

AGENCY FOR INTERNATIONAL DEVELOPMENT
 WASHINGTON, D. C. 20523
BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY
Batch 62

1. SUBJECT CLASSIFICATION	A. PRIMARY Food production and nutrition	AP10-0000-0000
	B. SECONDARY Water resources and management	

2. TITLE AND SUBTITLE
 Improving agricultural water use, organizational alternatives

3. AUTHOR(S)
 Radosevich, G.E.

4. DOCUMENT DATE 1977	5. NUMBER OF PAGES 153p.	6. ARC NUMBER ARC
--------------------------	-----------------------------	----------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS
 AID/TA/RD

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)

9. ABSTRACT

This state-of-the-art review of the legal aspects of water user associations is a pragmatic description of the types of water user associations functioning in different areas of the world. It is intended to assist agricultural development in rural areas by promoting the use of mutually acceptable organization schemes together with the introduction of intermediate technologies and improved water use practices. The focus is on the forms of water user associations and their attributes for inducing and achieving more efficient and effective water and related agricultural resource utilization. In order to examine the spectrum of existing organizational alternatives for water user associations, the organizational characteristics of several countries were subjected to analysis. Guidelines are outlined for the selection and formation of the type of entity best suited to achieve improved water management and agricultural development. Existing policies and organizations are considered. These guidelines cover a broad range of factors, and they provide a framework for evaluation, rather than a solution to each particular problem.

10. CONTROL NUMBER PN-AAD-823	11. PRICE OF DOCUMENT
12. DESCRIPTORS Management Organizations Organizing Public administration	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/TA/RD
	15. TYPE OF DOCUMENT

BEST AVAILABLE COPY

IMPROVING AGRICULTURAL WATER USE:
ORGANIZATIONAL ALTERNATIVES

George E. Radosevich

Assistance by

Miguel Solanes
and
Dennis Stickley

Resource Administration and Development Inc.
P. O. Box 1028
Fort Collins, Colorado

for

Technical Assistance Bureau/Rural Development
U.S. Agency for International Development
Washington, D.C.

Contract Number 3158408

1977

TABLE OF CONTENTS

	page
INTRODUCTION	1
PART I. THE ROLE OF WATER USER ASSOCIATIONS TO IMPROVE WATER MANAGEMENT	4
ORGANIZATIONAL ACTIVITIES	4
Water Delivery	6
Application	6
Removal	7
RELATED ACTIVITIES	9
ENDNOTES - PART I	12
PART II. THE GLOBAL SPECTRUM OF WATER USER ASSOCIATIONS	14
GENERAL PATTERNS OF WATER USER ASSOCIATIONS	14
Argentina	14
Afghanistan	17
Belgium	17
Sri Lanka (Ceylon)	18
Chile	18
People's Republic of China	19
Cyprus	20
Ecuador	20
France	20
Greece	20
India	20
Indonesia	21
Japan	21
Korea	21
Laos	21
Mexico	21
New Zealand	23
Peru	23
Singapore	23
Spain	23
Thailand	26
Taiwan	26
Tunisia	26
Turkey	26
United States of America	27
Western Samoa	27
Conclusion	27

TABLE OF CONTENTS (Continued)

ORGANIZATIONAL RANGE	29
Private to Public	29
Private--United States of America--	29
Italy--	32
Public--Rest of World--	32
Simple to Complex	33
Argentina--	34
Belgium--	35
People's Republic of China--	35
Chile--	36
Cyprus--	36
Dominican Republic--	37
England--	37
France--	37
Ecuador--	37
West Germany--	38
Greece--	38
Hungary--	38
India--	38
Lybia--	39
Mexico--	39
Peru--	40
South Africa--	40
Australia--	40
Spain--	41
Taiwan--	41
Tunisia--	45
Turkey--	46
Uruguay--	46
United States, In General--	46
United States, New Mexico--	47
Single to Multiple Purpose	47
Belgium--	48
Sri Lanka (Ceylon)--	48
Chile--	48
Dominican Republic--	48
England--	48
France--	48
West Germany--	49
Hungary--	49
Iraq--	49

TABLE OF CONTENTS (Continued)

Italy--	49
Mexico--	49
Paraguay--	50
Peru--	50
South Africa--	50
Taiwan--	50
Tunisia--	51
Turkey--	51
United States of America--	52
Function in Hierarchy	53
Argentina--	53
Belgium--	54
Chile--	54
People's Republic of China--	55
Iraq--	55
Korea--	55
Spain--	55
Taiwan--	56
Dejure & Defacto	56
Chile--	56
Dominican Republic--	57
Mexico--	57
West Germany--	57
Taiwan--	57
Tunisia--	57
Venezuela--	57
Italy--	57
Conclusion	58
FORMATION OF WATER USER ASSOCIATIONS	59
Argentina	59
Chile	59
Cyprus	60
Ecuador	60
France	60
Government Initiated	60
Greece	60
Hungary	61
Italy	61
Japan	61
Kenya	61
Lybia	62
Philippines	62

TABLE OF CONTENTS (continued)

Poland	62
South Africa	62
Australia	62
Spain	63
Mexico	63
Taiwan	63
Tunisia	63
Turkey	64
Uruguay	64
United States	64
Venezuela	65
Conclusion	65
MEMBERSHIP	67
Argentina	67
Austria	67
Sri Lanka (Ceylon)	67
Ecuador	67
West Germany	68
Greece	68
Hungary	68
Italy	68
India	68
Iraq	68
Japan	68
Mexico	69
Philippines	69
Peru	69
Taiwan	69
Tunisia	69
United States, New Mexico	70
Conclusion	70
AREA OF JURISDICTION OF THE WATER USERS ASSOCIATIONS	71
Chile	71
People's Republic of China	71
France	71
Greece	71
Mexico	71
Philippines	71
Taiwan	72
Tunisia	72
Conclusion	72

TABLE OF CONTENTS (Continued)

FINANCING OF WATER USERS ASSOCIATIONS	73
Argentina	73
People's Republic of China	73
Chile	73
Cyprus	73
France	74
Greece	74
India	74
Kenya	74
Korea	74
Mexico	75
Philippines	75
Poland	75
Portugal	75
Spain	75
South Africa	76
Rhodesia	76
Taiwan	76
United States	76
Conclusion	77
POWERS OF THE WATER USER ASSOCIATIONS	79
Argentina	79
Chile	80
People's Republic of China	80
Sri Lanka (Ceylon)	80
Ecuador	81
France	81
Greece	81
India	81
Italy	81
Japan	81
Korea	82
Mexico	82
Portugal	82
Poland	82
Philippines	83
Australia	83
South Africa	83
Taiwan	83
Tunisia	83
Turkey	84
United States	84
Conclusion	85

TABLE OF CONTENTS (Continued)

ALLOCATION OF DECISION-MAKING POWER	87
Argentina	87
Austria	87
Chile	87
People's Republic of China	88
Greece	88
India	88
Japan	88
Mexico	88
Turkey	89
United States	89
Conclusion	90
GOVERNMENT CONTROL	91
Argentina	91
Belgium	91
Chile	91
People's Republic of China	91
Ecuador	92
France	92
West Germany	92
Greece	92
Hungary	92
Italy	93
Iraq	93
Korea	93
Mexico	93
Portugal	93
Peru	94
South Africa	94
Taiwan	94
United States	94
Venezuela	95
Conclusion	95
END NOTES - PART II	96
PART III. ORGANIZING WATER USER ASSOCIATIONS	111
BENEFITS AND INCENTIVES.	111
ISSUES TO CONSIDER	113

TABLE OF CONTENTS (Continued)

INFLUENCING FACTORS.	116
Spatial vs. Temporal.	116
Labor vs. Capital Intensiveness	117
Subsistence vs. Affluence	117
Sectoral vs. Intersectoral.	118
Humid vs. Arid.	118
Surface vs. Groundwater	119
Quantity vs. Quality.	119
GUIDELINES TO FORMATION.	120
Nature of the Organization.	120
Purposes.	125
Powers.	126
Jurisdiction.	128
Membership and Internal Decision-Making	129
Financing	131
Incentives for Participation in Water	
User Associations.	132
Government Control.	133
Designing the Organization.	134
CONCLUSION	139
END NOTES - PART III	143

LIST OF FIGURES

PART I

- 1 Water Management Role of Water
User Associations 8

PART II

- 1 Voting Control of Mutual Company. 30
- 2 Control of Water Service to Stockholders. 31
- 3 Organization of Water Entities in Spain 42
- 4 Organizational Structure of an
Irrigation Association in Taiwan. 44
- 5 Agencies in Charge of Land and
Water Resources Development in Taiwan 44a
- 6 Relationship Among Governmental Agencies in
Charge of Land and Water Resources Development. . . . 44b

PART III

- 1 Model of the Irrigation Return Flow
System. 121
- 2 The Water Delivery, Farm and Water
Removal Subsystems. 122
- 3 Impact of Water Management and
Agricultural Practices Upon Irrigation
Return Flow Quality 123
- 4 Water User Organizations:
Development Scheme. 135
- 5 Water User Organizations:
Organizational Scheme for Hierarchy
of Association. 137

INTRODUCTION

This report has been prepared as a state-of-the arts examination of the legal aspects of water user associations and related organizations. It is intended to be a pragmatic exposition of the types of water user associations which function in different areas of the world and is primarily oriented for use in promoting the adoption of mutually acceptable organization schemes in conjunction with the introduction as intermediate technologies and improved water use practices to assist agricultural development in rural areas.

The success of any agricultural development program with the objectives of enhancing the quality of rural life and meeting national food production requirements depends on a strong water policy to increase delivery and application efficiencies, to encourage conjunctive use of surface and groundwaters and to integrate water quantity and quality control. These objectives can best be achieved through the active and well-structured collaboration of local water users among themselves and with officials charged with administration, control and distribution of water.

The realization of these objectives also requires an awareness on the part of government officials and policymakers of the conditions and constraints to change which water users face within their localities. Conversely, the image of government officials and personnel in relation to the water users must be improved by their demonstrating an appreciation and understanding of the problems of local farmers and in providing the water users with timely information on water availabilities.

The main focus of this report is upon the forms of water user associations and their attributes for inducing and achieving more efficient and effective water and related agricultural resource utilization. Concern is for the individual farmer and, particularly, the small farmer. This report also emphasizes the stimulation of rational resource management through the use of an organizational vehicle to be used in conjunction with accepted technologies and cultural practices.

Formation of local water user associations can provide the infrastructure for improving irrigation efficiency and increasing agricultural production by:

- (1) getting farmers directly involved in the local decision-making process;
- (2) managing the water distribution system, thus improving the delivery, application, and removal of water throughout the system;
- (3) resolving disputes between water users as individuals and problems arising between water users collectively and the central government;

- (4) serving as a communications link and forum for disseminating information and assistance on improved water use, agricultural practices and technologies, and methods for improving the quality of rural life;
- (5) channeling the needs and desires of farmers and rural communities to those government agencies best equipped to meet them through that level of the association hierarchy which has access to the appropriate level of government organization.
- (6) promoting the collective action of individual farmers by pooling their individual resources in actions which benefit the individual and the group;
- (7) establishing a formal management mechanism for administering government aid with a higher level of accountability and permanence;
- (8) taking advantage of the economies of scale in committing scarce financial and technological resources to programs which are better integrated with national or regional goals and which will benefit greater numbers of individuals.

This report examines the spectrum of existing organizational alternatives for water user associations. To this end, several countries were selected and their organizational characteristics subject to analysis. The categories for examination included: (a) the nature of their organizational structure, i.e., whether the water user association was a public or private entity, the complexity of operations, and its place in the hierarchy of water management organizations within the government in question; (b) the process for formation; (c) purposes; (d) areas of jurisdiction; (e) legal status, whether formal or informal; (f) requirements for membership; (g) officers and administrative functions; (h) methods of financing; (i) powers of the water user association; and (j) controls and restrictions which the central government exercises over the association.

The final portion of this report is directed to outlining guidelines for the selection and formation of the type of entity best suited to achieve the objectives of improved water management and agricultural development. Included in this process is consideration of the existing policies and organizations which may affect the selection of particular alternatives.

The recommended pattern for organizing water user associations is to examine both endogenous and exogenous entities and then structure and tailor the new entity to coincide with the religious, social, political, economic, and legal system for the country in question. Also, the water user association should commence with a simple, nonsophisticated organizational arrangement which is flexible enough to allow for institutional maturation as intra-water course demands and developments take place. It is also important to distinguish between improving an existing system and developing an entirely new program.

Other issues to be considered are: (1) the purposes of the organization, i.e., single purpose (irrigation) or multiple purpose (irrigation, conservation, drainage, reclamation, etc.); (2) jurisdictional or territorial limitations of operation; (3) financial operations, including assessments, public borrowing, and membership dues; (4) internal decision-making, including voting and selection of officers; (5) the interrelationship of the association with similar groups and with agencies of the central government; (6) possible incentives for individual participation; (7) how the water user association will function in relation to broader government policies for water and agricultural development; and (8) the method for resolving disputes which arise.

These issues must be viewed against the background of various influencing factors such as the trade-offs between the scarcity or abundance of labor and capital, the physical abundance of water resources and the environmental quality of that resource, and how the resource use is influenced by the seasonal aspects of surface runoff or aquifer recharge.

The suggested guidelines are intended to cover a broad range of factors. They are not considered to be inclusive as the nuances of a particular situation are best evaluated by the individual who faces them. In brief, the guidelines are intended as a framework for evaluation rather than a solution to each individual situation.

The basis of the report is the review of laws and secondary materials available on the various water organizations for the countries analyzed. Thus, the report reflects what is contained in the law, and the authors make no claim as to how effective the various entities are in operation nor to the extent the various nations have implemented their laws. One additional and crucial point must be made. The report does not explicate the effectiveness of the entities as they interface or fail to interface with national agrarian reform programs such as those of Mexico and Venezuela. This integration of purpose and capability is a much needed analysis as countries, large and small, face

PART I

THE ROLE OF WATER USER ASSOCIATIONS
TO IMPROVE WATER MANAGEMENT

- Organizational Activities
- Related Activities

PART I

THE ROLE OF WATER USER ASSOCIATIONS TO IMPROVE WATER MANAGEMENT

Water is a fundamental natural resource with complex characteristics. The ability to apply water for beneficial uses is as much subject to natural laws of the physical universe as the laws of human institutions. The greatest benefit from water is derived when it is used in combination with other natural resources (soil, mineral, or vegetative) and economic resources (labor and capital). The more efficiently it can be used in combination with other resources, whether by technological or institutional innovation, the greater the benefit to the water user and society.

Without its presence, and proper control over the distribution and use, progressive civilization is not possible. Indeed, there is evidence that, where regulatory controls have been efficient, civilization has grown; but where these controls have been ineffective, civilizations have declined and often disappeared.¹

Water laws are the expression of basic policy and substantive provisions dealing with the use of water and the development of water resources; they are the basis for establishing the administrative rules and regulations.^{1a} The underlying philosophy of each particular system of water law has a direct connection to the surrounding physical factors of its origin. Where water is plentiful, regulation is aimed at ameliorating the harmful effects of water (floods, salinization, etc.), but, where water is scarce, regulation is aimed at ensuring an adequate supply, for example, by providing that water is not owned by one individual but, rather, collectively so that all may use what is available.²

In a number of countries much attention is being paid to the organization and administration of local water control particularly for the purpose of mitigating the destructive effects of water by means of embankments and dikes for flood control, drainage of low lying areas and lands which have become unproductive due to soil conditions in established irrigation programs.³ Other organizations focus on preventing soil erosion associated with seasonal runoffs or unsound cultural practices. Some laws have gone so far as to provide that a landowner can be ordered by a court to install conservation practices which will prevent erosion problems.⁴

ORGANIZATIONAL ACTIVITIES

Many governments are now faced with the problem of a plurality of laws dealing with water allocation, utilization, delivery and removal, and control of water quality. These laws are scattered in a variety of sources and texts, often conflict with each other, and are known only to the administrators of a particular sector. This situation calls for a continuous review of existing water legislation in order to update it at regular intervals. This implies a basic water code with broad principles,

which do not change continuously, and regulations interpreting and applying these broad principles which can deal with changing circumstances.⁵

Of equal importance is the matter of how the laws are implemented, by whom and who is affected. Again, many countries face a proliferation of agencies at the national and subnational government levels, charged with carrying out specific functions of water development or control or oriented to a particular sector of the economy. The problems associated with macrostructure organization have been and will continue to be the focus of attention of developed and developing nations alike.⁶

However, a situation that exists in most every agricultural country, that is ignored or considered insignificant to the major efforts of improved water management, is the microstructure organization or water user association. Normally, technical solutions are offered to solve the problems of water users. Often, they do result in immediate and substantial benefits to him, provided he can afford the capital investment or is subsidized. But he must continually depend upon technical solutions; and as an individual has not really achieved the benefits of social interaction and cooperation in the utilization of his scarce resources, whether they are natural or acquired.⁷

An alternative to a purely technical solution, and one which has attained substantial success and sophistication in many countries,⁸ is the formation of water users associations. The terms water user associations or water user organization are used here to refer to any of the patterns of farmer to farmer or farmer to governmental agency entities designed to facilitate water delivery, application and removal. Where the term "water user association" as applied in a country refers to a specific organization distinct from others it will be noted. These entities of various forms have enabled the farmer to optimize his efficiencies of water use by adding flexibility to his application scheduling, sharing costs of an improved delivery system, and preventing unnecessary water removal problems. As with the water law, though, not just any structural pattern should be adopted. There are a wide variety of associations with varying degrees of success. It is important that the organization be structured from within the existing legal, social, economic and cultural framework, and not be a simple adoption of an association that has been successful elsewhere.⁹

The impetus and guidance for local water user associations may be either part of the water law or special legislation. The rule of innovation applies to drafting the law as well as to the organizational structure of the association, for as Montesquieu, the 18th century French scholar, said, "Civil and Political laws must be so fitted to the country for which they were enacted that it is a real coincidence if those of one nation apply to another."¹⁰

Our particular concern in this portion of the report is with the efforts of the local water user association in the water delivery and removal processes. The effectiveness of water user associations in water management depends upon physical conditions, existing technology, economic

capabilities, and the ability of the association to promote efficient water use among its membership and to prevent the development of institutional bottlenecks.

Water user associations must consider involvement in all dimensions of water management including the societal components comprising the political, legal, economic and cultural system as well as the technical and physical systems. It is necessary to gain an understanding of the role the water user association can play in each phase of the irrigation system to fully appreciate the usefulness of such organized effort.

A typical irrigation system can be divided into three subsystems based on a functional categorization of major irrigation components: (1) water delivery, (2) application, and (3) water removal.¹¹

Water Delivery

The water delivery subsystem begins with the necessary diversion works and their associated control and distribution systems. Depending on the source of supply, the delivery subsystem includes water storage facilities such as reservoirs and other impoundments as well as aquifers and well fields. Water user associations can play an important role in this phase of irrigation in several ways. First, the amount of water passing key points in the delivery system must be known in order to provide water control for maximum efficiency in water application. Water user associations can install and regulate flow measuring devices and other control works as a means to insure that each user receives the amount of water to which he is legitimately entitled. This places the association in the position of an impartial allocator of the resource and serves to lessen the possibility of dispute between adjacent irrigators if they were given the individual control of their own works. Second, the association assumes a collective responsibility for the repair and maintenance of the delivery system. This allows for a more complete program of upkeep for the facilities. If a particular portion of the system needs a greater amount of work, it is possible to concentrate its efforts in that area rather than each irrigator focusing his activities on the part of the system with which he is immediately concerned. Third, user association management of the source of supply allows the even regulation of that supply to lessen the overall impact on the area in times of shortage as opposed to a situation where those users in the upper portion of the system or those with the deepest wells receive adequate amounts of water while other farmers face shortages.

Application

The application or "water use" subsystem begins at the farmer's headgate, continues through his ditches or canals distributing water to the fields, and ends at the point where any excess waters leave his lands. The greatest impact which water user associations can have on this phase of irrigation is by influencing the choice of irrigation methods used by the individual farmer. This may entail promoting the adoption of different cultural practices for control of erosion, soil salinity, and the selection of crops which can be grown under applicable soil and climatic

conditions. Also, most irrigated areas need to improve the existing irrigation systems to obtain the greatest efficiency from water use. New application methods are available and it may be possible for the association to assist its members in financing and learning how to operate them.

One of the more interesting areas of water management is that of optimum irrigation scheduling. The purpose of irrigation scheduling is to advise a farmer when to irrigate and how much water should be applied.¹² This saves the farmer the effort of making the measurements and performing the calculations himself. Yields have been increased and farmers are better able to budget their time for other activities due to irrigation scheduling by water user associations. Also water user associations are able to employ the technical staff required to perform other more sophisticated operations such as the analysis of soils and recommended rates of fertilizer application.

Poor irrigation practices on the farm are the primary cause of overly large water diversions, as well as quality problems with the return flow to natural water course.¹³ Water user associations can improve the efficiency of water use by educating farmers on the best practices to follow for their conditions and by providing technical and financial assistance to their membership.

Removal

The water removal subsystem includes the surface and subsurface, whether natural or manmade, for removing "waste water" from the land and returning it to the water course for use downstream or in other locations on the land of the original irrigator. Water user associations can obviously perform the same management role in the construction, operation and maintenance of drainage systems as they perform for water delivery networks. Additionally, they can provide assistance by measuring the amount of return flow from land located within the association's jurisdiction as a means of mitigating the effects to other users in the system from a change of place or manner in the use of water by a member of the association. Associations can also keep records on the rate of salt leaching and waterlogging due to irrigation practices.

As water progresses through the hydrological cycles, so does the agricultural uses of water proceed through a cycle of eight stages which give recognition to the hydraulic characteristics of water and the climatic conditions of the irrigation system (see Figure 1). These stages are: (1) the source of water supply derived from natural, developed and recycled waters; (2) water control by natural and artificial impoundments and diversion works; (3) conveyance through a delivery network; (4) methods for application; (5) timing and amount of application; (6) drainage of the water following application by natural or artificial means; (7) return of the water to the natural water course for use by others; or (8) reuse of the water on the land to which it was originally applied.

The role of the water user association in water management varies with the particular stage of water use. The particular activities include:

FIGURE 1

WATER MANAGEMENT ROLE OF WATER USER ASSOCIATIONS

Innigation subsystem	Water Management Activity	Role of Water User Association
	Supply Natural (surface and ground) Developed (reservoir) Recycled	Construction, operation
Delivery	Control	Measurement and regulation
	Conveyance	Construction, operation and maintenance
Application	Methods (amount, cropping, other practices)	Advisory services Financing Incentives or sanctions
	Scheduling (timing)	Measurement and regulation
	Drainage	Construction, operation and maintenance
Removal	Return flow to water course	Measurement Approving change of place or manner of use
	Reuse on farm	Advisory services Incentives or sanctions

Construction, operation and maintenance

This role is a function of the need for either water delivery or removal systems which are so extensive and interrelated as to be beyond the ability of individual resources to develop and maintain.

Measurement and Regulation

This role is a function of controlling and quantifying the volume of water within the system, primarily in relation to seasonal demands and supply of the resource.

Advisory services

This is an educational and informational role and involves the dissemination of information and technical services on the application of the resource by the farmer.

Financing

This role is a function of the ability of the association to either raise funds through self-financing, borrowing, or government programs and making those funds available to individual farmers to improve the facilities for water use.

Incentives of sanctions

This role requires that the association approve or prohibit the place or manner of water use by the individual farmer due to the beneficial or harmful effects on other members of the association.

RELATED ACTIVITIES

Agriculture remains the cornerstone of the economy in many developing countries. Yet, in spite of this importance, agriculture is one of the most tenuous components of the economy primarily due to the many unpredictable forces acting upon the individual farmer and his productive capacity. Climatic variations, uncertainty and unpredictability of water supply, soil conditions and seed and fertilizer availability are among a few of the preharvest elements which the farmer must content with. In addition, population pressures, smallness of individual holdings, lack of knowledge of improved farming methods and capital make it difficult for the agriculturist to improve his condition. It is, therefore, necessary to develop a feasible and acceptable program that will reduce the risk associated with his profession.¹⁴

Many of these contingencies and constraints to increased benefits from resources use can be alleviated if the farmer can take advantage of economies of scale and be induced to internalize certain externalities that are now being passed on to others. To successfully accomplish this task, some common denominator must be identified. In the case of irrigated agriculture, that common denominator is distributed water, and characteristic of irrigation is the necessity to cooperate and coordinate activities.¹⁵

Irrigation programs have the potential for greatly increasing the productive capacity of agricultural land and thereby the income generated, population supported and the use of labor in the production process. In developed countries the additional yield from irrigation of subhumid and semiarid areas has been from one to threefold. In developing countries the increase approximates 20 or 30 percent.¹⁵

When the use of irrigation is coupled with improved conservation practices and the use of better crop varieties and fertilizers, the yield can be even greater. The introduction of irrigation may have an undesirable effect too, because the use of irrigation water as a factor of production has to compete with the above form of investment in agricultural production and the cost of water will be a leading factor in farmer acceptance. Although, here a distinction should be made between large scale projects which will require a commitment similar to that for major public works and smaller projects which can be achieved largely by mobilizing underemployed resources within the immediate community.¹⁷

The formation of a water user association may offer the individual farmer a vehicle for collective action.

In most irrigation systems, the cooperation that has developed among farmers needs only to be formalized to give stability and reliance to the arrangement. It is recognized that among the farmers in many countries, there is a high degree of cooperation in water use and, in some cases, even amount to a well-structured and semipermanent arrangement. Without a fixed and definite purpose, however, the ad hoc arrangement may unexpectedly be dissolved, consequently adding to the host of uncertain factors facing the farmer.¹⁸

Yet, many countries have no institutionalized system of water user associations by which farmers can jointly pursue optimizing a mutual task. Many of the problems faced by the irrigator and, in particular, the small farmer, can be partially solved by providing him an opportunity to formally organize with his neighbors to increase agricultural production by improving water management. The water user association can become the nucleus of mutual on-farm water activities pursuing objectives of equitable distribution of water, resolving disputes, watercourse rehabilitation, irrigation scheduling, assistance in land leveling, augmenting water supplies through tubewells and conservation practices, integrating water quality control through conjunctive use of ground and surface water and proper drainage and collection of fees and assessments.¹⁹

A water user association may also provide a forum for interaction between the tenant who actually operates the farm and his landlord who may or may not reside within the community. The involvement of absentee landlords in the use of water in the community in which they are a property owner helps to give the person whose land is to benefit from the operation of the water user association an understanding of his role in the community.

The water user association is suited to function as a communications link in other ways too. Primarily, a system of water user associations organized to function within their localities yet allied with similar groups on a national or regional level can facilitate the exchange of information among water users in other associations and between the associations and the central government. Associations could channel information about water needs, expected supplies, reports on crop and livestock conditions to the central government, and convey state policies and regulations concerning agriculture back to the individual farmer.

A natural spin-off of the availability of such a structure for communication would be the standardization of terminology, specifications, and measurements used in dealing with the various levels of agricultural production and water use. This would impart uniformity to the agricultural sector and could lead to improved allocation and marketing of agricultural resources.

The formalization of water use organizations would also provide an orderly system for the nondestructive resolution of conflicts and disagreement about the use of water and impart the 'rule of law' to the individual's use of water. As recognized by one commentator: "If problems of administration add uncertainty to the availability of the water, which is a common and likely occurrence, then the rate of acceptance (for irrigation) will be further slowed."²⁰ Therefore, in order to provide the individual with incentive to commit his scarce resources to the use of water within the structure and control of an organization, he must feel that the system provides stability and an avenue for redress of his grievances with other water users as well as with the association as an entity. The same is also true for the various levels of the water resource system.

Every new program has both positive and negative aspects, and instituting water user associations is not without exception. The benefits are easily seen, particularly when observing the schemes evolved in many other highly productive agricultural societies. Often the "costs" are subtle. Financial and technical assistance is a cost, but one which will hopefully be offset by future benefits. The most critical negative effect will be upon those individuals and officials who will have to change their mode of operation to accommodate the water associations. The willingness to accept and internalize change may be the most difficult step in the entire process. Many functions singularly carried out in the past will have to be jointly pursued or at least the decision-making process will have to be shared. Certain traditional positions could most easily be displaced and these functions granted to the association. Other negative effects may occur and must be evaluated.²¹

ENDNOTES - PART 1

1. Caponera, Dante A., "Evolution and Concepts of Water Legislation," Annales Juris Aquarum, Proceedings of the International Association for Water Law (September 2, 1968). See for an excellent discussion on the history of water law.
2. For a thorough discussion on various water law systems, see Proceedings of the International Conference Global Water Law Systems, Vol. 1 to 4, Prepared by G. Radosevich, et al., Colorado State University, Ft. Collins, Colo. (1975).
3. A converse situation exists in a few highly developed countries where the underlying philosophy was oriented toward private enterprise rather than social welfare. For example, in the arid western United States, a system of private water rights developed which gave a priority of use to the first users and subsequently transformed most unappropriated water to private use at the exclusion of the public, except for personal and domestic needs. See Radosevich, George E., Water User Organizations for Improving Irrigated Agriculture: Application to Pakistan, Water Management Technical Report No. 44, Consortium for International Development, Colorado State University, Ft. Collins, Colo. (1975).
4. Hellinga, F., Local Administration of Water Control in a Number of European Countries, International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands (1960).
5. Soil Conservation Laws, Code of Iowa 467A 43 provides ". . . it is hereby made the duty of the owners of real property in this state to establish and maintain soil and water conservation practices. . ."
6. Note 3 Supra.
7. Note 3 Supra.
8. Note 3 Supra.
9. For example, U.S.A., Taiwan, Spain and Argentina.
10. Note 3 Supra.
11. Quoted by Dante Caponera in "Evolution and Concepts of Water Legislation," Note 1 Supra.
12. Skogerboe, V., G. Radosevich and E. Vlachos, Consolidation of Irrigation Systems: Phase 1 - Engineering, Legal and Sociological Constraints and/or Facilitators, Completion Report No. 52, Environmental Resources Center, Colorado State University (1973).

13. Skogerboe and Walker, "Planning, Design and Construction of Water Delivery and Removal Systems," Colorado State University, Ft. Collins, Colo. (1974).
14. Ibid.
15. Note 3 Supra.
16. Note 3 Supra.
17. Mellor, John W., The Economics of Agricultural Development, Cornell University Press, Ithaca, New York (1966).
18. Ibid.
19. Note 3 Supra.
20. Note 3 Supra.
21. Note 17 Supra.
22. Note 3 Supra.

PART II

THE GLOBAL SPECTRUM OF WATER USER ASSOCIATIONS

- General Patterns of Water User Associations
- Organizational Range
- Membership
- Area of Jurisdiction of the Water User Association
- Formation of Water User Associations
- Financing of Water User Associations
- Powers of the Water User Association
- Allocation of Decision-Making Powers
- Government Control

PART II

THE GLOBAL SPECTRUM OF WATER USER ASSOCIATIONS

GENERAL PATTERNS OF WATER USER ASSOCIATIONS

This portion of the report examines various forms of water user associations as they exist in some 28 different nations. This discussion considers the spectrum of these organizations across a wide range of attributes including: organizations which are relatively simplistic in their nature and purpose to those which are much more complex; from those associations which are privately owned and operated to those which exist as creatures of the state; from those which serve a single need to those whose purposes are broader; from those which function in complete autonomy to those which are merely a unit in a larger federation; and from those which have a formal legal status and identity to those which exist more informally.

The discussion specifically considers the method of formation, membership practices, jurisdictional boundaries, financial capabilities, powers which it has been delegated, the decision-making process within the association, and the degree of autonomy from the central government.

The form of organization adopted by a water user organization is vitally important, for upon it depend not only the legal powers of the association, but also the relations between the association and the individual water users. The form may be changed, for example, from private company to public district without change in the physical works or in methods of delivering water or operating and maintaining the system. However, a change in the type or form may mean fundamental changes in the powers of the organization, in control over the management, the obligations of the water users to provide revenue for the project, and in methods for collecting the revenue.¹ Most importantly, it might necessitate adjustments in the basis of the farmers' rights to receive water.

The material in this portion of the report is taken from codified descriptions of the various organizations discussed. Since the frame of reference for this portion is limited to statutes, administrative regulations, executive decrees, and similar documentary sources, the authors make no representations as to the performance and success in application of the systems which are described in the following subsections. It is, however, suggested that consideration be given to having field evaluations conducted on several of the systems which appear to have the soundest legislative structure. Such on-site evaluations would be able to offer a dimension, in terms of specific guidelines on operation and management, which is beyond the scope of this report.

Argentina

In Catamarca Province, Argentina, the system is enumerated in the Laws 594 (1896) and 655 (1900). Law 594 requires the irrigators to constitute an "Irrigation Commission" in the Departments (counties) where

there are more than ten irrigators. The commissions are required to have three members, elected by the irrigators. In the irrigation districts in which there are less than ten irrigators, one "commissioner" is elected, instead of a commission.

The Province of Jujuy in Argentina has enacted complete regulations for water users associations which date back to 1950 and are contained in the Law No. 161. The associations, called "consortiums," are considered to be public service institutions whose task is to encourage the rational and efficient use of the water. Consortiums can function with all the possible uses of the water. They can be formed either by special requests of an individual user, group of users, or by administrative directive.

Ancient associations ("de facto" ones) that encompassed the users of waters of Los Sauces River Basin also operated in La Rioja Province of Argentina.

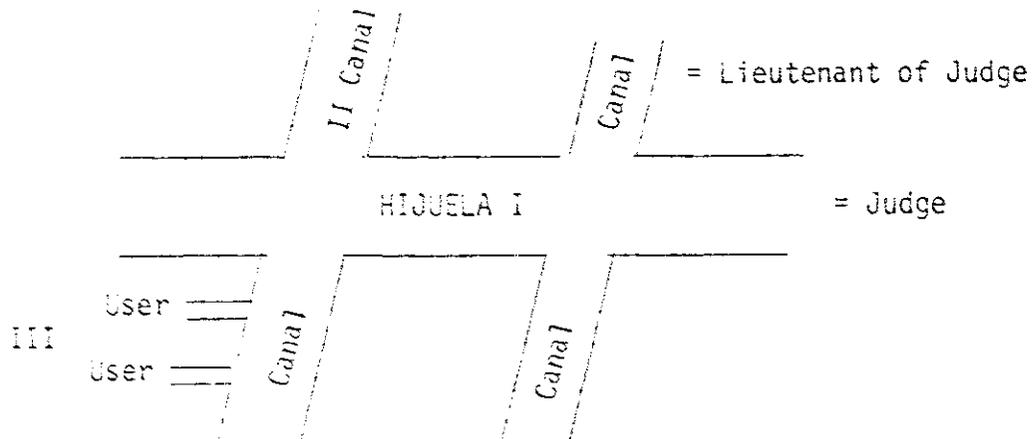
Mendoza Province is the most irrigated province in Argentina. Irrigation and water control works began in Mendoza in the 1600's. (The city of Mendoza was founded in 1561.) Several decrees and regulations of water of historical interest existed in the water legislation of this province up to 1884, the year in which the present water law was enacted. The model for the 1884 law was the 1866 Spanish water law as modified in 1879.

Before the Law of 1887, users associations were created and their functions and facilities were governed by various laws and regulations. The associations distributed waters, executed water works, raised funds from their members to pay the common expenses, and could resolve conflicts among its members. They were formed "de iure proprio," and a person acquired membership in the association by the sole fact that he was a user of water delivered by a given canal. The highest position in the community of irrigators was held by the Judge of the "hijuela" (canal). The judge was elected each year by the community composed of all the persons using the canal.

Until 1877 the vote of each person had the same value on a "per capita" system of voting. In 1877, the system was changed, and the rule was no longer "one person-one vote" but "one person-variable votes." The number of votes that a person could cast varied with the amount of hectares owned by the person. The maximum number was 20 votes, cast by the owners of large land holdings.

The decisions of the Judge of the Hijuela could be appealed before the "Juez General de Aguas" (General Judge of Waters). The orders of the Judge of Hijuela were carried out by the Lieutenant Judge of the Hijuela. There was a lieutenant judge for each canal of the hijuela.

Graphically, it would be:



This system was changed in 1884. The title of the water judge was changed to "Inspector." The Inspector was elected by the irrigators of each canal. The new law required that one more than half of the irrigators of each canal participate in the election (if there were 100 irrigators in the whole canal, 51 must vote). A candidate had to receive one more than half of the votes of the present members to be elected (if, of the 100 members, 60 were present, the candidate should obtain 31 votes).

