

CROATIA



EXECUTIVE SUMMARY

The issue of food and rural development in Croatia may be best summarized using a part of the speech of the Croatian Prime Minister at the World Food Summit in Rome, 1996.

Croatia belongs to the group of new members of the world community, but it is a country with rich experience and tradition in agricultural development, both as regards the scientific and research work and education, and practical food production. Although concerned with solving of the heavy effects of war, as well as numerous problems related to transition from planning to market economy, the Croatian Government focuses particular attention on providing food to the entire population and supplying of the market with adequate contingents of good quality products. Therefore the Republic of Croatia is ready to accept all ideas regarding the Summit dedicated to the security of nutrition, and shall give full support to its organization.

As a responsible member of the International community, the Republic of Croatia is concerned about slow solving of global problems related to security of nutrition and will persist on their solution at all levels. The seriousness of the situation is illustrated by the fact that permanent reduction of arable land areas has already become a global trend, and the expected growth of the population on Earth requires doubling of food production by 2025.

Keeping this in mind, we are sure that adequate quantities of good quality food may be provided only through increasing of production per unit of area. At the same time, this increase must be achieved by applying ecologically balanced technologies, in order to preserve the natural resources, and in the environment of "healthy competition" and social justice, in order to secure

availability of food for all who need it. The key role in achieving of these high goals will belong to scientific research and education activities in agriculture and related disciplines, but also to development of democracy in all segments of social life.

1. OVERVIEW OF NATIONAL POLICIES AND DEVELOPMENT PLANS

Recognizing the role of the agricultural sector in the national economy of Croatia, the Ministry of Agriculture and Forestry decided, with the assistance of UN Food and Agriculture Organization (FAO) to formulate the strategy of sustainable agricultural development, in accordance with the provisions of the Constitution of the Republic of Croatia regarding the development of economy on market principles. The fundamental goal of the strategy is:

Encouraging of more efficient production and marketing of agricultural products in a way enhancing the welfare of farmers and consumers, contributing to the development of Croatian national economy, protecting the natural resources of the Republic of Croatia and ensuring competitiveness of Croatian agriculture on the world market. In achieving this goal, particular emphasis should be given to family farms, which are the basis of Croatian agriculture.

Thus, the Strategy represents the concept of sustainable development of Croatian agriculture as an integrated approach to national development, with its goals: efficiency, righteousness and sustainability being carefully integrated into a coherent and operational framework.

2. PRESENT STATUS OF WATER

2.1 GENERAL CHARACTERISTICS

The Republic of Croatia, established after disintegration of former Yugoslavia in 1991, comprises the territory of 56,538 sq.km. which is about 22 percent of the former country, and its population is 4,784,265 (1991). It consists of two arms, the continental one stretching from Zagreb eastward, and the coastal one stretching along the Adriatic Sea.

With respect to the orographic, climatic and vegetation characteristics, the whole territory may be divided into the following geomorphologic units :

• the Pannonian Plain	31,000 sq.km	-	54.8%
• the mountain area	7,540 sq.km	-	13.3%
• the Adriatic zone	<u>18,000 sq.km</u>	-	<u>31.9%</u>
	56,540 sq.km	-	100.0%

The basic characteristics of the physical environment lead to the conclusion that the long-term development of the country should be based on agriculture and tourism. The climate, high rainfall (average 1,088 mm per annum), large areas of good quality farm land (about 56 percent) both in the Pannonian and in the coastal region, provide a sound basis for long-term development of highly efficient ecological agriculture. On the other hand, the Adriatic zone, although only 520 km long in a straight line, has, due to a large number of islands (total 1,180 islands and rocks) and highly indented coast, the total length of 5,790 km. Adding to this the low population density (less than 1 million), well afforested coast, a large number of clean gravel beaches, clear sea with large forests and karst vegetation in the immediate vicinity, strong future development of tourism seems to be beyond any doubt.

