

**SECTOR G**

**INSTITUTIONAL ASPECT**

**THE STUDY ON  
THE ENVIRONMENTAL IMPROVEMENT PROGRAM OF  
THE UPPER AND MIDDLE STREAM OF THE TUY RIVER BASIN**

**SECTOR G: INSTITUTIONAL ASPECT**

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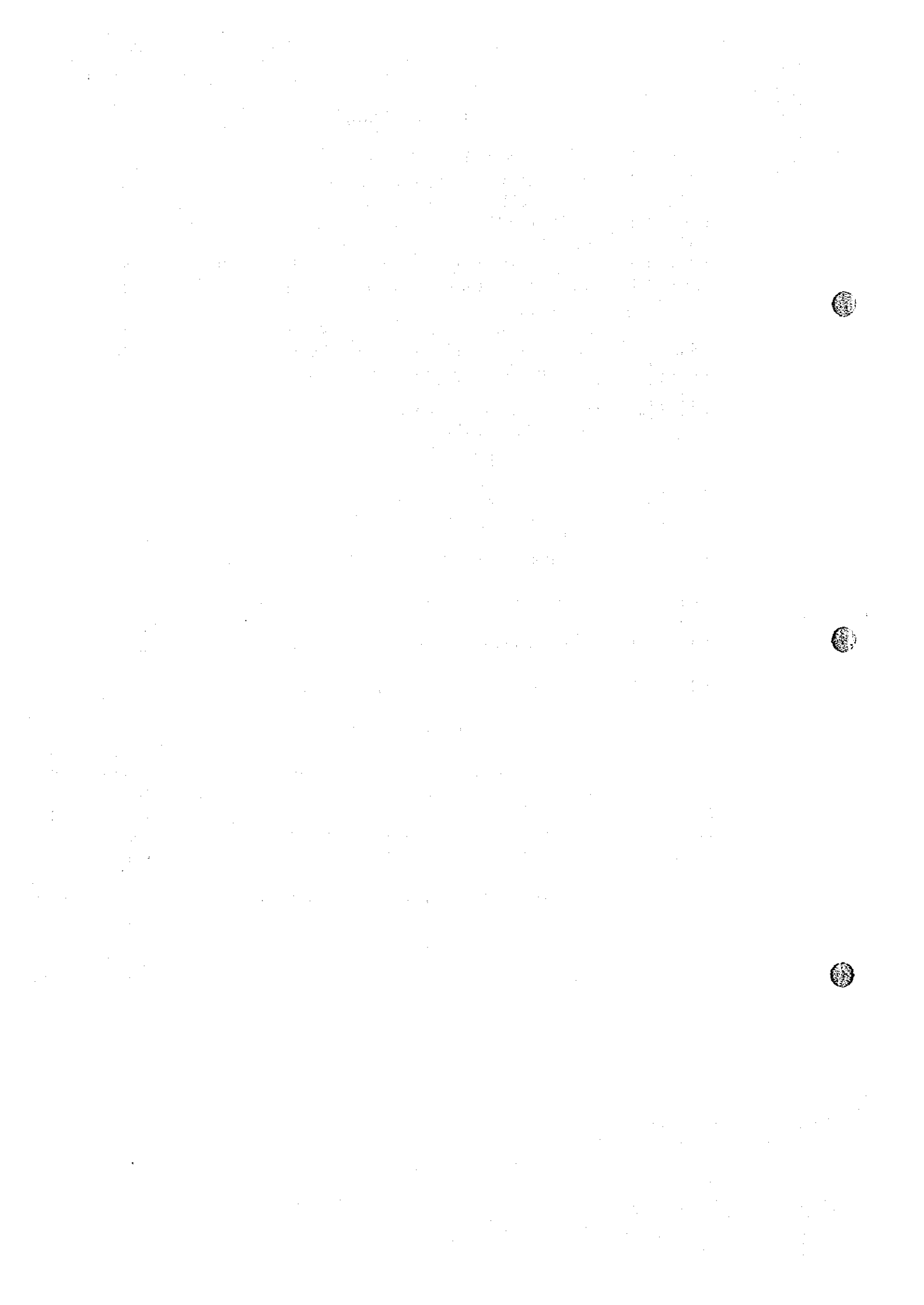
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## SECTOR G: INSTITUTIONAL ASPECT

### 1. PRESENT CONDITION

#### 1.1 Institutional Organization

##### MARNR

The Ministry of Environment and Renewable Natural Resources (*Ministerio del Ambiente y los Recursos Naturales Renovables, MARNR*) was founded in accordance with Art. 2 of the Law of Administration of December 26, 1976. This ministry is primarily responsible for actions such as planning and execution of activities of the National Executive for the promotion of the quality of life, environment and the renewable natural resources, and for the elaboration and execution of the programs of conservation, preservation, improvement, regulation, exploitation and use of waters, forests, lands and soils and so on (Art. 36, Law of Administration).

The MARNR has 8 levels of management (see Fig. 1.1-1): High Direction, Advisory and Support, General Directorates, Regional Operative, Autonomous Services, Autonomous Institutions, Foundations and Government Companies.

The outline of organizations under MARNR; namely, (1) Tuy River Basin Agency, (2) HIDROCAPITAL, (3) Environmental Guards, (4) SEFORVEN, (5) CONARE; and, (6) Directorate of Prevention and Extinguishing Forest Fires are discussed below.

##### Tuy River Basin Agency (ACRT)

The ACRT was created in 1992-93 as a Unique Authority of Area with the character of Autonomous Service without Juridical Personality.

#### (1) Functions

##### (a) As Unique Authority of Area

The implementing agency of this study is the "Unique Authority of Area of the Tuy River Basin and the North Slope of the Littoral Mountainous Region of Federal District and Miranda State", abbreviated as ACRT.

ACRT was established by Decree No. 2,307 of June 5, 1992 and published in *Gaceta Oficial* (Official Gazette) on April 12, 1993. Its general objective is the integral administration regarding the territory ordination and the protection, conservation and environmental improvement of the critical area with priority of treatment basin of the Tuy River and north slope of the mountainous littoral region of the Federal District and the Miranda State.

The agency's roles are the following:

- To establish the standards and guidelines of environmental character, of exploitation, and affectation of the natural renewable resources and the territory ordination.
  - To elaborate, coordinate and execute the plans, programs, and projects of investigation, information, administration, management, vigilance, control, education and environmental norms, in the territorial scope of the Unique Authority of Area, as well as foresee, process, and generate the financial resources necessary for its execution.
  - To identify and evaluate the projects directed to the solution of the environmental problems, territory ordination, and development of the natural renewable resources, within its spatial scope and to promote the execution of them.
  - To perform the services and execution of works which are directed to the recuperation and environmental sanitation and the improvement of the renewable natural resources, within the territorial scope of the Unique Authority of Area.
  - To promote and coordinate through the MARNR the necessary financing for the execution of the works for environmental maintenance, territorial ordination and development of renewable natural resources, either for the public or the private sectors.
- (b) As Autonomous Service without Juridical Personality
- Administration in such a way that in short or medium term it can allow auto-financing.
  - Generated incomes will be used exclusively to attend to the expenses due to such services.

According to these last functions the ACRT can have a management of its incomes independently of the national budget. It is also considered under the Law of Budgetary System, which consider that an exception to the 'Principle of Unitarian Treasure' is the management of the Autonomous Services without Juridical Personality.

Thus, it may be understood that the final administrative target of ACRT as autonomous service without juridical personality will be reaching auto-financing through the generation of self supporting incomes.

## (2) Organization

The organization of this Agency is shown in the chart of Fig. 1.1-2. Thus, the structure of the ACRT may be divided in the following components:

- Superior Council (*Consejo Superior*) is the highest entity of coordination and support for making decisions in the Agency. According to the law it should consist of 4 members who are the minister of MARNR and the 3 related governors (Federal District, Miranda and Aragua states).

- Advising Council (Consejo Consultivo) is the advising entity of the Agency, and has a wide representation and participation of the social and government agents. According to the law it should be integrated by about 100 members of the national and regional public institutes, the states and municipalities and legislative agencies, the association of companies, the associations of citizens and environmentalists, who decide their activities on the basin and relevant area.
- Executive Directorate is the directive entity of the Agency and is in charge of formulating the policies and strategies for the environment. According to the law it should consist of 9 members as the representatives of the MARNR, National Institute of Parks, State Governors, Mayorships, Municipal Councilors and non-governmental organizations. It is presided by the General Manager of the Agency.
- Programmatic Management (Gerencias Programaticas) are in charge of the coordination, formulation, and supervision of the programs and projects related to environment. Depends directly of the General Management.
- Territorial Management (Gerencias Territoriales) in charge of the execution of programs and projects, through the coordination and direction of the operative units.
- Operative Units (Unidades Operativas) have specific programs and projects in assigned areas or activities of work within each of the Territorial Management. Their specific activities are: processing permissions of construction of roads, earth works, exploitation of sand, logging for agricultural activities, terracing, establishment of industries, etc.

### (3) Personnel

The number of the agency staff totals 161 members and a classification is shown in Table 1.1.-1. Also the Miranda Management (office) which directly controls the upper and middle Tuy basin has its own personnel as shown in Table 1.1-2.

Table 1.1-1 Personnel of ACRT

Admin. Unit	Secretary	Adminis- -tration	Environ- -ment	Chief Operativ e Unit	Manager	Adviser	Total
General Manager	2	-	6	-	2	3	13
Admon. and Budget	2	13	-	-	1	-	16
Man. Educ./Participat	1	-	3	-	1	-	5
Man. Planning/Project	1	-	4	-	-	-	5
Man. Protection Zone	5	-	11	2	1	1	20
Man. Federal District	8	6	34	2	1	-	51
Man. Miranda	11	5	30	4	1	-	51
<b>TOTAL</b>	<b>30</b>	<b>24</b>	<b>88</b>	<b>8</b>	<b>7</b>	<b>4</b>	<b>161</b>

Sources: a) *Plan de Entrenamiento y Desarrollo de Personal, Soc. Fanny Parilli, Caracas, June, 1995*

b) ACRT



Table 1.1-2 Personnel of Miranda Management Office

Category	Territorial Management	Administration/Budget	Los Teques /High Tuy	Middle Tuy/ Ocumare	Rio Grande/Guatire	Low Tuy Barlovento	Total
Professional	6	1	5	3	1	3	19
Technician	1	3	4	7	2	1	16
Administration	3	3	3	2	-	3	16
<b>TOTAL</b>	<b>10</b>	<b>7</b>	<b>12</b>	<b>12</b>	<b>3</b>	<b>7</b>	<b>51</b>

Sources: a) *Plan de Entrenamiento y Desarrollo de Personal, Soc. Fanny Parilli, Caracas, June, 1995*  
 b) ACRT, Miranda Office.

The staff by profession is listed in Table 1.1-3, covering the entire agency.

Table 1.1-3 Number of Personnel of ACRT by Profession

Profession	Number
Hydrometeorologist Technician	9
Agronomist Technician	1
Draftsman	5
Forest Technician	7
Agriculture Technician	2
Surveyor	1
Geology and Mines Technician	1
Social Worker	1
Assistant Engineer and Planning	7
Superior Tech. of Publicity	1
Superior Tech. Civil Constructions	1
Superior Tech. Agriculture	1
Superior Tech. Marketing	1
Bachelor in Education	1
Lawyer	6
Agronomist Engineer	14
Agriculture Engineer	1
Hydrometeorologist Engineer	1
Hydraulic Engineer	2
Hydrologist Engineer	1
Civil Engineer	5
Chemist Engineer	2
Geologist	1
Forest Engineer	7
Bachelor in Geography	7
Urban Expert	2
Biologist	6
Architect	5
Sociologist	4
Bachelor in Chemistry	1
Secretaries and Clerks	30
Medium Tech. Administration	21
Univ. Sup. Computation	3
Bachelor Administration	1
University Sup. Tech. Social Work	1
<b>Total</b>	<b>161</b>

Sources: a) *Plan de Entrenamiento y Desarrollo de Personal, Soc. Fanny Parilli, Caracas, June, 1995*  
 b) ACRT

In general it can be observed that the number and kind of professionals corresponds to the objectives of the ACRT, regarding the integral administration of territory ordination as well as conservation and environmental improvement of the basin.

#### (4) Financial Aspects

According to the Decree creating the ACRT it has autonomy on Financial and Budgetary Management for the planning, programming, coordination, execution, follow up and technical/administrative control of the programs, projects and activities. Whenever necessary it should be linked and coordinated with the corresponding levels of the MARNR, regional governments, municipalities and other institutions of the decentralized public administration.

Besides, according to the same Decree the assets (*patrimonio*) of the ACRT are composed of the following:

- The funds allocated by the Government in the Budget Law.
- The funds derived from the services of exploitation of water, and other renewable resources, and other services.
- The funds derived from donations.
- The funds derived from agreements with local, regional, national or international institutions, as well as public or private entities.
- The funds produced by sureties (bails), when these are destined to environmental protection and recovery.
- Any other funds permitted by laws and regulations.

Most of these funds currently form the ACRT budget; however, the second item regarding the services of water use is still under discussion with HIDROCAPITAL. Considering such funds are larger than the budget allocated by the Government it is estimated that the probable reimbursement to ACRT will finally allow this agency to get auto-financing as an Autonomous Services without juridical personality.

##### (a) Budget of ACRT

The budget of ACRT for 1996 is allocated as shown in Table 1.1-4.

Table 1.1-4 Budget of ACRT in 1996

CONCEPT	BUDGET		
	Bolivares	US\$ *	%
REVENUES			
Contribution National Government	311,720,000	670,366	95
Contribution Federal District	5,000,000	10,753	2
Own Revenues	4,000,000	8,602	1
Fiscal Stamp **	6,000,000	12,903	2
TOTAL	326,720,000	702,624	100

EXPENSES			
Personnel Expenses	224,758,253	483,351	69
Materials and Supplies	27,140,000	58,366	8
Non Personnel Services	27,273,000	58,366	8
Real Assets	9,150,000	19,677	3
Serv. of Debt and Dim. of Passives	38,038,747	81,804	12
Transference	360,000	774	-
<b>TOTAL</b>	<b>326,720,000</b>	<b>702,624</b>	<b>100</b>

Source: Office of Administration and Budget, ACRT

\* As of 13/05/1996 exchange rate: US\$ 1=Bs. 465

\*\* According to a Resolution of the Treasury Ministry of May 29, 1995, it authorize to the Agency of Tuy River Basin to use 75% of the revenues due to Fiscal Stamp.

It can be observed that the personnel expense occupies more than 2/3 of the total budget, reducing the operation works to the minimum portion.

(b) Financing through the "Umbrella Law"

The Umbrella Law authorizes the national executive to undertake and execute public credit operations for the execution of projects. According to the Umbrella Law the financing of projects is through multilateral and bilateral agreements. The bilateral finance has been the more viable one.

For 1997 the Umbrella Law authorizes the national executive to undertake and execute public credit operations for an amount of about US\$2,897 million (US\$327 million of internal credit, and US\$2,570 million of external credit).

Among that amount the ACRT is authorized to undertake credit operations for the execution of sanitation projects through financing of international agencies for an amount of US\$20 million.

For the coming years additional funds are to be requested according to the needs for project execution.

(5) Offices

One of the present problems of the Agency is that their offices are located in different places. While the main office and all the Programmatic Management are in one building (at Edificio Camejo, 3rd Floor), the Office of Administration and Preservation, and the Protection Zone of the Metropolitan Area of Caracas are in another building (at Torre Sur Centro Simón Bolívar, 19th and 20th Floors, respectively), requiring some 30 minutes to do door to door procedures. When trying to communicate by telephone, it also tends to take a long time due to only two lines which are frequently occupied. So, the communication between offices is considerably obstructed.

This has been recognized since the foundation of the Agency. Some offices, for example, were located at the Central Park, however, as the rent of offices became expensive, it was decided to bring them to the present location.

There have been certain efforts to relocate all the Agency's offices into one building. This is absolutely the best solution for the distance between its

offices. Whatever the efforts, up to now in past seven actions during two years did not achieve the relocation due to several reasons. But it may not be impossible owing to the latest circumstances that the present building is planned to be replaced by a new official one (under the Justice Ministry).

### HIDROCAPITAL

Although the water supply and sewer service had been provided since 1943 by INOS (*Instituto Nacional de Obras Sanitarias*), a centralized and rigid administration caused a deterioration in the quality of such services and brought the institution into dependency on the budget allocation from the central government.

In terms of the state condition by 1989 due to financial, political and socio-economical reasons, the government initiated a process of modernization of the state with financial assistance of international organizations. It is considered the initial process to decentralize administration. Transitional and final stages compose the process.

At final stage it is required to transfer certain activities to the municipalities depending on the nature of such activities and the attitude of each ministry towards the decentralization.

In transitional stage, the Venezuelan Hydrological Company, HIDROVEN was established, consisting of 10 regional companies, and started its operation from 1991.

One of them is Hidrocapital which covers the geographical area of Miranda State and the Municipalities of Libertador and Vargas.

HIDROVEN and each of its affiliated companies like HIDROCAPITAL follow the policies formulated by the Ministry of Environment and Natural Renewable Resources and have an organizational structure as a government owned company.

#### (1) Functions

The functions of HIDROCAPITAL are:

- To improve the quality of the services to satisfy the public water demand;
- To expand the coverage of service to improve the public's accessibility to water;
- To improve the level of efficiency in the system operation and providing its service;
- To guarantee the potability of water;
- To obtain external financing sources; and,
- To bill the prices of the services provided such as water supply, as well as sewer and wastewater treatments where available.

## (2) Organization

The general organizational structure of Hidrocapital is shown in Fig. 1.1-3. The System Management section is divided by regions, corresponding to the Losada-Ocumare System the section of the upper and middle Tuy River basin and its organizational structure is shown in Fig. 1.1-4.

## (3) Personnel

The staff of Hidrocapital is classified with a total of 716 (Table 1.1-5).

Table 1.1-5 Classification of Personnel of Hidrocapital

Category	Number
Management	22
Corporate	163
Metropolitan System	194
Littoral System	82
Panamerican System	79
Losada-Ocumare System	83
Fajardo System	44
Barlovento System	41
Contracts	8
<b>TOTAL:</b>	<b>716</b>

Source: Office of Human Resources, HIDROCAPITAL

## (4) Financial Aspects

### (a) Budget

The budgetary situation of HIDROCAPITAL during the last 3 years is shown in Table 1.1-6.

Table 1.1-6 Budget of Hidrocapital During the Period 1993-1995

CONCEPT	1993	1994	1995
<b>REVENUES:</b>			
Selling of Water	6,392,676	20,984,866	27,280,326
<b>TOTAL:</b>	<b>6,392,676</b>	<b>20,984,866</b>	<b>27,280,326</b>
<b>EXPENSES:</b>			
Production & Distribution of Water	2,876,704	39,799,908	51,739,881
Admon. & Commercialization	3,835,606	459,034	596,745
Personnel	-	969,645	1,260,539
Operation	-	6,015,726	7,820,444
Depreciation & Amortization	-	87,528	113,787
<b>TOTAL:</b>	<b>6,712,310</b>	<b>47,331,842</b>	<b>61,531,395</b>
<b>DEFICIT</b>	<b>319,634</b>	<b>26,346,976</b>	<b>34,251,069</b>

It can be observed that the deficit has been increasing constantly since 1993. The estimated deficit in 1995 is around US\$34.25 million, basically due to the difference in the costs of production-distribution of water and the applied charges.

