CZECH REPUBLIC

SUMMARY

The Czech republic is an economically and culturally developed state in central Europe (48° to 51° N, 12° to 19° E) with a thousand-year-lasting cultural tradition of which an indispensable component are attitudes towards the environment. The country has 10.3 million inhabitants and extends over 7.887 million hectares of total area. From this, forest covers 2.630 million hectares and agricultural land 4.281 million hectares (of which 3.143 million hectares is ploughed land). Czech agriculture is capable of feeding the country and its water sources are sufficient to provide water for agriculture.

Czech economy has been undergoing, since 1990, an essential transformation towards market economy. This process affects both the agriculture and the water management. Some serious economic and legal problems of these two sectors still remain unsolved. One of such problems is the persisting division of competences, related to these sectors, among two, three or even more different ministries, in particular, the Ministry of Agriculture, the Ministry of Environment and the Ministry for Regional Development. While the Ministry of Agriculture oversees the agricultural and forest production and the exploitation of land and water resources, the Ministry of Environment administers the protection of land, water and forest resources and the Ministry for Regional Development cares for the rural development.

There exist, at the moment, several outlines of future agricultural and water management policies of the country, differing mainly in how they treat the role of the state and how they solve the trade off between social, environmental and market aspects. A factor which is assumed to eventually decide is the expected full accession of the country to the European Union after 2005.

1. OVERVIEW

The Czech Republic is a democratic state based on market economy. Basic macroeconomic data are given in Table 1. The principles of country's macroeconomic policy are normally established in Government's programs and consequently specified by the annual state budgets which are enforced as laws. Sectorial balances, prognoses of development and policy concepts in agriculture (including food industry), water management, environment and rural development are prepared regularly (usually every year). These are then applied in specific projects. Specific policies and scenarios are discussed in greater detail in para 5.

Table 1. Basic macroeconomic data about the Czech Republic in 1997

Characteristic	Value	Unit
Population	10.3	million
Gross domestic product in current prices	1649.5	billion CZK
Per capita GDP	about 5000	USD/year
Share of investments in GDP	30.7	%
Contribution of agriculture to GDP	2.1	%
Contribution of agriculture and food industry to GDP	7.0	%
State budget expenses	524.7	billion CZK
Balance of foreign trade	-140.8	billion CZK
Annual rate of inflation related to the previous year	8,5	%
Unemployment	5.2	%
Exchange rate of CZK to DEM	18.3	CZK/DEM

2. PRESENT SITUATION IN WATER MANAGEMENT

The Czech Republic is an important water divide between basins of three large European rivers (Elbe, Oder and Danube) flowing to three different seas (North, Baltic and Black). The country has 15.3 thousand km of water streams which are categorised as significant for water management. An overview of water resources of the country is given in Table 2. The water resources of the country are mainly recharged by atmospheric precipitation (the long-term annual average is 693 mm) and are therefore regarded as relatively uncertain. Exploitable resources make 30 to 50% of the total resources. The annual precipitation moderately exceeds the annual evapotranspiration (the long-term annual average is 500 mm). The averal annual inflow of water from other countries is only 9 mm while the average annual outflow to other countries is 203 mm.

Table 2. Overview of water balance the Czech Republic

Water balance item	Average annual value (mm)
Precipitation	693 mm
Evapotranspiration	499 mm
Outflow	203 mm
Inflow	9 mm

On an average, the reliable sources of surface water amount to 4796 million m^3/year while the exploitable groundwater sources can give 1339 m^3/year. After the increase of prices and the restructuring of industrial and agricultural production between 1990 and 1997 there was a significant decrease of water consumption. The specific water consumption of households is now by about 10% below, the average of EU. The sectorial breakdown of water consumption in 1997 is given in Table 4. It follows from it that the water consumption in agriculture (including irrigation) only represents about 1% of the total water consumption.