2.2 FLOOD CONTROL AND EROSION PROTECTION

• The Sava River Basin (Zageb)	24,283	sq.km
• The Drava and Danube Basin (Osijek)	9,657	sq.km
• The Istrian & Littoral Water Basin (Rijeka)	9,840	sq.km
• The Dalmatian Water Basin (Split)	12,548	sq.km
	<u>56,538</u>	<u>sq.km</u>

Out of the total area of lowland parts of the country (about 1.79 million hectares), flood protection systems are required on 486 thousand ha; so far, the completely protected area comprises about 276 thousand ha, while on the remaining area the flood control systems have to be built or rebuilt. The largest still unprotected or partly protected individual areas are situated in the Gatchment areas of the Sava, Drava, and Danube rivers. The prevailing flood protection method is construction of dikes, and recently also relief canals and flood storage' have been used as well. In future, larger participation of flood storages and non-structural measures in solving these problems may be expected.

2.3 AVAILABLE WATER RESOURCES AND FUTURE NEEDS

Generally speaking, the Republic of Croatia is very rich in water, and in this respect it belongs to the very top among the European countries. The average annual rainfall varies, depending on the area, from 650 to 3,500 mm, with a general average for the whole country of 1,088 mm per annum.

The annual amount of rainfall water in Croatia is 61.55 cu.km. which is 12,860 ou.m. per capita. Out of this, the total runoff is 41.80 cu.km, which results in the average specific runoff of 23.4 l/s/sq.km.

The situation in the water basins is, as follows (in cu.km. per annum)

Water basin	Surface water	Ground water
Sava River Basin	24.22	10.70
Drava & Danube River Basin	7.53	0.56
Istrian - Liftoral Water Basin	2.96	7.57
Dalmatian Water Basin	7.09	11.42
	<u>41.80</u>	<u>30.25</u>

As already mentioned, the Republic of Croatia is very rich in water by European standards, both per unit of area and per capita.

Water consumption for the population, municipal services and industry between 1980 and 1990 was at the level of about 800 million cu.m. per annum. Water consumption for irrigation, with respect to a very small percentage of irrigated area (about 0.3 percent) is practically negligible.

Total water consumption for the population, municipal services and industry was (in million cu.m.):

1985	1990	1991	1992	1993	1994	1995	1996
887	779	600	678	666	661	651	639

The drop of water consumption was the result of reduced normal activities (production) caused by war circumstances and by the transition process.

Waste water from larger urban settlements and industrial plants is disposed into the rivers and the sea, following a treatment process. Minor problems of pollution of the receiving water bodies close to larger cities and industrial centres are still present, but large efforts are made to improve the situation.

The water requirements for long-term development resulting from the existing long-term development plans are shown in Tables (a) and (b):

(a) Water requirements for irrigation (million cu.m)

Region	2025		2050	
	ha	million cu.m	ha	million cu.m
Sava	50,000	151.69	170,000	510.75
Drava & Danube	87,000	274.94	280,000	885.81
Istra-Littoral	8,400	32.37	28,000	107.93
Dalmatia	13,650	57.61	36,000	158.38
Total	159,050	516.91	514,000	1,662.87

(b) Total water requirements (million cu.m)

User	2025		2050	
	Million cu.m.	% of runoff*	Million cu.m.	% of runoff*
Domestic	1,000	–	1,525	–
Irrigation	517	–	1,663	–
Total	1,517	3,6	3,188	7,8

* Includes only local runoff (41.80 cu.km.), without transit and ground water

2.4 IRRIGATION AND DRAINAGE SYSTEMS

Construction of drainage amelioration networks in river valleys started in the early years of the century, applying mainly open (surface) drains. The works were, in most cases, carried out parallel with flood protection works or immediately afterwards. Until the early sixties, only open drainage networks were constructed, and after that, almost exclusively only subsoil drainage networks. In the period up to 1985, a large number of earlier surface drainage networks was remodelled into subsoil drainage networks.

The drainage systems constructed until 1990 include :

- completely constructed surface drainage systems on 600,054 ha
- partly constructed surface drainage systems on 518,830 ha
- Subsoil drainage systems on 161,530 ha

In the next planning period it will be necessary to take the measures to complete both the flood protection systems and the systems of internal drainage. Also, efforts should be taken to remodel as many surface drainage systems into subsurface systems as possible, subsoil drainage being the method of the future.

