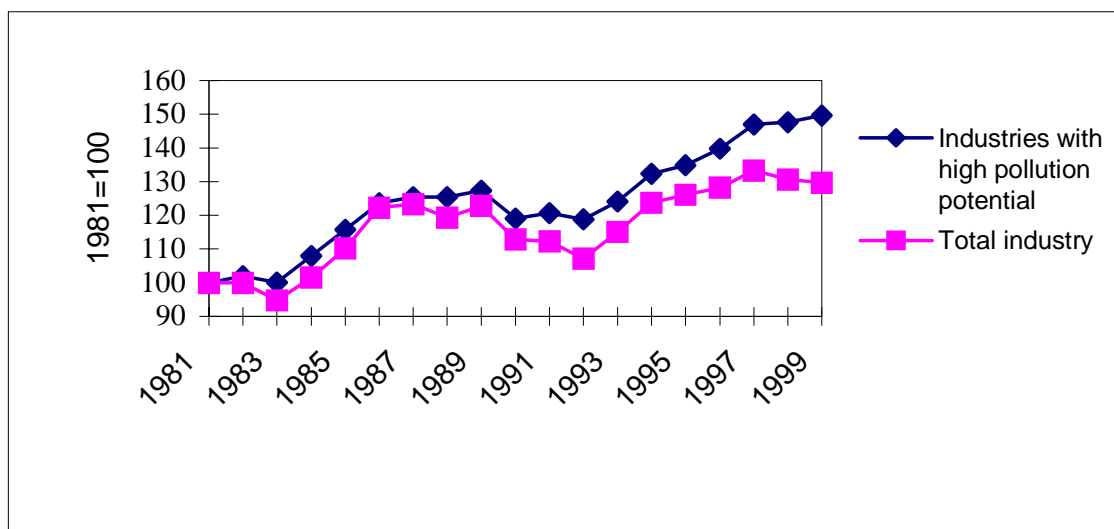
The institutional framework adopted for setting up environmental agencies was based on the distribution of functions to all levels of government (federal, state and municipal). In rough terms, sanitation and solid waste disposal problems were assigned to local agencies, air and water pollution became a responsibility of state agencies, while biodiversity protection and deforestation control is mainly associated with the federal and state governments. However, note that this is an oversimplification of the reality and there are plenty of exceptions to this scheme, resulting in many cases of conflicting authorities to deal with the same problem. The maximum authority is the National Environmental Council (CONAMA), established at the federal level, and in each state it has a counterpart (and in some *municípios* too) that is hierarchically under CONAMA in terms of regulation. The judiciary power has also a significant role, since the federal and state prosecutors (*Ministerio Público*) have the power to charge those considered to be acting the public interest,

including the environment. This decentralized scheme has the advantage of more proximity between stakeholders and policymakers, thus allowing more pressure from the public opinion on governments and productive sector in respect of their environmental behaviour. On the other hand, the system can become very confusing, and in many times there are endless discussions about which agency is the responsible for one specific problem. Altogether with the traditional lack of importance of environmental questions in the political agenda, it has resulted in the absence of statistics concerning environmental issues in Brazil. Therefore, it is extremely difficult to generate aggregate figures, such as the volume of financial resources devoted to environmental improvements.² Sometimes the only possible way to provide an estimate is through indirect proxies, with evident costs to the credibility of the analysis.

On the other hand, the Brazilian economy is facing increasing environmental challenges. One of the few aggregate environmental indicators produced by the Brazilian Institute of Geography and Statistics (IBGE) is the industrial output growth according to a pollution potential classification. Graph 1.1 and Table 1.1 clearly show that the most dynamic industrial activities are the group with higher pollution potential.

Graph 1.1

INDUSTRIAL OUTPUT ACCORDING TO THE POLLUTION POTENTIAL, BRAZIL, (1981 = 100)



Source: Department of industry, IBGE.

These results are confirmed by many empirical studies that show that the Brazilian industrial exports have an increasing concentration of “dirty” products in its composition (Young 1998, 2001, Young and Lustosa 2001). Other problems are the delay in the implementation and lack of enforcement of environmental standards and controls, and the incentives that were given to the expansion of natural resource activities.

² The Brazilian Ministry for the Environment (MMA) is aware of this problem, and has been acting on the elaboration of a national system of environmental indicators with the collaboration of the Brazilian Institute of Geography and Statistics (IBGE). The recent creation of the Council for Environmental Statistics is an example of these efforts. However, results will appear only in the medium and long term, thus not being available for this study.

Table 1.1
INDUSTRIAL OUTPUT ACCORDING TO THE POLLUTION POTENTIAL,
BRAZIL, (1981 = 100)

Year	Industries with high pollution potential	Total industry
1981	100,0	100,0
1982	101,9	100,0
1983	100,1	94,8
1984	107,9	101,6
1985	115,8	110,2
1986	123,6	122,3
1987	125,5	123,3
1988	125,4	119,3
1989	127,3	122,8
1990	119,1	112,9
1991	120,7	112,3
1992	118,8	107,1
1993	124,1	115,1
1994	132,4	123,8
1995	134,9	126,1
1996	139,8	128,3
1997	147,0	133,3
1998	147,6	130,6
1999	149,7	129,7

Source: Department of Industry, IBGE.

Pollution problems are also the consequence of consumption patterns. Air emissions from cars and other mobile sources are a major problem in metropolitan areas, particularly São Paulo where car restriction measures (*rodízio*) have been in place since 1995. The lack of adequate sanitation results in major water pollution problems in urban areas, caused by household and other discharges. The same is valid for waste disposal: according to IBGE, 20% of the household waste is not collected, and only a minor fraction of the collected waste is destined to proper disposal facilities.

The situation in the “green” agenda is also a problematic one. Deforestation trends have not been controlled yet, as shown by the analysis of satellite images. Table 1.2 shows the most recent data for deforestation in the Amazon, where the average annual deforestation increased in the second half of the 1990s. Table 1.3 presents the loss of Atlantic forest (*Mata Atlântica*) in the states of the Southeast and South regions. As it shows, there was a decrease in the absolute level of deforestation. However, this must be counterbalanced by the fact that what remained of the Mata Atlântica rainforest in 1995 was less than 10% of its original cover.

Table 1.2
DEFORESTATION IN THE BRAZILIAN AMAZON, 1989-1999

(In 1.000 ha)

State	Deforested area, 1989/94	Deforested area, 1994/99
Acre	226	307
Amapá	74	23
Amazonas	304	488
Maranhão	368	635
Mato Grosso	2401	3400
Pará	2106	3426
Rondônia	1026	1322
Roraima	136	115
Tocantins	218	214
Brazilian Amazon	6858	9929

Source: Instituto Nacional de Pesquisas Espaciais website (www.inpe.br).

Table 1.3

DEFORESTATION IN MATA ATLÂNTICA, SOUTHEAST AND SOUTH REGIONS, 1985-1995

State	Deforested area, 1985-90 (1000 ha)	Deforested area, 1990-95 (1000 ha)	% of remaining forest relatively to the original cover
Espírito Santo	22	29	10,3%
Rio de Janeiro	165	22	11,0%
Minas Gerais	69	93	3,9%
São Paulo	76	64	9,0%
Paraná	157	79	10,5%
Santa Catarina	106	59	21,4%
Rio Grande do Sul	57	49	6,7%
Total	652	395	n.a.

Source: Fundação SOS Mata Atlântica, Instituto Nacional de Pesquisas Espaciais and Instituto Socioambiental (1998).

The environmental management system is heavily based on a public sector facing a continuous crisis of human and financial resource constraint in spite of the growing demand for more and better actions to protect the environment. Many of the promises taken during the Rio 92 Conference were not fulfilled, and the main message that environmental conservation is crucial for sustainable development has yet to reach the top decision makers in both public and private sectors.

But there are also good news. It is unquestionable that the private sector is changing its attitude towards the environment. The press has chosen the environment as one of the day-by-day issues covered by the news, the public opinion has also become more aware of the need of a better quality of life in all aspects, and politicians are being forced to consider this in the "realpolitik." In other words, there are solid reasons to become optimistic about the future. However, for these changes to take place effectively, the availability of financial resources for environmental improvements is crucial.

The objective of this study is to examine the evolution and characteristics of the financing for the environment in Brazil, in order to identify the advances and retreats after the Rio 92 Conference. Since this study had to be completed in a very short period of time, the main priority was to identify the resource flows from the federal government, carried out in section 2. Section 3 deals with data from the 1996-98 IBGE study on state and municipal public spending, and longer time series for selected states. Section 4 emphasizes the role of private sector in the adoption of environmental investments. Section 5 presents two case studies of private sources of funding for environmental projects. Finally, section 7 presents the main conclusions of the study.

II. Federal government expenditures

2.1 Methodological issues

Brazil has a decentralized administration, composed of three independent levels (federal, state, and *municipios*). The federal government is the single most important agent conducting official environmental programmes. For this reason, and because of the methodological differences in the budgets for every Brazilian state that would require more time and effort than the ones available for this study, we decided to focus on the environmental expenditures of the federal government. We strongly recommend a more long-term study, in the same lines as this one, in order to provide a better view of the environmental expenditures in the state and municipal levels.

However, despite the relative centralization of data concerning the federal government, tracking these expenditures is not an easy task. First of all, it is very difficult to build up a methodologically consistent time series for the environmental expenditures of the Brazilian federal government because of the many changes in the administrative system and in the budgetary procedures during the 1993/2001 period. For the purpose of this study, it was better to divide the whole period in two different stages: 1993/99 and 2000/01.

Regarding the 1993/99 period, the most disaggregate level of information can be obtained by the “sub programmes” classification of the federal government. Under this classification, one activity can be classified as “environmental” if the sub programme it belongs to has

an environmentally related goal, even though the specific nature of the activity is not directly related to an environmental procedure. The following sub programmes were considered as “environmental activities:”

Table 2.1
SUB PROGRAMMES CONSIDERED AS
ENVIRONMENTAL ACTIVITIES, 1993-1999

Sub programme code	Sub programme name
0059	Environmental inventories/surveys
0103	Fauna and flora protection
0104	Reforestation
0105	Soil conservation
0106	Botanic gardens and zoos
0296	Hydrological studies
0448	Sanitation (general)
0456	Pollution control ¹

Source: Author's elaboration.

¹ This includes nuclear security, disposal and management of radioactive residuals, environmental control of mining activities, control of fires in forest areas, and measures to control air and water pollution.

The “Pluriannual” Plan, presented in 1999 for the 2000-2003 period, introduced important changes in the methodology of the budget. Since then, the classification of environmental activities can be directly associated to the sub functions presented in the budget. This is an advantage, since expenditures are directly connected to their immediate objective, thus allowing the consideration of environmental activities in programmes that are not directly targeted to environmental objectives. Table 2.2. presents the list of the sub functions that were considered as environmental activities in this study.