For the 1995 budget estimation, the cost of production-distribution of water made an 84% of the expenses of HIDROCAPITAL which reach the amount of about US\$52 million while the revenues through the selling of water was only about US\$27 million becoming about half of the total production.

This situation makes a considerable deficit which have to be filled up by the central government. Consequently, this institution is ending up the same situation to that which in 1989 produced the restructuring of organization from INOS to HIDROVEN and the regional water supply and sanitation enterprises among which is HIDROCAPITAL.

**(b) Charges for Water Supply, Sewer, and Wastewater Treatment**

The mutual Resolution No. 304/28 between the Ministries of Promotion and MARNR published on the Official Gazette No. 35,161 of March 1, 1993 dictates the charges for providing services for supplying water and collection, treatment and disposal of residual waters. It is effective in all the national territories except those districts where such services are not provided.

There are four categories of water use:

- Residential use: Applied to every household, exclusively used for living.
- Social use: For households exclusively for living which are located in geographical area classified as low incomes level.
- Commercial use: Activities related to commerce, including offices.
- Industrial use:
  - i) Industries which use water as the main raw material.
  - ii) Industries where water is not the main raw material.

For billing purposes a monthly minimum consumption amount of 15 m<sup>3</sup>/household for social and residential uses was established (30 and 40-50 m<sup>3</sup> for commercial and industrial uses respectively. Then considering the extreme values of minimum and high consumption for each category the corresponding charges are described in Table 1.1-7.

The cost to produce 1 m<sup>3</sup> of drinking water in 1996 was Bs 47.96 ("Balance Ambiental de Venezuela 1996", MARNR, Page 4), thus the cost of the minimum consumption volume of 15 m<sup>3</sup> would be Bs 719.4. Then, the costs of water supply are been subsidized for the categories of social and residential uses (charging only 8% of real value for the first and between 16% to 40% for the second) and in most levels of the

commercial (31% to 78%) and industrial uses (35% to 107%) for the minimum consumption basis.

Furthermore, according to the law, the established charges should serve as a basis for collection and disposal of waste water. This charge should be 10% higher than the water consumption charge.

According to the same resolution, in the places where the service of wastewater treatment is possible to be provided, it will be charged 10% higher corresponding to water supply and collection and disposal of wastewater (Art. 24).

Although these charges have not been applied yet they have been proposed for future application when such treatment plants are in operation by the government institutions in charge.

According to the law, the regional water supply and sanitation companies (in the case of the Study Area it is HIDROCAPITAL) will decide the charges on their clients. However, the municipalities can also establish other price structures whenever operation costs need to be covered.

It seems reasonable that the same institution collects the payments for all these services, charging directly based on the water supply. Nevertheless an agreement between the Tuy River Basin Agency and Hidrocapital should define the terms of such payment collection. At present, the conditions of payment of raw water (previous to pre-treatment) from HIDROCAPITAL to ACRT are under discussion between both institutions.

Consideration should be taken for the large deficit of HIDROCAPITAL and review is needed for the current prices as well as the production costs.

Table 1.1-7 The System of Charge for Water Use

Type of Charge	Minimum Monthly Charge per 15 m <sup>3</sup> (Bs.)	Monthly Payment per Consumption of 120m <sup>3</sup> (Bs.)
(a) Residential		
Type 1	112.50	1,662.50
Type 2	140.75	2,078.25
Type 3	168.75	2,493.75
Type 4	197.00	2,909.50
Type 5	225.00	3,325.00
Type 6	281.25	4,156.25
(b) Social		
Type 1	56.25	1,497.00
Type 2	56.25	1,822.00
Type 3	56.25	2,147.00
Type 4	56.25	2,297.00
Type 5	56.25	2,797.00
Type 6	56.25	3,447.00

(c) Commercial	Consumption up to 30 m <sup>3</sup> /month (Bs/m <sup>3</sup> )	Excess (Bs/m <sup>3</sup> )
Type 1	15.00	25.00
Type 2	18.75	31.25
Type 3	22.50	37.50
Type 4	26.25	43.75
Type 5	30.00	50.00
Type 6	37.50	62.50
(d) Industrial A	Consumption up to 50 m <sup>3</sup> /month (Bs/m <sup>3</sup> )	Excess (Bs/m <sup>3</sup> )
Type 1	20.50	32.50
Type 2	25.60	40.60
Type 3	30.75	48.75
Type 4	35.90	56.90
Type 5	41.00	65.00
Type 6	51.25	81.25
(e) Industrial B	Consumption up to 40 m <sup>3</sup> /month (Bs/m <sup>3</sup> )	Excess (Bs/m <sup>3</sup> )
Type 1	17.00	27.00
Type 2	21.25	33.75
Type 3	25.50	40.50
Type 4	29.75	47.25
Type 5	34.00	54.00
Type 6	42.50	67.50

Source: *Gaceta Oficial* No. 35,161 of March 1, 1993, Prices of Water Supply.

Besides, any adjustment of these charges will be executed according to the following equation:

$$Pmra = Pmri(axS/Si + bxE/Ei + cxQ/Qi + dxC/Ci)$$

Where:

Pmra = Mean adjusted referential price

Pmri = Mean initial referential price

a = rate of personnel costs to the total

b = rate of costs of electricity to the total

c = rate of costs of chemical substances to the total

d = rate of costs of maintenance to the total

The summation of these factors should be 1.0.

*Total Cost = Personnel Expenses + Electricity Charges + Chemical Substances Costs + Maintenance Expenses*

Where:

S = Current minimum salary

Si = Initial minimum salary

E = Expected mean price of electricity (Bs/kwh)

Ei = Initial mean price of electricity (Bs/kWh)

Q = Expected average price of chemical substances

Qi = Initial average price of chemical substances

C = Current price index for wholesalers of construction products

Ci = Initial price index for wholesalers of construction products

Values for Pmri used in the current price list were as follows:



Tariff	Pmri (Bs/m <sup>3</sup> )
Social-Residential use	7.50
Type 1	10.00
Type 2	12.50
Type 3	15.00
Type 4	17.50
Type 5	20.00
Type 6	25.00

Source: *Gaceta Oficial* No. 35,161 of March 1, 1993, Prices of Water Supply.

### Environmental Guards

The function of the environmental guards has been established through Decree No. 1,221 of November 2, 1990.

The activities performed by these corps have these purposes: Prevention, vigilance, examination, control, inspection, sanction and repression of the actions or omissions which directly or indirectly can degrade the environment and the natural resources.

According to the Decree the service of environmental guards will be executed through:

- Appropriate officials of the following ministries: MARNR, Agriculture and Livestock, Sanitation and Social Welfare, Energy and Mines, Transportation and Communications, Interior Relations and Public Ministry.
- The officials of the institutions in charge of the Administration of Areas Under Special Administration Regimen (ABRAE), the Unique Authorities of Area, and other institutions of the public administration to which the laws and regulations assigns functions of the environmental guards.
- The officials of the armed forces of cooperation.
- The officials of the governments and the municipal councils, in their territorial scope.
- The officials of the police of the metropolitan, states and municipal, fire fighters, harbor captains, and civil defense.

Outline of the work is as follows:

It includes resident associations, boards of conservation, preservation and improvement of environment, local conservation committees, fire brigades, vigilant volunteers assigned by MARNR, and other institutions and associations of the public.

In the Penal Law of Environment it is considered that the knowledge of the environmental crimes corresponds to the ordinary penal jurisdiction. To the effects of this Law, the National Executive can create an environmental police with instructive powers of the penal process (Art. 22).

At present it is considered that the environmental guards do the function of the environmental police, which operates according to the following.

In Venezuela the National Armed Forces (FAN) are composed of 4 branches: Air Force, Navy, Army, and Armed Forces of Cooperation or FAC (*Fuerzas Armadas de Cooperación*).

Within the FAC are the National Guards, which give support to the public administration in the following terms: security, national protection and guards of environment and natural resources or special administration police (PAE, *Policía de Administración Especial*).

PAE comprise the following functions: i) vigilance of the assigned areas, ii) analysis of samples in the central laboratory of the National Guard, iii) promotion of workshops, education and publication, iv) inspection of the industrial activities and v) control and supervision through the request for the submission of a copy of all the authorizations for use of the renewable natural resources to the regional commander of the National Guard of the related jurisdictions.

According to the Law of the FAN defines their function regarding environmental aspects:

"To exercise the national protection and the guardianship of the environment and the natural resources according to the laws in this matter and those regulations of the national executive." (Art. 12, Item j)

Based on this the guardianship is executed in the following aspects:

- Forestry: According to Art. 13,14,15,16,17,18 of the Regulations of Law of Forestry, Soils and Waters
- Environment: According to Art. 17 of Law of Environment
- Nature fauna: According to Art. 97,98,99 of Law of Protection to the Wild Fauna
- Fishery

Currently the Environmental Protection Units of the National Guards (*Unidades de Resguardo Ambiental de la Guardia Nacional*) within the Study Area are located in two regions: i) upper Tuy River sub-basin: Los Teques and Colonia Tovar, ii) middle Tuy River sub-basin: Ocumare del Tuy.

#### Autonomous Venezuelan Forestry Service (SEFORVEN)

The SEFORVEN (*Servicio Autónomo Forestal Venezolano*) has the responsibility to coordinate the planning and execution of policies and actions for the conservation, and development of the productive forests and forest lands of the country.

#### National Company of Afforestation (CONARE)

The CONARE (*Compañía Nacional de Reforestación*) is a national company created by the Venezuelan Government on 1975. Its main objectives are: to formulate, promote, develop, execute, supervise and advise on plans, programs and projects of

forest plantations. In this way the institution has an economic and social function, within the guidelines of the national forestry policies.

CONARE covers two sectors: the natural forests, and the planted forests, been these last ones which justified the creation of this national company. Thus, up to now it has accumulated experience in design, promotion, and development of big programs of plants production, projects of planting for several purposes and maintenance of forestry works in general. Additionally it promotes and execute programs for the conservation and protection of watersheds.

### Directorate of Prevention and Extinguishing of Forest Fires

Considering a large scale of damages produced by forest fires in the area of the basin it is worthy of mentioning the activities performed by the institution in charge in the Directorate of Prevention and Extinguishing of Forest Fires in MARNR.

This directorate is under the General Directorate of Environmental Vigilance and Control in MARNR.

MARNR assigns the following functions to this directorate:

- To lead the Program of Prevention and Extinction of Forest Fires
- To promote and orient the development of educational programs with the purpose to generate a conservationist awareness among the population, to encourage their participation in the prevention of forest fires
- To coordinate and develop programs of training of the human resources of MARNR and other institutions concerned with the prevention and extinguishing of forest fires.

At the same time the Directive Plan of Management of the National Program for Prevention and Extinction of Forest Fires and Control of Bush Fires establishes the legal guidelines with the following purposes:

- To reduce the occurrence number of forest fires due to criminal activities
- To eradicate the occurrence of forest fires due to criminal activities in the ABRAE (Areas Under Regimen of Special Administration) and the critical areas.
- To increase the training of the fire brigades

## **1.2 National Environmental Policies**

In 1976 the government of Venezuela recognized many environmental problems generated as a result of economic development and consequently established the Law of Environment, deciding the foundation of a guardian institution for protection and promotion of the environment; that is the Ministry of Environment and Renewable Natural Resources (MARNR).

The main purpose of the law of environment was stated in Article No.1: "The present law has the purpose to establish within the policy of integral development of the nation, the main principles for the conservation, preservation and improvement on behalf of the quality of life".

The MARNR was founded in accordance with the Law of Central Administration (Official Gazette No. 1,932 of 26-12-76), with the duties:

- To perform the activities for the national government in order to promote the quality of life, environment and the renewable natural resources.
- To elaborate and execute the programs of conservation, preservation, improvement, regulation, exploitation and use of the water, forests, land and soils, wild flora and fauna, national parks (Article 36 of Law of Central Administration).

Some environmental legal statements had already been established. For instance, Forestry Law of Soils and Water (2-4-1966) had its by-laws and institutional setup but many other laws and regulations have been established with specific purposes since the Environment Law.

### Legal Framework

The general legal framework of the environmental policies in Venezuela which can be applied to the Tuy River Basin composes of 24 laws and regulations and their features are broadly divided into three: environment, water, and human activities (Table 1.2.-1).

Table 1.2-1 (1/3) Legal Statements on Environment in Venezuela

Classification	Title	Date	Feature and Main Purpose
Environment	Law of Environment	16-6-1976	The main principles for the conservation, defense and improvement of environment on behalf of the quality of life.
	Forestry Law of Soils and Water	26-1-1966, 28-4-1977, 6-10-1989	Regulates the conservation, promotion and exploitation of the natural resources and their products.
	Law of Protection of the Wild Fauna	16-6-1976	Regulates the protection and rational exploitation of the wild faunas and their products.
	Decree no.1302	10-10-86	Establishment of incentives for the persons who make investments in equipment, civil works and facilities for the conservation, defense and improvement of the environment(derogated).
	Decree no.1221	2-11-1990	Regulation of the Environmental Corps (Reglamento sobre Guardia Ambiental) and the organization, operation, assignments and coordination of the institutions and officials to work in the corps.
	Penal Law of Environment	3-1-1992	Classification of the environmental crimes which violates the regulations related to conservation, defense and improvement of the environment and establishment of the corresponding penal sanctions.
	Decree no.2213	27-4-1992	Partial by-laws of Organic Law of Environment on the environment impact assessments.

Table 1.2-1 (2/3) Legal Statements on Environment in Venezuela

Classification	Title	Date	Feature and Main Purpose
Water	Decree no. 2831	20-10-1978	Partial by-laws no.4 of the Organic Law of Environment on classification of waters (Derogated by Decree No.883).
	Resolution no.31	28-5-85	Standards on liquid effluents
	Decree no.238 Decree no.883	29-1-92 18-12-95	Sanitation standards of drinking water quality Establishment of the standards of the classification and quality control of the water bodies and liquid residues or effluents
Human Activities	Decree no.1,400	10-7-1996	Regulation and control of the exploitation of hydric resources and watersheds
	Decree no. 635	25-1-1990	Regulation of piggery activities at the national territory, according to the principles of conservation, protection and better option regarding the uses of resources such as mentioned in the state's and regional plans of territorial ordination
	Law of Mines and its by-laws	18-1-1945	Regulates the exploration and exploitation of mines
	Decree no.2216	27-4-1992	Standards of the management of solid residues from domestic, commercial, industrial or any other nature which is not harmful
	Decree no.2219	27-4-1992	Standards to regulate the influence of the natural renewable resources, associated to the exploration and exploitation of minerals.
	Decree no.2220	27-4-1992	Standards to regulate the activities which can produce changes of flow, obstruction of river beds and problems of sedimentation.
	Decree no.2224	27-4-1992	Standards to regulate the discharges of liquid residues to water bodies(derogated by Decree No. 883).
	Law of Urban Ordination	16-12-1987	The ordination of the urban development in all states in order to make a smooth development of the populated centers.

Table 1.2-1 (3/3) Legal Statements on Environment in Venezuela

Classification	Title	Date	Feature and Main Purpose
Human Activities	Decree No. 125	22-4-94	Complementary standards for the phased improvement of activities which produce liquid pollutants affecting environmental quality (derogated by Decree No. 883).
	Decree No. 2211	27-4-1992	Standards of the control of generation and management of toxic residues
Administration	Law of Central Administration	28-12-1976	defining the duties of the MARNR
	Resolution	27-2-81	price list of services of aqueducts and sewer
	Law of Territory Ordination	11-8-1983	States the regulations which will rule the process of ordination of the territory in accordance with the economical and social strategies of the nation
	Resolution 304/28	1-3-93	Price list of the services of aqueducts, collection, treatment and disposal of residual waters.

### (1) Water Quality Standards

The standards for water quality have been established in several regulations from 1978. In such regulations are contained the limiting parameters for pollution due to organic compounds as well as toxic materials.

The regulation presently active and to be applied to the upper and middle stream of the Tuy River basin is Decree No. 883 "Standards for the Classification and Control of Water Quality of the Water Bodies and Discharges of Liquid Effluents" published December 18, 1995.

Decree No. 883 classifies the water into seven types for use. The type applicable to the upper and middle stream of the Tuy River is No. 1, which comprises water for domestic and industrial use that require potable water, and also is divided into three sub-types defined as follows:

Sub-type	Definition
1A	Water that only needs to be treated using a disinfecting process.
1B	Water that can be treated with conventional methods, e.g., coagulation, flocculation, sedimentation, filtration and chlorination.
1C	Water that can be treated with non-conventional methods.

Thus, the sub-type applicable to the upper and middle stream of Tuy River is 1B.

The major items of the regulations comprising the several stages of water from the sewer discharge to the drinking stage are compared in Table 1.2-2.

