ANNEX B.11

AGRICULTURE

B.11 AGRICULTURE

B.11.1 AGRICULTURAL LAND AND PRODUCTION

B.11.1.1 GENERAL VIEW OF CURRENT PRODUCTION AND CONSUMPTION OF FOOD

Appropriate nutrition uptake and stable supply of food are fundamentally important for food production. It is necessary to review the current situation of these factors and evaluate their positioning in the agricultural development at a starting point of the study for the preparation of guidelines and recommendations for promoting agriculture in the Zahorska area.

(1) Nutrition Uptake in SR

Food Balance Sheet of FAO (2001) provides us data on per capita food consumption and nutrition uptake as well as the supply and demand by agricultural product of each country. The Food Balance Sheet indicates that the daily energy uptake per capita is 3,100 Cal on average in SR: 2,300 Cal from plant origin and 800 Cal from animal origin (Table B.11.1). The tendency is stable since 1994 and 1995. Protein uptake per capita is also stable: 80g a day with 50-50 composition of plant and animal products. Fat from plant origin has been recently increasing, although the total amount is maintained 120 g per day. The Green Report 2000 of SR evaluates the current nutrition as the consumption of meat being still above the recommended levels of nutrition intake. The consumption of cereals in flour was notably higher as compared with the EU level. However, consumption of fruits, milk, etc. remains well below the recommended levels of intake. In addition, with the economic development of SR in the future, the consumption of meat and other animal products will be increased to the levels the EU countries have already reached.

(2) Production and Consumption of Cereals and Livestock/Dairy Products

For a couple of years immediately after independence in 1993, food consumption was remarkably varied, indicating that potato consumption decreased and cereal consumption instead increased rapidly. Consumption of fresh milk also decreased substantially. However, after the transitional phase, the food consumption has been stabilized, including imported fruits and other agricultural products (Figure B.11.1).

Mixed farming of cereal production with livestock production is known to be the most widely accepted agricultural performance in terms of food production and agricultural earnings in European countries. The share of feed in cereal production is also high in SR as in the EU district. Table B.11.2 indicates production and international trade in cereals, entire supply after the adjustment of reserve stock and consumption for feed/food/processing. Production, total supply and consumption for feed have been decreasing in the past 5-6 years (Figure B.11.2). Feed is a priority area of major crop consumption. However, it has been decreasing, while consumption for food and processing maintained a similar level in the same period. As an example, wheat consumption for feed and food was 1,056 thousand ton

(62%) and 456 thousand ton (27%) in 1993, respectively; however, the consumption for food increased to 585 thousand ton, and the wheat for feed decreased to 700 thousand ton in 1999 (Table B.11.2).

Recent production of meat overall has been maintained. Pig meat has a high share, while, beef production, having low feed efficiency, was lowered and shifted to poultry which has the highest feed efficiency among the three (Figure B.11.3). In the future development strategy for high value added production by animal husbandry, it is necessary to explore possibilities of lowering production cost of feed and improving efficiency of feed use. In addition, higher quality and more diversified products are required for agricultural production.

B.11.1.2 HARVEST AREA OF MAJOR CROPS

(1) Land Use in Slovakia and the Study Area

In SR, agricultural land is 2,441 thousand ha, about 50% of the total land area: 4,904 thousand ha (Table B.11.3). In the agricultural land, arable land and meadows are the two major items of the land use; 59% and 35% of the share, respectively, in 2001. Forest area occupies the majority of the area (81%) in the non-agricultural land. Since 1990, the land area of all the items except meadows have decreased. It indicates that agricultural activities in terms of cultivation area have been falling. The forest area, in spite of the rapid development of built-up areas due to urbanization, is slightly increasing.

Malacky and Bratislava IV were included in the external area of Bratislava up to the end of 1996. Therefore, independent district data of Malacky and Bratislava IV can be obtained since 1997. In Senica, agricultural land is 58.2%, of which 47.8% is arable land (Table B.11.4). These data are much higher than the other districts: Malacky and Bratislava IV and SR. Forest area of Senica is 31.6% of the total land, smaller than the SR level. In Malacky the shares of arable land and forest area are 26.8% and 27.3%, respectively. These data are smaller than the other districts due to the large military areas. In Senica and Malacky forest area is relatively smaller than the Bratislava IV and SR. Considering the fact that Senica and Malacky have large areas of sandy soil, the small area of forest would have a detrimental effect on farming from a viewpoint of agro-environment. As observed in the land use of SR, the shares of meadows and forest area were slightly increased in the recent land use in all the three districts. Especially in Malacky, .the average of 1999 and 2001 increased by 16% as compared with the average of 1997and 1998. The meadows in the Malacky district amounts to 28% of the arable land. The meadows in the wet area is productive and can be used for various purposes, but the meadows in the dry area are not abundant in vegetation and limited to agricultural use. The meadows are effective to protect farmland from wind erosion as a covering for crops in early spring. In the future a more productive function of the meadows should be explored (Table B.11.5).

(2) Land Area for Cropping

The Malacky district is entirely included in the study area, while only a part of districts of Senica and Bratislava IV are included in the study area. Therefore, Malacky district will be examined in detail for characteristics of land use. Figure B.11.4 shows the share of cropping in the Malacky district. Rye has the largest share (18.23%) and is followed by wheat, oil crops and fodders. High adaptability of rye to this area causes the high presence in the Malacky district.

In the recent trend of cultivation area, the area of cereals decrease rapidly (Table B.11.6). Wheat, a major crop in the district, decreased, and rye, the highest share crop in the total production for SR, also decreased. The decrease of area is observed for potatoes and vegetables in the Malacky district. Feeds are also decreasing. Only oil seeds increased. Market needs of vegetable oil are high because of increasing domestic consumption of edible oil and export needs. Even vegetables, which are often evaluated as most suitable crops to the Zahorska area together with rye, are decreasing for every species. The whole of production activities are shrinking in the Zahorska area. It is not easy to find a way to reconstruct, but concentration of production resources for more efficient cropping is a possible approach for the future development.

B.11.1.3 YIELD OF MAJOR CROPS

Wide variety of crops area cultivated including cereals, oil crops, vegetables, etc as shown in Table B.11.7. The yield fluctuation sometimes becomes large in this area because of dry weather and the wide distribution of sandy soils. Especially in 2000, severe drought caused considerable decrease of yields of almost all crops. Therefore, it seems it is appropriate to use average yields for a period of four years from 1977 to 2000 for the examination of crop yield. Sugar beet is not usually cultivated by the quota in production, and soybean is cultivated for feed of animals.

Due to the wide area of sandy soil, the crop yields of Zahorska area were lower than other agricultural areas in SR. The yields of crops of extensive farming such as wheat, barley and maize are generally lower than the average of SR. The ratio of Malacky is 81% of the average of SR, and the level is less than the surrounding districts. A decrease by 20% is critical to cereal production that has small profits, sometimes negative profit under unfavorable climatic conditions. Low productivity at this level may cause the end of farming. To continue farming, it may require large scale farming or the close linkage of cereal production with animal husbandry in mixed farming for highly profitable farming. The situation will be worse, when agricultural inputs are limited by increasing costs of fertilizers and agricultural chemicals and decreasing of prices of farm products.

Light soil like sandy soil is often suitable to vegetables and tuber crops. The ratio of the average yields of crops in the Zahorska area <Mainly Malacky> is 132 to the SR average. The Malacky's level is much higher than Senica: 59 and similar to the Bratislava: 141. The yield of potatoes is also above the national average. The reasons of the higher yield of the crops by intensive farming in the Zahorska area are estimated to be light soil conditions, higher fertilizer inputs due to higher profits of vegetable production and incentives given by the close location to the large consuming area.