Table 2.2
SUB FUNCTIONS CONSIDERED AS ENVIRONMENTAL ACTIVITIES, 2000-2001

Sub function code	Sub function name
511	Basic rural sanitation
512	Basic urban sanitation
541	Environmental preservation and conservation
542	Environmental control
543	Recuperation of degraded lands
544	Water resources

Source: Author's elaboration.

Using these classifications, it was also possible to identify the expenditures of environmentally related activities taken outside the Ministry for the Environment for the 1993/2001 period. These include expenditures taken in the following Ministries:

- Agriculture
- Planning, Budget and Public Administration
- Defense
- Mines and Energy
- Transportation

- Science and Technology
- Education
- National Integration
- Health
- Development, Industry and Foreign Trade
- Presidency of the Republic

The analysis of the expenditures of the Ministry for the Environment (MMA) is complicated because of the changes in its structure, with the inclusion/exclusion of many different areas. The most important alteration occurred in the 1995/1999 period, when the Ministry of the Environment became also responsible for the management of water resources, including the federal programmes for irrigation (sub programme 0077) and water supply (sub programme 0447). In order to allow for methodological consistency in the series, these expenditures were not considered in the analysis. All the remaining sub programmes of the agencies listed below were included in the analysis:

- Direct administration/MMA
- Brazilian Institute for the Environment and Renewable Resources (IBAMA)
- National Environmental Fund (FNMA)
- National Water Agency (ANA)

This problem of separating water supply from sanitation is a major methodological issue for state data as well, since they are traditionally treated together in administrative terms. Almost all of the companies responsible for these services are state-owned (or recently privatized) and the budgetary information cannot be easily disaggregated between both functions.

Another problem is that the Ministry includes under its structure some regional development agencies that are not directly related to environmental protection. For this reason, the agencies listed below were excluded from the analysis:

- National Department for Drought Emergencies (DNOCS)
- São Francisco Valley Company Development Company (CODEVASF)
- Barcarena Development Company

These agencies' areas of action are mostly concentrated in the Northeast region. Since it is possible that part of the environmental expenditures are "hidden" in other categories of expenditure by these institutions, the final outcome may result in the underestimation of the environmental expenditures in the Northeast region.

It is very important to differentiate the "authorized expenditures," which refer to the forecasts of expenditures that are allocated in the budget, from the expenditures that effectively took place ("valores liquidados," in the official terminology). It was possible to obtain consistent series for both categories for the federal government, and there could be considerable differences between the two series.

The year average of the general price index for domestic goods (IGP-DI), estimated by the Getúlio Vargas Foundation, was used to produce time series with constant prices. It was obtained through the arithmetic average of the month indices, and for 2001 a forecast of 7,94% was used for the year inflation. Table 2.3 presents the price deflators used to achieve constant price series. It is important to point out that the first years of the series (1993-1994) were of very high inflation, which distorts the results of the deflation procedures if the expenditures are not evenly distributed among the year - most budget disbursements for public investment tend to be concentrated in the second half of the year.

Table 2.3
PRICE DEFLATORS (BASED ON THE IGP/FGV)

Year	1993 ¹	1994	1995	1996	1997	1998	1999	2000	2001
Deflator	0,022186	2,743621	1,718562	1,547134	1,434586	1,38616	1,245015	1,094422	1

Source: Author's elaboration.

¹ Currency at the time: cruzeiros.

Finally, note that the total of federal government expenditures used for the percentage calculations includes the entire debt roll over executed in that year. Given the short maturity of Brazilian internal debt, this inflates the amount included in the budget, reducing the ratio of non-financial expenditures compared to the total expenditures. Another practice in the Brazilian government that was respected in this paper is to include the cost of loans on the budget of the main user of these funds, as well as to include pensions to retired public servants in the budget of the Ministry he/she belonged to, and not to a general retirement account. The main reason for doing so is to present the total financial burden faced by environmental protection agencies. However, whenever possible, data is presented per category of spending, allowing flexibility to the reader to regroup the spending categories according to his/her desire.³

2.2 Analysis of federal government budget and expenditures in the 1992-2000 period

Table 2.4 presents the data of the authorized environmental expenditures in the 1993/2001 period, while table 2.5 shows the effective environmental expenditures (in 1993 and 1994 only the expenditures of the MMA were considered). It is clear that the proportion of these expenditures compared to the total federal expenditures is extremely low, showing that the amount destined to environmental disbursements has barely followed the overall spending of the federal government.

Table 2.4
AUTHORIZED EXPENDITURES IN ENVIRONMENTAL ACTIVITIES IN THE FEDERAL BUDGET
(In R\$ 1.000, average prices of 2001)

Year	A. Direct Administration	B. IBAMA	C. FNMA	D. ANA ¹	E. Total MMA (A+B+C+D)	F. Other Ministries	G. Total (E+F)	% of Federal Budget
1993	147.459	587.453	16.435		751.346	913.877	1.665.223	0,5%
1994	375.058	409.876	22.158		807.092	956.520	1.763.612	0,4%
1995	376.497	609.881	19.634		1.006.012	954.555	1.960.567	0,7%
1996	544.903	537.838	16.181		1.098.921	54.449	1.153.370	0,5%
1997	526.745	546.971	14.346		1.088.062	77.028	1.165.090	0,4%
1998	688.635	560.613	20.104		1.269.352	36.207	1.305.560	0,4%
1999	418.005	483.823	9.786		911.614	50.662	962.276	0,3%
2000	361.233	585.842	29.861		976.937	1.001.132	1.978.068	0,7%
2001	355.767	562.085	46.200	243.291	1.207.343	2.639.219	3.846.562	1,4%

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

¹ ANA was created in 2000.

³ In the IBGE (2001) study for the 1996-98 period, summarised in section 2.3, the expenditures with pensions, interests and amortisation were excluded from the government functions and added to the central administration. These spending categories have to be excluded from the tables presented in section 2.2 in order to allow the comparison of results from these two sections.

Table 2.5
EFFECTIVE EXPENDITURES IN ENVIRONMENTAL ACTIVITIES IN THE FEDERAL BUDGET
(In R\$ 1.000, average prices of 2001)

Year	A. Direct Administration	B. IBAMA	C. FNMA	E. Total MMA (A+B+C)	F. Other Ministries	G. Total (E+F)	% of Federal Budget
1993	38.410	414.858	9.671	462.939			
1994	132.137	360.942	10.022	503.100			
1995	113.254	516.420	12.272	641.946	29.549	671.494	0,3%
1996	311.180	474.489	12.884	798.553	42.241	840.795	0,4%
1997	372.430	469.212	9.791	851.433	60.658	912.091	0,4%
1998	492.516	478.521	4.799	975.836	29.652	1.005.488	0,4%
1999	356.283	430.652	5.595	792.529	42.764	835.293	0,3%
2000	247.926	459.122	13.671	720.719	577.971	1.298.690	0,5%

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

At first sight, table 2.4 suggests an upgrade of the authorized expenditures from around 0.5% to 1.4% of the total budget. This is due to the methodological changes for the 2000 and 2001 budgets, when the category used for building up the time series was the sub functions instead of sub programmes, thus allowing the inclusion of environmentally related expenditures in programmes that are not directly targeted towards environmental goals. Therefore, examining the performance of the effective expenditures, the percentage over the total has not exceeded 0.5% and the average between 2000/1 (0.4%) is basically the same as in the previous period.

There is a consistent difference in the proportion of authorized and effective expenditures relatively to their totals: the former is always higher than the latter in a proportion oscillating between 62% and 86%. The analysis of the type of expenditure that was authorized but did not become effective shows that the probability of this happening with investments is much higher than with financial or personnel payments. The consequence is that the share of end-activities in the total spending is reduced, while a higher proportion of resources is allocated to mean-activities.

The situation has worsened after the adjustment measures agreed with the International Monetary Fund (IMF) after the exchange rate crisis in early 1999. The need to generate huge primary fiscal surpluses (i.e., excluding the payment of interests from the public debt) has resulted in constant pressures to reduce public spending, and the federal government has concentrated the financial cutback on public investments reaching different areas such as environmental, infrastructure, defense and social programmes (for a detailed analysis of the federal public spending in recent years see Viana Jr. *et alli* 2000, and Melo 2001). However, even primary surpluses of more than 3% of GDP are not sufficient to pay all financial expenditures related to the debt, meaning that the government has to look for new loans, creating a vicious cycle of indebtedness. If payments related to the public debt are not honored, the situation may worsen considerably because it would certainly reduce even further the capacity of funding of the government. Since most current expenditures are also fixed by previous contracts (pensions, wages), the only “free” category of spending is public investment, and therefore it is the one that suffers the most with the worsening of the fiscal scenario.

Another problem is that public investments tend to be concentrated in the second semester of the year, when the Treasury authorities are more confident on revenue estimates. This form of budget management creates problems and inefficiencies for public investments in general because it hampers good planning and eliminates positive externalities from continuous long term actions, such as those required in environmental and other social programmes.

Therefore, in spite of the increases in authorized environmental expenditures in the federal budget, the aggregate level of effective payments remains basically the same as in the early nineties. This shows that the commitment to sustainable development assumed by the Brazilian government has not been reflected in more resource allocation towards environmental (and social) objectives, particularly in the late 1990s and early 2000s.

The problem of financial restrictions for environmental purposes is better understood if the expenditures presented above are classified as current expenditures (including payments to employees and interests) or capital expenses (including investments and amortization). Tables 2.6 and 2.7 present the data for the effective spending of MMA (direct administration, IBAMA and FNMA) in the 1993/2000 period.