Table 1.2-1 Water Quality Standard in Decree No.883

Parameter	Type Sub-type	Type 1		Type 2		Discharged Water	
		1-A	1-B	2-A	2-B	to River e.t.c.	to Sewer Net
DO	(mg/l)	4.0 <	4.0 <	-	-	-	-
pH		6.0-8.5	6.0-8.5	-	-	6.0-9.0	6.0-9.0
Color (U; Pt-Co)		50>	150>	-	-	500	-
Turbidity	(NTU)	25>	250>	-	-	-	-
Fluoride	(mg/l)	1.7>	1.7>	-	-	5.0	-
Phenolic Compounds	(mg/l)	-	0.002	-	-	0.5	0.5
Total Coliforms	(MNP/100ml)	2000>	10000>	1000>	5000>	-	-
Fecal Coliforms	(MNP/100ml)	-	-	100>	1000>	-	-
BOD	(mg/l)	-	-	-	-	60	350
COD	(mg/l)	-	-	-	-	350	900
Total Suspended Solids	(mg/l)	-	-	-	-	-	1600
Suspended Solids	(mg/l)	-	-	-	-	80	400
Total Dissolved Solids	(mg/l)	1500	-	3000	-	-	-
Mineral oil	(mg/l)	0.3	-	-	-	20	20
Mineral oil and hydrocarbon	(mg/l)	-	-	-	-	20	150
Oils and greases from veg/animals	(mg/l)	-	-	-	-	20	150
Alkyl Mercury	(mg/l)	-	-	-	-	Undetec.	Undetec.
Aldehydes	(mg/l)	-	-	-	-	2.0	-
Total Aluminum	(mg/l)	0.2	-	1.0	-	5.0	5.0
Total Arsenic	(mg/l)	0.05	-	0.05	-	0.5	0.5
Total Barium	(mg/l)	1.0	-	1.0	-	5.0	5.0
Boron	(mg/l)	-	-	0.75	-	5.0	-
Total Cadmium	(mg/l)	0.01	-	0.005	-	0.2	0.2
Total Cyanide	(mg/l)	0.1	-	0.2	-	0.2	0.2
Chloride	(mg/l)	600	-	-	-	1,000	-
Total Cobalt	(mg/l)	-	-	-	-	0.5	0.5
Total Copper	(mg/l)	1.0	-	0.2	-	1.0	1.0
Total Chrome	(mg/l)	0.05	-	0.05	-	2.0	2.0
Detergents	(mg/l)	1.0	-	-	-	2.0	8.0
Dispersives	(mg/l)	1.0	-	-	-	2.0	8.0
Hardness (as CaCO3)	(mg/l)	500	-	-	-	-	-
Tin	(mg/l)	-	-	-	-	5.0	10.0
Extract of carbon at chloroform	(mg/l)	0.15	-	-	-	-	-
Total phosphorus (as P)	(mg/l)	-	-	-	-	10	10
Total Iron	(mg/l)	1.0	-	1.0	-	10	25
Total Manganese	(mg/l)	0.1	-	0.5	-	2.0	10
Total Mercury	(mg/l)	0.01	-	0.01	-	0.01	0.01
Total Nickel	(mg/l)	-	-	0.5	-	-	2.0
T-N(without NO <sub>2</sub> , NO <sub>3</sub> )	(mg/l)	-	-	-	-	40	40
Nitrites+ Nitrates	(mg/l)	10.0	-	-	-	10	-
Total Silver	(mg/l)	0.05	-	0.05	-	0.1	0.1
Total Lead	(mg/l)	0.05	-	0.05	-	0.5	0.5
Selenium	(mg/l)	0.01	-	0.01	-	0.05	0.2
Sodium	(mg/l)	200	-	-	-	-	-
Sulfates	(mg/l)	400	-	-	-	1000	400
Sulfites	(mg/l)	-	-	-	-	2.0	-
Sulfides	(mg/l)	-	-	-	-	0.5	2.0
Vanadium	(mg/l)	-	-	10.0	-	-	5.0
Zinc	(mg/l)	5.0	-	5.0	-	5.0	5.0
Temperature	(°C)	-	-	-	-	-	40
Biocides							
- Organophosphates and carbamates	(mg/l)	0.1	-	0.1	-	0.25	0.25
- Organochlorates	(mg/l)	0.2	-	0.2	-	0.05	0.05
Radioactivity							
- Alpha activity	(Bq/l)	0.1	-	0.1	-	0.1	0.1
- Beta activity	(Bq/l)	1.0	-	1.0	-	1.0	1.0

## (2) Factory Activities

The activities of the industrial factories are regulated by the following:

- Law of Environment, Art. 20, Item No. 1 and No. 6
- Decree No. 83 concerning to the discharges to sewer networks and water bodies

## (3) Sand Quarrying Activities

There are specific regulations about sand quarrying which are contained in the following:

- (a) Law of Environment, Art. 20, Item No. 1, 2, 3, 4 and 5.
- (b) Law of Mines and its By-laws:

Establish that soils or rocks for construction purposes, ornamental or any other kind which are not precious stones, sand, clay, limestone etc., belong to the owner of the land, who can exploit it without special restrictions. The exploitation of such materials is under the vigilance of the authority related to the police and the security of the works (Art. 7).

- (c) Plan of Regulating Use of the Critical Area with Priority of Treatment of the Tuy River Basin

It establishes the permitted activities in the study area as follows:

- Upper Tuy basin: agriculture, residential, tourism and recreation, industry, mining
  - Middle Tuy basin: agriculture, residential, industry.
- (d) Decree No. 2,219: Standards to Regulate the Affect on the Renewable Natural Resources Regarding to the Exploration and Exploitation of Minerals.

For the case of sand quarrying, the Decree establishes that the standards correspond to Type I, which comprises the explorations and exploitation of minerals of construction and ornament of any other kind which are not precious, to which is referred by the Art. 7 of the Law of Mines.

Specific regulations of the sand mining activities are defined as follows:

Art.28: It is prohibited to extract mineral in reservoirs that supply water to communities, or for hydroelectric development, unless it is as maintenance works;

Art.29: It is prohibited to extract minerals at a distance of less than 1,000 meters downstream or 500 meters upstream of bridges or any other infrastructure work;



**Art.30:** It is prohibited to extract minerals at a distance less than 500 meters upstream of hydrological stations or less than 3,000 meters downstream of water intakes for human consumption of hydroelectric use; and,

**Art.34:** The commercial and the residual materials produced by the extraction activity, should be arranged in such a way not to interrupt the free flow of runoff waters and not to be a source of high production of sediments into the river beds.

(e) **Decree No.2,220:** Standards for Regulation of the Activities which can Produce Changes of Flows, Obstruction of Riverbeds and Problems of Sedimentation.

It establishes that any activity which may produce changes of flow, obstruction of riverbeds and problems of sedimentation, will be performed only after the due authorization be provided by the Ministry of Environment.

#### (4) Piggery Activities

The activities related with the piggeries are regulated as follows:

- (a) Law of Environment, Art.20 item No.1
- (b) Decree No.883 concerning to the discharges to sewer and water bodies
- (c) Decree No. 635: Regulation of Piggery Activities

In this Decree for the regulation of the piggery activities the following is stated:

**Art. 1:** The National Executive will encourage the location of the piggery activities along the National Territory, according to the principles of conservation, protection, and best option regarding the uses of the resources, such as is expressed by the State and Regional Plans of Territory Ordination.

**Art. 2:** All piggery facilities must have mechanisms to control the pollution generated by such activity, complying with the legal norms which regulate this matter. Septic tanks and drains (sewers) are not considered treatment systems.

**Art. 3:** In the protected zones established in Art. 17, Numbers 1, 2, 3 and 4 of the Law of Forestry and Waters, piggery activities are prohibited.

**Art.4:** In the capital region, comprised by the Federal District and the Miranda State and in the states of Carabobo and Aragua with

the exception of Urdaneta District, not enlargements, nor new installations of piggeries are allowed.

**Art. 5:** Those owners of piggeries located in the areas mentioned in the previous article, who do not have mechanisms for the treatment of wastes, required by the corresponding legal norms, will be forced to suffer the corresponding administrative procedures, from the time this Decree was published, and will be sanctioned according to the Art. 25 and 26 of the Environment Law. Further action will be the closure of the piggeries, in order to avoid the continuation of the activities harmful to the environment. The closure of installations mentioned above will be ordered to be undertaken within the maximum term of two years from the date of publication of the present Decree. The closure to be executed under this article will not be subjected to indemnity, excepting when denature (disfigure) the right of property, because such installations have caused environmental damages, endangering the quality of life of the population.

**Art. 6:** The piggery exploitation located out of the area described in Art. 4, must adjust their installations to the current environmental norms and to obtain from the appropriate institutions the administrative authorizations and approvals for use.

**Art. 7:** Concerning location, installation, and relocation of the piggeries, the relevant persons and institutions, must comply the guidelines established in the State Plans of Territory Ordination. Applicable priority areas are the states of Portuguesa, Barinas, Cojedes, Guárico, Monagas and Anzoátegui, excepting the autonomous districts of Bolívar, Bruzual, Peñalver y Botillo and the Districts of Muñoz and San Fernando of Apure State. Do not qualify for the location of piggery development the protection zones of the reservoirs for human consumption, or regions where the availability of water resources is necessary for supply and other priority uses.

Based on Art. 4 and 5 of this Decree the piggeries in the study area of Tuy River Basin which do not comply with the norms should have been closed down by around January, 1992.

**(5) Forest Fires and Tree Felling**

These activities are regulated by:

- (a) Forestry Law of Soils and Water and its By-laws
- (b) Law of Protection of Wild Fauna

(c) Regulation of the Law of Environment concerning the Board of Conservation, Preservation and Improvement of Environment

(d) Foundation for the Protection Against Forest Fires

(6) Fiscal Incentives

From the review of previous and current laws and regulations related to fiscal incentives we get the following results (Table 3.1.2-1):

Table 1.2-3 Historical Review Concerning Fiscal Incentives

Law or Regulation	Date Published	Objective	Status
Decree No. 1.846	26/10/1976	Exoneration of income tax in a period of 3 years of up to 10% to those investments assigned to avoid environment pollution	No (Derogated by Dec. 2.001)
Decree No. 2.995	12/12/1978	Regarding Valencia Lake Basin: - Exoneration of importation tax for equipment, materials and raw material for installation/operation of water treatment systems. - Exoneration of income tax in a period of 5 years for the equivalent amount of the operation costs. - Soft conditions of credit by the government financing institutions for acquisition and installation of equipment for water treatment. To be regulated by the Ministry of Development and the MARNR.	No (Derogated by Dec. 2.001)
Decree No. 2.001	13/5/1983	- Exoneration of importation tax for equipment, materials and raw material for installation/operation of water treatment systems. - Exoneration of income tax in the first year of operation of the decontaminating equipment. - Soft conditions of credit by the government financing institutions for acquisition and installation of equipment for environmental decontamination.	No (Derogated by Dec. 1.302)
Income Tax Law Art. 14, item 3	3/10/1986	Exoneration of tax to those industries which apply methods to avoid the pollution of environment	No
Decree No. 1,302 Art. 3	10/10/1986	Reduction of 10% income tax for investments in equipment, civil works or facilities for the conservation, safeguard and improvement of environment. For local equipment 15%.	No
Income Tax Law Art.62, 63	13/8/1991	Deduction of 10% tax to those industries which make investments to eliminate or avoid the pollution of environment.	No
Decree No. 1,793	7/10/1991	States the applicability of incentives of Decree 1,302.	No
Income Tax Law - Art. 27:	25/5/1994	- Tax deduction for the constructions to comply with sanitary regulations.	Yes
- Art. 118:		- Applicability of tax deductions stated in Income Tax Law of 1991.	No

Sources: a) Collection of laws, b) Consultation with Legal Bureau of Tui Agency, and c) Consultation with Legal Bureau of Finance Ministry (SENIAT)

It can be observed that fiscal incentives have 20 years of history, but they have not been used appropriately due to different problems to be described in other section.

At present we can see that in the current income tax law only for constructions to obey sanitary regulations there is a tax deduction. The applicability of this incentive for environmental regulations is still unclear as there is no agreement among the concerned authorities. Attempts to create an Environmental Fund have been made previously, as explained below.

(7) Environmental Fund

(a) Within the Scope of MARNR

On July 1993 an study of "Program of Technical and Financing Assistance for the Reduction and Control of Industrial Pollution", proposed the creation of an Environmental Fund for the financing of small and medium industries. The Fund would be dependent of the National Environmental Fund which also at that time was been proposed to be created. Optionally the Fund could be dependent on an Administrative Directory of the Fund integrated by the General Managers of the Basin Agencies (including Tuy and Valencia Lake basins), representatives of the factories, and of the Governors, etc. It was proposed the Fund be composed by 20 US\$ million to be provided form the World Bank.

Among the several reasons why the proposed Fund could not be approved by the financing institution at that time (FAO-World Bank) were the following:

- According to such study the current regulation on standards of water quality (Decree 2,224 of April 23, 1992) established that the industries should adjust the quality of their liquid effluents to the limits of the current standards by April 27, 1994. It was considered that having still enough time (from July 1993 to April 1994) to see the actions of the industries to abide by the regulations, to create an environmental fund at that moment was too early.
- To give soft conditions of financing to environmental polluting industries was considered to be so much over-protective with them, taking into account that they are doing a bad activity, not to say a "criminal activity".

(b) Within the Scope of Municipalities

Another attempt to create a "Municipal Environmental Fund" for several municipalities, starting with Urdaneta, in Miranda State, in March 1994, has proved only to be a good intention but have not been implemented. Reasons for this failure are still unclear, however it is known that at the time when the plan was to be implemented the authorities were changed, and the new ones have not followed up the procedures. Pollution charges

are a kind of selective taxes which allows to charge to the polluters according to their pollution loads.

#### (8) Pollution Charges

Pollution charges are a kind of selective tax which allows to charge the polluters according to their pollution loads.

Such a tax is known also as *Pigovian tax* (after Arthur C. Pigou, 1877-1959, who was a professor of Political Economy at Cambridge University, and firstly proposed it).

These taxes are proposed to encourage the installation of equipment for the pollution abatement (or control).

At present mainly the developed countries are applying this type of charges due to the well developed monitoring systems they have. Among them are Germany, France, Holland, Italy, Belgium, Denmark, Australia, USA.

In the case of Germany, the emissions by 14 main polluting industries fell during 1969-1986 as follows:

Period	Rate
1969-1975	50%
1975-1980	20%
1980-1986	10%

It is considered such big reductions were attained by keeping the charges high enough and steady increasing it yearly.

In Venezuela the German Cooperation Agency (GTZ) by using the experience in Germany, has started some work of awareness for future implementation of pollution charges which they call "taxes for waste water". For that they did some presentations to the counterpart on 1995. More recently through a contract with a local consultant a bibliographical compilation have been elaborated. That is a diagnostic report on "Fares, Rates, and Incentives" (Tarifas, Tasas e Incentivos) in which they suggest it is possible the creation of new taxes specifically aimed to the compensation of the necessary expenses for the environmental recovering.

Such taxes, they say, may be created at any level, the national, states or municipalities.

According to the available information, further study for a complete proposal is been considered, and actions to contract another local consultant on this matter are underway.

In the present case we will try to make a proposal according to the available data. It is considered a further study may be necessary previous to the implementation stage.

### 1.3 Legal and Institutional Aspects Regarding the Tuy River Basin

The laws and regulations specifically related to the Tuy River Basin are broadly classified into three: conservation, development and administration (Table 1.3-1).

Table 1.3-1 Legal Statements Regarding the Tuy River Basin

Classification	Title	Date	Features
Conservation	Decree no.1010	20-7-72	Declaration of specially affected zone by the construction of a new urban center in the valley of Tuy with the area of approximately 4120 ha.
	Decree no.1046	20-7-72	Declaration of zone protective of soils, forest and water in the territory around the metropolitan Caracas.
	Decree no.2299	18-1-93	Ordination plan and by-laws of the use of the protective zone of the metropolitan Caracas.
	Decree no.2306	29-3-93	Declaration of critical area with priority of treatment on the Tuy River basin.
	Decree no.2308	26-3-93	Plan of ordination and regulation on the use of the critical area with priority of treatment on the Tuy River basin; Purpose: the improvement, recuperation and ordination of the basin, establishing the guidelines for the administration and orientation of the permitted land use and activities..
Development	Decree no.1039	20-7-72	Permission of a new urban center in the valleys of Tuy, City of Diego de Losada.
Administration	Resolution no.318	20-11-81	Regulations for the use of the sector of El Jarillo (Upper Tuy) for agricultural uses.
	Decree no.2307	12-4-93	Foundation of the Unique Authority of Area Agency of Tuy River Basin and the North Region of the Littoral Ridge of the Federal District and Miranda State.
	Decree no.3240	16-12-1993	Reform of Decree 2307; Incorporating the administration of the office of Protection of the Metropolitan Caracas.

#### (1) Water Pollution

With the application of the current legal norms for reduction of the pollution there are 19 industries (as of Feb/97) whose installation schedules have been approved by the MARNR. Factory names and due dates as well as monthly payments are listed below:

Table 1.3-2 Factories with Installation Schedules Approved

No	Factory Name	Beginning	Completion	Monthly Payment (Bs)
	<b>SUB-BASIN: HIGH TUY</b>			
1	Matadero VITO	2-96	5-96	80,000
2	Inversiones ALNACA	2-96	7-96	80,000
3	INPRODECA	3-96	1-97	80,000
4	La MONSERRATINA	7-95	12-96	-----
5	Tejidos ARAGUA	7-95	4-96	-----
6	RON SANTA TERESA	3-96	7-98	130,000
7	FITSA	3-96	8-96	80,000

<b>SUB-BASIN: MIDDLE TUY</b>				
8	ELECON	2-96	12-96	-----
9	MANPOLE	1-96	12-97	80,000
10	QUIMICAS POLIRESIN	2-96	7-97	80,000
11	SOMANIN	3-96	3-97	80,000
12	FERROGALVAN	4-96	4-97	80,000
13	APLANCHADOS REY DAVID*	-----	-----	-----
14	TEXTILESCOM	10-92	12-96	60,000
15	MULTIPRENS	9-94	9-96	-----
16	BALGRES *	-----	-----	-----
17	TECNOBLUE(PRELAV.	2-96	10-96	60,000
18	CHARALLAVE.)	3-95	1-96	-----
19	AMERICER	1-94	9-96	-----
	ASETRA			
	* Only terms of reference have been approved			

Source: Tuy River Agency, Miranda Office

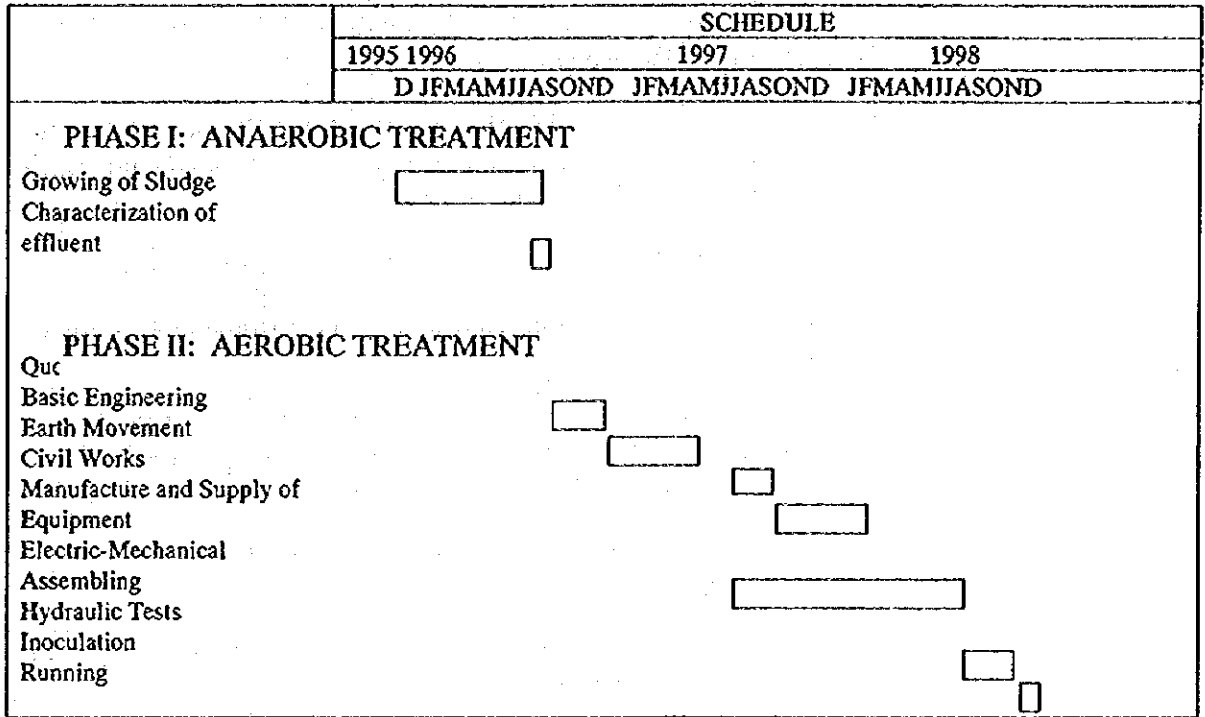
The monthly payment by each factory is based on Decree No. 883 of Dec/18/1995, Art. 46 which states the following:

"The costs of the inspections and verifications performed based on the requests of the factories, during the fulfillment process of adapting schedule, will be charged to the factories through payments to the Autonomous Services of MARNR".

So the payment is not a fine itself, but a charge for inspection of the fulfillment process of adapting (installation) schedule.

