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C Y P R U S

COUNTRY REPORT
ON
IRRIGATION WATER CHARGES

by

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ABSTRACT

Irrigation water charge in Cyprus is becoming a very important aspect of the water resources development because water is both very expensive and very precious. Due to this a charge has to be fixed for financial and economic reason such that:

- (a) For financial reasons, enough money has to be raised to pay the cost (or part of the cost) of the operation, maintenance and management of the work and to pay for the capital cost, the interest on capital and insurance costs, incurred for providing the water to the consumer.
- (b) For economic reason, so that it will encourage the consumers to use the irrigation water with the most efficient and productive ways thus achieving the objectives of the project and avoid wasteful use of it.

Based on the above two conditions, aiming at optimum utilization of the available water resources, certain procedures, guidelines and criteria have been adopted for fixing the water charges taking into consideration the irrigators interests and the economic and financial requirements. Because the cost of the irrigation water in Cyprus is comparatively high a subsidy ranging from 35% to 100% of the water cost is allowed by the Law, giving great flexibility to the Government to fix different charges for different projects according to the criteria. The procedure for water charge fixing for the Government Waterworks is very slow and tedious since the proposed charges must be approved by the Council of Ministers and ratified by the House of Representatives.

The charge collection is another issue which presents some problems related to the timely collection of the charges. The existing procedure although considered satisfactory for some time now and for some projects is now proving unsatisfactory and the proposed revisions must be adopted to enable the project authorities to collect all the charges and in time.

The problems related to the water charge fixing procedure and the charges collection along with other administrative and legal aspects related with the management of the water resources are expected to be overcome by the creation of a Water Entity now under consideration by the Government of Cyprus.

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1. Background Information

1.1 General

Cyprus is the third largest island in the Mediterranean sea, with an area of 9250 square kilometers, situated in the north-eastern end of the East Mediterranean sea. The topography of the country is marked by the presence of two mountainous regions, the northern sedimentary range along the north coast which rises up to 1000m above mean sea level, and the other in the southwestern part of the island which rises up to 2000m above mean sea level. Between these two ranges is the main agricultural plain, between Morphou bay in the west and Famagusta bay in the east, known as the Mesaoria plain with a total area around 259,000 Ha. Other good agricultural lands are situated on the coastal areas which are mostly flat and situated at elevations less than 200m above mean sea level.

1.2 Land use in Cyprus

According to the land use map of Cyprus which was prepared in 1975 the land use of Cyprus is classified into six categories as shown on table 1.

TABLE 1
Land Use Categories in Cyprus

Categ. No.	Land Use Category	Area (Ha)	Percentage
1.	Cultivated land	424 010	45.83
2.	Carob land (not cultivated)	69 000	7.46
3.	Forest (Main)	116 000	12.54
4.	Scrub (low density)	142 140	15.36
5.	Barren uncultivated land	110 000	11.89
6.	Built up areas	64 000	6.92
	Total	925 150	100.00

From the Table it is seen that of the total area 424,010 Ha or 45.83 percent of the total area is cultivated land (this category includes all irrigated and dry farming land). From this cultivated land 43,610 Ha i.e.10.29 percent of the total cultivated land or 3.87 percent of the total area of the island is under systematic irrigation while another 18,000 Ha. are under spate-irrigation (direct irrigation from inundation of river flows which takes place in the wet months), where the rest is under rainfed irrigation. Table 2 shows a summary of the use of the cultivated land by crop, area and percentage. The figures refer to the year 1979 and cover all of the Cyprus area.

TABLE 2
Cultivated Land Use by Cfp

Item	Category/Crop	Area (Ha)	Percent of Total Irrigated	Percent of Cultivated
I.	Irrigated Land			
1.1	Citrus	16 240	37.24	3.83
1.2	Avocados	50	0.11	0.01
1.3	Deciduous fruit	5 485	12.88	1.29
1.4	Deciduous stones	345	0.79	0.08
1.5	Table grapes	3 010	6.90	0.71
1.6	Bananas	284	0.65	0.07
1.7	Vegetables	16 811	38.55	3.96
1.8	Industrial	185	0.42	0.04
1.9	Fodder crops	1 200	2.76	0.29
	Total Irrigated	43 610	100.00	10.29
II	Spate Irrigation Land	18 000	-	4.24
III	Rainfed Land			
	Vines, Cereals, Carobs, Olives, Almonds etc	362 400	-	85.47
	Total Cultivated Land	424 010	-	100.00

1.3 Climate

The climate of the island is of the typical mediterranean type with mild and rainy winters and hot dry summers. Temperatures reach an average minimum of 9°C in December, being the coldest month of the year, and an average maximum of 35°C in August being the hottest month. Average annual rainfall is around 500 mm, 80% of which falls between the months of November through April. Though precipitation increases with altitude most of the cultivated land is found in the low rainfall zone, lying about 200 m above mean sea level. The country faces a severe draught once every ten years and a moderate one once every three years. Sunshine is abundant during the whole year, air humidity is slightly low most of the time with very low values at mid-day in the central plains and the winds are generally mild to moderate with variable direction.

1.4 Population

Total population of the country in 1973¹ was 634,000 or 68 persons per square kilometer, of which 57.8% was living in rural areas and 42.2% in urban areas. In the same year employment in agriculture amounted to 40.3%.

1.5 Water Resources

Available water resources of the island are exclusively dependent on rainfall plus any recycled water from domestic effluent or desalinated water. From the total quantity of 4,600 million cubic meters of water that fall on the island, 350 million cubic meters are disposed as groundwater, 600 million cubic meters are disposed as surface runoff where the remaining, is lost as evaporation and evapotranspiration. Of the groundwater available all the quantity is pumped for irrigation and domestic water supply where from the surface water 100 millions cubic meters are intercepted and stored in the dams mainly for irrigation and to a small extent for domestic water supply.

Cyprus is made up of 39 watersheds in all and has no perennial rivers i.e. any water that has to be used for summer consumption has to be stored during the winter months, hence the large number of dams on the island. The groundwater being at present the major source of water is pumped by thousands of privately owned shallow wells and deep boreholes, dugged or drilled in the major aquifers of the island.

1.6 Irrigated Crops and Types of Irrigation

Agriculture has always been one of the the most important sectors of the economy of the island. The average annual contribution to the GDP for the two years period 1971-72 was 18.7% being the primary sector but in the period 1981-1982 the contribution reduced to 10%, due to the Turkish Invasion which brought a serious setback to the agricultural sector.

Although the agriculturally cultivated land comprise around 45.83% of the total area of the island the irrigated land is only a very small portion (see Tables 1 and 2) this being mainly due to the shortage of the water resources.

As it is seen from Table 2 the irrigated land is cultivated by a variety of permanent and annual crops whose water requirements are high, where the majority of the remaining cultivated land is rainfed and planted mostly with cereals, vines, carobs, olives and almond.

Irrigated agriculture in the island has been practiced for over 2000 years and the irrigation practices in the past have been very inefficient. However the irrigation systems now used in Cyprus are characterized as improved with high application efficiencies and their adaptation emphasizes the scarcity and value of the irrigation water. Such methods are the drip system, the mini sprinkler, the sprinkler, the hose basin and some other methods less efficient. The choice of the irrigation method is based on a) the source of irrigation water, b) the flow rate available, c) the type of crop, d) the soil characteristics, e) the pressure available, f) the climatic conditions and g) other economic and social factors,

1 No official figures are available after this year because of the occupation of a large area of the area by the Turkish Army.