Table 2.6
EFFECTIVE ENVIRONMENTAL EXPENDITURES (MMA) ACCORDING TO THEIR NATURE
(In R\$ 1.000, average prices of 2001)

Year	1993	1994	1995	1996	1997	1998	1999	2000
MMA total	462.939	513.011	641.946	798.553	851.433	975.836	792.529	720.757
Current expenses	350.403	446.911	574.056	591.159	598.883	614.945	600.614	557.814
Personnel	184.255	255.088	382.435	355.327	329.409	331.584	325.575	283.048
Interests	5.317	8.086	9.081	9.361	25.265	23.920	36.756	16.863
Other current expenses	160.830	183.738	182.541	226.471	244.209	259.441	238.282	257.903
Capital expenses	112.537	66.100	67.889	207.394	252.551	360.891	191.915	162.943
Investment	72.157	51.596	44.882	173.128	171.884	281.570	72.349	125.914
Financial outlays	35.491	5.272	4.207	12.932	2.595	-	10.724	12.344
Amortization	4.888	7.878	18.800	21.334	75.918	79.321	108.842	24.686
Other capital expenses	-	1.354	-	-	2.154	-	-	-
Direct administration	38.410	132.137	113.254	311.180	372.430	492.516	356.283	247.926
Current expenses	27.675	83.953	72.358	132.482	139.137	149.299	181.589	139.621
Personnel	2.075	3.238	7.046	9.089	11.552	13.935	14.277	14.566
Interest	5.317	8.086	9.081	9.361	25.265	23.920	36.756	16.825
Other current expenses	20.283	72.629	56.232	114.033	102.320	111.443	130.556	108.231
Capital expenses	10.735	48.184	40.896	178.698	233.293	343.218	174.693	108.304
Investment	5.825	38.949	22.004	157.364	157.375	263.897	65.851	83.742
Financial outlay	22	3	92	-	-	-	-	-
Amortization	4.888	7.878	18.800	21.334	75.918	79.321	108.842	24.562
Other capital expenses	-	1.354	-	-	-	-	-	-
IBAMA	414.858	370.853	516.420	474.489	469.212	478.521	430.652	459.160
Current expenses	315.737	355.257	493.034	448.890	451.034	461.874	414.055	408.884
Personnel	182.180	251.849	375.389	346.238	317.857	317.649	311.298	268.482
Interest	-	-	-	-	-	-	-	38
Other current expenses	133.557	103.408	117.645	102.651	133.178	144.225	102.756	140.363
Capital expenses	99.122	15.596	23.386	25.599	18.177	16.647	16.597	50.276
Investment	63.652	10.326	19.271	12.667	13.429	16.647	5.873	37.809
Financial outlay	35.469	5.269	4.115	12.932	2.595	-	10.724	12.344
Amortization	-	-	-	-	-	-	-	123
Other capital expenses	-	-	-	-	2.154	-	-	-
FNMA	9.671	10.022	12.272	12.884	9.791	4.799	5.595	13.671
Current expenses	6.991	7.701	8.665	9.787	8.711	3.773	4.970	9.309
Other current expenses	6.991	7.701	8.665	9.787	8.711	3.773	4.970	9.309
Capital expenses	2.680	2.320	3.607	3.097	1.080	1.026	624	4.363
Investment	2.680	2.320	3.607	3.097	1.080	1.026	624	4.363

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

Table 2.7
ENVIRONMENTAL EXPENDITURES (MMA) ACCORDING TO THEIR NATURE
(In %)

Year	1993	1994	1995	1996	1997	1998	1999	2000
MMA total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Current expenses	75,7	87,1	89,4	74,0	70,3	63,0	75,8	77,4
Personnel	39,8	49,7	59,6	44,5	38,7	34,0	41,1	39,3
Interest	1,1	1,6	1,4	1,2	3,0	2,5	4,6	2,3
Other current expenses	34,7	35,8	28,4	28,4	28,7	26,6	30,1	35,8
Capital expenses	24,3	12,9	10,6	26,0	29,7	37,0	24,2	22,6
Investment	15,6	10,1	7,0	21,7	20,2	28,9	9,1	17,5
Financial outlay	7,7	1,0	0,7	1,6	0,3	0,0	1,4	1,7
Amortization	1,1	1,5	2,9	2,7	8,9	8,1	13,7	3,4
Other capital expenses	0,0	0,3	0,0	0,0	0,3	0,0	0,0	0,0
Direct administration	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Current expenses	72,1	63,5	63,9	42,6	37,4	30,3	51,0	56,3
Personnel	5,4	2,5	6,2	2,9	3,1	2,8	4,0	5,9
Interest	13,8	6,1	8,0	3,0	6,8	4,9	10,3	6,8
Other current expenses	52,8	55,0	49,7	36,6	27,5	22,6	36,6	43,7
Capital expenses	27,9	36,5	36,1	57,4	62,6	69,7	49,0	43,7
Investment	15,2	29,5	19,4	50,6	42,3	53,6	18,5	33,8
Financial outlay	0,1	0,0	0,1	0,0	0,0	0,0	0,0	0,0
Amortization	12,7	6,0	16,6	6,9	20,4	16,1	30,5	9,9
Other capital expenses	0,0	1,0	0,0	0,0	0,0	0,0	0,0	0,0
IBAMA	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Current expenses	76,1	95,8	95,5	94,6	96,1	96,5	96,1	89,1
Personnel	43,9	67,9	72,7	73,0	67,7	66,4	72,3	58,5
Interest	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Other current expenses	32,2	27,9	22,8	21,6	28,4	30,1	23,9	30,6
Capital expenses	23,9	4,2	4,5	5,4	3,9	3,5	3,9	10,9
Investment	15,3	2,8	3,7	2,7	2,9	3,5	1,4	8,2
Financial outlay	8,5	1,4	0,8	2,7	0,6	0,0	2,5	2,7
Amortization	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Other capital expenses	0,0	0,0	0,0	0,0	0,5	0,0	0,0	0,0
FNMA	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Current expenses	72,3	76,8	70,6	76,0	89,0	78,6	88,8	68,1
Other current expenses	72,3	76,8	70,6	76,0	89,0	78,6	88,8	68,1
Capital expenses	27,7	23,2	29,4	24,0	11,0	21,4	11,2	31,9
Investment	27,7	23,2	29,4	24,0	11,0	21,4	11,2	31,9

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

Table 2.8 presents the distribution of expenditures according to their area. Due to the methodological changes in the classification of expenditures, it is not possible to compare these values to previous figures.

The tables above show that administrative costs, payments to the social security system, financial operations (interests and amortization) and other “mean-activities” consume a considerable share of the resources originally allocated to environmental expenditures. This means that the allocation of resources to the assignment of environmental objectives “in the field” is considerably lower than the one expressed in tables 2.4 and 2.5. As discussed in the previous section, this is a consequence of the Brazilian practice to include these accounts in the budget of the respective Ministry, instead of the central administration unity of the government, and affects all other government functions (health, education, defense, etc.). There is an important consequence of these accounting procedures: in a period of restraints, the Ministry budget officer has little space to negotiate compensation funds from the Treasury, and because financial and pension payments are relatively rigid components of the budget, the adjustment has to come from more “flexible” components of the budget.

Table 2.8

MMA EXPENDITURES ACCORDING TO THE SUB FUNCTIONS CLASSIFICATION, 2000 BUDGET*(In %)*

Expenditure Sub function	Total MMA		Direct administration		IBAMA		FNMA	
	Authorized	Effective	Authorized	Effective	Authorized	Effective	Authorized	Effective
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
General administration	22,3	29,3	7,6	10,6	32,5	40,2	0,0	0,0
Social security contribution	10,3	14,0	0,3	0,4	17,0	21,7	0,0	0,0
Sanitation	0,6	0,2	1,7	0,6	0,0	0,0	0,0	0,0
Environmental preservation and conservation	31,2	22,0	33,2	33,3	27,5	14,2	77,7	79,8
Environmental control	3,0	3,2	3,4	3,4	2,5	2,9	8,6	9,5
Recuperation of degraded lands	5,8	6,4	0,2	0,3	9,6	9,8	0,0	0,0
Water resources	10,8	9,3	27,6	25,9	0,3	0,3	13,7	10,8
Scientific development & diffusion	0,8	0,8	1,5	1,4	0,4	0,5	0,0	0,0
Tourism	3,0	2,0	5,1	4,5	2,0	0,8	0,0	0,0
Payment of debt services	9,0	9,4	16,8	16,7	4,7	5,8	0,0	0,0
Others	3,1	3,5	2,7	3,0	3,5	3,8	0,0	0,0

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

The problem, therefore, is not the percentage *per se* of these components, but the huge oscillation they induce in other spending categories, particularly public investments. After a declining trend in the 1993/95 period (annual average of R\$ 56 Million), there was a substantial rise in the 1996-1998 period (annual average of R\$ 166 Million). However, after this peak, the effective expenditures on investment declined steadily, almost reaching the same level of the beginning of the period (annual average of R\$ 66 Million).

The spending destined to personnel also presented a “∩” shaped curve, with a steady decline in the end of the period. Indeed, the payments to personnel in 2000 were a little less than three quarters of the payments in 1995. The federal government policy of not conceding general pay rises, associated with the need of reducing the public deficit, reduced considerably the level of real wages paid in the public sector. Another cause of the declining values is the reduction in recruitment opportunities (the personnel category also includes payments to retired servants). Of course this has important consequences in the quality of the services provided by the federal environmental agencies, as well as in the public sector as a whole.

The budget for 2001 forecasts another important increase in investments, but this is due to the recently created National Water Agency (ANA), which will centralize the resources for water management that were dispersed among other Ministries. The high concentration of civil engineering works, such as dams, channels, pipelines, etc., explains why more than half of the authorized expenditures were assigned to investments in 2001. However, it is very likely that only a minor part of these resources will be effectively used, given the current Brazilian fiscal crisis.

It was not possible to identify the regional allocation for most of the expenditures, since around 80% of it was classified as “national.” For the remaining spending that could be classified according to the regions, there is a strong concentration in the North Region (which is entirely in the Amazon and covers almost half of the Brazilian territory) and in the Southeast Region (the most densely populated). Indeed, about 40 % of these expenses were located in the North Region, typically in forest conservation projects. The other three regions (Northeast, Centre-West and South) had a share of the expenditures below their shares of population or territory. This is a consequence of the already referred to concentration of federal government projects in the “green” agenda, while most of urban and pollution issues are left to be dealt by state and local governments.

Table 2.9
REGIONAL DISTRIBUTION OF EXPENDITURES

Region	Area Km ² (R% and % of total)	Population 2000 (R\$ and % of total)	Authorized expenditures 2000 (R\$ and % of total regional expenditures)	Effective expenditures 2000 (R\$ and % of total regional expenditures)	Authorized expenditures 2001 (R\$ and % of total regional expenditures)
National expenditures	8.547.403 (100%)	169.544.443 (100%)	779.884.381	599.467.611	940.055.336
North Region	3.869.638 (45.3%)	12.919.949 (7.6%)	79.018.848 (40.1%)	46.870.974 (38.6%)	130.206.098 (48.7%)
Northeast Region	1.561.778 (18.3%)	47.679.381 (28.1%)	19.404.099 (9.8%)	18.117.057 (14.9%)	42.983.237 (16.1%)
Centre-West Region	1.612.077 (18.9%)	11.611.491 (6.8%)	27.319.031 (13.9%)	2.581.509 (2.1%)	30.627.207 (11.5%)
Southeast Region	927.286 (10.9%)	72.262.411 (42.6%)	64.382.647 (32.7%)	50.130.324 (41.3%)	44.808.717 (16.8%)
South	577.214 (6.8%)	25.071.211 (14.8%)	6.927.690 (3.5%)	3.589.704 (3.0%)	18.662.332 (7.0%)
Brazil	8.547.404	169.544.443	976.936.695	720.757.180	1.207.342.927

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

2.3 Results from the IBGE study

In December 2001, IBGE published a document analyzing public expenditure in Brazil in the period 1996/98.⁴ It presents estimates of public spending according to the transaction function for the three levels of government: federal, state and (a sample of) *municípios*. Among the transaction functions, two can be considered as environmental expenditures:

- Environmental protection. This corresponds to the administration, operation and support of departments and agencies responsible for environmental preservation policies (environmental legislation, air and sound pollution control, reforestation programmes and policies, degraded areas monitoring, drought avoidance projects, survey and waste removal in protected conservation areas), and includes all expenditures with training, planning, monitoring, environmental data gathering and research.
- Sanitation. This corresponds to the administration, operation and support of departments and agencies responsible for water supply, sewage collection and all solid waste collection, removal and treatment.

