



# Irrigation Advisory Services and Participatory Extension in Irrigation Management

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## IRRIGATION TECHNOLOGY TRANSFER FOR FARMERS: THE CHILEAN CASE

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## **IRRIGATION TECHNOLOGY TRANSFER FOR FARMERS: THE CHILEAN CASE**

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### **Abstract**

The maximum Chilean irrigation potential is around 2,5 million hectares. The National Politics of Watering considers two fundamental aspects, first, the incorporation of new surface to irrigation and second, the improvement of 800.000 hectares. Agricultural Watering is under the Ministry of Agriculture in the National Commission of Watering, in it, there is a Technological Transfer unit. The mission is "to bring near and to put to disposition of the farmers, professionals and technicians of the sector, the new reception forms, distribution, conduction and setting in irrigation". The main lines of the Technological Transfer consider: Validation of Productive Systems Projects; Work with Farmer Organizations; Private Consultants Training; CHILERIEGO Review; Generation Change; Vulnerable Areas Intervention Models; Professional and University education; Hydrological Culture; and other topics.

The results have been satisfactory because it has been possible to intervene in different agricultural areas, with different weather and, overall, with different structures of property holding and farmers type. For the future there are new challenges related with the work scale, territorial intervention models, autonomous work systems generation, reception of private resources, evaluation systems improvement, administration, control, and criteria assignment for hydraulic investment.

### **General Antecedents**

Chile's continental area is 75,7 millions of hectares and 28,7 millions are lands that have some agricultural activity. 5,1 millions are only arable, (3,3 million unirrigated land and 1,8 million under channel levels). The 66% of this under channel levels surface possesses sure irrigation and the rest only eventually water supply. The arable unirrigated land potential ascends to 0,7 million hectares. According with this information, we can conclude that the maximum potential of irrigation in Chile is around 2,5 million hectares. There are more than 1 million hectares with drainage problems and 35.000 with salinity problems due to restricted drainage. Chile presents Mediterranean Weather conditions with a long period of dry station; this condition generates problems of drought at least every four years, with critical complications for the agricultural sector.

The agricultural sector has shown a significant development since 1985, in 2001 it represented the 5% of the Domestic Product. In the same year, exports were 4.800 million dollars, specially derived of agroindustry activities as: fresh fruit (grapes, apples), forest (cellulose) and wines.

Based in the previously exposed reasons, it has been detected that only building irrigation and drainage infrastructure we can't solve the irrigation problems. It is necessary to implement, develop, analyze, validate and transfer new technologies as a way to minimize risks and incorporate the quality attributes that are obtained and improved when irrigation is opportune and in appropriate quantities.

### **Water Resources Policy's Principles and Objectives**

Irrigation and Drainage Policy cannot be conceived separated from a Water Resources Policy. This Water Resources Policy is based on the following principles:

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- Water is a public use factor, because it is essential for the people, for the economic and social development and for the environment. Then, the State must assume a special guide through regulation norms that guarantee the correct resource use for the national development and for the society benefit.
- The resource use should be carried out in a sustainable way and assuring the associated environment protection.
- Water is an economic factor, then, juridical and economic system that regulates its use must take care for the efficient use.
- This policy should consider the water users, social organizations and the common citizen participation, reflecting the social water category, the economic, environmental and cultural importance and the society democratic reinforcement.
- Water, as a hydrological cycle component, has a complex behavior, with a lot of space and temporal interactions with other environmental elements. The policy must recognize this complexity and specificity. For that, its propositions must be compactly based over technical and scientific knowledge.

Due to these fundamental principles, main objectives were enunciated considering that the last purpose is the integral using, to be able to improve the quality of the inhabitants' life; avoiding that this not became an obstacle for the Chilean social and economic development.

The identified objectives are:

- Assure water supply for population's basic necessities.
- Increase the using efficiency in different sectors with economic viability, considering the scarce condition in a large part of the territory.
- Water resources localization in those demands that present the biggest economic, social and environmental benefit.
- Maximize water resources contribution for the country development, through finding new ways for remained and reuse water.
- Diminish the hydrological variability impact.
- Recover the existent environmental passive related with the Water Resources and assure the development without ecological deterioration.
- Minimize the social conflict levels related with water and walk towards a social peace.