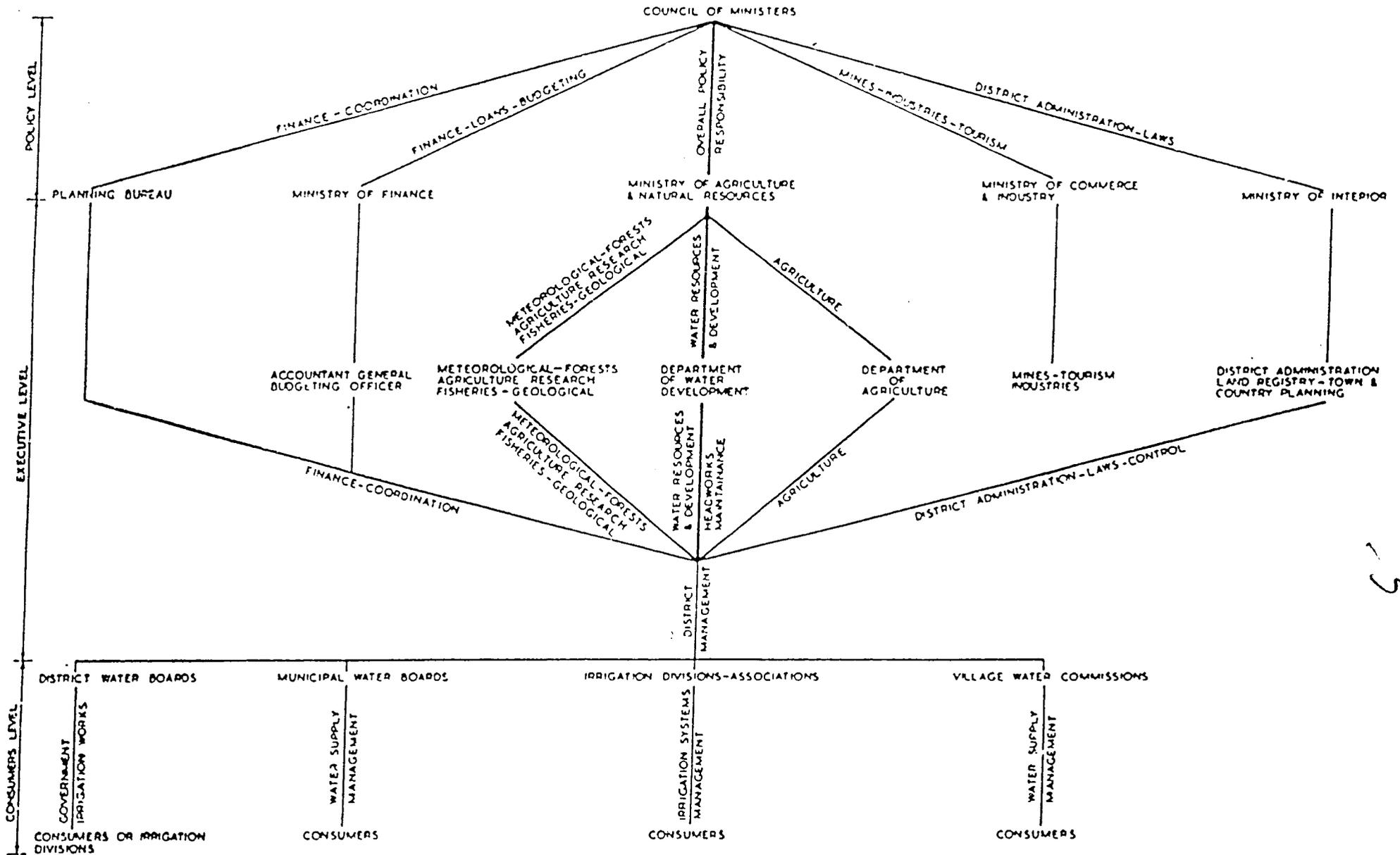
2. Water legislation and government policies for the recovery of Irrigation Investment

2.1 Water Laws, water policies and water administration

As many as a dozen or more major laws enacted through a period of 50 years and over, form what is today the water legislation of the country. These are the laws that were passed on to the new Republic in 1960 by the British colonial. According to the laws legal authority on water matters as it appear on figure 1 is divided over many Ministries where administration is spread over a wide spectrum of government departments. As is seen from the chart of figure 1 four Ministries are in some way or another involved in policy making where the major roles are carried out by two Ministries, the Ministry of Agriculture and Natural Resources which shoulder the responsibility for the overall policy on water matters and the Ministry of Interior which is responsible for the application and administration of the water laws. This complex situation is made still worse by the existence on most rivers and streams of numerous private water rights which are recognized by law and the constitution as private property.

The main water laws associated with the development and utilization of irrigation water are the following.

- Irrigation Division Law: This deals with the formation of an Irrigation Division by at least ten (10) proprietors, (owners of land) for the purpose of constructing, operating, improving, maintaining or repairing irrigation works and/or for the protection of their water resources or their water rights. The water resources, according to the law, are allocated (belong) to the land and not to the proprietor.
- Irrigation Association Law: This law provides for the formation of an Irrigation Association by at least seven (7) proprietors (owners of water) for the same purposes as the Irrigation Division. In this case the water belongs to the proprietor and not to the land.
- Wells Law: This law gives the power to the Government to control the sinking or construction, widening, deepening, or cleaning of a well or borehole and for imposing conditions as to the use of wells and/or boreholes.
- Water Development Law: This Law gives the power to the Government to declare certain regions as Water Development Areas for the conservation and better use of water resources in the same area or for the effective execution of an island wide policy relating to water.
- Government Waterworks Law: This vests in Government all underground water, all water running to waste from any river spring or watercourse and all other waste waters. It also provides for the defermination of water rights and gives to the Government power to plan, design construct, maintain, operate and manage any water project. The law became effective in 1929.
- Public Rivers Protection Law: This law gives the power to the Government to declare any public river or portion of a public river to be protected against damages to banks, removal or carrying away of gravel, sand, soil or other material from any river and the dumping of any rubbish or other refuse in the river.



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WATER DEVELOPMENT - ORGANIZATION CHART

- Groundwater Special Measures Law: This law was enacted in the late sixties and gives more power to the Government for enforcing measures towards better control of the extraction of groundwater and the efficient use of it.

2.2 Public Irrigation Works Investment

For the optimum exploitation and beneficial use of the scarce and valuable water resources and for maximizing the benefit from its use and for making possible the expensive irrigation projects the irrigation development in Cyprus is taking the form of Public Works whose construction is undertaken by the Government. Private irrigation is practiced only from individual shallow or deep wells and from private small springs whereas, where big money investments are required such projects are built by the Government in accordance with one of the two main Laws, the Government Waterworks Law, or the Irrigation Divisions Law.

Funds for financing the public and village projects are appropriated from the Government Development Budget and ultimately come from tax revenues or borrowing from other national or international lending agencies such as the World Bank, the Kuwait Fund etc. which add to the national debts. The cost sharing practice divides the burden for this cost between the beneficiaries and a subsidy from the tax payer and the portion of the fund to be repayed by the beneficiaries and the method of repayment depends on the policy of the Government and of the state of the Project (Government or Irrigation Division Law Project).

Following is a description of the two types of public irrigation projects and the policies adopted for their financing.