The original information was presented in current prices, and the conversion to constant prices was made using the same deflators as in the previous section. But there are methodological differences in comparison to the procedures described in the previous section. Amortization's, intragovernmental transfers and social security contributions were excluded, but the expenditures related to drought control and development programmes in the São Francisco valley and Barcarena were included. Table 2.10 presents the main results; again, it was not possible to separate water supply from wastewater collection and treatment, and the values presented are an overestimate of the total environmental expenditures.

⁴ The final research report to ECLAC was delivered in October 2001.

Table 2.10

ENVIRONMENTAL EXPENDITURES, FEDERAL GOVERNMENT

	1996	1997	1998
Total expenditures (R\$ 1.000)			
Environmental Protection (A)	887.670	731.176	1.018.071
Sanitation (B)	147.615	483.011	765.867
Total (A+B)	1.035.285	1.214.186	1.783.939
% of total expenditures			
Environmental Protection (A)	0,3%	0,3%	0,3%
Sanitation (B)	0,1%	0,2%	0,2%
Total (A+B)	0,4%	0,5%	0,5%

Source: Own elaboration based on data from IBGE (2001).

Because of the distinct methodological procedures, the results in absolute terms are different from table 2.5. The results in terms of the percentage in the total federal spending are, nevertheless, very similar.

2.4 Federal financial institutions and the “Green Protocol”

The federal financial institutions have an important role as the main source for development projects. In 1995, the federal government launched a new initiative, the Green Protocol, to encourage actions that are in accordance to sustainable development principles. Five federal banks have signed the document, aiming at the full incorporation of environmental variables as criteria in the analysis for credit concession: Banco Nacional para o Desenvolvimento Econômico e Social (BNDES), Banco do Brasil (BB), Caixa Econômica Federal (CAIXA), Banco do Nordeste do Brasil (BNB) and Banco da Amazônia (BASA). The idea was to go beyond the environmental requirements imposed in the Brazilian legislation and the National Environmental Council (CONAMA), promoting environmental principles at all operational levels of the federal financial institutions. This would require that these institutions would follow a series of guidelines:

- Existence of a specialized environmental department/unit inside the financial institution, that is actively connected with the other operational areas.
- Frequent programmes of human resources qualification and training on environmental issues.
- Obligatory enforcement of the environmental legislation, including the dissemination of information to customers.
- Introduction of environmentally related criteria for the concession of loans (such as eco-certification) that go beyond the licensing procedures already established in the legislation.
- Existence of adequate tools for the evaluation of environmental risks in the projects analyzed.
- Creation of specific credit lines for projects oriented to the environment, with special conditions (lower interest rates, longer payment periods, etc.)

However, the application of these principles has been very heterogeneous among the financial institutions involved.

The BNDES is the most important credit agent for investments in the productive sector, and a pioneer in the consideration of environmental variables in project analysis. Its first environmental unit was created in 1989, and in the 1989/1999 period the BNDES provided a total credit of

US\$ 5 billion to environmental investments (6% of the total investments funded by the Bank in the same period).⁵

Among these projects, some were destined to revert the environmental liabilities of the following productive sectors:

- Iron and steel industries (total lending of US\$ 158 million)
- Petrochemical (US\$ 51 million) and chemical (US\$ 23 million) industries
- Service stations (US\$ 6 million)
- Recuperation of altered lands (US\$ 10 million)
- Integrated environmental control of the Camaçari Petrochemical Pole (US\$ 33 million)
- Integrated environmental control of the Santa Catarina Textile Pole (US\$ 5 million)

The improvement of the environmental quality in urban and rural areas was another field of action. BNDES has provided around US\$ 600 million in credit lines to private pollution control initiatives, including critical regions such as the metropolitan regions of São Paulo (environmental recuperation of the Tietê river), Rio de Janeiro (Guanabara Bay Pollution Control Programme), Belo Horizonte and Porto Alegre (environmental recuperation of the Guaíba Estuary).

Lending to companies responsible for sanitation and waste collection programmes -most of them state-owned-, is another area of action. In the period 1996/2000, BNDES funded R\$ 718 million in sanitation projects. Adding up the other funding sources of these projects (mainly the FGTS, a fund created with resources from compulsory contributions from the private sector employees, and loans from international development agencies), plus those that are under analysis or in the contract stage, the total amount destined to sanitation projects reaches an estimate of R\$ 2.5 billion.⁶

Indeed, the estimate of investments in sanitation projects in 2001 exceeds R\$ 1.3 billion, the expected investment in the sanitation companies owned by four states (*Gazeta Mercantil*, 9 July 2001, p. A-7). According to the Association of Water and Sanitation Services Concessionaires (ABCON), the privatized companies expect to invest another R\$ 225 million, almost doubling the investment in 2000.

Table 2.11
INVESTMENT IN SANITATION
(In R\$ million)

	2000	2001
SABESP (São Paulo state)	620	700
SANEPAR (Paraná state)	217	250
COPASA (Minas Gerais state)	110	204
EMBASA (Bahia state)	170	170
Private companies	110	225

Source: *Gazeta Mercantil*, based on interviews with the companies.

However, there remains a huge deficit of resources to definitively solve the sanitation problem: the estimate of specialists is that US\$ 38 billions will be required until 2010 in order to achieve the targets of covering 98% of the households with proper water supply services, and to treat 65% of the water effluents.

⁵ Information provided in the document "O BNDES e o Meio Ambiente," available at the BNDES website (<http://www.bndes.gov.br/apresent/ambient2.htm>).

⁶ Information provided in the document "Carteira de projetos de saneamento já tem R\$ 718 milhões em financiamentos," available at the BNDES website (<http://www.bndes.gov.br/noticias/not367.htm>).

Another area that is receiving more attention from BNDES is recycling. In 2000, the disbursement to industrial recycling projects were R\$ 3 million, with the same forecast for 2001.

The operational routine of BNDES requires that, after the disbursement of the loan, there is a follow-up to verify if the environmental profile of the project is adequate. If the bank is informed that the borrower has been charged for infringing the environmental legislation, it starts a verifying process that may result in the suspension of the loan. Similar requirements are taken when the bank uses other financial institutions as intermediate agents in the process of conceding resources.

The other federal banks have less experience in the incorporation of environmental objectives in their practices. Banco do Brasil (BB) is the most important institution for the concession of agricultural credit, and is also a major player in the concession of other types of funding to business activities. The Green Protocol was the first moment when the bank become involved with environmental objectives. It does not have a specialized environmental unit, but has at least one environmental specialist in each unit of the Bank. In general terms, the most important environmental practice at the moment is the requirement that the legislation is being enforced (for example, it requires the presentation of the environmental licenses for the concession of loans) but some specific environmental programmes have recently started with specific credit lines - for example, the organic agriculture programme, started in 1999, that provides special conditions for the conversion from conventional to organic agricultural practices, or the "Pró-Natureza", that look for projects of conservation of water resources, renewable energy, and other activities that may result in positive consequences for the environment.

The actions of Caixa Econômica Federal are in the housing, sanitation and other urban development areas. It does not have a specialized environmental unit, but there are specific criteria for the environmental aspects of the project. As in the case of BB, the approval of loan requires the presentation of the respective environmental licenses and, depending on the dimension and characteristics of the project, the environmental authorities are consulted. There are also special credit lines for sanitation and waste collection and disposal projects.

The Banco do Nordeste do Brasil (BNB) and the Banco da Amazônia (BASA) are regional development banks that are mostly responsible for the application of special Constitutional funds to development projects in the Northeast and North regions, respectively. The incorporation of environmental variables in their practices is a gradual process, and usually the environmental requirements are those established in the legislation. However, there is a growing number of specific environmental programmes, as well as the elaboration and dissemination of information concerning sustainable practices in rural and urban activities. For example, the BNB has two programmes that are destined to support sustainable business practices, one with incentives to environmental projects in economic activities (FNE Verde) and the other specifically designed to reduce the negative impacts of tourism intensification in the region (Prodetur). Meanwhile, the BASA has credit lines for extractivism and forestry, and has shown growing concern for the incorporation of environmental objectives in the credit lines for agriculture, particularly those destined to family based producers.

2.5 External funding

External funding is a major issue for environmental projects. Tables 2.12 and 2.13 present the evolution of environmentally related effective expenditures of the MMA according to the source of funding. Note that the flow of resources presented a declining trend since 1994, with the exception of the years 1996 and 1998, oscillating between 6% and 17% of the total expenditures. Moreover, most of these resources come from external credit operations (loans), which means that in the long term, they represent an extra pressure of financial expenses in the budget. After

reaching R\$ 30 million in 1996, donations in 2000 were less than half of this value (R\$ 14 million). This means that the proportion of international donations/total expenditures in 2000 fell to the lowest level in the series (2.0%), clearly indicating a decline of the international support for environmental projects in Brazil.

Table 2.12
ENVIRONMENTAL EXPENDITURES ACCORDING TO THE SOURCE OF FUNDING, MMA
(In R\$ 1.000, average prices of 2001)

Year	Total	Domestic resources	External resources	Foreign credit	Donations
1993	462.939	392.041	70.898	n. a.	n. a.
1994	513.011	425.553	87.459	n. a.	n. a.
1995	641.946	577.582	64.363	51.000	13.363
1996	798.553	713.645	84.909	54.650	30.258
1997	851.433	801.626	49.807	27.241	22.566
1998	975.836	884.612	91.224	69.034	22.190
1999	792.529	723.328	69.201	38.116	31.085
2000	720.634	673.557	47.077	32.371	14.706

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

Table 2.13
ENVIRONMENTAL EXPENDITURES ACCORDING TO THE SOURCE OF FUNDING, MMA
(% of the total)

Year	Foreign credit	Donations	Total
1995	7,9	2,1	10,0
1996	6,8	3,8	10,6
1997	3,2	2,7	5,8
1998	7,1	2,3	9,3
1999	4,8	3,9	8,7
2000	4,5	2,0	6,5

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

Another important feature of the external funding is that most of the resources are directed to current expenditures. Table 2.14 shows the amount of resources from external credit and donations to each area of the MMA, according to the type of expenditure. Most of the foreign resources were directed to current expenditures, and there was a declining trend in the share of the resources destined to investments: in 2000, only 18% of the foreign resources were spent in investments.