In the event that the election did not take place, the inspector was appointed by the government in office at the time.

The inspector has authority over the distribution of the water necessary to supply the water rights on canal. He was directed to communicate all irregularities noticed in the system to the superintendent and was compelled to obey all the mandates and special commissions ordered by the Superintendent. The Inspector could designate employees to help him. In the original text of the law, inspectors were to be assisted by three delegates. The delegates were in charge of contracting the maintenance works of the channels. The cost of constructing and maintaining the irrigation works was distributed among the irrigators in proportion to the amount of land each one irrigated.

In 1889, the law was modified. Inspectors were restored the judicial functions, suppressed by the 1884 law. Inspectors were placed in charge of the canal's administration, after being elected by the irrigators of the canal. Each irrigator cast votes in proportion to the amount of irrigated land he owned. The maximum number of votes one person could cast was 15, eroding the power of the large landowners.

The inspectors prepared the budget of each canal, the cost was distributed in the same form as that of the 1884 law.

When the canal supplied more than 300 hectares, three delegates were also elected by the irrigators. Delegates contracted the maintenance works and prorated costs between the users. Both the inspectors and the delegates were under the authority of the Irrigation Department.

The Constitution of 1916 (presently in force) set out that the irrigators of each canal have the right to elect their authorities and to administer their own budget and rents, notwithstanding the right of the Irrigation Department to control the management that the association make of the money.

The present name of these associations is "Inspecciones de Cauces." The law governs all the functions and powers of the association.

In Rio Negro Province, Argentina, the Superintendent of the Direction of Waters can be elected by the water users, as established by Article 47 of the Constitution of the Province. Water user associations are regulated by Law No. 268, 1962. There are two forms of water associations, "de facto" associations, and "de jure" associations. The "de jure" associations can be created by private initiative or by administrative requirement. In the latter case, the order can be issued "ex officio" or upon petition made by a user to the Director of Waters.

In the province of San Juan, Argentina, the authority of water user associations is contained in the Water Laws No. 1866 (1942), and No. 57 (1957). Consortiums are to be formed in all canals, or groups of canals, that supply water to more than 300 hectares. In the Province of San Luis, Argentina, the user's associations are merely consultive bodies, managed by six water users?

Afghanistan

In Afghanistan, local administrations helped by "mirabs" supervise the distribution of water, repair and maintain irrigation systems. A permanent supervisor (bandban) is at the headwork of an irrigation system of canals and is paid by the people whose land is irrigated by the given system or canal. Another supervisor (mardicar) is at the head of each main distributary.

Water is distributed among the watercourses in proportion to the area of land to be irrigated on a time basis. Special supervisors (saatchi) regulate the time during which water is delivered to a village and are also paid by the landowners. Sequence of irrigation and water circulation are very strictly adhered to. The entire population is involved in cleaning canals. Lack of earth digging and moving machinery require the work be carried out by hand.

Belgium

The Wateringues of Belgium are landowners' associations concerned with the implementation of water works (Royal Order of March 2, 1971). They are Public Administrative Authorities instituted by the government on recommendation of the Minister of Agriculture. The area of operation is restricted to regional operations. The Polders, also of Belgium, are, in structure, composition, requirements for action, basically similar to the Wateringue. The difference is that Polder can also deal with maritime flooding and may be subsidized by the state.

Sri Lanka (Ceylon)

At the district level, the government agent (head of a district administration) acts as an agent of the Land Commission. He presides on the agricultural committees of each administrative district. The membership of the committees include as many holders of public posts as prescribed by regulation, and those interests related to paddy irrigation. Committees advise on irrigation matters within the district.⁹

Chile

The Chilean system recognizes two classes of associations: the "Asociaciones de Canalistas," which are formal organizations, and the "Comunidades de Aguas," which are informal organizations. The "Asociaciones" are incorporated while the "Comunidades" are unincorporated. The "Asociaciones" are organized through special procedures, while the "Comunidades" are "Ministerio legis" organizations, imposed by law, disregarding the will of the affected irrigators.

Water users associations have a long-standing tradition in Chile. The system can be traced back up to 1827, when the society of Maipo Canal was founded.

Up to 1908, these associations functioned as "de facto" communities, but in that year the "ley de asociaciones de canalistas" was enacted. The associations were considered to be a private entity, integrated by the water users, whose objective was to better use and manage the waters. It was considered that the asociaciones performed no commercial purpose.

Until 1967, waters were considered public when circulating in natural streams and private when circulating in artificial canals. The associations were the "water owners," and each member had a share of the total volume.

In 1967, the system was changed, and all waters, including artificial streams, are now considered public waters. The system of shares has been maintained in order to distribute water among the association members.

At present there are three types of organizations: Boards of Vigilance, Canal Associations, and Communities of Waters. Their regulation is governed by the Water Code, and the Regulation on Constitution and Statutes No. 1.021, of July 25, 1951.

A Chilean water community is created when more than one person is using the waters of the same canal. They are regulated by the Water Code, and the Dispositions of the Canal Associations are applicable to them, with some exceptions. Water communities can become a Canal Association by compliance of the requirements already explained. The "Comunidades de Aguas" are similar to unincorporated associations. Their authority is provided for by law, and they also distribute water to their members in proportion to the water rights of each user.

The "Asociaciones de Canalistas" are an incorporated type of organization, established for the purpose of receiving water from a source and distributing it between the water users, in proportion to the water rights of each one. They are given responsibilities in constructing, exploiting, conserving, improving diversion, conveyance, and other necessary irrigation works of common use.

The "Juntas de Vigilancia" are corporate organizations formed by all water users whose supply depends on the same natural stream and can encompass a river basin. They are integrated with members of the "Asociaciones" and of the "Comunidades," who are represented by the directives of each "Asociacion" or "Comunidad." Individual users, not members in Asociaciones or Comunidades, are also members of the Juntas de Vigilancia. The "Juntas" are corporate type organizations.⁶

People's Republic of China

In Mainland China, agricultural cooperation has been carried out through different patterns. The three major patterns are:

1. The Mutual Aid Teams - teams were based on traditional patterns of agricultural cooperation. They were designed to make economics of scale available to all landowners. They also presented some labor specialization and functioned in meeting peak demands of labor. Teams had two stages: (a) the seasonal M.A.T. - some means of production (animals, tools, human labor) were pooled to meet seasonal needs, and (b) permanent M.A.T. - some means of production were collectively owned.

2. The Agricultural Producers Cooperatives (A.P.C.) - The principle here was: "Central management and private ownership." Their nature was "semi-socialistic." Ownership of utilities was distributed between the members.

3. The Advanced Agricultural Producer's Cooperatives (A.A.P.C.) - A.A.P.C.'s were "socialistic" in nature. Major factors of production were collectively owned and no utilities were distributed among the members.

It was considered that collectivization would solve the problems of small scale individual farming.

In 1957 the "communes" were created. They were primarily used as a framework for mass mobilization of labor for capital projects. They were structured in three levels: (a) communes, (b) production brigades, and (c) production teams. Strategies for collectivization were: (1) It should be as voluntary as possible. Careful work should be done from below to get the ideas accepted by people; (2) existing indigenous cooperative patterns should be preserved; (3) the party should not interfere other than to stress the collective tasks; (4) ideological factors should be molded in the party doctrine; (5) differences between people should not be persecuted, and are complementary. Mutual benefits should be made clear to all the members; (6) external economies, economies of size, division of labor and government support are advantages in the collective system that peasants should realize. Any disputes between different water user organizations is resolved by submitting the conflict to the next highest political administrative unit for mediation.^{7a}

Cyprus

In Cyprus there are Irrigation Divisions which are required to be formed by the beneficiaries of every water project.

Also, there are Irrigation Associations, which are groups of farmers, water owners with registered title deeds or ab-antiguo water rights. The owners do not encourage these associations to undertake water works, unless the owners choose to relinquish their water rights. Therefore the Irrigation Associations only perform minor works like repair and improvement.

Rural water supply is governed by Village Water Commissions which are committees made up of the district officer as chairman and village members elected as representatives.⁸

Ecuador

The Water Directories of Ecuador are created when more than five persons share water rights. The statutes of the Water Directories of Ecuador require approval by the Ecuadorian Institute of Water Resources and must determine the structure and functions as well as the distribution, exploitation and conservation of the waters in the directories.⁹

France

At the collective level, irrigation associations can have several forms. Generally, the approach is to group the farmers into free or authorized associations as decreed by law of June 21, 1965, completed by law of December 22, 1968. Farmers are associated in Syndicates.¹⁰ In this country the water users associations include irrigation cooperatives (rural code Art. 128.3-130-133), associations for land drainage and other forms of land reclamation (Art. 137, Rural Code) and fishing associations of landowners riparian to private water courses which have been declared of common fishing interest by decree (Arts. 407-410 of the Rural Code).¹¹

Greece

Water Projects in Greece are classified in projects of basic importance (Class A), projects of local importance (Class B), projects of private importance (Class C). Under irrigation works of Class B, the pure management by the beneficiaries is considered the best form of irrigation organization. In projects of Class A, a mixed system is preferred. There are representatives of the public and of the government. These organizations are termed Land Improvement Organizations. Land Improvement Associations of Greece are subdivided into General Land Improvement Organizations (mixed principle) and Local Land Improvement Organizations ("pure" principle). The General Land Improvement Associations of Greece are self-administered boards of semi-government type, established by decree after acceptance of a proposal of the Minister of Agriculture for their formation. The area of jurisdiction is stated in the decree. This Association administers class A projects directly and Class B projects indirectly.¹²

India

In Maharashtra State, India, to regulate the efficiency of water supply in quantity and time, Canal Advisory Committees and Water Panchayat Committees are established. The irrigators and the government have representation in such committees. Cooperative development in irrigation can be traced back over centuries when these cooperatives acted on the "de facto" basis.¹³ The members of the Water Panchayat Committee of Maharashtra, India, are elected by all the

A system peculiar to the area is the "Phad" System. The interests of the beneficiaries are pooled together. Under this system, diversion weirs have been constructed on suitable points across the rivers. The overall irrigation system is named Thal.

The thal is subdivided into four phads. One phad is devoted to a permanent crop, sugarcane, and the rest to monsoon or winter crops. A rotational system assures the soil fertility. The areas are equal in size which ensures that the loads in the canal remain the same throughout the year.

Indonesia

The Directorate General of Water Resources Development of the Ministry of Public Works and Electrical Power of the Republic of Indonesia has the general authority for administration of irrigation projects in that country.^{13a} There are two basic types of irrigation systems in Indonesia; national and communal. National systems are those where the central government has control of the main delivery system and the local community operating the terminal delivery works. In the case of communal systems the entire system is operated by the local community.

Since 1974, the pressing need for agricultural production to meet the demand for food supplies by an expanding population, and the demand by agriculturalists for an improved standard of living has lead the government to provide special assistance to irrigation and reclamation projects where production can be increased in a short period of time with uncomplicated improvements.^{13b} These projects are termed Sederhana (simple) Irrigation and Reclamation Projects and are selected by the government on the basis of a survey conducted by the ministry. Most projects are the size of 230 acres and are organized around a village water master or "ulu-ulu" who directs how water is allocated. This is an informal organization with no codefied laws or regulations.

Japan

In Japan water user associations date back to the 12th century. They exist for the purpose of supplying water to political subdivisions. These informal associations are being replaced by cooperatives which must respect the ordinances set forth by the government.¹⁴ The formal associations in Japan are the Land Improvement Districts established in accordance with the Land Improvement Law (1949). Projects are undertaken for irrigation and drainage of farm land.¹⁵

Korea

In Korea all irrigation projects are developed and operated by a farmers' association in the benefited area. The associations are approved by the government and operate as corporations.¹⁶

Laos

In Laos there are water users associations for different purposes (drinking water, power, irrigation, etc.), but they are not governed by specific legislation. They can be established under the Civil Government of Laos and may be controlled by the Director of Agriculture of the Ministry of National Economy and Public Works.¹⁷

Mexico

Under the Mexican Water Law of December 31, 1971, there are provisions with respect to water user intervention in the administration and management of the waters.

Beginning with the Present of Mexico, there are several government agencies which have water related functions. The most important of these agencies is the Secretariat of Hydraulic Resources, which directs most of water management in Mexico.

This agency cooperates with other secretariats and departments in order to coordinate water management and annual water budgets with the overall governmental needs and plans.

The secretariat is in charge of the management and disposition of waters. This task is implemented through districts and units of irrigation. Water users have the power to intervene in the decision-making process of these organizations. Districts may perform different tasks. There are three different classes of districts: Irrigation Districts, Drainage and Flood Protection Districts, and Districts for the Growth and Protection of Fish and Water Fauna (which includes the cultivation and protection of water vegetables).

Water boards operate within the above districts and are in charge of the distribution of water between different sections within a district. They are regulated by rules enacted by the secretariat. The membership of water boards is composed of water users.

Districts must be approved by the President of Mexico, but each district project is prepared by the secretariat. The Secretariat of Hydraulic Resources prepares each project in consultation with the Secretariat of Agriculture and Department of Agrarian Affairs. In preparing projects for Fish and Water Fauna Districts, consultation is with the Secretariat of the Navy and scientific organizations.

Also in Mexico there are Irrigation Units for Rural Development. The purpose of these institutions is to promote rural development through the use of irrigation. They are created by the Secretariat of Hydraulic Resources, which includes public or private entities in order to form a Unit of Irrigation.

In each state, district (of government not of irrigation), and National Territory, a Directive Committee of Units of Irrigation for Rural Development is created. This body coordinates and organizes the operation and exploitation of the irrigation units. The Committees are composed of representatives from: (a) the government of the state, (b) Secretariat of Hydraulic Resources, (c) Secretariat of Agriculture, (d) Department of Agrarian Affairs, (e) public banks, (f) private banks, (g) National Company of Electricity, (h) national company of Popular Subsistences, and (i) representatives of the water users.

The functions of these committees are similar to the functions of the committees in the irrigation districts, with the addition of a specific mandate to organize User Associations in each Unit of Irrigation. The committee must supervise the performance of the associations as well as the management of funds. The regulations for the associations are established by the committee.

The User's Association is in charge of the administration, conservation, and operation of the irrigation unit. Units of irrigation are a step below the district. Several irrigation units can be fused to constitute an irrigation district.

Water boards of the irrigation districts of Mexico are auxiliary entities of the Secretary of Water Resources of Mexico. Regulations of the Water Boards must be approved by the Secretary of Water Resources. Water Boards govern the application of the agreements for water distribution (Water Law).¹⁸

New Zealand

In New Zealand, there are association for community supply, irrigation, farming, and household use (Sec. 50H Land Act, 1948). They have the authority to construct and operate water works. A Land Settlement Board resolves the problems and disputes among members of the association.¹⁹

Peru

The powers and purposes of Water Users Associations in Peru is contained in the Decree of the President, No. 495-71, December 1971. The decree was issued under the provisions of Article 136, General Water Law of 1969, which requires the creation of users' associations.

There are two levels of user associations: (1) a Water Users Council for an entire Irrigation District, and (2) an organization of users within each sector (districts are divided into sectors) called the "Commission of Irrigators." Districts are units of water administration. Each District includes one or more river basins. Water users in each district are required to form water users associations.

The water resources council of an irrigation district consists of: (1) one representative per each irrigation sector of the district; (2) a representative per each culinary water supply company (or, if none exists, one representative of the domestic water users); and (3) two representatives for all other classes of users. The commissions of irrigators for each sector or subsector of the irrigation districts are composed of all the users of each sector. Irrigators with small and medium size farms, associations of farmers, and rural communities within the area must also be represented on the commission.²⁰

Singapore

There are no water users associations in Singapore. However, there is the "Singapore Rate Payers' Association" which protects the interests of landowners and can influence the policies of the government on water services and water rates.²¹

Spain

Water administration in Spain takes place at two distinct organizational levels. At the government agency level, the Ministries of Public

Works, Agriculture and Industry have various delegated functions in development construction and management, create projects and programs and infrastructure activities. Another category of organizations are the autonomous agencies or entities, principally the Area Water Authorities (Confederaciones hidrográficas), river federations and the irrigation associations (Comunidades de Regantes). At the regional level of water administration, two distinct but similar entities exist, both organized around hydrologic boundaries of the watershed. They are the Area Catchment Offices (Comisarias de Aguas) and Area Water Authorities (Confederaciones hidrográficas). The former is an organ of the Ministry of Public Works, the latter an autonomous entity. The comisarias, thus, are part of the governmental framework directly concerned with water allocation, distribution and utilization.

The Area Water Authorities functions are primarily oriented toward planning, executing and operating water projects, collecting hydrologic data, collecting project assessments, and promoting the creation of irrigation communities.

Their internal structure consists of water users and representatives of the government. The membership of the organization is made up of water users to give them a direct avenue of input into water resources planning and project selection and construction.

This is the basic reason for creating an institutional body parallel to the comisarias. There are as many conferaciones as comisarias with the major organizational distinction being that water users form the former while the comisarias are bureaucratic institutions without user participation. There has, however, been a definite trend toward a lessening of power and support of the conferacion in favor of the comisarias.

At the local level, there exists a logical and simple hierarchy of autonomous entities consisting of water users of public waters. This hierarchy is placed in a category called Comunidades de Regantes (irrigation associations or communities of irrigators) and is a strong traditional feature of the Spanish water administrative system, making up the backbone of water resources control and management for national food production. Their success in Spanish agriculture is an example of decentralized administration of public property. Argentina has basically the same local administrative structure.

At the highest level is the federation of communities (or associations) (sindicato central), lacking many of the internal features of the comunidad general, and formed to pursue the mutual interest of communities on a reach of a natural watercourse getting water from different diversion works (see Figure 3).

The organic structure of the community of irrigators illustrates a logical functional diversion of activities particularly relevant to water control and management. It consists of three organs:

1. Junta general (general assembly)
2. Sindicato de Riego (board of directors)

3. Jurado de Riego (jury of water users)

Each member of the community must pay the assessments allocated him according to the quantity of water delivered. Although the water is not metered, a "duty of water" for various types of crops is established by the sindicato. That quantity is distributed through canal outlets calculated to deliver a certain flow for a certain period of time. The junta approves the budget and fees charged to the members.

Water user associations at the local level have greatly contributed to the development and effective utilization of available sources of water in Spain. The particular system of administration in Valencia has many attributes common to the rest of Spain, but an equal number of features unique to that fertile valley. The present system, although changed very little over time, has had the opportunity of centuries of experience of local control. It is this experience that is most useful to a country like Pakistan, where local administration of water is highly desirable to accommodate an extensive canal delivery network.

The communities may be organized voluntarily by action of water users of a common canal or watercourse, or by direction of the Comisario de Aguas in the basin.

As a legal entity, the irrigation association has several unique and important features--features that should be strongly considered among the organizational needs of developing countries. These features are:

1. Corporate entity
2. Judicial personality
3. Element of reality

When the waters are granted to a community it is charged with the control of the distribution of the water among its members. It administers the waters. If a person leaves the community he loses his right because he is leaving the lands. The right to use the waters is on the members of the community. The community, even when granted the water, performs only a distributive function.

The hierarchy of the irrigation associations begins with a very simple entity serving a small area from a lateral or subwatercourse to a federation of irrigation associations on the river. At the base of the hierarchy is the simple community (simple comunidad). The next level is the general community (comunidad general) which takes on very formal organizational characteristics and consists of simple communities and users served from a public canal and diversion works. The general community must defend the interests of the simple communities within their water delivery area. They are also responsible for the control and distribution of the community waters.

Thailand

There are no water user associations in Thailand. Potential associations would be regulated by the Civil and Commercial Code of Thailand. Furthermore, they would be under the authority of the Ministry of the Interior. They would be required to pay a fee and be registered with that ministry.²³

Taiwan

The irrigation associations of Taiwan are self-governing corporate bodies. They are public entities and their organization is prescribed by law (Art. 12, Water Law). They can be formed by private or public incentive (Art. 6 Rules). In the former case the form and territory must be approved by the government. These associations are highly controlled by Provincial and National levels of government. Most of their undertakings must be approved by the State.²⁴ There are 14 associations in Taiwan Province and 2 in Taipei city.

Tunisia

The Hydraulic Interest Groups of Tunisia are, by decree of 30 July, 1936, administrative bodies and perform studies for water works of collective interest. The Watering Associations of Tunisia are associations of landowners, established by Decree.²⁵

Turkey

Traditionally, drinking water supply, orchard and field crop irrigation, flood control and prevention, and drainage in Turkey have been managed at village level, under the control of the village council and assembly. Villagers have usually formed water users' associations which have been gradually regulated, as state intervention increased. The customary associations have been regulated and institutionalized under a Karez Board of Trustees (see Laws 442, 1924, Art. 24, on villages, and Law 1364-1918, on orchard irrigation, arts. 1-5).²⁶

United States of America

The categories of organizational arrangements in the United States are: (1) private organizations - including commercial and voluntary irrigation companies and voluntary associations; (2) quasi-private organizations including water users associations and cooperatives; and (3) public organizations - including irrigation and other special districts and special authorities.

Private organizations are basically three types: (1) commercial companies, (2) incorporated mutual companies, and (3) unincorporated mutuals (which includes voluntary associations).²⁷ Mutual irrigation companies are organized as a company or incorporated association under statute while the voluntary associations are not. Perhaps the most interesting exogenous influence upon the structure of irrigation organizations in the United States are the community ditch associations (acequias) found in New Mexico, Texas and Arizona. These voluntary type associations can

are traced back to Spanish and Moorish origin and were diffused throughout the Southwest by the Spaniards in the 17th and 18th centuries.²⁸ The common denominator to all members of the acequia is their residence in the community or local area and the need to divert and distribute water contiguous lands. Thus, as was customary in Spain and the Canary Islands, each village or group of farmers would construct its own common ditch.

Special districts are governmental units organized under rules and procedures which are specified by state enabling laws. Some districts perform only one function while others perform several. The most common functions are irrigation, soil and water conservation, drainage, flood control, and domestic water supply. There are one or more sets of laws for each kind of district. Districts have some corporate governmental powers; their own governing body; and considerable autonomy for budgeting, taxing and other decision-making including the power of eminent domain to condemn private property.

Once the new district exists as a legal entity, officers are elected or appointed, by-laws and operating rules adopted, financing arranged, and project operation begun. Districts hold annual meetings to elect officers and formulate future plans. When the need for the district ceases to exist, its functions have been completed and its debts liquidated, the district may dissolve if the enabling law so provides. If such procedures do not exist, the district simply may become inactive.

Special districts should not be confused with special or public authorities which also perform a selected number of functions and are structured similarly to districts. Generally, special authorities have less autonomy since much of the administrative control remains in the parent government. Authorities are usually created as a means to overcome constitutional debts limitation placed on general government where the expenditure of funds is of such a magnitude and the purpose or purposes so related or specific that decision-making authority is best placed with a single group or commission.

Western Samoa

There are "de facto" but not statutory water users associations in Western Samoa. They exist within a family under the customary Samoan Law. A planters' association is also in existence. The Cooperative Societies Ordinance was passed in 1952 in order to promote economic development in the agricultural field.²⁹

Conclusion

The preceding discussion indicates the wide range of organizational structures which presently exist throughout the world for managing the delivery, application and removal of water resources.

In some countries such as Spain, areas of Latin America, and Islamic nations, the system of water user organizations has deep historical significance and has evolved over many centuries. In other nations such as the People's Republic of China, the drive for agrarian reform has produced

an entirely innovative structure born of the creation of an entirely new social order. In western democracies the concern with property values and individual rights in that property has been a shaping force in determining the extent to which the individual will be subject to collectively made decisions.

A more specific examination of the range of organizational structures is presented in the following sections. The discussion is present in terms of specific categories of operational structure. These categories consider the range of organizations from those which are controlled entirely by the private sector to those which exist as an agency of the state. The complexity of structure is presented in examination of those groups which serve the needs of a small number of users in a highly localized area to those systems which function on regional and national levels. The range of purposes which water user associations have been created for varies from single purposes such as delivery or irrigation water to those organizations which have functions across the entire range of issues related to water and agricultural development. In their operation, water user organizations may function as semi-autonomous units in their relations with the central government and other similar user groups, or they may be part of a completely integrated hierarchy which parallels the various levels of official government.

ORGANIZATIONAL RANGE

Private to Public

The effort is made in this chapter to distinguish privately owned and operated water user associations from those which function more or less as a subdivision of government. Although water user associations are more commonly considered to be noncommercial organizations in nature, some scattered examples do exist of privately formed organizations, in the nature of private companies, which operate in much the same manner as their publicly controlled cousins.

Private--United States of America--

At the local level in the United States of America there are three distinct private organizational entities designed to accomplish water resources development and management within a system. Ranging in degree of private sponsorship from highest to lowest, they are the commercial irrigation or ditch company, the mutual irrigation company and the voluntary association.

Commercial irrigation companies are organized by entrepreneurs for profitable conveyance of right holders' water or for the conveyance and sale of water owned or controlled by the company. Due to the profit oriented nature of a commercial irrigation company, and given the sensitivity of agricultural production to unforeseen disasters such as floods, drought, salinization, etc.--or simply the lack of available capital, their may be no incentive to undertake this type of commercial enterprise. Furthermore, if lucrative profits were to be earned by such an enterprise, operation would have more than likely already have commenced.

Mutual irrigation companies are operated by water users for their express benefit and can be incorporated or unincorporated (Figure 1). Unincorporated mutual irrigation companies are discussed later under the topic of voluntary associations. One of the most striking attributes of mutual irrigation companies is the ease with which they can be created. As private organizations, they need only follow the general corporation law of the state in which they wish to incorporate. Since this is private enterprise, as contrasted with the public, governmental nature of special districts, no public hearings, elections, or public reports of feasibility studies are required. Membership is on a voluntary basis. This is not true of special districts which can impose membership on citizens of the area, as well as the financial obligations which go with membership. Mutual companies can operate across political boundaries, whereas special districts are normally confined to operating within a fixed geographical area.

The ability of mutual irrigation companies to raise revenue quickly is another important feature of this type of organization. Annual income is derived from assessments against shares of capital stock, which represent ownership of corporate assets and the right to use of water from the system. Shares of capital stock are held entirely or chiefly by the water users (Figure 2). When the stock is owned by profit seeking,

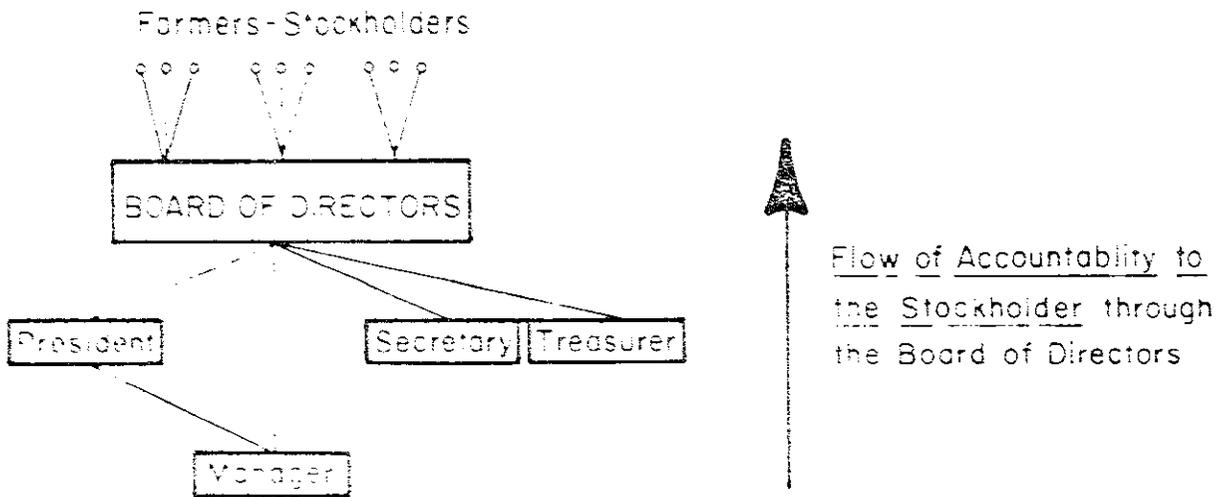


Figure 1. Vertical control of Mutual Company emanating from stockholders.

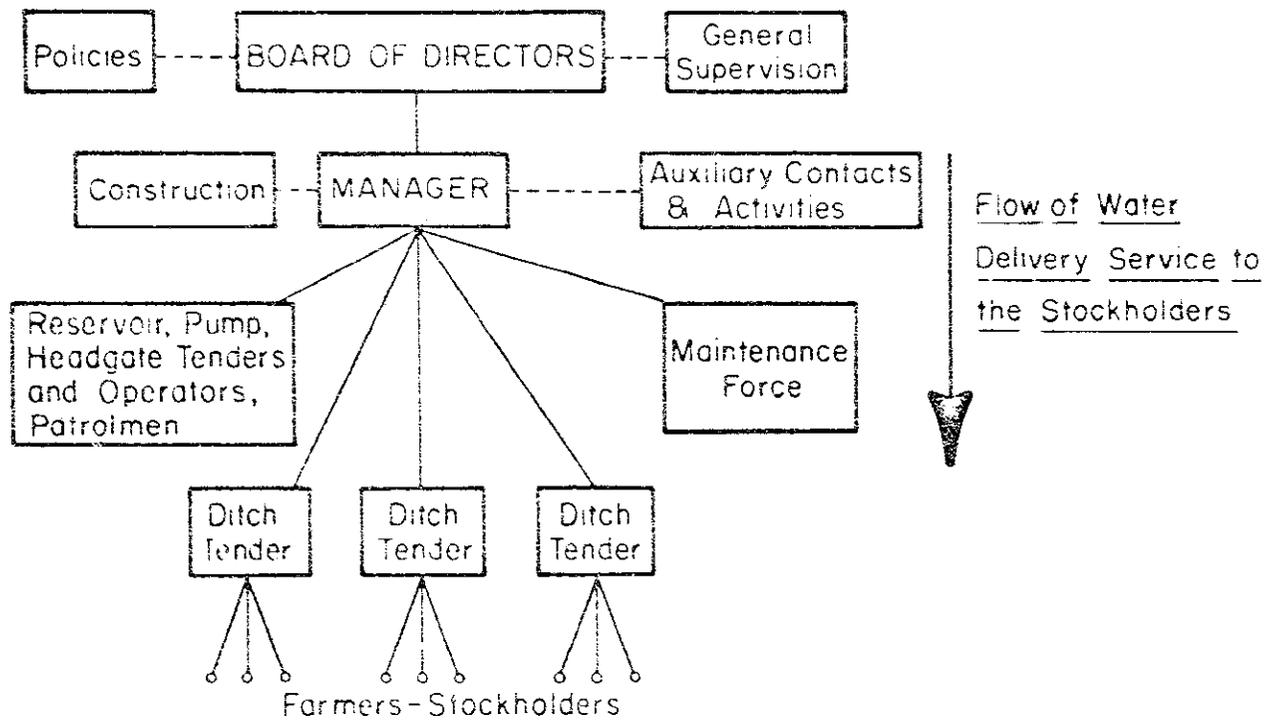


Figure 2. Control of water service to stockholders of Mutual Company emanating from board of Directors.

nonwater users, the organization is called a commercial company as discussed above, rather than a mutual company. Delinquent payments may be collected by selling the stock, suing the shareholder, withholding water from delinquent shareholders, or repossessing the stock. The procedure of capital stock assessment is faster than taxation or assessment as used by public districts.

Incorporated mutual irrigation companies are mostly located in the western United States.

Voluntary associations have similar objectives to mutual irrigation companies but their foundation is less on legislative enactments and more on custom. Such organizations are groups of water users informally associated under written or verbal agreements. They are not organized under state corporation laws and do not issue stock. Despite their lack of formal standing, their simplicity in structure and flexibility in operation make their use highly desirable in developing countries.

Voluntary associations and mutual irrigation companies offer the most relevant models, from the standpoint of developing countries, since they originate and function at the water user level. Their uncomplicated structure makes them easily adaptable to various specific situations.³⁰

Italy --

Private water delivery has been accomplished in Italy to some extent by irrigation "consorzi." The present system knows both voluntary and obligatory irrigation consorzi.³¹ The former are organized in accordance with Art. 918 Civil Code and the latter, called "land reclamation consorzi," under Art. 823 and 921 of the Civil Code and Decree No. 1933. The Italian system has shown an increasing history for governmental oversight and control.

Public--Rest of World--

The predominate form of water user associations are those which are governmental subdivision and can exercise only those powers which they have been legislatively delegated by the central government. Collectively, publicly formed water user associations cover a broad range of functions for public water resources management. Because there are so many varieties of public water user associations, and so many of them have been given combinations of functions unique to their country of origin, it is impossible to define a specific role that they play in the management of water resources. Suffice it to say that some are simple, small organizations servicing the water needs of only a few people within a highly localized area while others are as powerful and important as civil governmental units, affecting the living and working conditions of many people.

The best way to approach the role in water resources management is to note their typically dichotomous position within the structure of government as (1) independent units of local government, and (2) operating units for intergovernmental programs on the local level. In the first capacity, water user associations function as autonomous units of government,

subject to whatever checks and balances the parent government has imposed on them, within a specific geographical area. In their second role, public water user associations give local people an opportunity for self-government while allowing varying degrees of supervision, control, and technological and financial assistance while managing water resources as local operating units for national programs. This example of intergovernmental cooperation is typical of the spectrum of public water user associations.

The chief attribute of such organizations is their inherent nature for flexibility. This feature is particularly evident in the areas of geography and financing. It is possible to organize water user associations so that they can operate across internal government boundaries and they can be tailored to fit natural features associated with watercourses and hydrologic basins.

Financial flexibility is imparted through the basic proposition that the costs associated with water management should be borne by those who receive the benefits. It gives the direct local control to the persons affected by the service and should result in greater citizen interest and participation, for unlike those units of government which rely on taxation for revenue, local water user associations depend on service or user charges which have a higher correlation between actual benefits and cost of service.

Primarily two methods of creating public water user associations are used. Either the formation of the local organization is initiated by the local water users, or the central government forms the associations according to edict. The method of formation, bottom-up or top-down, can raise questions as to whether the local unit perceives its accountability to its membership or to the central government. However, in situations where general purpose governments are apathetic towards the problems of water management or otherwise hampered from taking action, public water user associations, however they may be created, become quick, effective alternative routes for action.

Voting power may be apportioned on the basis of assessed property valuation or number of acres irrigated rather than the one-man one-vote rule. Frequently the theory of participation in public water user association is based on the fact of property ownership rather than citizenship or actual residence.

Publicly created water user associations exist in all of the countries surveyed in Part II, including those countries such as the United States of America and Italy which also recognize the role of private enterprise in collective water management organizations.

Simple to Complex

Organizational patterns of water user associations range from simple structures serving few users within a local area as is the case for the communities of water users of Mendoza, Argentina, to complex organizations which manage water use within a river basin or national water system and

supply water across the spectrum of water uses for agriculture, municipal and industrial use as is the case in Taiwan, Mexico and West Germany.

The complexity of the structure is a function of geographical size, number and type of water users, size of individual holdings, physical availability of water supply, and the intricacy of the legal system within which the organization must operate.

Argentina--

The subdivisions of the water consortium of Jujuy Province, Argentina, are the assembly (all the members), and the directory (elected by the assembly, it is the executive board). The conditions for election as a member of the directory are set by the consortium's regulations.

In the Province of Larioja, Argentina, the associations are directed by a "Junta de Delegados e inspectores," which operates the secondary canals. The main canals are operated by a junta, composed of the Inspectors of the secondary canals.

The water users associations of Mendoza, Argentina, are directed by an "Inspector," elected by the users. The "Inspectors" serve for one year. They must own land in the area irrigated by the canal. A tenant cannot be an inspector. The inspector must reside in Mendoza Province and he should not be delinquent in his water taxes or water charges. The vote for inspector can be made through a proxy. If no election is held, the inspector is then appointed by the Department of Irrigation.

The main functions of the inspectors have remained unchanged through 100 years: They control water distribution, take care of the canal maintenance, distribute costs among the irrigators, and solve "de facto" problems between the water users. The decisions of the inspectors can be appealed before the administrative authorities of the Irrigation Department.

The inspectors are required to keep accurate accounts, and the books are to be presented to the newly elected inspector. The accounts are also to be submitted to the Irrigation Department.