Table 3. Overview of water resources of the Czech Republic

Internally renewable water resources:		194 mm/year
Potentially utilisable water resources:		about 89 mm/year
		i.e. 7 billion m^3/year
		or 680 m^3/capita/year
From this :	developed:	3.4 billion m^3/year
		330 m^3/capita/year
	potentially developable:	3.6 billion m^3/year
		350 m^3/capita/year

Table 4. Sectorial breakdown of water consumption in the Czech Republic in 1997

Sector	Surface water consumption		Groundwater consumption	
	thousand m^3	%	thousand m^3	%
Public water supplies	500 860.9	26.3	414 609.3	88.9
Power plants	854 361.8	44.8	1742.7	0.4
Industry	532 103.3	27.9	38 168.8	8.2
Agriculture	13 548.6	0.7	5 920.8	1.2
Other	5 189.7	0.3	6 035.0	1.3
Total	1 906 064.3	100.0	466 476.6	100.0

Therefore, there is no overall shortage of water for agriculture. However, water for agriculture, especially for irrigation, may be in short supply in some locations during prolonged drought spells which come quite irregularly during the growing season. Then a supplementary irrigation is needed (but is not always economical). The growing season in most climatic regions of the country extends from April to October. Except for some intensive vegetable-growing regions, only one main crop can be grown over a one-year period, while the rest of the season is frequently used for growing catch crops (mainly green fodder crops).

The main mission of the water management sector in the Czech Republic is the sustainable use of water resources and the prevention of damages which could be caused by water surplus or shortage. This means, in particular :

- general care of surface water and groundwater resources and maintenance of water streams,
- protection of the sources of drinking water supply,
- mitigation of impact of floods and droughts,
- protection of natural water ecosystems,
- control and improvement of the soil water regime (e.g. through irrigation and drainage).

Central responsibilities within the water management sector are with the Ministry of Agriculture (which is a central authority for water management) and the Ministry of Environment (which is a central authority for water resources protection). Since 1990, several transformation steps took place, aiming at the change of the previous water management system and taking into account the actual prices of goods and services, actual ownership rights and new legislation. In 1998, a partial amendment of the existing Water Act, dealing with the protection zones and measures against water pollution, was adopted. What remains is mainly to pass the new Water Act and the Water Supply and Sanitation Act and to improve the water protection legislation. A special institution must be created to co-ordinate various uses of water and to provide services for

management of the catchments. An efficient system of compensations for the “production of public goods” (i.e., the maintenance of the environment - including the hydrosphere - and the landscape) must also be elaborated. Both the Ministry of Agriculture and the Ministry of Environment submitted their own proposals for new legislation.

Water administrators, designated by law, administer at present 93% of the total river network. There are 7 river administrators in the country, namely five River Board companies (for the basins of Labe = Elbe, Vltava = Moldau, Ohre = Eger, Morava and Odra = Oder), the State Land Reclamation Authority and the Forests of the Czech Republic (a state entreprise). In a brief overview, water and water structures in the Czech Republic are owned as follows :

- small streams, groundwater storage, main drainage structures and some main irrigation structures are owned by the state
- large and medium streams, boundary streams and water structures in streams are owned by the River Boards, which are, at present, joint-stock companies of which 100% of shares is held by the state
- water supply schemes, sewerage schemes and communal wastewater treatments plants are owned by communities (towns, villages), either directly or indirectly through joint-stock companies
- water management structures and networks situated in or attached to manufacturing plants are private property; the same applies to fishponds, small and pumped-storage hydropower plants and many irrigation schemes and structures.

The problems of ownership of some other items, like, e.g.:

- water in the natural environment
- streambeds
- some irrigation schemes and most drainage schemes
- remain unresolved. New legislation is being prepared to solve these problems and to improve the system of overall water management administration. The Land Fund of the Czech Republic has already privatised 2/3 of the total number of main irrigation systems. Transformation of ownership of main drainage facilities is also envisaged.

There are 91 large reservoirs in the country, with the total manageable volume of over 1 million m^3 (not including large fishponds). During the 1997 floods, the water reservoirs reduced maximum flows by 10 to 25%. Practically all towns above 5000 inhabitants have been provided with wastewater treatment plants. The percentage of treated wastewater, out of the total wastewater collected by public sewerage systems, is 90.9%. Water quality in streams has improved (in comparison with 1991). Ever since 1990 the release of liquid wastes into streams has been decreasing and the number of wastewater treatment plants has been increasing. The problem of eutrophication of surface water bodies due to diffuse sources persists. The main pollutants are mineral oil substances and industrial chemicals. The quality of water in fishponds and other small surface reservoirs remains unsatisfactory. The quality of groundwater from shallow aquifers is, often, also unsatisfactory due to high contents of nitrite, nitrate, ammonia, sulphate and total oxidisable matter.