3. PRESENT STATUS OF FOOD

AGRICULTURAL AREA AND LAND USE

The total area of the mainland part of Croatia is 5,653,800 ha, out of which 1,978,000 are forests. The total agricultural area is estimated (1991) to about 3,208,000 ha, out of which arable land is 2,202,000 ha, pastures 1,155,000 ha, and marshes and reeds 33,00 ha. Out of the arable land, ploughland and gardens are 1,466,000 ha, orchards 70,000 ha, vineyards 71,000, and meadows 413,000 ha. For a long period, the statistics in Croatia has recorded a constant reduction of agricultural areas, probably due to construction of infrastructure and abandoning of agriculture.

In the period from 1992 to 1995 the total sown area in Croatia was on the level of about 933,000 ha, which is 28 percent less than in 1991. The reason was occupation of a part of the territory.

The cropping pattern, as a result of food requirements, land tenure and also tradition, is characterized by a high percentage of cereals. In 1995, cereals were sown on 639,000 ha, which is 67.5 percent of the total arable land. Undeveloped livestock farming, reduced number of livestock, in particular during the war, poor breed selection and poor forage technology are the reasons for small percentage of land under forage crops (in 1995, 12.2 percent or about 115,000 ha). The lowest percentage is that of industrial crops (75,000 ha in 1995).

Large areas in Croatia are uncultivated, in 1995 about 170,000 ha, which is even 15.2 percent of the total ploughland area. Before the war the percentage of uncultivated land was also rather high, although considerably less than at present (on average 9.2 percent in the 1981/91 period).

Agricultural land is divided into state property and private property (family farms). Thus, in 1991, out of the total agricultural land, 2,014,000 ha were private property, with 534,266 farms. The farms are small, which is the basic obstacle for rational use of production potentials. Thus, 201,332 farms are smaller than 1 ha. The average farm size is 2.94 ha. The average size of state-owned farms is 2,960 ha.

DEVELOPMENT OF AGRICULTURAL LAND

Presentation and description of agroecological zones - agricultural regions in Croatia - shows a high diversity of agricultural soils. In all regions there are considerable areas where the basic constraint for achieving high and stable crop yields is the unfavourable water-air regime, which is reflected as constant of temporary water surplus or shortage. On the other hand, the data on the small size of farms undoubtedly indicate the need to enlarge the farm size. Thus, land development and targeted enlargement of farm size are the key measures in achieving stable agricultural production and food supply.

HYDROTECHNICAL AMELIORATION

Status of land development

The areas belonging to former social farms - combines - were gathered on one or a few locations, with larger plots, and were mostly drained. However, the areas of family farms are mostly divided into smaller parcels, dislocated and undeveloped. Modern crop farming requires enlargement of parcels and of farms in general.

STATUS OF DRAINAGE OF HYDROMORPHIC SOILS

According to the available data, the area of hydromorphic soils where the fundamental constraint is excessive humidity, which has to be solved by detailed drainage works, is 1,789,070 ha. Until 1990, basic drainage by open drains was carried out on 600,054 ha, or 33.5 percent. On the area

of 518,830 ha, or 29 percent, the systems are partly constructed, while on 670,186 ha or 37.5 percent of excessively humid soils there are no drainage systems. It must be mentioned that the situation regarding amelioration works has been deteriorating since 1990. Namely, war operations, former temporary occupation by the enemy (27 percent of the area), uncertainty of land tenure changes and shortage of financial resources are the reasons of stalling of amelioration works.

Detailed subsoil drainage by pipe drains has been carried out only on 161,530 ha, or 19.6 percent, although the analysis of climatic and hydrogeological indicates the need for detailed drainage by subsoil pipe drains on the total area of 822,350 ha. So far, pipe drainage was installed on 160,550 ha, or 99.4 percent on the areas belonging to former combines, and only on 980 ha or 0.6 percent on private family farms. This means that in former combines out of the total area sown 49.9 percent were drained, while on private farms the drained portion was only 0.1 percent of the total area sown. Since 1991, only 970 ha have been drained in Croatia, which is understandable with regard to the war circumstances.