The inspector does not collect the contributions of each user; rather they are collected by the central offices of the Irrigation Department. The inspector, however, does prepare the budget for each year, and indicates how much each irrigator should pay. He makes investments and submits his accounts to the department for approval.

The system functions very well and there are about 500 Users Associations in Mendoza.

In the Province of Rio Negro, Argentina, the executive body is the Directive Commission which can enforce its decisions against dissidents. Decisions regarding financial charges can be appealed before the Director of Waters.

The "de facto" associations of Rio Negro, Argentina, are called "Communities" and its members designate a "Compartidor," who is in charge of the distribution of water among the members of the "community." He is in charge of administrative decisions, which can be appealed before the Direccion of Waters of the province, and administers the budget of the community.

In the province of San Juan, Argentina, the water users associations are called "Irrigation Commissions" and are managed by three members, elected by the canal irrigators. To insure equal representation on the commission, the canals are divided into three areas, and each member of the commission represents the irrigators of the area from which he was elected. For canals not irrigating at least 300 hectares, or not having at least six water users, one person is elected, instead of the commission.

Water users associations in San Luis, Argentina, are directed by a board elected by the water users. To be able to vote, the water user must be registered with the Register of the Direction of waters. Board membership lasts two years and they represent the upper, the middle, and the lower part of the watercourse. Each water user has one vote, without regard for the number of hectares he might have. The commissions can recommend to the Direccion of Waters, the works that should be performed as well as to recommend how the costs should be distributed.³²

Belgium--

The wateringues of Belgium are directed by a general assembly and managed by a board. The assembly adopts the decisions on construction, and improvement of flood control, drainage and irrigation works (Law of July 5, 1956, Art. 21).

The board is the executive body and is responsible for protection and maintenance of works, administration of the land properties of the wateringue and a twice a year inspection of the water works (Art. 47, Law on Wateringues). A tax is levied on all landholdings to finance the work (Art. 65).³³

People's Republic of China --

The communes of China are organized to perform several economic-administrative functions, among which there is irrigation control at users level. The administrative structure is:

		→ Assembly
	Commune	→ Council
		→ Committee
Brigade	Several	
Work Team	Several	25 families each

The team is the basic unit. It organizes production to meet its needs and the quotas allocated by the commune.

The brigade is the link with the commune. It performs planning and management functions and owns some production facilities.

The commune is the overall administrative framework. The commune has from 3,000 to 12,00 Ha. It can comprise from 20,000 to 80,000 persons. The subdivisions are the assembly, the council, and the revolutionary committee. The assembly elects the council, which elects the committee that performs the day-to-day supervisory and managerial functions of the commune.³⁴ Generally, the rule is that once the irrigation system has been constructed operation of the system is discretionary with the irrigation district. Smaller projects within the area of the project are incorporated in the administration of the larger unit.^{34a}

Chile --

The highest level of authority for the Canal Associations of Chile is the meeting of all the members of the association. The meetings are termed "General Boards of Shareholders." The "General Boards" meet in ordinary and extraordinary sessions.

The ordinary meetings are held the first Saturday of May of each year, and the extraordinary meetings are held any time they are required or necessary.

The Ordinary General Boards: elect the Directory of the Association, approve the budget and the fees that the users must pay, analyze the agenda of activities and the account of investments that the Directory must present, take action on any matters proposed to them (except for the ones which require special summons) and appoint inspectors to approve the expenses of the next year.

The Extraordinary General Boards can approve only those issues for which they have been specifically convened.

The day-to-day activities of the Administration of the association are carried out by the Directory which is appointed by the Board of Shareholders and which can have no less than three and no more than 11 members.

The Board of Directors of the Chilean Water Users Association has several interesting features. It can resolve water rights conflicts when: 1) they are related with water distribution between the shareholders of the organization, 2) there exists disputes between the shareholders and the association, about the rights of the shareholders, and 3) there are conflicts over control or repair of control structures. The decisions can be appealed before the ordinary civil courts. It can require the local police authorities to assist it in the execution of its orders. The board is responsible for: levying and collecting assessments, maintaining and cleaning the canals, and distributing water and protecting the basic distribution rights.³⁵

Cyprus --

The Irrigation Commissions of Cyprus elect a Committee of Beneficiaries responsible for water management at farm level.

Dominican Republic --

The Water Users Associations of the Dominican Republic enact their bylaws and elect a Directive Board which distributes waters, takes care of the interests of the community, establishes water terms, and settles internal conflicts.

England --

The Drainage Districts of England are managed by a board elected by the taxpayers, occupiers of agricultural lands, buildings and commercial woodlands. Some internal drainage boards are, however, administered directly by a water authority.

France --

The Basin Agencies of France are managed by a board of directors composed of an equal number of representatives of the administrative authorities, the users, and the local authorities.

Ecuador--

The subdivisions of administration for the Directorates of Waters of Ecuador are the General Assembly and the Council. The general assembly elects the council, through secret ballot, and approves the annual report on labor and investments prepared by the council. It must hold sessions at least once per year, at the legal address or in the place determined by the summons. Their resolutions are adopted by a simple majority of votes. The council has a president, a vice president, a secretary, a procurator, an administrator, and treasurer and one representative for each secondary canal. Their term of office is for one year and they can be re-elected. The members do not receive any salary and the posts are obligatory. The administrator and the treasurer are the only paid members. To be a member, it is necessary to have a water concession. The members of the council should be current in their obligations with the society. The council elects the successor to fill any vacancies. The council solves the administrative problem whose resolution is not under the jurisdiction of the Institute of Water Resources of Ecuador. The duties of the council are: to require obedience of the technical administrative dispositions of the institute; to protect the water rights of each user and ensure their compliance with the Water Law, their Regulations, and Statutes; to prepare their internal regulations; to maintain a list of the water users and their respective rights; to establish irrigation schedules; to plan and control the operation and maintenance of the aqueduct and its improvement; to control the volume of water that each user is receiving; to approve the budget prepared by the administrators; to control the investments; to apply sanctions for violation; to receive reports from their members; and to prepare an annual report with the details of investments and projects developed and send it to the institute.

The president is the legal representative of the directory. He authorizes the investments and signs the checks together with the secretary. He must oversee the compliance of the associations with the decisions

of the directory. The secretary is responsible for the papers of the directory. The treasurer takes care of the financial matters of the directory. He can open checking accounts and administer the accounts of the directory. He must post a bond. The administrator is appointed by the council. He must obey and require compliance with the resolutions of the council, register the daily volumes of the canals and control the efficient use of the waters in accordance with the water rights of the members, report to the council all the infractions, ensure the conservation and maintenance of the canals, prepare the list of users, and exercise all the other functions required by law.³⁶

West Germany --

The governing body of the water users association of West Germany is the assembly of all the members, or a committee elected by the members.

The chief administrative officer is the directorate which, in a small association, can be a single person.

To handle special problems, a further subdivision can be created. The members of the agencies serve without compensation. The staff varies with the size of the corporation. The competent units of the associations dispose of the budget and carry out the programs.³⁷

Greece --

The executive bodies of the Local Land Improvement Associations of Greece are the General Assembly and the Board of Directors. The General Assembly is elected by the members of the local councils at village level. The assembly has from 20 to 65 members. The villages' local assemblies elect representatives in proportion to the number of H.a.s in the project which benefit each village. The board of directors is elected by the assembly for a 3-year term.

The General Land Improvement Organizations of Greece has a committee of seven members, five appointed by the Minister of Agriculture and two elected by representatives of the Local Land Improvement Organizations operating within the area controlled by the Local Land Improvement Organization.³⁸

Hungary --

The activities of the water management companies of Hungary are managed by the Executive Committee. The Executive Committee is directed and supervised by the assembly of the members and, in technical aspects, by the relevant administrative bodies.³⁹

India --

Supervision and rotation of water supplies in Maharashtra, India, are entrusted to an inspector who is elected by the local committee of the village.⁴⁰

Lybia --

The water law for Lybia, prepared as a project of the U.N.'s F.A.O. in 1974, provides that where water users' associations have been constituted, these should, to the extent possible, be treated as one water user and water distribution among their members regulated by their respective board of directors. The law also allows water user participation in the committees and subcommittees deciding the issuance of water permits.⁴¹

Mexico --

In the irrigation districts of Mexico, the authorities for application of the regulations are the manager of the district who is appointed by the Secretariat of Water Resources, and the water boards. The water boards of the irrigation districts in Mexico are composed of water users, but they must be approved by and are controlled through the Secretariat of Water Resources.

Subdivisions of the district are: a) Manager of the District, b) Chief of Operations, c) Chief of Conservation, d) Chief of Administrative Services, and e) a Directive Committee (users are members). The committee has to approve the internal by-laws of the district which are prepared by the manager of the district.⁴²

The executive body of Mexican Water Boards is the General Assembly of Water Users. It is responsible for: 1) electing and removing the members of the Directive Commission of the Water Board, 2) issuing and revoking the offices of these members, 3) authorizing the Directive Commission to contract the works for the conservation of the water works, 4) reviewing and approving the budgets for water works, 5) reviewing and approving the cultivation programs, and 6) reviewing and approving the projects for the construction of new water works. The directive commission of the board is composed of a Council of Administration and a Council of Vigilance: The Council of Administration has a president, secretary, treasurer, and ordinary membership. The Council of Vigilance has a president, secretary, one ordinary member.

The majority elects the Council of Administration while the minority elects the Council of Vigilance. The members of both councils are elected for two years. To be elected a member of the Directive Commission, it is necessary to be an adult, to have the ability to read and write, and to be a water user, registered in the Register of Water Users of the district. The Council of Administration administers the assets of the board; can sue and be sued for the collection of money; and prepares the budgets for the administration conservation of the water works under its care. The budget must be approved by the general assembly and the directive committee of the district. It submits cultivation programs to the directive committee after they have been approved by the assembly of users. It administers water works and other goods and properties of the board. It must keep accounts of expenses and resources. Both must be disclosed to the representatives of the manager and of the directive committee. The council must inform the assembly on the expenses, the budget, investment of funds,

and send copies of them to the manager and the directive committee of the district. It can appoint and remove employees, including the appointment and removal of the distributor of waters for its section to the Directive Committee of the Irrigation District. It can collect funds to pay the expenses it has for construction and conservation of water works from the manager of the district who collects payments from the users and deposits them in a special account for the association (needless to say that the manager pays only when there is money in the account of the board). It oversees the distribution of waters in conformity with: a) the Irrigation Plan, approved by the Secretariat of Water Resources; b) the rights of each user; c) and in conformity with the regulations. Water will not be supplied if the user does not exhibit a receipt showing the payment of the fees for water. It constructs the water works necessary to improve the irrigation service and collects the cooperation fees that the users must pay. The fee is deposited in a special account kept by the district. The council can acquire goods and materials when the prices of the goods have been approved by the assembly. The council can also have other powers if specified in the act of Constitution of the Board and in its statutes. It must submit verified data on cultivated lands, yields and production costs.

The president of the directive commission is responsible for the improvement, maintenance and conservation of the property of the board. There is a treasurer who keeps the accounts and manages the funds. The secretary is in charge of the day-to-day keeping of files, correspondence, and Book of Acts.

The Council of Vigilance controls the acts of the Council of Administration. It can examine the accounts, the water works, the distribution of waters, the obedience of the regulations, and statutes. It must present reports of its findings to the general assembly.⁴³

Peru --

The Councils of Water Users of Peru has a board of directors consisting of a president, a secretary, a treasurer and two ordinary members. The board keeps accounting and minute books. The Commissions of Irrigators of Peru are controlled by a board of five members. Officers include a president, a secretary and a treasurer. The commissions must have at least one member to replace the absentees.

South Africa --

In South Africa, the riparian owners may petition for the formation of an irrigation district. If such a district (consisting of riparian properties) is proclaimed, a statutory board is elected by the riparian owners.⁴⁴

Australia --

The irrigation areas of South Australia are also administered by a board elected by the users.⁴⁵

Spain --

The organic structure of the community of irrigators of Spain illustrates a logical functional diversion of activities particularly relevant to water control and management. It consists of three subdivisions (Figure 3):

1. Junta general (general assembly). This consists of all water users and is equivalent to a legislative body. The right to vote in the junta is normally proportional to the hectares irrigated land. The assembly meets every year or every other year, as established by the members, to participate in major policy decisions, adopt budgets and new regulations, and elect members to the sindicato and jurado.
2. Sindicato de Riego (board of directors). The sindicato is the executive body of the community responsible for managing the affairs of the association, in particular, apportioning and distributing water. It consists of: a) president, b) vocales sindicos (area representatives), c) secretary and d) treasurer-accountant. The president controls the implementation of the resolutions adopted by the junta and presides over the junta meetings. He is an elected official.
3. Jurado de Riego (jury of water users). This is the unique and an important organ of the community; it is the judicial body consisting of: a) President elected by the sindicato and a member of it, b) vocales o jurados (members of the community), and c) secretary (who is also normally the secretary of the sindicato). Their function is to resolve disputes between members of the community and punish offenders of the association regulations. The jurado proceedings are very informal, oral and open to the public.

The canals, diversion structures and other water works are the property of the community if it is not specifically stated otherwise. New water works are proposed by the community sindicato to the junta. The junta must approve construction before any construction is undertaken. In the event of an emergency, however, the sindicato can order construction without convening the junta.⁴⁶

Taiwan --

Prior to 1975, the water associations of Taiwan had an Assembly of Representatives, elected by the members. They served gratuitously during four years. The number varied from 15 to 55 according to the size of the association. Two-thirds of the representatives had to be farmers from the area. The sessions were ordinary, two a year, and extraordinary (made by petition of the members). The representatives had to be at least 23 years old, and primary school graduates or ex-members of the staff of Water Association with good service records.

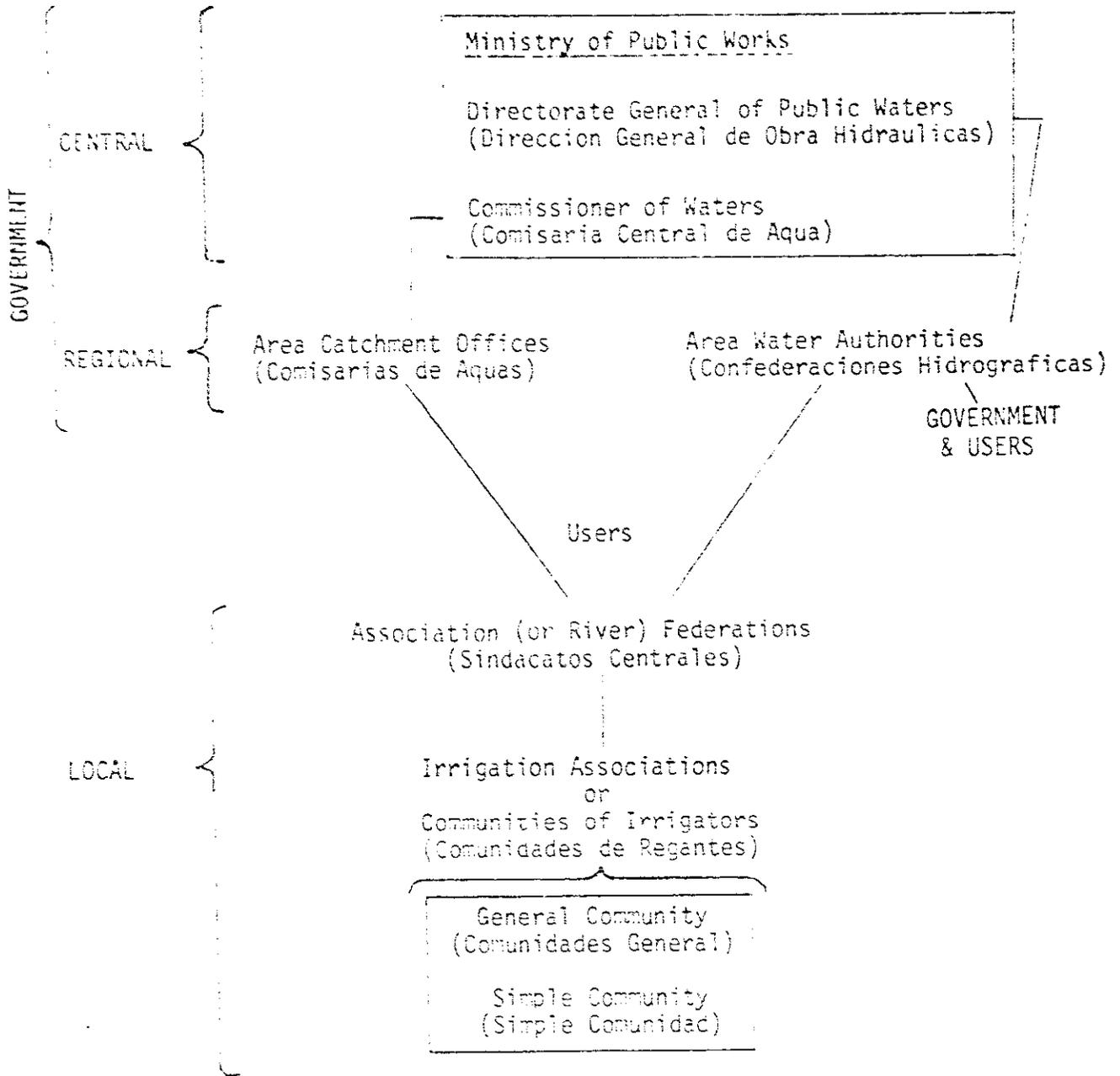


Figure 3 Organization of water Entities in Spain.

As of January 1, 1975, the service areas of Taiwan's irrigation associations were reorganized and the number of associations reduced from 22 to 14 for Taiwan Province. This spatial reorganization did not alter the authority of these associations to perform water management functions, operate its system for water distribution, maintain and repair distribution systems, and collect fees to repay the cost of service to individual users.^{46a} The functions of the assembly were: deciding on organizational rules, plans of operation, budget, review of balance accounts, loans and contributions, proposals of the chairman, representatives, matters requested by the members, hearing the report of the chairman, and other legal functions. Responsibilities for program and budget approval, formerly handled by the representatives is now done by a group of members of the Provincial Assembly and commissioners of Provincial Departments appointed by the Provincial Governor.

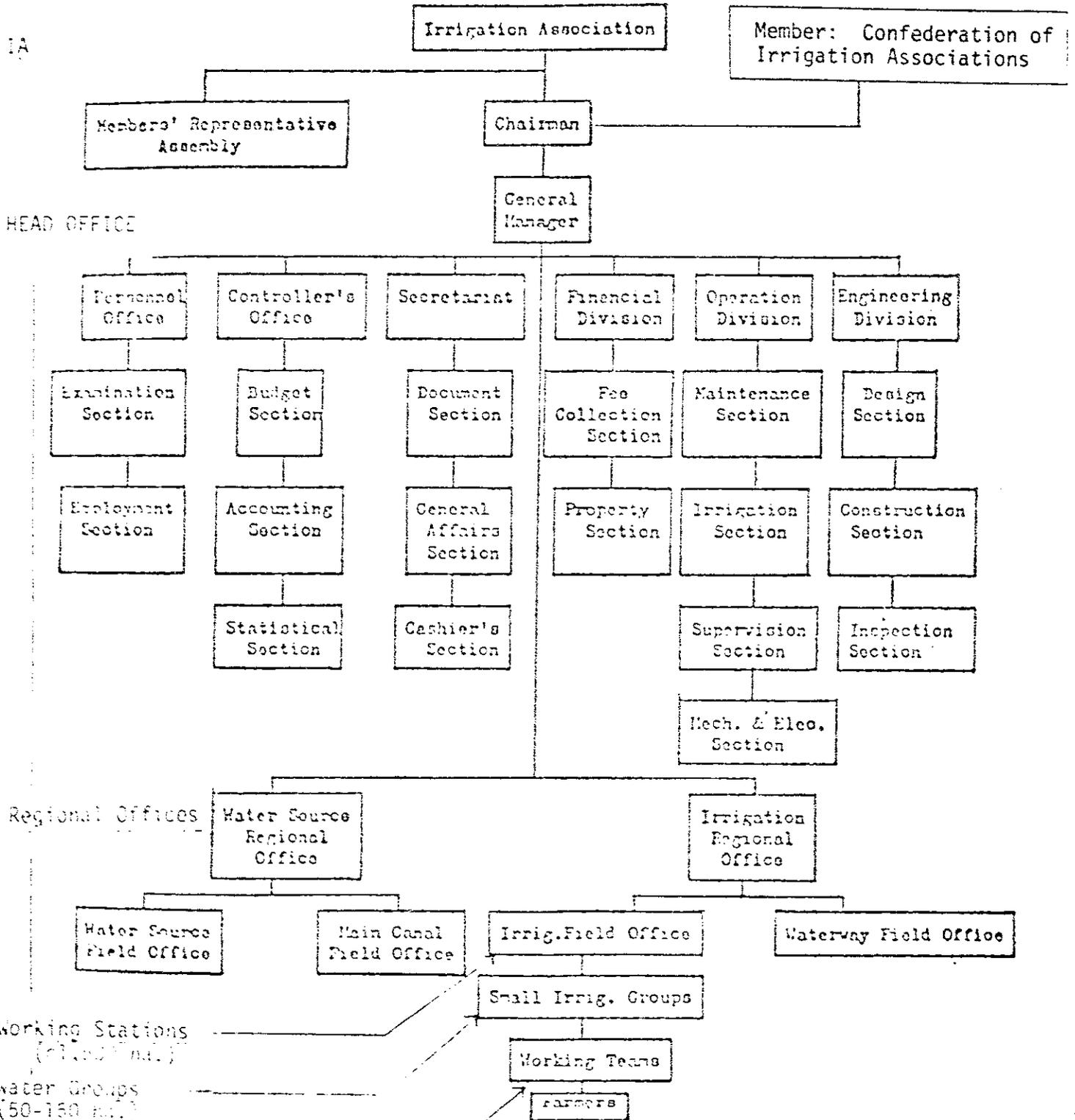
In 1975, when the terms of office expired for the representatives, no elections were held to select their successors. The chairmen of the irrigation associations are now appointed by the Taiwan Provincial Government.

The chairman of the Taiwan Water User's Organizations is elected by the representatives. His term of office is for four years. He is responsible for the overall supervision of activities, the staff and subordinate agencies, and represents the agency in dealing with other agencies. He must be over 25 years in age and, in addition, he must be either: (1) a college graduate; (2) successfully have passed a civil service examination (1 and 2 must include two years of experience in irrigation work); (3) hold the rank of recommended service and good records in forestry or irrigation; (4) have been member of a legislative body for more than six years; (5) ex-magistrate, mayor or speaker for a city for more than three years, or township chief for six or more years, and who has good service records; (6) an ex-chairman, vice chairman or general manager of a water association for more than three years or any ex-chief of department or section with more than six years service and good service records; (7) anyone having assisted to a technical vocational school or successfully passed the civil service examination on agricultural and technical subjects, and has served as manager of a farmer association during at least six years, and has good service records.

Regulations concerning appointment of the chairman, as well as the appointment of the staff, must be approved by the province or municipal district in which the association is. Regulations must also be reported to the national authorities, for record. The chairman and staff are considered government employees.⁴⁷

Operation of the association is carried out by the executive body which consists of three levels of administration: head office, regional offices, and field offices. The head office is the nucleus of the organization, made up of a chairman, general manager and staff offices in the engineering, financial, personnel, controller, operation and general secretariat. Figure 4 illustrates the extensive composition of the largest associations in Taiwan. The structure is simplified as the area under control decreases as shown in Figure 5, which shows the agencies in charge of land and water resources development. Figure 6 indicates their relationship.

Organizational Structure of an Irrigation Association in Taiwan
(Taiwan, Republic of China)

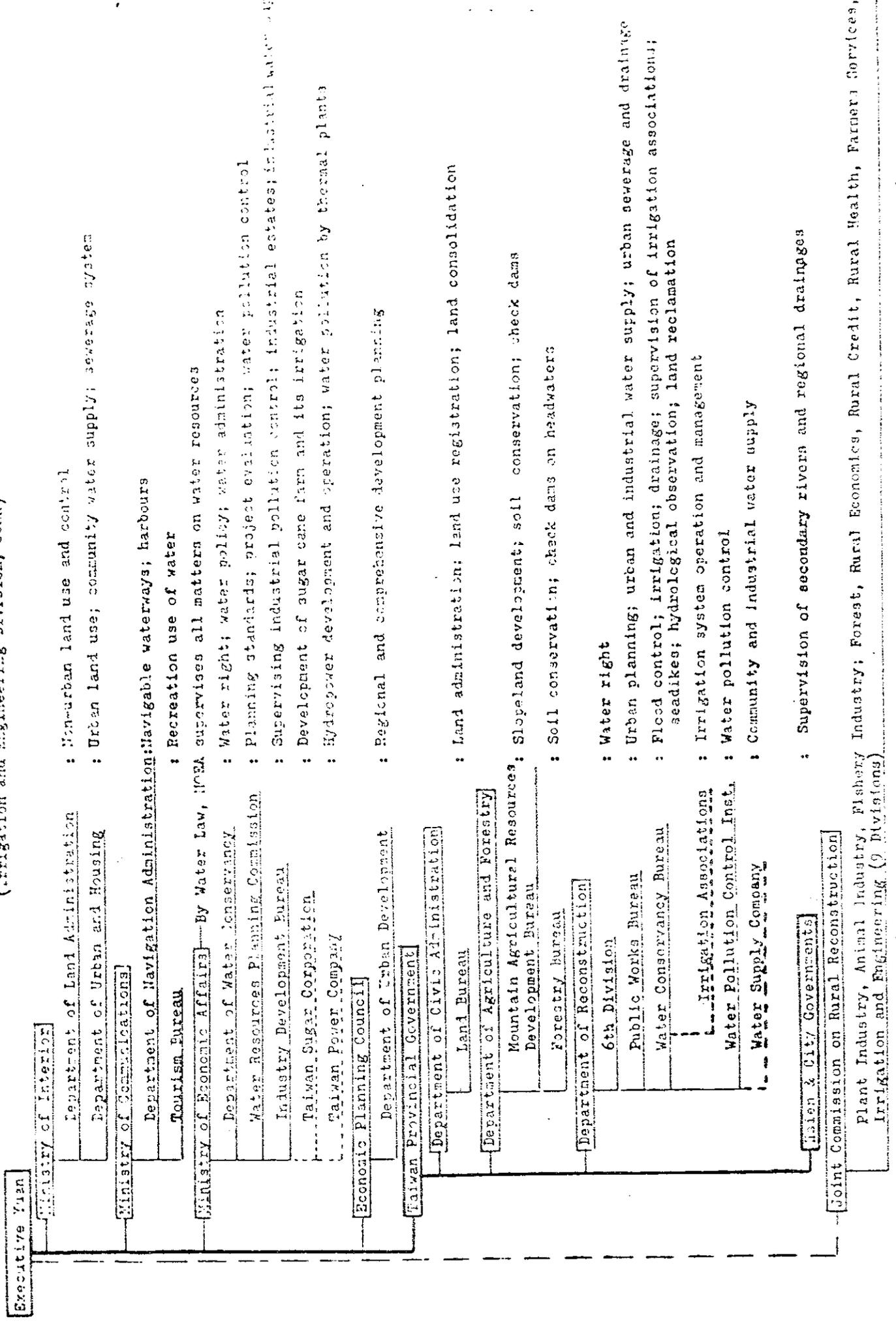


Working Stations
(rural area)

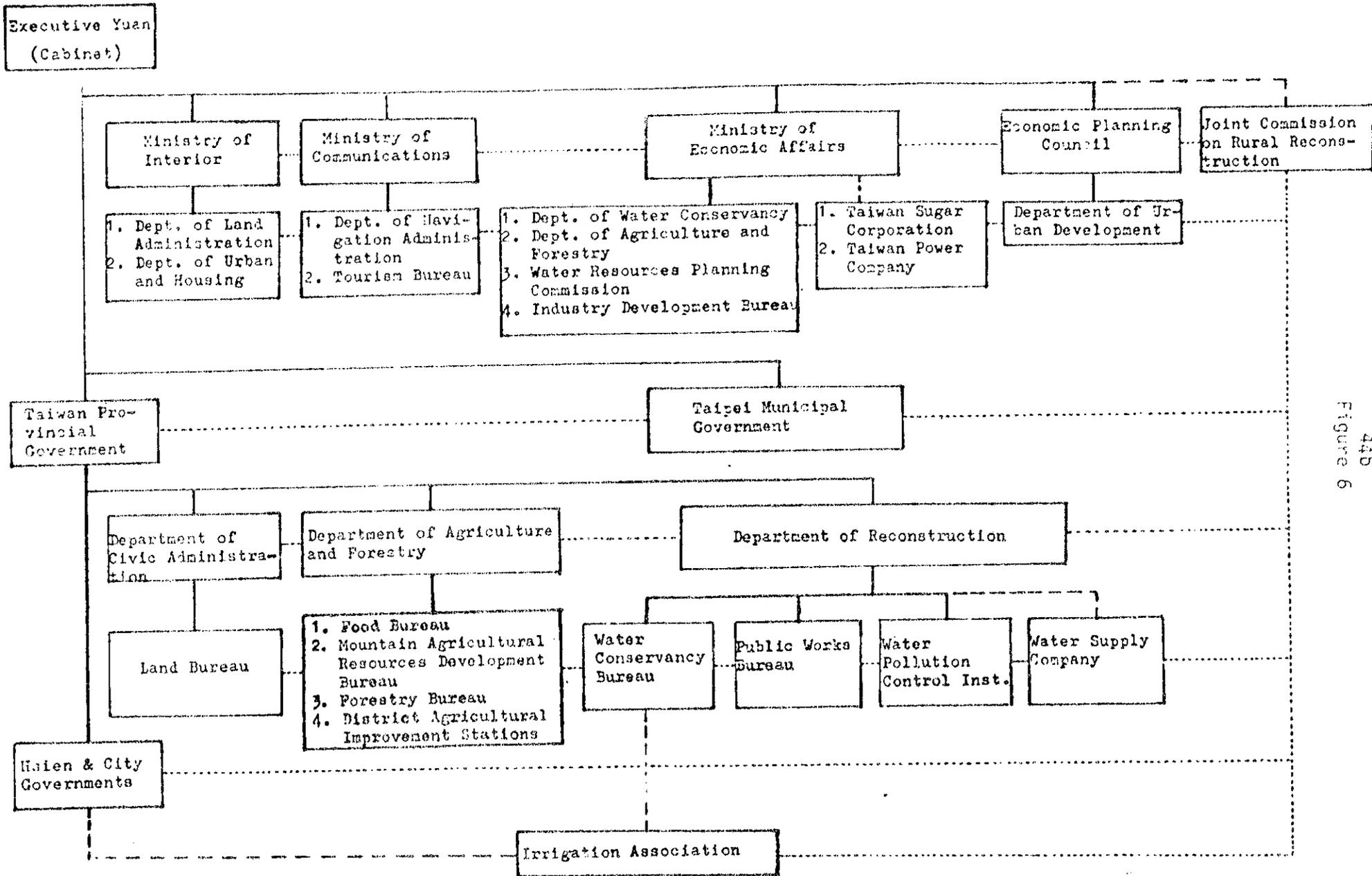
Water Groups
(50-150 ha.)

Sub-Water Groups - Elect leaders of Water Group
(20-50 ha.)

(Irrigation and Engineering Division, JCRR)



Relationship among Governmental Agencies in Charge of
Land and Water Resources Development



————— Administrative Relationship
 - - - - - Supervisory Relationship
 Functional Relationship

<u>Size of Project</u>	<u>General Guide for Organization Simplification</u>
1. From 50,000 ha to 20,000 ha	Sections under Controller's and Personnel offices can be eliminated.
2. From 20,000 ha to 10,000 ha	Inspection Section from Engineering Division, Maintenance Section from Irrigation Division and Accounting Section from Controller's Office can be eliminated as well as those in (1) above.
3. From 10,000 ha to 5,000 ha	Engineering Division should be put under Operation Division as a section and the section under financial division eliminated as well as those in (1) and (2) above.
4. Below 5,000 ha	Sections under Operation Division and Secretariat are to be eliminated as well as those in (1), (2) and (3) above, the Controller's and Personnel Office are reduced to one accountant and one personnel officer, respectively.

Regional offices are of two types: water source and irrigation. However, for projects under 50,000 hectares, the regional office is eliminated. The field offices are the working stations, and are divided into waterway and irrigation offices. In small projects, these field offices may be condensed into a field water source office, but in all cases irrigation field offices are formed. This latter office is in direct contact with the irrigators and is the most important communication link of the association. They generally command areas of 1,500 hectares or less.

Association members form small water or irrigation groups around 50-150 hectares that operate with sub-water groups or working teams of 10-15 farmers elected by the members for four-year terms. In addition to collectively working directly with the irrigation field office, this level is responsible for operation, maintenance and repair of the irrigation and drainage network, water management, establishing common seedling beds, and construction of minor laterals and diversion works. The sub-water groups cover an area of 20-50 hectares.

The entire hierarchy of the irrigation system is made up of water users, with the exception of technicians and other specialists. Officials and representatives of the association are elected by the members according to the level of activity in which they participate.

The membership is a key feature of the association since the basic philosophy for their creation is to stimulate farmer involvement in the decision-making process of national water use. Any person living in the jurisdictional limits of the entity who is either: a) an owner of private land, or (b) leases or is a tenant on public or private land, or c) managing public land is a member of the association.⁴⁸

Tunisia --

The Hydraulic Interest Groups of Tunisia are directed by a board of directors chaired by the governor; membership includes members of the

Regional Administration concerned and representatives of the ministries of Finance, Agriculture, and Interior. The board of directors is appointed by Order of the Ministry of Agriculture. It prepares the program of studies and promotes collective interest users' associations through participation in the relevant Hydraulic Interest Group. The directors of the special hydraulic interest groups of Tunisia supervises the financial management and the use of the waters for agricultural purposes. The management of the collective interest associations of Tunisia is charged to a board of directors which: prepares the budget, keeps a register of dues, proposes new works, repairs and maintains the works, collects dues, and keeps a water users chart with their respective rights.

The Unions of Cases Owners' Associations of Tunisia are directed by a board with a director, a deputy director, and members selected from the landowners paying the highest taxes. They are selected by the ministers of agriculture on suggestion of the regional governor.

The Watering Associations of Tunisia have a syndicate appointed from the landowners and presided by a director. The director protects the general interest of the associations, their sprinkler systems and correct apportionment of the waters among the members.⁴⁹

Turkey --

In the proposed law for Topso Cooperatives of Turkey, the organization is operated in a manner similar to other cooperatives, with perhaps a little less formality and required paper work. A general board consisting of all the cooperative members and a five-man executive committee elected by the general board for two years are the two bodies of the cooperative. The executive committee is charged with daily operation and administration of the cooperative. If disputes arise within the cooperative that cannot be settled in a general board meeting, then the provincial board of administration is requested to resolve the conflict.⁵⁰

Uruguay --

The Water Users Associations of Uruguay are directed by a board which is the executive, an assembly which is the deliberative body, and a Jury of Irrigation which is the judicial branch.⁵¹

United States, In General --

The management of the irrigation companies in the United States is carried out by a board of directors. Sole responsibility for managing the affairs of such associations or companies is given to a board of directors.⁵² This board has the power to formulate policies, make contracts, levy assessments, incur obligations, approve expenditures, and make rules and regulations for operation of the irrigation system and delivery of water to users.⁵³ The flow of authority is from stockholder to board to company. To be efficient, it is usually best to limit the number of members on the board of directors to as few as possible. The terms of office for directors and officers may be statutorily prescribed⁵⁴ or may be determined by the articles of incorporation or bylaws.⁵⁵

The president is usually selected from the board of directors⁵⁶ but, in cases where a vacancy occurs, the position may be filled by the members or stockholders in a special election.⁵⁷ Other officers might include a vice president, secretary, and treasurer, or these offices may be occupied by the same person.⁵⁸ The president's function is generally to supervise affairs, approve vouchers, and sign papers. A manager may be required to supervise operation, maintenance, construction, land, farming, and contacts with other organizations. It is advantageous if he has engineering experience. Obviously, in small companies, the offices of president and manager might easily be combined. Clerical functions, such as recording and disbursing to members the minutes of stockholders' meetings, can be taken care of by the secretary who does not need to be a director or member.⁵⁹

United States, New Mexico --

In the Voluntary Water Companies of New Mexico, U.S.A., management of the community ditch is carried out by three commissioners and a mayor-domo, elected by those members of the acequia who have water rights that are not in jeopardy due to delinquency in payment of ditch assessments.