(i) Irrigation Division Law - Small Projects (Village Projects). This law gives the power to a group of at least ten (10) land owners, with the consent of the Government, to form an Irrigation Division with the purpose of constructing, operating, improving maintaining or rehabilitating of irrigation works, or for the protection of their water rights. This law is applicable to surface or groundwater and it is used for the construction of usually small irrigation projects for one or more communities. The Irrigation Division Members elect an Irrigation Committee which undertakes to carry out the objectives and purposes of the Division including the operation, maintenance and management of the projects, the receipt of loans and collection of water charges or other charges for the purposes of the Division. The Committee may appoint any person for carrying out the tasks of the Committee.

Projects constructed in accordance with this law are considered public with a considerable high Government subsidy for the capital costs and for the maintenance costs. On the side of implementation of such projects the Government undertakes the planning, design and construction of the works, offering 100% finance, with 2/3 to 3/4 of the cost offered as a grant and the remaining offered in the form of a long term, low interest loan with a three year grace period. Upon completion of the construction the works are turned over to the Irrigation Division which undertakes its operation, maintenance and management under the guidance of the Government. However due to the difficulties that are faced by the committees with the recruitment of specialized labourers and for safety reasons the maintenance of these schemes is left to the Water Development Department. The operation and management costs are covered fully by the Irrigation Division beneficiaries where the maintenance costs are subsidized by the Government by 2/3 of the total cost.

The works constructed under this law usually include the headwork, (dam, pond, borehole etc.) and the distribution system (primary, secondary and tertiary pipes including valves, water meters etc.) extending up to the farm outlet. The on farm water application is the responsibility of the private individuals.

(ii) Government Waterworks Law - Major Projects. This law vests in Government all groundwater, all water running to waste from any river, spring or watercourse and all other waste water, and gives the power to the Government to plan, construct, operate, maintain, manage, rehabilitate and improve any waterworks. It also gives to the Government the right to decide the extent of such works, to acquire and requisition immovable property or water right for the purpose of waterworks construction. The law provides procedures for water right determination and sets guidelines for water charges fixing. The waterworks constructed in accordance with this law are public and all capital and annual costs are financed by the Government from public funds. The maintenance and operation of such scheme is undertaken by the Government and the beneficiaries pay to the Government a water charge which is fixed by the Council of Ministers and is revised periodically.

The planning, design, construction and maintenance of the Government waterworks is done by the Water Development Department where the operation and management is either entrusted to Government Control Committees (Waterworks Committees) or to the Water Development Department depending on the systems complexity. The works constructed under this law include the headworks (dams, wells, pond etc.) and the distribution system up to the farm outlet. The responsibility of the on farm irrigation system lies with the land owner or the beneficiary.

2.3 Public Irrigation Works Development

The groundwater resources of the country being much easier and cheaper to develop were the first to develop. Development was very quick by the sinking of thousands of boreholes by private individuals without any Government assistance. Public water development involving small dams and open channel distribution systems started back in 1940 but it was not until 1960 when the first large scale irrigation projects were constructed. Figure 2 shows the actual development in surface water storage of the Public Projects for the years 1961 to 1986 as well the programmed development up to the year 1990.

2.4 Policies for the subsidy and recovery of the investment.

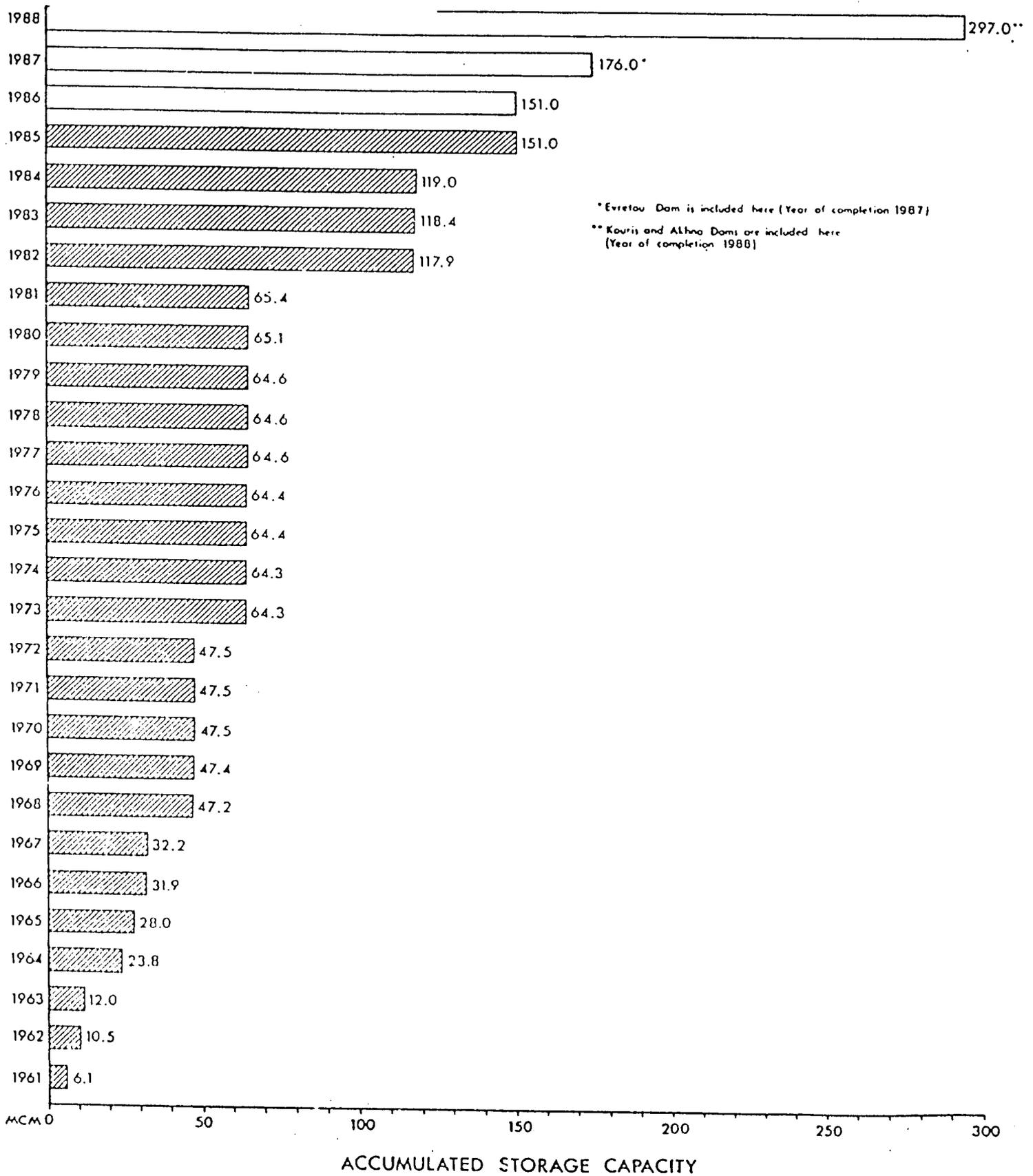
The majority or almost all of the public irrigation projects in Cyprus are composed from a storage dam and a collective distribution system. Since irrigation works construction is a costly¹ venture and the cost of water per cubic meter of water stored is amongst the highest in the world the Government has decided to subsidize the irrigation water by adopting different policies for works constructed under the two different laws. Accordingly the policies for the subsidy and investment recovery for the public works are the following:

1 Irrigation projects are costly because of physical and social reasons. Physical in the sense that all river beds are steep and narrow presenting difficulties in finding suitable dam sites, poor geology, heavy silting problems, wide variation of flows, and social, highly fragmented land tenure which add to the cost.