In Croatia, irrigation systems have been built only on 5,790 ha, which is 0.28 percent of the arable area, or 0.44 percent of the area sown in 1990. In this respect, Croatia is at the very bottom of the European list. Most land is irrigated in the Neretva river valley (2,815 ha), then in the area of Zadar and Biograd (1,845 ha). In Slavonia and Baranja, the irrigated area is 830 ha, in Podravina and Posavina together 240 ha, and in Istria about 60 ha. However, in Croatia there are numerous reasons calling for larger application of irrigation. In Slavonia and Baranja recently even 60 percent of the years were dry. Therefore, conventional crop farming is facing a crisis and has to look for the solution through irrigation. Besides, constant increase of the population (70 - 100 more each day), comparatively low availability of land (only 0.45 ha of arable land per capita) and constant loss of areas due to urban development (daily about 4 ha) are also calling for further development of irrigation to compensate the above problems by increasing the yields. This is in accordance with the ideas in developed countries and statements of international experts: the future of agriculture belongs to genetics and irrigation.

Out of the total of 1,628,000 of ploughland and other cultures in Croatia there are hydrogeological, topographic and hydrographic conditions for irrigation on 680,000 ha.

As regards the availability of adequate water for irrigation there are numerous watercourses, local sources with small intakes, as well as existing and potential smaller and large storage reservoirs, as well as ground water. As regards the availability of ground water, attention must be paid to problems of its possible pollution.

AGRICULTURAL PRODUCTION

Agricultural production has been considerably reduced since 1991 as a result of several adverse conditions: (a) reduction of agricultural productive resources caused by war, (b) devastation of the former social sector which, by its capacities and output was an essential part of Croatian agriculture, (c) reduced extent of self-financing (generally poor economic status of agriculture, as well as problems of delayed payment for sales), (d) low level of government support to agriculture, (e) unregulated regime of foreign trade with the neighbouring countries, and (f) considerable migrations of agricultural population in the recent years, which reduced the available space for agriculture.

AGRICULTURAL REGIONS AND THEIR PRODUCTION

Croatia is a heterogeneous country with respect to the climatic and pedological characteristics, which is important from the standpoint of management of agricultural resources and enforcing of selective agricultural policy.

The Republic of Croatia is divided into three regions: the Pannonian, the mountain and the Mediterranean region. With regard to the resources and to agricultural production, the most important is the Pannonian region, while the other two regions are important in such types of production which are possible in these regions because of their climatic and pedological properties. In the Mediterranean region, important production is growing of early vegetables and vegetables and flowers in enclosed spaces (greenhouses).

Out of the total agricultural area in Croatia, the largest portion is in the Pannonian region (46.3 percent), a smaller one in the Mediterranean region (34.1 percent), and the smallest in the mountain region (19.6 percent). Climatic conditions determine considerable differences between regions for other categories of agricultural land.

CONSUMPTION OF MINERAL FERTILIZERS AND PROTECTIVE CHEMICALS

The consumption of mineral fertilizers in Croatia has constantly decreased since 1988. namely, in 1988 the consumption of active substance in mineral fertilizers was 172,6 kg/ha, which in 1995 dropped to 93.1 kg/ha.

The law determines that in Croatia protective chemicals cannot be sold nor used without the permission of the Ministry of Agriculture and Forestry based on the analysis of the chemical, physical and biological properties and the approval by the Ministry of Health.

Although nowadays agriculture is mentioned as a potential source of pollution of surface and ground water, due to low consumption of mineral fertilizers and chemicals, in particular on private farms, surface and ground water in Croatia is not seriously loaded from this source. Integrated protection measures and controlled fertilizing may even improve the situation, granting good quality water to the population for a long period in future.

CONSUMPTION OF AGRICULTURAL AND FOOD PRODUCTS

Summary consumption of agricultural and food products on the local market largely determines the level of requirements the requirements for primary products and processed products on the national level.

