

Benefits and Second Generation Problems of Irrigation Management
Transfer in Colombia
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GLOSSARY

AA Administrative Agency (of an LDD)

ANUC	National Association of Rural Users (Spanish)
A,O&M	Administration, Operation, and Maintenance
CONPES	National Council of Economic and Social Policies (Spanish)
CONSUAT	Superior Council of Land Development (Spanish)
CORPOICA	Colombian Corporation for Agricultural Research (Spanish)
DNP	Department of National Planning
EA	Executing Agency (of an LDDs)
WBI	World Bank Institute of the World Bank
FEDERRIEGO	Federation of the Water Users' Associations of Irrigation Districts (Spanish)
FINAGRO	Fund for Agricultural Financing
FONAT	National Land Development Fund (Spanish)
GRU	General Registry of Users
HIMAT	Institute of Hydrology, Meteorology, and Land Development (Spanish)
IDB	Inter-American Development Bank
ICA	Colombian Agricultural Institute (Spanish)
IDEAM	Institute of Hydrology, Meteorology, and Environmental Studies (Spanish)
IGAC	Agustín Codazzi Geographical Institute (Spanish)
IIMI	International Irrigation Management Institute
INAT	National Land Development Institute (Spanish)
INCORA	Colombian Institute of Agrarian Reform (Spanish)
INDERENA	National Institute of Renewable Natural Resources and Environment (Spanish)
IVA	Value Added Tax (Spanish)
LDD	Land Development District
O&M	Operation and Maintenance
PIM	Participatory Irrigation Management
RADAT	Administration Regulations for Land Development Districts (Spanish)
RUT	Roldanillo-La Unión-Toro Irrigation District
SAC	Farmers' Society of Colombia (Spanish)
SAT	Subdirectorato of Land Development
SENA	National Learning Services
UNDP	United Nations Development Program
WUA	Water Users' Association (of an LDD)

SUMMARY

Management transfer in Colombia was unusual, in that it was initiated by farmers rather than by government initiative. Since the first two schemes were transferred in 1976, 16 of the 24 medium and large schemes in the country, covering about two-thirds of the quarter-million hectares under such irrigation, have been transferred to local associations to manage. Many of the remaining schemes are expected to be difficult to transfer and the process appears to have stagnated.

In 1991, a national federation of water user associations was formed to represent association interests. This federation has secured national recognition for itself and a seat on the top land development policy-making council in the country, but has not been active in providing services to its member associations. A new law passed in 1993 gave legal status to water user associations and outlined both their responsibilities and the supporting and monitoring obligations of the national irrigation agency, INAT.

Water user associations enter into contractual relationships with INAT for management, but not ownership, of system facilities. One very problematic feature of this relationship is the provision for ownership of assets which specifies that even assets such as heavy equipment purchased by the association with its own funds remain the property of the government.

Results of the transfer program include more flexible irrigation plans and cropping patterns. Unit costs of maintenance are said to have dropped, and transferred systems are more likely to follow a regular maintenance schedule than are those administered directly by INAT. In terms of finances, user managed districts receive only about one-quarter of their O&M costs as subsidies, on average, while INAT-administered districts receive subsidies covering nearly 90% of their costs. Association-managed districts have gained control over the form and frequency of their fee payments and have greater flexibility in dealing with defaulters. Administration of the transferred schemes requires fewer staff, and has generated more local employment.

Still, a number of second generation problems have emerged. These include several important legal deficiencies such as the rules on asset ownership and the cumbersome procedures and high fees involved in securing a legal water right.

Fee levels, now set by associations, are not keeping pace with inflation, and the result is deferred maintenance and a failure to accumulate funds for equipment replacement and rehabilitation. Financial management is a critical area for the success of the associations, but skills in this area are deficient and little or no training has been provided.

Little operational data is being collected making performance assessment difficult, and water is seldom delivered and charged for volumetrically, though plans call for this. Accumulating deferred maintenance and inadequate mechanisms for capital fund accumulation point toward severe future operational problems.

INATs role has changed significantly in the wake of the transfer of the management of two-thirds of its medium and large irrigation schemes to users, but the agency has not yet received a clear new mandate nor reorganized itself to carry out its new functions, particularly its support responsibilities to the associations. User associations are themselves facing serious potential problems due to their underfunding and lack of dynamism. The national federation of user associations has an extremely important potential role to play in revitalizing and supporting the associations, but has yet to seized and acted on this potential.

1 INTRODUCTION

In Colombia, the transfer of the administration of Land Development Districts (LDDs) to Water Users' Associations (WUAs) began as a result of an isolated initiative by a group of farmers rather than as a specific land development policy or program. In the early 1970s, the WUAs of Saldaña and Coello LDDs asked the government if they themselves could administer the LDDs, because the Colombian Institute of Agrarian Reform (INCORA) - the governmental agency responsible for their administration at that time-was expensive and inefficient.

With a degree of maturity, organization, enthusiasm, and decisiveness that was extraordinary for those times, these WUAs exerted considerable pressure on the government to make the transfer. The government finally agreed to their petition and, in October 1976, handed over to WUAs the administration, but not the ownership, of the irrigation infrastructure.

Since that time, the concept of transferring LDDs has undergone several modifications, while conserving its original structure. As other LDDs were transferred in the ensuing 20 years, problems emerged and solutions were developed. The results of the solutions applied so far must now be analyzed and recommendations generated that are appropriate for different economic, institutional, and cultural conditions.

Colombia has an estimated agricultural area of 14.4 million hectares, of which 6.6 million - 45.8% of the total - can be equipped with irrigation and drainage infrastructure and/or flood protection works. Of this area, 750,473 hectares, 11.4% of the total adaptable area, has already been developed (DNP, 1991). The private sector has participated actively in the development of irrigation in Colombia, covering 62% of the developed area (463,019 hectares) compared with the public sector coverage of 264,802 hectares (38%).

This study refers to medium-sized (500-5,000 hectares) and large LDDs (greater than 5,000 hectares). This clarification must be made because Colombia is also implementing a program for small-scale irrigation systems (less than 500 hectares). Although this program constructs physical facilities similar to those of medium-sized and large irrigation schemes, social and economic characteristics are different. The maximum holding size of farmers in the small schemes is 2.5 hectares, and the total production volume of these schemes is insignificant at the national level, which is not the case for medium-sized and large schemes. General information on Colombian agriculture is given in Annex 1.

Medium-sized and large LDDs in Colombia are listed in Table 1 and their locations are shown in Figure 1. Of these 24 LDDs, 16 are administered by their respective WUAs and 8 continue to be administered by the National Land Development Institute (INAT). General information describing each LDD and its date of transfer are given in Annex 2.

Table 1. Current Status of Land Development Districts							
Delegated to Water User Associations							
	District	State	Area [Hectares]				
			Total	Irrigation & Drainage	Drainage	Total Developed	Date Transferred
1	ALTO CHICAMOCHA						
Y	FIRABITOVA	BOYACA	16,722	1,373	8,321	15,235	24-Mar-95

2	SAMACA	BOYACA	2,947	2,934		2,934	15-Oct-92
8	MARIA LA BAJA	BOLIVAR	19,600	6,429	2,861	17,300	07-Dec-95
9	LA DOCTRINA	CORDOBA	3,000	2,000		2,570	15-Dec-95
5	TUCURINCA	MAGDALENA	9,866	7,214		7,214	28-Dec-94
6	SEVILLA	MAGDALENA	8,104	5,978		5,978	28-Dec-94
7	ARACATACA	MAGDALENA	13,300	10,692		10,692	28-Dec-94
11	ABREGO	NORTE SANTANDER	2,000	1,200		1,200	27-Dec-95
12	ZULIA	NORTE SANTANDER	15,843	10,519		10,519	26-May-92
10	RIO PRADO	TOLIMA	8,500	1,286		5,520	28-Oct-95
13	RIO RECIO	TOLIMA	23,600	10,374		18,650	20-Dec-89
14	COELLO	TOLIMA	44,100	25,000	1,870	40,000	30-Sep-76
15	SALDAÑA	TOLIMA	22,500	13,000		14,050	30-Sep-76
16	R U T	VALLE	10,750	9,500		9,700	14-Dec-89
	Subtotal		200,832	107,499	13,052	161,562	

	% Area Transferred		64%	90%	13%	61%	
Administered by INAT							
			Area [Hectares]				
	District	State	Total	Irrigation & Drainage	Drainage	Total Developed	Date to Transfer
17	MANATI CANDELARIA	ATLANTICO	29,000	0	21,268	25,206	1997
18	REPELON	ATLANTICO	3,800	2,100	250	3,400	1996
19	SANTA LUCIA	ATLANTICO	3,000	1,000	0	2,400	1996
20	CERETE, LORICA						
	Y MONTERIA	CORDOBA	55,000	4,100	47,039	51,139	1997
21	EL JUNCAL	HUILA	5,100	2,977	123	3,100	1996
22	EL PORVENIR	HUILA	762	241	115	357	1996
23	SIBUNDOY	PUTUMAYO	8,500	0	7,855	7,855	1997
24	LEBRIJA	SANTANDER	9,131	1,457	7,241	8,698	1997
	Subtotal		114,293	11,875	83,891	102,155	
	Total All Districts		315,125	119,374	96,943	263,717	
	% Area Remaining to be Transferred		36%	10%	87%	39%	

Adapted from: Situación de los Distritos de Mediana y Gran Escala. INAT. 1996

2 NATIONAL CONTEXT AND POLICIES

EVOLVING INSTITUTIONS

The construction of hydraulic infrastructure for irrigation and drainage began in Colombia in the late 1800s, carried out mainly by the private sector. State intervention began only in 1936 when the then Ministry of Economy began constructing irrigation and drainage systems. Since then, several entities have participated in land development but without following a consistent policy or adhering to a coherent set of investment priorities (DNP, 1991).