The care of the water regime in the landscape was not satisfactory over past decades. The maintenance of fishponds and other small reservoirs was neglected, while some streambed fortifications made in this period were ecologically inappropriate. The water retention capacity of the landscape and its biodiversity were impaired. Therefore, a programme of revitalisation of rivers systems was launched, aiming at restoration of the natural character of the landscape.

3. PRESENT SITUATION IN FOOD PRODUCTION

In 1996, the Czech Republic had 4.281 million hectares of agricultural lands and 2.630 million hectares of forest land. The agricultural lands consisted (in 1996) of 3.143 million hectares of ploughed lands, 0.902 million hectares of perennial grasslands (meadows and pastures) and 0.236 million hectares of gardens, vineyards, hop gardens and orchards. 0.026 million hectares of land has been devastated, mainly due to open-cast coal mining, and is gradually being reclaimed. 0.159 million hectares are open water bodies. Per capita, the Czech Republic has 0.76 hectare of total land (of this, 0.42 hectare of agricultural land, of which 0.31 hectare is ploughed land) and 0.25 ha of forest land. The share of ploughed land in agricultural land (73.4%) is one of the highest in Europe. The existing supplementary irrigation system can provide water to 0.153 million hectares (3.6% of the total agricultural land), while the extent of drainage is 1.087 million hectares (25.4% of the total agricultural land). The drainage systems have been mainly built as underground tile or plastic drains discharged into surface drainage canals or large-diameter underground pipes. Once built, these drainage systems act spontaneously due to gravity. Their maintenance was largely neglected over the last decade. On the other hand, the exploitation of irrigation systems, which in the Czech Republic have been almost exclusively built as pressurised underground pipelines supplying water to sprinklers (travelling guns, centre pivot or linear move systems), require additional effort and expenditures. At present, only about 15 to 30% (varying according to actual weather) of the capacity of existing irrigation schemes is being exploited. Practically 100% of water for irrigation is taken from surface sources. Groundwater is only used for irrigation of small gardens and orchards. Microirrigation is used on about 0.8% of the potentially irrigable area, while gravity irrigation only covers about 0.5% of this area. The rest is under sprinkler irrigation. The global irrigation efficiency is estimated as 80%. Virtually no land in the country is affected by salinity or alkalinity. About 50% of agricultural land is exposed to a significant erosion risk.

The agricultural land of the country has been categorised according to the prevailing agricultural crops grown as follows :

- grain-growing region (41% of the total agricultural land)
- sugar-beet-growing region (24%)
- potato-growing region (18%)
- fodder-growing region (10%)
- maize-growing region (7%)

The main agricultural crops grown in the country are :

GRAINS

Main cereals grown are wheat, barley, oats, rye and maize. The structure of production in 1997 was as follows: winter wheat 46%, spring wheat 4%, spring barley 29%, winter barley 9%, oats 5%, rye 4%, maize 2%, other 1%. The average yield of cereals in 1997 was 4.14 $t.ha^{-1}$. The Czech Republic is capable of covering its consumption of all basic crop products, while the export and import of these products are, on the long-term scale, balanced. However, the production of grains may be further reduced in future if the export of grains encounters more obstacles than now. This may lead to a further overall reduction of agricultural production and, as a consequence, to the necessity of alternative use of agricultural land.

As for future development of the food production sector, one expects a higher support to the production of oil crops and to local fruit and vegetable growers, an improvement of the quality of potatoes and the enlargement of capacities for processing sugar beet. The increase of domestic consumption (e.g. of dairy products) would assist in stabilising the market. The way out for beef production lies in specialised breeds and in the increase of productivity. The pork production

depends to some extent on the increase of export. The poultry production is expected to rise in accordance with world trends.