Self-sufficiency is a relative measure showing to what percentage the production of agricultural products covers the consumption. The war and its consequences, liberalization of the local market of agricultural products and transition from planning to market economy have resulted in the decrease of local production of almost all agricultural products, increasing of imports and of the negative balance of the Croatian foreign trade of agricultural products. The self-sufficiency of the majority of agricultural products has been severely reduced, and Croatia is at present to a certain extent dependent on the imports of large quantities of these products.

The degree of self-sufficiency or covering of consumption by the local production is higher than 100 only for wheat, maize, wines and poultry. On the basis of natural and technological conditions, generally speaking, Croatian agriculture has the possibility to achieve production of strategic product to the level of self-sufficiency and even more than that. Changing of the structure of resource utilization with improvement of the technological level, as well as stimulation measures of the agricultural policy, will make achieving of this goal possible on a longer run.

4. PRESENT STATUS OF RURAL DEVELOPMENT

The economic and social life in the rural areas is very complex, and agriculture is only one segment, although very important, in the development of rural areas. The traditional concept of rural development was used most frequently in connection with the development of agriculture in a broader sense. Recently, the concept of rural development includes also other dimensions of development, which are the prerequisite of improvement of overall quality of life in rural areas.

The rural areas, due to the migration into towns and industrial centers (in the country and abroad) were deprived of the young and most vital part of the population. For almost twenty years the natural population increase of the rural areas is negative, and their age and sex structure is disturbed.

The process of modernization of agricultural production was not followed by adequate development of industrial capacities, crafts, service workshops and other services in the rural areas. The priority was given to industrial development in urban zones, and therefore the villages and agriculture were subject to a strong exodus of labour and population into industry and urban areas. Both the number of farmers and the rural population dropped rapidly, and since the early sixties the number of farms has decreased as well.

Education promotes personal development of the individual, stimulating him to develop fully his intellectual, physical, emotional and spiritual talents. Free education gives everybody on equal chance to develop these talents.

Although the level of education in Croatia has risen considerably since World War II, both as regards the rural and agricultural population, the differences in comparison with the urban and non-agricultural population have increased. These differences show that so far the development policy has created the educated town and the uneducated village. The educational pattern of rural population has constantly deteriorated, particularly regarding the percentage of persons with secondary school, high school and university education.

FOOD IMPORTS

The potentials and tradition in nutrition of the population of Croatia are the factors economically and culturally influencing the changes of foreign trade of food during the last two decades. Global analysis of commodity and food trade in Croatia going two decades backwards from 1995 (to 1975) shows that the commodity trade was growing more slowly (increased by 4 times) than food trade (7 times). The average annual portion of food trade in the overall commodity trade in Croatia during the last two decades was 8.4 percent.

In the foreign trade of the Republic of Croatia the importance of food import has grown particularly during the last decade, when the country was exposed to essential changes related to Croatian independence and changed scope of registration of foreign trade, liberalization of the import regime, growth of the private trade network, etc.

The most distinctive change in the structure of food import was import of fruit and vegetables. Its portion was increased to 25 percent of the total import, and its value is USD 129 million.

FOOD SUPPLIERS TO THE CROATIAN MARKET

The two most important groups of countries supplying food to the Croatian market are the countries of the European Union (47.1 percent) and the countries of the former Yugoslavia - Slovenia, Macedonia and Bosnia and Herzegovina (together 14.5 percent). It should be mentioned that from among the other European countries Hungary is an important supplier of food to Croatia (10 percent of the total food import).

Participation of major countries in food import in 1995

No.	Country	Amount, mil.USD	Participation %
1	Italy	71	14.3
2	Slovenia	65	13.1
3	Germany	57	11.5

4	Hungary	50	10.0
5	Austria	39	7.8
6	The Netherlands	25	5.0

The average annual consumption of food products per family member was changed from 1970 to 1990 in Croatia, by reduction of consumption of cereals vegetables and products thereof and increased consumption of meat, fish and products thereof. At the same time, the consumption of milk was reduced as well. Such changes call for serious consideration, not only with regard to changes in the structure of nutrition, but also to the effects on the food market.