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DEPARTMENT OF WATER DEVELOPMENT PROGRESS IN DAM CONSTRUCTION

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2.4.1 Irrigation Division Schemes - Small Projects (Village Projects)

As explained before almost all small single community irrigation works are constructed in accordance with the Irrigation Division Law. The land owners with the consent of the government form an Irrigation Division and request the Government to proceed with the preparation of a feasibility study of the project. The feasibility study is presented to the land owners, members of the Irrigation Division for approval or rejection. Upon approval, and provided the Government agrees, the project designs are finalized and construction works start right after the approval of the funds appropriation. The capital cost of such projects is fully financed by the Government from Government funds in the following way.

- The Government provides from the Government development funds $\frac{2}{3}$ of the capital cost, which is given as a Government grant, to the Irrigation Division. The proportion of Government subsidy is not always the same and may vary depending on the socioeconomic situation of the land-owners.
- The remaining $\frac{1}{3}$ of the capital cost or whatever remains, is provided by the Government to the Irrigation Division through the Loan Commissioners as a long term, low interest loan. The loan is paid in 20-25 years at a rate of interest around 7% (at present) with a three years grace period.

Upon completion of the works the project is handed over to the Irrigation Division for management, operation and maintenance. The I.D. elects the Irrigation Committee which according to the Irrigation Division Law is entrusted with all legal and administrative powers to act on behalf of the division on matters related to management operation and maintenance of the project.

The Irrigation Division has to pay for all operation and management cost plus $\frac{1}{3}$ of the maintenance cost. The remaining of the maintenance cost is subsidized by the Government.

Therefore for projects constructed in accordance with the Irrigation Division Law the Government in practice pays all capital cost and has to recover within 20-25 years $\frac{1}{3}$ of the capital cost, or any other proportion being the loan granted to the Irrigation Division plus the interest resulting from the low interest rate. In principle it is the responsibility of the Irrigation Division Committee to impose and collect the charges that correspond to the annual installment for the loan repayment. The annual charge for the capital cost loan repayment is decided by the Irrigation Committee which decides on a per hectare (or per donnum) charge calculated by dividing the total annual amortization cost of the loan by the area commanded by the distribution system, thus each beneficiary paying according to the extent of his land being benefited by the project. This measure of charge for capital repayment has been found to be just, easy to apply and acceptable by the majority of the beneficiaries.

2.4.2 Government Waterworks Schemes - Major Projects

Waterworks constructed under this Law constitute the bulk of the public irrigation project in Cyprus. Out of the 151.00 MCM of surface storage in Cyprus 141.44 MCM constitute dams constructed under the Government Waterworks Law. Therefore the charge for irrigation water from these projects is very important and very critical since it affects the production costs, of a major part of the irrigated agricultural industry. This will be even more critical and most important with the completion of the new projects now under construction, such as the Southern Conveyer Project and the Khrysokhou Irrigation Project.

Table 3 shows a list of the Government Waterworks, completed and under construction, their storage capacities and their water yields as well as those of the Irrigation Division Projects, indicating the great role that the Government Waterworks have in the agricultural production sector.

TABLE 3
Government Waterworks Projects as compared
to Irrigation Division Project

		Storage capacity MCM	Yield MCM
	I. Government Waterwork		
	A. <u>Operational Projects</u>		
1.	Argaka Magounda (O)	0.990	0.900
2.	Ayia Marina (O)	0.300	0.300
3.	Kalopanayietis (O)	0.363	0.250
4.	Kiti (O)	1.610	0.250
5.	Lefkara (O)	13.350	5.000
6.	Pomos (O)	0.860	0.900
7.	Xyliatos (O)	1.220	1.200
8.	Yermasoyia	13.500	9.000
9.	Polemihia (O)	3.430	2.400
	B. <u>Prior Projects</u>		
10.	Paphos (P)	52.000	22.000
11.	Vasilikos-Pendaskinos (P)	32.000	15.000
12.	Khrysokhou ¹ (P)	25.000	14.200
	C. <u>Southern Conveyor¹</u>		
13.	Southern Conveyor (SCP)	123.000	70.000
	D. <u>Recharge Waterworks</u>		
14.	Recharge Waterworks	19.321	19.321
	Total	287.444	160.721
	II. <u>Irrigation Division Projects</u> (26 Dams 20 ponds)	9.556	9.000
	Grand Totals	297.000	169.721

1 Under construction
(O) Letter in brackets stand as follows, (O) for Operational Project,
(P) for Prior Project

The Government Irrigation Projects provide for the construction of the headworks (dams, boreholes, diversion weirs) and the distribution system up to the farms outlet. For all these works the landowners are not charged anything nor do they undertake any obligation or responsibility towards the project. After completion of the works, at their request for water supply, they undertake to buy water at a price which is fixed by the Council of Ministers and which may be revised from year to year.

2.5 Water Charging Functions

2.5.1, General.

The discussion that follows is applicable only to Government Irrigation Projects where farmers are asked to pay a charge per cubic meter of water consumed. The policy on the water charge or on the recovery of investment for Irrigation Division Projects has been discussed in Section 2.4.1.

2.5.2 Purpose of water charges.

Cyprus, with a semi arid climate, with a low rainfall unevenly distributed and of unreliable pattern, has an acute water problem which make irrigation projects very expensive to construct, and manage. Like every good or service offered, water has a price for which consumers are asked to pay and prices are charged for two reasons (a) financial and (b) economic. The financial one is that enough money must be raised to pay the cost (or part of the cost) of operation maintenance and management, the capital cost (or part of the capital cost) the interest on capital and the insurance cost incurred for providing the water to the farm outlet. The economic is that the quantity of water the consumers will buy and use will depend on the price. i.e. if the price is very high this will discourage the farmers from using the water or use it only for the production of very high return crops (limited use) where low prices will encourage the wasteful use of the water. In broader sense pricing also has a social function related to the multidimensional nature of social welfare where price levels influence income distribution, economic stability, and other social goals and to some extent the foreign trade balance.

2.5.3 Water charge function and the Law.

The importance of the water charge for water from the Government Waterworks has been foreseen by the Cyprus legislator and in 1968 the Government Waterworks Law was amended to provide guidance for water charges from such projects. In the Law which was passed by the Parliament of the Republic the following is stipulated, in summary.

The Council of Ministers may by Regulations, ratified by the House of Representatives, fix the fees, rates or any other money consideration which may be levied or collected from persons who use water or get benefit from Government Waterworks. these either being fixed in money terms per donum or according to kind of crop, or according to volume or time of use or according to volume or time of use or according to the benefit accruing or capable of accruing. In fixing the rates regard shall be made to:

- (i) the interest on capital expended,
- (ii) adequate provision for a sinking fund and insurance of the works and
- (iii) cost of operation, maintenance and administration of the works and the cost of pumping the water.

The rates or fees according to the law shall not be more than 40% of the weighted average cost of the water (per cubic meter) but in some special cases considering the high costs of any works or other economic and social conditions prevailing in the project area the rate may be increased up to 65% of the weighted¹ average cost of the water.

From the above it is seen that the Law defines the maximum water charge that the Government is allowed to impose for recovering part of the investment, and according to the Law the Government is allowed to recover, in normal cases 40% of the total weighted average unit cost of water and in extraordinary cases up to 65% of the total weighted average unit cost of the water. It also gives to the Government the power to:

- (a) fix the unit of water charge this being either in money terms per cubic meter of water or in money terms per donum of land irrigated or in money terms per donum of each crop irrigated or in money terms per unit of time used. This flexibility contained in the Law is very usefull since irrigation projects are not always equiped with water meters or water metering is not always easy to carry out.
- (b) fix different water prices for different crops, depending on the benefit accruing or on the Government policy regarding the agricultural production and food requirement of the population.
- (c) fix different water prices for different times of water use of the year (spring, summer, autum and winter). Water during winter flows combined with dam overflow have usually low price compared with water supplied during summer time.
- (d) fix different water prices depending on the benefit accrued or capable of being accrued.
- (e) fix different water prices depending on the volume of consumption (escalating water prices).
- (f) fix different water prices for different project areas after consideration of the high cost of the works (capital and running costs) or other economic and social conditions prevailing in the project area.