In 1961, the Colombian Institute of Agrarian Reform (INCORA) was created. It assumed responsibility for conducting land development programs and constructing irrigation and drainage districts. Another major function was to redistribute farmland among the rural population to reduce inequalities in holding sizes. However, while public sector involvement in land development increased as a result, that of the private sector dropped. The possibility of land expropriation by INCORA had a chilling effect on private investment in the rural sector. From 1961 onward, land development in Colombia has been carried out mainly by the government through various official entities. From 1963 to 1972, INCORA created and improved 15 irrigation and/or drainage districts affecting a total of 113,500 hectares. The land in these districts was distributed to landless rural inhabitants as part of the land redistribution program.

Subsequently, the government determined that it was inappropriate for INCORA to simultaneously execute two major programs considered fundamental to the agriculture sector - land distribution and land development for irrigation and drainage. In 1976, therefore, responsibility for constructing new irrigation and drainage districts was given to a newly created organization, the Colombian Institute of Hydrology, Meteorology, and Land Development (HIMAT), while INCORA retained responsibility for land redistribution. HIMAT also assumed responsibility for administering districts previously administered by INCORA.

Between 1976 and 1994, HIMAT worked mostly to rehabilitate and complete the irrigation districts it inherited. Although a framework was created for such work, financial resources were unavailable. As a result, construction was begun in only one district (Río Prado) and it remains unfinished. It also launched a program of small-scale irrigation development for irrigation districts of less than 500 hectares, located mainly in hilly areas.

Until 1991, this period was characterized by the absence of a clearly defined land development policy. The dynamism that had characterized the program under INCORA had dissipated. To remedy this situation, in 1991, the National Council of Economic and Social Policies (CONPES) established an explicit policy and HIMAT was divided into two entities: the Institute of Hydrology, Meteorology, and Environmental Studies (IDEAM) and the National Land Development Institute (INAT). IDEAM assumed responsibility for collecting, managing, and analyzing information on hydrology and meteorology and for executing and monitoring environmental studies, while INAT became responsible for conducting the national land development program.

NATIONAL POLICIES

The absence of an official policy on the transfer of LDDs is somewhat understandable given the roots of the program, discussed in the introduction. Because users must approach the government, transfer begins with the WUA. However, government agencies responsible for irrigation development and management have little or no incentive to continue the process. For example, the administration of the Coello and Saldaña districts was transferred to the WUAs in 1976, but no other districts were transferred until December 1989, when WUAs took over management of the Roldanillo-La Unión-Toro (RUT) and Río Recio districts. During this period, HIMAT exerted little effort to initiate transfers, resisting the potential loss

of power that such transfer implied. Resistance was stronger in those HIMAT regional offices where transferable LDDs were located. It was also stronger among HIMAT staff who were directly linked to the LDDs who felt that their jobs were threatened.

In 1986, HIMAT signed an agreement with the World Bank related to Loan 2667-CO. In this agreement, HIMAT committed itself, among other things, to "train Water Users' Associations in administration and accounting, thus enabling them to take charge of the management of the irrigation districts included in the project area, and to operate schemes of small-scale irrigation...." This commitment reactivated discussion on the topic of transfers and stimulated the reinitiation of transfer activities. These became manifested with the handing over of the LDDs of Río Recio and RUT in 1989, San Alfonso in 1990, Samacá-Zulia in 1992, and Prado de Sevilla in 1994. This last district was divided into four separate districts - Río Frío, Tucurinca, Sevilla, and Aracataca. In 1995, the LDDs of Abrego, Upper Chicamocha, María La Baja, La Doctrina, and Río Prado were handed over to the WUAs. Eight medium-sized or large LDDs remain to be handed over to their respective WUAs (Table 1).

In June 1991, the National Planning Department (DNP) submitted the document Land Development Program for 1990-2000 to CONPES, proposing a long-term agricultural policy for the country (DNP, 1991). The document summarized the proposed policies and outlined a restructuring of the land development subsector. It also recognized the importance of land development (particularly irrigation and drainage) and the need for investments by both the public and private sectors to modernize this sector. The proposed policy was based on an objective analysis of experiences in Colombia and in other countries and on the assessment of the main constraints hindering the development of adequate irrigation and drainage infrastructure.

A. The role of the Government in investment in land development
B. Physical and financial goals
1. Projects for large irrigation schemes
2. Projects for medium-sized and small irrigation schemes
3. Rehabilitation, completion, and expansion of LDDs
C. Strategies and mechanisms
1. Irrigation and drainage (private sector initiative)
2. Irrigation and drainage (public sector initiative)
(a) Institutional framework
(b) Project selection and priorities
(c) New resources for investment in irrigation at the regional level.
(d) Recovery of investments
(e) Policy on fees
(f) User participation
3. Other general considerations
(a) Technical issues
(b) Watershed conservation and management
(c) Hydrological emergencies
(d) Research and technology transfer

The draft policy addressed the topics shown in Box 1. It was intended to steer the land development process and establish a framework for user participation in all stages of projects, especially in LDD administration. Users would administer the districts, taking advantage of the experience acquired in districts transferred prior to 1990. The draft statement called for the government to provide training for the WUAs, and to design financial, administrative, accounting, and engineering systems of compulsory application in the LDDs. The Government would also promote the establishment of a Federation of Water Users' Associations.

Most of these measures were incorporated into Law 41 of 1993, issued by the Colombian Congress. The law gives legal recognition to WUAs and defines the scope of their activities. It also indicates the obligation of the executing entity (e.g., the agency that builds the irrigation and drainage system) to train users within the district in administration, operation and maintenance, new cropping techniques, marketing, and environmental management.

To date, the concept of transfer encompasses only handing over the administration of the districts to their WUAs. The infrastructure and assets involved continue to be government property. This situation limits the sense of ownership on the part of the WUA, and inhibits the

development of a strong administrative capability. It also indicates that the handing over of responsibilities has not been completed.

INAT's formulation of policies on the transfer of districts has been slow, dilatory even. Staff members have tried to postpone execution to maintain their power. Furthermore, directives have been absent at both the executive and intermediate levels. Budgetary restrictions delayed the execution of rehabilitation work in many districts and, in others, the completion of unfinished work. This is a serious drawback, because the best incentive for users is to receive a rehabilitated LDD.

3 LEGAL AND STRUCTURAL BACKGROUND

WATER LAWS AND REGULATIONS

Colombian legislation has always given importance to the norms that regulate the use of water and promote its conservation and quality. At first, the abundance of this resource and its easy availability made existing legislation sufficient for managing and regulating activities related to water use. However, with increasing population in recent decades, and the resulting growth in demand, new problems and issues have arisen which require legislative action.

In 1974, the National Code of Renewable Natural Resources and Environmental Protection was decreed (No. 2811). This Code defines the country's environmental strategy and norms, tools for developing policy, norms of environmental preservation, and norms regarding the ownership and use of renewable natural resources and the environmental impacts of such use. The custody of Colombia's natural resources was given to the National Institute of Renewable Natural Resources and Environment (INDERENA) until December 1993, when the Ministry of Environment was created. The Ministry is currently coordinating a study to define a National Water Strategy, with the participation of all other ministries involved in water-related issues.

WATER RIGHTS FOR AGRICULTURE

Decree 1541 of 1978 regulates the use of non-maritime waters and defines their dominion; procedures to acquire the right to use water and occupy channels; easements; hydraulic infrastructure; water use, conservation, and preservation; groundwater; administration of water supply; financial charges; WUAs; and sanctions.

1. Collective human consumption, rural or urban
2. Individual domestic needs
3. Community use for agricultural activities
4. Individual use for agricultural activities
5. Generation of hydroelectric energy
6. Industry
7. Mining
8. Community recreation and sports
9. Individual recreation and sports

Priorities for water use as specified in the decree are shown in Box 2. Collective water use for agriculture is therefore of highest priority after human consumption.

The law disposes that, to obtain water use rights, a water concession is required in the following cases.

- a. Domestic supply in those cases requiring derivation
- b. Irrigation
- c. Forestry

The law also establishes the procedures for granting permission for use or transfer of the concession and the sanctions for misuse.