Despite this declining trend of foreign resources destined to environmental expenditures, environmental projects remain one of the most important categories for attracting external resources from international cooperation. According to the Brazilian Agency for Cooperation (ABC), the annual amount of resources that are donated to Brazil through bilateral cooperation agreements is around US\$ 92 million. According to the ABC website (www.abc.mre.gov.br), the main donor country is Japan, which provided US\$ 53.0 million in 2000 (57% of the total), followed by Germany (US\$ 12.7 million), United Kingdom (US\$ 9.5 million) and France (US\$ 9.0 million). In June 2001, ongoing environmentally related projects were responsible for 41% of the total

bilateral cooperation projects under the supervision of ABC, showing the concern of donors with the environment.⁷

Table 2.14
EXTERNAL RESOURCES DESTINED TO ENVIRONMENTAL EXPENDITURES
ACCORDING TO THE TYPE OF SPENDING, MMA
(In R\$ 1.000, average prices of 2001)

Year	Current expenditures			Investments		
	Foreign credit (A)	Donations (B)	(A+B)/total external resources	Foreign credit (C)	Donations (D)	(C+D)/total external resources
1995	29.573.804	5.561.037	54,6%	7.802.188	21.426.332	45,4%
1996	27.903.633	18.061.199	54,1%	12.197.285	26.746.499	45,9%
1997	15.627.849	16.219.168	63,9%	6.346.912	11.613.262	36,1%
1998	17.552.149	10.725.129	31,0%	11.464.456	51.481.821	69,0%
1999	17.326.432	24.532.119	60,5%	6.553.128	20.789.702	39,5%
2000	25.592.652	12.885.186	81,7%	1.821.215	6.777.909	18,3%

Source: Own elaboration based on data from the Federal Government Financial Administration System (SIAFI).

The volume of resources from multilateral cooperation agreements (i.e., with funding from more than one donor country) is considerably higher, having reached US\$ 418.6 million in 2000 (ABC 2000). Although a similar statistic of distribution of the resource according to the project area was not available, there is a significant presence of environmental projects in multilateral cooperation. On the other hand, it is important to highlight that a considerable part of these resources were transferred from the Brazilian government, which uses these multilateral agencies to hire staff as consultants without the bureaucratic problems and costs associated with the admission of new civil servants. This dependence on “consultants” with high turnover rates, associated with the instability in the higher ranks of the government caused by political changes (when top positions are included in the bargaining process), makes long term planning nearly impossible for these agencies. Secretaries and departments appear and disappear frequently, and the reallocation of functions between the newly created institutions usually takes a considerable amount of time, with damaging consequences for the continuity and stability of the policies.

This does not mean that external resources are not needed to enhance sustainable development practices in Brazil. A good example of a successful experience is the Pilot Programme to Conserve the Brazilian Rain Forest (PPG7), the most important programme in terms of external funding. The PPG7 started in 1992 with an initial donation of US\$ 250 million, plus a ten percent counterpart of the Brazilian government. In May 2001, the total funds available to the Programme reached US\$ 330 million, a 20% increase over the original size. According to the 2001 Annual Financial Report of the Programme (World Bank 2001), from these US\$ 330 million, US\$ 218 have already been contracted, US\$ 72 million were firmly committed and the remaining US\$ 40 million have been indicated without a specific firm commitment or remains uncommitted in the

⁷ Note that this number is not compatible to the figures provided in tables 2.11 and 2.13. This can be explained because the classification of ABC is much wider than the strict definition of environmental activities adopted in the analysis of the budget, they refer to expenditures in all Ministries, not only the MMA, and the value on environmental projects identified by ABC also includes expenditures made by counterparts (multilateral and bilateral) and may include project components financed by other sources (NGOs, private sector, etc.).

Rain Forest Trust Fund (RFT).⁸ Table 2.15 shows the contribution of each individual country to PPG7.

Table 2.15
CONTRIBUTION TO PPG7, MAY 2001
(US\$ million)

Source	To RFT	Projects Contracted	Projects Committed	Projects Indicated	Total
Germany	19.35	77.36	33.74	16.69	147.15
European Union	14.05	37.19	12.52	-	63.76
United Kingdom	2.32	17.81	2.15	0.72	23.00
United States	6.25	3.00	1.10	9.15	19.50
Netherlands	4.88	0.50	3.63	-	9.02
Japan	6.80	0.49	-	-	7.29
Italy	3.85	-	-	-	3.85
France	-	1.36	-	-	1.36
Canada	0.74	-	-	-	0.74
Subtotal Foreign	58.25	137.71	53.15	26.56	275.67
Brazil – Government	-	26.58	11.87	4.03	42.47
Brazil – Communities	-	8.90	-	2.56	11.46
Subtotal Brazilian	-	35.48	11.87	6.58	53.93
Total	58.25	173.19	65.02	33.14	329.60

Source: World Bank (2001).

The PPG7 is specialized in sustainable development projects in the rain forests of the Amazon and Mata Atlântica ecosystems. It is divided into sub programmes that cover all aspects related to the conservation agenda, including social and economic aspects of stakeholders. Despite bureaucratic problems, such as the dependence on Federal Congress approval for the implementation of the projects and the excessive pressure on the executors in terms of filling activity reports, the overall evaluation is positive, and there is an increasing demand for PPG7 to expand its activities in the Mata Atlântica and to start projects in urban areas. However, the continuity of the Programme is largely dependent on a new round of donations, since only the RFT is financially sustainable.

2.6 Gaps in the analysis

One important point that has not been considered is the effort of environmental research in the budget for science and technology. We recommend future work in the analysis of the share of environmental issues in the concession of scholarships and research grants by the federal government agencies-CNPq, from the Ministry of Science and Technology, and CAPES, from the Ministry of Education. This could be done with a specific research that would analyze the education disbursements according to the subject field (for example, estimating the number of research projects, M.Sc. and Ph.D. dissertations, and teaching activities in environmental subjects).

⁸ The RFT was established in March 1992 by the World Bank and through funding from eight donors (Canada, the European Union, Germany, Italy, Japan, the Netherlands, the United Kingdom and the United States) with the objectives of co-financing the projects under the PPG7, including administrative expenses, support activities and pre-investment work (World Bank 2001). Only the interests and other financial gains obtained from the fund are available to projects, in a way that is sustainable in economic terms.

A second point that deserves attention is classifying the transfer of resources to states and *municípios* by functions or programmes. This procedure is complex and requires a patient analysis of the effective destination of the resources. Again, a specific research on the estimates of transfers to states and *municípios* according to the activity area is highly recommended.

Finally, there was no attempt to discuss the issue of economic instruments in the federal government. The main reason for this is that two previous studies were recently carried out on the subject and published by ECLAC (Gusmão 2000, Seroa da Motta 2001).

III. Analysis of the public budget in states and municipalities (municipios)

Every state in the Brazilian Union decides autonomously its annual budget, which needs the approval of each state's legislative assembly. After the fiscal year ends, the government accounts are submitted to the state account tribunals, which are empowered to approve or disapprove the state executive financial activities, independently of the federal government. Because of this autonomy, every state has its own methodological procedures on the analysis of public budgets and expenditures.

Aggregate values become available for the 1996/98 after the publication of IBGE (2001). For a longer time series, given the limited time and resources and the already mentioned focus on the federal government activities, this study will consider only the budget information (authorized expenditures) for some of the most advanced states in environmental control practices (São Paulo, Paraná and Rio Grande do Sul).

The IBGE (2001) study has shown that, altogether, state expenditures on environmental protection and sanitation are higher than the federal spending on the same issues. It is not a surprising result since it is state agencies who are mainly responsible for pollution control activities and for a considerable share of protected areas. Therefore, we strongly recommend a lengthier study, in the same lines as this one, in order to provide a better view of the environmental expenditures in the state and municipal levels.

3.1 Aggregate results 1996-1998

Table 3.1 summarizes the information on current and financial expenditures for the 26 Brazilian states and the Federal District from IBGE (2001). They present an increasing trend of spending, from 1.4% to 1.9% of the total state governments' spending. However, the time series is too short to conclude whether this is a sustainable trend or not; the evidence from the three case studies in the following sections show no clear long term ascending trend of environmental expenditures as proportion of the total state public spending.

Other important features are that sanitation is equally important as environmental protection in the total spending, but presents a higher proportion of investments (most of sanitation infrastructure investment is carried out by private companies hired by the state). This contrasts with the federal environmental spending, more concentrated on environmental protection activities. As already referred to, the impossibility of separating expenditures on solid waste and wastewater collection and treatment from water supply impedes a better understanding of the real efforts on pollution control.

Table 3.1
ENVIRONMENTAL EXPENDITURES, STATE GOVERNMENTS

	1996	1997	1998
Total expenditures (R\$ 1.000)			
Environmental Protection (A)	864.979	809.637	1.562.009
Current expenses	534.125	439.270	721.761
Investment	154.461	197.411	465.254
Sanitation (B)	850.568	1.295.024	1.485.512
Current expenses	269.156	262.499	164.550
Investment	208.373	221.681	284.353
Total (A+B)	1.715.547	2.104.661	3.047.521
Current expenses	803.281	701.769	886.311
Investment	362.834	419.091	749.606
% of total expenditures			
Environmental Protection (A)	0,6%	0,5%	1,0%
Sanitation (B)	0,6%	0,9%	0,9%
Total (A+B)	1,3%	1,4%	1,9%

Source: Own elaboration based on data from IBGE (2001)

3.2 State of São Paulo

The main institutions responsible for environmental management in the State of São Paulo are:

- Secretary for the Environment
- CETESB (state environmental agency)
- Forestry Foundation
- Zoo Park Foundation
- Secretary for Water Resources, Sanitation and Public Works (including the Sanitation Fund – FESAN, and the Water Resources Fund – FEHIDRO)
- SABESP (state water supply and sanitation company)
- Department of Water and Electricity

It should be taken into account that the last three institutions are not responsible for sanitation only, but also for water supply and hydroelectricity. Therefore, considering all the budget of these institutions as destined to sanitation and other environmental objectives would overestimate the total sum of authorized environmental expenditures. In order to deal with this problem, table 3.2 presents two different series of authorized expenditures for the 1996/2001 period. The first one (“Environment without sanitation”) comprises the authorized expenditures for the Secretary for the Environment, CETESB, Forestry Foundation and Zoo Park Foundation and is a lower boundary for the total environmental expenditures of the State of São Paulo. The second one (“Environment plus water”) includes the Secretary for Water Resources, Sanitation and Public Works, SABESP and the Department of Water and Electricity, and is an upper boundary for the environmental expenditures.