2.5.4 Water charge function and the Loan Agreement Between the Government and the World Bank in relation to the Southern Conveyor Project

The importance of the price of the irrigation water from the Government Waterworks not only those financed (partly) by the World Bank but of the irrigation water from all Government Waterworks is emphasized strongly by the inclusion in the Agreement of a separate clause setting the minimum average prices of the irrigation water, in contrast to the Law which sets the maximum allowable prices. For pricing purposes the agreement divides the projects into three categories, (a) the Operational Projects (b) the Prior Projects and the Southern Conveyor Project.

1 For the law, the weighted average cost of the water per cubic meter is calculated by dividing the summation of all cost described in (i)(ii) and (iii) above, of all Governemnt Projects by the total amount of water for sale.

The Operational Projects are all small projects constructed before 1980 and generally the unit water cost is considerable lower than the remaining prior and the Southern Conveyor Projects. The Prior Projects are the three large projects financed by the World Bank namely the Paphos Irrigation Project, the Vasilikos-Pendaskinos Project and the Khrysokhou Irrigation Project. The Southern Conveyor Project is defined as a category by itself. (See Table 3 for Project classification). For each of the three categories the Agreement stipulates as follows:

Operational Projects: For these projects the Government shall establish water charges at levels sufficient to recover a percentage of the weighted average unit cost of the water made available under such schemes which percentage shall be:

- for fiscal year 1984 not less than 28%
- for fiscal year 1985 not less than 35%
- for each year thereafter not less than 40%

Prior Projects: Starting with the year in which water is made available (first year of operation) under each of the Prior Irrigation Projects, respectively establish charges for the water made available in the area covered by the respective Project at levels sufficient to recover a percentage of the weighted average unit cost of water made available under such projects which percentage shall be:

- for each year starting with the first year of operation until the sixth year of operation not less than 30%, 40%, 45%, 50%, 60% and 65% respectively, and,
- for each year thereafter not less than 65%.

Southern Conveyor Project: Starting with the year in which water is made available under the Project (first year of operation) establish charges for project water which shall apply equally to surface and ground water, at levels sufficient to recover the weighted average of the full unit cost of groundwater and of a percentage of the unit cost of surface water which percentage shall be:

- for the first year of operation not less than 45%
- for the second year of operation not less than 55%
- for the third year and the years thereafter not less than 65%,

For the purposes of price setting the term "unit cost" means full operation, and maintenance costs together with capital cost to be calculated at an interest rate of 9% per annum over a period of 40 years and the term "weighted average" of such unit cost means multiplying the unit cost for each scheme or project by the corresponding volume of water produced, totalling the result and dividing such total by the total volume of water available under said schemes and projects.

2.5.5 Criteria for fixing water prices:

The Law as explained above sets the guidelines for maximum water prices whereas in the Loan Agreement the minimum charges for each type of project are recommended. In general it is stated that the Government using the Law provisions and the Loan Agreement clause should proceed and impose such prices so that 40% and 65% of the total cost of the irrigation water is paid by the consumer depending on the source of supply on the Project. Since not all projects are the same, differing in cost, dispersed in various locations of the island, supplying water of different quality and with high or low pressure, varying and steady discharges and irrigating low on high return crops the following criteria were considered in the past and are always considered for fixing the water prices, these being within the guidelines stated in the Law and the Loan Agreement (in other words the Government from each category of Projects collects the stated percentage of the total cost of the water with prices differing from project to project).

- (a) The weighted average cost of water: This criteria is the first named in the Law and the Loan Agreement as a basis for fixing water charges. For each project the cost of water is calculated using the present worth method of analysis for the capital component cost and the running cost method for the variable cost. Therefore the capital water cost component for a project is more or less constant whereas the variable cost component represents the actual cost incurred during the year under consideration. Table 4 shows the calculated capital cost, the annual cost, the total cost of water for each project and the weighted average unit cost of water from the three categories of projects.
- (b) The Annual cost: Provided that the consumers must pay at least the running cost of a water then the annual cost must be taken into consideration.
- (c) Ability of farmers to pay and Benefits received: The charge an individual on a farmer will pay for water depends on his economic situation and his income. Consideration must be made of the farmer's economic condition especially in the first years of project implementation where the farmers have to spent money on land levelling, land preparation, installation of the on farm distribution system, the plantation of crops etc. without any income in cases of permanent plantation for which 5-7 years are required to reach a maturity level of production. Therefore the water charge must take into account the farmers investment requirements program and this must be fixed in relation with other development and subsidy programs in irrigated agriculture in the project area. Related to the ability of the farmers to pay is the benefit received from irrigated agriculture, since very high water prices will discourage farmers from using water or abandon in total the irrigated agriculture which will have an adverse effect on the project economic and to the national economy in general. Since the cost of irrigation water in Cyprus is one of the highest in the world, in fixing the rates as outlined in the Law and the Loan Agreement the Government is carrying out studies on input-output from irrigated agriculture thus establishing the safe limits of the water price that farmers are able to pay safeguarding at the same time a reasonable income. From studies carried out it is seen that with the existing water prices there is no problem but in the near future there will be a problem which will force the Government to increase the subsidy unless the benefits received (product prices) are increased at a higher rate than now forecasted.

TABLE 4
Unit and Weighted Average Cost of
Water from Government Waterworks (1985)

No.	Project Name	Unit Cost of in U.S. cent/m ³				
		Capital ¹	Variable ²			Total Unit Cost
			C + M	Energy	Total	
<u>A. Operational Projects</u>						
1.	Argaka Magounda	15.02	2.54	-	2.54	17.56
2.	Ayia Marina	14.62	3.52	-	3.52	18.14
3.	Kalopanayiotis	55.00	6.58	-	6.58	61.58
4.	Khrysokhou Valley ³	3.78	3.52	4.84	8.36	12.14
5.	Kiti	38.82	2.42	-	2.42	41.24
6.	Lefkara	31.10	4.40	-	4.40	35.50
7.	Pomos	12.72	3.52	-	3.52	16.24
8.	Xyliatos	37.48	6.60	-	6.60	44.08
9.	Yermasoyia- Polemidhia	16.02	2.42	1.20	3.62	19.64
Weighted average for Operational Projects		15.60	-	-	1.89	19.38
<u>B. Prior Projects</u>						
10.	Paphos	19.36	2.00	5.16	7.16	26.52
11.	Khrysokhou	26.00	3.00	-	3.00	28.00
12.	Vasilikos-Pendaskinos	28.00	3.00	-	3.00	31.00
Weighted Average for Prior Projects		22.00	2.34	3.38	5.72	27.72
13.	<u>C. Southern Conveyor Project</u>	48.00	4.00	4.00	12.00	56.00

1. Using the Present Worth method

2. Based on annual cost and volumes

3. Borehole scheme: All other supplied from a dams reservoirs

- (d) Water Quality and Service: The water quality from the public projects in Cyprus is at present of no great importance because the water supply from the different projects is on the average of a uniform quality. However there are differences from one project to another on the services offered. i.e. water pressure, rate of supply, mode of water supply (on demand, on rotation) and the water dependability. These are taken into consideration when fixing the water charge from a project.
- (e) Socioeconomic Reasons. Cyprus is an island with a large part of its area under occupation and with the usual natural and short communication roads blocked. This situation has created a serious problem to some communities in some projects area, for which an extra advantage has to be given to encourage them to stay in their land and continue their activities as in the past. The same is true for poor isolated communities
- (f) Equivalence of water charge from Government Waterworks to the water charge from Irrigation Division Projects

Although the quantity of irrigation water supplied from Irrigation Division Projects is relatively small in general in some communities it is as much as the water quantity delivered from the Government Waterworks. Under such circumstances the prices of the irrigation water from the two categories of projects must be as close as possible thus avoiding discrimination between the farmers. In view of this and for achieving a relatively uniform prices for the whole island the Government is now studying the subsidy policies for the Irrigation Division Law Projects.