An example of the installation schedule approved to RON SANTA TERESA is Fig. 1.3-1.

Fig. 1.3-1 Installation Schedule Approved to Ron Santa Teresa



Source: Tuy River Agency, Miranda Office



## (2) Land Use

Land use is regulated in the Tuy River basin by the Decree No.2,308 (5-6-1992): Plan of Ordination and Use Regulation of the Critical Area with Priority of Treatment Tuy River Basin.

General Objective is to establish the guidelines for the administration and orientation of the uses and activities allowed in the critical area with priority of treatment. Specific objectives are the following:

- To achieve sanitation and environmental recovery of the basin;
- Zoning related to agriculture, industry, mines, residential, tourism and recreation;
- Coordination with the appropriate institutions the establishment of the system of Areas Under the Regime of Special Administration (Areas Bajo Regimen de Administración Especial, ABRAE);
- To define a consolidate urban system according to a sustainable development of the region;
- To coordinate and strengthen the public institutions related to environmental management of the basin; and,
- To promote the participation of the public in the environmental management in the basin.

The allowed uses for the Tuy River Basin in the zones corresponding to this study are:

- Sub-Basin High Tuy: agriculture, urban, tourism, recreation, industry and mineral exploitation; and,
- Sub-Basin Middle Tuy: agriculture, urban, industry.

### 1.4 Enforcement of Laws

With regard to the enforcement of the laws, punishment in the case of violations is discussed hereunder:

The several laws have established penalties for different prohibited activities as follows (Table 1.4-1):

Table 1.4-1 Penalties Established in Different Laws

Law / Activity	Penalty		
	Prison (years)	Fine	Others
<b>Law of Forest, Soils and Waters (26-1-1966)</b>			
Setting fire to forests	1 - 6		
Illegal exploitation of forest products, or destroy vegetation		1,000-50,000 Bs	
<b>Organic Law of Environment (7-6-1976)</b>			
For the enforcement of the law	10 (max)	1,000,000 Bs (max)	-Temporary, total or partial occupation of the polluting sources (not exceed 6month) -Temporary or permanent closure of the factories -Temporary or permanent closure of the activity -Modification or demolishing of buildings -Any other measure to correct/repair damages
<b>Organic Law of Territory Ordination (11-8-1983)</b>			
Activities contrary to the present law, to the plans of territory ordering and to the administrative authorizations.		1,000 - 500,000 Bs. 1/1, 2	- 2 years disability to obtain authorizations - Confiscation equipment - Demolition installations - Repair of the damages
<b>Penal Law of Environment (3-1-1992)</b>			
Discharge of non-biodegradable materials, biological/chemical agents, effluents/waste waters without treatment, to water bodies, river sides, beds or basins	1/4 -1	300 - 1,000 DSM*	
Produce change of flow or sedimentation in the rivers	1/4 -3/4	300 - 900 DSM	
Exploitation of granular materials	1/3 - 2/3	400 - 800	
Pollution of underground water	1 - 2 month	1,000 - 2,000 DSM	
Setting fire to plantations, pasture, forests, etc.	1/2 -6	600-6,000 DSM	
Generation/use of toxic/dangerous substances. Transforming of toxic or dangerous residues which can be transported to other receptive mean. Mixing/operation/discharge of toxic materials with domestic or industrial waste to unauthorized sites, etc.	1 - 3	1,000-3,000 DSM	

\* DSM (*Días Salario Mínimo*)=Minimum Salary per Day=1 US Dollar as of Feb/97.  
 1/: If the damages caused are economically available, fines will be 20-60% of the cost, whenever the fine not be less than the mentioned fines. 2/: Penalties by this law are independent of application of other laws.  
 Source: a) Organic Law of Environment, 1976, b) Organic Law of Territory Ordination, 1983, c) Penal Law of Environment, 1992.

Thus, by using this tools of punishment the ACRT through the corresponding penal courts is applying sanctions to several industries, and their present condition is as follows (Table 1.4-2):

**Table 1.4-2 Present Condition of Legal Sanctions in the Tuy River Basin**

Condition	High Sub-basin (No. of Factories)	Middle Sub-basin (No. of Factories)
Closing of Factory (by using National Guards)	4	
Sued at Penal Court	7	
Administrative Procedure Opened	8	42

Besides it, the branch office of the Agency of Tuy River in the Miranda State reports the followings activities during the period 1994-1996 (Table 1.4-3):

**Table 1.4-3 Application of Legal Actions during Period 1994-96**

Action	1994	1995	1996
Miscellaneous Penalties	523		
Closing of Factories			4
Administrative Sanctioning Procedures	261	260	1,060
Control of Permissions and Activities	697	183	250
Inspection of Industries, Piggeries and Hotels	210	107	75
Control of Afforestation	110		
Processing of Requests of Deforestation with Agricultural Purposes	518	260	
Analysis of Record of Industries	157		
Denunciations Attended			450

## 1.5 Education and Public Awareness

### 1.5.1 Within the Scope of the Tuy River Agency

Education and public awareness within the Tuy River Basin Agency are the responsibilities of the Programmatic Management of Participation, Education and Relations with the Users (*Gerencia Programática de Participación, Educación y Relaciones con los Usuarios*), which is directly under the General Management of the Agency. The main activities of the management office are or have been:

- Execution of workshops for elaboration of Local Plan of Ordination and Environment Management, PLOGA (*Plan Local de Ordenamiento y Gestión Ambiental*) with the participation of representatives of resident associations, municipalities and the local government, for the formulation and proposal of solution of the environmental problems.
- Participation in meetings of resident associations of the municipalities with the purpose of collecting information.
- Interview of mayors, counselors and representatives of the public.
- Execution of seminars for manufacturers ("The manufacturers and their participation in Environmental Management").
- Elaboration of the training plan of the Agency, which will be the guideline for training and development of human resources.

- Publication of course invitations for the staff. Processing and evaluation of applications. (In the second semester of 1995, thirty-five officials were registered in the training courses and one for a post graduate course. In addition, ten other officials are studying at post graduate courses.)
- Participation with the working team coordinated by ODEPRI (Office for Professional Development and International Relations) for the elaboration and design of the training program for Integrated Management of the seashore areas in Venezuela, to be supervised by the MARNR.
- Publication of the Informative Bulletin of the Agency (*Boletín Informativo de la Agencia*).
- Elaboration of the Agency Operative Plan 1995 (*Plan Operativo de la Agencia 1995*)
- Elaboration of the annual activities/financial report 1995 (*Memoria y Cuenta 1995*) corresponding to the Tuy River Basin Agency for submission to the Commission of Financial Accounting of the Environment Ministry.
- Participation in the First World Congress of Environment Education, held in Caracas in 1995, with a presentation related to the methodology of participation of the public: "Local Plans of Ordination Environment Management (PLOGA)"
- Publication of articles in the local newspapers about management of the Tuy River Basin Agency.
- Publication of "Standards of Environmental Quality Control", a guide to manufacturers, 1993.

### 1.5.2 Cooperation Between the Ministry of Education and MARNR

On March 26, 1996 an agreement was signed between the Ministry of Education and the MARNR. Its main purpose was to unify, formulate, and coordinate programs and projects in order to encourage the environment education in the development process of Venezuela.

Later, the agreement will be adjusted to an operative basic plan in order to be approved by both sides which will have the following guidelines:

- Evaluation and reconsideration of the environmental education in the curriculum design of education at different levels: pre-school, primary, secondary, tertiary and post graduate education.
- Integration of methodological strategies of environmental education in the practical guides of activities of the teachers at the pre-school level.

Besides, further topics are considered, namely, the incorporation of new environmental contents in the primary education, introduction of environmental information and teaching technique in the secondary and higher education.

Apart from public education, the staff training for environmental education are also considered to be upgraded.

The agreement contains the promotion of environmental education in different categories: adults, military, indigenous and border area.

Information on short term actions is not available yet because only a few months have passed since the agreement.

### 1.5.3 Existing Non-Governmental Organizations (NGOs)

There are four non-governmental organizations recognized important in the study area:

Name of NGO	Location
Sociedad Conservacionista del Tuy	Ocumare del Tuy, Miranda State
Junta del Ambiente de los Teques	Los Teques, Miranda State
Comision de Ecologia, Asamblea Legislativa	Los Teques, Miranda State
Sociedad Conservacionista Sucre	Cagua, Aragua State

Aside from the above, other 199 environmental NGOs are located in some entities as follows:

Federal Entity	No. of NGOs
Federal District	167
Miranda	16
Aragua	16
Total	199

Source: *Balance Ambiental de Venezuela, 1994-95*, MARNR

At present the Tuy River Basin Agency keeps contact with some NGOs in order to coordinate the environmental actions in the basin.

## 1.6 Identification of Key Issues and Problems

### 1.6.1 Institutional Measures Already Adopted and their Status

Institutional measures have not been discussed as a direct cause of pollution, e.g., organic pollution, toxicants and turbidity. In this section, discussion is made by considering the institutional aspects.

### 1.6.2 Laws and Regulations

The present condition of the laws and regulations has been discussed in previous sections. Here, key issues and problems of legal framework and condition of enforcement of these laws are discussed in order to identify the necessary improvement.

#### Legal Framework

The legal framework of activities that result in pollution has been identified. Firstly, the Law of Environment was analyzed. Existing water quality standards were

accordingly analyzed, and the legal framework for activities of factories, sand quarry, piggeries, forest fires and tree falling was identified.

### (1) General

The Law of Environment defines those "Activities Susceptible to Degrade the Environment" (Art. 20) as follows:

- Activities directly or indirectly polluting or deteriorating the air, water, sea depths, soil or subsoil, or unfavorably affecting fauna and flora.
- Harmful disturbances to the topography.
- Harmful disturbances to the natural flow of waters.
- Sedimentation along the riverbeds and water reservoirs.
- Harmful changes of water beds.
- The introduction and use of non-biodegradable products or substances.
- Produce disturbing or harmful noises.
- Damage the landscape.
- Modify the climate.
- Produce ionizing radiation.
- Cause accumulation of residues, garbage and waste.
- Cause eutrofication of lakes and lagoons.
- Any other activity capable of altering the natural ecosystem and negatively affecting the health and well-being of the people.

The same law establishes the mentioned activities which may produce non-irreparable damage and which are considered necessary under economic and social points of view. They can be authorized if the necessary guaranties, procedures and norms are established for their due correction (Art.21).

Thus, considering the Study Area we can identify as environmental degrading activities those which finally produce water pollution or shortage such as factories, sand quarries, piggeries, forest fires/tree felling, etc.

### (2) Water Quality Standards

Under the current standards of water, Sub-type 1B established by Decree No. 883, the limits for BOD have disappeared, though it is a parameter internationally used for water quality evaluation of raw water assigned to human consumption before treatment. In the previous Decree, valid up to December 1995, this value had been fixed to a limit of 2.5 mg/liter. Thus, in relation to the organic contamination of water only the parameter of DO is in current use.

However, the parameter of DO gives different values according to the time the samples are taken, day or night time, especially in polluted streams with algae

influence due to photosynthesis. Thus, it is recommended that a complete cycle of 24 hours of sampling is made to have accurate testing.

By this consideration it appears that only DO may not be a sufficient parameter to evaluate the quality of the Tuy River water and consequently analysis should be done in the sense of introducing again the parameter of BOD for further evaluation of these waters. As a reference in Japan the limit of this parameter for this type of water is less than 3 to 5 mg/liter.

Also in the current water quality standards for waters Type 1B, the parameter of Suspended Solids (SS) has not been included. Considering that it is an important factor to measure the turbidity of water, SS shall be included in the proposed classification and quality standards for Tuy River Basin.

### (3) Piggery Activities

Based on the previously mentioned Decree No. 635, the piggeries in the Study Area of Tuy River Basin which had not been adequately equipped with respect to the standard should have been closed down by January, 1992. However, although the Agency has undertaken great efforts to comply with this regulation, it has been difficult to attain the goals due to the following facts:

- Transition phase between the program of SARETUY and the relatively recently creation of the Agency of Tuy River Basin (April/93).
- Lacking of enough resources at the many polluting farms for the timely inspection and sampling.
- Resistance of affected farm owners to abide by the verdicts of lower level justice courts. The owners appeal to higher courts claiming some other non-environmental related regulations favor them, like those related to employment rights, etc. There is at least one case of a farmer, after being closed down by the Agency, appealing on these grounds. The farmer was victorious and his property and livelihood returned.
- The environmental related crimes are tried in the common civil courts where cases of murder, robberies, etc., are also tried, which are more numerous and urgent. This situation produce longer waiting periods for the environment related lawsuits in comparison with the others.
- Environmental related lawsuits are of relative recent practice, so there are not so many professionals acquainted with the procedures in comparison with the other cases.
- Occasional soft application of the law from the authorities in charge. For example, at least one case (Agropecuaria 67, Boca de Cagua, High Tuy River Basin) was dismissed based on the fact that on December 18, 1995 Decree No.883 was published dictating the "Standards for the Classification and the Quality Control of the Water Bodies and Liquid Effluents" which overrides Decree 2,831 of August 29, 1978, Decree 2,224 of April 23, 1992 and Decree 125 of April 13, 1994.

Regarding this last point, considering the fact that the legal procedures were initiated because of the violation of the Law of Environment, Art. 20, No. 1 and Presidential Decree No. 635 on the regulation on piggeries, the same procedures should be finalized after satisfaction of these regulations. However, the justification to dismiss it was the change of other regulations which only resulted in a change in the values of some parameters of water quality standards without producing any void of the law.

The consequence of deciding to dismiss the case because of the change of water quality standards would mean also the closure of all the initiated procedures concerning other piggeries, industries, sand quarry companies, etc., which are doing environment degrading activities, and they could continue undertaking it unless new proceedings are started.

#### (4) Problems Regarding Applicability of Incentives

The first fiscal incentives for activities related to the protection of the environment were established some 20 years ago, around the same period as the publication of the Law of Environment (16-6-1976) and the creation of the Ministry of Environment (26-12-1976). However, their application has been difficult due to the following:

- The contents of regulations are ambiguous, unclear, or overlapping other laws.
- Too frequent changes and modification of laws
- Lack of legal information from the institutions in charge to beneficiaries
- Difficulty in procedures for fiscal incentives
- Originally, environmental activities were not specifically considered as subject to fiscal incentives in the current Income Tax Law. In a recent judgment by the Tributary Agency (SENIAT) it was necessary to open the applicability of the incentives.

### Enforcement of Laws

The status of law enforcement is discussed below for the monitoring system and punishment.

#### (1) Monitoring System

The monitoring of the water quality in the upper and middle stream of the Tuy River basin has been proposed by GTZ and implemented by the Tuy River Agency. A constraint of this system is recognized that there are deficiencies of the laboratory. It does not allow the performance of analysis required for a complete monitoring system.

In order to avoid paralleling activities already planned, the present study may consider the possibility of reinforcing the present laboratory or to install another one exclusively for the use of the Tuy River Agency as has been previously proposed by some authorities. Another contribution may be to



install new stations or rehabilitate existing hydrological stations in order to undertake more accurate and permanent measurements of river flow and water levels.

## **(2) Punishment in the Case of Violations**

Considering that many laws and regulations (more than 30) have been established regarding all the known environmental aspects and specifically concerning the Tuy River basin, it is certain that the legal framework has been almost settled. What is important is enforcement of the laws.

For example in the Penal Law of Environment there is established some action to persons who start forest fires. The punishment corresponds to six months to five years in prison and fines of 600 to 6,000 DSM (Minimum Salary per Day). According to the collected information these punishments have not been handed out because it is so difficult to apprehend the perpetrators.

In the Law of Forest, Soils and Water it is stated that in the event of permission to burn residues of tree felling, open fire around parcels having a width of about 5 meters are to be carried out by burning in small portions on the days without strong winds, etc. These conditions are difficult to check so the regulations are not obeyed.

### **1.6.3 Organization and Operational Management**

Although the Tuy River Basin Agency was created by Decree No. 2,307, dated on June 5, 1992 and published on April 12, 1993, the setting up of the main high level structure of the institution is pending. According to the Decree, the Superior Council should be comprised of 4 members, the Advising Council of about 100 members and the Executive Directorate of 9 members. However, up to now only in the last group is composed of the General Manager who is named by the Minister of MARNR; the other members have not been named yet, after 3 years since the creation of the Agency.

In one sense the completion of the organization may produce a more strong institution capable of generating enough economic resources to comply with the purpose to which it was created.

The intention of having sufficient representatives of the authorities and civil society is good. However, since so much time has passed without the creation of such an organization and the legal problem which have occurred, it shows how difficult it would be to operate the agency with such a complicated structure. Having worked so far without such structure, it is probable the Agency could continue to work well in the same way.

#### **Personnel Aspects**

According to the study of "Plan on Training and Development of Personnel" elaborated by Fanny Parilli in 1995, the environmental professionals (66) within the ACRT have the highest level of academic training.

Thus, no special consideration of training in this regard is proposed. However it is recommended to update training in environmental aspects, such as monitoring, environmental inspections, procedures, etc. At the same time related to the legal regulations, constant updating is deemed necessary, especially for the personnel concerned with the activities of inspection. It is so because of the constant changes of such regulations.

### Financial Aspects

Financial aspects are discussed for Tuy River Basin Agency and HIDROCAPITAL as follows:

#### (1) Tuy River Basin Agency

From the distribution of budget for the Agency it is observed that personnel expenses (salaries) consist of more than 2/3 of the total budget, 483,351 out of 702,624 US dollars, reducing the operations work to a minimum portion.

Considering the magnitude of the work assigned to the Agency, the budget seems to be inadequate. Knowing that the total budget of the MARNR is Bs. 97,873,000,000 (approx. 211 million US dollars) and the Agency's budget only represents about 0.3% of the MARNR budget, and considering the beneficiary population in the Tuy River basin approaching 5 million (almost 25% of total population), and also the area covers one of the most important industrial zones of the entire country (about 50% of the total) the Agency should be correspondingly strengthened in the financial aspects.

Additional financing sources should be looked for in order that the Agency can comply with all the functions for which it was created.

At present there are talks underway between ACRT and HIDROCAPITAL in order that the value of the raw water used from the basin of Tuy River be paid to ACRT as established by the Decree of Creation of the Agency regarding the assets which includes the funds originated by the services of water use.

Although the Decree does not specify the amount to be paid to the ACRT, the value considered is about 10% of the invoiced water.

Besides, according to the mutual resolution No. 304/28 of March 1, 1993, between the Ministry of Promotion and MARNR regarding the Charges for Water Supply, Sewer and Wastewater Treatment, 10% of charge will be applied for Wastewater collection and disposal, and another 10% for wastewater treatment. Thus if the ACRT undertake the construction of facilities in this regard, a just acknowledgment of such expenses should be attained.

It is expected that conclusion of the talks will produce a common agreement acknowledging all these payments.

## (2) HIDROCAPITAL

This institution, besides its own revenues and the transference of the national government, has obtained some financing from the Andean Promotion Corporation (CAF, *Corporacion Andina de Fomento*) for the project of Rehabilitation of the Pumping Systems of Tuy I to be executed during 1996-97.

Also through an agreement with EXIMBANK of the USA and based on an evaluation of the treatment plants performed by the French Consortium SAUR-GDE in 1994, the Agency is in the process of negotiating acquisition of equipment for rehabilitation of the treatment plants which supply drinking water to Caracas, the Seashore and Panamerican Zones.