### **Irrigation and Drainage Policy in Agriculture**

The Irrigation Policy considers two fundamental aspects, first, the incorporation of surface to irrigation and second, improve 800.000 hectares from 2000 to 2006. Due to these concepts, the Technological Transference has a growing importance. Studies and analysis estimate that it is possible to achieve the conquest of new markets, with new products, through the appropriate use of the irrigation water and with the election of species and varieties that can be incorporated in the Chilean portfolio exports.

Another element for the analysis is related with the public sector organization, this is a non-solved topic in the Chilean State Modernization process and sometimes it generates some confusion. Even so, irrigation resides in the Ministry of Agriculture and specifically in the National Commission of Irrigation. (NCI)

There is a "Unit of Technological Transference" under the CNI, this unit mission is **"bring to the water users, farmers, professionals and technicians, the new reception, distribution, conduction and setting in irrigation technologies."**

As a beginning point, in the NCI the "setting in irrigation" concept has been defined. This concept involves more than the intention of improving the water administration and application, more than the introduction of important changes for the producers income generation (that permit the investment recovering that are demanded due to the incorporation of new and more efficient irrigation technology). In this context, the "setting in irrigation" concept not only includes the investment in hydraulic infrastructure (reception, accumulation, regulation, distribution, conduction and surrenders), rather, it also refers to the water administration inside and outside the farm limits, the analysis of restrictions (climatic, supply, etc.) and the soil conditions. Overall, the concept considers as implicit a continuous improvement and changes that impact farm performance.

Based on this concept, there are different actions in Technological Transference because, added to the efficiency improvement in the water using, the system is pointing to develop complementary capacities for farmers and also for the water users organizations. This way, varied activities, related with irrigation technical and hydraulic elements, has been developed: Productive Systems Validation, User Organization Reinforcement, Professional Permanent Training, Territorial Intervention Models and Diffusion Tools. The final objective is to achieve the appropriation of the new technologies considering environmental aspects.

From the beginnings of the 90's many programs - that permit the water use as an input source to increase the Chilean Agriculture competitiveness - have been developed based on quality and productivity.

### **The Technological Transference Main Lines**

In Chile a system for Technological Transference is been developed, not exempt of complications. However, a lot of activities have been carried out with some advances and improving the coordination between the private and public sectors. In this ambit we must coordinate the foment instruments.

The system is guided by the following criterias:

- Duplication efforts avoiding (financial, professionals and technical)
- Programs based in a diagnosis that responds to the user necessities
- Financial funds increasing through contracts involving regional and private instances.
- Local governments reinforcement (municipalities).
- Active participation of the involved community.
- Technical excellency in the transference.
- Regional Universities Participation.
- Producers' technical and commercial capacities development
- Economic, social and sustainable development, especially in poverty areas and sectors with natural resources used in excess.

The system challenges are varied; nevertheless, it has been possible to establish procedures for these criteria's application. It is necessary to settle down that while experiences are developed in the rural sectors, (that always begin with the farmers that have more interest) a social validation goes taking place in the community. This way, a shared process of learning is generated, combining and mixing the users potentialities and experiences with the technician's abilities. As the above-mentioned example, in an important number of programs it has been possible to begin with only a small group and concluded it with a great number of users requesting the transference and/or adopting the developed technologies.

### **Productive systems validation (PROVALTT)**

The main objective of Productive Systems Validation and Technological Transference Projects is the adoption of efficient irrigation technologies administration and application, related with high profitability crops, validated, and technically feasible under the project area conditions. The PROVALTT structure allows the development of two categories of closely related activities in a systemic way:

- Validation (applied investigation) of irrigation technologies oriented to the development of profitable productive options, through Validation Units (UVALES) and Demonstrative Modules (MODEM'S);
- Validated technology induction, promotion and adoption using diffusion activities, extension, training and technical attendance, all implemented through:
  - Training: technical courses directed for professionals, technicians, farmers, producers, etc.
  - Extension: general and specific meeting days, technical meetings, integration and support for the Agricultural Schools, technical discussion, groups of technological transference, etc.;
  - Elaboration, edition and distribution of informative and pedagogic materials as notes, technical and meteorological bulletins, manuals, videotapes and/or slides sets, radial and television programs.

The activities consider professional and technological support:

- The area professionals and the project Boss;
- Specialists in pertinent matters that are working in the Investigation Regional Centers, Experimental Stations and Universities;
- In situ devices oriented towards the validation (applied investigation) for information and profitable technological references for a quickly incorporation in the production systems. Moreover, these units are also used for demonstration in order to multiply the extension efforts.

These devices are:

- The Validation Units (UVALES);
- The Demonstrative Modules (MODEM'S).