2.6 Water Charges Imposed since 1968:

Table 5 shows the water charges that were imposed during the period 1968-1985. As it is seen the water charges are more or less uniform and they take into account the project location the period of supply (overflow or supply from the reservoir) and the type of crop. Other criteria taken into consideration are the service offered and the socioeconomic considerations.

2.7 Effectiveness of the Method Applied for the investment recovery.

Using the above guidelines and criteria the Council of Ministers approve the water charge for each project. The criteria adopted so far have proved to be very helpfull in fixing the water charges from the various Government Projects although it must be stated that the farmers are never happy watever the price of the water. Of course the problem of water charges fixing will get more critical with the completion of the new projects now under construction and when efforts will be made to implement the Loan-Agreement provision for minimum charges. These provisions, if applied without any modification will create three categories of farmers, the cheap water farmers (from operational projects) the medium price water farmers (prior Projects) and the expensive water farmers (the S.C.P.)

TABLE 5
Water Charges from Government Waterworks (Public) U.S. Cent/m³

Ser. No.	Project	Year 1970			Year 1971			Year 1982		Year 1983		Year 1985		Year 1986	
		Over-flow	Vegetable	Other Crops	Over-flow	Vegetable	Other Crops	Over-flow	From Dam						
1.	Argaka Makounda	Free	2.0	2.0	Free	2.0	3.0	Free	4.0	Free	5.0	Free	6.0	Free	6.0
2.	Ayia Marina	1.0	2.0	2.0	1.0	2.0	3.0	-	4.0	1.0	5.0	-	6.0	-	6.0
3.	Kalopanayiotis	Free	2.6	2.6	-	3.6	3.6	-	4.0	Free	6.0	-	7.0	-	7.0
4.	Khrysokhou Valley	N.O.	-	-	-	5.0	5.0	-	5.0	-	7.0	-	8.0	-	8.0
5.	Kiti	0.5	2.0	2.0	-	3.0	3.0	-	4.0	Free	4.0	-	5.0	-	5.0
6.	Lefkara	N.O.	N.O.	N.O.	-	2.0	2.0	-	2.0	Free	6.0	-	7.0	-	7.0
7.	Pomos	2.0	2.0	2.0	1.0	2.0	3.0	2.0	4.0	2.0	5.0	2.0	6.0	2.0	6.0
8.	Xyliatos	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	Free	6.0	-	6.0	-	6.0
9.	Yermasoyia-Polemidhia	-	1.4	3.0	-	2.0	3.0	-	5.0	-	6.0	-	7.0	-	7.0
10.	Paphos	N.O.	N.O.	N.O.	-	3.0	3.0	-	4.0	-	7.0	-	8.0	-	8.0
11.	Vasilikos-Pendaskinos	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	-	Free	-	9.0
12.	Mavrokolymbos	-	2.0	3.0	-	2.0	3.0	-	4.0	-	6.0	-	7.0	-	7.0

N. O. Not on operation

* Exchange rate 2 U.S. Dollar to 1 Cfl.0

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2.8 Percentage of direct subsidies to irrigation water

As described above Public Irrigation Projects are built either in accordance with the Government Waterworks Law or the Irrigation Division Law.

For Projects constructed under the Irrigation Division Law the Government provides the following subsidies.

Capital Costs: The Government subsidizes 0.67-0.75 of the total capital cost with the remaining given as a long term low interest rate loan. The loan is given with a 7% rate of interest paid in 22 annual equal installments with a three (3) years grace period.

Running Costs: The Irrigation Divisions bear all the operation and management costs and share with the Government the maintenance cost of the headworks in proportion of 1/3 to 2/3.

For the Government Waterworks the Government undertakes total financing of the works with a subsidy ranging, according to the Law, from 0-60% of the total cost of the water (capital and variable cost)

2.9 Government financial contribution to tertiary and on farm systems

In all cases the distribution systems (with are totally financed by the Government) extend from the headworks up to the farm outlet including the tertiary canals or pipes. For the on farm irrigation systems the responsibility lies in total with the farmer who can either finance his own on farm system or can make use of the "Improve water use Program" sponsored by the Department of Agriculture. According to this program the farmers can get a limited short term relatively low interest loan through the Cyprus Cooperative Bank plus any technical consultancy concerning the on farm irrigation system. In the past the program provided a 15% grant on the total capital cost.

2.10 Deficiencies of the Policies with regard to the recovery of the irrigation Investment

The policy on water subsidy as outlined above has worked satisfactory in the past. For the Irrigation Division Law Projects the recovery policy has been working up to recently quite satisfactory, with the old, low capital, low running cost projects. Lately with the construction of high capital and high running cost projects the system has come under pressure by the farmers for increasing the subsidy in capital cost or subsidize the running costs. This is mainly because the price of the irrigation water from the Government Irrigation Projects was relatively cheaper than the cost of the irrigation water to the farmers from the Irrigation Division Projects. Under such pressure the Government appointed a Committee to study the subsidy program (of the Government) in general including water projects subsidy. Another development is the Loan Agreement provisions which actually set the minimum prices and the maximum subsidies of irrigation water from Government Waterworks which hopefully will increase the prices of irrigation water from the Government Projects to match those of the Irrigation Division Projects. Other deficiency of the present system is the procedure required to adopt a new water charge. Although the Law sets the maximum prices (For Government Waterworks) any prices have to be approved by the Government and ratified by the House of Representatives which result to delays and postponements.

All the above problems related to the recovery of the capital and annual cost investment will be dealt in detail in the new study now undertaken by the Government in its effort to establish an Entity for the Management of the Water Resources of the island.

3. Payments for the abstraction of water from Rivers or from Groundwater.

This subject has been under consideration in the past in an effort to optimize the utilization of the available water resources and curtail the pumpage from the aquifers but no decision has been taken by the Government. (According to the Waterworks Law all free running water and all groundwater belongs to the Government). This issue I believe will be a separate subject to be studied within the framework of establishing a Water Entity.

4. Actual Policies with regard to the financing of irrigation investment in private schemes.

Private irrigation schemes are defined those that serve only one private. Since all free running surface water and the underground water belongs to the Government private schemes can only be built for use of private water or in cases of groundwater where a permit to pump water has been issued by the Government to a private. Such private schemes are comparatively small covering a very small area and no financing in any form is given by the Government, except in the cases of the on farm distribution systems, related to the "improved water use program" where the financing is very limited. Also in the case of Irrigation Associations where privately owned water is developed for irrigation purposes the Government offers financing and a grant but again the policy is to discourage the construction of such schemes. Generally it can be said that the Government does not favour the construction of private irrigation schemes and its policy is that no such schemes are to be encouraged. This reflects the importance that the Government sets on the utilization of the vital for the economy water resources of the island.