When disputes arise over water use rights, the actions taken depend on whether the complainants have water concessions. Where the contending parties have water concessions, the official environmental authorities have jurisdiction to handle the dispute until a settlement is reached. When an environmental authority grants a concession for water use, the authority is guaranteeing the use of the conferred right and, where that right is impeded, the authority will ensure the enforcement of this right. For unresolved cases, the parties may resort to

litigation for a final settlement of the dispute. Where one or more of the parties in the dispute does not have a water concession, the problem is resolved by civil law, because, in Colombia, no specific jurisdiction exists for water issues.

GOVERNMENTAL ORGANIZATIONS

The land development subsector is comprised of (a) the Ministry of Agriculture, as the agency regulating land development policies; (b) CONSUAT, as the entity guiding and coordinating these policies; (c) INAT and other public and private entities, as executing agencies; and (d) the National Land Development Fund (FONAT), as the administrative unit that finances irrigation, drainage, and flood prevention projects.

The CONSUAT is an advisory and coordinating organ of the Ministry of Agriculture, and is in charge of guiding and recommending the application of subsector policies. Participants in CONSUAT are:

- The Minister of Agriculture, who presides over the Council
- The head of the DNP
- The Minister of Environment
- The President of the Fund for Agricultural Financing (FINAGRO)
- The Director General of the Agustín Codazzi Geographical Institute (IGAC)
- A representative of the indigenous communities in whose territories land development is being conducted
- The President of the Farmers' Association of Colombia (SAC)
- The President of FEDERRIEGO
- The Director of INCORA
- A representative of the National Association of Rural Users (ANUC)

The Technical Secretariat of CONSUAT is provided by INAT.

INAT is a government agency that promotes, finances, or co-finances land development; designs studies; executes infrastructure projects; provides community and technical services; and offers technical assistance in irrigation-related issues. It aims to intensify soil and water use, ensure high productivity, and advise public and private sectors in the design of studies and in the construction of land development infrastructure, while safeguarding and conserving soil and water resources in the watersheds circumscribed by the LDDs and preventing, controlling, and protecting against floods in district areas.

INAT is responsible for developing the country's land development policy. However, it may and does authorize other public entities to construct infrastructure. These entities are called "public executing agencies." An analogous situation occurs in the private sector, where INAT may authorize engineering firms who demonstrate expertise and who fulfill certain requisites previously established by CONSUAT, and to act as "private executing agencies."

LOCAL ORGANIZATIONS

As part of the Program of Agrarian Reform, INCORA began to organize communities located in sites where it was implementing its programs. Part of that organization consisted of forming a General Committee of Users, an executive committee that represented the community before external organizations, in particular INCORA.

When the Committees of Users in Saldaña and Coello requested that the administration of these LDDs be handed over to them, these committees were transformed into WUAs, and the Ministry of Agriculture granted them legal status. Their organization and operation obeyed the norms that the Ministry had established for agricultural organizations.

Law 41 of 1993 refers specifically to the WUAs of the LDDs, delegating the control and monitoring of these associations to INAT. To perform these functions, CONSUAT issued

Resolution No. 019 of 1995, "by which the course of action and the basic organizational principles of water users' associations in land development districts are indicated." This resolution is the regulation currently in force for monitoring and controlling the activities of WUAs. All administrative statutes issued to implement this resolution are clear in recognizing the principle consecrated by law of community participation in the land development process, from project design through to construction.

The reality, however, is different. Participation is only on paper and the mechanisms and procedures for community participation are yet to be established. This gap is used to justify INAT's activities in which WUAs have been absent - for example, preinvestment studies, and contracting and following up of work. The participation of WUAs in these activities is mandated in Article 22 of Law 41 which defines their roles. Colombia is undoubtedly adjusting, and, once this process is complete, the WUAs will presumably be actively involved in all stages of the development process. But to date, little genuine desire has been evidenced to provide WUAs with the participation granted to them by law. At the same time, neither the WUAs nor the Federation of the Water User's Associations of Irrigation Districts (FEDERRIEGO) have made energetic claims to secure the participation to which they are entitled. Despite the foregoing, the WUAs have generally played their roles well. In particular, they have generated feelings and attitudes of "ownership" of their respective LDDs and they have worked to obtain needed resources and to increase the participation of users and the government.

Previously, Associations worked independently of each other and, despite proximity, exchanged very little of their experience or their analyses of common problems. The address the need for greater interaction, WUAs created FEDERRIEGO, a second-level organization that was recognized by the Ministry of Agriculture and granted legal capacity.

This Federation played an important role in writing Law 41 of 1993, participating in discussions and making observations on the different drafts of the Law as they were produced. As the organization with the greatest collective experience in transferring LDDs, FEDERRIEGO also took the initiative to make its own contributions. Law 41 of 1993 recognizes the Federation as the official voice for all WUAs. The president of the Federation has the right to speak and vote in the CONSUAT, the highest policymaking agency on land development issues. A Federation representative also serves on INAT's Board of Trustees, with the right to speak and vote.

Beyond its involvement in the development of Law 41, however, the output of FEDERRIEGO's activities has been exceedingly modest. The leadership displayed during its creation has not been constant, and only 10 of the existing 24 WUAs that manage medium-sized and large districts have joined the Federation. Despite the fact that FEDERRIEGO has contributed to the creation of a favorable atmosphere within decision-making circles-for example CONSUAT and INAT's Board of Trustees-it has not developed a clear well-defined role to benefit WUAs. In a recent workshop organized by external consultants for the FEDERRIEGO Board of Trustees, a number of weaknesses were identified relating to (a) social issues; (b) institutional presence and leadership; (c) administration; and (d) finances and budgets. The following potentialities were also identified: (a) legal disposition, background, and acquired experience; (b) assertiveness, and group approach; and (c) growth potential (Arellano and Bernal, 1996).

FEDERRIEGO is now reorganizing to provide associated LDDs with services and information produced by other entities, for example, results of research carried out by public entities or trade unions such as the National Federation of Rice Growers or the National Federation of Cereal Growers. This new structure should prove the foundation for strengthening both WUAs and FEDERRIEGO itself.

CONTRACTUAL AGREEMENTS

The first contractual agreements were made with the WUAs of Saldaña and Coello districts through which the government "delegated functions" to a "delegated administration". That is, the delegating entity (the government as represented by HIMAT) transferred to the receiving entity (the LDDs of Saldaña and Coello) the responsibility for administration of a public good and authorized the receiving entity (the LDDs) to carry out, in it's (HIMAT's) name, all the activities deemed necessary in this regard. HIMAT considered "that the degree of development of the user community in the Districts of Saldaña and Coello indicates that they are capable of assuming responsibility for the administration, conservation, and maintenance

of the corresponding districts". An agreement was signed with each WUA, whose objective was "to administer, operate, complete, and rehabilitate the irrigation and drainage district of Río Saldaña (Río Coello)..."

1. The WUA is responsible for administration
2. The General Comptroller of the Republic provides fiscal surveillance
3. The goods are given in administration and use but not in property
4. All goods and equipment acquired during the administration become property of INAT
5. The budget prepared by the WUA should be approved by INAT and may be modified by the latter when deemed necessary
6. Fees are to be approved by CONSUAT

Agreements of this nature were made until 1993 when "Agreements of Delegation of Functions" (for transferring the administration of LDDs) were changed to "Contracts" to conform with a recently issued law of administrative contracting. These contracts state that "the Water Users' Association assumes the administration, operation, and conservation of the Land Development District...." Comparison of the two models of transferring administration to WUAs shows that the new agreement maintains the essential structure of the old one, along with basic aspects of surveillance and monitoring by INAT. Key features are shown in Box 3. The transfer of administrative responsibilities to WUAs is a step forward in the participative process. However, because of restrictions placed on decision-taking and property ownership in the contract with the government, the WUAs' sense of ownership and autonomy is distinctly limited. WUAs regard the relationship with the government as paternalistic. Because the hydraulic infrastructure continues to be governmental property, the WUAs expect the government to assume the costs of operation, maintenance, and replacement of heavy machinery and other equipment.

<p>Water Users Association</p> <ul style="list-style-type: none"> <input type="checkbox"/> Carry out activities that lead to an optimal administration, operation, and conservation of the infrastructure and other assets of the district <input type="checkbox"/> Ensure that tasks are correctly executed <input type="checkbox"/> Ensure that water resources are efficiently used <input type="checkbox"/> Formulate policies and establish guidelines for executing cropping and irrigation schedules <input type="checkbox"/> Conduct those activities required to protect, conserve, and manage the water basin feeding the district <input type="checkbox"/> Prepare a budget proposal for approval by INAT and a schedule of user fees for approval by CONSUAT <input type="checkbox"/> Regularly report its management activities to INAT <p>INAT</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide the WUAs with legal advice and technical assistance in organizational and development aspects <input type="checkbox"/> Train the WUAs in the administration, operation, and conservation of the LDDs <input type="checkbox"/> Ensure that the WUAs apply the norms issued for the correct administration of the LDDs <input type="checkbox"/> Approve the budget presented by the WUAs and define the percentage of subsidy assigned to each; handle the formalities with CONSUAT for approving proposed fees <input type="checkbox"/> Impose, through law enforcement authorities, those coercive measures required to administer the district and to sanction infringers of the norms of operation and management of the LDDs <input type="checkbox"/> Approve those projects to be conducted by the WUAs to complete, expand, and rehabilitate the LDDs

In addition to the administration contract signed between INAT and each association, regulatory rules are contained in Law 41 of 1993, Decree 1881 of 1994, and the Administrative Regulations for Land Development Districts (RADAT). These define the norms and criteria that the WUAs should follow to administer a LDD. The main responsibilities of both the WUA and INAT are shown in Box 4.

