

MEXICO



PRESENT OUTLOOK

Mexico has a territorial extension of approximately two million square kilometers, with around 96 millions of inhabitants, of which 30% live in rural areas.

In accordance with the National Employment Survey for 1995, the rural population involved in agricultural activities in the rural zones was estimated As 9.7 million of which 33% owned land, the 9% were landless producers and the 58% workers: 24% where paid and 34% were unpaid. Of the rural population, 50% are below the age for work , and of the employed population, 39% are workers over 40 years of age. The principal segment that contributes immigrants to the urban zones and to other countries is that of 15 to 39 years, the most productive. With differences between regions, the role of woman in agricultural and livestock activities and in access to the land has become more important. Presently, 26% of the agricultural workers are women.

Some constant facts persist in the evolution of the rural population: high rates of fertility and migratory flows that maintain the volume of population in the rural areas without significant variations, and a tendency to the dispersion in small locations that continues to increase.

In accordance with research by the Economical Commission for the Latin America and the National Institute of Statistics, Geography and Informatics, published in 1993, the rural population in conditions of extreme poverty represented in 1992 close to 8.8 millions of people, which a segment, between 1.0 and 1.2 millions is constituted by seasonal journeymen, of which approximately 650 000 have to move to regions far from their places of origin, mainly to the north and northwest of the country and to the United States of America. Half of these workers are landless indigenous people; and a third are women.

In relation to the climate, in Mexico the annual average rainfall as of 777 mm, concentrated in three months, from July to September. The space distribution of rainfall and temperatures produces a great variety of climates, that range from arid (31%) and semi-arid (36%) conditions in the northern region, to the humid tropic (33%) in the southeast. Nearly 27% of the rainfall, that is 410 billion cubic meters converts into superficial runoff that feeding 13 main rivers of the nation. The renewable volume of groundwater is estimated at 31 billion cubic meters and non renewable supplies, stored in aquifers, amount to 100 billion.

In the northern part of Mexico and in the highlands, representing more than a half of the national territory, runoff amounts to only 20%. In spite of the fact that in this region lives 76% of the total population where 70% of the industries are established and where 40% of croplands are located.

The southeastern part of Mexico, which is less than a fourth of the total land surface, with only 24% of the population of the country and very little industry, receives 67% of total runoff.

The wrong space and time distribution of water have compelled government and private enterprises to develop an important infrastructure, in order to regulate their availability. At present, Mexico has a hydraulic infrastructure that supplies a large part of water demand for urban centers, food production, the industry and generation of electric energy. Also, the majority of the largest rivers are partially or totally controlled by multiple uses dams.

The average volumes utilized in Mexico, according their use, are, summarized in the following chart.

User of water in Mexico (Volumes in millions of cubic meters)

Type of use	Extraction			Use			
	Superficial	Ground	Total	Losses	Available water	Consumption	Waste water
Agriculture	41,850	16,274	58,124	16,616	41,508	29,056	12,452
Livestock	735	585	1,300	65	1,235	1,050	185
Urban-Domestic	3,560	9,622	13,182	5,266	7,916	1,609	6,307
Industrial	560	1,679	2,239	105	2,124	1,814	320
Total	46,705	28,140	74,845	22,052	52,793	33,529	19,264
% of use/ Total	62.40	37.60	100.00	29.46	70.54	44.80	25.74

Fuente : CNA (195)

A little over a fourth part of the water extracted for the different uses, returns as waste water, generally polluted, because only 536 million m3 of this volume are treated, which represents less than 3%. A large part of this volume is used again, mainly in the agricultural sector, with the risk of contamination of aquifers.

It should be stressed that, the volume of water loss, is often reused in irrigation down stream or recharging aquifers, exception made of the volumes that go to the sea, mainly in the coastal irrigated zones.

The irrigated areas represent the 30 percent of the agricultural cultivated land, they generate 50 percent of the value of the agricultural production, 70 percent of exports and 80 percent of the

employment in the farm land; around 400 thousand hectares have problems of salinity and more than 80, out of a total of 258 aquifers are over exploited. This trend compromises profitability and the possibilities for a productive advance in this sector.