5. Actual Policies with regard to O + M expenditures in public irrigation schemes.

5.1 General: Operation and maintenance costs are made up of the following components.

- (a) Operation costs which include the wages and incidental fees (insurances, social insurance, perdiemt, transport etc.) for the employment of the staff required to operate and manage the project.
- (b) Maintenance costs which include wages and incidental fees for the employment of the maintenance staff plus the cost for the purchase of spare parts and equipment for the proper maintenance of the project. Improvements, additions and replacements to the project are not included in the maintenance costs.
- (c) Energy Costs: These are the costs required to pump the water of the project if required.

The O + M costs are calculated by adding all costs associated with the operation, management, and maintenance of the project, including those related to the dam, plus the cost of the energy if any. Replacement to the project or improvements or extensions or large scale repairs and maintenance are assumed as capital cost and are not accounted in the O + M costs.

5.2 Predominant methods of collecting charges

O + M recovery policies are different for the two types of public irrigation projects as follow:

(i) Irrigation Division Projects. According to the Law the Irrigation Division Work are managed by Irrigation Committees, elected by the beneficiaries. The Committees have the power to impose charges to the beneficiaries in such a way so:

- all operation, management and energy costs are paid by the beneficiaries. No Government grant or subsidy is given to the Irrigation Division.
- the maintenance costs of the headworks are shared between the Government and the Irrigation Division at a ratio 2 to 1. The grant is given on maintenance works carried out by the Water Development Department which controls the Government Funds. No money are given to the Irrigation Divisions for works carried out by themselves unless such works are approved by the Water Development Department.

All operation, management and the share of the maintenance costs are collected in total, separately from the capital cost, by the Irrigation Committee by imposing to each beneficiary a charge either per cubic meter of water consumed or per unit area of the land commanded by the irrigation system. In cases where pumping energy cost is a major component of the O + M costs the charge is proportional to the volume of water consumed.

Based on the above the I.D. Committees, under the supervision of the Government (District Officer), prepare an annual budget of income and expenditure related to the O + M costs, with the Government contributions only 1/3 of the maintenance cost of the headwork. This budget is balanced and the beneficiaries are charged accordingly.

(ii) Government Waterworks Projects

Operation and maintenance costs for the Government Waterworks are provided in a budget prepared either by the Waterworks Committee or the Water Development Department and approved by the Council of Ministers. The O + M costs are not collected separately but according to the Law they are added to the capital costs for the calculation of the unit water cost and are taken into account in fixing the water charges. (See section 2.5.3.)

5.3 Effect of Energy cost on O + M costs

Public irrigation projects in Cyprus, as a rule, provide the water to the individual farm outlet at sufficient pressure, around 3.5 bars, for on farm irrigation by high application efficiency systems. The responsibility for providing the required head to the farm outlet (a prefix head) lies with the project and if pumping is required then such pumping is undertaken by the Project.

The effect of the energy cost on the O + M costs is small or great depending on the total manometric head to which the water is pumped, the cost of fuel and the volume of water which requires pumping.

From the figures given in Table 4 it is seen that the energy costs where required is comparatively great being 40-50% of the O + M costs.

5.4 Low and High Capital Cost Projects and O + M Costs

The amount of capital expenditure per hectare for an irrigation project (or the capital cost of water) depends very much on the type of headworks (expensive or cheap dam, pond or boreholes) the conveyance if any and the type of the distribution system. Due to topographical constraints dam structures in Cyprus are very expensive which result to high investment cost per hectare compared with borehole project which result to low investment cost per hectare. However the low investment cost per hectare for the borehole projects are compensated by the high pumping costs, (increased O + M cost) thus the total water cost being approximately the same for low and high investment projects. In general it can be said that surface water projects with high investment cost per hectare and without pumping have a low O + M cost whereas groundwater schemes with low investment cost per hectare have a high O + M cost due to pumping and due to high maintenance costs. Table 6 gives the capital and O + M cost of surface and groundwater schemes, for comparison purposes.

Gravity schemes usually have a smaller O + M cost compared with the O + M cost of the pumping schemes as is seen from Tables 4 & 6.

Pumping schemes require higher operation and maintenance costs resulting from the following.

- Pumps require continuous attendance and maintenance which is not required by gravity scheme.
- The maintenance of the pumping unit is comparatively expensive both in wages and spare parts.
- Pumping costs extra money not required by gravity schemes.

TABLE 6
Capital and O + M Costs for Low and High
Investment Cost Schemes* in U.S.Dollar/Ha or U.S.Dollar/

No.	Scheme/Type	Annual Cost in U.S. Dollar per Ha	Capital Cost in U.S. cent/m ³	O + M Cost in U.S. cent/m ³	Total Unit Cost U.S cent/m ³
1.	Ephtagonia Pond	952	18.1	9.1	27.2
2.	Arakapas Pond	1087	20.7	5.3	26.0
3.	Kyperounda Pond	1192	22.7	17.7	40.4
4.	Dhieronas Pond	1352	25.7	4.1	29.8
5.	Polystypos B/H	845	16.1	24.9	41.0
6.	Alona B/H	721	13.7	14.70	28.4
7.	Askas B/H	665	12.6	15.0	27.6
8.	Agros B/H	540	10.2	13.9	24.1
9.	Sykopetra B/H	586	11.2	13.6	24.8

* All these schemes were constructed within the Pitsilia Integrated Rural Development Project partly financed by IBRD.

5.5 Farmer's Participation in O + M decisions

Operation and Maintenance decisions in public irrigation projects are taken by the responsible authority entrusted with the operation, management and maintenance of the projects as follows:

(i) Irrigation Division Projects:

The operation, management and maintenance of the Irrigation Division Projects are according to the law entrusted to a Committee elected every three years. This Committee has all the legal and administrative power to operate, manage and maintain the project according to rules and regulations approved by the beneficiaries and the Government. However due to the fact that the Committee's technical know-how are limited, and for economy reason, the Committees request and get technical advise regarding operation and maintenance for the schemes from the Water Development Department, which finally undertakes the maintenance of the works, (mainly the headworks) where the operation and management remain in the hands of the Committee.

(ii) Government Waterworks.

The operation and management of the Government Waterworks is entrusted either to the Water Development Department or to Waterwork Committees, whereas the maintenance is always entrusted to the Water Development Department. As it appears all decisions concerning the maintenance of the Government waterworks are taken by the Water Development Department. The same applies to projects operated and managed by the Water Development Department although Advisory Committees composed from Government officials and farmers representatives can give an advise accordingly.

For projects run by the Waterworks Committees all decision concerning the operation and management are taken by the Committees. These Committees are Government controlled Committees made up of Government officials (the district officer, a representative of the Water Development Department and the Department of Agriculture) and farmers representatives elected by the farmers.

6. Farmer's Ability to Pay Water Charges

6.1 General: The charge a farmer will pay for the consumption of irrigation water will depend on his economic situation, his income in general and investment requirement and mainly on the revenue he is getting from the irrigated crops. Therefore great consideration must be given in fixing a water charge to the ability of the farmer to pay. This ability is generally a function of the benefits received and the taxes paid.