There are different stages as Program Installation, Shared Diagnostic (through workshops and meetings with the community). Later, the program is structured in the selected area. The most important activities are:

- Localization and identification of UVALES and MODEM'S;
- Analysis, identification and systematizing of the high-priority programmatic lines:
- Water condition development (conduction, channel, and small accumulation infrastructure).
- Irrigation structure technification and training requirements.
- Productive development projects with market options
- Identification and definition of characteristics as a first step for implement and develop an Irrigation Programming System.
- Support program for the producer.
- Definitive technical proposal elaboration.
- Constitution of a Supervision Productive and Support Committee in the PROVALTT area.
- Socialization of the definitive technical proposal.

In the execution stage the activities are:

- UVALES & MODEMS design and installation.
- Validation activities development (work in UVALES).
- Technical attendance to MODEM'S.
- Courses of irrigation destined to Professionals and Technicians.
- Support for Agricultural Schools (1° to 8° Grade).
- Practical training in irrigation for farmers and operators.
- Training for Water Users Organizations.
- Development of extension activities, diffusion and technical attendance:
- Field Days meetings.
- Technical lecturers.
- Organization of technical interest groups.
- Elaboration and distribution of bulletins.
- Workshops and Analysis Seminars for a permanent evaluation and schedule control with the Supervision Committee.

It is important to highlight that each PROVALTT has a Supervision Committee that decides the global lines for the executioner to carry out the modifications according the changing circumstances.

The PROVALTT system has intervened in approximately 300.000 hectares and including 40.000 users (organizations, small, medium and big producers) that are direct or indirectly benefited with this type of projects. Also, there is beginning work with agroindustries, the idea is validate new productive option and implement suppliers' development programs. This project is very important, the small farmers are subjected by price variations and their organizations haven't yet solved the commercialization problems. Have clear price rules as an agroindustry supplier based on contracts incorporates a stability grade for the small farmers.

Table 1. The PROVALTT activities.

PROVALTT	PROGRAM		COURSES & WORSHOPS		DIAS DE CAMPO Y REUNIONES TEC.	
	N° PRODUCERS	AREA (ha)	N°	ATTEND.	N°	ATTEND.
Sifón La Placa	234	5,117	6	216	21	651
Canal Buzeta	480	2,000	7	154	27	756
Emb. Lliu-Lliu	74	340	4	36	22	491
Emb. Convento Viejo	2,893	27,500	4	89	46	1,315
Valle Putaendo	1,962	6,400	12	574	39	1,162
Sifón Loncomilla	326	7,700	4	148	14	392
Canal Cayucupil	97	1,384	3	54	13	550
Faja Maisan	677	7,032	20	298	40	1,160
Htos. Familiares	267	271	1	20	3	84
Canal Waddington	4,218	15,213	4	31	28	442
San Felipe-Los Andes	1,060	11,500	4		41	1,783
Canal Melado	3,803	51,000	6	100	4	150
Com. Portezuelo	1,050	27,653	10	196	10	858
Sn. Pedro de Atacama	400	1,200	0	0	7	140
Sistema Paloma	3,200	43,000	14	153	20	550
Cuenca del Choapa	3,697	22,948	5	60	13	266
Provincia Quillota	4.909	17.646	12	125	12	264
Cuenca Tinguiririca	7.800	77.200	14	155	15	302
<b>TOTAL</b>	<b>32.762</b>	<b>281.492</b>	<b>130</b>	<b>2.409</b>	<b>375</b>	<b>11.316</b>

## Water user organizations training

Participation in water user organizations is not satisfactory, generally those users with more cultural level or with a bigger participation (in the river and channels flow) are who participate actively. The organizations are having bigger relevance in drought or flood times, in those periods, is very usual observed that the participation in meetings is highest than normal supply situation. For example, during the great drought in 1998/99 meetings never registered before those participation levels. That is to say, generally, water users normally appeal to the organization in critic periods, more even, in normal times even it is difficult the tariff collection for the operation costs. This program considers the work with Water Communities, because those organizations are more vulnerable than others.

Until beginnings of the 90's many programs were made with the organizations, but in general, the considered topics were related with legal constitution and regularization of water rights. Since 1991 a new work began, more dedicated to the management and invigoration of those groups, more than the legal topics and water rights, the program considered water administration and project development. The idea was to generate strong organizations, and build capacities to assume new challenges and promote the member's democratic participation.