The commissioners are responsible for the operation and management of the ditch. They adopt by-laws, rules and regulations and, in general, perform the functions of a board of directors.⁶⁰ They assign tasks to be completed by other members and determine the assessments necessary to pay the association expenses. The commissioners designate from among themselves a chairman, secretary and treasurer to carry out their duties. In this manner, the commissioners perform the functional tasks. Collectively, they decide operational issues.

The mayordomo is the person hired to carry out the water allocation and distribution tasks of the acequia. He levies and collects fines and assessments, prepares reports, and in general performs the activities of the association. The mayordomo is elected by the members and must be a landowner with right to water.

Single to Multiple Purpose

Water user associations have been organized for a wide range of purposes. The most common purpose is for the delivery of water required for seasonal application in the production of crops. In some systems, the association is concerned with cultural practices related to the application of the water in methods which reduce soil erosion and salinization as well as cultural practices related to cultivation, selection of seed and other areas of close concern to agriculture.

Where the economic base of a country is more complex and the agricultural sector is not the major area of economic emphasis, water user associations are created for the purpose of protecting wildlife and fish habitat and distributing water to municipal and industrial users. In the main, the principal focus of these organizations is the provision of a stable supply to irrigators. However, it is not uncommon to find that water user associations have a role to play in drainage, flood control and

water quality areas too. The spectrum ranges from the complex commitments of the German water users associations to the very simple functions of the Commissions of Public Waters of Paraguay.

Belgium --

The main objective of the Wateringue Board of Belgium is the promotion of agricultural interests by maintaining or creating within the area of the wateringue a water level favorable to agriculture. This is done through drainage of excess waters and by bringing water in during the drought periods. They may also undertake land reclamation. The Wateringue Board also oversees planting schemes, buildings and other works along non-navigable water courses (Royal Order of January 30, 1958, Art. 2).⁶¹

Sri Lanka (Ceylon) --

The Cultivation Committees of Ceylon have been organized by the paddy Land Act and irrigation ordinances. They are responsible for the maintenance of water works, at user level, in their areas of jurisdiction. In Ceylon, the District Agricultural Committee advises the government agent on matters of irrigation and paddy lands.⁶²

Chile --

The fundamental goal of the user associations of Chile is the administration and management of the waters of common use, upon which the water users have their rights.⁶³

Dominican Republic --

In the Dominican Republic, the water law provides for the user associations to construct and operate canals.⁶⁴

England --

Internal drainage districts exist in the rural areas of England and Wales for the protection of land against soil erosion or encroachment by water.⁶⁵

France --

The Societies of Mixed Economy of France construct hydraulic works, manage the area, and regulate and distribute the waters.⁶⁶ The National Company for the Management of the BAS-Rhone, et du Languedoc, was established to promote the irrigation in the area of its authority.⁶⁷

The company operates as concessionaire to the main works and canals. The distribution of the waters within the system must be carried out by the users' associations, already existing or to be set up, or by the company directly if the users' associations do not perform that function.

West Germany --

The decree of 1937 for the Water Associations of Germany provides the following duties for the water and soil associations: 1) production, completion, maintaining, regulation, removing of waters, 2) production, improvement, maintaining, management and removing of dams and other water reservoirs, barrages, sluices, hydroelectric stations and the like, 3) high water protection, 4) cleaning, removal and innocuous utilization of waste water, 5) procurement of water for consumption purposes, 6) melioration and preservation of soil in their agricultural condition, and 7) to take measures of furtherance and surveillance in the above mentioned tasks.⁶⁸

Hungary --

The Hungarian water users associations are charged with water control, soil conservancy, irrigation and water and sewage works.⁶⁹ The water management companies of Hungary control erosion, gully formation and regulation of small watercourses in hilly and mountainous parts of the country. They also construct flood control works of local significance.

Iraq --

The Agricultural Cooperative Societies of Iraq are in charge of the supply and regulation of water pumps. They also regulate land cultivation and development in the best possible manner including the selection of seeds, the classification of crops, control of agricultural pests and the construction of canals and drains.⁷⁰

Italy --

The objective of water users associations in Italy is the better utilization of the waters (T.V., arts. 16.1, 59.1, 59.2). They are formed to promote the rational management of the waters within the districts (T.V. 59.1). There also are associations while not primarily related to water play an incidental role with respect to water use. They are the Land Reclamation Associations, the Water Works Associations, the Associations for the Protection of Fish Resources and the Industrial Development Associations.⁷¹ In Italy, the consortiums for reclamation works can be authorized to participate in hydraulic works and water use. In addition to the consortia dealing with hydraulic utilization, there are many others dealing with irrigation. In this case they are formed by different proprietors and divert public water through one or more canals. The volume of waters is determined and granted by the government for distribution on the co-users lands.

These consortiums are very old and are ruled by customary internal regulations, not interfered with by the state. The state limits its relation with them to matters of diversion of public waters for rivers or from state canals.⁷²

Mexico --

The object of a Mexican Irrigation District is the better use of the waters.⁷³ The Water Boards of Mexico are responsible for the water

works placed in their respective sections. The manager must prepare a plan of water works including the works charged to the district and also the works charged to the boards. The plan must be approved by the directive committees. The boards must maintain the water works under their jurisdiction and can receive technical assistance from the district.⁷⁴

Paraguay --

The Representative Commissions of users of public waters of Paraguay operate to resolve the conflicts arising among water users.⁷⁵

Peru --

Water Users Councils of the Irrigation Districts of Peru must prepare, propose and execute studies and construction works for improved use and development of renewable natural resources. They also participate in the formulation and execution of cultivation and irrigation plans, attend meetings called by the District Water Authority, comment on the budget prepared by the technical administrator of the district for the conservation and improvement of the irrigation and drainage structures of the district, collect assessments to cover the costs related to these items and to administrative work and labor costs, and make tri-annual reports. The same functions are covered, within their respective jurisdiction, by the irrigation commissions of the Peruvian water districts.⁷⁶

South Africa --

The Water Boards of South Africa are corporate bodies and their main duty is to distribute water to the irrigators under their control in accordance with their rights. These boards construct irrigation works such as: storage dams, canals, drainage works, etc., and it is a function of the department to oversee operation of the boards, to insure that they perform their duties in the best interests of the concerned communities.⁷⁷

Taiwan --

The basic function of the Water Users Associations of Taiwan is delivery of irrigation water to their members. They are also charged with the removal of drainage waters. Their activities range from planning and construction of works to distribution of waters. They construct, operate and maintain water works. They can collect fees from their members, and also from non-members when they are using their facilities. They settle water disputes and assist government agencies. By Art. C10 of the regulations, they must prevent and repair any damage to irrigation facilities (clause 2). They must also coordinate their activities with the government policies on rural development, agriculture, industry and land (clause 5). In addition they must perform all other tasks charged by the government. They can acquire land through condemnation or by agreement with the landowner.⁷⁸

Tunisia --

The Watering Associations of Tunisia were established between 1900 and 1906 and their purpose is to use the waters of the Oueds of Central Tunisia (Zeroud-Merquellil). There are also Oases Owners Associations whose purposes are the construction and maintenance of water works and the distribution of waters according to rights and customs. The Collective Interest Associations of Tunisia undertake water works of collective interest and operate and maintain them.

The Unions of Landowners Associations of Tunisia undertake the maintenance and use of soil conservation and land reclamation works. The special Hydraulic Interest Associations of Tunisia were instituted in the Decree of August 5, 1933, regulating the conservation and use of the waters of public domain. Their purposes are the implementation, maintenance and use of water works for protection against harmful effects of the waters, improvement, cleaning, and regulation of water courses, drying, reclamation, desalinization and drainage of wet and insalubrious land, warping and filling of marshes, irrigation, and water supply.⁷⁹

Turkey --

At the time the proposed law for Topsis Cooperatives of Turkey was submitted to the National Assembly, the following purposes were identified:

1. develop agricultural resources to prevent waste of these resources as well as manpower;
2. assure maximum benefit, especially for small farmers, from services and facilities;
3. assure more productive work from people through government guidance;
4. assure greater efficiency and economy in various services and installations;
5. assure people's participation in projects and investments by encouragement, guidance and assistance, and help adoption of rational and efficient methods;
6. assure suitability of services and installations to local structure and needs;
7. reduce cost and increase production through encouragement of cooperation among small farmers;
8. prevent clashes between farmers and eliminate factors which handicap increase of production;
9. assure protection of government-built installations and their proper maintenance and longevity;

10. encourage farmers to solve their problems with their own means through education, government support and technical assistance;
11. assure efficient operation of government-built irrigation networks and irrigation of the entire area which was anticipated in the original plans; and
12. take measures jointly with the farmers and construct needed installations to make best use of the waters obtained from government irrigation systems, and prevent damages of inadequate irrigation.⁸⁰

United States of America --

The so-called commercial irrigation company was a phenomenon of the western United States in the 1870s and 1880s. These companies were formed with private capital, usually capital raised by selling bonds to persons far away or even in other countries for the purpose of: 1) construction or development of facilities, 2) forming private contracting companies for the sale of water, or 3) providing public utilities.

These companies were speculative ventures, the hope being that the promised availability of water would bring to the sparsely settled West people who would use the water in enough volume to produce income for repayment.⁸¹ However, because farms take time to become profitable, the investments generally did not prosper and new forms of organizations were used to open up the land.

A mutual irrigation company in the United States may be defined as a private association which is organized for the express purpose of furnishing water to the shareholders or members thereof at cost.⁸² The corporation is not organized for profit but rather to distribute water to shareholders.

The voluntary associations of the United States may be described as associations of persons, usually along the same water supply source, who organize for the purpose of better protecting their rights and the division of waters in the stream between respective owners. Such associations construct the necessary works for the diversion of water and transport it only to the lands of members of the association.⁸³ The most important function of the voluntary water companies of United States is the distribution of water to the members. This is done by the mayordomo or ditch rider according to the number of shares held.

The water user associations in the United States are quasi-private, incorporated associations usually organized by actual or potential water users or a federation of existing companies to contract with the government to build or improve irrigation works. The advantage of such a system is that it provides a means for many poor landowners with small parcels to pool limited funds, irrigate their lands, and increase their crop yields, thereby increasing their incomes. Indeed, such a plan encourages purchases of arid but fertile land which can often be bought at low prices. After irrigation such land should support itself and increase in value.

Generally, the object of the associations is threefold: 1) to provide irrigation in an area where individuals do not have funds to finance such a venture independently, 2) to allow the government to deal with one organization representing all water users in an area rather than having to deal with many users on an individual basis, and 3) to provide a responsible organization to manage the irrigation contemplated by a reclamation act.⁸⁴

In the United States irrigation districts are quasi and public organizations, formed to amass sufficient capital to construct and operate irrigation systems on a larger geographical basis than covered by irrigation companies. The distinctive feature of the districts of United States is its ability to sell bonds and levy ad valorem property taxes to raise the monies necessary for project construction and repayment. Originating as a formalized concept in California with the Wright Act of 1887, the irrigation district idea was soon adopted by the other 16 western states as a means to improve agricultural production development of water use potentials.

Initially, districts were formed for the single purpose of the water delivery system and to provide proper timing of delivery. Then, salinity problems began occurring and the functions of drainage and waste water removal were added. Gradually, districts also expanded their functions to include municipal water delivery, flood control, soil conservation as well as agricultural purposes.

Function in Hierarchy

The position of the local water user association in a formal or informal hierarchy of water user associations will often depend whether the association has been formed voluntarily by the users in the area or if the central government has created the subdivision by decree and membership is compulsory. In the former situation, the local group may be autonomous in its freedom of operation and may have the ability to organize itself without regard of political boundaries. They may form a loose confederation at higher levels of government to see that their needs and interests are expressed to the appropriated entities of civil government. In the latter case, organization and control of local associations will be according to stricter rules for operation and the structuring of the association will take place from the "top-down" and the hierarchy of associations will parallel the divisions of civil government and operation will be more conscribed by the recognition of political boundaries and the interdependency between various levels of the association hierarchy.

Although some flexibility is lost, communication, planning and implementation of government policy is improved. Also, this integration can facilitate the diffusion of technical and financial assistance throughout the system.

Argentina--

In Rio Negro, Argentina, there are associations of associations. They are called "Associations of Second Degree." The Irrigation Commissions

of San Juan, Argentina, are integrated in "Juntas Departamentales," (County Boards), whose members are elected by the members of the Commissions. These boards have also three members, and are in charge of the maintenance of secondary canals, while the "Commissions" are in charge of tertiary canals. They fix the time at which each tertiary canal should receive water. The system of San Juan Province is very effective.⁸⁵

Belgium --

In Belgium there can be Polders and Wateringue Associations, constituted for the defense and representation of the common interests. They can be formed voluntarily or compulsorily. Articles 6 and 9 of the Law of July 5, 1956, on Wateringues. The Polder Associations, which are similar to the Wateringues Associations, are regulated by the Law of June 3, 1956.⁸⁶

Chile --

The Boards of Vigilance of Chile are formed by private individuals, canal associations, communities of waters, or juridical entities using the waters of the same basin or hydrographic unit. They are juridical entities which administer and distribute the waters to which their members have rights. They develop and maintain the water works for common use and undertake the rest of the tasks encompassed by the law. They can construct new water works or improve the ones already existing with the authorization of the Directory of Waters. They are created by a meeting held before the ordinary justice, at requirement of any of the interested or of the General Director of Waters.

The competent judge is the single head of the department where the watercourse crosses only one department. If the watercourse crosses or separates several departments the competent judge is the single head of the province. If the watercourse crosses several provinces the competent judge will be selected from the provinces of earliest creation. The Constitutive Act must be contained in public law, and it should be approved by the President of Chile, previous report of the Director of Waters. Jurisdiction embraces the natural watercourses, reaching to the points of diversion of the derivating canals. The members of the board are the users of water regardless of their purposes. The boards do not have power over the communities or the association. It only inspects the points of diversion from the natural water course. It is not a federation or a Supra-association entity similar to the ones we find in Spain.

The area of jurisdiction is a basin or a hydrographic unit, but under special circumstances the code allows their constitution in special sections of the river. The total of water rights of the area controlled by the board are divided in shares which are then allocated among the derivative canals in proportion to the water rights that each canal has. They have an organizational structure similar to that of the canal associations. They have a general board for the functions already discussed for the canal associations and a Directory for Administrative Matters.

The waters are distributed among the canals by the "Repartidores" who must be civil engineers.

In the meetings of the general boards, the canal associations are represented by their presidents, the communities of waters by the presidents of their directories or by their administrator; the rest of the members are represented by the use of special representatives or by themselves.

The voting rights are regulated in the same form as the canal association.⁸⁷

People's Republic of China --

In the People's Republic of China, irrigation districts are separate administrative and accounting units within their own boundaries. An "irrigation district representatives" conference is held twice annually to discuss plans for water utilization, repair and construction of facilities for the various districts.^{87a}

Iraq--

The Cooperative Societies of Iraq are required to jointly establish a general cooperative society or cooperative syndicate in accordance with the provisions of Law No. 27 of 1944 governing cooperative societies.⁸⁸

Korea --

In Korea there is a Korean Irrigation Associations Union which has several members. Membership is voluntary and does not have to be approved by law. The "KIAU" assists its members giving them technical assistance, surveys, designs and supervision of projects; they advise on the financial policy, suggest rules for land management, rent equipment to its members, secures loans for construction of a member's project, instructs on farming methods, arranges conferences for organizational improvements, negotiates repayment contracts and other activities in the interest of the members.⁸⁹

Spain --

The hierarchy of the irrigation associations in Spain begins with a very simple entity serving a small area from a lateral or subwatercourse to a federation of irrigation associations on the river. At the base of the hierarchy is the simple community (simple comunidad). The next level is the general community (comunidad general) which takes on very formal organizational characteristics and consists of simple communities and users served from a public canal and diversion works. The general community must protect the interests of the simple communities within their water delivery area. They are also responsible for the control and distribution of the community waters.

The highest level is the federation of communities (or associations) (sindicato central), lacking many of the internal features of the comunidad general, and formed to pursue the mutual interest of communities on a reach of a natural watercourse getting water from different diversion works. There are also hydrographic confederations, whose authority is extended over complete river basins.

The internal structure of the "confederaciones" originally consisted of a general assembly of members, but this was changed in 1949 to a Board of Government consisting of water users and representatives of the

government. The membership of the organization is made up of water users to give them a direct avenue of input into water resources planning and project selection and construction.

Their present functions are primarily oriented toward planning, executing and operating water projects, collecting hydrologic data, collecting project assessments, and promoting the creation of irrigation communities.⁹⁰

Taiwan --

Since 1975, the organizational hierarchy of irrigation associations has been supplanted by direct governmental control.

Dejure & Defacto

The legal status of the water users associations depends on their conditions for formation. They can exist as either "de jure" or "de fact." In the former case they are allowed to contract, are vested with legal rights, and subject to legal duties. In the second case, "de facto" associations, the rights and the duties, legally at least, pertain to each particular member of the association. In this case, the association is more a scheme for cooperation, without "de jure" existence. It is important to note that where these "de facto" associations exist, they should be formally recognized by law.

Most "de facto" associations are based on old customary patterns developed as a result of man's efforts to control his environment. They are deeply rooted in the societies in which they exist and are more real and important than any legally created body. Often they can be used as bases for successive and successful institution building. In this respect two good examples are presented in the Paddy Lands Irrigation Ordinances that the British enacted for Sri Lanka (Ceylon) in the last century and by the Indonesian Laws which recognized the customary "Subak" system of Bali.⁹¹

When the water users associations have a de jure existence, i.e., when they have a specific legal status, they can be private, civil, public, or administrative in nature. In Mendoza, Argentina, they are regulated by public law. The same solution applies in Chile, Peru, Mexico, and most of the European countries. In the United States, the range of associations has extreme variability; they can be private, quasi private, and quasi public and public. In Spain, water users associations are regulated by administrative, public, law.

Chile --

The canal associations of Chile are formed by all the persons using the waters of the same artificial canal. They are legal entities organized to take the waters from the matrix canal, distribute the waters among their members, construct, exploit, conserve and improve the delivery and conduction water works. They can execute various acts and contracts necessary for achieving the objectives of the association.⁹²

Dominican Republic --

The user associations of the Dominican Republic are societies of persons of public character.⁹³

Mexico --

The Water Board of the Mexican Districts of Irrigation are agents of the Federal Executive.⁹⁴

West Germany --

In Germany, about the turn of the century, the cooperatives for the best use of the waters, and also controlling the noxious effects of the waters, were formed as corporations of public law, with authority to collect dues from its members and force membership of the persons using waters or affected by its noxious effects. The Water Association Decree of 1937 sets up the basic statutory and legal foundation of the associations, but it is possible to found water user associations by special laws when exceptional circumstances are required. Today there are about 24,000 such associations in Germany ranging from very important ones to small ones. There are also peasant associations for soil conservation. When the association is based on the Water Association Decree of 1937, the corporate charter is issued by the central authority.

When the association is a special one, the articles of incorporation are prepared by the association and they must be approved by the central authorities.⁹⁵

Taiwan --

Water Associations of Taiwan are self-governing corporate bodies organized by farmers to administer the irrigation facilities, construct irrigation works, distribute water, assist in planning new water projects and serve as the direct mechanism for operation of a repayment program.⁹⁶ The Water Law of 1963 declared them to be public entities.

Tunisia --

The Unions of Oases Owners Associations of Tunisia have civil status and were instituted between 1912 and 1919. Membership is compulsory. Even in those cases where no irrigators are members the association is concerned primarily with irrigation interests.⁹⁷

Venezuela --

The water users associations of Venezuela have a legally recognized status. They can get concessions for water use. They can also obtain concessions for hydraulic water works.⁹⁸

Italy --

The water users associations of Italy are regulated by public law when they are of compulsory formation. When they are voluntarily formed they are regulated by civil law.⁹⁹

Conclusion

In general, it is possible to say that there is a tendency towards the public creation of water users associations. They are an essential element for the development of irrigated agriculture in developing countries. Characteristics that show their public character are: a) forced membership (Germany, Italy, Spain, Mexico, Peru, Mendoza, and San Juan, Argentina, Chile, Taiwan, Tunisia, etc.); b) the right of condemnation, which is almost universally granted to water associations; c) the non-renunciability of the membership; d) the right to impose dues and fees among their members; e) they are regulated, assisted, and controlled by the state; f) they can enact regulations of obligatory compliance for their members; and g) the decisions of the majorities bind minorities without the minorities having the recourse of "dropping out."

Finally, it is useful to quote Professor Hellinga who performed a study on local water associations in Europe and who stated that: "Private associations, cooperatives, or contracted arrangements do not play a relevant role. In general they are not useful for the administration of water at local levels." 100

FORMATION OF WATER USER ASSOCIATIONS

The formation of water users associations is according to one of two methods. First, it is possible for water users to act on their own incentive to establish such an organization. Generally, this method is provided for under enabling legislation which creates the structure for, as well as the method of organizing, the association. However, there are examples, such as that of voluntary association in the western United States, where collective action has developed, by necessity, without formal governmental approval. When an association is organized according to the provisions of an enabling act, the typical requirements are that at least a majority of the landowners or operators present a petition stating such things as the area of jurisdiction that the association will have, the membership roll, the purposes for which it is being organized, and the bylaws of the association for internal operation. The petition is submitted for approval to a court or administrative agency of the government. If approval is granted, the association begins operation and the information in the petition becomes binding on petitioners and nonpetitioners.

Secondly, it is possible that the central government may wish to establish water user associations according to a general plan for the nation or region or in an area where water shortage requires stricter controls on water use. In this case, the government may have authority to assume the initiative under the same enabling legislation which provided for individual action at the local level. However, the creation of water user associations, as management units in some countries, such as Mexico, is entirely the province of the federal executive. In such state-created systems, membership is compulsory on all operators in the jurisdiction of the association.

A brief discussion of the procedures employed in various countries is presented below.

Argentina

In Jujuy Province, Argentina, the procedure is to analyze each request for formation of a user association on case by case method. The constitution of each association is ordered by decree of the governor of the province. In this province formation of a water user association is not mandated by law. In Mendoza Province, Argentina, the constitution of a water user association becomes obligatory by the sole fact of being a water user.¹⁰¹ Therefore, if there was merely a single user within a particular watercourse, he would be required to form a one-man association.

Chile

The canal associations of Chile can be organized by Notarial Scripture signed by all the water right owners of the canal. If unanimity is lacking, formation can take place by a hearing before the judge of the department in which the works diverting waters for the matrix canal are located. In this meeting it is necessary for a majority, but not unanimity. The meeting can be requested by any of the water users or by the Director

general of waters. Notice of the hearing must be published. The notice can be made by personal service or citation when it is known that there are less than four interested parties. The articles of association must be formalized in a hearing before the Judge of the Department in which the canal is located. The statutes of the association establish the quantity of water that each shareholder has right to and the total water allotment of the organization. The Constitutive Act and the Statutes must be signed by a notary. The President of Chile must approve the constitution of the association and its statutes. He must also approve any amendment to the statutes. In both cases it is necessary to give him a report of the General Direction of Waters.¹⁰² The procedure is the same for "Asociaciones de Canalistas" as it is for the "Juntas de Vigilancia." "Communities" are formed "ministerio" legis, without formal procedures.

Cyprus

In Cyprus, the Irrigation Divisions Law, Chapter 342, requires at least seven proprietors to form an irrigation association, for the construction, operation, maintenance, and repair of any irrigation work and for the protection of their water resources or their water rights.

The Irrigation Associations Law, Chapter 115, has the same requirements.¹⁰³

Ecuador

The water directories of Ecuador can be formed on initiative of the institute or the water users. The promoters must hold a general meeting in which the water council is elected. Potential members must be personally summoned and the summons must be made at least eight days before the meeting. The meeting is called General Assembly.¹⁰⁴

France

The users associations of France can be freely formed by individual users or specifically established by affirmative government action. The former requires unanimous consent of all the members.

Government Initiated

Associations can be formed on order of the Prefect, or on incentive of the majority of interested owners, or on local initiative (Decree of 21-12-1926-art. 2, 5-12 and 9).¹⁰⁵

Greece

An application must be directed to the Minister of Agriculture for the establishment of a Local Land Improvement Association. Land property registers, showing the voting power of the people and of the beneficiaries, have to be compiled by the Land Reclamation Service through the Project Administration Division. For the establishment of an association, a majority of 5/9th of the landowners is required.¹⁰⁶

Hungary

In Hungary, interested parties may form, according to pertinent statutory provisions, water management associations within areas representing a water management unit. Associations are organized for the performance of water management and related soil conservation activities.¹⁰⁷

Italy

The water users associations of Italy are formed voluntarily or compulsorily. The former are regulated by civil law, and the latter by administrative law. The government may compel some or all of the water users to form a consortium for the better use of the waters. Users may also initiate the establishment of consortiums by application. The application must contain technical plans, membership of the consortium, estimate of costs, the financial plan and a draft of the by-laws of the consortium.

The obligatory consortium is supervised by a representative of the Minister of Public Works. A presidential decree must be issued upon the advice of the Superior Council for the formation of a consortium. The decree specifies: purposes, limits, statutes, uses, cadastral, buildings, and costs for the members of the consortium.

Free associations are constituted by neighboring landowners using the waters of the same, or contiguous, public or private watercourses. The objectives of these associations can be irrigation, industry or multi-purpose [Civil Code 918-920; Law 5192-(2-2-1888) Art. 1, 16]. Compulsory associations are regulated by different provisions depending on the use. They can use public or private waters, and the provisions which are applicable are the ones for land improvement unions. For diversions from state owned canals, the Minister of Finance can set up compulsory water users associations for each group of intakes (R.D.L. No. 1335, 1936, Arts. 2.3, 2.4, and 3.2). In addition, compulsory water users associations can be formed for public waters. These associations can be established directly by the government or at the request of a group of users. They are created by presidential decree, on proposal of the minister of Public Works, who appoints their president (T.U. 60-62).¹⁰⁸

Japan

Land Improvement Districts of Japan are organized by at least 15 persons and authorized by a prefectural governor. The district boundaries must be delineated, and there also must be an explanation of the area that will be improved. Land improvement districts must be authorized if there is no formal opposition to their formation.¹⁰⁹

Kenya

In Kenya, two or more operators who have a common interest in the employment of water or in the drainage of swamps may unite in an association for the exercise of a permit for a private project (Kenya Water Ordinance of 7 May 1952, Art. 49).¹¹⁰ All such associations are on a voluntary basis.

Lybia

In the proposed water law for Lybia, prepared by F.A.O. in May, 1974, it is provided that whenever possible the General Water Authority shall facilitate the formation of water user associations. Whenever technical or economic circumstances so necessitate, the central government may require the organization of water users into the water users associations.¹¹¹

Philippines

The water users associations of Philippines are regulated in the Irrigation Law, Sect. 12. These organizations are formed at the request of a majority of the water users in the area affected. The mayor of the area in which the system is located calls a meeting of water users to form the association if requested by at least three appropriators of water. The associations are regulated by the national water law.

Additionally, there are irrigation districts which are formed when a group of landowners apply for a governmental loan for an irrigation system. The districts are regulated by section 10 of the No. 2652 Act. The owners of the lands to be irrigated are required to organize in the form of a corporation or association, approved by the laws of Philippines. The articles of incorporation and by-laws must be submitted to and approved by the Secretary of Public Works.¹¹²

Poland

The cooperatives for water management of Poland may be established entirely by a decision of the water administration itself. The cooperatives may also be established by the administration if a majority of interested persons, or the owners of at least half of the lands in the area benefited, vote for it (Poland, Water Law of 30 May 1962, Art. 112).¹¹³

South Africa

In South Africa, any three or more owners of land riparian to a public stream (or its tributary) who together own not less than one-tenth of land that is irrigated may petition the minister of that area to organize it into an irrigation district. The minister may, on his own initiative, recommend that any portion of a government water-control area be constituted an irrigation district; and the president may, upon recommendation of the minister, combine or enlarge such districts (South Africa, Water Act, Act No. 54 of 1956, secs. 71-76).¹¹⁴

Australia

In South Australia, by the 1939 Act "The Irrigation on Private Property," the owners using the water of the Murray River can petition to the government for the establishment of a private irrigation area. The proposal must be signed by at least half of the landowners of the proposed irrigation area. Under the Irrigation Act 1930-1946, the

minister of irrigation can reclaim lands, establishing in them irrigation areas. These areas are divided in blocks which are leased to farmers.¹¹⁵

Spain

The communities of Spain may be organized voluntarily by action of water users of a common canal or watercourse or by direction of the Comisario de Aguas in the basin. The latter action can occur when a watercourse serves 20 or more irrigators and 200 irrigable hectares or if the comisario determines local agricultural interests would be best benefited by such an organization.¹¹⁶

Mexico

The Mexican districts of irrigation are created by the Federal Executive. The projects are prepared by the Secretariat of Hydraulic Resources with intervention of other secretariats and departments. The units of irrigation of Mexico are created by decision of the secretariat. The legislation requires that the secretariat provide participation to the water users in the organization and control of the national systems of irrigation. Irrigation districts are considered public utilities. The decree describes the boundaries of the district and specifies which lands, waters, and works are included within it.¹¹⁷

Taiwan

Water users associations of Taiwan may be formed by either private or public incentive. The first step is to form a "preparatory body" from which the association will later develop. Both classes or preparatory bodies are directed by local authorities. The preparatory body can become a water user association after presentation of an application which includes: a draft of operational rules and organizational structure; map of the area under jurisdiction; water plan and budget; name and list of the members; and agreement letter of the majority of the members in which they ask for approval of the establishment of the association (Article 8). If there is any change in the environmental condition or in the planning of the water resources, the association can be altered or even terminated by the government. No enabling legislation is needed from the association. It is a purely administrative governmental concern.¹¹⁸ With the 1975 reorganization and reduction of the number of irrigation associations, it is unlikely that new organizations would be approved by the Taiwan Provincial Government.

Tunisia

Unions of landowners of Tunisia can be organized voluntarily or compulsorily. Both forms have a recognized legal status. The hydraulic interest groups, another form of water user association, are formed according to government edict and are automatically established upon administrative proposal.

Collective interest associations of Tunisia can be formed either voluntarily or on governmental action. They can operate in conjunction with special hydraulic interest groups or watering associations.

Requests for formation of special hydraulic interest groups must contain: purposes, land surface, water works planned, and a pledge of the landowners to assume the costs caused by the association. The decision of formation is taken in a general meeting at which administrative departments and landowners can participate. The water committee of Tunisia must give final approval by decree to the statutes of the association. 119

Turkey

Water supply projects for more than one village or municipality are the responsibility of water user associations (Law 7428, 1960, Drinking Water on Villages, Art. 9, and Law 1580, 1930, on municipalities, Arts. 133-148). The Law 6200 of Turkey, 1953, organizing and regulating the General Directorate for State Hydraulic Works, Art. 2-J, provides for this body to create water users associations for large scale development works which, once finished, are handed to the users associations for their management, operation and maintenance.

The General Directorate for Soil Conservation and Irrigation, Law 7457, 1960, Art. 2-1, is empowered to set up cooperatives or associations for small scale irrigation, soil conservation and land reclamation. The municipalities of Turkey can set up irrigation associations as well as supplying water for drinking, domestic, municipal and irrigation purposes. These associations are established by action of the municipal council or assemblies (Law 831, on water, Art. 1). 120

The proposed legislation for Topsis Cooperatives of Turkey requires at least seven landowners in a particular area must submit a written application to the governor of the province to initiate the creation of a cooperative. The application is to provide details on size and members of land holdings, type of project to be undertaken or operated, etc. Provincial officials must find the plan acceptable before it is submitted to the landowners of the area for approval. If landowners owning two-thirds or more of the land in the project area approve the plan, a cooperative is established. There must be at least 20 members in the organization. 121

Uruguay

The Rural Code of Uruguay, based on the Spanish water law, provides for the constitution of irrigation associations. They are compulsory when public waters are used for the irrigation of more than 200 ha. They can be established upon request of a municipality or group of water users. 122

United States

Mutual irrigation companies of the United States developed independently from government control in many western jurisdictions. They were established by necessity as diversions of water by individual farmers became increasingly difficult both physically and financially. Neighborhood

cooperation seemed the only way to provide water for collective prosperity.

These companies usually control only their main canals, with the lateral ditches frequently being incorporated under separate entities. Most companies are formally incorporated although a few continue to exist as informal arrangements. The mechanics of organization are the same as those for any private corporation.¹²³ If the stock is to be made appurtenant to the land served by the company,¹²⁴ the articles of incorporation must so provide. Additionally, the stock certificate must describe the lands to which the shares are appurtenant as well as any other special provisions such as the source of water or point of diversion.

Voluntary water users associations in the United States are often organized with a considerable degree of local formality. Officers are elected and by-laws, rules, and regulations are adopted for governing the respective rights of the members and the general affairs of the association.¹²⁵ Although verbal agreements may be made between members, it is easy for misunderstandings to arise so it appears best to have a written agreement (which may be called the articles of agreement) signed by each member.¹²⁶ Though much formality may attend the organization, title to the water rights remains with the individual members and not in the association.¹²⁷ This is a further distinction from the mutual irrigation company where water rights are usually held by the company or assigned to the company by the right owners.

Formation of irrigation districts in the United States can be brought about by the voluntary act of the irrigation community or, occasionally, as a condition to federal and state funding of an irrigation project. Normally, a majority of landowners who will benefit from the district activities must vote for formation. Another approach followed in California is the proposal for formation by a set number of petitioners who must have title to not less than 20 percent of the assessed value of the land in the proposed district boundaries.

Upon approval of a majority of electors in the proposed district, a board of supervisors or commissioners are elected. This board then completes the formalities of district formation.¹²⁸

Venezuela

Water users associations can be formed either voluntarily or by government edict on the proposal of a group of proprietaries or by presidential request. These associations are regulated by the law on Agrarian Reform. There are also water juries composed of public officials and water users created by the Forestal Law of Soils and Waters.¹²⁹

Conclusion

The majority of countries allow water user associations to organize according to the individual initiative of water users under provisions which are state in enabling legislation. In this fashion, the method of

formation and means of operation are controlled by the government. Furthermore, final approval of the association's establishment rests with the central government.

In those situations where action on the local level does not meet the requirements of the central government due to delay, water shortage, or other reasons, it is possible for the government to assume the leadership for establishing water user associations under the same enabling legislation.

Other examples can be found at either extreme--from the complete autonomy of voluntary associations in the western United States to the strict planning and control by the government in Mexico.

MEMBERSHIP

Water user associations can be formed either by individuals or legal entities. Membership can be voluntary or compulsory. Often, a minimum number of water users is required to form a water users association. In some cases, special qualifications are required to be a member or officer of the executive body of the association. Some countries require that membership be composed entirely of private land owners while others permit a mixture of non-landowners and government officials.

Argentina

In the province of Jujuy, Argentina, membership in a water users association is not imposed by law unlike other provinces where a person becomes a legally bound member of a water association without any possibility of renouncing his membership. If a person is included in a consortium against his will, he can appeal this action to the courts.

La Pampa Province of Argentina established obligatory membership in water associations. The membership is acquired through use of the waters of an irrigation canal.

Membership in the water users associations in the Province of Mendoza, Argentina, is obligatory and is imposed by law. Membership is imposed as long as the user has title to water.

In the Province of San Juan, Argentina, the minimum of six irrigators is necessary to form a consortium.¹³⁰

Austria

The Austrian legislation provides for three principal types of local water cooperatives: voluntary foundation and membership, voluntary cooperatives with obligatory membership, and obligatory cooperatives. The last is created for flood control and water pollution control.