Fluctuation of yield is also important in crop production. In Malacky coefficient of variation (CV%) of cereals was 31.4% which is a little higher but almost the same as the other districts (Table B.11.8). Rye and wheat showed good values of CV%, and stable yields are obtained over different years. The CV% of vegetables for the Malacky district was much lower than Senica and Bratislava. High average yields and low CV% in vegetable production indicate that vegetables are suitable for the growth conditions of Malacky

B.11.1.4 PRODUCTION OF MAJOR CROPS

(1) Production of Major Crops in the Study Area

The share of rye in the total production in SR was 10.84%, much higher than other crops (Table B.11.9). Rye is resistant to dry and cool weather, and it is cultivated as a winter crop as well as winter wheat. Both crops are usually grown without irrigation. From the growth characteristics these crops are suitable to the natural conditions of the Zahorska area. Oats are also relatively high ratio to the production in SR. In Senica, cereal production has generally higher ratio to the total production of SR than Malacky.

For vegetable production the shares are generally higher than those of cereals, as expected from the high yield level of the vegetable production in Malacky. Kohlrabi (11.52%), cauliflower (3.92%), salad cucumber (3.76%), etc. have high ratios compared to the SR. Senica, on the other hand, shows rather low shares in vegetable production. All the vegetables cited here are below 1 % in their share. For agricultural conditions estimated from the production of cereals, Senica is more favorable for the agricultural production. However, the share of the vegetable production is much smaller than Malacky. The reasons are not clear, but one possible explanation is that Senica is located in a more remote area than Malacky, which means less favorable for marketing to Bratislava. Vegetables are usually light and are small commodities with moderate added value. Therefore, high transportation cost including human labor cost may inhibit the development of vegetable cultivation in Senica.

In fruit production apple is a major fruit in the Zahorska area. For planting area the apples share about 40% in the three districts, and in the Malacky apples (216 ha) occupied 42% of the total fruit fields (519 ha). The share of the area of fields by Bratislava, Malacky and Senica to the total area of SR were 5.22%, 2.38% and 1.23%, respectively. However, ratio in yield is the opposite: in Bratislava and Malacky they were below the SR level. From this it is estimated that in fruit production location has high advantages, since fruits are perishable and small in lots of commodities (Table B.11.10).

The fact that there are several products which have high share in the production indicates that there are strong possibilities of producing high productivity/market competitive products.

(2) Share in Cereal Production in Malacky District

In cereal production on average over the past 4 years in the Malacky region the share of wheat was 33%, the largest in the district, followed by rye: 25% and grain maize: 20% (Figure B.11.5). About half of the wheat and rye produced in Malacky is estimated to be consumed for feed. Therefore, 50%-60% of the

cereal products are used for animal husbandry in accordance with interview survey. These data and the wide area of meadows indicate close relations of cereal production and agricultural land use with animal husbandry in the mixed farming.

B.11.1.5 HUMAN RESOURCES IN FARMING

Since the change of political and economic system, a large number of technicians and businessmen were attracted to the business world from the agricultural world. People in the managing staff, especially in agricultural cooperatives, are worrying about the lack of human resources in agriculture in the future.

As an example the human resources of agricultural units were shown below from the results of the farming units survey.

1. Independent farmers (SHR)
   a. Number of family members : Average 4.3 persons
   b. Number of people engaged in farming : 3.0 persons<Mainly father, mother and son or daughter>
   c. Usually farmers have experiences for more than ten years in their specific area
2. Enterprises
   a. Average age of owners : 43 years old
   b. Number of employees on average of enterprise : 67 persons (Seasonal workers: 190)
   c. Number of experts in enterprises : 11.0 on average

- Agronomy	2.7	- Machinery	2.4
- Civil engineering	1.6	- Economics	2.4
- Animal husbandry	2.6		

From these data the current farmers and agricultural enterprises are active and aggressive in their business. Their necessary agricultural techniques are also well maintained and developed. However, for the future development several requirements have to be studied.

(1) Motivation to Develop Skills for Agriculture and Marketing

In SR and EU tractor championships are well organized and give incentive to farmers. When we consider market competitiveness, contests for good products and techniques are important. It will be a good incentive to improve the quality and productivity of agricultural products.

(2) Training for Diversification

The farming world is always developing; therefore, farmers are seeking new fields of business, and new comers try to enter the farming world. To accelerate the development of technology of these people, vocational schools on farming and technical licenses will be required.

The results of the farming unit survey indicated that farmers and enterprises put top priority in the necessity of technology and information on production, crop species/variety, input cost, marketing, processing and marketing. While, the EU accession and export/import attract less interest in their opinions.

B.11.2 ANIMAL PRODUCTION

Animal husbandry is the main profitable part in the mixed farming of cereal production-animal husbandry. It is also an indispensable part for the production of protein food. General views of animal production and structure of the mixed farming will be described.

B.11.2.1 IMPORTANCE OF ANIMAL PRODUCTION IN SR

In agricultural production in terms of value in SR, about one-third of the total production comes from crop products and the rest from animal products (Table B.11.11). SR is composed of mountainous areas and flat plain areas. The mountainous area such as Zilina Region and Trencin Region have high ratios of animal production in the total agricultural production. In Bratislava Region the ratio is 39% from crop products and 61% from animal products. Bratislava city, the largest commodity consuming area in SR, requires various products. Nitra Region, the largest crop producing area, produces large amounts of animal products. In this specific area the ratios of animal products still exceed those of crop products. This indicates that animal production is deeply involved in the agricultural production regardless of the level of crop production in all of SR.

The animal production areas are evenly distributed in the SR, different from the crop production, which is concentrated in Nitra and Trnava Regions: standard deviations of the regional distribution ratio are 12.1% for crop production and 5.6% for animal production. Distribution of animal products also varied by product. Meat and eggs are highly localised, but fresh milk, due to being perishable, heavy and low profit commodity, the production area is widely distributed. Considering the situation of the Zahorska area, livestock production and dairy products have advantages from location.

Production of meat of cow and pig and fresh milk in the study area have been decreasing since 1997 (Table B.11.12). In Malacky also production of cow and pig meat decreased rapidly. In 2000, pig meat production increased again but cow meat is still decreasing. The current BSE problem has worsened the situation in cow fattening.

Milk production also slightly decreased but stabilized. From these data, pig production which has better feed efficiency and milk production will be revived and increase in the future.

Price of live animal for slaughter is increasing in pigs and decreasing in bulls at the slaughterhouse in the interview survey in the Malacky district.

Year	Price (SKK/kg).	
	Bull	Pig
1999	46	45-46
2000	48	48
2001	40	58

B.11.2.2 MIXED FARMING OF CEREAL PRODUCTION WITH ANIMAL HUSBANDRY

In European agriculture, mixed farming is traditionally well established and accepted in wide agricultural areas as a major part of production. It is reported that about two-thirds of agricultural land are used for animals and more than half of the cereals are consumed in animal husbandry. Mixed farming is also a fundamental agricultural segment in SR. Mixed farming is observed in every place regardless of farming scale. In the farming unit survey there is no single farming of cereal production or animal husbandry. As mentioned in the previous section the low profit margin of cereal production is compensated for by animal husbandry. In the actual farming, various modifications of the mixed farming were observed in the farming unit survey. Self-supply feed is used as a fundamental part of mixed farming. Oil crops are cultivated in extensive farming, and vegetables are produced in intensive farming as supplementary parts of the mixed farming.

(1) Structure of Mixed Farming

1) Cost and Profit of Cereal Production

In SR cereals such as grain maize, wheat, triticale, barley and soybeans are used for concentrated feed, and silage maize and alfalfa are widely used for roughage. These crops usually have low profit. As an example, production cost of winter wheat is shown in Table B.11.13. The wheat production cost for medium yield was estimated to be 10,600 SKK/ton for direct cost and 12,720 SKK/ton for entire cost including management cost. This value is almost the same as the level by the Green Report: 10,222 SKK/ton and 12,266 SKK/ton, respectively. Unit sales price of wheat is estimated at 3,600 SKK/ton for feed and 4,200 SKK/ton, and the wheat production provides 10,332-12,040 SKK/ton in the case of average yield: 2.87 ton/ha. The production cost is narrowly covered by the sale price for average yield of feed production.