The irrigation sector has an average productivity three times larger than that of the rain fed sector; however, the value of the production has had strong variations, due not only to the availability of water and the state of the infrastructure, but also to variations in the yields, in the costs of products and of the inputs and of the composition of the pattern of crops.

The use of water in agriculture represents the 80% of the total of use of water; however, it is worthy to note that demands in the other sectors have grown at rates larger than that of the agricultural sector. Actually, the urban use has grown at annual median rate of 7.5%;. which implies that in ten years the volume used has doubled, while that of the agriculture has almost remained constant. For this reason, there are conflicts between users of the different productive sectors.

Also, as an effect of the over exploitation of the resources, there are economical and ecological problems that affect other users of the resource. The over exploitation of the aquifers, has a consequence; an increase in the costs of extraction of water from the wells and the concentration of salts in these aquifers, as well as negative effects such as the settlement of the ground and the disappearance of springs.

The inefficient management of water utilized for irrigation, is not only the origin of problems and conflicts. It is also a factor that limits the achievement of higher yields in irrigated agriculture. This reason calls for an improvement in water use to satisfy the requirements of other sectors, in areas of conflict and scarcity, and of expansion of the surface dedicated to double crops.

At a macro level, the faulty management of water, is generating recurrent economical crisis in zones where water is scarce; in the management of reservoirs problems arise when utilizing maximum water available each year, without considering that the reservoirs have an important function of regulation, in order to store water in wet years with purpose of using it in dry years. Also, in the allocation of volumes for the different, users without an adequate consideration and there are cases where users of some sectors are provided with more water than necessary, while others in the same basin, suffer from scarcity. This is related to problems of water management and related legal issues.

At parcel level, the mismanagement of water generates multiple problems, some consequences may be: an increase of ground water levels, soils salinization, lower yields, waste of water in damage of other users and pollution of excess water.

In our country the large works of hydraulic infrastructure have already been developed; the expansion of this frontier represents investments in the order of 10 thousand dollars per hectare for which a partial solution aims to the technification of irrigation. The change from gravity to pressure irrigation costs one thousand dollars per hectare and the increase in productivity is very significant.

There are wide disparities in the regional distribution of productivity. The northwest region presents the largest capability to produce crops with high added value in relation to the size of its economically active population and to the number of production units. In this region, the gross value of agriculture and livestock production per productive unit is three times larger than that of the central region and almost 12 times larger than those of the south and southeast regions.

Productivity gaps show the feasibility to triple the yields in some very well identified regions in relation to the national average by introducing state of the art technology in irrigation, mechanization, use of improved seeds, fertilization, and weeds plagues control.

Main factors that have influenced the limited performance of the sector are mainly the following:

- Opening of land for cultivation each time of lesser quality and a progressive degradation of agricultural soils and range lands.
- Decapitalization, with notable exceptions in the segment of commercial agriculture and intensive technified cattle breeding, mainly for export; which is the result of an insufficient and uncertain profitability linked to unfavorable rural-urban prices.
- Exhaustion and distortion of a policy of development of the farmland in spite of the magnitude of granted supports, showed its inefficiency in encouraging private investment, rational use of the natural resources and know how to improve the living conditions of the majority of the rural population and of the development of their productive potential.
- Limited application of technological advances. Important technological advances have been achieved, but concentrated in the exploitations that are traditionally more profitable.
- Inadequate and rigid productive structure.
- Excessive division of the land holdings and of its exploitation that imposes limits to investment and to the acquisition of better technologies.
- Insufficient development of local and regional markets, without the stimulus of competition.
- Reduced and declining availability of financing, in internationally competitive terms.
- Low growth rate of agricultural and livestock production for the last 30 years, below the population growth, generating negative growing balances in foreign trade.
- Excluding some large size irrigated exploitations, there are profitability and productive capitalization problems of the sector facing a great potential for development on basis of higher efficiency, specially among small scale producers.
- There is a strong inequality in productive and technological development levels between regions and even in activities within the same geographical zone. Exploitations with state of the art technologies in irrigation coexist with others with traditional productive procedures and low productivity.
- Large part of the poverty of the country is concentrated in the rural areas. Over three fourths of the rural population don't have an income high enough to satisfy all their basic needs, and approximately two thirds of the population of the country in extreme poverty live in the rural areas.