Also the program "Improvement of Water Supply Administration" is presently being conducted with assistance from IDB and the World Bank.

Nevertheless, the financial situation of HIDROCAPITAL has become increasingly difficult in recent years. Urgent measures are needed to stabilize the financial situation of this institution. One of such measures may be the review of the selling prices of water to the consumers.

### Facilities and Equipment of the Tuy River Agency

Besides the problem of not having a proper building, at present the Agency is lacking equipment and materials, for example, a copying machine, printers, audiovisual equipment, vehicles, etc. Similarly, small purchases of paper, and several office supplies cannot be readily obtained because of the lack of a quick purchase system and also the scarcity of funds is so extreme that the funds run out before the scheduled period.

In the field, the operative units have resource limitations (vehicles, daily allowances) for performing specific inspections and to follow up the vigilance in the assigned areas related to authorized activities or those prohibited in the area of the basin.

### Related Project: Sanitation of the Valencia Lake

An institution similar to the Tuy River Basin Agency was created under Decree No. 2,309 of June 5, 1992 and published in the Official Gazette on April 12, 1993. Thus, created was the Unique Authority of area named "Agency of the Basin of Valencia Lake and the North Slope of Littoral Mountainous Area of the Aragua and Carabobo States".

The organization of this agency is similar to that of the Tuy River Basin Agency. It is considered that the institutional structure for the execution of future projects in the Tuy River basin may be similar to that of the Valencia Lake basin.

#### 1.6.4 Public Awareness on Environment

Environmental education has been performed by the Programmatic Management of the Tuy River Basin Agency, having periodic meetings with the resident associations

of the municipalities, with the mayors and other representatives of the civil society. Also some seminars promoted by GTZ have been organized focusing on the manufacturers. For example, "The Manufacturers and Their Participation in the Environment Management" was held last year in order to exchange experiences in aspects related to treatment systems from part of the industrial sector, attended by 33 manufacturers of the basin of Tuy River.

Other activities are the publication of environmental aspects in local newspapers, as well as participation in national or international events.

One of the aspects, which is apparently lacking of public awareness in relation to environment, is the disposal of domestic garbage. Usually people throw garbage over nearby riverbanks, with the intention of flowing it downstream however, they accumulate contaminating the waters.

Another factor to be taken into account is the large number of forest fires produced in the dry season. There have been identified six main causes of these fires:

- Use of fire in traditional agricultural practices;
- Use of fire in old pastures to regenerate new growth;
- Use of firewood or coal in activities of hunting or tours;
- Carelessness of smokers who throw away lit cigarettes;
- Burning of rubbish; and,
- Vandalistic actions of irresponsible persons

Even when there are sufficient legal regulations regarding the prevention of forest fires it seems that compulsory measures are inadequate. Also countermeasures of forest fires should be strengthened in order to quickly extinguish fires.

Regarding these aspects where public awareness is weak, the program on environmental education will carry out activities to enhance public awareness.

### **1.6.5 Strengthening of Institutional Measures**

Strengthening of institutional measures will include those identified in the previous chapter. Although further study is needed, the following will be taken into consideration.

#### **Laws and Regulations**

Laws and regulations are sufficient to a large extent. The following will be necessary to promote the implementation of the program.

- Introduction of BOD as an organic pollution indicator to the Tuy River
- Introduction of SS as a pollution parameter in Tuy River
- Necessary arrangement of laws for the establishment of Environmental Fund
- Consideration of fiscal incentives for investments in wastewater treatment

facilities

- Introduction of pollution charges
- Financial Enhancement of ACRT (Auto-financing)

### Enforcement of Laws

Many of the present problems related to the environmental improvement of the objective area have causes in the application of laws and regulations. The following action will be needed for the implementation of the program.

#### (1) Monitoring System

As discussed before some activities are identified to be included in the program. However the items shall be selected to avoid parallel work with that of GTZ. The proposed activities are the following:

- Reinforcement of the present laboratory or installation of another exclusively for the Tuy River Basin Agency.
- Installation of new stations or rehabilitation of the existing hydrological stations in order to make more accurate and permanent measurements of discharge and water levels.

#### (2) Punishment

Application of punishment is deemed necessary in combination with the support system. Application of punishment shall be promoted with the enhancement of monitoring system and measures to level up public awareness of the environment.

### Organization and Operational Management

Organizational, personnel and financial measures will be proposed on the basis of the present key issues and problems as presented in the previous chapter.

### Public Awareness on the Environment

As discussed before, some activities have been conducted under the assistance of GTZ. In the present program, necessary items for public awareness will be identified and selected considering no parallel work under GTZ.

The activities will be performed through the Environmental Education Program.

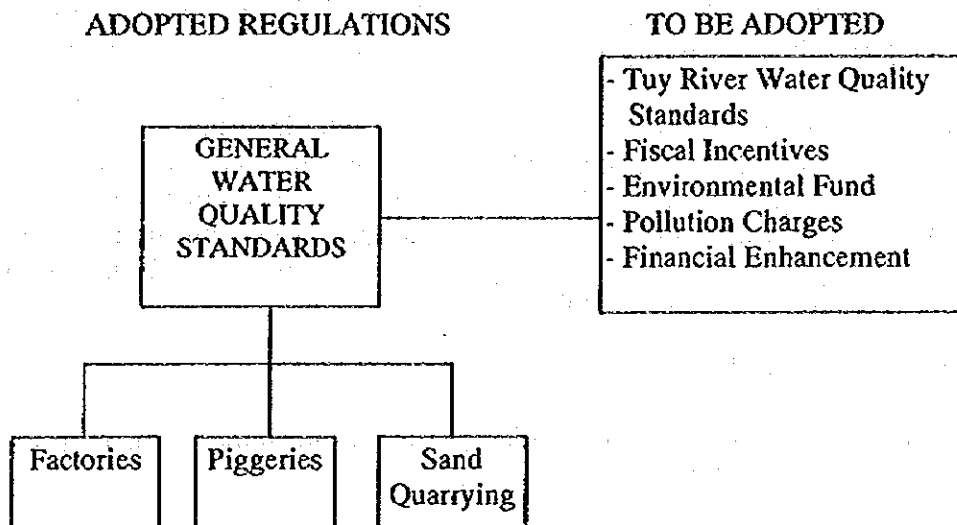
## 2. MASTER PLAN STUDY ON INSTITUTIONAL MEASURES

### 2.1 Improvement Plan for Laws and Regulations

As mentioned in previous sections, there are about 35 laws and regulations concerning the environmental aspects which comprise matters like mining, forestry, erosion and sedimentation, water quality, discharge of liquid effluents, territory ordination, urban ordination, piggery activities, environmental safeguards, management of solid residues, etc.

Regarding the Tuy River basin this legal framework can be seen as a tool for the improvement of water quality through the regulation of several activities like factories, piggeries, sand quarrying, forest, etc. However, there are still some regulations and measures to be undertaken in order to support the existing ones and compose an integral legal arrangement for the sanitation of the Tuy River basin.

Schematically, the present situation is as follows:



Therefore the legal arrangements here proposed will be undertaken in order to have a more complete coverage of the regulations regarding the establishment of water quality standards for Tuy River, fiscal incentives, creation of an environmental fund, pollution charges, and financing enhancement of ACRT.

#### 2.1.1 Classification and Water Quality Standards for Tuy River

Article 5 of Decree 883 published on December 1995 states that the classification of each water body will be made by the national executive, and specific standards on effluents also will be classified.

Considering the fact that the waters of Tuy River have not been specifically classified and that the mentioned Decree 883, do not consider neither the standard for BOD in the case of water Sub-type 1B (which corresponds to Tuy River) nor the standards for

the parameter of Suspended Solids (SS), it is deemed necessary the elaboration of specific standards for Tuy River.

### **2.1.2 Fiscal Incentives**

The current Income Tax Law published on May 25, 1994 and December 18, 1995 (revised) unfortunately do not pick up the environmental sense of the previous regulations and no consideration to this point is given.

Nevertheless, in Art. 58 of the current law, established are incentives of tax reduction of 20% on the amount of new investments in industry and agro-industrial activities designed to effectively increase production capacity, made in the period of the following five years after the publication of the law.

Also in Art. 27, Item 10, are considered tax deductions for the constructions to comply with sanitary regulations. At present after consultation with concerned authorities it is unclear whether or not such condition include the environmental regulations. A further investigation is to be undertaken.

Considering that environmental activities are not specifically included in the current law and that it is necessary to encourage and promote environmental protection facilities in the industries, proposed is either reactivating the previous Decree or considering tax reduction benefits in the current law for investments in environmental protection related facilities. This can be done by the modification of the law through the National Congress or by creation of a new Decree by the initiative of the MARNR through its legal bureau for approval of the President. Alternatively, the inclusion of environmental aspects in the sanitary regulations can also be considered, which could be decided through an analysis of the tributary authorities.

### **2.1.3 Environmental Fund**

An Environmental Fund (EF) is proposed for the implementation of part of the program contained in this Master Plan.

The resources of the EF will be used to finance a soft loan for wastewater treatment facilities of factories, sand quarrying, and piggeries which do not have the financial capability to absorb the investment cost, or because of high priority given by the government due to their polluting effects.

The ACRT shall establish the priorities for financing pre-investment studies and the realization of the works, depending on the location, used water volume, pollution loads, type of production process, economic activity, proposed treatment, etc.

At the pre-investment stages the EF will allow the elaboration of pre-feasibility, feasibility and design studies of treatment facilities. Projects of effluent treatment plants for a group of small or medium size factories or piggeries shall have high priority for inclusion in this program. The EF also will allow and promote the training of technical staff.

The financial aspects of the proposed Environmental Fund are considered in the corresponding section.

#### **2.1.4 Pollution Charges**

It is proposed to introduce pollution charges for factories and piggeries.

The main purpose is to charge the polluters accordingly with the pollution load they have. Also it is considered that the charge be increased periodically to take into account the delay to comply with the regulations and the relative damage to the environment.

#### **2.1.5 Financial Enhancement of ACRT**

Since the ACRT was created as an Autonomous Service without Juridical Personality, one of the targets should be the getting of auto-financing through the service it gives.

One of the most important service the Tuy river basin provides is the allotment of 2.39 m<sup>3</sup>/sec for the total production of HIDROCAPITAL which is 19.11 m<sup>3</sup>/sec (i.e., 12.5%).

So far, both institutions have been discussing the amount which HIDROCAPITAL should reimburse to ACRT. These talks have been based on the Decree of creation of ACRT which establish as one of its assets the service of water use. Although no specific amount is mentioned in such Decree, in the discussions about a 10% of the raw water value is being considered.

Besides, in an independent regulation mutually agreed by the Ministries of Promotion and MARNR, charges for wastewater collection/disposal as well as waste water treatment are established at 10% each. It is deemed necessary that such funds be reimbursed to ACRT as the institution to implement such facilities of this type in the present study.

A proposal considering these facts is made in this study.

## **2.2 Improvement Plan for Organization**

For the implementation of the Master Plan, MARNR will act as the counterpart institution, and the offices of the Tuy River Basin Agency and Hidrocapital will directly coordinate the execution of the project.

Considering the specific purposes for which the ACRT has been created, the Agency has the responsibility to execute plans, programs and projects of environmental management, and to execute works directed to environmental sanitation as well as promote and coordinate the necessary financing for the execution of the works of environmental conservation either for the public or private sector.

In the case of Hidrocapital, it has the duty to guarantee potable water, and should assume such responsibility. Therefore, at the stage of project execution, the Tuy River



Basin Agency will participate through the Management of Studies, Planning and Projects department for the physical execution and through the Office of Administration and Budget for the financial execution.

Considering that in the ACRT there is no experience with projects of this magnitude, the creation of design and construction sections, as well as the recruitment of some technical staff such as engineers (sanitary, civil, electrical), and architects is considered. In view of the valuable experience of the staff working at present in the Valencia Lake Project which is in the final stage of execution, some of them may be transferred to the Tuy River Basin Agency, to work in the construction of wastewater treatment facilities. Another alternative is the creation of an Executing Unit which would coordinate the execution of the civil works during the period of construction. Besides, some equipment for the implementation of the works will be needed such as vehicles, copy machine, computer, etc.

In the case of Hidrocapital, an institution with long experience in the development of projects of different magnitude, the creation of new sections will be unnecessary, but recruiting of some staff and acquisition of equipment may be necessary. Alternatively, considering the magnitude of the works, an executing unit can be also considered.

## **2.3 Study on Education Program to Promote Public Awareness**

### **2.3.1 Measures**

For the effective implementation of the Master Plan, an education program to promote public awareness on environmental issues shall be undertaken to include all the sectors involved in the basin. Therefore, the program is focused on three points of view: the education system, the public, and the manufacturers.

Thus, for the implementation of the Education Program to Promote Public Awareness, the following measures are proposed:

#### **(1) At the Level of the Education System**

The Tuy River Basin Agency shall follow up the current cooperation agreement between the Ministry of Education and MARNR signed in March, 1996.

Based on this agreement, the Agency shall promote that all education-related institutions within the basin, from kindergarten to the highest level, shall provide steady guidance on the main environmental issues. This promotion shall be coordinated with the resident associations and the existing NGOs.

The contents of the main environmental issues include water pollution problems caused by effluents from factories and piggeries and waste water from urban centers, significance of improvement of water quality of the Tuy River, waste disposal in urban areas, measures against tree felling and forest fires, and so on.

(2) At the Level of the General Public

- Periodic publication of the "Informative Bulletin of the Agency" (Boletín Informativo de la Agencia) is highly recommended. This bulletin shall be made available to the residents of the basin, especially, the persons which have prominent activities inside it, such as the municipal authorities and NGO related personnel. Contents shall always include the current main environmental issues, laws and regulations such as those relating to water quality, tree felling, forest fires, sand mining, waste disposal, etc.
- Publication of newspaper articles related to the environmental protection of the Tuy River Basin is recommended. The impact of newspapers on society is more direct and wide reaching compared with the bulletin. So partial reproduction of the contents of the bulletin can be included specially those issues related to water quality, forest fires, sand quarrying, and waste disposal. The current laws and penalties applied when violated shall be mentioned too.

(3) At the Level of Manufacturers

- Periodic workshops and seminars addressed to the manufacturers shall be prepared by the Agency in the implementation of the project. This will produce a continuing awareness in who are in charge of large pollution sources. Also this makes the manufacturers notice significance to comply with the water quality standards resulting in promotion of installation of treatment plants.
- The publication of the pamphlet "Standards of Environment Quality Control, a Guide for Manufacturers" is recommended to be issued at least once a year. The last one was published in 1993, and contained the old water quality standards, therefore, it is necessary to update it to the new standards.

It is estimated that the program will need an additional yearly budget of about US\$40,000 to perform these activities.

### 2.3.2 Personnel

The personnel to perform these activities will be those currently employed in the Management of Participation, Education and Relations with the Users, a division of the Tuy River Basin Agency. Basically the staff is sufficient in number and well trained, however, some updating and/or training courses shall be considered for technicians. Recruitment of the existing or new staff in publishing aspects is also recommended.

### 2.3.3 Equipment and Materials

For performing the mentioned activities some basic initial equipment and materials will be necessary. This will be used to strengthen the office of Programmatic Management of Participation, Education and Relations with the Users. The list of such equipment as well as the estimated costs are shown in the following Table:

**Equipment for Strengthening Environmental Education and Public Awareness**

Equipment	Number	Cost (US\$)
Vehicle	1	30,000
Computer/Printer Set	2	7,000
Portable Computer/Printer Set	1	4,000
Copy Machine	1	4,000
Overhead Projector	1	1,000
Slide Projector	1	800
VCR	1	700
Color TV	1	700
TV Camera	1	1,500
Photographic Camera	1	300
Total		50,000

### **3. FEASIBILITY STUDY ON INSTITUTIONAL MEASURES**

#### **3.1 Provision of Laws and Regulations**

##### **3.1.1 General**

The concept of this Study for the setting up of legal arrangement is to integrate environmental regulations in such a way that the regulations support each other in order that the legal framework will be effective as a whole.

At present there is an existing framework of regulations to obligate the polluting industries to eliminate or reduce the pollution to standardized values. However, due to problems in the applicability of such regulations and the lack of supporting incentives the compliance has been slow.

In the Feasibility Study, the proposed measures to complement the existing regulations are justified and proposed.

The measures proposed here are the following:

- Fiscal Incentives (tax deduction)
- Environmental Fund
- Pollution Charges
- Classification and Water Quality Standards for Tuy River
- Financial Enhancement of ACRT (Auto-financing)

The first two measures are considered as incentive measures, since their purpose is to encourage the compliance of the existing regulations as well as the others proposed. This is attained through reduction of tax due to installation of anti-pollution equipment, and soft conditions of financing by the environmental fund.

The third measure has the purpose to push the polluters into installing anti-pollution equipment. It is a coercive measure.

The fourth measure has the purpose to complement the existing regulations on water quality specifically for the Tuy River.

The fifth measure is a proposal based on the existing legal framework and it is being discussed between ACRT and HIDROCAPITAL.

Concerning the incentive and coercive measures a summarized description of their main features is made in the following (Table 3.1.1-1).

Table 3.1.1-1 Description of Main Features of Incentive and Coercive Measures

Measure	Merit	Demerit
(1) Fiscal Incentives (Tax deduction)	<ul style="list-style-type: none"> <li>- Protection of the environment compensates the revenues not received by the government.</li> <li>- All people is beneficiary of the incentives specially industry and piggery owners and the public.</li> <li>- Allow to the polluters to participate in the environment recovering.</li> </ul>	<ul style="list-style-type: none"> <li>- The government do not receive a portion of revenues through the tax system.</li> <li>- It is necessary to dispatch staff to check the operation of the equipments.</li> <li>- At the end of the incentive period, the original motivation to protect environment may be lost.</li> </ul>
(2) Environmental Fund (soft loan, etc.)	<ul style="list-style-type: none"> <li>- Allows to fix priorities of treatment to certain industries or piggeries.</li> <li>- Allows to acquire equipment to enterprises of all scales.</li> </ul>	<ul style="list-style-type: none"> <li>- Staff for inspection is necessary.</li> <li>- There is a risk of lack of payment of the financing.</li> </ul>
(3) Pollution Charge (or pollution tax)	<ul style="list-style-type: none"> <li>- Allows to evaluate and charge more to the sources of pollution according to their pollution loads.</li> <li>- Allows to sanction the polluters when the incentives have already disappeared.</li> <li>- Charges can be gradually increased when polluters do not reduce their loads.</li> <li>- It is intended to encourage the polluters to install pollution abatement equipment.</li> </ul>	<ul style="list-style-type: none"> <li>- A continuous monitoring of the pollution loads is necessary.</li> </ul>

Although there are some demerits in each measure, merits are overwhelming. Furthermore, considering acceptability to the population and specifically by the authorities and the polluters these measures need to be implemented.

In the following sections each of the mentioned measures are proposed.