2) Cost and Profit of Animal Production

The cost of animal production was obtained from the statistical data by MOA. In the study, share by item was used to estimate the effects of feed on the total cost. The shares of feed are 34.9% in milking cow, 51.8% in cow fattening and 62.0% in pig production. The share of feed cost in the total cost is high, especially in case of pig raising. If feed is supplied at low price, pig raising will be profitable. In these conditions mixed farming is performed in various areas, and is also accepted from small scale farming to large scale farming.

Mixed farming has also advantages in the protection of environments by enabling animal wastes to be used for manure by recycling. In the farming unit survey manure was used at a rate of 32 t/ha (average of 10 cases) to cereals, maize, rape, etc. Actual area applied with manure was not large as compared with the entire area, but the farming method is useful for the protection of environment and increase of soil fertility.

3) Development of Mixed Farming

Due to high ratio of feeds, reduction of feed cost produces high profits for animal husbandry. Therefore, several approaches are developed by various methods.

- Selection of appropriate crops.
- Selection of soil conditions.
- Utilization of irrigation.
- Utilization of high ground water area
- Utilization of meadows.

Farmers select several possible approaches and combine them depending on the circumstances. Many farmers use slightly flooded areas with high ground water, because these areas have basically high vegetation growth without irrigation and with less fertilizers. There are some risks of damage by flooding, inconvenience in field work and detrimental effects on crop growth and quality of products. Generally these damages can be masked by the advantages of abundant water and sandy soil in the Zahorska area. Quality of products is usually not a critical point in feed products. Several farmers expressed their experience of high yield of silage maize cultivated in slightly high ground water areas, which had been abandoned for years. These approaches are one of the possible promising ways for low cost, sustainable and environment- protective farming.

B.11.3 STRUCTURE OF MAJOR AGRICULTURAL PERFORMANCE

B.11.3.1 TRENDS OF AGRICULTURAL UNITS

Management forms of agricultural units were greatly changed from agricultural cooperatives and state-run units to private enterprises and farmers after the change of political regime (Table B.11.15). At the independence of SR, numbers of state farms, agricultural cooperatives and independent farmers were 148, 1116 and 17840, respectively. In 1999, the numbers had changed to 2, 801 and 21,263. A large number of cooperatives and state farms were changed to corporations. Along with the management change independent farmers were also produced. Agricultural lands of state farms and cooperatives were markedly decreased and private companies, and independent farmers increased their land and are still increasing (Table B.11.16).

In the Zahorska area most of the cooperatives were changed to corporations and a small number of independent farmers. In Malacky district it is peculiar that several large companies occupy a majority of farmland: the top six enterprises share as much as 77% of the entire arable land and that several registered independent farmers (SHR) are found in each town. The reasons why large cooperatives changed to corporations are not clear, but they are estimated to be as follows:

- Members of cooperatives still desire to keep their assets intact after the change of management.
- A large amount of debt which was loaned with low interest rate before the political change became a heavy burden to the management due to the hike of interest rate.
- The debt of old cooperatives is not taken over to a new company when the management body is changed.

Also the reasons why several large enterprises were established and developed in the Zahorska area remain to be investigated, but the following are often pointed out:

- Yield level of cereal production is lower than in other areas by 20%, resulting in low profit; therefore, large scale farming is required for stable management.
- Traditionally the Zahorska area had commercial and industrial management, as observed in potato export.

[The agricultural census 2001 has been conducted by the Statistical Office of SR, and the results are expected to be published in late 2002..]

B.11.3.2 FARM MANAGEMENT CATEGORY

Farm management in the Zahorska area is categorized in to the following 3 types tentatively:

(1) Mixed Farming of Cereal Production with Animal Husbandry

In mixed farming, as mentioned in the previous section, low profitability of crop production is compensated for by animal husbandry: milk production and pig raising. Milk production requires various equipment and a large amount of funds to cover initial cost. In addition, it also has operation costs. Therefore, only the large scale enterprises can afford the cost and maintain the business. In beef and pig production, the enterprises raise relatively more pigs than beef in terms of live weight. Considering the feed efficiency, pig production, which has better efficiency will be more profitable than bull fattening. Pig production will be more suitable to SHR farming (Table B.11.18).

(2) Mixed Farming and Other Profitable Crop Production

To stabilize the mixed farming, profitable crops such as oil crops and vegetables are added to the mixed cropping as supplementary production. In the comparison of land use of the enterprises with SHR, ratios of oil crops and vegetables of SHR are higher than those of enterprises. The land holding of better soil quality and intensive farming, due to the small scale of farming, introduce this difference. While the share of fodder of the enterprises is much higher than in the SHR, reflecting the needs from milking cows (Table B.11.19).

(3) Combination of Cereals, Oil Crops, Vegetables, Processing, etc.

Profitable crops such as oil crops, vegetables, fruits, etc. are also produced in combination without mixed farming, because the animal production requires a large amount of initial cost and time consuming work. The combination of work depends on the size of farming area, human labor and natural conditions such as soil fertility and availability of irrigation water.

B.11.3.3 LAND HOLDING/USE IN THE ZAHORSKA AREA.

To understand the current farming conditions, the farming unit survey was conducted. From the results of the survey several data on land holding, soil type and location are shown in Table B.11.17. The average agricultural land use of the enterprises was 2,949 ha and 102 ha for SHR. The arable land is 2,300 ha and 100 ha respectively. Almost all the land of the enterprises was rental, but 44% of the land of SHR was owned by them. Rental fee of farmland was 1-1.5% of the selling price: about 600-800 SKK/ha. The land holding (use) by the farming units which responded to the survey is increasing both in enterprises and SHR. In soil type the ratio of sandy soil amounts to 61% in the farm land of the enterprises , but the ratio is only 38% for SHR. The ratio of the arable land which is equipped with irrigation facilities was 36% for enterprises and 5.6% for SHR. However, the actual irrigation area was as low as 9.3% for enterprises and 3.6% for SHR. The utilization of irrigation equipment was quite low in the enterprises (26%), but SHR uses it more efficiently (52%).

These data indicate that a relatively high proportion of SHR own their land and also use better quality soil. The reasons for the low efficiency of use of irrigation facilities has to be examined in detail, especially from an economic point of view.

B.11.4 CULTIVATION METHOD

B.11.4.1 CROPPING PATTERN

(1) Cropping Ratio

SR is located in a high latitude zone, and hence cropping is usually once a year. The planted area and cropping ratio to the total arable land in SR, Malacky and Senica districts were shown in Table B.11.20. In SR the cropping ratio was rather stable: changing in a narrow range from 87% to 91% in a period of 1997 to 2000 with an average of 88%. Malacky and Senica districts had slightly lower value: 83% and 80%, respectively. In Senica the 1995 value was unusually low due to the regulation to eliminate samples below 2 cases. If the number of 1995 is removed, the cropping ratio is 85%, similar to the average of SR. The cropping ratios of Malacky and SR are decreasing, and it is quite rapid in Malacky. The reason for the decrease in the cropping ratio is not clear, but it is estimated that cropping in less favorable farmland may be stopped. Non-cropping can cover farmland continuously such as meadows in most cases and provide protective effects on the land, but it often causes pest and diseases. Effects of non-cropping areas on agriculture and better use of these areas need to be assessed.

(2) Cropping Calendar

The cropping calendar is shown in Figure B.11.7. Crops are clearly categorized into winter crops and summer crops. The winter crops are seeded in autumn and harvested next summer. Typical winter crops are winter wheat, triticale, rye, oat and rape. The summer crops are sown in March and April and most of them are harvested in September and October. The summer crops contain potatoes, spring barley, maize, sunflower and many other vegetables. The winter crops are not usually irrigated and function to

protect farmland from wind erosion in early spring. The summer crops usually require irrigation, and many of them are profitable. Crops are usually irrigated in May to July before and after the flowering stage.