Considering the Chilean law, there are three kinds of organizations:

- Water Community: it consists on two or more possessors of water rights in a common system (water or drainage). All the matters of interest of a community are discussed and solved in a general assembly, which also chooses a directory.
- Channel Association: it is formed by all the users of a common channel including the water communities. It has similar functions as a water community, but it has a collective legal status, that facilitates the collective credits obtaining
- Meeting of Surveillance: it is an organization constituted in a common river. Their members are individuals, public entities, channel associations, water communities and any other entity that uses the water from oneself basin including users that don't use water for irrigation (mining, industries).

The most important functions of the organizations are:

- Water extracting from the main source
- Explode, preserve and foment the necessary infrastructure for their members
- Administer the works transferred by the State (reservoirs, small aqueducts, etc).
- Water Distribution.
- Tariff gathering for administration, distribution, repairs and acquired and built works paying-off.
- Water supply suppressing (deprive the use for those members that don't pay the tariffs or for user that extract water in excess to their rights.
- Solve conflicts according the law.

A program has been designed to settle down the methodologies should be used to intervene in the organizations. Beyond a technical or legal consultancy, the objective is to establish solid bases and determinate the organization requirements.

As first element, the idea is "to seduce" to the water users to achieve an actively participation. The program is pointing to develop organizations to convert them in an encounter place for technical and economic subjects, this way; it will be possible to establish the organization and the basin as the structure unit of the irrigation policy. The underlying concept in this program is to assure the operation in the medium and long term, generate an ownership sense and a constructive conversion culture (appropriation).

The considered subjects are:

- Organization Development: formation, legal aspects, social aspects, leadership, and participation.
- Organization Management: budget handling, water flow administration, remainders, combined work for work identification, outstanding information distribution, users support, etc.

In the first stage - elaboration and validation of the methodology - only 40 communities were considered. These selected communities are representative of the different kinds of organizations. Then, beginning in 2003, the program will consider 300 communities with 1.500 water users for two years. The idea is that the program could be permanent in the long term, including the 2.800 Water Communities (130.000 water users).

These actions are contained in the methodology that is developing, taking care of the critical elements identified in the diagnoses. For such reason, the training contents incorporate variables of environmental sustainability and generic options (woman), topics recently considered in the organization works.

### **Intervention models in vulnerable areas**

As the productive systems are developed, the necessity of intervening in vulnerable areas - considering them as an integrated system - takes more importance. Together with the Cooperation of the Japan Government, (JICA) the program "Transference of Technologies of Watering and Protection of Natural Resources in the Commune of Ninhue and Portezuelo" is being developed. This project consists in validate a methodology over a small basin of the mediterranean unirrigated territories. This model considers a specific territorially action. Later, with the validated intervention technologies, the results will be applied in a surface of 500.000 hectares that are in risk due to more than 120 years of agricultural activity, with techniques that generated a gradual process of erosion and exhaustion of the water and soil resources.

The specific objective is "determinate a technology for integral soil and water conservation for a sustainable agriculture in small basins of interior unirrigated land". Also, the elaboration of appropriate plans of rural development; improve of the technology in soil conservation; and verification of combined new practices for the ecosystem conservation.

This is a project that considers the producer's socioeconomic and cultural reality and contributes with appropriated solutions for the productive systems. The project is articulated with all the public and private institutions in function to have an efficient use of all the state interments and their appropriability.

According to these objectives the developed activities are:

- Studies of tideland and river currents
- Studies of existing underground waters
- New water sources
- Technology improvement of water collection
- Irrigation Technology Improvement
- Elaboration of a basin management plan
- Technology of non harmful cultivation systems

For each one of the enunciated stages, specific products have been defined and elaborated with the obtained technical results. These results must be transferred to the farmers in a comprehensible form and an easy reading language. Each activity is executed in agreement with the involved community, that is to say more than a purely technical relationship, it is necessary a sane interaction between technicians and

farmers. Discussion spaces, social validation and results have settled down, the experiences are carried out in farms and there is also a demonstrative unit. The main direct actions for the community are:

- Manuals elaboration for basin integrated management
- Theoretical-practical sessions in conservation matters and water efficient use
- Systematic classes for children of the basic school (soil and water conservation).
- Systematic classes for the students of the Secondary School (Technical Education)
- Intervention methodology publications with accent in water and soil management
- Seminars and workshops for result and strategic intervention discussion of natural resources in the unirrigated areas.