4 PROMOTIONAL ACTIVITIES

Activities to promote the transfer of a district to its users are carried out intermittently and do not follow an established protocol. As Arévalo et al. (1994) say, "the number of users is unknown and participatory processes are slow and unarticulated because of the lack of institutional planning. Administrative disarticulation is attributable to the lack of guidelines and strategically defined transfer policies, not only generating misinformation within the institution itself and among users, but also reducing the reliability of INAT's management."

PROMOTING PARTICIPATORY MANAGEMENT OF IRRIGATION

Table 1 indicates three distinct periods of transfer: (a) 1976, when, by request of users, Coello and Saldaña districts were transferred, (b) 1989 and 1993, when, in compliance with the commitments made to the World Bank, the LDDs of Río Recio, RUT, Samacá, and San Alfonso were transferred, and (c) 1994 and 1995, when the largest number of districts were transferred to fulfil a goal of the administration at that time. The eight districts still awaiting transfer will not be easy because their budgets are heavily subsidized (Table 2). In addition, the land development subsector has not yet adopted programs oriented to motivate users to endorse the transfer. The lack of even a design for a strategy to reach users indicates that the transfer of these districts is not a priority with the current administration.

Loan 2667-CO was requested mainly to rehabilitate LDDs and the commitment made by the government was that the districts would be transferred to a participatory management mode. These rehabilitation programs further served as an incentive for transfer because one of their components involved the purchase of heavy machinery and other equipment to replace existing equipment. This possibility delighted the WUAs. But, in Colombia, most rehabilitation programs have not been completed because of the lack of governmental resources, leading to skepticism among users.

Until Law 41 of 1993 was promulgated, the government had no clear reasons for establishing the transfer of LDDs as a key program, except on request of users or commitments made to the World Bank. Law 41 compiles past recommendations and decrees into a clear statement that districts should be transferred to the users for their administration and that, once the value of the public investment is recovered, the infrastructure and other assets at the service of the district become the patrimony of the respective WUAs. However, the provisions of this law apply only to systems constructed after its promulgation. Thus, the impediment of transferring system assets to future LDDs is solved, but the barrier remains for those districts constructed before the Law was issued.

FORMING WATER USERS' ASSOCIATIONS

The WUAs had their origin in INCORA's program for community organization, an experience that yielded excellent results. The results were first applied by HIMAT (now INAT) to organize the WUAs in districts built after 1976, the year in which HIMAT was created. Subsequently, the results were used by INAT, especially in its program for small-scale irrigation development. The initial organization of the associations was not difficult, but several problems emerged when the WUAs attempted to exercise their rights. For example, the creation of WUAs generally tended to reduce INAT's scope of action which was usually interpreted by INAT staff as reduced power and increased

Table 2. Budgeted costs and subsidies for Land Development Districts, 1993 - 1996, ' 000 Pesos

Districts	1993			1994			1995			1996		
	Budgeted Costs	Fee Income	Subsidy	Budgeted Costs	Fee Income	Subsidy	Budgeted Costs	Fee Income	Subsidy	Budgeted Costs	Fee Income	Subsidy
Administered by INAT												
Repelón	593,978	63,000	89%	623,000	83,000	87%	766,257	99,000	87%	975,944	80,000	92%
Manatí	345,897	24,000	93%	390,000	73,000	81%	480,157	87,000	82%	787,132	0	100%
Santa Lucía	382,535	23,000	94%	418,000	34,000	92%	514,510	38,000	93%	858,303	46,800	95%
Montería-Moc.	787,596	285,000	64%	638,897	378,000	41%	1,010,874	467,000	54%	1,424,760	208,000	85%
El Porvenir	44,081	5,000	89%	65,946	7,000	89%	156,332	9,000	94%	192,049	15,964	92%
El Juncal	986,639	263,000	73%	1,086,522	282,000	74%	1,540,709	384,000	75%	1,719,451	582,990	66%
Sibundoy	615,925	0	100%	531,920	0	100%	640,400	0	100%	908,404	0	100%
Lebrija	326,500	29,000	91%	407,495	35,000	91%	552,942	39,000	93%	617,235	70,800	89%
Average			87%			82%			85%			90%
Delegated to WUAs												
María la Baja	419,934	123,400	71%	689,243	131,000	81%	772,900	177,500	77%	908,100	144,900	84%
Samaca	74,282	74,282	0%	87,130	87,130	0%	88,250	88,250	0%	113,054	113,054	0%
A. Chicamocha	314,687	314,687	0%	340,194	340,194	0%	359,794		100%	467,257	250,248	46%
La Doctrina	153,255	40,600	74%	207,435	52,700	75%	309,097	76,300	75%	412,032	70,000	83%
San Alfonso				107,318	107,318	0%	134,718	134,718	0%	161,428	161,428	0%
Río Frío										503,400	270,480	46%
Tucurínca										627,552	316,501	50%
Aracataca											330,500	5%

										346,649		
Sevilla										615,066	268,000	56%
Abrego	46,773	19,000	59%	43,474	30,000	31%	57,339		100%	64,092	51,092	20%
Zulia	361,708	361,708	0%	520,114	520,114	0%	673,503	673,503	0%	724,030	724,030	0%
Coello	1,127,171	1,127,121	0%	1,298,750	1,298,750	0%	1,675,225	1,675,225	0%	1,714,126	1,714,126	0%
Saldaña	826,889	826,889	0%	1,138,000	1,138,000	0%	1,289,001	1,289,001	0%	1,559,500	1,559,500	0%
Río Recio	435,002	435,002	0%	448,823	448,823	0%	553,795	553,795	0%	683,006	683,006	0%
Río Prado	257,313	81,300	68%	175,704	89,500	49%	225,300	140,500	38%	280,010	177,210	37%
R.U.T	662,930	662,930	0%	823,734	823,734	0%	1,026,665	1,026,685	0%	1,257,320	1,257,320	0%
Average			25%			20%			32%			27%
Source: INAT. 1996. <i>Status of medium and large scale districts.</i>												

job insecurity. However, these difficulties have diminished since Law 41 of 1993 expressly mandated the transfer of LDDs.

Once LDDs were transferred to WUAs, users were to be trained as required. Because this training was not part of an overall strategic program, various guidelines and training programs were established. The administration contracts obligate INAT to carry out these training plans, which were not to be limited to courses for users, but were to include activities carried out jointly with other entities to increase the users' level of awareness of their responsibility toward the LDDs.

A model plan for training was designed by the District Management Group of the Subdirectorate of Land Development (SAT) which conceived of training at three levels:

1. The Board of Trustees of the Association
2. Employees of the LDD
3. General users

For each level, the objective, the activities to be performed and their duration, the procedures to be used, and the specific topics are given (INAT, 1996).

5 RESULTS OF MANAGEMENT TRANSFER

WATER DISTRIBUTION

Before users participated in irrigation management, water distribution was planned and carried out by governmental entities (INCORA, HIMAT, and now INAT) responsible for the LDDs. The staff of these institutions was not involved in agriculture—the main activity of these districts—nor were they interested or committed to the district's development because they were not usually residents.

Cropping and irrigation plans were prepared by these administrative entities without the participation of users and without considering their agricultural needs. The rigidity of these plans made their application difficult, but brought discipline and order to users' behavior. Water delivery, especially in the larger LDDs, was measured so that each user knew how much water he or she received. This work was carried out by appraisal commissions equipped with the necessary instruments. This system worked, but, because of the importance of the water measurements, both for water deliveries and for billing purposes, it led to fraud.

Following transfer of management responsibility to WUAs, cropping and irrigation plans are more realistic and more responsive to market influences. The preparation of these plans generally complies with the following procedure.

1. Users inform the Operations Office of each LDD in advance of the crop, area to be planted, and possible planting date
2. The Operations Office then analyzes the requests, calculates water requirements, and compares them with the availability of water
3. Conclusions are drawn from these comparisons, and plantings are authorized, with their respective dates, following a preferential order established in the RADAT

The RADAT of land development districts also establishes the procedures and priorities to follow in case of water shortage. It defines the status of water distribution for irrigation according to water availability. These status levels are:

1. Free flow, when all water supplies are able to meet demand
2. Rotation, when water availability is deficient and delivery must be by turns
3. Emergency, when water availability is highly restricted and demand cannot be adequately met, thus requiring more drastic changes in the irrigation scheme operations
4. Drought, the nonexistence of water, which makes water distribution impossible

The foregoing is complemented with decisions made by the Board of Trustees of each WUA on restricted planting, crop priority, and water supply according to established priorities. The predominant distribution model is volumetric delivery of water, which consists of defining a volume of water per unit of area (m³/hectare). It is based on previously defined parameters that correspond to the physical characteristics of the soil to be irrigated and the crop. Water thus assigned and delivered is quantified, and that volume is the basis for charging the volumetric rate.