(3) Crop Rotation

Crop rotation is also important for stable crop production by protecting plants from soil-born diseases and pests, reducing wind erosion and improving soil fertility. In their traditional cultivation, the same species of crops are not cultivated in two continuous years except several cases of wheat, barley and rye. Alfalfa is usually cultivated 4-5 years in succession on the same field from an economic point of view. From the necessity of protection of agricultural land from wind erosion and efficiency of irrigation, the winter crops and summer crops should be separated, and the crop rotation should be prepared for each group. To improve efficiency of irrigation categorization of crops and composition of crop rotation by category is also important: high necessity group<summer crops and leafy crops> and low necessity group <winter crops>.

B.11.4.2 TECHNICAL PACKAGE

Various factors are required in crop production. Necessary technical factors have to be included in a package, and an appropriate level of each factor needs to be secured to avoid a decrease of yield in consideration of the law of the minimum. The technical package is usually composed of improved crop and variety, land preparation, irrigation, fertilization, crop protection, mechanization, post-harvest technology and marketing. Farming in the Zahorska area is well irrigated and mechanized. However, due to the increase of cost of farming inputs such as fuel and fertilizers, land preparation, fertilization and plant protection it might not be well managed. Perfectly organized irrigation and drainage system is not always fruitful, if fertilization and crop protection are not properly conducted. The current situation of these items needs to be examined and improved with a view to improving productivity, quality of products and market competitiveness of food crops.

(1) Fertilizers

It is often mentioned that the fertilizer use in SR has decreased to one fifth in the past ten years. The current level is about 50 kg/ha (N, P2O5 and K2O) for SR, and in Malacky the total amount is 40.3 kg/ha, the lowest among the 3 districts in spite of widespread development of sandy soils. Although the application level was improved from the 1998/1999 level, the situation is still low. Low fertilization causes not only lower yield but also poorer quality of crops. As an example, wheat is graded by quality into 4 classes by parameters including protein content and ripening of grains. These parameters are closely related to amount of N application. Since manure from animals is applied to farmland, it will improve the soil fertility to a certain extent, but the level is not enough to improve the cropping. Nitrogen is the most common deficit nutrient, while the potassium in soil is in rather good condition. Therefore, the combination of fertilizers needs to be improved; for example, compound fertilizers (Ex. 15-15-15) and ammonium sulfate. Fertilizers with micro-nutrients are also required especially in sandy soil. Fertilizer use has to be examined from soil type. These fertilizers are already widely produced. Therefore, direction of fertilizer use and application methods need to be improved for its efficient use.

(2) Mechanization

Machines are indispensable for large scale farming in the Zahorska area. The majority of machines used now were obtained more than ten years ago. Although the agricultural machinery industry in SR is well developed as symbolized by a Zetor, parts of machines per area have been decreasing since 1990 (Table B.11.22) due to high cost of machines. For farmers who can not afford to buy enough fertilizers, the prices of agricultural machines, which often exceeds one million SKK, are beyond their financial capacity. Mechanical services have recently been developed by various enterprises (Table B.11.15), and, in addition, agricultural enterprises provide these services in mutual cooperation. These systems are useful not only for poorly equipped farmers but also to counteract depreciation of machines by increasing frequency of use. Besides the mechanical services, a specific credit system is required to cope with difficulties in funding high initial costs.

(3) Irrigation

The Zahorska area is a well-equipped area in SR. The results of the farming unit survey indicate 80% of the enterprises have contracts with the SWME-PD for irrigation services. However, the actual irrigation area in the enterprises was only 26% of the installed area or as low as 9% of the arable land (Table B.11.17). From the results of farmers experience and expectation of irrigation, farmers well understand the effects of irrigation (Table B.11.23). The following reasons are expressed by farmers on the low rate of use of irrigation:

- The capacity for irrigation services by the SWME-PD is not enough.
- Farmers' equipment is not well installed.
- Irrigation water is not supplied at the right time to the right place due to technical matters.
- The irrigation effects are not attractive to farmers: an increase by 10-20% for winter crops and 70-100% increase for feeds in many cases.

Many aggressive farmers seek agricultural land where ground water level is high, because plant growth is greater. In their opinion, flooding damage is less than drought damage or no serious damage. However, irrigation is really necessary for many crops such as vegetables, and it is effective if it is well managed. Therefore, it is necessary to evaluate irrigation in terms of economic effects on crop production. It is also important to identify lands for which irrigation is indispensable and crops, which are categorized as high response to irrigation, and establish appropriate crop rotation for an efficient irrigation system.

(4) Crop Selection

Crop potential for resistance to drought and flooding is quite important for selection of appropriate crops. Crops are classified to 8 categories by root structure in relation to resistance to excess moisture. Maize is categorized to have high resistance to excess moisture; while, carrots and onions are susceptible to high soil moisture. Root length is a major parameter to assess drought resistance of crops (Table B.11.24). Wheat and rye have roots of more than 2 meters in length. These crops have high

resistance to drought. It is important to categorize crops by resistance to water stresses and establish crop rotation according to the category.

(5) Quality Control

For the food production such as wheat for food, oil crops and livestock, a quality control and inspection system is quite important. Quality control is the first step for market competitiveness and high profitability. Food wheat has 4 levels of grading (Table B.11.25) and animals also have official grades for appropriate weight and fat content. The parameters of wheat are closely related to nitrogen fertilization. Therefore, cultivation methods to improve quality of agricultural products need to be examined and established.

Various technical packages are possible depending on purposes of production and marketing. In the current situation, the technical package is primarily important for the development of high value-added agricultural products. The technical package is a kind of technical guideline. Therefore, this information should be disseminated to farmers, as a method, through agricultural media: newspaper, TV and magazines.

B.11.5 FORM OF FARM MANAGEMENT

- Trial of zoning of the Zahorska area from agro-economic aspects –

Various approaches for efficient plant production have been tried based on soil fertility, irrigation, and climatic conditions in the Zahorska area. These methods provide farmers with high productivity of agriculture, in terms of amount of products. However, for profitable agricultural production, economic factors should be included in the development approaches.

In this survey we are trying to zone the Zahorska area by major farming style and major profitable segments. The parameters for the zoning are as follows:

- Natural conditions:	Precipitations. Geomorphology Soil conditions.
- Conditions of infrastructures:	Irrigation Transportation
- Conditions of agriculture:	Type of farming units. Production type Constraints.

Four zones were categorized tentatively based on the parameters above using the results of the farming unit survey and other related information.

I. Fan of the Male Karpaty.
II. Malacky Plain.
III. Flood Plain.
IV. Suburbs of Bratislava Town.

The explanations of the parameters are indicated in Table B.11.26. General characteristics, advantages, constraints, and possible directions for the development are tentatively summarized.

I. Fan of the Male Karpaty.

a. General Characteristics

- Occupied by a large enterprise.
- Major form of farming: Mixed farming of milk production with cereal production.
- Extensive crop production e.g. cereals, oil crops, etc.

b. Advantages

- Holding vast agricultural land.
- Mixed soil fertility: high soil fertility.

c. Constraints

- Low irrigation rate.
- Mixed soil fertility: low fertility and high gravel content.

d. Possible Directions for the Development

- Develop milk production and diversify extensive cropping of food crops by using vast land with various soil fertility.

II. Malacky Plain.

a. General Characteristics

- Variety types of farming units.
- Major form of farming: Mixed farming of livestock with cereal production.
- Diversification in agricultural production.

b. Advantages

- Well-developed irrigation system.
- Variety of farming conditions: soil type, irrigation, farming style, etc.

c. Constraints

- Vast area of sandy soil

d. Possible Directions for the Development

- Develop the mixed farming and diversify crop / food production by making full use of irrigation and variety of natural conditions.