4. PRESENT SITUATION IN RURAL DEVELOPMENT

The countryside is an essential component of the living space for most people in the Czech Republic. Even the inhabitants of towns and cities spend a part of their lives in the country. The Czech countryside arose as a synthesis of natural factors with man's effort, exerted over centuries, to cultivate the landscape. It is intimately associated with agriculture, forestry and water management and, therefore, its present state reflects the problems which these sectors have to face. The overall reduction of agricultural production and its (very common) unprofitability resulted in deterioration of socio-economic conditions of rural population. The present recession, experienced by all sectors of country's economy, contributed to the decline in extent and quality of infrastructure. This altogether leads to poorer accessibility of basic services, public transport, health care and culture for inhabitants of the countryside and to a general decrease of their living standard in comparison with the period before 1990. It is more difficult for inhabitants of villages to find jobs than for town dwellers, which results in gradual migration of educated and skilled people from villages into towns and cities.

It is the policy of the government to compensate for these unfavourable processes and to take care of the regional development of which the development of countryside is an indispensable part. Since 1996, this policy is implemented and guaranteed by a separate ministry, the Ministry for Regional Development, which, in addition to launching and executing its own development programmes, also co-ordinates regional activities of other ministries and other subjects. Among the development programmes, on must mention the "Countryside Renewal Programme" which is focused on restoration of social, cultural and economic life of the countryside as well as on the protection of the nature and the landscape. Preferential support has been given, within this programme, to small village communities below 2000 inhabitants (94.4% of the total expenditures).

The rural development is also directly or indirectly supported by "The care of the Landscape" programme, subsidised by the Ministry of Environment, the "Programme of Revitalisation of Streams" (under Ministry of Agriculture), and a programme of air quality improvement, of which an important component is providing natural gas supply to small towns and villages.

The agriculture continues to play an essential role in the life of the countryside. Agricultural enterprises in the Czech Republic have recently undergone a differentiation, generated by different natural conditions. According to the criteria which are in accordance with those adopted by EU, 19 districts were identified as those in which agriculture has serious problems. Even in these and similar districts the agriculture is deemed to be an unreplaceable agent of landscape maintenance. The agricultural policy of the state, bearing this fact in mind, tries to support this function of agriculture by legislation as well as by economic tools.

However, it is particularly in the sector of water management that the existing legislation reveals gaps and deficits. The country still expects its new Water Act which is hoped to reflect in a holistic manner the changes having occurred after 1989. A positive news is that the corresponding bill has already been elaborated and submitted for approval. The division of competences among various ministries and other authorities is, however, ambiguous and unstable.

Comprehensive land use planning and land consolidation projects, after several years of theorising are now being put in practice and are expected to become a good tool for creation, protection and conservation of the landscape. Among other effects, these projects are seen as ways of gradual implementation of the (already elaborated but not yet put in practice) studies on the Local Systems of Ecological Stability.

5. FUTURE SCENARIOS AND OBJECTIVES

In future, the basic character and parameters of the present Czech agricultural policy are deemed to remain in force. The existing system of socially and environmentally motivated subsidies is assumed to expand further. In principle. However, the future Czech agricultural policy depends on the results of further negotiations about country's accession to EU. Four model scenarios, described below, have been formulated as a framework within which the actual future policy can oscillate:

SCENARIO A – SURPLUS PRODUCTION

The available sources are fully exploited for production. The plant production is intensive everywhere. The surplus production is exported. The prices are subsidised (to support the production and on social grounds). This scenario portrays a situation similar to the actual state in recent years and bears a risk that the surplus production will become unmarketable. The integration into EU will be difficult.

SCENARIO B – AGRICULTURE CAPABLE OF COMPETITION

The efficiency of production is improved. The agricultural land is differentiated according to its productivity. Some land is set aside as unproductive or the land use is changed towards a less intensive type (e.g., the ploughed land is converted into grassland or afforested). The state does not interfere in market processes but offers alternative programmes for regions in which the intensive agriculture is not feasible but the environment and the landscape have to be cared for. The risk lies in abandoning and neglecting less productive lands, social difficulties and insufficient landscape maintenance.