Although this is the theoretical model for irrigation management, it is not necessarily carried out exactly in this manner by the WUAs. The practices outlined above require a regular

system of water measurement to implement. However the computing of the amount of water delivered is deficient, given the infrequent use of water gauges, even though they exist in most LDDs (INAT, 1996). Actual practices are thus most likely variations on this model.

Before the participatory approach to irrigation management was applied, the AA was a public entity, with a government-assigned budget, and could therefore rely on a technical department to carry out engineering tasks. When users assumed primary responsibility for administering LDDs, they sought to reduce costs, often by eliminating or downsizing the technical section. Technicians working in O&M sections were persuaded to carry out the functions of technical assistants. This void is now evident in transferred LDDs and, even though INAT (and, previously, HIMAT) is committed to provide that assistance, it has been limited and is often no more than a commitment.

When the administration of the LDDs was carried out by a public entity, information was rigorously collected, recorded, analyzed, and examined. However, with the initiation of participatory management, both parties lost interest in the efficient collection and management of information, resulting in an ongoing lack of adequate information. Several voices have been insisting on the need to establish a methodology and procedure to evaluate the LDDs that are still under INAT's responsibility. But, to date, no action has been taken, despite reiterated offers made by the International Irrigation Management Institute (IIMI), who has experience in this area, to participate in such efforts.

A most important achievement obtained with the participatory approach to irrigation management is that decision making is done by people within the district itself. Before the change of management, administrative decisions were made by HIMAT (now INAT), who were ignorant of what was happening at the district level. The participation of the WUAs in decision making has yielded an administration that is more committed, not only to local farmers, but also to providing services that are timely and equitable.

Cropping systems are also more realistic, seeking to better fulfill market requirements. All LDDs in Colombia enjoy the freedom of planting whatever they wish, except in the Coello district, where rice planting is restricted because of limited water (Vermillion and Garcés-Restrepo, 1996).

MAINTENANCE

WUAs are obliged to prepare and submit to INAT a budget proposal based on an operational plan for the year. The administrative agency of each LDD thus prepares in advance the annual maintenance plan which specifies planned activities, their duration and costs, required machinery, and dates of maintenance according to a methodology established by INAT (1996). With the participation of users in district irrigation management, much has been gained in refining these plans - for example, reduced unit costs and more timely execution of tasks.

As mentioned earlier, many LDDs receive government subsidies (17 of 24). On the whole, the maintenance programs of unsubsidized LDDs follow their maintenance plans and tasks are usually not postponed. The entire program is paid for by the O&M fees collected. The opposite occurs in the subsidized group, where little of what is planned is executed, and, because INAT frequently fails to transfer subsidy funds on time, maintenance is usually deferred because of the lack of either resources or liquidity (INAT, 1996).

Another problem observed in WUAs' administration of LDDs is that all districts prefer to have their own heavy machinery and other equipment, leading to low use levels of the equipment. Most also have their own workshops for repairs and maintenance, with permanent workers, leading to high repair and maintenance costs. The districts have not yet analyzed the possibility of renting or leasing machinery.

AGRICULTURAL PRODUCTION

As a result of all the changes, first in HIMAT and now in INAT, data collecting has been notably neglected and information required to analyze agricultural production in LDDs under different management modes is unavailable. Over the last 20 years, production in LDDs has increased significantly, but this increase is attributable not only to participatory irrigation management but also to concurrent factors, such as the availability of improved seeds, new cultural practices, and higher agricultural input use. Singling out the impact of the change in management is thus not possible.

As in the case of production, the change in area planted has depended not only on user administration, but also on other factors such as farm credit. Overall, the area planted has increased, but the same difficulties in interpretation apply.

Users are more practical in planning cropping calendars and, consequently, in scheduling irrigation. In tropical environments, where crops can be grown throughout the year, rural wisdom refrains from concentrating certain activities, such as planting, thus optimizing the use of available machinery and labor. Water delivery is staggered in accordance with the staggered planting schedule, as is, of course, harvesting, to avoid plunges in purchase prices caused by abundant supply.

FINANCES

WUAs carry out numerous activities, among which is the administration of the respective LDDs. INAT, as the entity responsible for the control and surveillance of the WUAs, demands that these associations, when acting as the AA of an LDD, handle the two organizations-association and district-separately so that accounting, finances, and all other activities are separate and independent. This should continue, inasmuch as the users pay only the part of expenses that correspond to the LDD infrastructure and assets for which they are responsible, as established by Law 41 of 1993. Financial information on the LDDs is shown in Annex 3.

MANAGING ASSOCIATION FUNDS

Billing users for services provided by the LDD is an important administrative activity. The collection of water fees is the best indicator of the quality of administration. An efficient process generates confidence and credibility in the user, promoting payment of service fees.

To administer the LDD adequately, WUAs have an administrative section in addition to those for operations and maintenance. This administrative section has a treasury to handle the funds and an accounting unit. Funds are managed through the banking system, being controlled by both the treasury and accounting units. Nowadays, almost all the transferred districts use systematized accounting practices and are interconnected with the operations section. This allows them to consult the updated statements of account of each user in the district.

In Colombia, whoever administers governmental assets is obliged to give accounts to the General Comptroller of the Republic. The comptroller audits the books and determines whether they are in accordance with procedures established by law. Based on this examination of accounts, the Comptroller draws conclusions and may or may not approve the accounts. If accounts are not approved, then the executives of the association, the members of the Board of Trustees, or the administrator must become responsible, depending on who ordered the disallowed expenditures.

Colombian legislation also establishes that an association must have an internal auditor who is selected by the General Assembly of the WUA. The auditor should be a certified public accountant. The functions of the accountant, among others, are to ensure the correct financial management of the Association. Penalties are severe for auditors who fail in this task.

WATER FEES

One advantage of user involvement in management is that they have more control over an important variable production cost. When WUAs participate in the establishment of water fees, they can define the form and frequency of their payment obligations.

Water costs have had an interesting evolution, as in the cases of Coello and Saldaña where water fees (both fixed and volumetric) increased the first year, but then stabilized. The increase in total output per hectare and per unit of water was significant in these districts (Vermillion and Garcés-Restrepo, 1996).

To recover A,O&M costs, two types of fees have been established by decree .

- A Basic or fixed fee, which is the cost per hectare subject to irrigation and/or drainage, flood control, roads, and other infrastructure that should be paid by users.
- A Usage or volumetric fee, which corresponds to the cost per volumetric unit that should be paid by users for the water consumed and supplied to their properties. The

LDD also bills users for costs incurred for other services provided, such as the lease of machinery or topographic surveys.

Table 2, which shows the degree of cost recovery of LDD budgets for A,O&M, also shows the worryingly low level of collection of water fees, which is taken to the extreme in the Manatí and Sibundoy districts, where collection is nonexistent. Of the 24 districts listed in Table 2, only seven are self-sufficient. All other districts receive subsidies, ranging from 5% to 100% of their budgets.

Despite these subsidies, budgets are usually insufficient causing notable deficiencies in maintenance programs. To determine the level of subsidy received by the WUAs, INAT bases the degree of expected fee collection on previous collections and assigns subsidies accordingly. This approach obviously discourages payment, and collection, of O&M assessments.

It should be noted that the highest levels of fee collection for O&M costs are reached in those districts, such as Coello and Saldaña, where users have contributed the investment costs of the system. In contrast, the lowest levels of collection correspond to those districts involved mainly in drainage and for which the government has been the only investor. A study of accounts receivable, Analysis, Design, and Implementation to Recover Accounts Receivable, was carried out by a consulting firm for INAT. This study pointed out the following limitations to fee collection (INAT, 1996).

- Inaccuracies in the boundaries of the LDDs
- Outdated the General Registry of Users (GRU)
- Inconvenient billing dates
- Deficient communication between the District and users
- Inability of INAT to renegotiate debts
- Lack of documents enabling INAT to initiate coercive collection
- User expectations of possible forgiveness of interest obligations, based on similar actions taken by other entities in the sector
- Indifference of users to the LDDs
- Ineffective strategies used by INAT to recover debts. (Perhaps collection would be more effective if WUAs were made responsible for collecting accounts receivable, with the money collected reinvested in the infrastructure of the respective LDD.)

Water measurement is deficient in all the LDDs (INAT, 1996). In Saldaña, calibrated measuring devices were built at the water's entrance to each property larger than 10 hectares. However, their use has been minimal because neither the users nor the LDD executives consider measuring the amount of water delivered as important. Most of the time, water is delivered without measuring the flow at the entrance. The employee who delivers the water estimates (guesses at) the flow and records the period during which that flow has been received. The total volume received is calculated on the basis of these data. The amount is accumulated throughout the harvest and totaled at the end of the season thus establishing the volume to be billed under the volumetric fee system.

Associations are nonprofit entities and therefore cannot distribute profits among their members. If a surplus occurs at the end of the fiscal year, this may be assigned to the budget of the following year or allocated to funds reserved for such activities as the replacement of machinery, the protection and conservation of the watershed, or other objective previously established by the association.