Obligatory membership is for the case when, without the inclusion of additional land, a project would be neither technically nor economically feasible. Water cooperatives are legally required to recognize the pre-membership water uses of individuals who are compelled to join a cooperative.¹³¹

Sri Lanka (Ceylon)

The agricultural committees of Sri Lanka are composed of both government officials and private interests.¹³²

Ecuador

The "Directories" of Ecuador are formed by the water users of an aqueduct system. Each water user has the right to be represented at the Assembly of Water Users.¹³³

West Germany

Membership in the water communities of Germany may be compulsory. The communities can be formed by individuals owning land and plantations and by legal entities of public or corporate nature. The public bodies can impose water charges and community taxes which are payable to the association. The addition or deletion of members is conducted by the board of control, with participation from the association and interested parties.¹³⁴

Greece

Participation in the user associations of Greece is compulsory for those individuals who are benefited by the project.¹³⁵

Hungary

Membership in the water companies can be private or corporate. Hungarian water management companies are composed principally of private membership when the main purpose concerned small scale domestic water supply. Corporate membership by agricultural cooperatives is predominant in situations involving organization for the construction, maintenance and operation of irrigation and drainage systems, watershed management, erosion control and flood control.¹³⁶

Italy

The Italian irrigation consorzi recognizes both voluntary and obligatory irrigation associations. The former are organized in accordance with Article 918 of the Civil Code and the latter, called "land reclamation consorzi," under Articles 823 and 921 of the Civil Code and Decree No. 1933.¹³⁷

India

Membership in the water cooperative of Maharashtra, India, is open to all people who have been granted water rights. Membership is obligatory.¹³⁸

Iraq

Agricultural cooperative societies of Iraq are composed of the occupants of lands distributed by the agrarian reform in the district. The societies may also accept as members those whose land in the district does not exceed the maximum limit for distribution.

Japan

All qualified persons are obliged to be members of the land improvement districts after formation has been approved. Most members of the land improvement districts are owners or users of farm land (Law 195-1949). However, a land improvement district can be formed by individuals engaged in agriculture or livestock farming. So owners, owners of non-agricultural lands.¹³⁹

Mexico

Water users within a Mexican irrigation district in order to receive water must be associated in the board of waters corresponding to the section in which his plot is located. Membership in a water board is obligatory for the minority if a majority of users of an irrigation section within a district of irrigation have decided to form a water board. The water board must be approved by the directive committee. The water users are required to register with the water board for the sections where they are using water.¹⁴⁰

Philippines

Water user organizations may be formed voluntarily by the users themselves (irrigator's associations) or may be required to be organized by law as precondition for the granting of government loans (irrigation districts) for irrigation.¹⁴¹

Peru

The Water User Councils of Peru require that there be at least five agricultural users in the councils and 40 percent of them have to have farming plots no greater than three times a family unit size. Membership qualifications are made by the water authority and are based on the user's census. Only those users who are not delinquent in the payment of assessments may participate. Council members are elected every two years and can only be reelected once.

An irrigation commission is formed by five members who are elected by the members of a sector within an irrigation district. To be elected a person must be an irrigator and must be registered with the commission.¹⁴²

Taiwan

Membership in the water users associations of Taiwan is obligatory. All the persons owning private lands in the area of the irrigation association are members. Tenants and lessees of lands, as well as government agencies using these lands, are also members. Regulation (Art. 14 inc. 4) allows other "beneficiaries" to be members of the association.¹⁴³

Members enjoy rights to irrigation and other legal benefits. They pay membership fees and perform other duties required by the laws, ordinances or rules of the organization. Members can be punished by suspension of his rights or, in serious cases, by revocation of his rights. The membership fee has temporarily been fixed at the 1974 level.

Tunisia

Union of Oasis Owners Associations of Tunisia controls the rights to water. Membership status in the union is a function of size of land ownership.

The hydraulic interest groups of Tunisia are composed of all the persons benefiting from their works. Users of water works which are partly or totally financed by the state are automatically members of such associations.

Collective interest associations of Tunisia are composed of the water users in a watercourse or a system of watercourses. Normally, they are formed by landowners of land located in an area irrigated by newly created well fields or within naturally irrigated spring areas. The government actively promotes their creation.¹⁴⁴

United States, New Mexico

To be a member of a community of Water Association of New Mexico, United States, a person must own land which is entitled to be irrigated from the acequia. Voting rights and other privileges vary among associations - from systems where a member can cast votes in direct proportion to the amount of land under irrigation, to one person one vote, or rights based upon the quantity of water that the owner is entitled to receive.¹⁴⁵

Conclusion

Upon formation of a water user association, membership in the association is generally compulsory on those individuals who will receive benefit from association efforts. A few systems, such as those in Mendoza, Argentina, and the United States, provide methods for the minority who do not wish to participate financially in the association to seek judicial review of the formation of the association. Membership entails certain responsibilities as well as rights. Full participation in activities beyond payment of dues and other financial support may be conditioned upon literacy, land ownership, or age.

Voting systems range from those countries such as Peru where votes are cast in proportion to the size of land holding within the association to the one-man one-vote system in most associations in the United States. Several systems permit municipalities, government personnel and agencies and private corporations to be members of water user associations also. The most important aspect of membership is whether to allow tenants and lessees to be voting members or to restrict such membership to landowners only. The general rule seems to be that membership in the association follows either title to the land or the right to the use of water. However, there is a growing trend, particularly in South American countries which have undergone recent land reform, to allow nonowners to participate fully in association decision-making.

AREA OF JURISDICTION OF THE WATER USERS ASSOCIATIONS

The common procedures for the determination of the spatial powers of the associations are: (1) the arbitrary establishment of an area of activity, and (2) a more flexible system in which the area of authority of a water user association varies with the area affected or benefited by irrigation works, or in accordance with the size of the areas in which the waters subject to the authority of the association are used.

Chile

The jurisdiction of the associations of canalists in Chile begins at the point of the diversion and goes up to the last point of water use.¹⁴⁶

People's Republic of China

Irrigation districts in the People's Republic of China have authority over a specific stretch of river, canal system or reservoir and function as a distinct administrative unit. The boundaries tend to parallel that for the corresponding level of political administration.¹⁴⁹

France

The syndicates of France function within communal limits but under special circumstances can extend their activities beyond those limits. There are about 1,000 such systems and their areas vary in size.

The "societies of mixed economy" function in areas larger than the communal boundary of syndicates. They manage activities of the government, private and collective users. Five such entities have been created and are known as Regional Management Societies. They are: Bas Rhone et Languedoc; Provence; Gascogne; Corse, and Rhone.

Greece

The area under control of the land improvement organizations of Greece is that area which is affected by a water project. The jurisdiction of the association is flexible and varies with the stages of the project being carried out.¹⁴⁷

Mexico

Districts of irrigation in Mexico have a jurisdictional area determined by regulations approved by the President of Mexico. The regulations determine which water resources shall be controlled by district and specify the source and volume. Districts of irrigation are divided into sections and each section is under the jurisdiction of a water board.¹⁴⁸ The boundaries of each section must be approved by the secretariat.

Philippines

The lands included in an irrigation district are determined by the Director of Public Works (now Irrigation Administrator of the National Irrigation Administration) and approved by the Secretary of Public Works and Communications. The minimum size of the district is 25 Ha.

Taiwan

The spatial jurisdiction of irrigation associations is determined by the Taiwan Provincial Government. At present there are 14 associations in Taiwan Province and 2 associations in Taipei City. There are three levels of internal administration in irrigation associations: 1) working stations which are located in regional areas and control up to 1,500 hectares; 2) water groups which are organized by farmers and comprise an area from 50 to 150 hectares; and 3) sub-water groups which are from 20 to 50 hectares.^{148a}

Tunisia

The jurisdiction of the hydraulic interest groups of Tunisia is determined by constitutive decree issued by the governor.¹⁴⁹

Conclusion

The general rule for jurisdictional control is that the association will have authority over those lands which are served or benefited by the activities of the association, i.e., lands irrigated by the canals and ditches of the association. Final governmental approval of the area of jurisdiction is used in most countries as a means to avoid an overlap in area controlled by two or more associations.

Minimum size, rather than maximum, is a feature of the Philippine system and unless the association will service an area of 25 hectare, it cannot be formed. Other countries take the size of the area to be served into consideration as a method for determining the level of the association in the total national hierarchy of water organization as is the case in France and Taiwan.

France

The rates to be paid by the water users associations of France are collected as direct taxes by the Prefect on the basis of rolls prepared by the Executive Committee. Administrative Tribunals establish the tax rates. Rates are set according to the benefits and interests in the planned works.¹⁵³

Greece

Land Improvement Organizations of Greece (OEV) can levy and collect assessments directly or through the Agrarian Bank of Greece. The Agrarian Bank assumes responsibility in its banking operations with the project beneficiaries, of transferring repayment charges which are deposited with the bank by water user organizations to the OEV.

General land improvement organizations of Greece can levy assessments against local improvement land organizations for the payment of maintenance and operation of the water works.¹⁵⁴

India

In Maharashtra, India, the repairs of the canals are made by the cultivators who share the expenses, including the salaries of the inspectors. Water rates are a user charge based on size of holding and are collected as part of the tax levied on the land. Water rates are paid to the irrigation department by the cooperatives on behalf of their members rather than by each person using water. The water is allocated to the cooperative which distributes it among its members.¹⁵⁵

Kenya

Assessment for construction and maintenance of works and the expenses of associations of operators are decided by the membership. However, the ratio charged for the distribution of water is subject to the approval of the water administration.

Rules made by an association concerning charges for the distribution of water are subject to approval by the Water Apportionment Board.¹⁵⁶

Korea

In the Republic of Korea, where projects are developed and operated by associations in the benefited areas, the cost of construction of works is shared (usually in equal proportions) by the associations and by the government. The government makes grants to the associations, and the associations obtain loans from the Agricultural Bank through the Korean Irrigation Association Union (an association of associations) for their share of the costs. The association collects fees from the users for defraying operation and maintenance costs, paying dues to the association union, and for annual reimbursements of the long-term loan and interest.¹⁵⁷

Mexico

Water users must pay for all services they receive from an irrigation district. Payment is direct function of the amount of water that has been used, extension of cultivated land, value of crops, expenses necessary for the adequate administration of the district, and return on the investment made by the state.

Water users associated in the water boards of the Mexican irrigation districts are required to pay "cooperation fees," approved by the general assembly of the users of a water board and the directive committee of the district, to amortize the costs of the water works carried out by the board, under the control of the district. The estimation of financial requirements to cover the expenses of water distribution, conservation, improvement and administration approved by the directive committee of the district. The board is authorized to propose the amount of the cooperation fee and the form of payment. The directive committee may approve or modify this proposal. The fee is for the payment of water works built by the board.¹⁵⁸

Philippines

Corporations are required to contribute 50 percent of the costs of construction, improvement, maintenance, or reconstruction of the district irrigation system. The remainder is paid by government loan. An estimation of the costs is made by the Administration of Irrigation. The maximum amount of the loan cannot exceed 50 percent of the assessed value of the land and is payable in 20 years after the completion of the works.¹⁵⁹

Poland

The projects of the water associations in Poland are carried out independently or by cost-sharing with the central government. Charges are made for water withdrawn from installations for collective supply. The Council of Ministers determines the level of charges, including cases where no charge is required. This responsibility can be delegated to the Praesidium of the District's Peoples' Council.¹⁶⁰

Portugal

Irrigators and beneficiaries associations, under a 1966 law, derive their revenue from operation and maintenance taxes, members' contributions for general expenditures, proceeds of fines and compensation payments and from any other proceeds or subsidies attributed to them (Portugal Decree No. 47, 153 of 1966, Art. 35).¹⁶¹

Spain

Each year a budget is approved for the expenses of the water communities. The sindicato carries out the works and controls the money.

Each member of the community must pay the assessments allocated him according to the quantity of water delivered. Although the water is not

noted, a "duty of water" for various types of crops is established by the sindicato. That quantity is distributed through canal outlets calculated to deliver a certain flow for a certain period of time. The junta approves the budget and fees charged to the members.¹⁶²

South Africa

Water boards obtain revenue by levying taxes on irrigated lands or from charges for water supplied. Government subsidies can cover 33½ percent of the cost of water projects. In theory the boards can construct large water projects; however, in practice the most important water works are carried out by the state.¹⁶³

Rhodesia

Irrigation boards in South Rhodesia can levy taxes on every area scheduled as irrigable to defray expenditures. Boards can also enter into agreements with owners of irrigable areas for loans to be repaid by taxes levied on land within the project area (S. Rhodesia, Water Act, Chap. 208, Sec. 91).¹⁶⁴

Taiwan

Association members are required to pay membership fees and assessments for repayment of loans to cover cost of association operation. In addition, charges are made for use of the delivery system and sale of surplus waters. Sources of revenue of these organizations are composed of: (1) membership fees, paid in proportion to the benefits obtained from irrigation and drainage; (2) engineering costs are paid by the persons directly benefiting from them; (3) fees collected from the users and sale of surplus water; (4) financial profits; (5) government subsidies; (6) by subscriptions and donations; and (7) other forms of legal income.

Revenue is used to pay for construction and maintenance of irrigation facilities and to pay personnel and operation expenses. The revenue must be deposited in government institutions.

Methods for budgeting and settlement of accounts must be approved at provincial or municipal levels and reported to the national authorities for record.¹⁶⁵ Since 1975 budgetary controls have been given to a group of province officials appointed by the Taiwan Provincial Governor.^{165a}

United States

Assessments are the chief form of revenue for voluntary ditch companies. The companies may compel the members to pay their share of assessments¹⁶⁶ and may stop water delivery to insure compliance.¹⁶⁷

One of the main objects of incorporation for voluntary ditch companies is to obviate the difficulties arising in enforcing the pro rata contributions of the co-owners of the water rights for maintenance of the works and other necessary expenses. By merging individual rights, each shareholder may be compelled to contribute his proportion of all necessary

expenses or forfeit his right to use of the water.¹⁶⁸ The same implied contract which obligates the company to deliver water implies the reciprocal duty on the part of the shareholders to pay their assessments.¹⁶⁹ Of course, in order to render such assessments valid, the purpose for which they are levied must come within the purposes of the incorporation, as set forth in the articles of incorporation or charter, and must also meet the statutory requirements.¹⁷⁰

When assessments are made, they become liens on the water stock itself, rather than on the land.¹⁷¹ However, where stock is appurtenant to land, there is authority that the assessment becomes a lien on the land,¹⁷² superior to the lien of a mortgage on that land.¹⁷³ A more direct method of enforcement of payment is to simply refuse delivery of water. Such methods are recognized in New Mexico¹⁷⁴ (in the case of community ditch or cooperative associations) and in Wyoming.¹⁷⁵ In New Mexico, a fine may be assessed before the water is denied.¹⁷⁶

Stockholders may be exempt from assessments if it is so provided by the terms of their agreement made at the time they purchased their stock.¹⁷⁷

Further, it has been held that an assignee of a water right on which a past assessment is due is not personally liable for such past assessments unless expressly assumed.¹⁷⁸

In water users associations, delinquent members face several possible sanctions. These are the imposition of an additional charge,¹⁷⁹ loss of the water supply,¹⁸⁰ or cancellation of the water right with forfeiture of payments already made¹⁸¹ which costs shall be subject to repayment by the water users. It appears best to recover the actual, as distinguished from estimated, costs to construction.¹⁸²

Conclusion

The methods which water user associations can use to finance their operations is directly related to the sources from which revenue can be obtained. The most common practice is to place the entire burden on the members of the association in the form of charges for the amount of water used or to levy taxes on the assessed valuation of the land owned by the irrigator. Payment is generally in monetary form; however, some countries allow farmers to make payment in-kind by working at a set rate for the association. Although rates or levies may be set by the local association, government approval is a common feature with many systems before revenue can be collected. Loss of water or other sanctions can be imposed against those who do not meet their obligations to the association.

Larger projects require amounts of capital which are usually beyond the resources of a local association. Therefore, cost-sharing with the central government in the form of loans or grants enable the association to expand their financial base. If the government requires repayment of the loan with interest, the rate of interest will have a great affect on whether the project is undertaken. Even if the loan is interest free, repayment will be the responsibility of the individual users through assessments paid to their association. The central government may also perform the service of collecting and managing the money to repay the loan on behalf of the local association.

If capital is available in the private sector, it may be possible for associations to issue bonds which are retired by regular payments made by the association from assessments or charges required from individual water users. The requirement of repaying the debt with interest is a standard feature of private financing and here again the "cost" of money could be a limiting factor in using this method of financing.

POWERS OF THE WATER USER ASSOCIATIONS

Water users associations are conferred specific powers to carry out their commitments. The scope and class of powers is variable. In some countries, like Spain, or Germany, they can enact regulations which are legally binding on their members. In other parts of the world, like Mendoza, Argentina, they administer the distribution of the waters but do not enact regulations. In Spain they can be recipients of water concessions from the central government. Spanish water user associations also have judicial functions.

In most countries they can raise revenues, as we have already seen, and generally have the necessary powers to assure continuity and unity of control over water distribution and maintenance and repair of water works. They also might be given powers of eminent domain to condemn private property. They can also undertake the construction of new water works. In this respect their role is variable. In Mendoza, Argentina, they are limited to minor improvement works. In Germany they can even construct reservoirs and hydroelectric stations. In developing countries it seems adequate to give them only a few simple and basic functions and for government to strictly control their compliance.

Argentina

The "Commissions" of Catamarca Province, Argentina, can adopt their regulations to establish the conditions that members of the commission have to fulfill in order to be elected. These regulations must be approved by the governor of the province. The commissions prepare their yearly budget and nominate and appoint their employees. They have the power to establish the timing for water distribution to each user, i.e., the hours at which the user will get the water rather than the time during which the user will get water.

Each association in Jujuy, Argentina, enacts its own charter which is approved by the governor. The by-laws should determine the contributions of each member and the lands that will be within the territory of the consortium. They should also determine the criteria used to distribute expenses between the members of the consortium.

The consortium of Rio Negro, Argentina, has the right to establish its own charter as well as the procedures to elect its authorities. Both are approved by the administration.

The "Inspector" is elected by the users served from the same canal and controls the distribution of the waters, the maintenance of the canals, and prepares the budget for the water works of each canal in Mendoza, Argentina. He is required to keep a book of accounts which must be prepared to the new inspector and which is audited by the Department of Irrigation. He has authority to solve "de facto" conflicts. The Commissions of San Juan, Argentina, perform the same functions that the "Inspectors" perform in Mendoza.¹⁸³

Chile

The action of the Association of Canalists of Chile and the decision of the director is legally binding on the members. This authority extends to all the issues in which there is a community of interest with respect to water management, including the case of a conflict between two users. Water users associations operate like corporate associations. Except for the case of the "Comunidades," their charters should be approved by the President of Chile.

Generally, the associations have the power to distribute water and to assess water right holders for operating costs. The "Asociaciones" and the "Juntas" may pledge the assets of their shareholders as security for the payment of loans related to works and improvements, and may issue bonds for those debts, and make assessments against members to pay the bonds upon maturity. "Communities" do not have this authority.

The "juntas" are the only entities which can declare water shortages, they also can request the President of Chile to declare a particular source of water is exhausted. This declaration prevents future water consumptive concessions from being given. The "juntas" also have water distributors which are authorized to carry out distribution orders of its boards of directors and to police water uses in specified areas under the "juntas" control.

Each water user association must maintain a registry of members or shareholders in which the water use rights of each member and all changes are recorded.

Shareholders are required to: a) pay a fine for not attending the meetings, b) pay for the works that benefit them, c) allow common use of their private canals by other shareholders on a cost-sharing basis, d) pay penalties of 2 percent per month and water supply suspension for no payment of assessments, and e) allow organization officials to enter his property to carry out their duties. Water rights never pass to the association, and artificial canals are private property of the members except for cases in which canals are constructed by the association. 184

People's Republic of China

Water districts in the People's Republic of China have authority to levy fees for water delivery, operate related agricultural enterprises, and employ professional staff. They also conduct educational programs on efficient water management practices. 184a

Sri Lanka (Ceylon)

Meetings of landowners in Ceylon are provided for by the Irrigation Act. These organizations can regulate water use, management of paddy lands, or any other kinds of cultivation capable of being benefited by irrigation works. They are also charged with the enforcement of established customs affecting such cultivation, the regulation of duties, remuneration and duration of the irrigation headmen, and the regulation of the labor contribution that each member of the meeting must make, or money contribution for maintenance, management and operation of the system. Meetings also approve irrigation schemes, water rates, decide questions arising from the operation of a system under the Irrigation Ordinance. It can enact regulations which must be approved by the minister and published in the gazette to be enforceable. 185

Ecuador

Water users of the directories of water in Ecuador must participate in the meetings of the general assembly, under penalty of fines. They are required to pay expenses for association in proportion to their water rights. Rights to water supply can be suspended for nonpayment.¹⁸⁶

France

Basin agencies in France research and develop water resources. They finance water projects and can lend money to private individuals. They can levy taxes in proportion to the benefits the people receive from the works.

Greece

Land improvement organizations of Greece can expropriate land, issue regulations for operation and maintenance, impose sanctions, and police the use of the waters.¹⁸⁷

India

Committees in Maharashtra, India, are given authority to exchange views on the needs of water, dates of planting, and to collect and distribute information. The committee prepares a roster and informs the irrigation officials on the water needs of their members. They also advise and control the irrigation. When supply is deficient, the rotation period is increased and the full area of the phad is maintained. Disputes are resolved at the local level through arbitration.¹⁸⁸

Italy

In Italy, the decisions of the consortiums are binding on dissidents. Water users associations can condemn existing water rights among their members, provided compensation is paid (Unique Text of Waters, Art. 59). The use of the waters is granted through concessions given to private persons or to users associations. The users associations can require that new water users become members of the association (T.U., Art. 66).¹⁸⁹

Japan

The land improvement districts of Japan administer both irrigation and drainage works. They promulgate administrative regulations which must be authorized by the governor. Districts can work in cooperation with the state for the construction of water works. Costs for the works are reimbursed by the users in proportion to their benefit. The state or a district may condemn land improvement projects on its own action or upon application of 15 members of the association. Compensation is paid within the limits of the landowners profit. The structures may be either administered by the Ministry of Agriculture and Forestry or can be transferred to the land improvement district.¹⁹⁰

Korea

The irrigation associations of Korea function as contracting agencies, making all the necessary payments for water works to be used by their members.

The association purchases the rights of way for irrigation works. The association also operates projects and promotes better farming practices. It furnishes tools, equipment, supplies for maintenance and operation, and carries on the business of the project.¹⁹¹

Mexico

The directive of a Mexican irrigation district committee is required to: a) make agricultural programs, b) promote investigation and use of agricultural technology, c) formulate and promote credit plans, d) formulate plans for irrigation and cultivation, e) promote the organization of farmers, f) promote the commercialization of farm products, g) promote the construction of storehouses, h) promote the development of agricultural industries, i) promote infrastructure works, j) promote the creation of centers for rural training, k) prepare the budget of the district and propose to the secretariat the payments which should be made by the water users for services given by the district, l) act as consultive organism in all matters related with the development of the district, and m) perform all other functions committed to it.

The directive committee of a Mexican irrigation district approves the plans for irrigation and any later amendments. It decides how the waters not put to use by the person having right to them are to be distributed among the other users. It also determines which areas of the district will not be irrigated, based on the study of the water resources which are available and the salinity of the land and agrolological studies.

Water users of the Mexican users board are obligated to assist to the general assembly in which delegates of the users are elected to be members of the directive committee of the district. They must also assist the general assemblies of the water board operating in the section where they have lands under irrigation.¹⁹²

Portugal

Associations have authority to build additional water works to increase the utility of water supply projects in accordance with plans approved by the central government (Portugal, Decree No. 47, 153 of 18 August 1966, Issuing the Regulations Governing Irrigators' and Beneficiaries' associations).¹⁹³

Poland

The inhabitants of rural areas in which there are collective installations for water supply are required to render personal services. The value of the services is deducted from the price each user pays for water service.

The People's Council and the water associations are responsible for the maintenance, protection and operation of the water works.¹⁹⁴

Philippines

The associations of Philippines are authorized to appoint a caretaker who is charged with preservation and administration of the system, distribution of the waters among the water users and resolves controversies between them. Associations can issue regulations, subject to the approval of the Secretary of Public Works. Regulations are issued for preservation of the irrigation system and operation of the administration. Members of the association contribute, in proportion to their benefits, funds for the improvement and preservation of the system. A president is elected every year to represent the association. He is also the ex-officio treasurer and collects payments from the members.¹⁹⁵

Australia

The irrigation areas of South Australia comprise a board whose members are elected by the users. The board has authority to impose levy taxes to pay for improvement works and administrative expenses.

South Africa

In South Africa, irrigation boards have the power to construct, control, operate and maintain works. They are authorized to supply water to local authorities, state agencies and provincial administrations. Irrigation boards can exercise control over private water works to the point of condemnation in order to effect proper distribution (South Africa, Water Act, Act No. 54 of 1956, secs. 89 et seq.).

Taiwan

The basic function of the irrigation association in Taiwan is to deliver water to the irrigators. In the normal operation, the associations are also authorized to perform the following activities: 1) construction, improvement, operation and maintenance of irrigation systems; 2) prevention and relief of damage to irrigation systems; 3) respond to emergency flood relief and prevention needs; 4) financing of irrigation systems; 5) rent or purchase land for irrigation projects; 6) study and development of the benefit of irrigation; 7) coordination with government policies of land, agriculture, industry and rural development; and 8) anything entrusted by the government agency in charge according to law.

Tunisia

The Unions of Oases Owners of Tunisia construct and maintain water works, distribute waters according to rights and customs, keep water registers and set a court of arbitration to resolve problems between their members.

Watering associations in Tunisia decide on the means for water works operations, construction and maintenance. They also decide on watering operations. They have a cadastral plan and a register of taxes showing the dues of the members per irrigation surface unit from which they establish the taxes levied from the members.

Hydraulic interest groups are organized into collective interest associations and represent the users interested in these works. They control the management of these associations. By Decree of July 30, 1936, they are administrative bodies which study water works of collective interest and organize water users into collective interest associations. The special hydraulic interest associations of Tunisia have legal status and may seek water use authorization.

Turkey

The general directorate for soil conservation and irrigation of Turkey has drafted a law which proposes the establishment of "Soil and Water Resources Development Cooperatives" as a means to provide the organization framework for farmer cooperation in improving irrigated agriculture. The objective of the draft law is to organize the farmers into soil and water development units which can undertake studies, research, prepare projects, undertake construction and operation, and rent, condemn, or own movable and real property. These organizations are called TOPSU cooperatives.¹⁹⁶

United States

Mutual companies in the United States possess such powers as are conferred on them by statute and may engage only in such enterprises as are set forth in their certificates of incorporation. All other powers beyond those given are, by implication, excluded.

Voluntary water users associations require that each tenant in common keep the ditch or other works in repair and those making such repairs may compel a contribution upon the part of those who fail to bear their share of the expense or labor. Every owner of the acequia in the community associations found in New Mexico is required to contribute his quota of labor or monetary payment to maintain and preserve the ditch, whether he uses it or not. Although the acequias are privately owned, they are declared political subdivisions of the state and can function as a corporation with power to sue and be sued.

The relationship between private organizations, whether organized as mutual or commercial corporation, and their shareholders is based on contract. The rights and duties of both parties grow out of the contract implied in a subscription for stock and construed by the provisions of their charters or articles of incorporation. A trust relationship between the company and its stockholders arises from this contract with the corporation being authorized to conduct the business in the interests of the stockholders. As trustee for its stockholders, the corporation is bound to protect their interests. It follows that a duty is incumbent upon the corporation to initiate actions in matters concerning protection of

water rights or other company property without naming stockholders as individual parties to the action. The officers, managers, and boards of directors also hold trust relationships with both the corporation and its stockholders. This means that the validity of a contract entered into by a board of directors may be challenged by the stockholders. Also, officers are bound to avoid dealings where there is a conflict of interest between them and their stockholders, although they may have dealings in company matters where there is no conflict.

In the formation of mutual corporations, it is common for owners of the original water rights to deed water rights and rights in the works to the corporation and take shares of stock in proportion to value of the property contributed by all. Legal title is transferred to the company but equitable title remains in the original owner. In other words, the company holds the legal title in trust for its respective shareholders. The terms of this trust are governed by the articles of incorporation or by-laws. In absence of express restrictions, implied powers are seen to be inherent in the company to enable them to exercise the powers expressly conferred and to accomplish the objects for which they were created. Companies have been allowed to borrow money to finance an authorized project or to guarantee bonds issued therefore subject to charter restrictions. More importantly, a power to sell water rights may be implied from the power to acquire and own water rights.¹⁹⁷

Conclusion

The powers which a water user association can exercise are granted to it by the central government, although some examples exist in the western United States of associations exercising authority under contract and corporate law. Generally, associations are given the power to provide for the regulation of water delivery and the construction, repair and maintenance of the systems. Associations are given the authority to promulgate regulations for internal operation and to set tax or assessment rates for financial support of its activities. In both instances, approval by a higher level of government may be required before the association can enforce these actions upon its membership. Another standard feature is to empower the association to hire employees or other officials of the association to conduct the day-to-day business of the association.

The authority to resolve disputes between members has been granted to associations in some countries and this power may be exercised in some judicial capacity or by having the association arbitrate the dispute. Another interesting power is the right of the association to exercise the power of eminent domain to condemn private property in the form of land or water rights. Some countries provide that compensation must be paid for the property taken while other systems allow for expropriation without payment.

Where the authority of the association is derived from a grant of the central government's police powers, the association cannot go beyond those powers and those powers not given the association are reserved to the central government. In the exercise of its powers, the association

is generally permitted to impose sanctions or penalties on its members who refuse to comply with association regulations. These sanctions can take the form of fines or other means such as loss of water service or water rights can be used to enforce compliance. Where such sanctions are allowed, a rational system gives the individual the recourse to appeal the ruling to a higher authority or court.

ALLOCATION OF DECISION-MAKING POWER

This chapter attempts to show how decision-making power is regulated and allocated in different systems of water users associations. In some countries voting power is directly proportional to water rights, or to irrigated acreage. In Spain, for example, a person has as many votes as units of water right. In other countries voting power has been regulated in order to avoid dominance by the big landowners. This regulation assumes different forms. In some countries everybody has one vote, regardless of the water rights; in others, a maximum number of votes per capita is set and, last, other systems try to balance by giving everybody a minimum number of votes to start with.

Argentina

In Mendoza, Argentina the law has tried to reduce the disparity in voting power between small and large landowners. Voting rights are proportional to the amount of irrigated land that each landowner has. There is a minimum amount and a maximum number of votes. The votes are determined in this form (Art. 42, Mendoza Water Law, 1884):

<u>Votes</u>	<u>Ha</u>
1	2000m ² to 2 ha
2	2 ha to 5 ha
4	5 ha to 10 ha
6	10 ha to 15 ha
7	15 ha to 20 ha
8	20 ha to 30 ha
9	30 ha to 50 ha
10	more than 50 ha

Members of the commissions of irrigation in San Juan, Argentina, vote on issues significant to the operation and management of the association. The number of votes each irrigator has is proportional to the number of hectares he has under irrigation on a graduated basis. The maximum amount of votes is ten.

Austria

Voting power in the Austrian water cooperatives is allocated in accordance with the financial contribution made except that a minority representing at least 20 percent of the total voting members can insist on at least one representative to the board of directors.

Chile

R. Medina undertook a most interesting case study of the legal control over water use for agriculture in Central Chile where he found that a proportional voting structure was used to perpetuate the prevailing position of the large landowners who could thus impose their water interests upon the entire association of communities.

A new water law, No. 16640 of 1967, a system of voting in local water organizations, has been prescribed which attempts to protect the interests of the smaller users.

The Chilean Reform of 1967 replaced the system of voting by hectares with a combined system of equal votes per each member and the traditional distribution of votes by hectares irrigated. Each shareholder has a right to the number of votes resulting from the division of the total amount of shares among the number of shareholders, plus one vote for each actual share. Action of the board is decided by majority vote.¹⁹⁸

For example, there are 100 shares of water distributed unequally among five members. A has 50 shares, B has 10 shares, C has also 10, and D and E have 15 shares apiece. The basic number of votes for each member will be the result of dividing 100 among 5 = 20. Each member will have 20 votes to start with, regardless of the number of shares that he has. The final number of votes for each member is determined by the addition of the actual shares of each member to the basic 20 shares. Thus, A will have $20 + 50 = 70$, B will have $10 + 20 = 30$, as well as C, and D and E will have $15 + 20 = 35$ votes apiece. In this method, the system attempts to reduce control by the bigger water owners.

People's Republic of China

All water users are members of a production team. A production team is the basic unit for collective action and has an average of 150 persons and 25 hectares of land in cultivation. Production units then comprise larger units such as natural villages and communes. Irrigation districts are the next level of rural administration above communes.^{198a}

Greece

Each member of the Assembly of the Local Land Improvement Association of Greece has one vote because they all represent the same amount of hectares but in the village council, each member has up to three votes, depending on the amount of benefited land he has.¹⁹⁹

India

The members of the cooperatives of Maharashtra, India, are entitled to only one vote irrespective of the area of sugarcane he grows or the number of shares he holds.²⁰⁰

Japan

In the land improvement districts of Japan, decisions are taken by majority vote. However, decisions on important issues require a 2/3 vote.²⁰¹

Mexico

Water boards of Mexican irrigation districts hold ordinary assemblies at least once each three months. The extraordinary assemblies are held at request of 20 percent of the members of the board or at the request of the Council of Vigilance.

Boards must hold assembly to decide the plans of cultivation for winter and summer during the last two weeks of August. These plans must be approved by the Directive Committee of the District of Irrigation before the first of October.

Decisions of the assembly must be made in meeting attended by at least 50 percent of the members of the board if it is first summon. If it is second summon, the decisions will be valid regardless of the number

Turkey

Topsu cooperatives in Turkey provide that each member has one vote regardless of the size of his landholding. In the case of jointly owned property, only one vote is allowed to be cast by a partner or representative.²⁰³

United States

Generally, the majority of members has the right to control matters of the organization with the caveat that a person joining such a voluntary association does not vest in the majority the power to injure the rights of the individual.²⁰⁴ When the policy adopted by the majority does not materially injure the vested rights of the minority, a majority of tenants in common has the right to control the affairs of the ditch. Neither law nor equity will aid a stubborn minority in preventing the majority from doing an act for the manifest good of the whole community, where no one is injured and all benefit.

In the irrigation companies, the stockholders or members of the mutual companies (including voluntary associations) have the final control of its policies through the voting. Their functions are few but vitally important. They elect the directors²⁰⁵ and may remove them from office.²⁰⁶

They may make, amend, or repeal by-laws,²⁰⁷ or may leave this power to the board of directors. All amendments to the articles of incorporation require the stockholders' prior approval.²⁰⁸ Such fundamental steps as consolidation with other corporations or unincorporated associations²⁰⁹ or voluntary dissolution of the corporation or association can be taken only with their consent.²¹⁰

The stockholders of such corporations and associations usually meet at least once a year.²¹¹ Each stockholder has the right to vote at any election.²¹² The voting is done on either a one vote per share basis²¹³ or a one vote per member basis.²¹⁴ If different classes of stocks are issued, the voting privileges of these classes may be varied, although there is nothing compelling an arrangement of this sort.

Since the control emanating from the stockholders would be little more than an illusion if the only direct control available to them were through the ballot box at the annual election, to allow greater control sections for removal of undersirable directors and officers are provided.

Mutual corporations may adopt such rules and regulations, not in violation of law governing the distribution and use of the water furnished among their shareholders, as are equitable and reasonable. Rules and regulations have no effect unless authorized by the charter or articles of incorporation or unless assented to by the stockholders whose rights are affected.²¹⁵

Conclusion

Exercise of the legal powers given to the association and other expressions of collectively made decisions require that a system for polling the association's membership be implemented. The most common form of collective decision-making is for members to express approval or disapproval of proposed actions by voting.

The numbers of votes which a member can cast vary from system to system. It is not uncommon for the number of votes to be a direct function of the number of acres or hectares which a member of the association has under irrigation or that voting be a direct function of the amount of water which a farmer has a right to. One system, Austria, equates voting with the amount of financial support contributed to the association.

Countries such as Chile and Argentina have attempted to reform this pattern of voting by placing a ceiling on the maximum number of votes regardless of size of operation and by granting more votes to smaller landowners. Other nations such as Japan and parts of the United States apply a strict one-man one-vote rule.

Usually a majority vote is sufficient for most issues; however, issues which may require extraordinary action may require 2/3 or greater to gain approval. Such decisions may include construction of facilities, election of officers or decisions to use debt financing.

Certainly not all decisions need to be made by the collective action of the association. Purely administrative matter should be left to the discretion of officers or employees of the association with the opportunity to review them at the next regular meeting of the association.

GOVERNMENT CONTROL

The activities of the water users associations are important to the central government. Water related activities are important for their economic significance, connection with developmental processes, character of public services, and their incidence in the general well being of the people. Due to these factors, water users associations are, in some degree, controlled by the government. The following cases present some of the forms in which government control can be implemented.