Along with stimulation and protection of the local production it is also important to develop the system of consumer protection, so that commercial import and privileged import (government commodity reserves), are not motivated only by the ratio of local standards regarding the quality of food of foreign origin.

FOOD EXPORT IN THE RECENT PERIOD AND ECONOMIC TREND

The total export of the Republic of Croatia and the food export from 1990 to 1996 (January to May) has a variable trend. However, up to 1992, a growing trend of export is noted, and from 1992 to 1994 the trend is falling, as a result of the war. Food export shows minor changes. The participation of food export in the overall export of Croatia from 1980 to May 1996 ranges between 7.5 and 10.4 percent.

Food export from the Republic of Croatia will be strongly influenced by forming of the free customs zone between the Republic of Croatia and the Federation of Bosnia and Herzegovina, normalization of political and economic relations with Serbia, accession of the Republic of Croatia to the CEFTA Association, signing of trade agreements with the European Union, growth of international tourist traffic in the country, and by structural of agriculture under the influence of the world market.

In any case, Croatia will develop as a country open to market relations with all countries of its direct and broader European geographic environment, ready, of course, also for cooperation with the countries of the 'third world', with which the exchange of goods is at a very low level, and which should and can be bilaterally improved.

5. FUTURE SCENARIOS AND AIMS

Although the share of agriculture in the domestic product until 2000 will continue to decrease slowly, agriculture in the rural areas will remain the major activity and the backbone of development. It will not be significant only as the place of employment, but also as a source of raw material for small processing plants, tourism, services and manufacturing crafts, intellectual services, etc. which will result in a versatile production structure that will allow full employment of the population, higher income and higher standard of living.

This would actually be the way to transform the present plans for development of underdeveloped areas on the entire territory of the country.

Depending on the incentive policy, at the end of the planning period and maybe even somewhat earlier gradual growth of population in the rural areas should be expected.

In the youth population, transfer in the non agricultural activities will generally stagnate, and in some parts of the country even uncertain increase of the number of the young farmers may be expected (Central Croatia and Slavonia). The measures of land policy should direct the development of agriculture towards highly productive farming. Recent investigations of standpoints and opinions of the rural youth indicate not only an increased interests in living in the village, but also a more positive attitude towards the farmers profession and reputation.

Starting from the socio-demographic trends in the village and agriculture and above assumptions, the share of agricultural population in the total population will continue to decrease.

The share of agricultural in the total population was 10.3 percent. The natural growth of agricultural population in the coming period will be negative.

The basic principle in the strategy of rural development should start from optimum and rational use of the potentials.

Planing of development in rural areas cannot be oriented towards returning to the traditional village, because it has changed, and it's stability, autonomy, social structures and institutions have been disturbed. It is necessary to establish special purpose funds at the national level and pass adequate laws which will ensure implementation of development of the village.

It is necessary to accelerate investments in municipal and tourist infrastructure, in particular in telecommunication and informatics, in order to make the economic and technical information available and to establish the connections between the rural areas and centres of economic and cultural life.

It is a notorious fact that in many rural areas there is not a sufficient number of schools, and the education programs are not suited to their requirements either. Therefore with regard to the importance of education and professional training in development of rural areas, educational activities should be suited to the specific needs, and educational infrastructure should be established which will allow implementation of the set objectives.

Problems of the village must be paid a greater attention in the general policy, in order to provide support to the development of rural areas, and in general, revitalizing of the village.

6. CHALLENGES FOR THE FUTURE SUSTAINABLE AGRICULTURE

As the world population is constantly growing, it is estimated that the present generation will face the task to produce, in the next fifty years, the quantity of food equal that produced in the past 8000 years of human history.

There can be no illusion that this task is possible to fulfil without serious increase of production per unit of area, because the possibilities of increasing productive areas are very limited.

At it's historical crossroad, the economic recovery and development in Croatia intends to be based on the modern concept of sustainable development, founded on agriculture and tourism as the economic activities relying on renewable natural resources. Such "pro ecological" orientation requires some changes and adjustment, in particular changes aiming at protection of natural resources of great importance to agriculture, first of all soil and water, and a certain kind of 'alliance" of the practised methods and the nature. In other words, increasing of yields per units of area, or production per unit of capacity, requires as a precondition the application of modern, corrected solution in crop farming.