### 3.1.2 Fiscal Incentives

#### Adoption of Fiscal Incentives

Considering that at present no factory has been availing of fiscal incentives and that the opinion of at least four related lawyers was not conclusive, official consultations with the National Integrated Service of Tributary Administration, SENIAT (*Servicio Nacional Integrado de Administración Tributaria*) were made. Consultations were emphasized on whether the term "sanitary regulations" contained in the current law of income tax (Art. 27, Item 10) include the environmental regulations or not. The study team's opinion is that since the water of Tuy River is largely used for human consumption after the corresponding treatment by HIDROCAPITAL, such condition should be considered for final judgment.

SENIAT gave the result of its study, concluding in the judgment the following (see Annex):

"The current law of income tax, in Article 27, Item No. 10, establish the deduction of expenses for taxpayers due to fulfillment of sanitary regulations, within which the environmental regulations also can be included".

Therefore, the fiscal incentive corresponding to tax deduction has been created in this way, opening the adoption from February 26, 1997 date of the Judgment by SENIAT.

### Estimation of Tax Deduction

Considering that the value of each treatment plant is US\$200,000 (Bs 94,000,000), a gross estimation of the tax deduction for each factory at the implementation of the present Feasibility Study is as follows (Table 3.1.2-1):

Table 3.1.2-1 Estimation of Tax Deduction for Each Factory

No.	Income Bracket per year (Bs.)* (Income Tax Law)	Income Segment for Each Factory (Bs)	Tax Rate (%)	Tax (Bs.)	Tax (US\$)
1	Up to 3,400,000	3,400,000	15	510,000	1,085
2	3,400,000 to 5,100,000	5,100,000	22	1,122,000	2,387
3	More than 5,100,000	85,500,000	34	29,070,000	61,851
	Total	94,000,000 (200,000 US\$)		30,702,000	65,323

\* Original values in the Income Tax Law are expressed as Tributary Units (U.T.) equivalent to Bs 1,700/1 U.T. as of Feb. 1997

Based on the above table the original value of US\$200,000 deducted from the gross income of the factory as a deduction for the calculation of the tax would represent an actual value of US\$65,323. It is the tax which the government will not receive from each factory. For each factory such amount represents a "discount" of about 33% of the original value of the treatment plant.

Considering there are 103 factories within the implementation area, the total value of taxes not received by the government would be US\$6,728,269.

This amount divided by the number of years for installation of treatment plant, i.e., 3.5 years, results in an average value per year of US\$1,922,363, which is the annual tax deduction for the 103 treatment plants in the Tuy River basin during the execution period

The amount is also 0.22% of the revenues for income tax during 1996 (i.e., 1,922,363 ÷ 886,200,000).

### Screening for Tax Deduction

#### (1) Current Situation of Tax Evasion

Although fiscal incentives have been proposed for the factories which install treatment plants, some special screening may be necessary. According to recent information, tax evasion in Venezuela in general has been very high, probably due to the general financial situation of the country. Improvement has been made due to measures by the Tributary Agency (SENIAT); however, it may take some time to reach reasonable levels.

In previous years, fiscal evasion through income tax has been as follows:

**Income Tax Evasion in Venezuela (1992-1996)**

Year	Potential Collection (US\$ Million)	Effective Collection (US\$ Million)	Evasion Rate (%)
1992	566	118	79.20
1993	798	303	62.08
1994	1,190	329	72.32
1995*	1,739	598	65.61
1996**	2,521	886	64.85

\* Estimated; \*\* Projected

As can be observed the fiscal evasion has decreased in recent years due to more strict measures undertaken by SENIAT to improve tax collection. It is expected that further collection is made in the coming years as a result of the activities of SENIAT.

**(2) Current Policies on Tributary Collection**

In general, there are several alternatives for increasing the tax collection:

- Increase of tributary rates
- Creation of new taxes
- Increase of the number of taxpayers
- Improvement of tax collection methods

According to SENIAT estimations, 10% of improvement of tax collection during 1995 would mean the additional collection of US\$661.3 million which is superior to the actually collected income tax on that year.

According to the experience of SENIAT increasing tax rates or creating new taxes or new payers produce a stronger resistance from the payers and do not encourage evaders to pay, so it is not reasonable to use such alternatives.

Consequently, the current policy in this matter is to improve the collection of taxes through the reduction of the evasion rate, using modern programs of fiscal control.

It should be noted that the Pollution Charge (or "pollution tax") being proposed in this Study is a local tax for some 100 polluting factories within the basin. Thus it is not a general tax. Also it is applied to only the polluters agents in the period they are producing pollution. If they decrease the pollution they will pay less or finally would pay nothing if they eliminate the pollution. Therefore it is not a permanent tax as long as it encourages the installation of treatment plants by themselves.

It should also be noted that this study has promoted fiscal incentives and it successfully obtained the judgment of SENIAT about their applicability to environmental matters (included in the sanitary regulations). This arrangement is justified as follows:

- Tax evasion should be considered a temporal situation as long as the authorities allow such situation to happen, while environmental related fiscal incentives should be kept permanently, because polluters have the tendency to increase with time, as industries expand.
- The data provided by SENIAT are general for all the country. However in general as well specifically in the Tuy River basin, it can be assumed that among the polluters there are honest taxpayers which are complying with the tributary regulations and deserve to be taken into account with encouraging measures to stop the pollution.

### (3) Adoption of Screening System

To avoid giving fiscal incentives (as well as soft loans through the Environmental Fund) to the tax evaders, a special screening system of applicants should be undertaken by the concerned authorities.

The screening of applicants could be performed by reciprocal communication between ACRT through the Environmental Fund office with the SENIAT authorities.

If necessary, an agreement between such offices may be elaborated concerning the beneficiaries inside the Tuy River Basin.

### 3.1.3 Environmental Fund

#### Proposal of Environmental Fund

##### (1) Necessity of the Environmental Fund

Regarding the reasons which years ago justified not to create the fund, it is considered that enough time has passed to see what can be expected from the factories.

For example, among more than 100 factories and piggeries within the Tuy river basin only some 20 installation schedules have been approved by MARNR as of February 1997.

Several standards have been published since at least 1978 when the standards of Classification of Waters were established. After that several other related or modified regulations have been published with the purpose of wastewater treatment by the factories. However, the treatment has been delayed up to the present.

Reasons for this delay in compliance with the law are mainly: (a) lack of financial resources; and, (b) lack of technical assistance.

Therefore, an Environmental Fund (EF) is proposed for the implementation of part of the program contained in this Study.



## (2) Scope of the Environmental Fund

The resources of the EF will be used to finance soft loans for wastewater treatment facilities of factories, sand quarrying, and piggeries which do not have the financial capability to absorb the investment cost, or because of high priority given by the government due to their polluting effects.

The Tuy River Basin Agency shall establish the priorities for financing pre-investment studies and the realization of the works, depending on the location, used water volume, pollution loads, type of production process, economic activity, proposed treatment, etc.

The direct administration of the funds may be undertaken by established financial entities like the Industrial Credit Fund, FONCREI (Fondo de Credito Industrial), which cover loans to small, medium and large industries, having already experience with financing treatment plant installations to many industries (more than 20) of Valencia Lake basin. Alternatively, the Corporation for the Development of Small and Medium Industry, CORPOINDUSTRIA (Corporacion para el Desarrollo de la Pequeña y Mediana Industria), may also be considered. Both of them are government owned institutions depending on the Ministry of Industry and Commerce, and can afford to give financing in better conditions than the commercial banks, because they do not have to pay taxes.

The above two institutions were established for financing the secondary industry. There is one more governmental institutions, FCA (Fondo de Credito Agropecuario), whose objective is to finance the primary industry in more favorable terms than the commercial banks. This organization is considered appropriate to give financial assistance to piggeries. The detailed financial aspects of the proposed Environmental Fund are considered in the corresponding section.

### Proposal of Law

The proposed law for the creation of the Environmental Fund will contain the following:

#### (1) Purpose

The Environmental Fund will have as main purpose the financing of investments in environmental matters for the factories and piggeries in the basin, in softer conditions as compared with the commercial banks, specially regarding the interest rates and periods. The factories and piggeries will be selected according to criteria of size, volume of pollution, etc.

#### (2) Constitution of Resources (*Patrimonio*)

The resources of the fund will be constituted by:

- The loans provided by national or international financing institutions.

- The funds produced by Resolution No. 2.828 of May 24, 1995 of the Ministry of Finance which authorizes the ACRT to use 75% of the resources obtained by the application of the Fiscal Stamp Law.
- The funds produced by the application of Decree 883 (Art.46), regarding the inspections and verifications during the process of adequateness period for the factories and piggeries within the Tuy River Basin.
- The funds produced by the fines imposed in accordance with the application of the Penal Law of Environment (Art. 18) in the Tuy River Basin.
- The funds produced by the fines imposed in accordance with the application of the Law of Territory Ordination (Art. 71) in the Tuy River Basin.
- The funds obtained from the application of agreements with natural or legal persons, public or private, national or foreign institutions.
- The funds originated by donations.
- The funds originated by pollution charges.
- Any other resources legally permitted.

(3) Administration of the Environmental Fund

The Environmental Fund will have two proper functions: operation/appraisal and banking. To perform the respective functions the Environmental Fund Operation Unit and the Environmental Fund Banking Unit will be established in FONCREI or CORPOINDUSTRIA. In addition, to carry out technical support services, the existing Studies, Planning and Projects Section in the Tuy River Basin Agency will be reinforced/reorganized.

There will be a coordination forum comprised of representatives from the Tuy River Basin Agency, the Fund, factories and piggeries, CORDIPLAN and MARNR to support the Fund. Also a board of audit and a managing committee will be established.

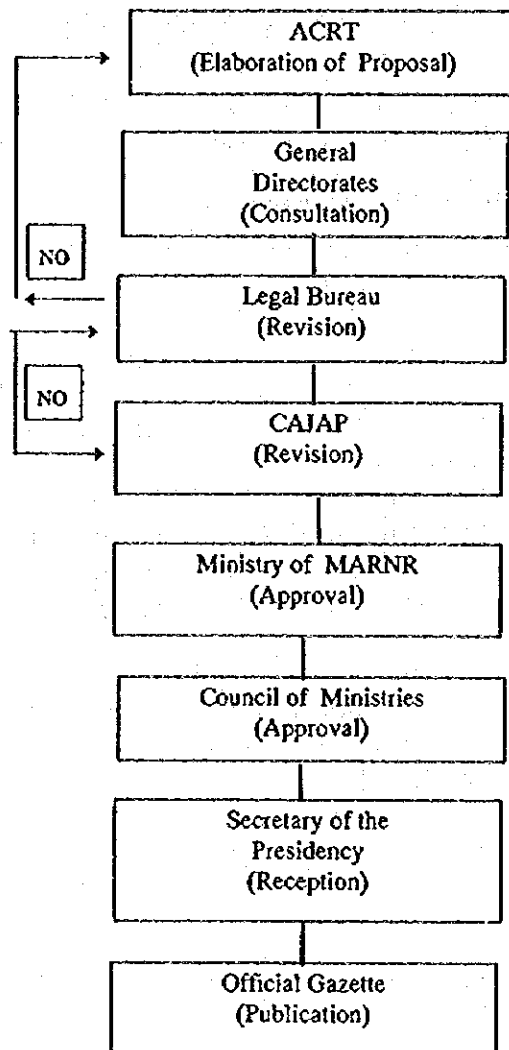
For more detail, refer to Subsections 3.3.2. and 3.3.3.

Legal Procedure

The legal procedure for the creation of the Environmental Fund is as follows, as shown in the flow chart below.

- (1) Elaboration of proposal of Decree at the level of ACRT.
- (2) Consultation with the different General Directions of MARNR, specially those of Environment Quality, Environmental Planning and Ordination, Environmental Education, Environmental Information, and Vigilance/ Environmental Control.
- (3) Revision by the Legal Bureau of MARNR.

- (4) Revision by legal advisers of CAJAP (Commission of Legal Advising of the Public Administration). Approval by the General Attorney of the Republic.
- (5) Approval by the Ministry of MARNR.
- (6) Approval by the Council of Ministries and the President.
- (7) Reception by the Secretary of Presidency.
- (8) Publication of Decree in the Official Gazette.



### 3.1.4 Pollution Charges (PC)

Basically the method for obtaining pollution charges is as follows:

- Selection of main parameters which produce most of the pollution, like BOD, SS, Cd, Hg, toxicants, etc.

In Germany, the following parameters are used: SS, COD, Hg, Cd, Toxicity in fish. (Source: Dr. Ing. Klaus Digel, March, 1995, "Control de los Efluentes Líquidos y Sistema de Financiamiento, Caso: Provincia de Hessen, Alemania. Proyecto Venezolano Alemán MARNR/GTZ, Saneamiento del Río Tuy)

- Estimation of cost of decontamination of water per unit of volume (for example a cubic meter, or a liter), based on the selected parameters.
- The estimated cost will be charged to the industries or piggeries according to the degree of pollution they have. This will be the pollution charge.
- The pollution charge may be increased periodically (e.g., every year) in some percentage (e.g., 100%), in a way to force more the polluters to abide by the regulations as soon as possible.

The technical as well the economic estimations on taxes are presented in other concerned sections.

Regarding the legal procedure for the implementation of such taxes, it should be similar to that of the Environmental Fund, and is explained below.

### Proposal of Pollution Charges

#### (1) Necessity of Pollution Charge

With the current regulations on environmental aspects it has not been possible to obtain a quick response from the industry and piggery owners. Further compulsory measures are necessary to push them further to comply with the established water quality standards. The best way to attain this goal is through the pollution charge (PC).

#### (2) Scope of Pollution Charge

The PC will be paid by the polluters as far as they do not abide by the environmental regulations. Payment will be done to the ACRT which will return it to the beneficiaries through the Environmental Fund in a form of financing of soft loans for wastewater treatment facilities.

### Proposal of Law

The proposal of the law for the creation of the Pollution Charges will contain the following:

#### (1) Purpose

The PC will have as main purpose the punishment to the environment polluters, according to their pollution loads.

The funds produced by the application of the PC will be used to enhance the Environmental Fund and will be returned to the beneficiaries in soft loans.

(2) Administration of the PC funds

The PC will be administered through the Environmental Fund.

Legal Procedure

The legal procedure consists in the same steps as that of the Environmental Fund.

**3.1.5 Classification and Water Quality Standards for Tuy River**

Background

In above mentioned Decree 883 published in December 1995, standards for each water body may be established according to their specific conditions. Therefore, the law proposed here is based on this regulation, specifically for the Tuy River.

Justification

The Tuy River is a water body where many industries and piggeries directly or indirectly discharge their wastewater.

Regulations on the specific waters of Tuy River are deemed necessary, to have a more enforcing legal tool to be obeyed by the polluting factories and farms.

Proposal of Law

The proposal for Classification and Standards of Quality Control of Waters of the Tuy River will contain the following information:

Classification	Location
Sub-type 1B	High and Medium Stream

The waters of Sub-type 1B are those with characteristics corresponding to the following limits and ranges:

Parameter	Limits or Ranges
Dissolved Oxygen (DO)	more than 4.0 mg/l (*)
pH	minimum 6.0 and maximum 8.5
Real Color	less than 150, U Pt-Co
Turbidity	less than 250, UNT
Fluoride	less than 1.7 mg/l
Total Coliform Organisms	monthly average less than 10000 NMP/100 ml

\* This value also can be expressed as percentage of saturation, which can be more than 50%.

Also in the case of Tuy River the limit for the parameter of Suspended Solids (SS) will be less than 750 mg/l and the parameter of Biochemical Oxygen Demand (BOD) at the middle basin (reference point at water intake in San Antonio de Yare) is limited to less than 3.0 mg/l.

Besides, the waters Sub-type 1B should not exceed the following limits:

Elements or Compounds	Limits
Mineral Oils	0.3 mg/l
Aluminum	0.2 mg/l
Total arsenic	0.05 mg/l
Total Barium	1.0 mg/l
Total Cadmium	0.01 mg/l
Total cyanide	0.1 mg/l
Chloride	600 mg/l
Total copper	1.0 mg/l
Total chrome	0.05 mg/l
Detergents	1.0 mg/l
Dispersives	1.0 mg/l
Hardness, expressed as CaCO <sub>3</sub>	500 mg/l
Extract of carbon at chloroform	0.15 mg/l
Phenols	0.002 mg/l
Total Iron	1.0 mg/l
Total manganese	0.1 mg/l
Total Mercury	0.01 mg/l
Nitrites + Nitrates (N)	10.0 mg/l
Total silver	0.05 mg/l
Total lead	0.05 mg/l
Selenium	0.01 mg/l
Sodium	200 mg/l
Total dissolved solids	1500 mg/l
Sulfates	400 mg/l
Zinc	5.0 mg/l
Biocides:	
- Organophosphates y Carbamates	0.1 mg/l
- Organochlorates	0.2 mg/l
Radioactivity:	
- Alpha activity	maximum 0.1 Becquerelio per liter (Bq/l)
- Beta activity	maximum 1.0 Becquerelio per liter (Bq/l)

### Legal Procedure

For the elaboration of specific standards for the Tuy River the legal procedure is same as that of the creation of the Environmental Fund.

### **3.1.6 Financing Enhancement of ACRT (Auto-Financing)**

(Through reimbursements from HIDROCAPITAL)

### Justification

- (1) Regarding the Role of ACRT as Autonomous Service without Juridical Personality

ACRT was created as an Autonomous Service without Juridical Personality. Consequently, it has a short-medium term the target of auto-financing through the selling of its own services.

Decree No. 1921, published in Official Gazette No. 34,836 on 1-11-1991 "By-laws of the Autonomous Services without J.P." dictates the following:

"Art. 6. The Autonomous Services without Juridical Personality shall be administered in a way such to allow their auto-financing in a short or medium term."

"Art. 12. The own incomes generated by the management of the Autonomous Services without J.P. will be exclusively used for the expenses of such services".

As to the assets of ACRT, Decree No. 2,307, published in Official Gazette No. 35,188 on 12-4-1993 "Creation of the Tuy River Agency", states the following:

Art. 17, The assets of the ACRT are:

- The funds assigned by the Government in the Budget Law.
- The funds generated by the services of exploitation of water, other natural renewable resources and other services.
- The funds generated by donations
- The funds originated by agreements with local, regional, national or international institutions, as well as public or private entities.
- The funds produced by sureties (bails), when these are destined to environmental protection and recovering.
- Any other permitted by laws and regulations

Thus, most of these kinds of funds are currently composing the ACRT budget, however, as can be seen in the description of the budget of ACRT during 1996 the second point regarding the services of water exploitation does not appear.

Budget of ACRT during 1996

No.	CONCEPT REVENUES	BUDGET		
		Bs.	US\$*	%
1	Contribution National Gov.	311,720,000	670,366	95
2	<i>Water exploitation services (proposed)</i>	?	?	?
3,4	Contribution by Federal District	5,000,000	10,753	2
5	Own Revenues	4,000,000	8,602	1
6	Fiscal Stamp **	6,000,000	12,903	2
	Total	326,720,000	702,624	100

Source: Office of Administration and Budget, ACRT

\* As of 13/05/1996 exchange rate: US\$ 1=Bs. 465

\*\* According to a Resolution of the Treasury Ministry of May 29, 1995, the Tuy River Basin Agency is authorized to use 75% of the revenues due from Fiscal Stamp.

Such water exploitation funds are still under negotiation with HIDROCAPITAL. However, for the discussion about 10% of the price of drinking water has been mentioned.