Argentina

In the province of Mendoza, Argentina, water users organizations are under the control of the Department of Irrigation. The department must approve the yearly elections of the inspectors. If the elections do not take place, the department appoints an inspector. The budget and the expense accounts of the inspectors are examined by the department which also controls the performance of the labor of cleaning and maintenance of canals. The department collects and administers the revenue of the association.²¹⁶

Belgium

Authorization of the King is required for the improvement of protective dikes or ditches (Art. 81 Wateringue Law). Authorization from the Permanent Delegation is needed for other works (Art. 82). The Wateringue can undertake emergency works without authorization, but this action must be immediately communicated to the authorities.²¹⁷

Chile

Law 16640 now permits state intervention on its own initiative. However, state agencies were reported to be far from adequately prepared to perform the functions entrusted to them.

Control is carried out by the Directory of Waters which participates in the formation and establishment of water users associations. It can require the organization of associations and the construction of water works necessary for better water use. The directory can also require the consolidation of points of diversion within watercourses and canals.

It can change the source of supply of the waters and require programs of water works to be financed from the budgets of users associations. The directory controls the distribution of the waters, within the association, and can take control of the water distribution (for no more than 60 days) when there are irregularities in the associations. It can order the removal of inefficient directors from the users associations and intervene in association operations if necessary. It can control the distribution of the water through the National Enterprise of Irrigation. The directory is represented in the assembly boards or directories when it is considered convenient.²¹⁸

People's Republic of China

Irrigation districts are separate administrative units with a full time specialist staff. All operations must be conducted in accordance with the regulations established by the State Council. Organizational structure and procedure tend to be flexible enough to adapt to local conditions.^{218a}

Ecuador

The directories of Ecuador are subject to the technical, legal, and administrative control of the Ecuadorian Institute of Water Resources. The institute settles the conflicts among water directories and enforces compliance with the administrative orders.²¹⁹

France

The government exercises close supervision over the water basin agencies through a special commission which it appoints. These commissions have a veto right. The government can carry out the tasks that the water users associations failed to perform when failure is considered to be detrimental to the public interest (Law of December 22, 1888, and Decree of December 21, 1926).²²⁰

West Germany

The water associations in Germany are controlled, according to the importance of purpose, by ministers (food, agriculture and forestry), the governors, counties or free towns. Thus, control is vested at national, state, county, and free towns level, depending on the importance and the objectives of the association. There are, of course, norms and rules which are common to all associations.²²¹

Greece

Land improvement organizations in Greece are supervised by the Minister of Agriculture. Local land improvement associations can either be supervised by a general land improvement association or by the reclamation service, depending on whether it operates a Class B project within the area of a Class A project, or a Class B project not integrated in a Class A project. Organizations of water users in Greece are autonomous. However, in special cases, the Minister of Agriculture may interfere in their operation by the substitution of the elected board by a temporary executive committee appointed by the Minister of Agriculture. The organization has to assume obligations for a portion of the total cost when financed by the government. The agreement is voted upon by the general assembly who authorizes the president of the board to sign the repayment contract.²²²

Hungary

Hungarian water associations are supervised by the National Water Authority who employ competent district water authorities. They perform public works of local interest through common efforts and financial contributions of the interested parties. From the agricultural viewpoint, they are controlled by the Ministry of Agriculture and the local department of the council having jurisdiction. They are represented on the District Panel of Water Management Associations and on the Central Panel of Water Management Associations.²²³

Italy

The Minister of Public Works controls the activities of Italian associations. He can establish unions of water users associations as a means to coordinate their activities. The minister can nullify decisions of the consortiums and appoint special commissioners to decide on the issues presented on appeal by affected persons.²²⁴

Iraq

Cooperative societies in Iraq are supervised by the Minister of Agriculture. The supervisor may be in charge of more than one cooperative society.²²⁵

Korea

In the Republic of Korea, farmers associations must obtain government approval prior to their establishment, but the supervision of design and construction of projects is usually carried out by the Korean Irrigation Association Union at the request of the individual associations.²²⁶

Mexico

The water boards of Mexico's irrigation districts are under the constant vigilance of the Secretariat of Water Resources, which can intervene in board matters when necessary.

Conflicts on regulations are solved by the directive committee of the district in first term and by the Secretariat of Water Resources in second term. The last decision is definitive and nonappealable. The election of the members of the directive commission of the water boards is conducted in the presence of a representative of the Secretariat of Water Resources. The same requirement is applied to the approval of the budgets and programs of the board.²²⁷

Elections within the water users boards of Mexican irrigation districts are approved by the directive committee of the district. Water boards in Mexican irrigation districts can be dissolved on proposal of the district manager when they do not fulfill their duties with respect to water works. The committee must approve the dissolution and the manager can take control of the water works.

Portugal

The irrigators and beneficiaries associations in Portugal must submit their budgets through the General Directorate for Agricultural Services to the Agricultural Water Board for approval. They are required to prepare annual tax schedules in accordance with government approved plans and submit their tax revenues to the Agricultural Water Board (Portugal, Decree No. 47, 153 of 1966, Art. 6).

Peru

Water Users Council in Peru are officially recognized by the Ministry of Agriculture. Commissions of irrigators are controlled in the same form as the water councils of the irrigation districts and have the same responsibilities. Commissions of irrigators are officially recognized by the technical administrator of the district and do not require recognition by the ministry. All districts are required to keep a register of water rights and water users. Water is property of the state and cannot be registered as appurtenant to any real property where it is used.

A person who is not registered as a water user cannot receive consideration for a water allocation by the district when the district is preparing the cultivation and irrigation plans for the coming year.

The General Water Bureau also maintains a register of water users. This register is kept up to date by the information that the technical administrator of each district must submit each year. The specifications and conditions of each water right are recorded in the registers.²²⁸

South Africa

Government supervision in South Africa extends to many of the activities of irrigation boards. A state appointed official may attend without voting any meeting of an irrigation board, give advice and inspect lands or works under the board's control. The board's term of office may be terminated for negligence or refusal to comply with a direction and its functions taken over by the state (South A., Water Act, Act No. 54 of 1956, Sec. 95).²²⁹

Taiwan

Since 1975, irrigation associations have been placed under the direct control of the Taiwan Provincial Government by action taken under Article 108 of the Organization Rules of Irrigation Associations which provides for government operation if associations become ineffective in agricultural improvement. This take-over is temporary and is to last for 3½ years.

United States

In some jurisdictions public utilities are controlled by statute. A company which holds itself out for compensation by those who apply for water within the area served by its irrigation system is not a mere private corporation but is affected with a public interest and is subject to regulation and control as a public or quasi public corporation. Many commercial companies acquired public utility status as a result of servicing municipal needs.²³¹

Venezuela

The projects of the water users associations of Venezuela must be approved by the Minister of Public Works.²³²

Conclusion

Government control of water user associations varies according to the stage of development of the association and the level of its operation, whether it be national, regional, or local. Control may be purely through statutory means or through oversight of government officials.

Government control is uniformly present during the process of organizing water user associations. Enabling acts provide for the method and form of organization. These procedures must be complied with in order to give the force and effect of law to the later efforts of the association. In the later operation of the association, legal requirements must still be met and a different type of government control may now extend to the regular activities of the association. Such a practice is most common in those countries which have recently undergone agricultural reform programs and where the association is promoted from the 'top-down' rather than developing from the grass roots level. This control is typically applied to the budgetary operation of the association and to the annual repair work performed on the distribution system.

If the association, or hierarchy of associations, operates programs which have relevancy beyond the local level or in areas other than agricultural water supply, some control is exerted by that level of government which is affected by the program. This may require approval and coordination of efforts with national and regional governments as well as with municipalities.

The most common form of governmental control is found in specific statutes and governmental regulations. Under this system the actions of the association are presumed to be legitimate unless challenged by a party who feels he has been injured by association action. In other systems direct control is vested in an official of government who oversees the routine functions of water associations and can enforce compliance with the laws and policies of the central government.

ENDNOTES - PART II

1. Irrigation-Enterprise Organizations, Circular No. 934, USDA, Washington, D.C. (1953).
2. See Joaquin Lopez, "Organizacion de Las Comunidades de Usuarios en La Republica Argentine," Revista "Agua" No. 21, p. 48. Departamento General de Irrigacion, Mendoza, Argentina.
3. See A.F. Issag, Afghanistan: Its Objectives Programs and Progress in the Field of Water Resources, page 3. Paper presented at the United Nations Water Resources Administration Seminar - January 1973, N. Delhi, India.
4. See Water Laws in Europe, Food and Agricultural Organization of the United Nations, (Rome 1975) p. 19.
5. See Water Legislation in Asia and the Far East, p. 76, United Nations Water Resources Series No. 35, New York (1968).
6. See David Daines and Gonzalo Falconi, Water Legislation in the Andean Pact Countries, p. 49 and following, Logan, Utah, United States (1974); also see Gabriel Munoz Gonzalez, De La Organizacion Para La Administracion de Las Aguas en Chile, p. 19-29, paper presented at Quito, Ecuador, (1974); see also Joaquin Lopez, op. cit. in note 1; and Walter Lichem "The Role and Internal Structure of Local Water Users Organization" p. 16-17, Proceedings of the Interregional Seminar on Current Issues of Water Resources Administration, United Nations, New Delhi (1971).
7. See John Wong, Land Reform in the People's Republic of China, Institutional Transformation in Agriculture, p. 196-229, Praeger Special Studies in International Economics and Development, New York (1973).
- 7a. James E. Nickum, "Local Irrigation Management Organization in the People's Republic of China," 28 Annual Meeting of the Association for Asian Studies, Toronto, Canada (March, 1976).
8. See George Tombazos, "Cyprus, Organizations, Institutions and Finance" International Conference on Water for Peace (1968).
9. See Instituto Ecuatoriano de Recursos Hidraulicos, Ley de Aguas, art. 76, (May 1972).
10. See Framji and Mahajan, Irrigation and Drainage in the World vol. I, p. 298, International Commission on Irrigation and Drainage, New Delhi, India (1969).
11. Supra, note 4, p. 78.

12. See G. E. Papadopoulos, Greece, "Water User Agencies for Water Development and Operation," International Conference on Water for Peace (1968).
13. See N. V. Khursdale, Role of the Cooperatives in Water Resources Management, p. 7, United Nations Seminar, New Delhi (1971).
- 13a. See Effendi Pasandaran and William Collier, "Long-run Monitoring of Irrigation Benefits in Indonesia," Workshop on Implementing Public Irrigation Programs, East-West Food Institute, Honolulu, Hawaii (August 1976).
- 13b. See Madsalim and Ashari, "Sederhana (Simple) Irrigation & Reclamation Project," Workshop on Implementing Public Irrigation Programs, East-West Food Institute, Honolulu, Hawaii (August 1976).
14. See Abstraction and Use of Water, a Comparison of Legal Regimes, p. 116, United Nations, New York (1972).
15. See Water Legislation in Asia and the Far East, p. 94, Water Resources Series No. 31, United Nations, New York (1967), also see Framji *op. cit.* p. 573.
16. See Framji, *op. cit.* note 10, p. 611.
17. See Water Legislation in Asia & the Far East, Water Resources Series No. 35, United Nations, New York (1970) p. 108.
18. See Mexican Water Law (Spanish Original) arts. 168 and 169.
19. Supra, note 15, p. 115.
20. See David Daines, *op. cit.* note 6, p. 159.
21. Supra, note 15., p. 122.
22. In addition to the fine works of Dr. Martin-Retontillio, from which much of this discussion is based, the senior author has also sought counsel in the following excellent expositions on irrigation communities through the interpretation and consulting of Dr. Miguel Solanes, lawyer and water law specialist from Mendoza, Argentina, and Research Associate to the Conference Committee for The International Conference on Global Water Law Systems, 1974-1975: Comunidades de Regantes: Concepto, Naturaleza Juridica y Regulacion Positiva, by Sr. Julio Maestre Rosa, Bosch, Casa Editorial, Barcelona (1969); Tratado de la Legislacion de Aguas: Publicas y Privadas, by Srs. R. Gay de Montella y Cristobal Masso Escofet, Bosch, Casa Editorial, Barcelona (1956), Vol. II-Legislacion Complementaria, de los Jurados de Riego, p. 248-279; Regimen Juridico de las Comunidades de Regantes, by Juan Antonio Bolea Foradada, Escuela Nacional de Administracion Publica, Madrid (1969); Manual de Aguas by Angel Carmona Hernandez, Editorial Boyer Hnos. Barcelona (1966).

23. Supra, note 17., p. 169.
24. Supra, note 15. p. 52.
25. See Water Laws in Moslem Countries, p. 182-186, Food and Agriculture Organization of the United Nations, Irrigation and Drainage paper No. 20/1, Rome (1973).
26. See op. cit. note 4, p. 247.
27. See George Radosevich, Organizational Alternatives to Improve On-Farm Water Management in Pakistan, p. 12. Colorado State University (1975).
28. For an excellent account of the history, organization and operation of the acequias see Thomas F. Glick, The Old World Background of the Irrigation System of San Antonio, Texas, Southwestern Studies Series, Monograph No. 35, University of Texas at El Paso, Texas (1972), and Phil Lovato, Las Acequias del Norte, Technical Report No. 1, Four Corners Regional Commission, Taos, New Mexico (1974).
29. See United Nations, Water Resources Series No. 35, p. 151.
30. Supra, note 28.
31. See Walter Lichem, "The Role and Internal Structure of Local Water Organization," United Nations Interregional Seminar on Current Issues of Water Resources Administration, New Delhi, India (December, 1971).
32. See Lopez, op. cit. note 2.
33. See op. cit. note 4, page 19.
34. See Wong, op. cit. note 7.
- 34a. See op. cit. note 7a.
35. See ops. and pages cited in note 6.
36. See Instituto Ecuatoriano de Recursos Hidraulicos, Reglamento De La Ley De Aguas, Arts. 32-47.
37. See Paul Kaiser, op. cit. note 68.
38. See op. cit. note 12.
39. See op. and pages cit. in note 69.

40. See op. cit., note 13.
41. See op. cit. Note 18, Arts. 73-74.
42. See Mexican Water Law, Arts. 13 and 14.
43. See op. cit. note 45, Arts. 104, 107, 109-111.
44. See op. cit. note 77.
45. Supra, note 17, p. 7.
46. See Radosevich, op. cit. note 27, p. 46.
- 46a. See Chung-yue Funge, "Cooperation Among the Irrigation Associations, The Provincial Water Conservancy Bureau and the Joint Commission on Rural Reconstruction on the Irrigation Development of Taiwan, Republic of China," Workshop on Implementing Public Irrigation Programs, The Food Institute, East-West Center, Honolulu, Hawaii (August, 1976).
47. Supra, note 15., p. 53-55.
48. See Radosevich, op. cit. note 27, p. 72.
49. See op. and pages cited in note 25.
50. See Radosevich, op. cit. note 27, p. 92.
51. See Lopez, op. cit., note 64, p. 225-226.
52. Colo. Rev. Stats. §30-1-4 (1963); Utah Code Ann. §3-1-13 (1953); Wyo. stats. §17-173 (1957).
53. Colo. Rev. Stats. §30-3-3 and 30-3-6 (1963); Utah Code Ann. §3-1-9 (1953); Wyo. Stats. §17-171 (1957).
54. Utah Code Ann. §§3-1-13 and 3-1-15 (1953); Wyo. Stats. §§17-173 (1957).
55. Colo. Rev. Stats. §30-3-10 (1963).
56. Colo. Rev. Stats. §30-3-12 (1963); Utah Code Ann. §3-1-13 (1953); Wyo. Stats. §17-173 (1957).
57. Colo. Rev. Stats. §30-3-12(4) (1963); Utah Code Ann. §3-1-13 (111)(b) (1953).
58. Colo. Rev. Stats. §30-3-13 (1963); Utah Code Ann. §3-1-15 (1953).
59. Colo. Rev. Stats. §30-3-13 (1963).

60. Phil Lovato, Las Acequias del Norte, infra footnote 28.
61. Supra, note 11, p. 19.
62. Supra, note 17, p. 60
63. Supra, note 6.
64. See Joaquin Lopez, "El Derecho y La Administracion de Aguas en Iberoamerica," p. 213, in Proceedings of the International Conference on Global Water Law Systems, Colo. State University, Ft. Collins, Colo. 1976.
65. Supra, note 4.
66. Supra, note 10, p. 37.
67. Supra, note 14.
68. See Paul Kaiser, "The Justice of the Soil and Water Associations in the Federal Republic of Germany," International Conference on Water for Peace, 1968.
69. See United Nations, Department for Economic and Social Affairs, Water Resources Section of the Resources and Transport Division, National Surveys of Water Resources Administration, Hungary, Chapter IV/45 (1968).
70. See Iraq Agrarian Reform Law No. 30, (30 September 1958). The Weekly Gazette of the Republic of Iraq No. 20 (3 December 1958), p. 206, Art. 32.
71. Supra, note 4, p. 42.
72. See Water Laws in Italy Food and Agricultural Organization of the United Nations, p. 16-17, Rome (1953).
73. See Mexican Water Law, Arts. 42-57.
74. See Reglamento del Distrito de Riego del Rio Colorado, Mexico, Diario Oficial, (23 de Julio ole 1964), Arts. 63, 65, and 65.
75. See Guillermo Cano, Las Leyes de Agua en Sudamerica, F.A.O., Rome (1956), p. 119 and following.
76. Supra, note 20.
77. See G.A.R. Dowling, "Water Law and Organizations in South Africa," International Conference on Water for Peace, (1968).

78. Supra, note 15, p. 53.
79. See op. and pages cit. in note 25.
80. See Radosevich, op. cit. in note 27, p. 69.
81. Ibid.
82. "At cost" means not for profit. See West's Ann. Calif. Public Utilities Code §2705.
83. See, for example, Colo. Rev. Stats. §31-16-3 (1971 Supp.)
84. See George Radosevich, op, cit. in note 27, p. 30.
85. See Joaquin Lopez, op. cit. note 2.
86. Supra, note 4, p. 19.
87. See Gabriel Munoz Gonzales, op. and pages cited in note 6.
- 87a. See op. cit. note 7a.
88. See op. note 70 and 63.
89. Supra, note 10, p. 611.
90. See Radosevich, op. cit. p. 44 & 46.
91. See Wohlwend, B. "Hindu Water Law & Administration in Bali, Indonesia," Proceedings of the International Conference on Global Water Law Systems, Vol II, prepared by G. Radosevich, et. al., Colorado State University (1976).
92. See Gabriel Munoz Gonzalez op. & pages cited in note 6.
93. See Joaquin Lopez, op. and pages cited in note 64.
94. See Reglamento del Distrito del Rio Colorado, Art. 100.
95. See op. cit. in note 68.
96. See L. T. Chin, Land and Water Development Division, F.A.O., "Irrigation Associations" and "Management, Operation and Maintenance of a Completed Project," Proceeding: FAO/UNDP Regional Seminar on Measures to Accelerate Benefits From Water Development Projects by Improving Irrigation, Drainage and Water Use at the Farm Level, (held in Manila, Philippines 7-16 Oct. 1970); 1971.
97. See op. and pages cit. in note 25.
98. See Joaquin Lopez op. cited in note 64, p. 239.
99. Supra, note 72, p. 152.

100. See Local Administration of Water Control in a Number of European Countries, p. 73. Publication No. 8 of the International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands (1960).
101. See Joaquin Lopez, op. and pages cit. in note 2.
102. See ops. and pages cited in note 6.
103. See op. cited in note 8.
104. See David Daines, op. cit. in note 6, p. 125.
105. Supra, note 14, p. 118.
106. See G. E. Papodoupolos, op. cit. in note 12.
107. See op. cit. in note 40, Chapter III, p. 12 and Chapter IV, p. 41.
108. Supra, note 4, p. 152-153.
109. Supra, note 15, p. 34, and Supra, note 10.
110. Supra, note 14, p. 19.
111. See Food and Agricultural Organization of the United Nations, Land and Water Investigations in Lybia, TF 9184 Water Legislation Mission Report No. 2 (May 1974) Art. 65.
112. Supra, note 14, p. 143.
113. Supra, note 14, p. 118.
114. Ibid.
115. See United Nations Water Resources Series No. 64, p. 7.
116. See Radosevich, op. cit. in note 7, p. 45.
117. See op. cited in note 18, Arts. 42-86.
118. Supra, note 14, pp. 52-55.
119. Supra, note 25.
120. Supra, note 4, p. 247.
121. See Radosevich, op. cit. in note 27, p. 68.
122. See Joaquin Lopez op. cit. in note 64, p. 226.

123. In some states these are organized under special statutes for nonprofit corporations. See Utah Code Ann. §16-6-18 through §16-6-53 (Supp. 1971); Wyo. Stats. §§17-122-1 through 17-122-14 (1957).
124. In some areas stock is statutorily and judicially prohibited from being appurtenant. Utah Code Ann. §73-1-10 (1953); Hatch v. Adams, 57 U. 73, 318 P. 2d 633 (1957).
125. Suggestions as to what items might be covered in such articles may be found in Utah Code Ann. §3-1-5 (1953). Also found are provisions for amending these articles and for establishing by-laws, as well as for delineating the powers of such an association. See Utah Code Ann. §§3-1-6 through 3-1-9 (1953). Also see supra for a discussion of organization. See Appendix 2.
126. This formal signing of a document may well act as more of a deterrent to wrongdoing than a mere formal agreement.
127. Note that this is not a corporation which has a life of its own but merely an association of persons who may leave it any time they wish. Since it has no life of its own, it requires no submission of rights to create a separate entity.
128. See Radosevich, op. cit. Supra, note 27, p. 35.
129. See Joaquin Lopez, op. cit. in note 64, p. 239.
130. See Joaquin Lopez op. cit. in note 2.
131. See Walter Lichem op. cit. in note 6, p. 14.
132. Supra, note 17, p. 60.
133. See David Daines, op. cit. note 6, p. 125. Also see Ecuatorian Water Law Art. 29.
134. Supra, note 68.
135. Supra, note 12.
136. See Walter Lichem op. cit. in note 6, p. 16.
137. See Walter Lichem op. cit. in note 6, p. 14.
138. See V.M. Khursdale, op. cit. in note 13.
139. See United Nations Water Resources Series No. 31, note 15, p. 34; and Framji, Irrigation & Drainage in the World, note 10, p. 573.

140. See Mexico, op. cit. in note 45, Arts. 57, 97, 98.
141. See Walter Lichem, op. cit. p. 16.
142. See David Daines, op. cit. in note 6, p. 159 and following.
143. Supra, note 15, p. 52-55.
144. Supra, note 25.
145. See Radosevich, op. cit. in note 27, p. 18.
146. See Gabriel Munoz Gonzales, op. and pages cited in note 6.
- 146a. See op. cit. note 7a.
147. See G. E. Papadopoulos, op. cit. in note 12.
148. See Reglamento del Distrito del Rio Colorado, Art. 99.
- 148a. See op. cit. note 46a.
149. Supra, note 25.
150. See Joaquin Lopez, op. & note 2.
151. Supra, note 6.
- 151a. See op. cit. note 7a.
152. Supra, note 8.
153. Supra, note 14, p. 116.
154. Supra, note 12.
155. Supra, note 13.
156. Supra, note 14, p. 121 and 123.
- 157.. Supra note 14, p. 122.
158. See Mexican Water Law, Arts. 69-72. See Reglamento del Distrito del Rio Colorado, Arts. 71, 79, 84.
159. Supra, note 15, p. 143.

160. See Poland, Act Concerning the Water Supply for Agriculture and Rural Areas, Arts. 6, 7, 8, 10, 12, in Food and Agricultural Legislation, Vol. XV. No. 3, V/4a.
161. Supra, note 14, p. 122.
162. See Radosevich, op. cit. note 27, p. 47.
163. Supra, note 77.
164. Supra, note 14, p. 122.
165. See Water Law & Irrigation Associations of Taiwan, Arts. 24-34.
- 165a. See op. cit. note 46a.
166. Colo. Rev. Stats. §31-14-4 (1) (1965); New Mexico Stats. §75-14-23 to 35 (1953).
167. Colo. Rev. Stats. Ibid, Wyo. Stats. §§36-106 and 41-221 (1957) for stockholders using water on land under the line of the same ditch.
168. Colo. Rev. Stats. §21-14-4 (1965); Wyo. Stats. §36-106 (1957); Fuller v. Azusa Irrigation Co., 138 Cal. 204, 71 P. 98 (1902). See also Wyo. Stats. §41-221 (1969) for stockholders using water on land under the line of the same ditch.
169. Calahan v. Chilcott Ditch Co., 37 Colo. 331, 86 P. 123 (1906); McHale v. Goshen Ditch Co., 49 Wyo. 100, 52 P. 2d 678 (1935); Henderson v. Kirby Ditch Co., 373 P. 2d 591 (Wyo. 1962). The assessment may sometimes be in labor or money. Colo. Rev. Stats. §31-14-4 (1); New Mexico Stats. §§75-14-23 to 35, in cases of community ditches.
170. Colo. Rev. Stats. §31-14-4 (1965); Wyo. Stats. §36-106 (1957).
171. Colo. Rev. Stats. §31-14-14 (4); Stevens v. Curtis, 122 C.A. 2nd 30, 264 P. 2d 606 (1963).
172. Green and Griffen Real Estate and Investment Co. v. Salt River Valley Water Users' Association, 25 Ariz. 354, 217 P. 945 (1923). It should be noted that appurtenancy is being gradually abrogated in the districts which recognized it, pursuant to a policy of making water available in the most advantageous places rather than "locking" it to one piece of land. See Ariz. Rev. Stats. §45-172 (1972).
173. Federal Land Bank v. Bissonette, 51 Idaho 219, 4 P.2d 364 (1931).

160. See Poland, Act Concerning the Water Supply for Agriculture and Rural Areas, Arts. 6, 7, 8, 10, 12, in Food and Agricultural Legislation, Vol. XV. No. 3, V/4a.
161. Supra, note 14, p. 122.
162. See Radosevich, op. cit. note 27, p. 47.
163. Supra, note 77.
164. Supra, note 14, p. 122.
165. See Water Law & Irrigation Associations of Taiwan, Arts. 24-34.
- 165a. See op. cit. note 46a.
166. Colo. Rev. Stats. §31-14-4 (1) (1965); New Mexico Stats. §75-14-23 to 35 (1953).
167. Colo. Rev. Stats. Ibid, Wyo. Stats. §§36-106 and 41-221 (1957) for stockholders using water on land under the line of the same ditch.
168. Colo. Rev. Stats. §21-14-4 (1965); Wyo. Stats. §36-106 (1957); Fuller v. Azusa Irrigation Co., 138 Cal. 204, 71 P. 98 (1902). See also Wyo. Stats. §41-221 (1969) for stockholders using water on land under the line of the same ditch.
169. Calahan v. Chilcott Ditch Co., 37 Colo. 331, 86 P. 123 (1906); McHale v. Goshen Ditch Co., 49 Wyo. 100, 52 P. 2d 678 (1935); Henderson v. Kirby Ditch Co., 373 P. 2d 591 (Wyo. 1962). The assessment may sometimes be in labor or money. Colo. Rev. Stats. §31-14-4 (1); New Mexico Stats. §§75-14-23 to 35, in cases of community ditches.
170. Colo. Rev. Stats. §31-14-4 (1965); Wyo. Stats. §36-106 (1957).
171. Colo. Rev. Stats. §31-14-14 (4); Stevens v. Curtis, 122 C.A. 2nd 30, 264 P. 2d 606 (1963).
172. Green and Griffen Real Estate and Investment Co. v. Salt River Valley Water Users' Association, 25 Ariz. 354, 217 P. 945 (1923). It should be noted that appurtenancy is being gradually abrogated in the districts which recognized it, pursuant to a policy of making water available in the most advantageous places rather than "locking" it to one piece of land. See Ariz. Rev. Stats. §45-172 (1972).
173. Federal Land Bank v. Bissonette, 51 Idaho 219, 4 P.2d 364 (1931).

174. New Mexico Stats. §§74-14-24 and 75-14-41 (1953).
175. Wyo. Stats. §§36-106 and 41-221 (1957).
176. New Mexico Stats. §75-14-34 (1953).
177. Farmers' Pawnee Canal Co. v. Henderson, 46 Colo. 37, 105 P. 1063 (1909). However, since assessment is the only way to raise extra revenue for mutual companies, this type of provision will rarely, if ever, appear.
178. Laramie Rivers Co. v. Watson, 69 Wyo. 333, 241 P. 2d 1080 (1952). A more direct method of enforcement of payment is to simply refuse delivery of water. Such methods are recognized in New Mexico; New Mexico Stats. §§75-14-24 and 75-14-41, in the case of the community ditch or cooperative association; and in Wyoming, Wyo. Stats. §§36-106 and 41-221 (1957). In New Mexico, a fine may be assessed before the water is denied; New Mexico Stats. §75-14-34 (1953).
179. Act of August 4, 1939, Ch. 418, 6, 53 Stat. 1191 43 U.S.C. 485 (e) and West's Annotated California Water Code 57522 (1966).
180. Act of August 4, 1939, Ch. 418, 6, 53 Stats. 1191, 43 U.S.C. 485(e).
181. Act of August 13, 1914, Ch. 247, 3,6,38 Stat. 687, 688, 43 U.S.C. 480, 496. Sale of the parcel is also possible (West's Annotated California Water Code 51600 through 51618, 1966), through redemption of the sold tract is allowed, if accomplished within a year, by paying the purchase price and interest to the buyer. (West's Annotated California Water Code 51646 through 51654, 1966).
182. See Radosevich, op. cit. note 27, p. 32.
183. See Joaquin Lopez, op. cit. in note 2.
184. Supra, note 6.
- 184a. See op. cit. note 7a.
185. Supra, note 17, p. 60.
186. See David Daines, op. cit. p. 125.
187. Supra, note 12.
188. Supra, note 13, p. 6.
189. Supra, note 13, p. 6.

190. Supra, note 10, p. 573.
191. Ibid, p. 611.
192. See Mexican Water Law, Art. 68 and Reglamento del Distrito del Rio Colorado, Arts. 28, 29, 40, 48, 117.
193. Supra, note 14, p. 120.
194. Supra, note 169, Art. 6.
195. Supra, note 15, p. 143.
196. Supra, note 26.
197. See Radosevich, op. cit. note 27, p. 14, 18, 20, 23, 24, 25, 29.
198. See Walter Lichem, op. cit. in note 6, p. 32-33.
- 198a. See op. cit. note 7a.
199. Supra, note 12.
200. Supra, note 13.
201. Supra, note 15, p. 34, and note 10, p. 573.
202. Supra, note 94, Arts. 101-103.
203. See Radosevich, op. cit. note 27, p. 68.
204. Candelaria v. Vallejos, 12 N.M. 140, 81 P. 589 (1905); Bartholemew v. Fayette Irrigation Co., 31 U. T. 86 p. 481 (1906). See also Kinney on Irrigation and Water Rights, 2nd Ed. 1462 (1912) for a discussion of this point. The test seems to be whether vested rights will be injured by the majority. If they will be and if the change requested cannot be effected without hurting a minority, the rule seems to be as stated - that the majority cannot run roughshod over the minority. But, where no injury would result, a minority may not stand in the way. Too, where maintenance of the ditch becomes impossible -- therefore the good of the community is at stake--without a change which will adversely affect a minority, the good of the community at large will prevail and the minority's objections will be to no avail.

205. Colo Rev. Stats. §30-3-12 (1963); Utah Code Ann. §3-1-13 (1971); New Mexico Stats. §75-15-3 (1953). For convenience, the first directors may simply be appointed with elections being held thereafter. It is usually provided that directors and executive officers be chosen from the members or stockholders. See Utah Code Ann. §3-1-3 (1953); Colo. Rev. Stats. §30-3-12 and §30-3-13 (1963). From this, it is obvious that the job is usually not full-time so the member can also pursue his agricultural activities. Salary, therefore is not great and a per diem basis may be best, i.e., \$10 per meeting plus travel expenses. This may be varied depending on the amount of time an individual is required to devote to company business.
206. Colo. Rev. Stats. §30-3-16 (1963); Utah Code Ann. §3-1-16 (1953). The whims of the members are controlled by requiring at least ten percent of the members to join in the petition to request an election for removal of a director. In addition, officers appointed by directors may also be removed by this method. See Utah Code Ann. §3-1-16 (1953) and Wyo. Stats. §17-175 (1957).
207. Colo. Rev. Stats. §30-3-10 (1963); Utah Code Ann. §3-1-8 (1953); Wyo. Stats. §17-159 (1957); West's Annotated Corporation Code 12900 (1955).
208. Colo. Rev. Stats. §30-3-9 (1963); Utah Code Ann. §3-1-7 (1953); Wyo. Stats. §17-169 (1957).
209. Utah Code Ann. §3-1-32 (1953). However, members may lose their votes if they do not respond to a public notice for impending election within the prescribed time, if their stock is not fully paid, or if they are delinquent in payment of their assessments. See Utah Code Ann., Id.; New Mexico Stats. §75-15-3 (1953); and West's Annotated Corporation Code 12801 (1956).
210. Utah Code Ann. §3-1-20 (1953).
211. Colo. Rev. Stats. §30-3-11 (1963) provides for one annual meeting or more meetings per year if desired; Utah Code Ann. §3-1-12 (1953); Wyo. Stats. §17-174 (1957). Notice of meetings must be sent to members in order to give them adequate time to adjust their schedules and prepare to attend. See Utah Code Ann., Id. (10 day requirement) and Wyo. Stats., Id. (20 day requirement).
212. West's Annotated Corporation Code 12702. But note that this section provides that any member who has voting rights may vote. Members may lose their rights by not paying for their stock certificates or by being delinquent in payment of their assessments. See #41, supra. Too, stock may be issued with no voting rights.

213. New Mexico Stats. §75-15-3 (1953).
214. Colo. Rev. Stats. §30-3-15 (1963); Utah Code Ann. §3-1-10 (b) (1953); Wyo. Stats. §17-172 (s) (1957); West's Annotated Corporation Code 12702. Digression: As can be seen, this arrangement is more popular than the one allowing voting shares to be determined by the amount of water rights. There are dangers in both positions, of course. Where voting shares are allotted by amount of water rights, it is immediately apparent that the large landholders will probably control things. Where reform is sought and the vast majority of persons affected by the proposed reform are small landholders, as is the case in Pakistan, this drawback would likely impugn the entire effort. On the other hand, the inequities of allowing the small owner to dictate policy to one who has a much larger investment and interest at stake are immediately apparent.
- Some middle ground would be best. As a suggestion, it might prove feasible to establish a system of cumulative voting. In this arrangement, voting stock would be distributed on the basis of water rights owned but, in an election, a stockholder might cast as many votes in the aggregate as he holds shares of stock, multiplied by the number of directors or issues upon which he is voting. He may cast the whole number for only one candidate or issue or he may divide them. This makes it possible for minorities to organize and elect a representative or push an issue through, but it would not give them total control. Neither would the major owners have absolute control.
215. See Radosevich, *op. cit.* note 27, p. 22, 23, 28.
216. See Joaquin Lopez, *op. cit.* note 1.
217. Supra, note 4, p. 19.
218. See Gabriel Munoz Gonzalez, *op. cit.*, in note 6.
- 218a. See *op. cit.* note 7a.
219. See David Daines, *op. cit.* in note 6, p. 125 and following.
220. Supra, note 14, p. 110, 102.
221. Supra, note 39.
222. Supra, note 12.
223. Supra, note 40.
224. Supra, note 4, p. 152.
225. Supra, note 41, p. 33.

226. Supra, note 14, p. 123.
227. Supra, note 45, Arts. 116-120.
228. See David Daines, op. cited in note 6, p. 156-161.
229. Supra, note 14, p. 123.
230. Supra, note 15, p. 53.
- 230a. See op. cit. note 46a.
231. See Radosevich, op. cit. note 27, p. 15.
232. See Joaquin Lopez, op. cit. note 64, p. 239.

FINANCING OF WATER USERS ASSOCIATIONS

The object of this chapter is to examine the forms in which the revenue for organizations of water users is generated. In some countries the payments to the water users associations are considered user charges, while in others they are simply tax payments. Financing of water works can be carried out by the associations itself, through government loans, outright subsidies, or by public borrowing by issuing bonds or debentures.

Argentina

In Jujuy Province, Argentina, the contributions to the consortiums are considered as user charges.

Users associations in La Pampa, Argentina, have to determine what kind of investment should be made to maintain and to improve the irrigation canal before adopting the method for distributing costs between users.