SCENARIO C – LANDSCAPE AND COUNTRYSIDE

The domestic demand for agricultural produce is fully saturated. The disadvantaged regions focus on "ecological" agricultural production or on maintenance of the environment and the landscape. The state offers an extensive "safety net" for producers of various commodities and provides funding for the landscape and environment maintenance. The traditional appearance of the countryside has been preserved or restored. This scenario resembles the present actual state. An optimum re-allocation of agricultural production is difficult to achieve and overproduction can easily occur.

SCENARIO D – WATER

The main objective of agricultural activities is the production of clean water for domestic and foreign users and the retention of water in the landscape. Good quality of water on the Czech territory has a favourable effect on the water quality in neighbouring countries. The country is better prepared to face the expected global climate change. The effects, i.e., the clean water and the water retained in the landscape, are treated as goods which must be paid for. This is mainly achieved through extensification programmes, enjoined regimes of farming and investments into enhancement of the landscape retention capacity, all applied on a large scale. This scenario requires that the agricultural policy is carefully co-ordinated with the water management policy. There is a risk of food underproduction and/or insufficient food safety of the country in potential crisis situations.

For future, several alternative scenarios of water management can be considered. They are all market-economy based but a certain level of state's authority over water as a natural resource and as a component of the environment is preserved in all of them. The extent of the participation of the state and, on the other hand, the extent to which the responsibility for water resources and for the environment is to be imposed on private owners, are the points in which the particular scenarios differ.

The most realistic scenario seems to be the one assuming a medium extent of state participation which should ensure that public interests are observed, while some responsibility and initiative is left with the private sector. The development of individual regions is, in this scenario, co-ordinated centrally. Permanent effort will be required to harmonise partial interests and to overcome the unwillingness of private owners to carry the burden imposed on them. One can also formulate a separate soil policy. The problems not yet fully resolved are the adequate land evaluation, the rational exploitation of the soil, its protection, the optimum land use in less fertile regions and the defence of public interests whenever the land is handled with. The long-term policy objective is to conserve and protect the soil as a natural resource, as a basic factor for food production and as a component of the environment which fulfils several ecological functions. The most realistic soil policy for future is probably the one based on a compromise between the liberal and the conservationist approaches such that some state control of the land is preserved. This scenario also implies that about 80% of the agricultural land is used for intensive agriculture (while on about one half of this area the farmers are compensated for the limitation imposed on them for the sake of protection of natural resources), 12 to 13% are exploited extensively and the remaining 7 to 8% are set aside. It is also assumed that land owners are compensated for the loss they incur in a public interest.

As for future scenarios of rural development, they are to a high degree predetermined by the corresponding agricultural policy scenarios but additional social and regional aspects must also be considered.

The environmental module of the future agricultural policy will apparently be based on the requirement that a sustainable development (in the sector of agriculture) is reached within 5 to 15 years.

6. CHALLENGES OF FUTURE

In the very near future, the development of Czech agriculture, food industry, water management and other related sectors will be marked by intensive preparations for the accession of the country to EU. The agriculture and food belong in this respect to most difficult sectors, particularly because of the Common Agricultural Policy of EU which creates a preferential environment for farmers in member countries. On a long-term horizon, the Czech agricultural policy (and other related policies) will apparently develop within the framework of the EU common policies and is therefore difficult to predict on the national level. Nevertheless, some elements of the scenarios listed above will almost certainly be included, taking into account Czech traditions and the opinions presently prevailing in the Czech society. Having formulated future policies as alternative scenarios renders more options to future decision makers.

The end vision is a stable agrarian sector which fulfils all its productive and non-productive functions and is at the same time capable of competition on the EU market. The comparative advantages, arisen historically or following from the country's geographic position and social structure, will be fully used and the state of the environment will be gradually improving. The market will be liberal but a "safety net" will be established according to EU rules. This will be, in principle, a continuation of the already existing agricultural policy, except that the (reformed) Common Agricultural Policy of EU will be put into force. The sectors of water management, soil management, forestry, environment and regional and rural development will be strongly influenced by the agricultural policy, but non-production functions and public interests will be more accentuated in them than in the agricultural policy itself. The geographic location of the country will make it possible to influence positively the water supply and water quality in neighbouring countries.