Other activities are forest works, support to zero cultivation management and the elaboration of irrigation projects for each farm (Wells, treadmills, small reservoirs)

Also, another objective is to establish combined actions for not duplicating the State actions. As in other programs, people's participation is fundamental. The diagnosis showed that it was necessary to generate capacities in the community so that they could identify, elaborate and manage projects of economic and social development. This is the only way will have a "people appropriation" of each action.

### **Irrigation and drainage diagnostic**

The problems that block the development of irrigation and drainage are known but they are not measured neither located. The potential of water resources, whose figures seemed effective, is far of the current reality. The data that, usually are managed, are exchanged repetitions among the same information sources and with the same errors.

The necessity to know the resources potential became evident because this unknowledge blocked the efficiency of the farmers, organizations, and public and private organism investments. The knowledge of such resources, the problem solutions and the elaboration of that policy will increase the agriculture potential, the rural employment and, consequently, the Chilean development. Even more, the international factor also endorses, even more, the necessity to know the real offer of water resources due to the commercial agreements with the European Union and United States. This reason justify that have a development based over obsolete information is a risk that we cannot permit.

In this way, a Geographic Information System (GIS) was generated and implemented, agile, interactive and up-dated. The GIS is allows to have an appropriately manage of the irrigation sector databases. But the most important thing was the logical design of procedures and processes oriented to reinforce the capture, administration, manipulation, analysis, modeling and visualization.

This tool has been incorporated to the system of Technological Transference through its distribution in all the Chilean regions so this information can be permanently subjected to an upgrade process and revision by regional actors as way to obtain databases that reflect the reality.

This is a gratuitous tool, without cost for its consultation or for information extraction because the system operators are financed by shared programs between regions and the central level. User's levels have been defined to modify the information too. There is a especially conviction that this GIS will be a contribution and a valuable step ahead for whole community, specially for the basic and secondary students, where the topic of the natural resources is being considered as a priority.

## **Generation change**

When technical advances in the rural sectors are tried, especially in the small farmer's level, it is necessary to consider the technical, environmental, commercial and also anthropological aspects, as the only way to have a holistic overview. The adoption of irrigation and drainage technologies, the innovation in productive alternatives and, overall, a new conception of water, are elements that must be considered. In Chile, the 40% of the small farmers are older than 55 years, obviously a critical challenge for the Technological Transference.

This is a new work line (began in 2001) in which many institutions are required. Through the introduction of irrigation technologies this program is trying to give real work options for youths, so they can stay in the rural sectors with possibilities and attractiveness for them. The program has the following criteria and actions:

- Generation of productive projects
- Project Management Capacities
- Develop organizations for associative projects
- Social, environmental and economic training
- Agriculture technology Training
- Increase the access for economic resources
- Optimize the existing instruments and new instruments creation to supplement them.

As it is shown, the Technological Transference participation in this process is very important because many studies conclude that it is possible to generate more effectiveness in the local and regional economy performance with a motivated youth.

## **Private consultants training**

The existence of professionals with capacities to generate irrigation and drainage projects is essential. The necessity to generate these capacities is based in the fact that irrigation should not be only a process of hydraulic and structural calculations, it also requires of an agronomic component to consider the productive destination of that hydraulic work.

As in Chile a process of decentralization is developing, the training programs to private consultants are carried out according to the geographical and ecological conditions present in each territory. This training program considers three target groups as a way of making a pertinent training and obtain results in front the local necessities. These objective groups are farmers, local agents and private consultants.

For professional of the local levels, irrigation is one of the activities that they carry out and the program is oriented to the identification of alternatives for irrigation and drainage projects. There are several institutions dedicated to the technical and productive development in agriculture and not all the professionals have the appropriate formation, knowledge and training. With this work, the first stage is the correctly project identification, later with a profile, private consultant is hired for design and present it to the financing sources.

The identification and execution of irrigation and drainage projects cannot be only a technical and administrative decision. For the transference success, it is fundamental to involve farmers in each one of the steps that should be given to opt to a irrigation project. Only the technical recommendation and execution don't generate capacities to farmers, the irrigation project should be a combined creation and the farmer should appropriate it.

With this modality, the local agents work became an appropriate way to transmit the technical options to the farmers, and the consultants can be information nodes. Also, all irrigation projects are assumed by all those involved, assuring a long term technological improvement.