Associations of LaRioja, Argentina, are authorized to finance construction of water works in cooperation with the government of the province, and after works are finished, the maintenance costs of them is to be borne by the water users. This system has not been successful and water project costs have had to be paid by the government.

In Rio Negro Province, Argentina, members of the community use the same canal, and the association annually determines the costs of construction, exploitation, and conservation of water works. These costs become the budget for the association which is financed through contributions of the water users.

In the province of Mendoza, Argentina, the water users can pay a fee for service or they can contribute personal or hired labor.¹⁵⁰

People's Republic of China

Water user organizations in the People's Republic of China finance their operations by one of three methods: 1) levying fees for water delivery; 2) conducting economically profitable related activities such as production of food from reclaimed land; and 3) reduction of professional administrative staff. Funds collected for water service must be used exclusively for water development and conservation and may not be a source of general revenue. Capital construction is financed directly by the central government.^{151a}

Chile

In Chile, assessments for the costs of administration, maintenance and construction are paid by shareholders in proportion to the amount that the water rights of each user represents in the total water rights of the corporation. When some works benefit only a reduced number of users, only those who benefit pay the cost.¹⁵¹

Cyprus

Irrigation divisions have authority to collect water taxes on behalf of the district water board or they may purchase the waters in a bulk allotment from the district water board and then arrange payment with the users. Irrigation divisions can obtain loans for water projects from the national government. They collect the funds from their members for repayment.

Village water commissions are responsible for the management of domestic water supply works and for the collection of the funds to repay the

PAGE 111

ORGANIZING WATER USER ASSOCIATIONS

- Issues to Consider
- Influencing Factors
- Guidelines to Formation
- Conclusion

PART III

ORGANIZING WATER USER ASSOCIATIONS

BENEFITS AND INCENTIVES

Water user associations can function as an implementation system for government policies designed to increase food production, advance rural development, or improve resource management. This is accomplished in one or both of two ways.¹ First, by providing services and technical assistance which farmers are unable to secure as individuals. Secondly, by providing farmers the guidance and training to take advantage of appropriate technologies and advanced cultural practices.

This part of the report primarily deals with the parameters to be considered in attempts to reorganize or institutionalize the concept of water user associations as a means to improve on-farm water management and to facilitate overall agricultural development. Such efforts cannot be satisfactorily accomplished merely by adopting a checklist of recommendations without due consideration being given to the social fabric of the country involved. The particular scheme employed must be structured and tailored to coincide with the political, legal, cultural, economic and religious systems for the country in question. Only after evaluating and understanding the factors which influence the present use of water resources and those elements which are likely to influence their prospective use, can one intelligently advise on the adoption or rejection of specific components discussed hereafter.

Further, it can be said that no one particular organizational scheme stands out as the panacea to problems faced by small farmers in developing countries. One organizational type that has worked well in one country, province or culture may fail miserably in another locale even with similar agronomic conditions. Because organizations are created and operated by human beings, the degree of success depends upon the decision making process and attitudes of the membership and leaders. Countless examples in the U.S. and many other countries exist to illustrate this point.

The important criteria for the organization is that it be formed to implement and perpetuate an activity of tangible and obvious benefit to the membership and that the membership be knowledgeable and feel comfortable with the organization and its capabilities to assist them. Without a purpose of general acceptance, any organization, regardless of type and breadth of power, will soon become viewed as the pawn for the influential and wealthy.

In most countries the most immediate benefit to farmers from organizing is to serve as a vehicle to acquire and utilize appropriate technologies that will increase production and/or reduce labor and other costs from this humble and simple beginning, other functions can be added. In new project areas, the organization may initially be formed to operate and maintain the project facilities, such as canals, laterals and headgates so that water delivery can take place as efficiently and effectively as possible. Then as the water users acquire the ability to deliver water as best the system will afford, improvements on the system can be promoted as well as adoption of appropriate technologies.

The prime objectives in organizing farmers is to enable the water users, individually and collectively, to improve themselves, to provide the central government with appropriate feedback that will enable realistic policies to be formulated, and to facilitate implementation of those policies. Water user associations can best do this by functioning as a forum where farmers, regardless of the size of their holdings, present their views and identify with national efforts to improve the standard of rural living.

Agricultural development which emphasizes supplemental irrigation particularly depends on the increased commercialization of agriculture. This commercialization requires greater investment in production supplies and equipment, and in expanded marketing capabilities.² Water user associations will not only enhance farmers participation in the management aspects of water use, but can provide the education and training necessary for this agricultural commercialization.³

There are other incentives for farmers to participate in local water user associations beyond motivations for democratic participation in decision making and identification with the nation building process. Water user associations can foster the recognition of the right of each member of the association to use water and provide for enforcement of such a right consistent with the concept of equitable apportionment.⁴ Giving institutional recognition to such rights on the local level imparts stability throughout the system and this has the effect of encouraging farmers to undertake efforts to increase production by removing some of the risk involved in obtaining the necessary amount of water required to ensure expanded crop production. Such stability also assists various levels of government, and farmers, to engage in short and long range planning for obtaining production goals.

If the system encourages the participation of tenants on an equal footing with landowners, representation of this segment of the agricultural labor force (which is the significant group in many developing countries) acts as an incentive to the tenant. It also facilitates the flow of information to individuals who are most responsible for the methods of irrigation and other cultural practices which are applied to the land.

The most obvious incentive would be the financial and technical assistance which a structured organization can provide to its membership. It may be possible for the association to defray or minimize the initial and subsequent costs of improving the delivery and use system through cost sharing grants or subsidized loans. Programs for technical assistance and other educational efforts can be expanded to include areas of rural life not directly related to water management as a means of promoting community development through the water user association. This would encourage participation in, and identification with, the efforts of the association by individuals other than those who are farmers per se.

Often, governments will have policies related to agrarian reform. It is necessary to differentiate between those agrarian reform programs which are more oriented towards land tenure reform as opposed to programs

focusing on land operation reform.⁵ Land tenure reforms are concerned with the system for title or ownership of the land. Land operation reform deals with patterns of cultivation, cultural and management practices, and scales of operation. Such policies will have a significant impact on programs for improved water management and vice versa.

Economics of scale offered in water development may not harmonize with programs for land reform based on subdividing larger holdings into smaller parcels. Yet, the more numerous the holdings of individual operators, the greater the need for education and communication on the part of the expanded number of individual decision makers. Also, land reform programs often emphasize the need for an organization which is able to mobilize the resources of individual operators and to use collective judgement to make decisions which the individual will accept as binding. Such decisions will be more understandable to the individual because he participated in their making.

ISSUES TO CONSIDER

In utilizing the information in this report, several issues and conditions must be addressed prior to making a determination as to what specific direction to take and what components should be incorporated into the organizational framework of the association. These issues are important to the design and evolution of a successful program whether water user associations of some type are to be formed as a component to a national or provincial/state public irrigation improvement program or whether the concern of the government is to provide irrigators with an opportunity and approach so they can voluntarily mobilize to increase production and enhance their water use. The issues are:

1. What are the water and related resources development policies of the country?
2. What type of local water organizational structures currently exist, if any?
3. If such organizations do exist, are they institutionalized or coincidental, defacto or dejure?
4. What incentives exist for creating or improving water user association?
5. What land use and tenure systems are involved?
6. Is the formation of such organizations timely?

The institutionalization of water user associations requires a simultaneous effort at both macro and micro levels of government. In keeping with announced or proposed policies of the government, an established agency, department, ministry or bureau may have been designated the responsibility for programs which will logically involve water user associations. These programs may include land leveling; water course

rehabilitation; information dissemination on water supply, allocation and distribution schedule; and programs for technological assistance. These are a few areas of interest to the water user.

Therefore, on the macro level it is important, from the standpoint of intergovernmental coordination, that a comprehensive understanding of the interface of a program for water user associations with other agencies and programs be considered. Hopefully such an evaluation at an early stage in the introduction and formation of water user associations will avoid wasteful duplication of effort and the risk of failure.

Ascertaining the existence of water user associations is a logical and important step to take in assessing the need for and potential functioning of such an institution. Existing structures should be evaluated in terms of their performance in achieving or facilitating the achievement of government objectives for efficiency of water use and agricultural development. It is also important to determine whether the organization was evolved over time or whether it is part of a program of a previous administration. In both cases the recognition of the organization by the present administration and the general acceptance by the population offer an immediate indication as to the potential effectiveness of the effort.

A distinction must be made between improving upon an existing system or developing a new system of water user associations in an area where no institutionalized system exists. Improving on an existing system of association requires:

1. A state-of-the-arts assessment of existing institutions, not only local water user organizations, but all entities related to water control, use, and agricultural activities. The rationale for this assessment is to acquire an understanding of the pragmatic operation and to identify potential impediments or complexities to improving water user associations.
2. Evaluation of the goals and problems of coordination between existing organizations and proposed changes.
3. Determination of the degree of flexibility in formulating a complete system of administration consistent with national or regional policies and development programs, from the "bottom-up" grassroots form of organizational approach. This "bottom-up" approach to institutional organization requires that each level in the potential hierarchy of the water user association be consistent with the administrative system used to implement national and regional policies for development programs.

Developing and introducing a new system of social organization for water delivery and use as prime objectives must be treated differently. This requires:

1. Evaluation of national and subnational water and related resources and socio-economic goals, policies and laws.
2. Determination of the degree of flexibility in formulating a complete system of administration consistent with national or regional policies and development programs, the "top-down" form or organizational approach.

The initial structuring of a new water user association should be simplistic enough on the micro level to encourage farmer participation and flexible enough on the macro level to allow for institutional maturation as intra-water course demands and developments take place.

Since the formation of water user associations will offer the individual farmer a group for collective action, the timing in organizing water user associations should be closely geared to the introduction of the appropriate technology. The formation of a water user association also provides a forum for the education and training which may be required for successful adoption of the new technology.

Early formation of water user associations during the initial planning and development stages in rural development programs will have the advantage of providing an institutional linkage between national planners and the affected public. Therefore, if it is deemed to be advantageous to solicit public involvement in the early phases of the development program, and formation of water user associations will be a useful mechanism for this purpose.

Once water user associations have been organized, assuming it is accomplished in the early stages of development, the organization will be able to evolve with the increased complexity of institutions and technology. This aspect has the benefit of pacing the level of institutional and technological understanding of the members of the association with that of the system which develops over time. The ability of the individual farmer to identify with the organization, which is intended to function as a change-agent, will improve the adoption of new technologies when introduced through the organization.⁶

The selection or recommendation of a particular organizational form for formation of a water user association as an agent for rural development through introduction of appropriate technologies for improving the efficiency of on-farm water use will pose several complex problems which must be dealt with according to existing circumstances. First, little empirical research has been done to develop production functions which provide high rates of return for the various combination of inputs used

by different types of appropriate technologies.⁷ Such information that is available more often is indicative of successful small-scale or pilot projects than for integrated rural development programs.⁸ In the face of a lack of empirical data from which to make specific recommendations, the authors refrain from attempting to supplant their judgment for that of the administrator or project officer who is aware of the nuances of the situation with which he is confronted.

Secondly, where efficiency and productivity are concerned, if the returns from the introduction of appropriate technologies are low from society's point of view, such returns will be even lower from the view of the individual farmer who is expected to adopt them. If this is the case, farmers will be reluctant to invest in technology and the rate of development through change will be further slowed.

Finally, the fact must be kept in mind that there is often a complementary relationship between more than one form of technology and other innovative practices. Therefore, a high level of productivity from the adoption of the appropriate technology may depend on close coordination of the introduction of the new technology, the institutional and educational process of its introduction, and other inputs. An example in the use of a new technology for water management would be to consider not only the new technology but to interrelate it to improved varieties of seed, use of inorganic fertilizer, and new institutional doctrines governing the amount and timing of water application.

INFLUENCING FACTORS

Once an understanding and appreciation has been acquired of the overall background within which water user associations will be organized, or the existing organization improved, there are specific factors which can significantly affect the selection of the components presented in this report. These factors range from the physical aspects of the resource and the economic and social resources of the country in question to government policies which affect the dimension of water application.

Spatial vs. Temporal

Often governmental efforts for planning and implementing resources development are formulated in terms of the spatial coverage and the temporal sequence to be followed. The former dimension concerns the spatial orientation of the policy or program in terms of national, regional, or local levels of operation. Because policies often reflect political orientation, they usually define their parameters along political (artificial) boundaries. For most economic sectors and activities this works well. However, it is recommended that special attention be paid to the nature of the resource and water use activity by agriculture in developing the policy. The policy should allow flexibility to operate in the natural boundaries of the resource and its use characteristics at either the national, provincial or state and local levels. Also, guidelines which are intended for use on the local level may lack relevance to those policies which have a wider application.

Generally, planning and programing efforts will be given an orientation to a specific time horizon. Such policies may be expressed as short or long term goals, or possibly given a more exact status such as five or ten year plans. In this situation the approach selected for

forming water user associations should be related to the immediacy of the objective which is to be accomplished. Certain components will facilitate the achievement of practices which may or may not be considered a priority item for the stage of development which is being pursued.

In both the spatial and timing situation the issue is one of relevance. If the approach adopted is not timely in relation to the stage of planning or program development, or is inappropriate in relation to the level of attention, the advancement of the program will be of marginal significance.

Labor vs. Capital Intensiveness

The adoption of certain guidelines will involve the recognition of trade-offs between those practices which will be either labor or capital intensive. The amount of capital which can be committed to water development programs may be limited, in comparison to the availability of under-employed labor resources, in most developing countries. The selection of an approach which facilitates the participation of tenant farmers allows the association to draw on this source of labor. Likewise individual members should have some choice whether to contribute capital (as may be the case for absentee landowners) or to contribute "in kind" (as may be the case for moderate and low income farmers). In both situations, the intent in selecting structural guidelines should be to provide maximum incentive for individual participation.

Subsistence vs. Affluence

In developing countries, farming is more a way of life than a business and agricultural production is primarily for home consumption and meeting local market needs. The structuring of organizations should be done with recognition of several important distinctions between subsistence and affluent societies.

As mentioned in the preceding section, the prevalence of under-employed human resources should cause the adoption of a program which provides incentives for individual participation in terms of contributing personal services rather than financial payment. Furthermore, the fact that greater numbers of the country's population will be involved in the agricultural sector of the economy rather than in manufacturing or service is all the more reason to structure a system which makes optimum use of human resources.

Agricultural practices will tend to be more land intensive rather than land extensive. As a result, farmers will identify more strongly with local problems and concerns rather than with national or regional interests. These factors stress the importance of the water user association as a communication and educational linkage to the national government.

Finally, the experience of farmers in developing countries with group management of a resource and dealing with governmental and institutional systems will be limited. Therefore, the guidelines for forming water users associations which place an emphasis on simplistic and flexible systems are to be preferred. As local experience and understanding progresses, more complicated features can be added to the functions of the water user asso-

ciation. Presumably, as the experience of farmers grows, production will increase and rural living will gradually move out of the base subsistence levels found in many countries. The important factor here is to provide the incentive through a realistic program of improved water management that can expand to assist in solving related problems, such as credit and processing, storage and marketing of products.

Sectoral vs. Intersectoral

The main focus of this report has been the involvement of farmers in water user associations as an institutional means for improving water management. It is also feasible that participation in the efforts of water user associations could be broadened to include water users who are not directly concerned with agricultural production. For example, it may be in the interests of comprehensive management of a watercourse to include municipalities and other communities who use the water course in common with the irrigators of the water user association. The same argument can be made for the inclusion of industrial water users.

In these situations, the type of membership, degree of participation, and control that municipal and industrial water users would have within the association should be given careful consideration. However, membership should subject the nonagricultural users to the decisions made by the associations. If these outside interests are not given formal or informal membership status, this will require additional coordination on behalf of the association. Furthermore, the association will need to be an effective spokesman for the farmers in situations where irrigators must compete with nonagricultural users for water resources in cases of expansion of irrigated acreage or in distribution of available water supplies during draught periods.

One constraint in the past has been the purely sectoral approach taken in many countries. Admittedly, agriculture has been given an advantage through the evolution of water use, i.e., many countries still have Departments of Irrigation which are charged with jurisdiction over water. But agriculture cannot operate in a vacuum, independent of the other economic sectors. The importance of these sectors and the need for intersectoral activity cannot be over-stressed in deciding what role of authority the associations should have.

Humid vs. Arid

The amount of water available from natural sources will affect the purpose and mission of the water user association. In situations where there is a general scarcity of water for agricultural production, the size of land holdings tend to be larger and the demand for water induces the construction and regulation of a physical system for the delivery of water supply. The right to use water is often more distinct and more valued than in areas of greater water abundance. The demands for water supply in arid regions are also a function of the seasonal needs of irrigated crops. In arid areas, supply and demand, as well as delivery, must be considered as an integral system.⁷ There are many promising technological and institutional possibilities for simultaneously increasing supply and reducing demand that together will benefit arid lands. These possibilities include rain water harvesting, reuse of water, reducing evaporation, reducing seepage losses, trickle irrigation, and more efficient water management system.

In more humid areas, the emphasis is more on how to remove unwanted water, or how to control seasonal flooding to prevent loss of life and damage to property. Here the function of the water user association is to remove water from agricultural lands rather than one of delivery for application.

As mentioned above, the selection of guidelines which stress the right to use water and the timing of delivery are much more important in an arid country.⁹ Whereas the need to maintain systems associated with delivery or removal of water are of importance to either climatic situations.

Surface vs. Groundwater

Another factor of importance to the design and operation of water user associations concerns the source of supply. Traditionally, in most countries, farmers obtain supplemental water for crops from surface sources--streams or lakes. But over the past few decades, low cost pumping has introduced another source to many irrigators, and in some countries, uncontrolled groundwater pumping has caused soil and social problems. The recent ground water use referred to does not include the age old spring and water tank uses made in many parts of the world with lift by Persian wheel, etc. These practices, as useful as they have been, provide limited volumes of water.

The problem caused by ground water use stems primarily from uncontrolled pumping and well spacing. In those countries and areas where it is possible to draw from both surface and ground water, the government should regulate the conjunctive use of the resource by placing the responsibility upon the association for reporting the source of supply, distributing water efficiently and without harm to neighboring associations, and requiring permission before new wells can be located, constructed and operated. This authority is needed due to the fact that groundwater supply can be affected by the overuse of surface water and vice versa. The physical interrelationship of these two supplies should be given recognition in the water management structure although one source of the other may play the leading role in providing water for agricultural application.

Quantity vs. Quality

A perpetual problem faced in developed and developing countries is the failure to recognize, in law and administration, the interrelationship that exists between the use of water for agriculture and the resulting effects upon water quality. In many areas, particularly at the upper reaches of extensive irrigation systems, water quality is not a problem. It is usually the lower reaches that begin to experience decreased crop production from degraded water, surface or ground.

To most water users in arid areas, water of any quality is graciously accepted and utilized. But, in irrigation systems where there are high inefficiencies in use, there are normally large amounts of return flows from seepage in the delivery systems, and deep percolation and/or tail water runoff caused by excessive application of water to the field.

The complexity of the return flow system and its relationship to a river basin are schematically illustrated in Figure 1. Figure 2 focuses upon the individual farm and identifies the three major sub-systems of an irrigation system that water use on a farm unit makes up. These sub-systems are: 1) the water delivery sub-system; 2) the farm application sub-system; and 3) the water removal sub-system. Figure 2 is a simple illustration of what occurs when water is used on any size farm unit. It becomes much more complex when this scheme is multiplied by the small landholdings found in most developing countries.

Although there are many benefits from the return flows in the sense that it makes up the source of supply for downstream users, there is also increasing recognition of the detrimental effects. Figure 3 summarizes the impact upon irrigation return flow quality from traditional water use and agricultural practices. Many countries (Mexico, Pakistan, United States) are experiencing reduced and even eliminated agricultural production caused by the degrading constituents that reach the receiving waters and are subsequently used by downstream irrigators.

It is important that this relationship and interdependence between the allocation and distribution of water for irrigation and the resulting impact on downstream flows be incorporated into the rights and responsibilities of water user association activities. Indeed, if the associations are to play a major role in water management specific duties in this area are requisite. Furthermore, they may be the only entity which can assume the oversight for water quality on the local level.

Therefore, water user associations should be given power to act in areas associated with water quality concerns as well as with the delivery and removal of the amount of water required in agricultural production. Such authority would be an institutional recognition of an established environmental interrelationship associated with water management similar to the conjunctive use relationship between surface and ground water sources.

GUIDELINES TO FORMATION

Nature of the Organization

Water user associations are usually formed according to one of two methods. First, the water users act on their own initiative to establish such an organization. Generally, this method is provided for under enabling legislation which creates the structure for, as well as the method of, organizing the association. In most western countries, water users organize voluntarily according to enabling legislation adopted by the government.¹⁰ However, voluntary associations are also formed by necessity where collective action has developed without formal governmental approval. These organizations represent the customary or traditional pattern, like that found in Indonesia, and play an important role in the entire community activity.

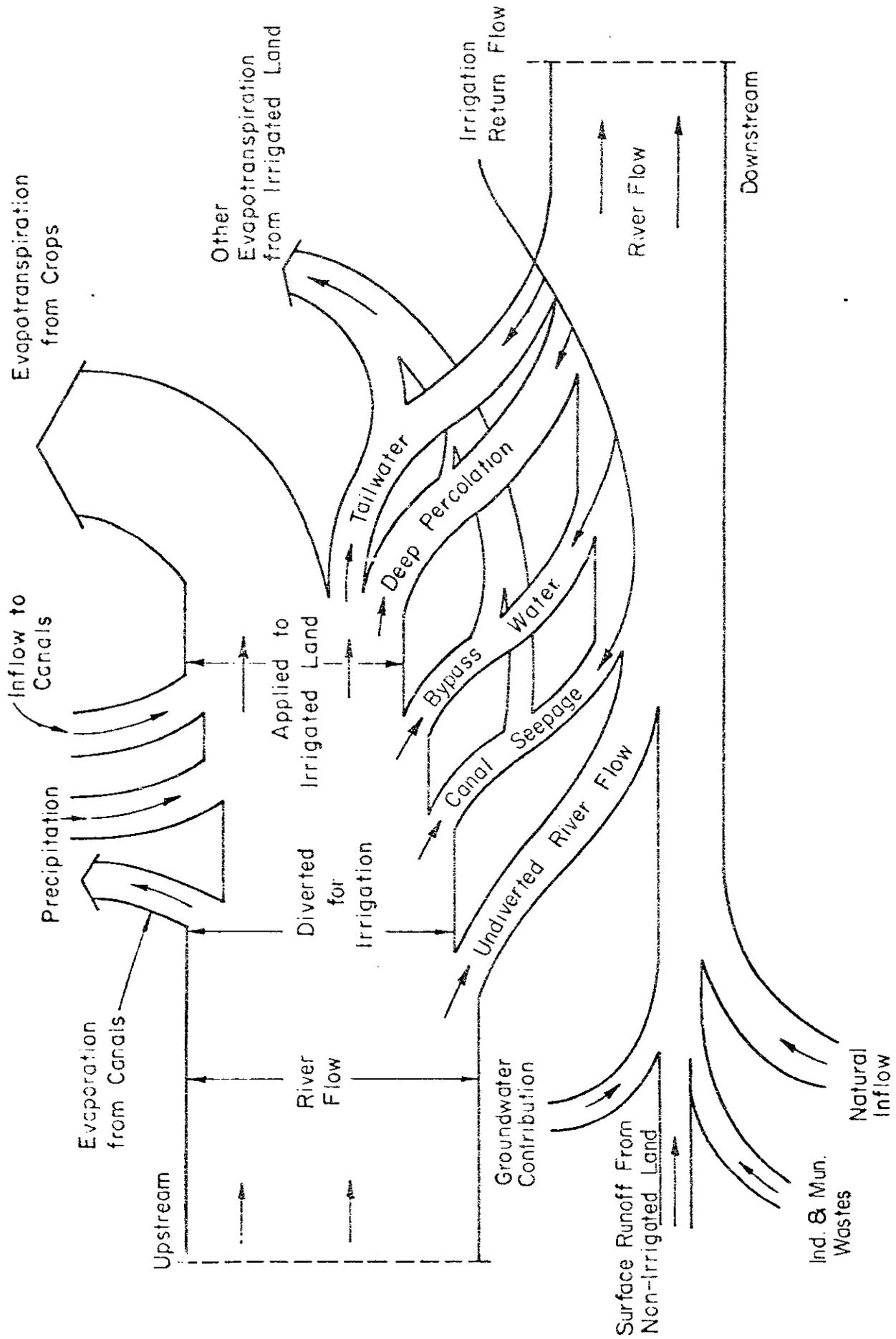


Figure 1. Model of the irrigation return flow system.

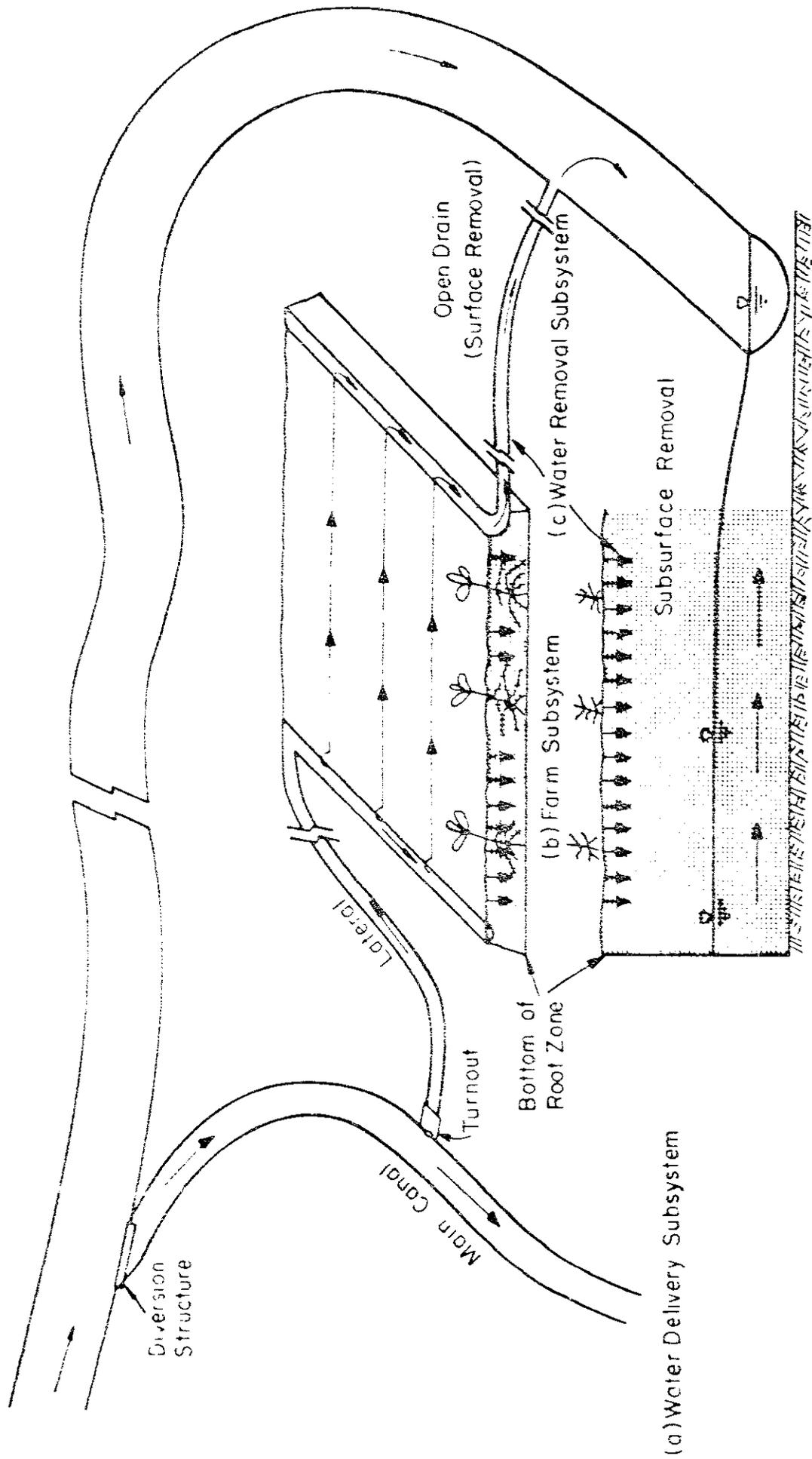
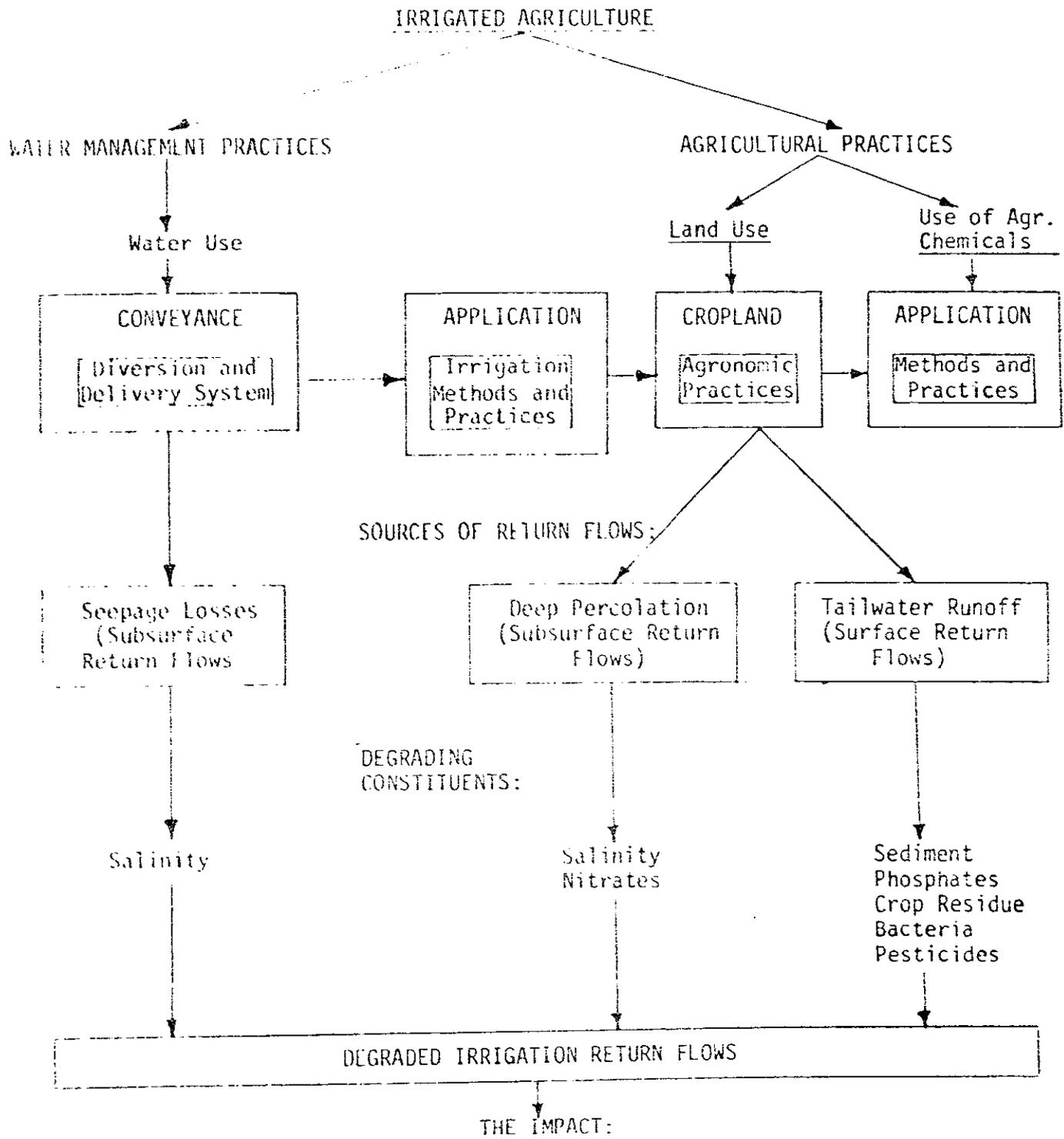


FIGURE 2. The Water Delivery, Farm, and Water Removal Subsystems.

(Skogerboe, 1976)

FIGURE 3

Impact of Water Management and Agricultural Practices
Upon Irrigation Return Flow Quality



Deterioration of Ground Water and Surface Water Quality

(Radosevich & Skogerboe, 1977)

When an association is organized according to the provisions of an enabling act, the typical requirements are that at least a majority of the landowners or operators present a petition addressing such items as the area of jurisdiction that the association will have, the membership roll, the purposes for which it is being organized, and the by-laws of the association for internal operation. The petition is submitted for approval to a court or administrative agency of the government. If approval is granted, the association begins operation and the information in the petition becomes binding on petitioners and nonpetitioners.

Second, the central government may wish to establish water user associations according to a general plan for the nation or region or in an area where water shortage requires stricter controls on water use. In this case, the government may have authority to assume the initiative under the same enabling legislation which provided for individual action at the local level. However, the creation of water user associations as management units in some countries, such as Mexico, is entirely the province of the federal executive. In such state-created systems, membership is compulsory on all users in the jurisdiction of the association.

The majority of countries allow water user associations to organize according to the individual initiative of water users under provisions which are stated in enabling legislation. In this fashion, the method of formation and means of operation are controlled by the government. Furthermore, final approval of the association's establishment rests with the central government. The formation of voluntary associations will typically occur where the economic incentives for increased production and efficiency that effect the level of crop and livestock yield, are rewarded in the market.¹¹

In those situations where action on the local level does not meet the requirements of the central government due to delay, water shortage, or other reasons, it is possible for the government to assume the leadership for establishing water user associations under the same enabling legislation.

The organizations are also given private or public legal status. Private organizations, such as companies or corporations, have attributes of flexibility in operation through adoption of by-laws tailored to meet the peculiarities of the members, and autonomy from government interference and overseeing all activities. Also, the management of the association is primarily concerned with its accountability to its membership rather than to the regional or national government. The disadvantages are lack of government control and the inability of the organization to levy taxes and obtain financing through sale of bonds.

Publicly created water user associations will sacrifice much of their local autonomy in internal management but this factor may be offset by the fact that such bodies can be given governmental powers such as eminent domain for the condemnation of private property and the ability to exercise state police powers to enforce its rules and regulations concerning water and related land resource uses. The formation

of such bodies may improve the channeling of governmental assistance in the face of possible prohibitions in making governmental aid available to private ventures or associations.

Where the government's policy is directed at the public or state ownership and control of natural resources, publicly created associations will be a means for implementing this policy on a local or regional level and can foreclose the exploitation of natural resources by foreign capital. Public entities can do more to protect the public interest in the use and allocation of natural resources in developing countries. Furthermore, if the associations are coordinated with the governmental infrastructure, the implementation of national policies for rural development can be improved over that of relying on private associations.

In summary, the options to be considered in determining the nature of the organization are:

1. How is it to be introduced:
 - a. by voluntary creation of water users under general enabling legislation which provide the opportunity to organize; or
 - b. by compulsory creation by the government to achieve particular objectives.

2. What legal status should the association have:
 - a. private entity; or
 - b. public entity.

No rigid combination will solve every problem faced by the government and water users. The nature of the organization will depend upon what is to be achieved and the capability of the water users. Based upon the experience and trends in several countries, however, it is recommended that both options under (1) above be adopted, and initially only public legal status be granted.

Purposes

The basic objective of a country in deciding to promote or compel the organization of water users will obviously vary and depend upon the national or regional goals and policies to be achieved. However, it is assumed that the government is committed to the proposition that agricultural production can increase, greater water use efficiencies attained and standard of rural living raised by introducing appropriate technologies to their farmers, and by developing a program to insure that these technologies and improved practices are in fact utilized by the farmers in irrigated areas.

If this assumption is correct, then the major purpose for getting water users to organize is not for the sake of organizing, but rather to perform tasks and functions that will be of direct benefit to them and their country. The water user association is, thus, only one

essential component in the overall effort to improve and increase the role of agriculture to the individual and his constituency.