Table 2 presents the budgeted costs and funds collected by the LDDs during 1993, 1994, 1995, and 1996, and the subsidy required by each LDD to complement the annual budget. This table also indicates the subsidy granted by INAT to each LDD. Subsidies are about three times greater in those LDDs administered by INAT than in those transferred to WUAs, however the INAT-administered group includes a number of problem LDDs. Subsidies in

both groups have increased slightly between 1993 and 1996. Under a plan proposed by INAT, subsidies for most transferred districts will end next year.

BILLS PAST DUE

The concept of "bills past due" corresponds to the accumulation of debts users have with their respective LDD. Principal causes are mismanagement of fee collection by the AA; deficient delivery of services, and consequent user refusal to pay; and inability of users to pay when the debt has grown and/or when interests charged for unpaid debts are high.

The magnitude of the problem of unpaid bills varies from one LDD to another. It depends, in part, on whether the LDD is administered by a WUA or by a public entity. In the first case, administration is more flexible. Because it is a private corporation, relationships between the LDD and users are governed by standards established to regulate the relationships between private parties.

In the second case, the matter is more complicated because billing becomes routine over time and is done without analyzing past collection performance or correcting errors. Inaccurate service fee invoices are thus produced. When the user wishes to pay but does not agree with the values on the invoice, problems arise because of the difficulty of modifying or correcting the invoice. Users have also learned that if they lodge a protest, whether justified or not, fee collection is suspended and water service continues while the dispute is being resolved. A never-ending cycle is thus formed.

INVESTMENTS

The annual budgets, developed by WUAs and approved by INAT, also specify future investments. The investment program, for either heavy machinery and other equipment or infrastructure, is executed by joint decision of the LDD manager and the Board of Trustees. In those districts where assets are still the property of the nation, the respective WUAs must take out insurance to protect themselves against all risks.

INSTITUTIONS

The participation of users in irrigation management has generated local changes and has made various organizations redefine their roles in view of changed circumstances. Thus, governmental entities in charge of the public administration of irrigation have changed their focus from operational activities to planning land development programs. From being administrators of LDDs, they have become controllers and monitors of the new administrators - the water users' associations (WUAs).

Major additional changes are foreseen in the immediate future, because Law 41 of 1993 grants the private sector a growing participation. The most important functions of INAT will then be to direct the land development subsector and to grant and manage subsidies and incentives. This financial role will increasingly remove INAT from operational tasks in the rural sector, leaving this field to user associations, their Federation, and commodity associations.

The change in the role of users is, perhaps, of the greatest importance. From passive spectators, they have become protagonists of their own work plans and can now exercise their expertise on irrigation and management of districts, an opportunity that they had not previously had. Users have begun managing their own resources and to play an important role in changing management of the Districts and national agricultural policy.

ADMINISTRATIVE MODE

The administrative agency (AA) of an LDD can be (a) the executing agency (EA), in other words, the agency that built the LDD, for example, INAT; (b) the WUA of the LDD, which has first priority to be the perspective AA; or (c) a third party to whom the district's EA contracts the administration when the WUA cannot assume the administrative responsibility-a highly improbable case. The AA is responsible for the LDD's operation, its obligation extending from harnessing the water to delivering it at the entrance to each property, from whence water distribution is the responsibility of each user. The AAs have therefore paid little attention to the application of irrigation water within each property, thus leading to very low on-farm water-use efficiencies (INAT, 1996).

When a WUA administers an LDD, participation in irrigation management normally follows because the association is an administrative organization in which users are represented. The Board of Trustees of a WUA is the executive component that represents the interests of the members. Experience has shown that when users participate in the planning of water distribution, they are more committed to achieving realistic and efficient water use.

LABOR AND EMPLOYMENT

Significant changes have occurred in district administration with respect to labor use. Administration is carried out by fewer people, compared with that operation by the governmental agency (Garcés-Restrepo and Vermillion, 1994). Local people have also more opportunities for temporary employment, exert greater control over the district and its activities, and have rationalized procedures and contracts.

Labor issues have been handled inadequately in the Saldaña and Coello districts, because of the relative inexperience in this field and the lack of understanding of the goals pursued by official entities. After the transfer, the WUAs re-employed workers who previously were working in the districts for the government. This led, years later, to the decision that the WUAs had to recognize and finance retroactive fringe benefits for these employees, which significantly affected their finances. In other districts, this experience was taken into account and problems were avoided, presumably by not hiring previous employees. Within the restructuring that first led to HIMAT and its subsequent transformation into INAT, programs were created to facilitate the retirement and relocation of redundant personnel.

There are other problems with WUA personnel practices. The WUAs hire personnel according to employment policies and procedures which are frequently less than objective. For example, friends and relatives are hired or political favors are paid back. As a result, the quality of personnel is sacrificed.

LIMITS ON PARTICIPATION

The degree of participation of both users and associations is comprehensive, except in two areas. The first is the handling of debts, especially bills past due, which can be revised and modified by the district's administration, but can never be written-off. Writing off debts, or condonation, is restricted in Colombia, and can be carried out only through passage of a specific law by the Congress of the Republic. The second issue involves the contracting of work in the transferred districts, whether financed with resources from the national budget or from other sources. One function of the WUAs, granted by Law 41 of 1993, is to "participate in land development projects, presenting recommendations to the executing agency on project design and investment budget, and in the selection of proposals for work on infrastructure, through the Technical Committee of the Users' Association of the respective District." However INAT directly contracts work without user participation, and has delayed issuing of a regulation that defines the procedures for that participation.

When the law was partially modified in 1994, an attempt was made to explicate this aspect, but the result was to restrict what was already expressed in the law by the following enunciation "The users, through the Technical Committee, may present recommendations on the selection of proposals within the same terms established by the law for the proponent in contractual procedures, being understood that, with the citation or invitation formulated by the Executing Agency, the Agency is fulfilling the obligation established in the Third Numeral of Article 22 of Law 41 of 1993."

ROLE OF FEDERATION OF THE WATER USERS' ASSOCIATIONS

The FEDERRIEGO has at times played an important role at the national level. Since it was created in November 1991, it has participated in the gestation of the Land Development Law and in the elimination of the tax on added value (IVA) for some LDD activities.

As a result of Law 41 of 1993, FEDERRIEGO began to participate in the CONSUAT and on INAT's Board of Trustees. This participation, however, has diminished to attendance at meetings. The Federation has not presented, on its own initiative, projects or programs that would favor user associations. Additionally, its interaction with other organizations such as SAC, an entity that groups together almost all the organizations of the agricultural sector and is distinguished by its aggressive advocacy for the sector, has also been extremely limited. Its

activity has been more adjustment to the ambiance than action. With reorganization and strengthening, the Federation can surely improve its performance.

Internally, FEDERRIEGO's role has also been deficient and its ineffectiveness seems to stem from the lack of clear and specific objectives and of a set of services to offer to member districts. Member districts have a clear need for such services. By participating in irrigation management, the WUAs have had to confront issues such as the management of sediments, deterioration of watersheds, efficient application of irrigation water, drainage, salinization, and machinery selection and purchase. INAT is committed by contract to provide technical assistance on such matters, but frequently such assistance goes only as far as good intentions. INAT personnel have been reduced because of re-engineering and continuous downsizing, and new employees tend to be relatively inexperienced. As a result, WUAs have expressed the need for FEDERRIEGO to assume the responsibility of providing WUAs with technical assistance, not necessarily directly, but by coordinating this service and identifying possible sources of assistance (universities, consultant firms, and trade associations such as those for coffee, rice, and cereal growers).

Marketing problems represent another area in which FEDERRIEGO could assist its member WUAs. Because the collection of market information and prices can be difficult and expensive for each district to handle individually, FEDERRIEGO could offer market information to all member districts as another service.

So far, the Federation's work has been based on the individual efforts of members of the Board of Trustees, people who are extremely busy with other activities and cannot dedicate the time required to managing the Federation on a day-to-day basis. FEDERRIEGO urgently needs to hire a small, motivated, full-time staff to prepare projects and define the required rationale.

INAT recently contracted a consultancy firm to help support the creation or strengthening of a federation of users of land development districts, thus seriously questioning the representativeness of FEDERRIEGO and its organization. At present, participation within FEDERRIEGO is restricted to a selected group that does not permit democratic intervention by ordinary members (Arellano and Bernal, 1996). The consultants pointed out that "the essence of a trade association organization abides in the following factors:

- That it can provide effective services to its members
- That it can defend its interests
- That it is strong and exerts social presence
- That it has the capacity to be a valid speaker before the nuclei of political and economic power ..."

The report assessing FEDERRIEGO finished by stating that "FEDERRIEGO still has a long way to go before it becomes the trade association needed by the users of land development districts" (Arellano and Bernal, 1996).

6 TRAINING PROGRAMS

WATER USERS' ASSOCIATIONS

Training efforts to date by HIMAT (now INAT) have been intermittent and have aimed more to fulfill commitments and utilizing external assistance funds than to establish a solid program with previously defined objectives and purposes. At present, only a general training plan, covering common issues of the districts, can be prepared because a diagnosis and inventory of district needs required for preparing a plan with specific objectives is lacking. Training programs were conducted before some of the districts were handed over to the WUAs. Although well-intentioned, they have been short and wanting in relevance, thus frustrating rather than satisfying the users.