### **Chileriego magazine**

Chileriego magazine is published every two months since he 2000. A Publishing Committee composed by technicians, academics and farmers that have involved in irrigation technology circuit, selects the contents. The magazine seeks to be a mechanism of permanent communication for all users, consultants, supplying companies and the public institutions. It is looked for to establish a permanent and dynamic work forum.

The magazine is distributed in two formats. An edition properly such magazine, with quality paper (crouché, density 0,9 and format A4) with color. This edition is dedicated to the organizations, authorities, professionals, and to all the actors that circulate permanently in the water resources sector. As massive diffusion, an economic version is published, with newspaper paper, tabloid format, and color with 5.000 copies.

The diffusion materials, notes, documents, news, technical manuals, calendar of events, special reports and all about related with irrigation in Chile, are also included in the web site [www.chileriego.cl](http://www.chileriego.cl). With the computers increasing use, this communication system is very useful, low cost and permits feedback in short times. In the web site there is a non-cost virtual library with all the technical manuals. They are also available different work elements in Videos, CD and slides format.

Another transference tools are games to be worked by farmers' groups. For example the game is "Water Users Right & Obligations". This game is oriented to know the main legal subjects, to improve the access to the legal benefits and how to react in different situations. These role games have a satisfactory result because in some organizations the water management is not with the legal norms. The generation of these diffusion tools points to be worked by groups and/or individually.

### **Participation in events**

The participation in events is important as a support and a way to show the Technological Transference activities. Many courses, seminars, diffusion shops, exhibitions, national and international meetings are realized. The idea is to be present in all the national and regional events. In those events we can show the Technological Transference system to 8.500 users during 2001.

Another participation action area is the formal education at schools and technical institutes. Every project or transference program must consider an integrated work with all the formal education system (basic schools, high schools, professional - technical education - professional, universities, etc). This is a demanded condition for the execution of the program. Until now about 6 Universities, 12 technical institutes and more than 25 schools have participated in this process.

### **Final Considerations and Challenges**

The described actions are an overview of technical, social and economic elements. The policies are oriented toward concepts as "good practices in agriculture", water supply and quality, and the best use for the associated crops. Under an environmental viewpoint, the idea is to develop a sustainable agriculture sector, increasing the small farmer strengths, reinforcing the potentialities, incrementing profit through more added values.

Technological transference programs should give a real solution and be developed under farmer's conditions. It is for such reason that the generation of these programs is not a product of the public bureaucratic decisions. The road that should be continued, to be consistent with the objectives, is very complex and sometimes confused.

To elaborate a program, at least, is necessary to consider:

- Regional and local diagnostic.
- Big Reservoirs and Channels areas
- Regional and local authorities' requirements
- Organizations requirements
- Analysis of the regional strategies of irrigation
- Reference terms in agreement with the applicants

After a program is adjudicated to the executioners, a Direction Technical Committee is established, in this committee all the involved groups and institutions are represented. The existence of this committee is fundamental for the result socialization. The reports are revised and can be approved or rejected, generally this committee proposes observations that permit the changes to improve the program.

Actually, the results have been satisfactory; this system has permitted to intervene in different agricultural areas, with different weathers, with different land holding structures and farmers' type. The Technological Transference System is slowly giving answer to the requirements in this new stage.

The future challenges are related with the selection of productive options to be chosen, so the investments in irrigation could be financed with this productive options profit. Chile has been incorporated to the worldwide commercial system through opening new markets and commercial agreements with other countries; this is a real challenge.

Another challenge that is already being analyzed is related with the technological barriers that Chile's agriculture faces towards clean production. The organic production initiatives (fruits and wines) is being adopted by many farmers, then financial institutions must be watchful to this new condition and work with clean production programs according the Chilean agriculture situation.

As it has been enunciated, it is necessary to insist in the educational work and training for organizations, professionals and farmers. Today challenges must consider water as an agricultural input and is necessary to pay for it. Even in these days, in some sectors, water is assumed as a "gift from he nature". It is necessary to work in a new conception, a new water culture something as "emotional hydrology", and for it efforts should be bigger.

In the future we must insist in territorial intervention models, generation of autonomous systems for the organizations and overalls an appropriate model of basin management. A irrigation programming systems has been developed in the Talca University in he VII Region, the work is related with fruit plantations, vineyards and other crops. It is necessary to have more irrigation program systems, especially in the north region and overalls in all that sectors that are in scarcity of water scarcity.

In Chile we are convinced that when exists a virtuous combination of factors, wills, complementary resources will arrive alone. For that, we must educate and collaborate with the user empowerment, that is the final challenge.