Table 3.2
AUTHORIZED ENVIRONMENTAL EXPENDITURES IN THE BUDGET
FOR THE STATE OF SÃO PAULO
(In R\$ 1.000 at 2001 prices)

	1996	1997	1998	2000	2001
Total Environment without Water (A)	292.876	292.568	344.003	287.914	247.638
Total Environment plus Water (B)	1.089.560	1.284.387	2.977.279	1.664.285	1.604.277
Total Budget State of São Paulo (C)	48.745.996	35.497.049	50.162.836	42.260.423	43.580.251
(A)/(C)	0,6%	0,8%	0,7%	0,7%	0,6%
(B)/(C)	2,2%	3,6%	5,9%	3,9%	3,7%

Source: Own elaboration based on the budget laws of the State of São Paulo.

Regardless of the chosen methodology, it is clear that the authorized environmental expenditures have declined in absolute terms and in proportion of the total authorized expenditures in the budget since 1998. This is a strong indication that environmental objectives have been receiving less importance and resources from the state government, in a similar way to what has happened in the federal government for the most recent period.

In 1998, the peak on water related investments was caused by the approval of funding for projects on water supply and sewerage systems (collection and treatment), sanitation in the Guarapiranga watershed and depollution of the Tietê river. In the 2000 and 2001 years, the approved funding for projects in these areas have dropped considerably.

As a final comment it has to be noted that the total volume of environmental expenditures in the budget of the State of São Paulo has a close dimension to the federal expenditures. However, given the lack of time, it was not possible to examine the effective expenditures; data for the federal government have shown that the difference between them can become considerable. This is another reason why specific in-depth studies looking at state-level expenditures must be carried out to complement this analysis.

3.3 State of Paraná

The state of Paraná is considered one of the leaders on environmental issues in Brazil. The same Secretary is responsible for environmental protection and water resources management -thus, again, difficulting the separation between environmental control and water supply measures. One interesting characteristic is that since 2000 the state of Paraná has adopted a classification of functions/sub functions similar to the one proposed by the federal government.

Table 3.3 presents the evolution of authorized environmental expenditures in the 1999/2001 period. Table 3.4 presents the distribution of the authorized expenditures per sub-function.

Table 3.3
EVOLUTION OF AUTHORIZED ENVIRONMENT EXPENDITURES, PARANÁ STATE
(In R\$ 1.000 at 2001 prices)

	1999	2000	2001
Environmental expenditures (A)	232.910	361.965	254.684
Sanitation (subtotal)		170.056	95.004
Environmental management (subtotal)		191.909	159.680
Total expenditures (B)	11.784.671	11.339.323	12.249.434
(A)/(B)	2,0%	3,2%	2,1%

Source: Own elaboration based on data from the Secretary of Finance, Paraná State (SEFA).

Table 3.4
DISTRIBUTION OF EXPENDITURES PER FUNCTION/SUB-FUNCTION, PARANÁ STATE, 2001

Function/Sub-function	Authorized expenditure (R\$ 1000)	% over total environmental expenditure
Sanitation (subtotal)	95.004	29,1%
Rural basic sanitation	1.400	0,4%
Urban basic sanitation	93.604	28,6%
Environmental management (subtotal)	159.680	70,9%
Preservation and conservation	96.353	29,5%
Environmental control	27.184	8,3%
Recuperation of degraded lands	30.953	9,5%
Water resources	5.190	1,6%
Technological development and engineering	72.190	22,1%

Source: Own elaboration based on data from SEFA.

Note that the magnitude of the environmental expenditure as a proportion of the state budget is similar to the one observed for São Paulo (around 2 and 3%, including the expenses on water related projects). There was a peak in 2000, but the decline of environmental expenditures observed in the 2001 budget has restored the authorized spending at a similar level to that of 1999.

Another interesting characteristic of the public environmental management in Paraná is the tax allowance for *municípios* with higher proportion of protected areas (“green tax”). This point is discussed in the subsection 3.5.

3.4 State of Rio Grande do Sul

The situation in Rio Grande do Sul is not different from that of the other states. The total allocation for environmental expenditures has not increased during the period, with the possible exception of 2001, when a considerable increase in the allowance of resources has reverted the declining allocation in the 1999/2000 period. Nevertheless, it is important to remember that these are authorized expenditures, which only become effective if the state government decides to.

Table 3.5
AUTHORIZED ENVIRONMENTAL EXPENDITURES IN THE BUDGET
FOR THE STATE OF RIO GRANDE DO SUL
(R\$ 1.000 at 2001 prices)

	1995	1996	1997	1998	1999	2000	2001
Secretary for the Environment (A)	11.883	11.580	8.508	10.327	8.451	10.904	35.343
Zoobothanic Foundation (B)	10.734	9.663	9.979	11.742	10.594	12.376	13.476
Secretary for Public Works and Sanitation (C)	32.281	49.612	25.724	31.939	16.480	12.250	27.013
Total (A+B+C)	54.899	70.856	44.211	54.008	35.525	35.531	75.833

Source: Own elaboration based on data from the Secretary of Finance, Rio Grande do Sul.

In proportion to the total budget for the state, the allocation of resources is lower than in other states. It is possible that the total environmentally related expenditures are underestimated, since programmes in other secretaries (such as Organic Agriculture, for example) were not considered. This could have been solved if the state budget data were presented with the same methodological approach as the one used by the federal government (like Paraná State does).

Table 3.6
AUTHORIZED ENVIRONMENTAL EXPENDITURES IN THE BUDGET
FOR THE STATE OF RIO GRANDE DO SUL
(In %)

	1995	1996	1997	1998	1999	2000	2001
Secretary for the Environment (A)	0,1	0,1	0,1	0,1	0,1	0,1	0,3
Zoobothanic Foundation (B)	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Secretary for Public Works and Sanitation (C)	0,3	0,4	0,2	0,2	0,2	0,1	0,2
Total (A+B+C)	0,5	0,5	0,3	0,3	0,4	0,3	0,7

Source: Own elaboration based on data from the Secretary of Finance, Rio Grande do Sul.

3.5 State laws of environmental criteria for tax redistribution among municipalities (“green ICMS”)

The tax on the circulation of goods and services (ICMS) is a VAT-like tax that is collected by the state governments, and part of these revenues has to be redistributed among the *municípios*. Part of this redistribution to the *municípios* (75% of the total) has to follow the criteria established in the federal constitution, but the redistribution of the remaining 25% depends on the decision of each state’s legislative congress. In 1992, the state of Paraná introduced a law directing 5% of the ICMS (around R\$ 40 million per year) to *municípios* in proportion to environmental conservation units and watershed protection areas.

This tax redistribution system has been very effective in encouraging the *municípios* to increase the total protected area in their boundaries, since this would represent a higher budget. For example, the *município* of Morretes was the 203rd in the ranking of tax redistribution before 1992, and after the law it became the 107th, while the *município* of Antonina moved from the 191st to the 84th position. Another indication that the law has been successful is that the number of *municípios* that are considered eligible for the benefit increased from 112 in 1992 to 192 in 1998 (Veiga Neto 2000).

After the experience of Paraná, other states (São Paulo, Rio Grande do Sul and Minas Gerais) have approved laws with similar objectives, and their introduction is under negotiation in the states of Santa Catarina, Bahia, Espírito Santo, Mato Grosso, Mato Grosso do Sul, Ceará and

Rio de Janeiro. The Minas Gerais experience is the most interesting one because it has already been implemented with an important innovation: waste collection and basic sanitation indicators became part of the environmental criteria for the reallocation of ICMS among *municípios*. These two criteria alone were responsible for the transfer of R\$ 18 million to *municípios* from the beginning of the programme (end of 1995) until June 2000.

3.6 Municipal expenditures

Table 3.7 summarizes the data from the sample of *municípios* considered in the analysis by IBGE (2001), showing that the relative importance of sanitation expenses is considerably higher than for states and the federal government, while the spending on environmental protection reaches a very similar proportion. This indicates that environmental issues are relatively more important to local governments, particularly those concerning solid waste and wastewater. However, despite that the number of *municípios* has increased in the sample considered for every year (27 state capitals plus 151 *municípios* in 1996, 160 in 1997 and 216 in 1998) the spending in absolute terms has declined during the period considered. The same happened to the proportion of environmental expenditures relatively to the total municipal spending (from 10.0% in 1996 to 8.1% in 1998).

Table 3.7
ENVIRONMENTAL EXPENDITURES, MUNICIPAL GOVERNMENTS

	1996	1997	1998
Total expenditures (R\$ 1.000)			
Environmental Protection (A)	162.045	161.523	200.521
Current expenses	58.406	84.895	107.129
Investment	102.009	63.326	85.042
Sanitation (B)	3.850.117	3.335.579	3.490.615
Current expenses	2.486.343	2.325.533	2.893.230
Investment	1.181.583	768.564	557.630
Total (A+B)	4.012.162	3.497.102	3.691.136
Current expenses	2.544.749	2.410.428	3.000.359
Investment	1.283.592	831.889	642.672
% of total expenditures			
Environmental Protection (A)	0,4%	0,4%	0,4%
Sanitation (B)	9,6%	9,2%	7,6%
Total (A+B)	10,0%	9,6%	8,1%

Source: Own elaboration based on data from IBGE (2001).

It is not possible from IBGE (2001) to disaggregate the sanitation costs, but waste collection and disposal activities are the most important environmental issue under the responsibility of the local administration. The município of São Paulo alone has an annual expenditure of around R\$ 500 million, or 6% of its budget, on this issue (Brum and Crivellaro, 2001). Even though there are aggregate estimates of the number of households that have waste collection services and there is an approximate idea of the total amount of waste that is collected everyday (125.000 tons per day, according to IBGE), no numbers are provided for the costs of this activity. A “back of the envelope” exercise can provide a rough estimate of this number. Assuming a collection and disposal cost of R\$ 40/ton, approximately 2/3 of the average cost in the city of São Paulo, the total expenditure in this activity reaches the annual value of R\$ 1,8 billion per year, highly concentrated on the municipal budgets. This is, nevertheless, a very imprecise figure, and we strongly recommend a specific study on the aggregate level of expenditures on this issue.

IV. Environmental expenditures in the private sector

There are no empirical surveys of the private sector expenditures on environmental issues. Interviews with staff members of the Industry Federations of São Paulo and Rio de Janeiro were carried out and both have answered that studies on this issue are being considered for the near future. The only available data refers to recycling, which are detailed in subsection 4.3.

In the absence of direct observations, qualitative indicators were used. For the industrial sector it was possible to use the Survey of Economic Activities in the State of São Paulo (PAEP), detailed in subsection 4.1, and the report on the competitiveness of the Brazilian industry, examined in subsection 4.2. The only data identified for the agriculture sector was the production and consumption of defensives, analyzed in subsection 4.4.