Training programs for board members of the different associations have involved study trips to Mexico and Chile. Several technicians from the districts have, through World Bank Loan 2667-CO, attend training programs abroad. No formal training programs were created for administrative personnel such as treasurers and secretaries.

Some associations, by their own initiative and using their own resources, have conducted training programs for their employees. But these efforts have been sporadic and did not follow an overall plan or strategy.

The District Management Group has identified, for the WUAs, some target groups for training and a general set of topics as shown below.

1. Extended Board of Trustees
 - a. Organization of the LDDs
 - b. Planning
 - c. Organization of the WUAs

2. District administration
 - a. Administrative personnel
 - b. Finance personnel
 - c. Technicians
 - i. Operation
 - ii. Conservation

 - d. Environmental management and development
 - e. Legal issues

3. General users
 - a. Information on the LDD, its operation, and organization
 - b. Users' duties and rights

INAT

INAT has used some of the credit received from the World Bank for institutional development, training staff, and purchasing basic equipment, mainly computers. The institution, however, is undergoing structural changes and renewal of personnel. Resources from the Inter-American Development Bank (IDB) will be used to contract a consultancy firm to advise and support INAT in the process of institutional strengthening during the next 3 years. A defined training program is planned for personnel at all levels and in the specialized areas required by the institution.

A program of continued education for most INAT personnel is included in the plan for institutional strengthening. This program will include personnel at headquarters and at regional offices, and will be carried out with resources from the IDB loan. No program of continued education exists for the personnel working in the districts, whether paid by INAT or by the associations themselves. However, if the employees of the WUAs are to maintain a level of knowledge that will enhance their performance, they must receive continued education.

7 SECOND GENERATION PROBLEMS

During and following the transfers of LDDs to WUA management, a number of problems have arisen in their administration. These are listed below in order of priority to Colombia.

LEGAL ISSUES

1. *LDD property rights*. The major legal issue affecting the transfer of an LDD to its WUA is the ownership of the infrastructure and assets already constructed and in operation for the LDD. These continue to belong to the state; only the administration is transferred to the users.
2. *National Water Code*. The absence of a national water code results in confused and sometimes conflicting legal interpretations. Such a compilation would collect and organize the entire body of existing legislation on water. It would also deal with water rights, administrative procedures, and legal proceedings in lawsuits concerning water.
3. *Water rights*. Water rights must be procured to use water. Autonomous regional corporations belonging to the Ministry of Environment are the agencies in charge of

granting water rights. Because existing procedures are complicated and difficult to apply, most LDDs lack formal water rights.

4. *Water fees at the watershed level.* The autonomous regional corporations responsible for managing water at the regional level are authorized to collect fees for the use, control, and monitoring of the resource. These fees were established without in-depth analysis and their payment has been onerous for the LDDs - so much so that they are requesting that the fees be revised. This cost is additional to the fees collected by the LDDs for system operation and maintenance.

FINANCES

Inadequate financial resources to administer, operate, and maintain LDDs constitute a major problem. Budgets are unable to cover all required costs, and the LDDs do not derive sufficient income from the sale of services.

1. *Resources for administering, operating, and maintaining the LDDs.* According to INAT, with a few exceptions LDDs have low levels of fee collection because the General Registry of Users is not kept up to date, users have difficulty in paying, the water supply service is deficient, and the role and benefits of LDDs are not widely known. If the collection of O&M fees is low, then budgets show deficits and the administration of these districts becomes deficient.

2. *Resources to rehabilitate the LDDs.* Seven of the 16 transferred LDDs do not receive O&M subsidies from the government. In all LDDs, however, users generally increase fees at a rate lower than that required. This causes some maintenance tasks to be put off, generating an accumulation of postponed tasks that lead to major rehabilitation programs. LDDs are truly self-sufficient only when the needs of rehabilitation and maintenance of the infrastructure can be executed with the funds collected. But, when a major job is required or heavy machinery or other equipment has to be replaced, finances record a deficit. The case is similar for those LDDs that are subsidized. A time will come when the government will not subsidize or will not contribute resources to rehabilitate the LDDs. In view of the indifference shown by users to these looming problems, serious social impacts will surely result.

3. *Equipment replacement funds.* The reserve funds currently held by LDDs are insufficient to replace the heavy machinery, vehicles, and other equipment that INAT has handed over to them and which the LDDs need to operate normally.

4. *Bills past due.* The increasing accumulation of users' debts with the LDDs is a cause of concern. This problem has not been resolved because of INAT's complex bureaucratic procedure and because users have learned how to use these difficulties to their advantage - delaying payments while retaining irrigation service.

5. *Training in financial management.* The budgets handled by the LDDs, even the smallest, constitute sums of money that merit sensible financial management. But of all the aspects involved in LDD transfer, this has received the least attention. Employees of WUAs and members of the Boards of Trustees desperately need training specific to this area.

OPERATION AND MAINTENANCE

Transferred LDDs have applied a risky approach to reduce administrative costs: they have downsized their technical staff or have dismissed qualified personnel and replaced them with inexperienced, but less expensive, personnel. Maintenance is also being postponed, generating an accumulation of deferred maintenance that, when finally addressed, will involve very high costs.

1. *Operating the LDDs.* Existing infrastructure is underused and undergoing progressive deterioration because of inadequate maintenance. Crop and irrigation improvement programs are also lacking. These factors affect LDD operation, which show a low efficiency of soil and water use. Water supply programs are inadequate because no functional system exists to measure water, and water gauges are not used. None of the LDDs have an updated general register of users, so operational tasks and fee collection become increasingly inefficient.

2. *Maintaining the LDDs.* Inadequate budgets lead to lagging maintenance programs, even in the best-administered LDDs. Plans are being made to solve these problems

through state-funded rehabilitation programs, but this will only reinforce the culture of deferred maintenance. The heavy machinery and other equipment LDDs received from INAT need replacing and funds for this will have to be generated. However, here also, in the absence of clear guidelines on ownership and cost sharing, LDDs will continue to set aside insufficient replacement funds while WUAs perceive the possibility that INAT will make the replacements.

3. *Information generated by the LDDs.* The recording, classification, analysis, study, and use of information generated by the LDDs have been totally neglected. INAT is not processing this information and, as a result, the LDDs have stopped recording data. This has a number of negative consequences, including the inability to analyze LDD performance.

ROLE OF INAT

1. INAT's decision to continue the transfer program. The role played by INAT, the main governmental land development agency, should be redefined and clearly specified. The definition should address the following points.

- INAT's commitment to the transfer policy established by Law 41 of 1993. To date, this commitment has been intermittent, being picked up whenever external pressures are exerted.
- Responsibilities of the parties involved, both during and after transfer. Attention should be paid to the role that INAT should play after an LDD has been handed over to its WUA.
- Needed modifications to transfer procedures, based on previous experiences.
- A training plan that will satisfy the real needs of both users and LDDs.
- Prompt payment of INAT's existing subsidy and financial support commitments for administration and training programs and a clear policy on cost sharing with WUAs for rehabilitation and heavy machinery and equipment replacement programs.
- An operational plan that coordinates the activities of various INAT sections so that the Institute works in an integrated fashion, thus avoiding scattered and inefficient actions. Additionally, staff members should be sufficiently motivated to act as fundamental promoters of transfer.

2. Research and validation of technology. Only limited research is conducted on operation and maintenance of LDDs. This task is a government responsibility, and INAT should conduct or commission research and establish programs to develop and validate new technologies and approaches.

WATER USERS' ASSOCIATIONS

Legal instruments are a good basis for conducting and maintaining a transfer program, but enormous efforts will be required to ensure the effectiveness and sustainability of the WUAs if they are to administer the LDDs and participate, along with the government, in the management of Colombia's water resources (Subramanian, 1996).

1. *User participation.* The participation of users in important matters is decreasing (INAT, 1996). The number of attendants at General Assemblies is less than 50% of those qualified to attend. Such apathy leaves decision making in the hands of a small self-perpetuating group.

2. *Activities that benefit users.* WUA activities are routine and new services are rarely developed for the water users, accounting, in part, for their limited participation.

3. *A weak federation.* The weaknesses identified in the WUAs are transmitted to their higher level organization, the Federation. As a result, the Federation of the Water Users' Associations of Irrigation Districts (FEDERRIEGO) also needs to be strengthened. WUAs should federate themselves in a such a way that they have

sufficient authority and prestige to dialog directly with the government on policy issues regarding water resources or agriculture. WUAs should strengthen themselves through training programs to prepare their representatives to represent their interests with the government and for soliciting needed public services.

ENVIRONMENTAL ISSUES

1. Degradation of the watershed. When programs to protect watersheds are limited or inadequate, programs for watershed recovery become necessary. Otherwise, water volume decreases and sediments increase.
2. Degradation of water quality. The careless use of agrochemicals in farming has decreased water quality to such an extent that it is perhaps the greatest challenge faced by the WUAs. Communities must be educated to minimize negative impact.
3. Industrial pollution. Industries contaminate water sources, affecting not only its use for irrigation but for all other purposes. This problem must be solved.