IMPORTANCE OF BIOTECHNOLOGY

The requirements for traditional food from primary production and growth of ecological awareness of the population in our country lead, beyond any doubt, to the conclusion that the issue of biotechnological procedures which have already been developed to a considerable degree in the world, will require a strategic decision of the Croatian Government on the development of technology in general, and in particular, of biotechnology of land as permanent and inalienable national resource.

IMPORTANCE OF IRRIGATION

In the country, considerably larger investments in irrigation than at present are justified. For more rapid development of irrigation, it is first necessary to change the present attitude. In the past the still prevailing opinion about irrigation, it is first necessary to change the present attitude. In fact, the still prevailing opinion about irrigation in the country is that irrigation is means to fight the drought. As in the past drought used to occur periodically, and mostly rather rarely (on average every 3 to 4 years), this had influenced the belief and opinion which resulted in constant postponing of beginning of major investments in irrigation. Besides, in former production a rather narrow crop rotation and cropping pattern was applied, including only several basic crops. Thus there was, and there still is, the conventional "dry farming" agriculture with one sowing of crops which may mainly do without irrigation. This phenomenon is described as "psychological barrier".

Earlier crop production on former state farms was loaded by large quantities of mineral fertilizers, pesticides, and heavy machinery. The effects of such technology are smaller humus content in soil, deteriorated texture, compacted soil, pollution and degradation of biological and productive properties of soil. Thus the soil and the environment were neglected.

In such circumstances and in accordance with the processes in the world, our country also adopts the idea of organic biological production and development of sustainable agriculture, in which context irrigation gets its proper place.

In irrigation conditions the farms will apply mixed crop-livestock-vegetable farming. A wider cropping pattern will be applied with plant crops, forage, industrial and vegetable crops in regular and stubble sowing. Two harvests on our fields are the dream of every farmer. However, this is possible to achieve only with irrigation and proper use of water and soil. Modern technology-irrigated agriculture uses water very rationally to intensify the production, and takes care of all natural resources of the environment and of the social surroundings. Accordingly, this gives more opportunity to livestock farming which provides manure and helps to maintain favourable physical, chemical and biological soil properties and allows the irrigation potentials to reach their full scale. Thus unlike the former agricultural practice in our country where crop production was separated from livestock farming (on former state farms-family farms were mainly small and unable to change anything), on future farms with mixed production there will be a close connection (symbiosis) of crop and livestock farming which will allow proper land use and rational application of irrigation and other agrotechnical measures.

At present, our crop farmers are more interested in growing of crops requiring more modern technologies and irrigation. New production of vegetables, fruits and ploughland crops are starting, with irrigation, towards production of ecologically clean food.

AGRICULTURE, TOURISM AND FAMILY FARMS

Determination of Croatia to found the development of agriculture on village family farms is a qualitatively different approach and departure from the former practice, which lasted for several decades. However to achieve this, it is necessary to provide the conditions allowing the village family farm to take over the role that is meant for it. It is necessary to make the diagnosis of the status of family farms in separate regions in order to find the permanent motive for agriculture. It is important to investigate the life cycle of the family farm, because the existence of the critical mass in various stages of life is essential for development of agriculture.

The family farm must be trained to operate in accordance with the criteria and requirements of the world market. the agricultural system based on family farms must be dynamic, flexible, innovative with constant tendency to improve the competitiveness, with rational use of space, protection of the environment, autochthonous natural, cultural and historical values, and reducing status and material differences between the agricultural and other populations in Croatia.

In the vicinity of tourists areas family farms should be stimulated to develop as mixed households according to the sources of income. Combining the work and employment of family members in tourism and agriculture will make them more flexible as economic units and allow them to gain maximum benefits. Orientation towards family farms also helps the development of various forms of tourism: agrotourism, rural, health, nautical, and others.

This approach to development will be maintained by the population in a given area, with better solving of social and other problems.