4.1 Empirical evidence of the determinants of environmental expenditures in the private sector

The Survey of Economic Activities in the State of São Paulo (PAEP) was carried out by the SEADE Foundation using data for the year 1996. Questionnaires were sent to 43.900 companies, from all sectors. The answers were voluntary, explaining the difference in the

total of answers in each table. Lustosa (1999) used this data set to examine the perception of environmental issues in the firms' competitiveness.

The questionnaire was divided in chapters, one of them with specific questions about the environmental perception of the firm. One of these questions was whether the firm had invested in changes in the production process for environmental reasons. Table 4.1 presents the results according to the capital ownership and proportion of exports over total sales. The vast majority (82%) declared that in 1996 they had no investments motivated by environmental issues.

Table 4.1

FIRMS WITH INVESTMENTS IN PRODUCTION PROCESSES FOR ENVIRONMENTAL REASONS, 1996

Investment in the production process for environmental reasons	Capital Ownership (in 31/12/1996)			Total
	National	Foreign	National and Foreign	
Yes (A)	7.294	251	92	7.636
A/C (%)	18,2	43,1	35,5	18,7
Exports/revenues (%)	1,54	12,91	8,83	2,00
No (B)	32.674	331	167	33.173
B/C (%)	81,8	56,9	64,5	81,3
Exports/revenues (%)	0,60	6,14	5,53	0,68
Number of Firms (C=A+B)	39.968	582	259	40.809
Exports/revenues (%)	0,77	9,06	6,69	0,93

Source: Lustosa (1999).

The presence of foreign owners and the importance of exports in total sales increase the probability of environmentally motivated investment in the firms. The proportion of companies partially or entirely owned by foreigners that answered positively to this question was 40.8%, against only 18.3% of the domestically owned companies.

Another issue that increases the probability of environmentally motivated investments is the proportion of exports over total sales. The proportion of the firms with positive answer (2.0%) is considerably higher than the same proportion for the firms with negative answers.

An econometric study using the same data (Ferraz and Seroa da Motta 2001), has reached similar conclusions, adding the following factors that increase the probability of investments caused by environmental questions:

- The size of the firm, measured by the number of employees (the probability of environmental investments increases with the size of the firm).
- The age of the industrial unit (the probability of environmental investments increases with the age of the firm).
- Tighter environmental controls (firms established in areas where the application of environmental standards is more severe tend to invest more in environmental issues).
- Local pressure from the society (firms established in areas where the local population has revealed more interest on environmental issues tend to present higher levels of environmentally motivated investment).

4.2 Competitiveness Report of the Brazilian Industry

The National Bank for Economic and Social Development (BNDES), the National Confederation of Industries (CNI) and the Brazilian Support Service for Micro and Small

Companies (SEBRAE) have been carrying out a survey on many aspects concerning the Brazilian industrial firms since 1999 (BNDES/CNI/SEBRAE, 2001). A sample of 1158 firms answered the questionnaires in 2000, covering 22 different sectors and all the regions of the country, with answers referring to the previous year (1999).

The environmental performance of the industry was examined according to the following aspects:

- Characteristics of the environmental management of the firm
- % of the net revenues spent on environmental investments
- Motivation for the environmental investments
- Financial sources for the environmental investments
- Classification of environmental investments
- Results from the environmental investments

Only 10% answered that the firm had a specific unit responsible for the environmental management. Half of the firms in the sample replied that environmental management decisions were taken by the general direction, and other 20% said that the production management was responsible for the environmental management. Almost a quarter of the sample (23%) informed that no environmental management procedures were considered in the firm.

The average spent on environmental investments in 1999 was 0.8% of the net operational revenue (NOR) of the firms. This value was slightly higher than the figure obtained for 1998 (0.7%) in the previous survey. Most importantly, the firms declared an intention to increase these expenditures to 1.1% of the NOR in the 2000-2001 period, indicating a trend of rising investments in the private sector on environmental issues.

According to IBGE, the added value of the Brazilian transformation industry in 1998 was around R\$ 227 billion, and R\$201 billion in 1999 (in 2001 prices). Assuming the added value as a proxy for the NOR, this could represent an annual environmental investment of around R\$ 160 million in both years. Table 4.2 presents the estimates for each industry:

Table 4.2
ESTIMATED ENVIRONMENTAL INVESTMENT PER SECTOR

Sector	Environmental investment as % of NOR ¹ 1998	Value added ² 1998	Estimated environmental investment 1998	Environmental investment as % of NOR ¹ 1999	Value added ² 1999	Estimated environmental investment 1999
Leather and footwear	0,3	2.234.791	670	0,2	1.974.316	395
Rubber and plastic products	0,2	8.956.305	1.791	0,3	7.853.066	2.356
Textiles	0,6	5.927.567	3.557	0,4	5.245.733	2.098
Vehicles and transport equip	0,4	15.323.492	6.129	0,5	13.061.645	6.531
Wearing Apparel	0,3	4.944.822	1.483	0,5	4.277.434	2.139
Chemical products	0,7	50.545.183	35.382	0,6	45.363.572	27.218
Metal products excl. machinery	0,5	11.925.267	5.963	0,6	10.247.197	6.148

Table 4.2 (Conclusion)

Sector	Environmental investment as % of NOR ¹ 1998	Value added ² 1998	Estimated environmental investment 1998	Environmental investment as % of NOR ¹ 1999	Value added ² 1999	Estimated environmental investment 1999
Machinery and Equipment	0,7	20.178.865	14.125	0,9	17.504.317	15.754
Basic Metallurgy	0,9	11.231.944	10.109	1,1	10.351.502	11.387
Wood products	0,8	7.571.928	6.058	1,1	6.787.998	7.467
Electric Material	0,7	12.509.675	8.757	1,2	9.938.378	11.926
Pulp, Paper and Paperboard	0,8	9.322.663	7.458	1,2	8.624.590	10.350
Food and beverage	0,8	39.137.611	31.310	1,3	34.879.563	45.343
Non-metallic Minerals	1,4	12.504.994	17.507	1,6	10.975.597	17.561
Furniture and other industries	0,8	14.640.354	11.712	0,6	13.588.303	8.153

Source: ¹ BNDES/CNI/SEBRAE (2001).

² Adapted from IBGE data, R\$ 1000 at 2001 prices. Vehicles and transport equipment include parts; basic metallurgy refers to iron and steel and non-ferrous metallurgic, while other metallurgic were classified as metal products; electronic material was added to electric material; wood products include furniture; printing, pharmacy and veterinary products were added to other industries.

The most important reasons declared for adopting environmental investments were the compliance to legal requirements and the improvement of the image of the company, both with a bit more than 60% of the answers. Other important motivations were the improvement of the management process (28% of the answers) and access to new markets (24%).

The majority of the environmental investments were financed with the firms' resources: for investments in the 1998/99 period, 69% were funded this way. The government banks were responsible for the funding of 22% of environmental investments in the same period, and the private banks for only 17%. The forecast for the 2000/01 period points out an increase in the demand for credit from the government banks from 22% to 41% of the environmental investment projects, while the participation of private banks would remain at around 18%. This shows that the industrial companies are cautious in the funding of environmentally motivated projects, making use of own resources or special credit lines of the government credit agencies preferably to private credit lines.

The most important category of environmental improvement was the reduction of losses and rejects of materials and finished products, adopted in 63% of the firms that had investments in the 1998/99 period. The control/treatment of noise, solid waste and water effluents, and energy conservation were also adopted in more than half of these firms (see table 4.3). The areas that will receive more attention in the near future are energy conservation, staff training and implementation of environmental management systems.

The results for the firms with environmental investments have been quite positive: for 49% of them, there was input optimization, for 47%, reduction in the emission of air pollutants and reduction, re-circulation and control of liquid effluents, and for 31% there was reduction in solid waste disposal.

Table 4.3
TYPE OF ENVIRONMENTAL INVESTMENTS, % OF POSITIVE ANSWERS
(In %)

Type of investment (% of firms that declared this type of investment over the total number of firms that declared environmental investments)	Observed investments 1998/99	Forecast 2000/2001	Never
Treatment/control of water effluents	51.8	35.6	34.5
Treatment/control of solid waste	52.8	39.5	30.2
Treatment/control of gas emissions	40.3	29.1	45.7
Treatment/control of noise	54.2	44.9	26.8
Reduction in losses and rejects of material and finished products	63.0	50.7	20.6
Energy conservation	52.0	54.2	21.7
Clean energy sources	22.3	33.3	53.0
Re-circulation and recuperation of water	37.2	38.2	41.6
Improvement in the project, design and packaging of products	44.2	48.7	33.4
Staff training for environmental management	38.8	53.1	29.9
Implementation of environmental management systems	19.0	50.0	41.9

Source: BNDES/CNI/SEBRAE (2001).

The most important benefit of the investments was the improvement in the image of the company. Other competitive advantages identified were increasing sales and access to new markets and, even though the final cost of products have increased for one third of these firms (table 4.4).

Table 4.4
RESULTS OF ENVIRONMENTAL INVESTMENTS
(In %)

	Increased/improved	Reduced/worsened	No change
Final cost of the product	34.4	5.7	59.9
Sales	25.2	1.2	73.6
Access to new markets	29.2	1.2	69.6
Image of the company	67.4	0.3	32.3

Source: BNDES/CNI/SEBRAE (2001).

4.3 Recycling in the private sector

Despite its continuous growth in the nineties, the recycling industry in Brazil has a relatively small size, with less than 0.08% of the total employment and 0.05% of the total income of the transformation industry. Table 4.5 presents its evolution in the 1996/98 period, according to the annual industry survey (PIA/IBGE). Total sales have reached R\$ 192 million in 1998, of which 73% were originated from metallic rejects.

Table 4.5
RECYCLING INDUSTRY IN BRAZIL

	1996	1997	1998
Total recycling			
Output ¹	150.019	191.038	192.808
Value added ¹	97.613	128.319	121.253
Wages ¹	35.731	43.304	43.050
Occupied personnel	3.144	3.752	3.755
Number of units	117	132	164
Metallic rejects			
Output ¹	94.971	122.314	139.918
Value added ¹	69.279	97.563	92.045
Wages ¹	26.393	31.624	31.722
Occupied personnel	1.931	2.377	2.251
Number of units	44	52	62
Non-Metallic rejects			
Output	55.049	68.724	52.890
Output ¹	28.334	30.756	29.208
Value added ¹	9.339	11.680	11.328
Wages ¹	1.213	1.375	1.504
Number of units	73	80	102

Source: Annual Industrial Survey (PIA/IBGE).

¹ R\$ 1.000 at 2001 prices.