This major purpose can be articulated as a number of specific purposes for the formation of water user associations. These specific purposes are enumerated as among the most important. The government should select those that meet their needs and may also identify other purposes related to particular conditions, objectives, or problems that it faces. The following specific purposes are recommended for consideration, based upon their current use or identified need:

- Promote the best (highest, wisest) use of land and water resources.
- Assist in construction, operation and maintenance of a water diversion and delivery system.
- Promote the improvement of on-farm water use, scheduling of delivery and the delivery.
- Assist or undertake the construction, operation and maintenance of a water removal system.
- Cooperate and contract with governmental agencies to implement water and other agricultural improvement programs.
- Disseminate information on water supply, delivery, employment programs, etc.
- Carry on conservation practices within the boundaries of the association.
- Undertake water course rehabilitation and land-leveling to improve land and water use.
- Promote and assist in related agricultural activities that benefit the community of irrigators.

Broader purposes for water user association formation have included such activities as providing hydroelectric power, sewage disposal and soil conservation. To reiterate, an important purpose for these organizations lies in the area of improving cooperation among individual farmers and levels of government and the dissemination of information related to general rural development. For example, in Iraq these organizations are responsible for pest control and seed selection as well as water development and distribution.¹²

Water user associations can also perform an important role in rural areas by functioning as a tribunal for the resolution of disputes between individuals and the association in the use of water resources or related agricultural activities as is the case in Spain and Taiwan.

Powers

Once the functions or purposes are established for which water user associations are to be formed, the next step is to provide the associations with the legally binding and enforceable powers to accomplish them. An important issue which is related to the determination of the powers is that of maintaining accountability for the use of such powers with the granting government. In most countries

it may be adequate to initially focus upon a few simple and basic purposes and grant the specific powers necessary to carry out these purposes. These purposes and powers should be within the capability of the government to effectively promote and monitor.

The powers and duties which should be considered among those granted organizations created to improve water use and increase agricultural productivity can be divided into four general categories: Administration, Operation, Enforcement and Dispute Solving, and Miscellaneous.

Administration powers include those necessary to carry on the organizational activities of the association such as membership, finance and management. Operation powers are those which define or outline the parameters of functional activities related to the purposes of the association. The powers to enforce rules and resolve disputes include determination of the problem and carrying out or enforcing the decided solution to the problem. As with every social organization, there are often many issues to be addressed that are peculiar to the culture and region that require miscellaneous powers.

Within each of the four general categories of powers, the following specific powers are recommended:

Administration Powers

- Elect officials and representatives to serve on the managing body of the organization.
- Right to create internal organs of the association to carry out the purposes and powers granted.
- Enact by-laws and other internal rules and regulations for operation consistent with the state purposes. By-laws should be filed with the government agency in charge of the water association.
- Authority to borrow, incur indebtedness, accept loans and pledges, levy assessments, impose fines for violation of rules, prepare budgets and carry on other financial responsibilities.
- Incur obligations (by the managing body) under contract with the government or private sector consistent with the association's purposes.
- Contract for materials and services.
- Appoint or/and hire water masters or ditch tenders.

Operations Powers

- Establish water use principles and delivery schedules.
- Control water delivery according to rules on distribution and delivery.
- Enter persons' lands, with notice, to survey and inspect water works.
- Operate and maintain water works within the organization's boundaries.
- Require non-waste of water and prevention of harm to other users.
- Require on-farm drainage, if necessary.
- Undertake other activities associated with improving water use efficiency and increased production, such as water course rehabilitation and collective land leveling.

Powers to Enforce Rules and Resolve Disputes

- Compel payment of fines or services in lieu thereof.
- Accept complaints from membership.
- Identify problem and gather facts through investigations and hearings.
- Decide appropriate solution and if necessary punitive action.
- Insure solutions carried out and punitive action enforced.
- Develop abatement schedule if the problem requires a phasing-out so to not cause undue hardship on either party.

Miscellaneous Powers

- Obtain credit or commodities related to agricultural production for the membership.
- Eminent domain powers to acquire rights-of-way, lands, water rights and water facilities, as necessary to carry out the purposes of the association.
- Right and responsibility to require the association membership to comply with the water and other laws, decrees and agency rules established by the government; for example, well spacing and ground water pumping rules, non-dumping of wastes into canals, etc.
- Gather and disseminate information to membership.
- Send representatives to confer and/or work with government officials on matters affecting the membership of the association.
- Undertake or participate in educational and demonstrations programs that benefit the membership.

Jurisdiction

Jurisdictional authority of water user associations consists of two parameters. The first is in terms of a spatial or territorial nature. An organization created primarily to facilitate improved water use does by the very nature of this resource require boundaries to conform to the hydrologic characteristics rather than social or political. Cooperatives and traditional village organizations often extend beyond or fail to include all water users affected by the general water delivery system in an area. Their boundaries usually follow markets, social or political lines.

Thus, the physical parameters of a water use association must at least be the command area of the water distribution system. In most countries, a government agency is in charge of the water diversion, storage (if any) and major delivery system. This may include a series of major and minor canals. But at some point there is a clear distinction between the government's canals and the discharge outlet and laterals delivering water to a farmer or group of farmers. Generally, the government assumes no responsibility for operation and maintenance beyond this outlet. It is this command area under the outlet that can serve as the association's boundaries. All water users receiving water from this outlet have a common interest to insure that no waste is committed and that water is properly delivered to their fields through the laterals and sub-laterals. It is this common interest that must be drawn upon in promoting programs to improve the system.

It is highly recommended to include adjoining lands affected by the water delivery system or within the sphere of conservation influence. For example, lands that are irrigated from wells, springs or runoff adjacent to the lands receiving most of their water from canals should be included to insure soil erosion control and proper drainage.

However, overlapping jurisdiction should be prevented. Where this possibility occurs, inter-association agreements should be worked out so that each association's rights and responsibilities are identified. These agreements should strive to eliminate problems and promote cooperation.

The by-laws or rules can be amended to extend the area of services or, if approved by the government, engage in inter-water course exchanges.

The second parameters of jurisdiction is that of subject matter. Expanding or restricting the authority of water user associations to specific activities or functions is more in the nature of authorizing or limiting the powers of the association. This was addressed in the prior section. It is mentioned here only because some legal classifications of jurisdiction refer to both area and subject matter.

Membership and Internal Decision-Making

Earlier in this part of the report, the option to form a water user association was explained as a matter of government policy--that is, once the legal foundation for creating such organizations was adopted, the formation could either be voluntary and initiated by the water users, or compulsory as required by the government if certain activities or programs were undertaken.

Membership in the water user association, however, should not have this option. As a general rule, once either compulsory or voluntary associations are formed, membership in the association is required of those individuals whose lands are benefited from efforts of the association. This rule is recommended. In some countries (i.e., Argentina and United States), those who do not want to become members in the association and participate in the benefits and responsibilities can seek judicial review during the formation of the organization. By this means, if the court finds it unreasonable to include them, they may be excluded from membership. But, as with the majority of national or state laws on this topic, if a certain percentage of the benefited parties favor the formulation of the public organization, the minority is required to abide by that decision. This general rules does not answer the question as to whether or not tenants, municipal corporations or government officials should be permitted to become members of the association. If the association is involved in supplying services to municipal corporations, they are generally granted representation in the association.

The question of government water officials is normally a different matter. Most often, farmers feel there is a distinct difference in objectives between the regulator of water and the water user. It is recommended, therefore, that the canal officer be permitted and encouraged to attend some meetings as an observer and advisor, but not voting member of the association.

Membership of tenants must likewise be carefully weighted. It is recommended that landowners and tenants be included in the membership as an incentive to the tenant to utilize good husbandry upon the owner's lands. In voting, the right to vote may be divided in some manner between landowner and his tenant.

Exercise of the legal powers given to the association and other expressions of collectively made decisions require that a system for polling the association's membership be implemented. The most common form of collective decision-making is for members to express approval or disapproval of proposed actions by voting.

The number of votes which a member can cast vary from system to system. It is not uncommon for the number of votes to be a direct function of the number of acres or hectares which a member of the association has under irrigation or that voting be a direct function of the amount of water which a farmer has a right to. In Spain, for example, a person has as many votes as units of water right.

Other nations such as Japan and parts of the United States apply a strict one-man, one-vote rule. One system, Austria, equates voting with the amount of financial support contributed to the association.

In Mendoza, Argentina, the law has tried to reduce the disparity in voting power between small and large landowners. Voting rights are proportional to the amount of irrigated land that each landowner has. There is a minimum amount and a maximum number of votes. The votes are determined in this form (Art. 42, Mendoza Water Law, 1884):

<u>Votes</u>	<u>Ha</u>
1	2000m ² to 2 ha
2	2 ha to 5 ha
4	5 ha to 10 ha
6	10 ha to 15 ha
7	15 ha to 20 ha
8	20 ha to 30 ha
9	30 ha to 50 ha
10	more than 50 ha

Members of the commissions of irrigation in San Juan, Argentina, vote on issues significant to the operation and management of the association. The number of votes each irrigator has is proportional to the number of hectares he has under irrigation on a graduated basis. The maximum amount of votes is ten.

To most developing countries, one of the most important aspects of membership is whether to allow tenants and lessees to be voting members or to restrict such membership to landowners only. The general rule

seems to be that membership in the association follows either title to the land or the right to the use of water. However, there is a growing trend, particularly in South American countries which have undergone recent land reform, to allow nonowners to participate fully in association decision-making.

Although the range in voting systems varies considerably, it is recommended that a graduated voting system, like that employed in Mendoza, be adopted as a more equitable approach. It may be impossible to eliminate the favorable position of either large landholders or the multitudes of small farmers, but this approach comes the closest among those approaches analyzed.

Using the graduated approach, the tenant issue is likewise partly resolved. Tenants can be given the right to vote a percentage of the landholders total voting rights, i.e., 30 or 40 percent or the landholder can assign his full voting privilege. This protects the owner's economic interest in the land while enabling the tenant to participate in decisions which do affect his output.

Usually a majority vote is sufficient for most issues; however, issues which may require extraordinary action may require 2/3 or greater to gain approval. Such decisions may include construction of facilities, election of officers or decisions to use debt financing.

Certainly not all decisions need to be made by the collective action of the association. Purely administrative matters should be left to the discretion of officers or employees of the association with the opportunity to review them at the next regular meeting of the association.

Financing

One of the major tasks that must be performed by the governing body of an association is the preparation of a budget and securing of financing to carry out the activities to be performed during the year. A simple budget consists of two components: revenues and expenses. Within each of these two components are projected and actual revenues and expenses. The actual expenses will be monies and debts carried over from the past year of operation. It is the duty of the governing body to project what additional revenues and their sources will be needed to cover the expenses of activities to be performed during the next budget cycle. The expenses common to water user associations can be placed in two categories: operating and capital contribution costs. The former include costs of administration--such as payment of a manager, secretary, office expenses--and operation and maintenance costs of the system. The latter may be necessary only when the association proposes to rehabilitate or extend the water delivery system or obtain equipment and other items to be used by the association for the benefit of its members.

The methods which water user associations can use to finance their operations is directly related to the sources from which revenue can be obtained. The most common practice is to place the entire burden on the members of the association in the form of charges for the amount of water used or to levy assessments based on the valuation of land owned

by the irrigator. Payment is generally in monetary form; however, some countries allow farmers to make payment in-kind by working at a set rate for the association. Although rates or assessments may be set by the local association, government approval is a common feature with many systems before revenue can be collected. Loss of water or other sanctions can be imposed against those who do not meet their financial obligations to the association.

Larger projects require amounts of capital which are usually beyond the resources of a local association. Therefore, cost-sharing with the central government in the form of loans or grants enable the association to expand their financial base. If the government requires repayment of the loan with interest, the rate of interest will have a great effect on whether the project is undertaken. Even if the loan is interest-free, repayment will be the responsibility of the individual users through assessments paid to their association. The central government may also perform the service of collecting and managing the money to repay the loan on behalf of the local association.

If capital is available in the private sector, it may be possible for associations to issue bonds which are retired by regular payments made by the association from assessments or charges required from individual water users. The requirement of repaying the debt with interest is a standard feature of private financing and here again the "cost" of money could be a limiting factor in using this method of financing.

Incentives for Participation in Water User Associations

A wide variety of factors may influence individual farmers to participate in a water user association. These factors range from increased personal income to participation and self-determination in decision-making on methods for rural development.

In one of the few studies to be conducted on incentives for improved on-farm water management, the most effective inducement was the availability of low-cost financial assistance for irrigation improvement.¹³ The other types of incentives identified according to their rank in acceptability among individual water users were: 1) loans for irrigation system improvement where the interest rate is a function of efficiency; 2) cost-sharing for irrigation improvements; 3) technical assistance on irrigation management and conservation; and 4) scheduling of water delivery.

Conditioning the participation in any program for financial or technical assistance by becoming a member of a water user association is an additional inducement for participation. It is also a test that will reflect the water user's perception of the usefulness of the program.

A system which encourages participation in local decision-making by tenants as well as by landowners will offer further incentive for participation on the part of the individual who does the actual farming. If tenant participation is to be permitted, tenants should also be able to hold positions as officers in the association as is the practice in Mendoza, Argentina.

In more complex social settings, the government allows members to deduct the cost of fees and charges paid to water user associations from their property or income taxes. A similar approach would be to permit a tax credit for the cost incurred as a member of an association. This is one means by which the government can induce irrigators to participate in agricultural improvement programs. As a condition to receiving the government assistance, those farmers who do organize can receive the tax deduction or credit.

Government Control

The issue of governmental control of water user associations is essentially a question of how to provide accountability on the part of the association for its role in the overall rural development efforts. The control issue presents itself as what means can be built into a system of water user organizations which allows the central government to monitor the implementation of programs designed to promote more efficient water use and comprehensive rural development.

Several methods for monitoring accountability of local water user associations can be employed by the central government. First, during the process of formation either enabling legislation or government mandate can provide guidelines and accepted patterns of organizational structure as well as its delegate powers. The requirement for audits of operating and capital construction budgets and the provision for governmental inspection of other financial records and accounts insures the financial integrity of local associations.

The regulation of local elections and setting requirements for those who hold official positions in the association can facilitate the responsiveness of the association to its membership and the central government. In any case where the governing body or the general membership is given the authority to adopt and enforce local by-laws, regulations or ordinances, provision should be made for the filing and review of those rules with the central government.

The central government should have the authority to enter and inspect the facilities maintained by the association. If the association has the authority to levy taxes or assessments, the government may consider it essential to approve or directly manage the setting of the rate and collection of revenues.

Finally, government advisers should attend the meetings of the local associations on a regular basis. If absolutely necessary, government officials could become association members and officers, as is the case in Taiwan, as a means of improving the accountability of water user associations. Periodic surveys of association activities should be conducted to determine if the association needs technical assistance, and is properly and fairly carrying out its purposes.

Designing the Organization

The previous 13 pages provide an insight into the role of water user associations, particular features found in laws, decrees and rules of many countries, what should be considered and basic guidelines to formation. Given this information, the next and perhaps most important task is to design the organization(s) itself. What has already been discussed in Part III will not be repeated. The focus here is upon the organizational structure, offices and a potential hierarchy of association.

Most irrigation delivery schemes consist of the government constructing the surface water diversion and conveyance system with water delivery through a series of canals to the outlet where a farmer or group of farmers receives their allocated water supply. For this report, we will refer to the canals as major and minor canals. Often there are larger canals feeding the major canals and small distributaries, still under government jurisdiction, conveying water to the irrigators' outlets. We will assume that below this government controlled outlet, there are laterals within the irrigation system command area delivering each farmer's share to his field. These laterals are under the control of the irrigators served thereunder. It is these laterals that the association will manage (see Figure 4).

The scheme is not disrupted if ground water is included in the water supply. Placement of wells is very important to the water delivery scheduling program, and this can be one of the prime operational tasks of the association if the surface water supply can be supplemented by ground water.

In designing a system of local water user organizations around this physical scheme, there are several fundamental principles that should be taken into account:

1. A policy of decentralized, self-management at the watercourse level should be adopted. This principle will go a long way to inducing participation by water users, developing a sense of pride in operation and stimulating a progressive agricultural economy.
2. The format of the association should be structured similar to existing institutions to present only a limited amount of social disruption.
3. To be most effective, much flexibility should be allowed to give the agriculturalists in local areas the opportunity to adopt the types of organizations most acceptable to them.
4. Not only the positive aspects of forming associations should be discussed, but also a clear understanding of sanctions and enforcement against infractions of association rules must be made.
5. The purpose to be served by the organization should justify its existence. In the converse, no association should be formed simply to create an entity. Further, the organization should be publicly responsible for use of public waters.

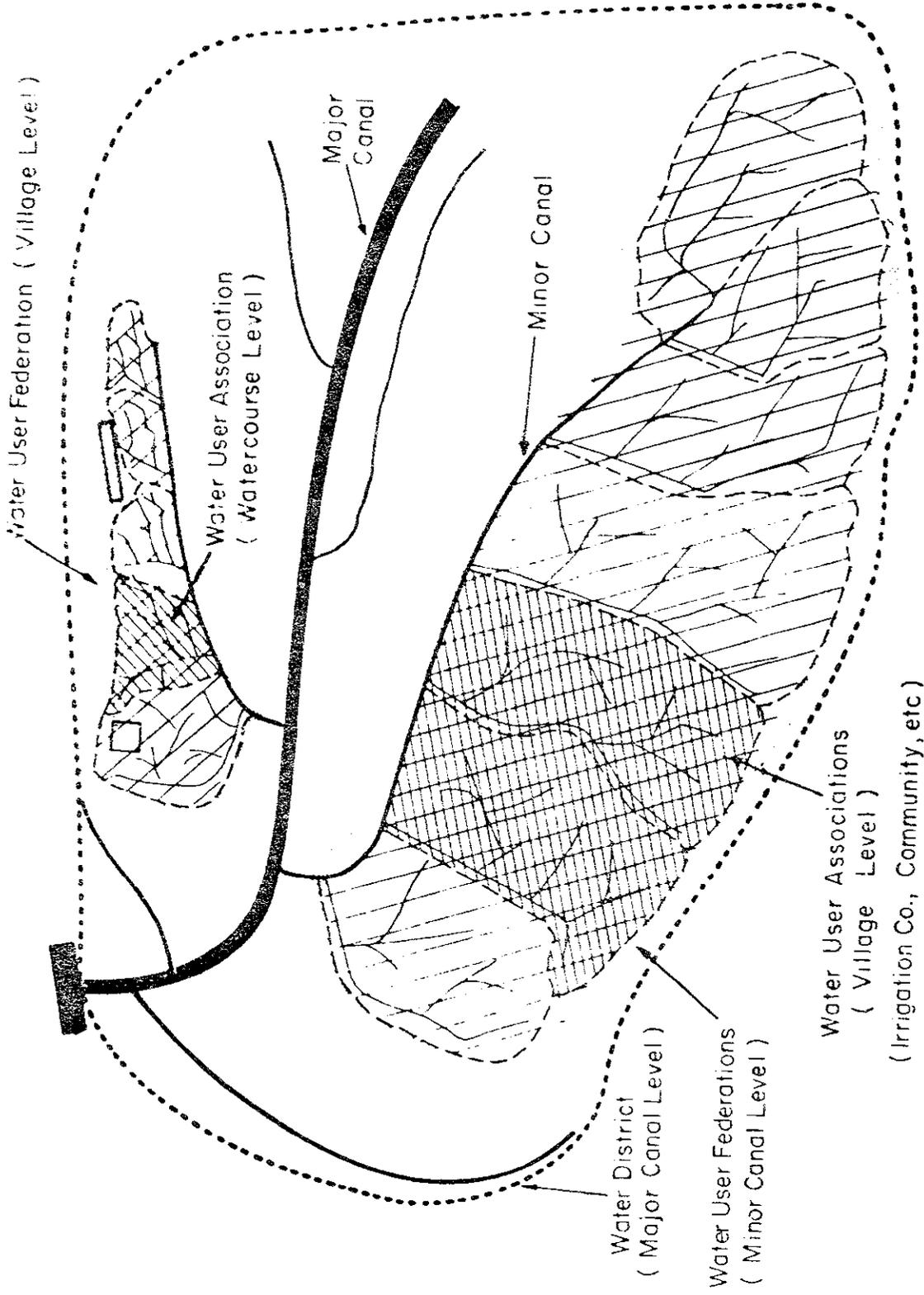


FIGURE 4. Water User Organizations: Development Scheme.

6. Goals of the associations should not only include improving water delivery and scheduling but include the minimization of risk while maximizing production for association members.

7. The composition of the association should be confined to landowners and tenants in the command area and only members who are actively involved in irrigation should hold office.

The four basic concepts of an association found in the Spanish system will enable local control and self-imposed management. They are recommended and stated as follows:

- An association's existence is justified by a need to deliver water to a specific parcel of land in a more efficient and effective way.
- Concept of proportional distribution of water theoretically favors no man, but rather provides to each irrigator a portion of water according to the size of the holding or may reflect the type of crop grown.
- Concept of individual responsibility to community for maintenance of his part of the watercourse and duty not to waste water makes each irrigator unique and significant. Infractions may result in fines or non-delivery of water.
- Concept of collective responsibility through internal organs of the association place the capability and success of effective control and management upon the irrigators themselves.

The basic organization of water users should be at the "below the outlet level" or at the village level (see Figure 5, Level I). Conforming to the above principles and the previously stated purposes and powers, the organization should consist of three separate organs. The first is the governing body or assembly, made up of all members. The second is the managing body, consisting of elected representatives who serve as officers of the organization. The third is the dispute-resolving body. It may be made up of the same persons as elected to the managing body. This form of decision-making provides a check and balance by the members of the association on activities and resolving disputes.

The membership of the governing body has been discussed previously. The managing body, however, must be closely examined. Often representatives are elected "at large" to the "Board of Directors" or "Committee." This is not recommended. An equitable representation on the board of directors from throughout the watercourse is fundamental to the protection of interests and rights in water of those irrigators located at the tail of the watercourse. The board should consist of members representing various areas within the command area.

The managing body could consist of a five-member board (or some number depending upon the size of the command area), and representing different areas of the watercourse (e.g., one from the head of the watercourse, two from the middle, and two from the tail end). A rotating presidency or chairmanship is suggested with the president selecting a treasurer and secretary, all from within the five representatives. Three

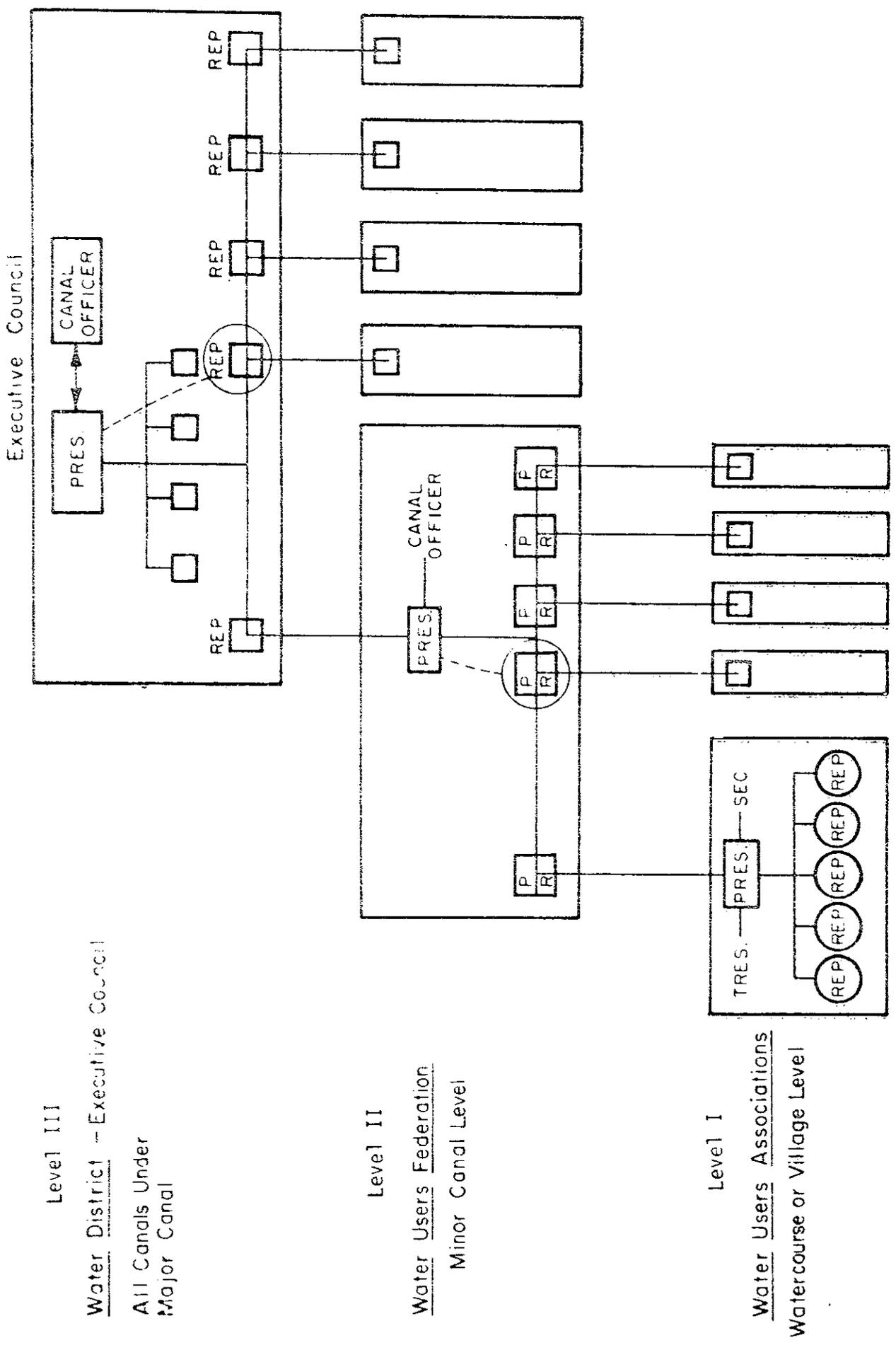


FIGURE 5: Water User Organizations: Organization Scheme for Hierarchy of Associations.

year terms of office may be best suited, with terms expiring in staggered manner. No officer would have any power greater than each other.

It is likely that collective action on the part of the majority of the associations would adversely affect individual members. In such cases, the organizational stability and credibility of the association is promoted if a method for settlement of disputes is provided within the structure of the association. Of prime importance in any such method for resolving disputes is that the initial determination must be done quickly, with as little procedural formality as possible, and that the determination be made locally.

Two distinct methods for resolving disputes are commonly used. First, is that of a decision being made by either a tribunal composed of members of the association or a hearing examiner, who is an official of the association or the government. The dispute resolving body could consist of the president and secretary of the board and three members of the association, one each from the head, middle and tail of the water-course. Or, a "tribunal" may be elected to hear and decide conflicts and problems that occur within the association command area.

In this method the initial decision can then be appealed to a higher level which will either review the proceedings of the first forum or will conduct a new inquiry into the dispute. The process of appeal can be to an appeals board which is given specific responsibility for disputes involving water user associations and its members or to a civil court which is given jurisdiction over such appeals. Further and final appeal to a court of law may be an additional feature.

The second method for settling disputes is to submit the controversy to an arbitration board or to an individual arbitrator. Under this approach, the decision will usually be binding on the parties and further appeal may not be provided for. While the arbitration process satisfies the need for expedient local resolution of controversy, it may not be a completely adequate means for protecting the concept of a personal or property right to the use of water. As pointed out earlier, the recognition of such rights on the local level imparts stability and removes some of the risk the individual faces in obtaining the necessary amount of water to insure expanded production. Unfortunately, the process of arbitration often is reduced in its simplest terms to finding a middle-ground which is not completely satisfactory to either party but seems to be equitable to the arbitrator.

One other point on the membership and the organization. When water is allocated to an association, the association is generally charged with controlling the distribution of water among its members. It administers the waters. If a person leaves the association area, he loses his right because he is leaving the lands. The right to use the waters is on the members of the association.

Level I is considered the most essential to improved water management. However, several upward extensions of the association are recommended to place the irrigators in a better position to implement irrigation

scheduling, dissemination of information on canal rotation and closures, participating in delivery decisions made by the government. The organizations at this level should be created under special legislation giving them legal status, or formed as voluntary associations under existing company or cooperative laws.

The next level of organization would be a federation of water user associations at the minor canal and/or village level. In the case where two or more watercourses serve one village, the commonality of interest could be the basis of forming a federation to better manage the waters for irrigation and other rural needs. The composition of this entity would consist of the presidents (or chairmen) from the associations represented. One from among the representatives would be selected as president of the federation. He, like the president of the associations, would have no greater power than other federation officers, requiring a majority approval for all actions (see Figure 4 and 5, Level II).

In addition to this formal board, the canal officer could be made a technical advisor without voting privileges.

Carrying the hierarchy one level further, a water district could be formed at the major canal level primarily to disseminate information on water supplies, deliveries, etc., and enabling the government to acquire water users' input into the decision-making process. An executive council consisting of presidents or chairmen from federations (or elected representatives from unfederated minor canals) would be formed. The council could maintain an official position in the district, without voting privileges.

Voting rights for the federation and district should likewise be graduated according to area served. This would prevent a small watercourse or canal command area from overinfluencing the activities of large command areas.

The structures suggested are perceived to be implemented over a considerable period of time. This would enable the users, themselves, to make the necessary modifications that will personalize the system. However, the purpose for setting out a rather detailed and sophisticated program is an attempt at the very outset to prevent constraints to creating a hierarchy from developing.

CONCLUSION

The efficient and effective utilization of water resources is rapidly becoming a major topic in all nations due to increasing demands for food, fiber and energy. Agriculture, globally, is the largest diverter of water, and consequently a potential candidate for governmental action programs designed to improve the use of water and thereby either expand the irrigable acreages or reallocate the saved supplies to other

sectors of the economy. To carry out such programs, however, requires the mobilization of the agricultural water users into some organizational entity through which the government can implement and assist the desired changes. These entities are best described as water user associations.

The prime objective is to enable the water users, individually and collectively, to improve themselves and provide the governing body with appropriate feedback so that realistic policies and programs can be formulated and implemented. Water user associations can function as the forum for farmers of any size land holding to identify and realize their real importance to their nation.

As we have seen, water users associations are widely disseminated over the world. Their patterns and characteristics differ from time to time and from place to place, but nevertheless, all of them have a common feature--they are extremely relevant for adequate water management. The reasons for their relevancy have been explained in the introduction to this report.

The importance of the water users associations has prompted the governments of many developing countries to enact laws in which these institutions are carefully regulated. For these countries, the experience of the English in Ceylon is useful. When the English initially came into Ceylon, they erased the existing institutions and, in their place, attempted to implant a system based on the European conception of law and social relationships. They abolished forced services and destroyed the local authorities of autoctonous origin. In their place they installed minor courts of European type and voluntary services. The results were decay of water works, continuous dispute over water rights and destruction of the spirit and practice of mutual obligation that existed prior to the entrance of the English. The solution that was developed was to redefine the local customs; tradition was revived, and there was a "return" to some features of the old system, which through the time had proved to be the most adequate for the area. In this revival of old practices, each village or assembly of proprietors was allowed, within the general guidelines of the government, to enact its own rules. The plan solved problems of codification by providing for local existing practices to be adopted as formal regulations.

The lesson to be taken from this example is that any attempt to institutionalize water users associations must be preceded by the analysis of the institutions existing in the area to be served.

The second observation to be made is based on a case study in the Phillippines. The analysis was carried out in the Iwrigation System of LAOAG-VINTAR. In this system of water management, an irrigation Association made up of water users exists within an area served by a government institution. The association came into being when the farmers decided to offer personal services to solve problems of canal maintenance. The cooperation between the state and individual farmers has been very successful. This success is attributed to the understanding existing between official and private institutions as well as to the authority of the associations to require personal services from their

members. The system has provided new channels of communication between the government and the water users. In addition, it solves a chronic problem of the developing countries: the scarcity of financial means. Through the personal labor of the members of the associations, the system has been able to overcome the constraints imposed by the lack of capital. The corollary of this example is that if a system is to be successful, it is necessary to develop some form of coordination between the water users and the government. In developing countries, it is convenient to allow the associations to require personal services from their members.

It has been found that absentee landowners are an obstacle for the development of water user associations because they share-crop the lands and draw rent and interest payments while disassociating themselves from the technical requirements of production. Permitting tenant membership ensures that the person who is actually cultivating the farm will participate in association activities.

There are four essential requirements for success of joint arrangements for water development and control. First, joint development of water control calls for an arrangement whereby decisions can be reached that are binding upon the minority even when such a minority is opposed to the proposed action. Such decisions may be in connection with the construction of new works and the levying of assessments for repayment of costs according to the extent the land is benefitted.

Attaching to this majority-minority aspect of the joint arrangement there is an important ancillary aspect. Care will have to be taken to ensure that a minority does not become bound by a majority decision with respect to a matter that is not in keeping with the requirements of fairness and justice, as for instance a decision which imposes disproportionately high assessments. There must be a right of appeal to a higher authority which can, if need be, declare the decisions of the majority void or modify them.

Secondly, joint water control entails expense. Revenues to cover this expense must be raised by the area in question. An important condition for the continued life and success of the local organization is that the expenses must be covered by the parties concerned and that no party can decline to pay.

It is a characteristic of the local organization for water control that there is a direct relation between interests in the work and contribution towards the costs of the works. In many cases, water control is a means of increasing the productivity and the value of land. For this reason, the costs should be spread over the area in question. If the land is pledged for repayment of the costs, a sound basis is generally laid for the financing of the joint arrangement.

Thirdly, in the majority of cases it follows from the nature of the joint arrangements for water control that it will have to be possible to make regulations or by-laws with respect to water control. Provisions must also be made for the enforcement of these by-laws or regulations.

It is desirable that this point be elucidated with a few examples. One might take as a first example the problem of drainage in a low-lying region by making use of the existing water courses. In this case, the flow of water through these watercourses has to be assured. In the drainage system, the flow of water must not be interrupted by structures or other obstructions built by individuals. By-laws or regulations should make provision for this.

In another case, it may be desirable to establish a system for the distribution of irrigation water in order to insure that every holding of land can obtain a certain quantity of water at regular times. This may require that there are no uncontrolled diversions elsewhere. Here, too, it will be necessary to have a regulation that is respected and which can be enforced when occasion arises.

Another important situation is the regulation of stream pollution. There must be control of discharges of waste water or other matter which causes unacceptable levels of pollution.

Fourthly, joint water control will invariably be accompanied by the construction of irrigation drainage channels. In the interest of the joint arrangements, it must then be possible to acquire the land necessary for the construction of these channels even when the owners are not willing to sell the land which the local organization needs. There is accordingly the need for an arrangement which provides for the acquisition or compulsory purchase of land. It goes without saying that such a possibility must include with the provision for compensation to the owners of the land, through which channels will have to be cut, for their loss of property and attendant damage.

The four factors dealt with above form the most important requirements which the organization of joint water control must meet. No matter what pattern the scheme takes, provision will always have to be made for these factors if water control is to become an accomplished fact.

The foregoing suggests the conclusion that the organization for local water control will be in the nature of a corporation with certain legal powers. The four points mentioned cannot be provided for without legal status. Other forms of joint organization, such as mutual contracts and agreements and cooperative societies, do not adequately provide guarantees for the objectives described in this report as being indispensable for the success of local organizations in joint water control.

END NOTES

1. Staub, William J. and Donald G. Green. "Performance Management Units for Agricultural Agencies," Workshop on Implementing Public Irrigation Programs, the Food Institute, East-West Center, Honolulu, Hawaii (August 1976).
2. Bagadion, Benjamin U. "Farmers Involvement and Training in Irrigation Water Management and Farm Development," Workshop on Implementing Public Irrigation Programs, the Food Institute, East-West Center, Honolulu, Hawaii (August 1976).
3. Ibid.
4. Radosevich, George E. Water User Organization for Improving Irrigated Agriculture: Application to Pakistan. Consortium for International Development, Colorado State University, Fort Collins, Colorado (December 1975).
5. Tuma, Elias H. Twenty-Six Centuries of Agrarian Reform. University of California Press, Berkeley, California (1965).
6. Note 2, supra.
7. Mellor, John W. The Economics of Agricultural Development. Cornell University Press, Ithaca, New York (1966).
8. Ruttan, Vernon W. "Integrated Rural Development Programs: A Skeptical Perspective." International Development Review (1975/4).
9. More Water for Arid Lands: Promising Technologies and Research Opportunities. Advisory Committee on Technology Innovation Board on Science and Technology for International Development, National Academy of Sciences, Washington, D.C. (1974).
10. Ibid.
11. Note 4, supra.
12. Note 7, supra.
13. Incentives for Improved Water-User Efficiency. Idaho Department of Water Resources, Boise, Idaho (August 1976).