6.2 Revenues from Irrigated Crops: If the net revenue received per cubic meter of water used is higher than the water charge per cubic meter of water then the farmer is considered to have the ability to pay the charge. This is established by studying farm models with representative farm budgets by considering the benefits and cost related to one hectare of each crop of the crops included in the project area. Therefore the net benefits, before paying for irrigation water charge, are estimated by deducting from the gross revenue the production cost, the interest in operating capital, the investment cost and the maintenance of on farm distribution system but not the cost of the irrigation water. Given the quantity of water required for the irrigation of the crop to produce the said benefit, the return to water can be estimated and compared with the proposed water charges to see if the charge is profitable or not. From the studies carried out in 1985 the return to water from perennial and annual crops are as shown on Table 7.

TABLE 7

Return to Water from Perennial
and Annual Crops

Ser No.	Crop	Return to Water in U.S. cent/m ³
1.	Citrus (mixture)	19
2.	Table Olives	122
3.	Avocados	56
4.	Bananas	20
5.	Tomatos	68
6.	Potatoes	122
7.	Ground Nut	20
8.	Melons	204
9.	Water Melons	106

6.3 Pricing policies for agricultural input and farm products.

Generally it can be said that the prices of the agricultural inputs, such as fertilizers, herbicides and others including machinery and fuel are controlled and to some extent subsidised by the Government, where the farm product prices are free to fluctuate and be established by the law of supply and demand with few exceptions one being the banana whose price is fixed by the Government (Import of bananas is not allowed for the protection of the local production).

6.4 Tax Policies on land, on produce and income

Agricultural land is not in any way taxed nor is the production taxed. The farmers are subject to the same income tax like any other citizen of the republic. Any help they get is in the form of subsidies.

6.5 Effect of Water Charges on the revenue from crops and on production costs

From studies carried out in the past (in November 1984) it has been established that the water cost amounted to around 10-20% of the total production cost where a 100% increase (from 6.52 to 13.04 U.S. cent/m³) of the charge would increase the portion between 20 and 35%, increasing the total cost of production by 12 to 20%. Further increase to the water charge would have a still higher increase in the production cost which if not compensated with higher prices of the agricultural products will render the farmers unable to pay for such increased charges.

Table 8 shows the gross revenues, the production costs including water, and the net benefits in U.S. Dollars/Ha of the main crops under irrigation in the Government Projects.

TABLE 8

Gross Revenue, Production Cost and Net Benefit in U.S.Dollars/Ha

Crop	Gross Revenue U.S.Dollars/Ha	C o s t s U.S. Dollar/Ha					Total	Net Benefits U.S.Dollars per Hectare
		Production Costs	Interest on operating capital	Cost of Irrigation Water	Cost of Irrigation System	Maintenance and Repl. of Irrigation System		
Tomatoes Open	10 800	6 255	285	570	315	45	7 470	3 330
Cucumbers Open	12 150	7 425	330	420	315	45	8 535	3 615
Potatoes Spring	7 500	3 405	150	300	315	45	4 215	3 285
Groundnuts	2 925	1 635	75	450	315	45	2 520	405
W.Melons	9 450	3 855	180	480	315	45	4 875	4 575
Melons	13 500	3 315	150	480	315	45	4 305	9 195
Onions	12 150	4 260	195	375	315	45	5 190	6 960
Citrus	7 740	2 640	120	825	-	165	3 750	3 990
Lemons	7 125	3 225	150	825	-	165	4 365	2 760
Avocados	11 250	1 725	175	975	-	165	2 940	8 310
Bananas	8 325	3 510	165	1 470	-	165	5 310	3 015
Table olives	11 250	4 920	165	345	-	165	5 655	5 595

7. Problems Related with the Fixing and Collection of Water Charges

7.1 Fixing of Water Charges and Problems

According to the existing Law and the policies the fixing of water charges is done for the two types of Public Irrigation Schemes as follows;

(a) Irrigation Division Law:

For each Irrigation Division the elected Irrigation Committee is responsible for fixing the charges in such a way so that all O + M costs are paid and any debts due to capital expenditure for the construction or rehabilitation of the scheme are repaid in accordance with the loan agency terms and conditions. The fixing of charges by the Irrigation Committee is always done in accordance with the existing regulations of the Irrigation Division which are approved by the beneficiaries and the Government.

(b) Government Waterworks

For all Government Waterworks the water charges are fixed by the Council of Ministers (in accordance with the existing Law, the S.C.P. Loan Agreement provisions and the criteria as explained in Section 2.5.3, 2.5.4 and 2.5.5) and are ratified by the House of Representatives. The relative studies for the water charges fixing are carried out by the Water Development Department and the Department of Agriculture and proposals are submitted to the Council of Ministers, for approval. The approved water charges are then submitted to the House of Representatives for ratification and are published in the Official Gazette of the Republic in the form of Regulations.

In the case of the Irrigation Divisions the mechanism of water charge fixing is simple and flexible and does not present any difficulties. On the other hand the mechanism and procedures for water charges fixing for the Government Waterworks is slow and tedious which result to delays and very often no decision is taken so water charges are not revised.

7.2 Collection of Water Charges and Problems

Water charges collection from the beneficiaries for the two types of Public Irrigation Schemes is done as follows:

(a) Irrigation Divisions: The charges are collected by the treasurer of the Irrigation Committee. These are collected either once every year or every two months depending on the method of charging. There are no serious problems except in case where the beneficiaries or land owners are at large in which case there beneficiaries are charged later or the charges are collected by the tax-collectors of the Inland Revenue Department.

(b) Government Waterworks: The collection of charges from the sale of water from the Government Waterworks is the responsibility of the Waterwork Committees if the Project in-operated and managed by a Committee or the Director of the Water Development Department if the project is managed by the Director. In both cases the collection of the charges is done in accordance with regulations approved by the Council of Ministers and ratified by the House of Representatives. According to the existing Regulations the consumer is required to settle any bill within 15 days of its issue. If the bill is not paid then the bill is send to the tax-collector of the Inland Revenue Department for collection.

The above procedure although it has been working for some time now, (over 18 years) it has a basic drawback for it does not force the consumers to pay in time and properly their debts. This resulted to the accumulation of debts from a number of consumers, amounting to hundreds of thousands of dollars enhanced also by the slow and lengthy procedure of charge collection by the tax-collectors. Based on the above findings the Water Development Department has proposed the revision of the water charge collection Regulations by introducing a number of measures which will encourage and force the consumers to pay their debts in time. Such measures are the following:

- Payment will be made within 30 days after issue of the bill.
- If the bill is not paid in time the water supply will be interrupted and for its restoration the consumer will have to pay the pending bill, a 10% surcharge on the bill and expenses for the interruption and restoration of the supply.
- The Director or the Waterworks Committee will have the right to bring the consumers to the court for the recovery of the charges in case the consumers refuse to pay.
- If the charges cannot be recovered by using the above measures, then they will be sent to the tax-collector for collection.

The proposed measures (Regulation Revisions) already tried in one project have proved to be very effective.

8. Conclusions and Recommendations

This paper concludes that water charges are necessary for the efficient use of the available water resources and for the collection of the necessary funds to cover for the construction and operation and maintenance costs. The criteria and the guidelines available for fixing the charges are well established while the procedure for fixing the charge is slow, lengthy and tedious resulting to delays or no action at all. The procedures for charge collection are well defined and effective and with some improvements will become even much more effective.

A drawback of the water charge function included in the S.C.P. Loan Agreement between the I.B.R.D. and the Republic of Cyprus is that it will finally create three categories of farmers, the cheap water farmers, the medium price water farmers and the expensive water farmers. This must be avoided so that all farmers on the island being supplied with water from Public Irrigation Projects are treated equally. Other difficulties faced with the procedure of water charge fixing are expected to be dealt with in the study for the establishment of a Water Entity which will undertake the management of all water resources of the island.

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