AGRICULTURAL ALLIANCE

The problems mentioned above and the influencing factors are being taken care mainly with support of the Agricultural Alliance Program, in operation since 1996. It is a multiple-component program that gives financial support to producers that are able to develop their own viable projects technically, economically, and ecologically sustainable. The producers decide their actions and participation in the investment. The results achieved to date have been encouraging and the new approach and guidelines will lead the way, within the possibilities of the country, for a better development of the agricultural sector at the turn of the new millennium.

The policies and use of the available funds will be directed to diminish the above mentioned negative factors. The results show that we are succeeding with production and productivity increases with the end result of higher income levels and a better quality of life for the rural population.

The Agricultural Alliance is the result of the agreement between producers, Federal and State Governments. It was designed after a detailed diagnosis of the agricultural sector which had highlighted above mentioned problems. For this reason, it was designed to fulfill the following objectives: recover the profitability of agricultural production; increase production above the

demographic growth; fight poverty; maintain a positive trade balance and provide population with food at competitive prices.

In the context of the Alliance, the federal concept plays a key role. The Federal Government defines the general policies for development of the agricultural sector, the establishment of standards and rules for the allocation of resources and their expenditure, as well as the evaluation of results. States governments determine local priorities, coordinate specific actions and the organization of producers for production and marketing. In this new approach, it is fundamental that producers, based on their own decisions, decide the programs and actions they participate in, according to their needs and their financial capability, their technological level and their financial and economic viability analyses.

For the operation of the programs of the Agricultural Alliance, the Federal Government signed agreements with the Governments of the States, and the funds were administered through the States Trusts for Distribution of Funds, that were created for this purpose. State Councils were established with the participation of all the producers' organizations to define priorities. "Produce" institutions, with the purpose of speeding the technological change were also established.

The programs of the Alliance were grouped in five categories that cover the scope and activities of the agricultural sector :

- Agricultural promotion that comprises several programs, including fertigation, mechanization, and specific product-based projects.
- Livestock promotion like the program for establishment of rangelands, dairy products promotion, genetic improvement and better livestock.
- Rural development: training and extension, elementary technical assistance, and rural equipment.
- Agricultural sanitation: programs for animal and vegetable sanitation.
- Transference of technology.

The Program for Temporary Employment is being implemented in a coordinated way, with the agricultural side operated by the Agriculture, Livestock and Rural Development Secretariat (SAGAR), and the development of rural communities operated by the Secretariat of Social Development (SEDESOL).

As an example of operation of the programs of the Alliance, we have that of Fertigation, whose main objective is to increase the productivity of irrigated areas based on projects that include the use of irrigation and fertilization, allowing a more efficient water use, lowering energy and fertilizers costs, and increasing yields.

The Program includes the following concepts of investment: high and low pressure irrigation systems, fertigation equipment, pipes, pumps, filters, watermeters, designs and executive projects and technical assistance. Since farmers are in charge of actions, they directly contract supply and installation.

The Federal Government contributes with 35 percent of total investment or up to 305 dollars per hectare and the State Governments with an additional 10 percent. The producers participate with their own resources, coming from credits, labor or local materials.

Projects executed with support of the Program of Fertigation during the last three years, have benefited some 50,000 producers, achieving technological improvement of 345,519 hectares.

An analysis of 1996 actions was elaborated to determine the impacts of the Program, the main achievements are :

- Estimated water saving of 40% and of electricity 32%.
- Increase of 18% in harvested area and of 30% in production and 17% of additional cropped surface area.
- Increase of 116,000 work-days per year.
- Increase of 28% in the volume of agricultural products for export.
- The return of the projects is 16% and that of the producers reaches 25%.
- The beneficiaries express that they have succeeded in increasing their available income, which allowed 49% of them to make investments in equipment, improvement of housing, furniture and food.