III. Flood Plain.

a. General Characteristics

- Variety of soil types and soil fertility
- Major form of farming: Mixed farming of milk/ livestock with cereal production.

b. Advantages

- High vegetable growth: high ground water area.
- Widely developed eco-farming.

c. Constraints

- Flood area.
- Limitation to agricultural development in the Protected Lanscape Area.

d. Possible Directions for the Development

- Develop the mixed farming and eco-farming and diversify agricultural performance by the advantages of various soil and water conditions.

IV. Suburbs of Bratislava Town.

a. General Characteristics

- Large scale farming: not dominant.
- Strong possibilities of diversification of agricultural production.
  <Mixed farming, oil crops, vegetables, fruits, etc.>

b. Advantages

- Strategic location close to large consumption area and industrial area.
- Distribution of farmland with a variety of soil fertility.

c. Constraints

- High land price.
- Limited irrigation services.

d. Possible Directions for the Development

- Develop intensive agriculture and various profitable farming by use of advantages of location.

Table B.11.1 Nutrient uptake and food consumption per capita in SR

Item		Category	Unit	1993	1994	1995	1996	1997	1998	1999
Nutrients	Carolies	Total calories	Cal./day	2,866	3,045	2,932	2,994	2,999	3,136	3,101
		Vegetable products	Cal./day	1,978	2,230	2,108	2,189	2,200	2,323	2,300
		Animal products	Cal./day	889	815	824	804	799	813	800
	Protein	Total protein	g/day	80.5	83.9	77.8	80.5	80.1	83.2	80.2
		Vegetable products	g/day	36.8	44.2	37.0	41.1	39.9	41.2	40.1
		Animal products	g/day	43.7	39.6	40.7	39.4	40.2	42.0	40.1
	Fat	Total fat	g/day	106.7	109.8	110.7	105.0	105.8	120.8	120.4
		Vegetable products	g/day	35.1	41.9	43.0	38.4	39.9	54.8	53.9
		Animal products	g/day	71.6	67.9	67.7	66.6	65.8	66.0	66.5
Food		Cereals	kg/year	107.3	145.0	120.1	125.7	122.3	125.1	126.3
		Potatoes	kg/year	126.1	67.4	75.9	80.3	81.6	78.1	77.9
		Veggetables	kg/year	74.9	69.4	66.2	76.2	85.0	92.5	104.0
		Fruits	kg/year	45.6	46.5	52.7	80.7	66.9	77.9	67.0
		Meat	kg/year	77.3	73.3	72.4	72.1	75.5	74.0	78.1
		Egg	kg/year	17.2	17.2	17.6	17.1	17.2	17.0	13.2
		Milk	kg/year	174.1	126.3	143.1	126.9	131.4	146.1	128.3
		Wine	kg/year	1.6	5.5	7.6	7.0	7.9	6.8	8.2
		Beer	kg/year	80.9	96.6	85.1	86.6	106.6	84.0	76.6

Source: FAO Food Balance Sheet (2001)

Table B.11.2 Production and consumption of cereals and potatoes in SR

(Unit: 1000 t)

Crop	Item	1993	1994	1995	1996	1997	1998	1999
Cereals	Production <a>	3,157	3,700	3,489	3,322	3,740	3,485	2,894
	Import	313	222	96	201	205	155	121
	Export	383	363	1,168	285	289	671	697
	Total supply <b>	3,323	3,492	3,315	3,195	3,207	3,012	2,862
	Feeds	2,225	2,123	2,162	1,982	1,939	1,798	1,677
	Processing	119	199	143	165	212	184	175
	Food	571	775	644	676	659	674	681
	Self-sufficiency <a/b>	95.0	106.0	105.2	104.0	116.6	115.7	101.1
Wheat	Production <a>	1,529	2,145	1,938	1,713	1,886	1,789	1,207
	Import	124	139	25	44	52	92	62
	Export	98	59	716	66	67	143	127
	Total supply <b>	1,708	2,045	1,910	1,648	1,671	1,520	1,450
	Feeds	1,056	1,154	1,179	902	918	790	700
	Processing	13	14	14	12	19	19	19
	Food	456	686	543	575	559	571	585
	Self-sufficiency <a/b>	89.5	104.9	101.5	103.9	112.9	117.7	83.2
Maize	Production <a>	674	521	597	750	819	637	779
	Import	8	5	34	4	5	12	7
	Export	130	138	180	38	81	325	171
	Total supply <b>	587	433	440	623	566	542	548
	Feeds	528	378	386	552	485	468	458
	Processing	3	2	2	2	8	15	20
	Food	0	0	0	0	0	0	0
	Self-sufficiency <a/b>	114.8	120.3	135.7	120.4	144.7	117.5	142.2
Potatoes	Production <a>	857	399	441	777	504	412	384
	Import	38	56	91	69	27	46	72
	Export	8	13	3	3	2	3	1
	Total supply <b>	786	470	559	806	549	497	492
	Feeds	36	34	71	292	45	8	5
	Processing	4	2	7	10	5	8	13
	Food	672	360	407	432	440	421	420
	Self-sufficiency <a/b>	109.0	84.9	78.9	96.4	91.8	82.9	78.0

Source: FAO Food Balance Sheet (2001)

Table B.11.3 Agricultural land use of SR

<Area>							(Unit: 1000ha)
Item	1990	1995	1997	1998	1999	2000	2001
Agricultural land	2452.8	2446.0	2444.4	2444.6	2443.6	2442.2	2440.7
Arable land	1509.0	1483.2	1475.6	1472.1	1469.2	1460.6	1450.5
Vineyards	31.4	29.6	29.1	28.8	28.4	28.0	27.7
Gardens	77.8	77.9	78.0	77.9	77.8	77.7	77.6
Orchards	20.3	19.1	18.8	19.0	19.0	18.6	18.8
Meadows	812.7	834.8	841.7	845.6	848.2	856.4	865.2
Hop	1.5	1.4	1.3	1.3	1.0	0.9	0.8
Non-agricultural land	2450.8	2457.7	2459.0	2458.8	2459.9	2461.4	2462.8
Forest area	1986.0	1991.7	1993.4	1996.4	1998.3	2000.1	2001.3
Water areas	93.4	93.7	93.5	93.3	93.2	93.2	93.1
Built-up area	125.1	128.5	196.1	218.6	218.1	218.4	219.3
Others	246.3	243.9	176.1	150.6	150.3	149.6	149.1
Total land area	4903.6	4903.8	4903.5	4903.5	4903.5	4903.6	4903.5

<Change of share by item>							(Unit: %)
Item	1990	1995	1997	1998	1999	2000	2001
Agricultural land	100	100	100	100	100	100	100
Arable land	61.52	60.64	60.36	60.22	60.12	59.81	59.43
Vineyards	1.28	1.21	1.19	1.18	1.16	1.15	1.14
Gardens	3.17	3.18	3.19	3.19	3.18	3.18	3.18
Orchards	0.83	0.78	0.77	0.78	0.78	0.76	0.77
Meadows	33.13	34.13	34.43	34.59	34.71	35.07	35.45
Hop	0.06	0.06	0.05	0.05	0.04	0.04	0.03
Non-agricultural land	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Forest area	81.04	81.04	81.06	81.19	81.23	81.26	81.26
Water areas	3.81	3.81	3.80	3.79	3.79	3.79	3.78
Built-up area	5.10	5.23	7.98	8.89	8.87	8.87	8.91
Others	10.05	9.92	7.16	6.12	6.11	6.08	6.05

<Change by item since 1990>				(1990=100)		
Item	1995	1997	1998	1999	2000	2001
Agricultural land	99.7	99.7	99.7	99.6	99.6	99.5
Arable land	98.3	97.8	97.6	97.4	96.8	96.1
Vineyards	94.1	92.4	91.6	90.2	89.0	88.1
Gardens	100.0	100.2	100.1	100.0	99.8	99.7
Orchards	94.1	92.5	93.3	93.6	91.7	92.6
Meadows	102.7	103.6	104.0	104.4	105.4	106.5
Hop	95.2	88.5	85.8	70.3	58.8	55.1
Non-agricultural land	100.3	100.3	100.3	100.4	100.4	100.5
Forest area	100.3	100.4	100.5	100.6	100.7	100.8
Water areas	100.3	100.1	99.9	99.8	99.8	99.7
Built-up area	102.7	156.8	174.7	174.3	174.6	175.3
Others	99.0	71.5	61.1	61.0	60.8	60.5