Considering such funds are larger than the budget assigned by the Government, it is estimated that the probable reimbursement to ACRT will finally allow this agency to get auto-financing as an Autonomous Services without juridical personality as required by law.

(2) Regarding the Investment on Wastewater Collection/Disposal and Treatment

Mutual Resolution No. 304/28 between the Ministry of Promotion and MARNR, published in Official Gazette No. 35,161 on 1-3-1993 states the following:

"Art. 14. The rate to be applied to each place and client will be that corresponding to the system from which the water is provided and the base price for each system will be fixed by the Regional Hydrological Enterprise previous consultation with HIDROVEN. The following will be taken into account:"

- "Operation and maintenance costs of the systems of aqueducts, collection/disposal of wastewater."
- "Value of the installations of aqueducts and sanitation."
- "Hydrological possibilities"

This article means that in the case of Tuy River basin HIDROCAPITAL will decide the prices. Also, it means that all costs will be taken into account.

Then other regulations are contained in the same resolution, as follows:

"Art. 24. In the places where the necessary infrastructure to provide the service of wastewater treatment be available, it will be charged in function of 10% of the invoiced value of the services of drinking water and collection/disposal of wastewater."

"Art. 32, b. The service of wastewater collection and disposal can be charged in accordance with the equivalent to 10% of the invoiced value of the minimum consumption of drinking water (only for estimation purposes)."

Accordingly, a proposal is made here considering the present talks and the regulations established by law.

The proposal consists in recommending the funds HIDROCAPITAL is supported by law to collect, regarding the water exploitation, and because of facilities (wastewater treatment/collection/disposal) to be constructed by ACRT be reimbursed to this agency.

An estimation of the amount to be reimbursed by HIDROCAPITAL to ACRT is made. This is a gross estimation to serve as a negotiation base, because there are some other expenses like administration, updating of prices, etc., which have not been considered yet.



### Estimation of Reimbursement from HIDROCAPITAL to ACRT

Assuming an average volume of water used from Tuy River is  $2.39\text{m}^3/\text{sec}$ . (average value 1991-1995) a gross estimation of the reimbursement is obtained considering two cases as follows.

Total production per year:

$$2.39\text{m}^3/\text{sec} \times 365\text{days/year} \times 24\text{h/days} \times 60\text{min/h} \times 60\text{sec/min} = 75,371,040 \text{ m}^3$$

Case I: Average Value of Drinking Water invoiced by HIDROVEN regionals in Venezuela:  $34.82 \text{ Bs/m}^3$  (\*)

$$\text{Total cost per year: } 75,371,040 \text{ m}^3 \times 34.82 \text{ Bs/m}^3 = \text{Bs } 2,624,419,613 = \text{US\$5,583,872}$$

a) Water exploitation (current talks) (10%), proposed for short term implementation (from 1998):

$$\text{US\$5,583,872} \times 0.10 = \text{US\$558,387}$$

b) Application of Charges for Sewer water treatment (10%) proposed for medium term implementation, after construction of facilities (from 2004):

$$\text{US\$5,583,872} \times 0.10 = \text{US\$558,387}$$

c) Application of Charges for Sewer water collection/disposal (10%), proposed for medium term implementation, after construction of facilities (from 2010):

$$\text{US\$5,583,872} \times 0.10 = \text{US\$558,387}$$

Case II: Average Cost of Production of Drinking Water by HIDROVEN regionals in Venezuela:  $47.96 \text{ Bs/m}^3$  (\*)

$$\text{Total cost per year: } 75,371,040 \text{ m}^3 \times 47.96 \text{ Bs/m}^3 = \text{Bs } 3,614,795,078 = \text{US\$7,691,053}$$

a) Water exploitation (current talks) (10%), proposed for short term implementation (from 1998):

$$\text{US\$7,691,053} \times 0.10 = \text{US\$769,105}$$

b) Application of Charges for Sewer water treatment (10%) proposed for medium term implementation, after construction of facilities (from 2004):

$$\text{US\$7,691,053} \times 0.10 = \text{US\$769,105}$$

c) Application of Charges for Sewer water collection/disposal (10%) proposed for medium term implementation, after construction of facilities (from 2010):

US\$7,691,053 × 0.10 = US\$769,105

(\*) Balance Ambiental de Venezuela, 1996

Note: US\$1 = Bs 470, as of Feb. 1997

In such a way the reimbursements would be done with the approximate schedule as below:

Estimation of Reimbursements

CASES	Reimbursements (US\$)		
	Short Term (from 1998)	End Const. of Treatment Plants (from 2,004)	End Const. of Sewer Collection & Disposal (from 2,010)
<b>I</b>			
a	558,387		
b		558,387	
c			558,387
ACCUMULATED TOTAL	558,387	1,116,774	1,675,161
<b>II</b>			
a	769,105		
b		769,105	
c			769,105
ACCUMULATED TOTAL	769,105	1,538,210	2,307,315

Case I corresponds to the present situation, i.e., water is undervalued (in reality the price of water should be at least be the actual cost). It is incumbent on both sides to decide which value to use for the mutual agreement. The selling price should at least be the production cost.

Nevertheless, these values should be adjusted later after the construction of facilities proposed in this Study, according to the Equation of Charges Adjustment contained in the mentioned resolution.

To reach an agreement on this matter there is no need for a new regulation but only an internal agreement between both institutions. With such funds the ACRT can afford the payment of construction of facilities. Then the funds could be used for input into the environmental fund. Such funds will be recycled into the factories and piggeries to give them soft loans to finance treatment plants.

Finally, the target of ACRT would be attained as an auto-financing Autonomous Service without juridical personality.

## **3.2 Strengthening of the Function of Organizations**

### **3.2.1 General**

Considering the specific purposes for which the Tuy River Basin Agency has been created, the Agency has the responsibility to execute plans, programs and projects of environmental management, and to execute works directed to environmental sanitation as well as promote and coordinate the necessary financing for the execution of the works of environmental conservation either for the public or private sector.

Therefore, at the stage of project execution, the Tuy River Basin Agency will participate through the Management of Studies, Planning and Projects department for the physical execution and through the Office of Administration and Budget for the financial execution.

After the completion of the works at the operation-maintenance stage the participation of the Agency will be through the Territorial Management of Miranda at the city of Los Teques, which manages the High and Middle sub-basins of Tuy River.

In the case of Hidrocapital, it has the duty to guarantee potable water, and should assume such responsibility. Then, from the part of Hidrocapital the participation of the institution at the execution stage will be through the Vice-Presidency of Conservation and Development, which also gives coordination through the Management of Projects, Works and Contracts for the physical execution, and through the Management of Investment and Development for the financing execution. After the completion of the works at the operation-maintenance stage the participation will be through the Vice-Presidency of Operation and Maintenance of Investment and Development for the financing execution.

### **3.2.2 Proposed Organization for Implementation of Project**

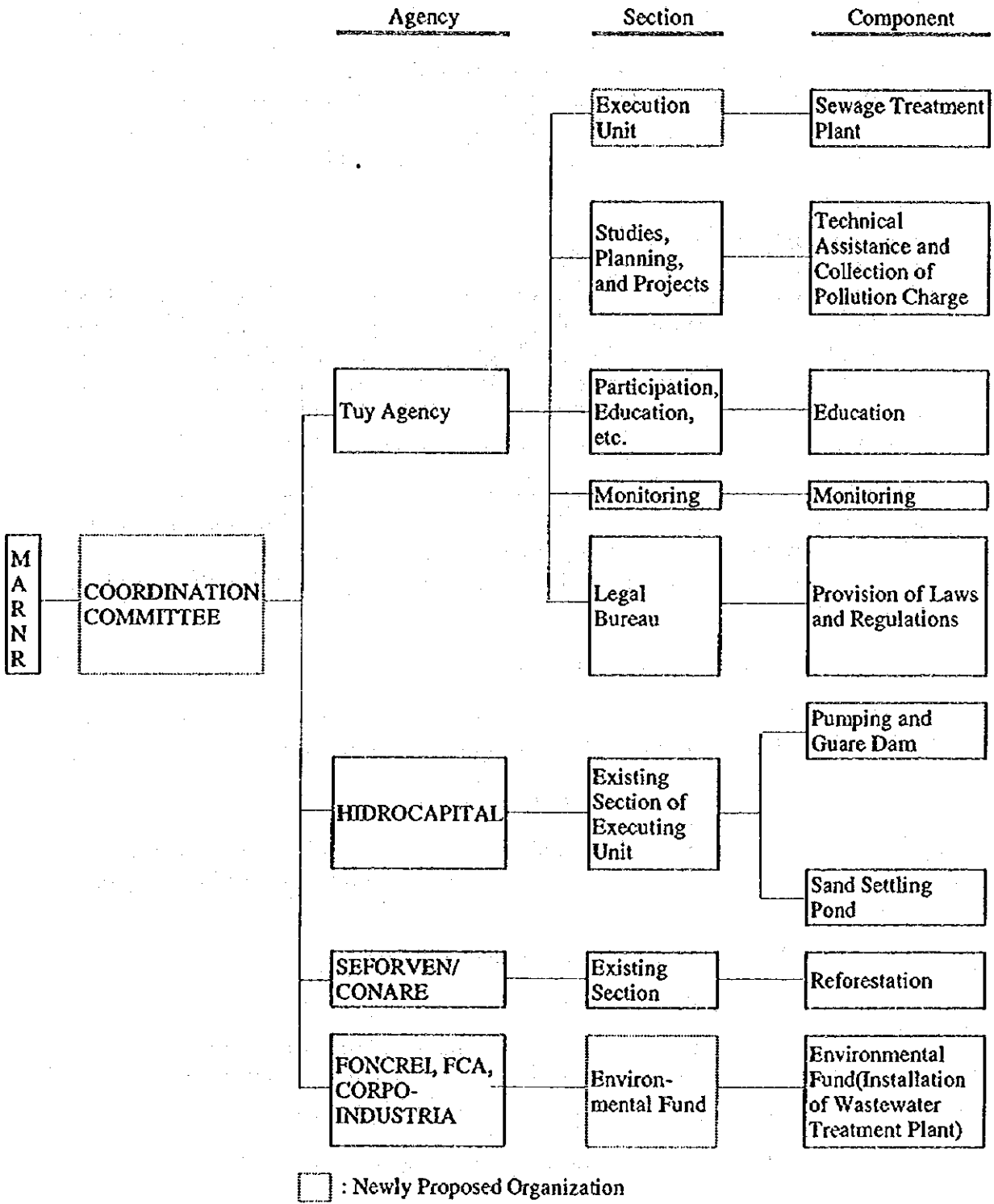
#### **General Proposal**

For the implementation, MARNR will act as the counterpart institution, and the offices of the Tuy River Basin Agency and Hidrocapital will coordinate the execution of the project through a Coordination Committee.

At the same time, considering the magnitude of the Project and previous experiences in other projects (Valencia and Maracaibo projects), the creation of a Project Executing Unit (PEU) is deemed necessary. It will execute the works corresponding to Tuy River Basin Agency. In the case of Hidrocapital, the works will be executed by the existing office of Management of Projects, Works and Contracts within the Vice-Presidency of Conservation and Development.

A general view of the execution of the several components of the project is shown below.

PROPOSED ORGANIZATION FOR IMPLEMENTATION



### Coordination Committee

The Coordination Committee will be integrated by the representatives of MARNR, the beneficiary states of Miranda and Aragua, and of the municipalities of Ocumare del Tuy, Las Tejerías and the others within the area, and the concerned NGO. As Chairman will act the representative of MARNR. They will hold periodic meetings along the duration of the works of the Sewage Treatment Plant, in order to coordinate the activities.

### Executing Unit of Tuy River Basin

For the execution of the project of Environmental Improvement of Tuy River Basin an Executing Unit shall be formed, which is proposed to be part of the Tuy River Basin Agency. It will have general coordination of the activities related to the execution of the works and the administration of financial resources with respect to the Tuy River Basin Agency during the execution period. The unit will be in charge of the construction of the infrastructure of the project such as sewage treatment plants.

Considering that the Project Executing Unit (PEU) is conceived as an institution for the general coordination of the activities, its staff should be recruited directly from the concerned institutions of MARNR, specially Tuy River Basin Agency. However, in cases of unavailable personnel the contracting of specialized staff should be considered.

#### (1) Organization and Functions

The PEU would be comprised of several managements (gerencias) which would have the following functions (see Organization Chart):

##### (a) General Management

- To plan, lead and supervise the functioning of the several managements. - To coordinate the procedures regarding the project financing and execution aspects.

##### (b) Management of Financing Execution

- To prepare the documents for biddings and contracts.
- To elaborate the requests for the disbursements of the financial resources of the project through the Environmental Fund.
- Follow up the assignment of counterpart budget.
- To keep an accounting record of all the transactions.

##### (c) Management of Technical Coordination

- To prepare the technical information for the elaboration of biddings and contracts.
- To coordinate the technical activities of the project.

- To lead the supervising staff in the project site. To prepare periodical progress reports.

(2) Personnel and Cost

The staff for the operation of the Executing Agency, for each management, is classified as follows:

Personnel Cost for the Executing Unit

Management	Staff Category	Number	Annual Cost (US\$)
General	General Manager Civil Engineer)	1	10,200
	Assistant Manager	1	6,000
	Executive Secretary	1	3,600
	Clerk	1	2,500
	Driver	1	3,000
Financing Execution	Lawyer	1	7,000
	Business Administration	1	7,000
	Administration Technician	1	6,000
	Driver	1	2,500
Technical Coordination	Manager (Civil Engineer)	1	7,000
	Assistant Manager	1	5,500
	Secretary	1	5,000
	Driver	1	2,500
Site Inspection	Civil Engineer	1	7,000
	Sanitary Engineer	1	7,000
	Chemist	1	7,000
	Assistants	3	15,000
	Secretary	1	3,000
	Driver	3	7,500
Total			114,300

(3) Equipment and Cost

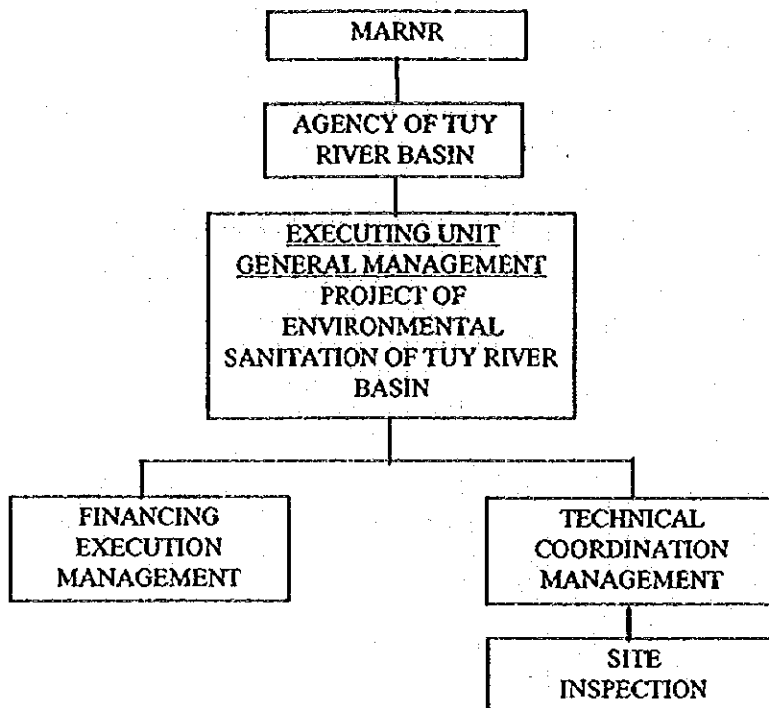
The Equipment for the operation of the Executing Agency, for each management is classified in the following way:

Equipment Cost for the Executing Unit

Management	Equipment	Number	Cost (US\$)
General	Vehicle (Wagon with A/C)	1	30,000
	Copy Machine	1	4,000
	Computer/Printer	1	3,500
Financing Execution	Vehicle (Sedan with A/C)	1	20,000
	Computer and Printer	1	4,000
Technical Coordination	Vehicle (Jeep)	4	50,000
	Computer/Printer	2	8,000
Total:			119,500

The organization of the Executing Unit is shown in the following Chart

## ORGANIZATION CHART OF THE EXECUTING UNIT



### 3.3 Establishment of Environmental Fund

Here, the financial/organizational aspects of the Environmental Fund ("the Fund") will be discussed. Legal aspects of the Fund are described in Section 3.1.

#### 3.3.1 Necessity of Environmental Fund

##### (1) General

Only less than half of the existing factories are equipped with treatment plants with sufficient capacity. If this situation is left unattended without any fundamental measures, the problem of industrial pollution will eventually get out of hand.

The most serious problem arises when factories and piggeries are not willing to construct, rehabilitate or improve treatment plants mainly for financial reasons. The economy of Venezuela is such that the factories and piggeries in general have been suffering from sluggish business for several years. Granted that they agree to comply with such measures, sometimes they are not be able to implement them due to financial constraints.

In this connection, small and medium size enterprises frequently face special difficulties in obtaining financing because: (1) their internally generated cash funds are generally limited; and, (2) they are precluded from capital markets due to their size.

It often happens that a factory or a piggery has no technical knowledge about what treatment plant it has to install. It wants to know what kind and what size of treatment plant is necessary and how much it will cost.

Also, there is widespread resistance to the sometimes one-sided legal actions of the government forcefully trying to attain its anti-pollution objectives. Here arises the need for education, mutual communication and information dissemination.

Against this background the establishment of the Environmental Fund is proposed. The function of the Fund is to lend money to factories and piggeries on more favourable and softer terms than in the case of commercial banks in respect of interest rate and repayment period. This aspect is especially more stressed in case of small and medium scale industries including piggeries.

Regarding technical assistance, the existing section for studies, planning and projects in the Tuy River Basin Agency will be reinforced/reorganized and be responsible for its implementation.

Regarding education, the existing section for participation, education, etc., in the Tuy River Basin Agency will be reinforced and take charge of its implementation. (Refer to Section 3.4.)

The reinforced section for studies, planning and projects will provide technical advices and services regarding appropriate technology to the borrowers. In this connection, the section will recommend the positive adoption of clean technology to them.

The reinforced section for participation, education, etc., will provide educational/motivation/public relations services. For instance, the section will tell factory people that a factory complete with appropriate treatment facilities will give the public the clean image of the factory and that the section will function as a promotion organ to indirectly help enhance the sales of its products.

## (2) Results of Questionnaire Survey on Financial Sources

A questionnaire survey was conducted toward factories and piggeries to know the existing financial sources for the construction of treatment plants and their needs for the establishment of the Fund. The following is the summary of its results:

### A. Factories

#### (a) Number of Factories Sampled

45, of which 36 (80%) responded to the questionnaire.



(b) Results of the Survey

Existing Status

Item	Total No. of Factories	Factories Using/Going to Use Internal Fund	Factories Using/Going to Use External Fund	Average No. of Workers	Average Monthly Sales (Bs. million)
With Treatment Plant of Sufficient Capacity	20	19	1	145	183
With Treatment Plant of Insufficient Capacity	5	3	2	346	578
No Treatment Plant	11	5	6	72	78
Total	36	27	9	151	206

- Factories Having Treatment Plants with Insufficient Capacity: tanneries, flagstone, textile, food

- Factories Having No Treatment Plant: detergent, aluminium, electricity set, thread dyeing, flagstone, metal mechanics, food

Desire to Utilize Environmental Fund for Future Construction, Rehabilitation, Replacement and Expansion and Desired Lending Terms:

- Desire to Utilize Environmental Fund: 36 Factories (100%)

- Desired Lending Terms (Average):

Amount of Loan	US\$153,000
Annual Interest Rate	12% (Bs. basis)
Grace Period	3 years
Repayment Period	8 years

(c) Explanation of the Results of the Survey

Most factories with treatment plants of sufficient capacity used their own internal funds in financing construction of their plant. However, around 50% of those with treatment plant of an insufficient capacity and with no treatment plant are going to utilize external fund.