PERSPECTIVES

Mexico's population in the year 2025 is estimated at 130 million inhabitants, that means that an increase of 30% is required to satisfy the basic food needs of the population.

The food security may be achieved via transference of technology and growth of productivity, considering that the extension of agricultural frontier in the country is practically exhausted, based on a more intensive and sustainable use of available resources.

In rural development two aspects should be considered: to provide more public services and to create more productive employments, better paid and in a permanent way.

It is a priority to continue with the technification. Of the 6.3 million of irrigated hectares only 700 thousand are technified, intensifying efforts in the next 12 years could bring 4 million more hectares, in the case that producers :

- Adopt in a large scale the use of proven technologies, sustained by training and technical assistance, in irrigation, drainage and soil conservation, in order to produce in an adequate sustainable way products in quantity and quality.
- Apply better inputs according to the specific conditions of their farms and fulfill certification and sanitary regulations.
- Adopt integrated systems for best plague combat and nutrition of plants and holistics in the livestock production that will reduce the risk of contamination by agro chemicals.
- Improve the use of natural resources, in conditions that preserve the environment as a priority, a balance should be reached in the exploitation of the aquifers.
- Achieve a better access to credit, in competitive conditions of opportunity and cost and schemes adequate to their specific needs.
- Modify their productive and organizational structure to adjust it to the markets requirements, with more profitable products and activities. A good effort is required to invest in order to improve the marketing facilities.
- Family integration in backyard activities and their productive diversification in which the water factor is determinant.

The governmental institutions that take part in the agricultural sector, have to:

- Reinforce the institutional coordination and with the organizations of not governmental and private producers, promoting the creation and adaptation of producers organizations under specific objectives, like basin councils, saving and loans institutions, and fundamentally of marketing.
- Analyze and plan the intersectorial and regional competition for the use of the natural resources in an agriculture-forestry-pasture context of the ecosystems of microbasins, and in a wide context of hydrographic basins. It also includes the effective use of labor, participation

of rural women and families, and the impacts for income in education, health and welfare and other services like electricity, drinking water, drainage, and roads.

- Continue supporting the investigation and technological development, sanitary regulations, the channels of internal marketing and the international negotiations in order to strengthen their contribution to the trade balance of the country.
- Reduce the post-harvest losses by means of the better handling of the products, define normalization standards, and develop quality control procedures, not only for the agricultural products but also in the materials and components of the irrigation systems.
- Promote the use of technologies in arid and semiarid areas that diminish the features of desertification, use of alternate sources of renewable energy, as well as the control and handling of resources in the humid and subhumid regions.
- Reinforce the issues of technical specialized assistance, not only in the irrigation but also in conservation of land and water, the utilization of fodder and range land and agricultural sanity.
- Search for alternatives of more accessible financing for producers, that also satisfy the rules of the funding institutions. Furthermore promote the organization and development of participation of savings and loan institutions.
- Improve the efficiencies of the water use and rehabilitate and modernize the operation and conservation of the irrigation and urban water infrastructure.
- Use water of low quality or recycled, with a previous study of their application using appropriate technologies.
- Raise awareness on the population on the use and rational management of water; emphasizing to the rural population the fundamental importance of this resource.
- Increase the propagation of the results of the Alliance for the Agriculture, that has led to measures like the agricultural and livestock national policy, which has in a short period of time, showed the technical, economical and social viability of a sustainable development. In the case of the Fertigation Program it has succeeded in increasing the income of the producers, the generation of employments and the exports, upon reaching profitability and quantity of the agricultural production; besides improving the efficiency in the use of the natural resources water and soil and protection of the environment.

The rural development, in these irrigated zones, undoubtedly will increase gradually, specially with the generation of better paid employments including, of course, the agroindustrial activity, the incorporation of productive projects and sustainable miniproducers and it will detonate the non-agricultural activities that will be carried out by members of the same community.

The major challenge of Mexico, at the turn of the XXI century, is to reduce the poverty of people who live in the rural areas.