Source: Statistical Office of SR (2001)

Table B.11.4 Comparison of land use in related district and SR (2001)

Item	Senica	Malacky	Bratislava-IV	SR
<Area>				(Unit: ha)
Parameter				<x1000 ha>
Agricultural land	39,791	34,285	3,708	2,441
Arable land	32,658	25,428	2,626	1,450
Vineyards	198	256	144	28
Gardens	952	1,044	590	78
Orchards	464	533	116	19
Meadows	5,519	7,026	232	865
Hop	-	-	-	1
Non-agricultural land	28,577	60,677	5,954	2,463
Forest area	21,584	* 25,959	3,225	2,001
Water areas	1,322	2,004	333	93
Built-up area	3,571	3,145	1,160	219
Others	2,100	29,569	1,236	149
Total land area	68,368	94,962	9,662	4,903
<Share by item>				(Unit: %)
Parameter				
Agricultural land	58.2	36.1	38.4	49.8
Arable land	47.8	26.8	27.2	29.6
Vineyards	0.3	0.3	1.5	0.6
Gardens	1.4	1.1	6.1	1.6
Orchards	0.7	0.6	1.2	0.4
Meadows	8.1	7.4	2.4	17.6
Hop				0.0
Non-agricultural land	41.8	63.9	61.6	50.2
Forest area	31.6	27.3	33.4	40.8
Water areas	1.9	2.1	3.4	1.9
Built-up area	5.2	3.3	12.0	4.5
Others	3.1	31.1	12.8	3.0

Source: Statistical Office of SR (2001)
Note: * 1999 data.

Table B.11.5 Changes of agricultural land use by area in the past five years

(Unit: ha)

Area	Item	1997	1998	1999	2000	2001	Average a ('97-'98)	Average b ('99-01)	Change b/a
SR	Agricultural land	2,444	2,445	2,444	2,442	2,441	2,445	2,442	1.00
<x1000>	Arable land	1,476	1,472	1,469	1,461	1,450	1,474	1,460	0.99
	Vineyards	29	29	28	28	28	29	28	0.97
	Gardens	78	78	78	78	78	78	78	1.00
	Orchards	19	19	19	19	19	19	19	1.00
	Meadows	842	846	848	856	865	844	857	1.02
	Hop	1	1	1	1	1	1	1	0.70
	Non-agricultural land	2,459	2,459	2,460	2,461	2,463	2,459	2,461	1.00
	Forest area	1,993	1,996	1,998	2,000	2,001	1,995	2,000	1.00
	Water areas	93	93	93	93	93	93	93	1.00
	Built-up area	196	219	218	218	219	207	219	1.05
	Others	176	151	150	150	149	163	150	0.92
	Total land area	4,903	4,903	4,904	4,904	4,903	4,903	4,904	1.00
Malacky	Agricultural land	34,257	34,258	34,270	34,273	34,285	34,258	34,276	1.00
	Arable land	26,782	26,624	26,169	26,090	25,428	26,703	25,896	0.97
	Vineyards	342	316	261	259	256	329	259	0.79
	Gardens	1,038	1,046	1,043	1,043	1,044	1,042	1,043	1.00
	Orchards	544	543	541	540	533	544	538	0.99
	Meadows	5,551	5,729	6,256	6,341	7,026	5,640	6,541	1.16
	Non-agricultural land	60,700	60,699	60,688	60,684	60,677	60,700	60,683	1.00
	Forest area	49,799	49,909	49,909	49,914	49,905	49,854	49,909	1.00
	Water areas	2,000	1,999	1,998	1,999	2,004	2,000	2,000	1.00
	Built-up area	3,272	3,130	3,146	3,136	3,145	3,201	3,142	0.98
	Others	5,629	5,661	5,635	5,635	5,623	5,645	5,631	1.00
	Total land area	94,957	94,957	94,958	94,957	94,962	94,957	94,959	1.00
Senica	Agricultural land	39,800	39,792	39,756	39,807	39,791	39,796	39,785	1.00
	Arable land	33,178	33,174	33,162	32,946	32,658	33,176	32,922	0.99
	Vineyards	198	198	198	198	198	198	198	1.00
	Gardens	960	960	960	958	952	960	957	1.00
	Orchards	495	495	495	465	464	495	475	0.96
	Meadows	4,969	4,965	4,941	5,240	5,519	4,967	5,233	1.05
	Non-agricultural land	28,543	28,550	28,587	28,536	28,577	28,547	28,567	1.00
	Forest area	21,508	21,508	21,532	21,575	21,584	21,508	21,564	1.00
	Water areas	1,306	1,304	1,305	1,305	1,322	1,305	1,311	1.00
	Built-up area	3,078	3,088	3,086	3,560	3,571	3,083	3,406	1.10
	Others	2,651	2,650	2,664	2,096	2,100	2,651	2,287	0.86
	Total land area	68,343	68,342	68,343	68,343	68,368	68,343	68,351	1.00
Bratislava I	Agricultural land	3,757	3,758	3,749	3,724	3,708	3,758	3,727	0.99
	Arable land	2,667	2,667	2,672	2,645	2,626	2,667	2,648	0.99
	Vineyards	152	151	146	145	144	152	145	0.96
	Gardens	591	591	579	582	590	591	584	0.99
	Orchards	116	116	116	116	116	116	116	1.00
	Meadows	231	233	236	236	232	232	235	1.01
	Non-agricultural land	5,903	5,902	5,913	5,939	5,954	5,903	5,935	1.01
	Forest area	3,251	3,224	3,226	3,226	3,225	3,238	3,226	1.00
	Water areas	341	341	338	338	333	341	336	0.99
	Built-up area	1,280	1,204	1,151	1,151	1,160	1,242	1,154	0.93
	Others	1,031	1,133	1,198	1,224	1,236	1,082	1,219	1.13
	Total land area	9,660	9,660	9,662	9,663	9,662	9,660	9,662	1.00

Source: Statistical Office of SR (2001)

Table 11.6 Change of cultivation area, production and yield for a period of 1997 to 2000 in SR and Malacky

(Unit: ha)

Crop	SR				Malacky			
	1997	1998	1999	2000	1997	1998	1999	2000
	X1,000	X1,000	X1,000	X1,000				
<Cereals>	870.7	865.1	739.4	812.5	15,158	13,996	12,571	12,202
Wheat	412.5	428.8	295.8	405.2	4,489	4,865	2,850	3,742
Spring barley	227.6	228.6	230.0	184.7	2,422	2,316	2,178	1,759
Rye	29.6	34.5	29.8	31.5	4,646	4,408	4,098	3,396
Grain maize	137.7	115.8	129.9	145.0	2,419	1,506	1,774	2,364
Others	63.3	57.4	53.8	46.1	1,182	901	1,671	941
<Potatoes>	32.5	28.8	26.8	27.1	303	254	222	134
Potatoes	27.9	24.2	22.6	24.1	183	194	171	104
Early potatoes	4.6	4.5	4.2	2.9	120	60	51	30
<Sgar beet>	47.1	34.8	34.5	31.7	127	0	0	0
<Vegetables>	29.3	29.6	33.7	31.8	842	836	670	339
Cabbage	5.5	5.5	6.7	6.8	251	269	180	88
Cauliflower	1.7	1.6	2.0	1.9	80	77	59	22
Carrots	3.9	4.0	4.2	4.0	121	115	107	60
Salad cucumbers	1.4	1.3	1.3	1.1	40	38	33	17
Tomatoes	3.6	3.5	3.7	3.6	26	24	21	12
Garlic	1.2	1.1	1.1	1.1	68	68	21	11
Onions	3.7	3.8	4.6	4.1	26	24	53	32
Others	8.5	8.7	10.1	9.2	230	221	196	97
<Oil seeds>	136.0	131.1	215.3	168.6	2,362	1,918	3,320	3,441
Sunflower	47.0	64.9	95.2	68.9	288 x		1,137	1,183
Rape	86.2	60.6	113.3	91.7	2,071	1,918	2,183	2,258
Others	2.8	5.6	6.9	8.0	3	0	0	0
<Feeds>	217.7	215.4	219.6	196.8	5,538	4,329	3,868	4,263
Silage maize	126.8	119.0	122.2	113.4	3,619	2,789	2,684	3,043
Alfalfa	70.3	67.6	69.6	62.2	1,886	1,480	1,104	1,088
Others	20.6	28.7	27.8	21.2	33	60	80	132
Total	1,333.4	1,304.7	1,269.4	1,268.4	24,330	21,333	20,651	20,379

Source: Statistical Office of SR (2001).
<Notes> Data which can not be published are calculated as zero.