It should be noticed that on average the factories with inadequate treatment plants have more workers and sales than the other two groups. It may be because larger factories are required to construct more expensive treatment plants and they are sometimes reluctant to or cannot meet the full cost.

Also, it is noticed that the factories without treatment plants have on average less workers and sales than the other groups.

It must be kept in mind that the above discussion is based on the situation where the Environmental Fund does not exist and eventually even those factories or piggeries with adequate treatment facilities have to replace them. It was found that factories interviewed were in unanimous agreement that in the event the Fund was created they would want to utilize it.

One cannot discern the tendency that some kinds of factories are more apt to have insufficient treatment plants or no treatment plants.

The average amount of money they desire to borrow is US\$153 thousand and the lending terms they prefer are the annual interest rate of 12% (Bs. basis), the grace period of 3 years and the repayment period of 8 years. The prevailing situation is that the annual interest rate is 30%, there is sometimes no grace period and the repayment period is 3 to 5 years.

#### B. Piggeries

##### (a) Number of Piggeries Sampled

12, of which 10 (83%) responded to the questionnaire.

##### (b) Results of the Survey

###### Existing Status

Item	Total No. of Piggeries	Piggeries Using Internal Fund	Piggeries Going to Use External Fund	Average No. of Workers	Average Monthly Sales (Bs. million)
With Treatment Plant of Sufficient Capacity	3	3	0	5	17
With Treatment Plant of Insufficient Capacity	7	n.a.	3	5	13
Total	10	n.a.	3	5	14

###### Desire to Utilize Environmental Fund for Future Construction and Expansion and Desired Lending Terms:

- Desire to Utilize Environmental Fund: 10 Piggeries (100%)

- Desired Amount of Loan: US\$53,000

### (c) Explanation of the Results of the Survey

Only three out of the ten piggeries interviewed replied that they have treatment plants with sufficient capacity. These three also have more sales than the average. They used their own funds to finance the construction of the plants. Out of the seven piggeries without treatment plants three answered that they are going to construct the plants with a loan. The average amount of the loan is US\$53 thousand. The remaining four gave no answer. This can be interpreted that they have no capacity even to borrow.

Piggeries are a typical small-scale industry and as such they are basically not capable of independently financing the construction of their treatment plants.

Those with adequate treatment plants will have to rehabilitate or replace them in future. All the piggeries interviewed expressed their desire and willingness to utilize the Fund in the event it is initiated.

### 3.3.2 Proposed Function

#### (1) Size of Fund and Financial Sources

The size of the Fund is US\$23,817 thousand (plus US\$200 thousand for the initiation cost). This is the estimated cumulative amount of the cost to be required to construct or improve the treatment plants up to 2003. Not all the factories and piggeries concerned will utilize the Fund. Also, those utilizing the Fund will not seek 100% of necessary financial resources externally. Again, this is a revolving fund and it can lend money to factories and piggeries out of its own internally generated fund. All this means that the size of the Fund could be less than estimated. However, the above figure is adopted so that it can meet contingency needs.

The budgetary situation of the Venezuelan government is such that it will be difficult to allocate part of the annual budget for the Fund. Therefore, the financial resources of the Fund will be 100% sought from offshore.

There is an argument favoring the introduction of a matching fund to prevent clients of the Fund from misusing the borrowed money. Although such a concept is not considered here, organizational and other measures should be developed based on further detailed analysis.

#### (2) Relending Terms

It is assumed that the financial resources of the Fund will be provided by external agency(ies) on the following terms based on the examples of international financing institutions' practice:

##### Lending Terms

Annual interest rate: 6% (US\$ basis); grace period: 3 years; repayment period: 15 years

The above 6% comes from the current Libor of 5.5% plus commission charge of 0.5%. Libor fluctuates from month to month. Therefore, the value is to be understood as an exemplary one in the prevailing circumstances.

For reference, there are two alternatives regarding the lending terms as shown below:

- Alternative 1

Annual interest rate: 2.5-5% (US\$ basis); grace period: 10 years; repayment period: 25-30 years

- Alternative 2

Annual interest rate: 6-7% (US\$ basis); grace period: 5 years; repayment period: 10-20 years

Relending Terms

To accommodate the initial establishment cost, O&M cost of the Fund, the cost of technical assistance, etc., annual interest rate will be raised to 6.8% in relending to factories and piggeries as shown below:

Annual interest rate: 6.8% (US\$ basis); grace period: 3 years; repayment period: 15 years

Actually loans will be provided on the bolivar basis. It is a delicate and complicated matter to determine the corresponding bolivar based interest rate from the dollar based interest rate of 6.8% since various factors such as inflationary trends in Venezuela and the exchange rate between the dollar and the bolivar are involved.

FONCREI's lending interest rate is 85% of the weighted average interest rate of the 6 main banks, that is, around 23% at the present moment. This lending policy can be a guideline when the Fund determines the bolivar based relending interest rate. The relending policies including interest rate should be decided by the managing committee.

(3) Favourable Treatment

Basically the relending terms should be one and the same to all factories and piggeries. However, technical assistance and related services may be provided as a grant to assist weaker companies.

(4) Proposed Division of Functions

Item	Studies, Planning and Projects Section	Environmental Fund Operating Unit	Environmental Fund Banking Unit
Organizational Position	Tuy Agency	FONCREI or CORPOINDUSTRIA	FONCREI or CORPOINDUSTRIA
Functions	Providing assistance and services regarding technologically and financially most appropriate treatment plants	Finding potential clients, screening of loan applicants, establishment of financing terms, decision-making on financing, etc.	Relending/providing financial resources to factories, receiving repayments, handling of arrears, management of banking, etc.
Remarks	to be reinforced/reorganized	to be added	to be added

FCA (Fondo de Credito Agropecuario) will take charge of operation and banking functions for piggeries. However, there will be no new or additional functions for FCA accompanying the introduction of the Fund due to the limited nature in the number and financial needs of piggeries concerned.

It is proposed that there be three broad divisions of functions as shown above. The reinforced Studies, Planning and Projects Section will positively take charge of technical support services, the Environmental Fund Operation Unit will engage in the operation/appraisal activities, and the Environmental Fund Banking Unit will perform banking functions.

The agreement will be made regarding the allocation of cost and profit between the three organizations.

(5) Alternatives Regarding Relevant Organizations and their Functions

For the sake of reference four alternatives are presented below regarding combination of relevant organizations and their functions.

Functions Related to Reduction of Industrial Pollution

1) Setting up Basic Anti-Pollution Policies
2) Establishment of Quality Standards for Industrial Discharges
3) Water Quality Monitoring in the Tuy River Points and Factory Compounds
4) Education and Public Relations Services on Pollution and Environment
5) Technical Assistance Regarding Appropriate Technology on Treatment Plants
6) Tax Reduction for Installation of Treatment Plants
7) Screening of Loan Applicants for the Environmental Fund
8) Lending to Factories and Receiving Repayments

## Alternatives

Alternatives	Organizations	Functions	Remarks
A.	Tuy River Basin Agency	1), 2), 3), 4), 5), 6)	Environmental Fund Operation Unit will be inside Tuy River Basin Agency
	Environmental Fund Operation Unit	7)	
	Environmental Fund Head Office	8)	
B.	Tuy River Basin Agency	1), 2), 3), 4)	Environmental Fund Operation Unit will be inside Tuy River Basin Agency.
	New Organization	5)	
	Environmental Fund Operating Unit	6), 7)	
	Environmental Fund Head Office	8)	
C.	Tuy River Basin Agency	1), 2), 3), 4), 5)	Environmental Fund will be outside Tuy River Basin Agency.
	Environmental Fund	6), 7), 8)	
D.	Tuy River Basin Agency	1), 2), 3), 4)	Environmental Fund Operation Unit will be semi-independent from Tuy River Basin Agency.
	Environmental Fund Operation Unit	5), 6), 7)	
	Environmental Fund Head Office	8)	

Functions 2), 3) and 5) can be grouped together as technical functions, while 6), 7) and 8) can be combined as financial functions.

Function 4), Education and Public Relations Services, will include the publicizing of a factory complete with a treatment plant so that it may get social recognition and trust.

Function 5), Technical Assistance, means the provision of technical assistance and guidance so that each factory may have the most technologically and financially appropriate treatment plant. In this connection the adoption of the so-called clean technology will be recommended where it is deemed proper.

Function 6), Tax Reduction, will include the following financially favorable treatments to eligible factories and piggeries.

(a) Tax Reduction for Purchase of Equipment

Tax reduction schemes will be available for purchases of treatment equipment.

(b) Tax Reductible Fund

When company income is set aside for environmental investment, such funds will become tax exempt.

This is recommended by the JICA Study Team as the most feasible course taking the actual situation into consideration.

(c) Accelerated Depreciation

Accelerated depreciation of treatment plant will be allowed for the initial years.

The JICA Study Team selected Alternative A as the optimum course after repeated discussions with the parties concerned.

3.3.3 Organization

(1) Organizational Structures

Studies, Planning and Projects Section	Environmental Fund Operation Unit	Environmental Fund Banking Unit
Tuy Agency Staff	FONCREI/CORPO-INDUSTRIA Staff	FONCREI/CORPO-INDUSTRIA Staff

The Studies, Planning and Projects Section will be manned by the Tuy Agency personnel, while the Environmental Fund Operation Unit and the Environmental Fund Banking Unit will be manned by the FONCREI or CORPOINDUSTRIA personnel.

In addition to the above organizations, a coordination forum, a board of audit and a managing committee are proposed to be established to assure that the Fund will function in a proper and stable manner. (Refer to Fig. 3.3-1.)

The internal structures of the above-mentioned section and units are as follows:

Organization	Personnel	No.	Annual Remuneration (US\$)
Studies, Planning and Projects Section	Manager (Civil Eng.)	1	10,200
	Assistant Manager	1	6,000
	Civil Engineer	1	7,000
	Sanitary Engineer	1	7,000
	Chemist	1	7,000
	Secretary	1	3,600
	Clerk	1	2,500
	Driver	1	3,000
	Sub-Total	8	46,300
Environmental Fund Operation Unit	Manager (Economist)	1	10,200
	Assistant Manager	1	6,000
	Secretary	1	3,600
	Clerk	1	2,500
	Driver	1	3,000
	Sub-Total	5	25,300

Environmental Fund Banking Unit	Manager (Economist)	1	10,200
	Assistant Manager	1	6,000
	Secretary	1	3,600
	Lawyer	1	7,000
	Accountant	2	14,000
	Clerk	1	2,500
	Driver	1	3,000
	Sub-Total	8	46,300
	Total	13	117,900

As the above table shows, the number of personnel is 8 in the Studies, Planning and Projects Section, 5 in the Environmental Fund Operation Unit and 8 in the Environmental Fund Banking Unit, totaling 21. The annual personnel cost is estimated at US\$46,300, US\$25,300 and US\$46,300 for the respective organizations, summing up to US\$117,900.

A coordination forum is recommended to be established comprised of representatives from the Tuy River Basin Agency, the Fund, factories and piggeries, CORDIPLAN and MARNR to support the Fund. Regular meetings should be held.

This is the organ for the exchange and dissemination of technical, educational and general information centering on industrial pollution, discussion for alleviation of technical and financial problems facing factories and piggeries, mediation and resolution of conflicts between the lender and borrowers, etc.

A board of audit will be newly introduced under the Ministry of Finance to perform external auditing functions to check/prevent financial irregularity of the Fund. Also, a managing committee comprised of the officials from the Ministry of Finance / CORDIPLAN / MARNR will decide on the allocations of the annual budget among administrative and investment sectors, guidelines on interest rates, etc., for the Fund.

The outlines regarding the division of role/functions/power of the Fund have been described above. It is recommended that further study should be conducted such as an institutional analysis on the internal structures, the number of personnel, the number/date of regular sessions and the cost to be required for the coordination forum, etc.

## (2) Operation and Maintenance Cost

The personnel cost is estimated at US\$117,900 as mentioned above. To this is added the contingencies and miscellaneous costs, which are estimated at US\$58,950 (50% of the above cost). Thus, the total O&M cost comes to US\$176,850.

### 3.3.4 Necessary Facilities and Equipment

The equipment cost for the Fund is estimated as follows:



Organization	Equipment	Quantity	Cost (US\$)
Studies, Planning and Projects Section	Vehicle (4 WD with A/C)	1	30,000
	Computer	1	3,500
	Copying Machine	1	4,000
Environmental Fund Operation Unit	Vehicle (4 WD with A/C)	1	30,000
	Computer	1	3,500
	Copying Machine	1	4,000
Environmental Fund Banking Unit	Vehicle (sedan with A/C)	1	20,000
	Computer	1	3,500
	Copying Machine	1	4,000
Total			102,500

As the above table shows, the equipment cost is estimated at US\$27,500 for the Studies, Planning and Projects Section, US\$37,500 for the Environmental Fund Operation Unit and US\$27,500 for the Environmental Fund Banking Unit, totaling US\$102,500.

Adding the contingencies and miscellaneous costs of US\$97,500, the total initiation cost is estimated at US\$200,000.

### 3.3.5 Operation Plan

It is proposed that the process of the establishment of the Fund be started in 1998 and be completed in the middle of 2000.

From the middle of 2000, the Fund will start operation. As a short-term program, the Fund will take care of the financial requirements up to the end of 2003. The Fund will be financially self-supporting. It will be a going concern trying to make profit every year.

It will borrow US\$23,817 thousand from the external financial agency(ies) at the concessional lending terms (interest rate: 6%), relend it to 103 factories and 27 piggeries at a little higher interest rate (6.8%) on average, and by so doing take care of the initiation, O&M, repayment and replacement cost and at the same time beget a surplus. The financial planning of the Fund is explained in 3.7 of Sector I.

## 3.4 Establishment of an Environmental Education Program

### 3.4.1 Background

During past years the activities on the environmental education aspects have been developed as shown in Table 3.4-1.

Table 3.4-1 Past Activities Regarding Environmental Education

Activities	1994	1995	1996
Workshops	2	4	16
Presentations / Seminars	1	2	1
Publication in Newspapers	2	1	1
Publication of Pamphlets	1	3	1

By performing such activities the training of teachers, community representatives, and national guard members has been executed. Also, last year, the cleaning and afforestation of small microbasins by getting the cooperation of the concerned people, teachers, students, public employees, national guard members, etc., was undertaken

### **3.4.2 Environmental Education Program**

For the effective implementation of this Study, an education program to promote public awareness on environmental issues shall be undertaken to include all the sectors involved in the basin.

The environmental education program is focused on three points of view: the school the education system, the public, and the manufacturers.

Thus, for the implementation of the Environmental Education Program to Promote Public Awareness, the following measures are proposed:

#### **(1) At the Level of the School Education System**

The Tuy River Basin Agency shall follow up the current cooperation agreement between the Ministry of Education and MARNR signed in March, 1996.

Based on this agreement, the Agency shall promote that all education-related institutions within the basin, from kindergarten to the highest level, shall provide steady guidance on the main environmental issues. This promotion shall be coordinated with the resident associations and the existing NGOs.

The contents of the main environmental issues include water pollution problems caused by effluent from factories and piggeries and wastewater from urban centers, significance of improvement of water quality of the Tuy River, and so on.

#### **(2) At the Level of the General Public**

- Periodic publication of the "Informative Bulletin of the Agency" (Boletín Informativo de la Agencia) is highly recommended. This bulletin shall be made available to the residents of the basin, especially, the persons which have prominent activities inside it, such as the municipal authorities and NGO related personnel. Contents shall always include the current main environmental issues, laws and regulations such as those relating to water quality, tree felling, forest fires, sand mining, waste disposal, etc.
- Publication of newspaper articles related to the environmental protection of the Tuy River Basin is recommended. The impact of newspapers on society is more direct and wide reaching compared with the bulletin. So partial reproduction of the contents of the bulletin can be included specially those issues related to water quality, forest fires, sand quarrying, and waste disposal. The current laws and penalties applied when violated shall be mentioned too.

(3) At the Level of Manufacturers

- Periodic workshops and seminars addressed to the manufacturers shall be prepared by the Agency in the implementation of the project. This will produce a continuing awareness in who are in charge of large pollution sources. Also this makes the manufacturers notice the significance to comply with the water quality standard resulting in promotion of installation of treatment plants
- The publication of the pamphlet "Standards of Environment Quality Control, a Guide for Manufacturers" is recommended to be issued at least once a year. The last one was published in 1993, and contained the old water quality standards, therefore, it is necessary to update it to the new standards.
- Information regarding the current fiscal incentives of tax deduction, financing procedures, etc. also should be given to the manufacturers. At present they have not been aware of the existence of these facilities, and the ACRT should inform to them about it.
- Information on pollution charges.

In summary the several activities of the Education Program for Environmental Awareness and their targets during the proposed period are:

Education Program for Environmental Awareness

ACTIVITY	YEAR					
	1998	1999	2000	2001	2002	2003
Workshops to:						
Teachers and Students	6	6	6	6	6	6
Residents	6	6	6	6	6	6
NGOs	6	6	6	6	6	6
Local Authorities	6	6	6	6	6	6
Seminars to General Public	2	2	2	2	2	2
Publication of Pamphlets	2	2	2	2	2	2
Publication of Newspaper Articles	12	12	12	12	12	12
Workshops (Talleres) to Manufacturers	6	6	6	6	6	6

### 3.4.3 Organization and Personnel

The personnel to perform these activities will be basically those currently employed in the Management of Participation, Education and Relations with the Users, a division of the Tuy River Basin Agency. The staff is well trained, however, some updating and/or training courses shall be considered for technicians. In some areas to be undertaken or strengthened with the project, new staff will be recruited as follows: Social Planner (Sociologist), Social Worker, Graphics Designer (Publicity Technician).

### 3.4.4 Equipment and Materials

For performing the mentioned activities some basic initial equipment and materials will be necessary. This will be used to strengthen the office of Programmatic Management of Participation, Education and Relations with the Users.

### 3.4.5 Cost Estimate

The cost estimation for new personnel and the equipment to be acquired are as follows:

#### Cost Estimate for Strengthening Environmental Education and Public Awareness

Personnel	Number	Cost (US\$) / year
Sociologist	1	7,200
Social Worker	1	6,000
Graphic Designer	1	4,000
Logistic Support	set	2,000
Training Abroad (2 persons)	3 month	20,000
Sub-total		40,000

Equipment	Number	Cost (US\$)
Vehicle	1	30,000
Computer/Printer Set	2	7,000
Portable Computer/Printer Set	1	4,000
Copy Machine	1	4,000
Overhead Projector	1	1,000
Slide Projector	1	800
VCR	1	700
Color TV	1	700
TV Camera	1	1,500
Photographic Camera	1	300
Sub-total		50,000