8 PROBLEM SOLUTIONS

ATTEMPTED SOLUTIONS

To solve the problems summarized in the preceding section, the following efforts (among others) have been carried out.

- To remove the legal impediment to transferring governmental assets to private parties, the Council of Ministers, the highest legal tribunal of the country, was requested to act. As yet, there has been no response.
- Existing jurisprudence on water-related issues has been compiled, and a decree is being prepared. However, a National Water Strategy is required for a more comprehensive approach. The strategy would cover water concessions, user fees, and surveillance and control of water in watersheds.
- Rehabilitation of the LDDs and replacement of heavy machinery and other equipment, using loans from multilateral banking, is in progress.
- Training programs in O&M have been scheduled for users, using resources from both the national budget and external sources.
- Transfer and validation of technology, through agreements with other official entities, such as SENA, ICA, and CORPOICA. So far, results have been discouraging.
- WUAs have offered training programs in organizational development to strengthen the associations and motivate users, but results have been disappointing.

ADOPTED SOLUTIONS

No solutions have been adopted for legal problems, even though the intention exists. Financial problems have been solved, over the short run, by rehabilitation loans from the World Bank. No concrete solutions were developed for the problems of O&M of the LDDs. Operational plans for LDDs recommended by different consultancy firms have not been applied, and WUAs have not received training. Maintenance plans and programs of the LDDs reflect inertia, and work conducted in each district usually follows routine patterns and is not actively planned and assessed. Activities such as research on technology transfer, validation of new technologies, application of solutions to environmental problems, and the assessment and improvement of the performance of the WUAs are at a standstill. Such stagnation reflects lack of leadership, inadequate service plans for users, and the absence programs to motivate users. The search for solutions to environmental problems has been nil, and this area requires immediate attention.

RECOMMENDATIONS

- Develop a comprehensive program for transferring districts. In doing this, defining the concepts of WUA property, infrastructure, and assets must be a top priority. Simple well-defined procedures for obtaining water concessions are needed, and arrangements should be made for the autonomous regional corporations overseeing the water resource to establish equitable fees for water use, control, and surveillance.
- Establish comprehensive rehabilitation programs for those LDDs still administered by INAT to encourage their transfer. Replacing heavy machinery and other equipment that are obsolete would also serve as an incentive.
- Implement training programs for the O&M staff of LDDs, aimed at solving specific problems in each district. The program should be based on individual diagnoses of district needs.
- Gain the full support of all INAT staff members by making them familiar with the transfer process. Obtain and communicate a clear commitment to the process from top management.
- Conduct research programs on irrigation management and on the transfer and validation of technology.
- Conduct research and educational programs on environmental problems to promote correct use of agrochemicals and pesticides and preserve water quality.
- Support WUAs through activities that strengthen organizations and generate leadership skills and attitudes of self-reliance. They do not need paternalism.

REFERENCES

- Alvarez, C.E. and C. Garcés-Restrepo. 1996. Perfil de riego de la República de Colombia. International Irrigation Management Institute. Cali.
- Arellano, M.T. and R. Bernal. 1996. Consultoría para apoyar la creación o fortalecimiento de una Federación de Usuarios de los Distritos de Adecuación de Tierras; Diagnóstico. Santafé de Bogotá.
- Arévalo, M.; F. Franco, A. Moreno, H. Valer, and A. Velasques. 1994. Análisis de fortalezas y debilidades - Distrito Prado Sevilla. Document 2. Project COL/93/013. Instituto Nacional de Adecuación de Tierras (INAT) and the United Nations Development Program (UNDP). DNP (Departamento Nacional de Planeación de Colombia). 1991. Programa de Adecuación de Tierras 1991-2000. Document DNP 2538-UDA-Ministry of Agriculture. Santafé de Bogotá.
- DNP (Departamento Nacional de Planeación de Colombia). 1991. Programa de Adecuación de Tierras 1991-2000. Documento DNP 2538-UDA. Ministry of Agriculture. Santafé de Bogotá.
- District Management Group. 1996. Status of medium-sized and large districts. Santafé de Bogotá.
- Garcés-Restrepo, C. and D. Vermillion. 1994. Irrigation management transfer in Colombia: an assessment of seven transferred districts. Paper presented at the International Conference on Irrigation Management Transfer, Wuhan, China, September 20-24.
- García-Betancourt, G. 1994. La transferencia en Colombia: El papel de la Federación Colombiana de Distritos de Riego. Informe preparado para el Instituto Internacional del Manejo de la Irrigación.
- INAT (Instituto Nacional de Adecuación de Tierras). 1996. Situación de los distritos de mediana y gran escala. Subdirección de Adecuación de Tierras and Grupo de Gestión de Distritos, Santafé de Bogotá.
- Subramanian, A. 1996. After the transfer: WUAs and water management in Colombia. World Bank. Washington, DC.

Vermillion, D. and C. Garcés-Restrepo. 1996. Results of management turnover in two irrigation districts in Colombia. Research Report 4. International Irrigation Management Institute. Colombo, Sri Lanka.

ANNEX 1: BACKGROUND INFORMATION ON COLOMBIAN AGRICULTURE

Background Information on Colombia

I. Official Name: República de Colombia

II. Basic Indicators

1. Location: The Republic of Colombia is located in the Northwestern portion of South America (latitude 5° N). It is bordered in the Northeast by the Atlantic Ocean, in the East by Venezuela and Brazil, in the South by Peru and Ecuador, and in the West by the Pacific Ocean and Panama.

2. Area: 713,592.5 miles²

3. Population (1994)

Total: 35,545,000

Rural: 9,603,000

Urban: 24,942,000

4. Population growth rate: 1.7% p.a. (1994)

5. Population Density: 18.75 inhabitants/mile²

6. Life expectancy: Male - 66 years, Female - 72 years (1992)

7. Gross Domestic Product (GDP): US\$ 51.6 billion (1993)

8. GDP annual growth: 4.9% (1993)

9. Per capita GDP: US\$ 1,518 (1993)

10. Official Language: Spanish

11. Currency: Peso 1,090.00 pesos = \$1.00 US Dollar (June 1997)

12. Principal religion: Catholic

13. Literacy rate: 76.6% (rural); 92.7% (urban) (1991)

14. Health and Nutrition:

Infant Mortality Rate: 37 per thousand with a 5.9% percentage variation

(1990) Malnutrition in children under the age of 5:

Global: 13.1%;

Chronic: 20.8%

III. Land Resources

Climate: There are different climatic systems in Colombia. They vary from the very humid (Pacific Region and lower portion of the Cordillera Oriental) to the semi-arid to arid (upper portion of the Guajira and certain isolated points in the Andean region). This describes areas with average quantities of very variable precipitation, which range from 30 mm in the Alta Guajira, to 9,000 mm in the Chocó. The country's yearly average rainfall is about 3,000 mm.

There are certain regions within the lower warmer lands where precipitation is high all year long (central portion of the Pacific Coast). The large valleys of the Magdalena and Cauca are characterized by marshy and flood prone regions, abundant rainfall, and high humidity. In the Caribbean region, temperatures are high, with an average of 27°C. Relative humidity is between 73% and 85%. The area of highest humidity is found in Turbo (Antioquia). In the Andean region, temperatures differ greatly from one zone to another, depending on elevation, ranging from 13°C to 28°C. In some places, like the Sabana de Bogotá, nightly temperatures can drop to 0°C. Relative humidity also varies widely in this area, fluctuating between 62% and 82%. The Eastern Plains and the Amazonia typically present very high temperatures, which rise above 25°C. However, in certain zones, like Mocoa and Sibundoy, temperatures average only 15°C. Relative humidity here is 77% to 87%. In the Pacific region, temperatures also rise above 25°C. However, due to the abundant rainfall present almost year-round, relative humidity in this area ranges from 85% to 91% - the highest in the country.

Agricultural land: According to the Agustín Codazzi Geographical Institute, there are presently 5,317,182 ha of agricultural land which include transitory, semi-perennial, perennial, and miscellaneous crops. Transitory crops cover 1,163,352 ha, and correspond to 1.02% of the county's surface area. Prevailing crops are:

- Warm elevations (0 to 1,000 m above sea level): cotton, rice, sesame seed, corn, sorghum, soy, and tobacco
- Moderate elevations (1,000 to 2,000 m above sea level): transitory crops are generally associated with perennial and semi-perennial harvests, the most widespread of which are corn, beans, yucca, vegetables, and tomatoes
- Cool elevations (2,000 to 3,200 m above sea level): potatoes, barley, wheat, corn, leafy vegetables, legumes, and other tubers

Semi-perennial crops cover 316,721 ha, corresponding to 0.27% of Colombia's surface area. This category includes bananas and sugar cane. Perennial crops are comprised mostly of coffee. Their global extension is 1,370,695 ha, which corresponds to 1.20% of the country's surface area. Within the miscellaneous group, there are areas with a mixture of uses, African palm plantations and fruit trees; this use covers approximately 2,462,290 ha, 2.16% of Colombia's total surface area.