Table B.11.7 Yield fluctuation by crop in Bratislava, Malacky and Senica in Comparison with SR

	Crop	Average yield (1997-2000)				Ratio		
		Senica	Malacky	Bratislava	SR	Senica	Malacky	Bratislava
<Extensive crops>		<Yield: t/ha>				<Unit: SR=100>		
1	Wheat	4.32	3.24	4.37	3.96	109	82	110
2	Spring barley	3.27	2.36	2.65	2.98	110	79	89
3	Winter barley	3.86	3.36	5.65	3.33	116	101	170
4	Legumes	1.62	1.16	2.53	1.91	85	61	132
5	Rye	2.10	2.03	2.91	2.50	84	81	116
6	Grain maize	3.82	3.54	5.44	5.13	74	69	106
7	Silage maize	26.34	16.18	26.28	23.79	111	68	110
8	Rape	1.80	1.48	1.95	1.93	93	77	101
9	Alfalfa	7.75	8.36	6.62	7.26	107	115	91
10	Sunflower	0.97	1.20	1.56	1.53	63	78	102
	Average	x	x	x	x	95	81	113
	Standard deviation	x	x	x	x	17.06	15.24	22.34
<Intensive crops>						<Unit: SR=100>		
1	Cabbage	11.75	13.24	10.87	20.92	56	63	52
2	Cauliflower	7.02	13.54	12.2	11.50	61	118	106
3	Kohlrabi	7.68	27.87	9.56	14.57	53	191	66
4	Salad cucumbers	6.64	25.07	48.8	17.24	39	145	283
5	Paprica	6.00	13.94	15.35	12.93	46	108	119
6	Tomatoes	9.59	26.97	41.88	20.87	46	129	201
7	Garlic	3.71	13.02	8.6	4.62	80	282	186
8	Carrots	11.71	13.93	18.52	16.03	73	87	116
9	Onions	7.14	8.98	17.84	10.85	66	83	164
10	Parseley	5.54	7.96	8.71	9.99	55	80	87
11	Gehrkins	6.64	15.68	16.4	9.72	68	161	169
	Average	x	x	x	x	59	132	141
	Standard deviation	x	x	x	x	12.06	60.06	64.64
<Reference>								
	Potatoes *	15.04	19.80	15.92	14.91	101	133	107
	Early potatoes *	14.80	15.30	12.86	13.13	113	117	98

Source: Statistical Office of SR (2001).

Table B.11.8 Fluctuation of yield of major crops

< Coefficient of varience (%) for a period of 1997 to 2000 by district.>

Crop	CV (%)			
	Senica	Makacky	Blayislava	SR
<Cereals>				
Wheat	13.6	16.1	15.9	13.6
Spring barley	26.8	35.9	35.7	21.2
Winter barley	22.4	35.4	x	21.8
Rye	18.1	15.4	36.7	13.3
Grain maize	28.4	28.3	24.7	23.8
Oat	42.8	38.1	39.2	25.8
Legumes	38.3	50.5	18.0	22.3
Average	27.2	31.4	28.4	20.3
<Potatoes: all>	19.7	26.1	37.8	3.9
Early potatoes	44.3	23.3	28.6	8.3
<Vegetables>				
Cabbage	80.4	70.5	29.0	27.6
Cauliflower	45.1	6.8	70.4	14.0
Kohlrabi	77.8	18.3	45.1	10.2
Carrots	94.4	26.3	3.1	12.0
Parseley	41.6	26.1	51.7	19.0
Gehrkins	109.9	41.2	45.0	16.8
Salad cucumbers	116.7	12.5	25.6	10.5
Paprica	48.6	19.7	47.1	18.3
Tomatoes	62.7	10.6	26.8	7.3
Garlic	24.5	71.8	24.5	9.8
Onions	51.5	17.4	55.1	27.9
Average	68.5	29.2	38.5	15.7
<Oil seeds>				
Sunflower	28.6	10.5	x	10.4
Rape	9.8	29.5	18.8	15.9
Soya	x	x	x	27.9
<Feeds>				
Silage maize	10.4	25.2	8.9	17.4
Alfalfa	8.3	26.4	4.9	10.6
Total average	44.6	28.6	31.6	16.5

Source: Statistical Office of SR (2001).

Table B.11.9 Production of major crops in the survey area

<Unit: ton>

Crop	Average (1997-2000)				Ratio		
	Senica	Malacky	Bratislava	SR	Senica	Malacky	Bratislava
<Cereals>							
Wheat	28,026	11,436	9,954	1,529,209	1.83	0.75	0.65
Spring barley	12,910	5,312	2,571	660,462	1.95	0.80	0.39
Winter barley	927	885	288	55,513	1.67	1.59	0.52
Rye	6,510	8,518	1,501	78,541	8.29	10.84	1.91
Oats	1,772	1,541	238	42,514	4.17	3.63	0.56
Grain maize	9,946	6,896	10,555	668,956	1.49	1.03	1.58
Legumes	111	52	1,300	36,528	0.30	0.14	3.56
<Potatoes, all>	2,395	4,804	1,733	429,823	0.56	1.12	0.40
Early potatoes	824	1,073	504	53,910	1.53	1.99	0.93
<Vegetables>							
Sugar beet	29,000	3,261	n	1,341,389	2.16	0.24	x
Cabbage	439	2,730	1,466	127,225	0.35	2.15	1.15
Cauliflower	69	826	697	20,812	0.33	3.97	3.35
Kohlrabi	145	2,591	777	22,487	0.64	11.52	3.45
Carrots	417	1,480	1,051	64,469	0.65	2.30	1.63
Parseley	81	381	218	20,227	0.40	1.88	1.08
Gehrkins	81	562	448	22,706	0.36	2.47	1.97
Salad cucumbers	50	824	661	21,923	0.23	3.76	3.01
Paprica	67	305	527	36,836	0.18	0.83	1.43
Tomatoes	130	574	1,313	74,751	0.17	0.77	1.76
<Oil seeds>							
Sunflower	685	1,100	818	104,315	0.66	1.05	0.78
Rape	3,541	3,089	1,464	170,207	2.08	1.81	0.86
Soya	119	2	x	4,575	2.60	0.04	x
<Feeds>							
Silage maize	87,304	49,901	21,365	2,881,516	3.03	1.73	0.74
Alfalfa	20,096	12,143	3,726	491,883	4.09	2.47	0.76

Source: Statistical Office of SR (2001)

Table B.11.10 Comparison of production, cultivation area and yield of major fruits among the three districts