4.4 Consumption of chemical defensives

The lack of environmental indicators for the agriculture sector in Brazil has forced us to use only one indirect indicator: the production and consumption of defensives. Table 4.6 shows the evolution of the industry in the 1996/98 period. There is a clear trend of diminishing sales, with a considerable reduction of employment and production units. This reduction in the demand for agriculture defensives may be an indication of changes in cultivation practices; however it is a very weak indicator (for instance, it needs the verification of exports and imports of this product). Further research needs to be done to have a better idea of the environmental performance of the agriculture sector.

Table 4.6
CHEMICAL DEFENSIVES INDUSTRY IN BRAZIL

	1996	1997	1998
Output ¹	3.894.767	3.818.546	3.315.798
Value added ¹	1.583.829	1.489.826	1.412.787
Wages ¹	445.813	398.521	323.315
Occupied personnel	10.304	9.273	7.258
Number of units	151	141	122

Source: Annual Industrial Survey (PIA/IBGE).

¹ R\$ 1.000 at 2001 prices.

V. Private sector funds

The BNDES/CNI/SEBRAE survey has shown that most of the investment is carried out with own resources or through special lines of public financial institutions. However, there are some new experiences that show that the private sector is getting more involved with environmental issues. Again, there is no systematic information on this topic. Therefore, we opted to analyze two case studies –one non-profit trust fund and one profit-oriented private company– in order to illustrate these new financial mechanisms.

5.1 FUNBIO

The National Biodiversity Fund (FUNBIO) was created in October 1995 with a US\$ 20 million donation from the Global Environmental Facility (GEF). The objective was to install a non-governmental trust fund to support projects on conservation and sustainable use of biological resources, with a time span of 15 years. The Fund must raise additional funds to complement the initial allocation of GEF resources in order to guarantee its long-term operation, so it has been seeking other donations or financial counterparts. The target is to accumulate an endowment fund that will permit operations solely based on the interests generated (FUNBIO 1999).

The management of the Fund is taken by an Executive Secretariat, under the guidelines and supervision of an independent Board of Directors. The Board of Directors is composed of

representatives of different segments of the civil society, including government, private business sector, academic institutions and non-profit environmental NGOs.

Eligible projects must refer to the one of the following topics:

- Biodiversity conservation
- Sustainable use of biodiversity
- Technological development and applied research that contributes to biodiversity conservation and/or its sustainable use
- Policy analysis on biodiversity conservation and/or its sustainable use

In the 1997/98 period, FUNBIO has provided US\$ 1,03 million to support projects. This is a relatively small quantity if compared to administrative and indirect costs, that consumed half million US\$ in the same period. This is an evidence that the problem of a considerable share of resources going to mean-activities, instead of end-activities, happens outside the government as well.

Table 5.1
FUNBIO EXPENDITURES
(In current US\$)

	1997	1998
Contribution to Projects – direct support	77.070	953.307
Contribution to Projects – indirect support	23.318	76.561
Administration	325.158	284.660
Institutional development	10.810	10.373
Planning activities	6.209	201
Information and studies	15.101	63.208
Fund raising	2.884	26.044
Project funding	30.672	4.058
Contractual commitments	121.292	134.303
Total	612.514	1.552.535

Source: FUNBIO 1998 annual report (FUNBIO 1999).

5.2 A2R

The A2R Environmental Funds is a Brazilian financial company specialized in composing and administrating investment funds in environmentally-related projects in Latin America. The pioneer was the Terra Capital Fund, which started its operations in December 1998. This is a fund for “green” projects following appropriate sustainable practices, including organic agriculture, aquaculture (fish and shellfish farming), reforestation using native species, non-timber forest products and ecotourism. The total disbursement in projects in Brazil until now was US\$ 4,5 million, and there is capacity for lending other US\$ 5 million. Like other A2R funds, Terra Capital finances projects in other Latin American countries, and most of the fund raising (in a total of US\$ 15 million) was done with foreign capital.

The Clean Tech Fund is expected to start its operation by October 2001. This fund is destined to support clean technology projects in Latin America, and it has already raised US\$ 20 million for funding, with the expectation of a second round of fund raising of around US\$ 15 million (almost exclusively foreign capital). The target is small and medium companies, investing between US\$ 0.5-2.5 million per project in the following areas: renewable energy, energetic

efficiency, effluent treatment/control, recycling, and transportation. They expect that around 40% of the funds will be invested in Brazil.

The most ambitious project is the Forest Fund, yet at a project level, aimed at sustainable forest management and forest plantation projects. They expect to raise up to US\$ 100 million, half of it coming from Brazilian investors.

Some foreign investment funds are also interested in operating in Brazil. However, the main restriction has been the identification of projects that are technically eligible for those funds, since they have to comply simultaneously with financial profitability and restrict sustainable management criteria.

The consolidation of economic instruments in international environmental agreements, particularly the Kyoto Protocol on greenhouse gases emissions, may accelerate this new financial market.

VI. Main conclusions

- Despite the official commitment to increase efforts in environmental matters, the federal government expenditures in this area did not augment in the 1993-2000 period, remaining at the level of 0.5%-1% of the total federal spending.
- It is particularly worrying that expenditures in personnel fell systematically in constant prices in the second half of the nineties: the aggregate expenditure in 2000 was less than three quarters of the spending with personnel in 1995, measured in real terms.
- On the other hand, the spending related to the federal public sector debt (interests and amortization) increased considerably. This is another evidence that the quality of the public spending on environmental programmes has declined, with less money being directed to end-activities.
- The former problem is connected to increasing importance of foreign resources. Environmental projects are the most important single element in international cooperation agreements, either bilateral (40% of the total) or multilateral (28%). Nevertheless, these resource flows are mostly directed to issues that are of international priority (mainly the green agenda and the Amazon), and only a minor volume is directed to the “brown” or “blue” agendas, or to projects outside the Amazon. It is particularly worrying that the Northeast region receives only a fraction of the international funds, despite the fact that

this region concentrates the higher proportion of the poor population, whose lives are directly dependent on the conditions of the environment.

- Another important issue concerning external funds is the need to separate what is “new” money that comes as donations from the external borrowing of the public administrations. The increasing proportion of the latter is one of the causes of the elevated burden of financial costs on the environmental budgets.
- There is a clear need to produce aggregate figures for the states and *municípios*. The methodologies used for public budgeting and expenditure control vary widely, making it very hard to produce compatible aggregate numbers.
- Results for the 1996-98 period show that the share of environmental topics in municipal budgets (between 8.1% and 10.0%) are considerably higher than in state budgets (between 1.3% and 1.9%). Both of them exceed the federal government expenditures, particularly in sanitation (which includes solid waste and wastewater collection and treatment). Table 6.1 shows the aggregate spending if all three levels of public administration from the IBGE (2001) study are considered altogether. There is a slight increase in absolute terms but a minor decline in proportion to the total public spending. Note, however, that the consideration of expenditures on sanitation overestimates the total environmental spending, since they also include water supply activities.

Table 6.1
AGGREGATE PUBLIC SPENDING, BRAZIL

	1996	1997	1998
Total expenditures (1000 R\$)			
Environmental Protection (A)	1.914.694	1.702.336	2.780.600
Current expenses	1.420.803	1.244.235	1.540.678
Investment	302.777	269.781	847.393
Sanitation (B)	4.848.300	5.113.614	5.741.995
Current expenses	2.762.403	2.593.991	3.063.815
Investment	1.424.998	1.060.697	923.381
Total (A+B)	6.762.994	6.815.950	8.522.595
Current expenses	4.183.206	3.838.227	4.604.494
Investment	1.727.776	1.330.478	1.770.774
% of total expenditures			
Environmental Protection (A)	0,4%	0,4%	0,5%
Sanitation (B)	1,1%	1,1%	1,0%
Total (A+B)	1,6%	1,5%	1,5%

Source: Own elaboration using data from IBGE (2001).

- In the states that were studied separately, there was no consistent trend of increasing expenditures on environmental objectives. The difficulty of separating sanitation from water supply efforts complicates even more the results from the analysis, but the trends with or without water management expenditures are not very different. The estimated range of environmental spending oscillates between 1%-3% of the total state budget.
- Another gap that needs to be fulfilled refers to the private sector environmental spending. Using surveys based on the opinion of industrial firms, there are positive signals that the private sector is getting more concerned with the environmental consequences of the production-consumption cycle. This is better perceived in the most dynamic companies, particularly those with interests/responsibilities at the international level.

- Combining one of these surveys with the IBGE data, it was possible to (roughly) estimate the environmental investment of the industry at around R\$ 160 million/year. Even though there is an expectation that this number will increase in the future, it is considerably lower than the public sector spending on environmental issues.
- Gross domestic product (GDP) in 2000 (at 2001 prices) was R\$ 1189 billion, public administration expenditures were approximately R\$ 260 billion, and the population around 170 million. Assuming that the public spending on environmental issues was of 1.5% of the total (R\$ 3.9 billion), the public environmental spending/GDP ratio would be of 0.33%, and an annual expenditure per capita of R\$ 22.9 (US\$ 9.2) per capita. If the estimated R\$ 160 million of environmental spending the industrial sector is added, total spending becomes R\$ 4.1 billion (0.34% of GDP), or R\$ 23.9 (US\$ 9.6) per capita.
- Most of the funding for environmental projects comes from the government (mainly federal, through BNDES) or international development agencies, or from companies own resources. The private financial sector has a minor role on the financing of environmental expenditures; less than 20% of the environmental investments have had resources coming from private financial institutions.
- On the other hand, it is important to note the appearance of innovative private funds specialized in environmentally friendly projects. These funds aim at foreign investors who want to combine “monetary” and “green” interests. The consolidation of economic instruments in international environmental agreements, particularly the Kyoto Protocol on greenhouse gases emissions, may accelerate this new financial market.

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Annexes

Methodological Attachment

National Currency Deflators

	1993	1994	1995	1996	1997	1998	1999	2000	2001
mult	0.022186446	2.743620852	1.718562204	1.547133882	1.434586147	1.3861604	1.245015365	1.094421802	1

To change the prices in the article (year 2001 prices) to year 2000 prices: divide by 1,094422

Exchange rates (annual average)

1994	1995	1996	1997	1998	1999	2000	2001 (current)
0.6377	0.9519	1.0042	1.0792	1.1597	1.8139	1.8294	2.5

To change prices into US dollars, in constant prices of year X, divide by the corresponding values shown below:

1994	1995	1996	1997	1998	1999	2000	2001 (current)
1.749607017	1.635899362	1.553631844	1.548205369	1.607530216	2.25833337	2.002135244	2.5

For example: To change values expressed in R\$ in 2001 prices into US\$ in 2000 prices, divide all the values by 2,002135

To change prices into US dollars, in constant prices of year X, divide each year's value by the corresponding value in the table above.
(NOTE: the values will be VERY different to the ones obtained for the series at constant prices.)



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