	Fruit	Average (1997-2000)				Ratio (SR=100)		
		SR	Bratislava	Malacky	Senica	Bratislava	Malacky	Senica
		Area (ha)				Unit: SR=100		
	<Total fruits>	18,612	760	519	202	x	x	x
1	Apples	8,039	260	216	115	3.24	2.68	1.43
2	Pears	884	28	3.4	14	3.21	0.38	1.54
3	Apricots	714	52	27	6.7	7.27	3.72	0.94
4	Peaches	885	70	36	5.8	7.92	4.04	0.66
5	Plums	1,155	35	11	15	3.07	0.93	1.28
6	Cherries	583	31	13	6.3	5.32	2.17	1.08
7	Black chrries	302	20	8.4	5.2	6.51	2.77	1.71
	Average	x	x	x	x	5.22	2.38	1.23
	Standard dev.	x	x	x	x	1.92	1.25	0.34
		Production (ton)				Unit: SR=100		
	<Total fruits>	134,188	4,873	3,163	2,562	x	x	x
1	Apples	78,384	3,251	2,300	1,690	4.15	2.93	2.16
2	Pears	9,580	220	27	241	2.29	0.28	2.52
3	Apricots	5,320	80	161	109	1.50	3.03	2.05
4	Peaches	6,193	625	386	103	10.10	6.24	1.67
5	Plums	10,516	280	52	218	2.67	0.50	2.07
6	Cherries	5,519	252	178	77	4.57	3.23	1.40
7	Black chrries	1,856	14	9	51	0.74	0.51	2.76
	Average	x	x	x	x	3.72	2.39	2.09
	Standard dev.	x	x	x	x	2.89	1.99	0.43
		Yield (t/ha)				Unit: SR=100		
	<Total fruits>	7.21	6.97	5.57	12.57	x	x	x
1	Apples	9.85	13.13	9.00	13.56	133.3	91.4	137.6
2	Pears	10.84	7.86	7.94	16.30	72.5	73.3	150.4
3	Apricots	7.39	1.54	7.00	17.07	20.9	94.7	231.0
4	Peaches	6.95	9.58	9.25	18.59	138.7	133.8	269.0
5	Plums	9.11	7.94	5.13	12.99	87.1	56.3	142.6
6	Cherries	9.48	8.13	14.42	12.51	85.8	152.1	131.9
7	Black chrries	6.18	3.05	1.57	9.61	49.4	25.3	155.5
	Average	x	x	x	x	83.95	89.57	174.01
	Standard dev.	x	x	x	x	39.18	40.34	49.63

Source: Statistical Office of SR (2001)

Table B.11.11 Sales of animal products by Region

Region	Slaughtered animals in total			Slaughtered poultry			Cow milk			Cosumer eggs		
	2000 Amount (ton of live weight)	2000 Share %	Index <2000/ 1999>	2000 Amount (ton of live weight)	2000 Share %	Index <2000/ 1999>	2000 Amount (Thousand litre)	2000 Share %	Index <2000/ 1999>	2000 Amount (Thousand pieces)	2000 Share %	Index <2000/ 1999>
Bratislavsky	8,527	3.2	91.4	5,844	6.2	99.6	44,332	4.7	106.5	53,139	6.7	90.0
Trnavsky	50,506	19.0	91.7	8,976	9.5	105.3	186,370	19.7	103.4	113,776	14.4	96.4
Trenciansky	28,608	10.8	94.5	13,359	14.1	101.3	105,151	11.1	101.4	100,332	12.7	97.1
Nitriansky	59,190	22.3	94.2	24,318	25.7	84.3	181,181	19.1	97.7	185,477	23.5	91.5
Zilinsky	20,918	7.9	89.0	12,562	13.3	89.9	109,378	11.5	100.0	65,242	8.3	96.0
Banskobystricky	39,564	14.9	97.0	11,774	12.5	97.6	130,631	13.8	95.9	104,340	13.2	79.9
Presovsky	29,669	11.1	93.8	9,328	9.9	88.4	117,540	12.4	101.9	91,060	11.5	87.3
Kosicky	28,648	10.8	91.7	8,300	8.8	99.9	72,940	7.7	97.5	76,940	9.7	74.0
SR total	265,630	100	93.3	94,461	100	93.2	947,523	100	100.1	790,306	100.0	88.8

Source: Statistical Office of SR. (2001.4)
Selected Data on Regions in the Slovak Republic

Table B.11.12 Weight of live animal sold for slaughtering for meat

(Unit: ton or klitr.)

Area		1997	1998	1999	2000
Senica	Cow	2,739	2,361	2,231	1,904
	Pigs	5,339	4,927	3,909	4,136
	Milk	n	n	6,802	6,820
Malacky	Cow	1,865	1,532	1,340	842
	Pigs	1,394	1,201	935	987
	Milk	n	n	18,281	17,933
Bratislava	Cow	291	451	380	348
	Pigs	888	n	1,021	1,031
	Milk	n	n	5,074	5,849
SR	Cow	94,048	87,125	77,223	67,752
	Pigs	183,484	169,319	170,105	164,863
	Milk	1,116,143	1,141,695	1,073,183	1,067,378

Source: Statistical Office of SR (2001).

Table B.11.13 Estimation of production cost <Wheat>

No.	Items	Amount (Per ha)	Unit price	Cost (SK/ha)	RIAFE 1999	RIAFE 2000	RIAFE Average	Green Report 2000
1	Land rental			500				
2	Ploughing *			1,300				
3	Manure *	30t/ha	30 SK/t	900				
4	Fertilizers	200 kg/ha		1,200	2,437	2,302	2,370	1,533
5	Fertilizer application *			500				
6	Seeds	150 kg/ha		1,100	1,936	1,759	1,848	1,674
7	Seeding *			500				
8	Agricultural chemicals	4 l/ha	600 sk/l	2,400	1,335	1,412	1,374	1,936
9	Agricultural chemicals application *			500				
10	Harvesting *			1,700				
<11>	Planting stock							234
<12>	Fuels							2,894
<13>	Agr. Machinery				1,786	1,612	1,699	634
<14>	Others				4,992	5,552	5,272	
	Sub total			10,600	12,486	12,607	12,547	8,905
15	Management cost (20% of immediate cost)			2,120	3,116	2,902	3,009	1,781
	Total cost			12,720	15,602	15,509	15,556	10,686
Ref.	Wheat sales amount							
	(Food)	2.87 t/ha	4,200 SK/t	12,040 SK/ha				
	(Feed)	2.87 t/ha	3,600 SK/t	10,332 SK/ha				
		Subsidies	800 SK/ha	800 SK/ha				
	Total (Food)			12,840 SK/ha				
	(Feed)			11,132 SK/ha				

<Notes> *: Fee by contract including fuel and operator costs.
Sources: Farming unit survey (2001)
RIAFE (1999 and 2000)
MOA Green Book 2000.

Table B.11.14 Estimation of Production cost <Animal husbandry>

Animals	No.	Items	Composition of cost 1999 (%)	Composition of cost 2000 (%)	Composition of cost Average (%)	Reference (Japan) (%)
Milking cow	1	Feed	35.1	34.6	34.9	41
	2	Labor	17.4	15.5	16.5	32
	3	Facilities and equipment	14.8	13.6	14.2	5
	4	Medicines	1.4	1.3	1.4	3
	5	Others	31.3	35	33.2	19
	6	Total cost	100	100	100	100
Cattle for fattening	1	Feed	52.5	51.1	51.8	57
	2	Labor	11.5	11.2	11.4	27
	3	Facilities and equipment	13.5	13.2	13.4	6
	4	Medicines	0.3	0.2	0.3	2
	5	Others	22.2	24.3	23.3	8
	6	Total cost	100	100	100	100
Pigs	1	Feed	62.2	61.8	62.0	64
	2	Labor	6.3	6.1	6.2	17
	3	Facilities and equipment	11	11.2	11.1	6
	4	Medicines	1.2	1.3	1.3	4
	5	Others	19.3	19.6	19.5	9
	6	Total cost	100	100	100	100

Source: MOA (2000 and 2001)

Table B.11.15 Number of agricultural and food production units under Minisgriculture in SR

(Units: Bodies)

Category		1993	1994	1999
Agriculture	State farms	148	153	2
	Agricultural cooperatives	1,116	1,026	801
	Private companies	218	181	623
	Agricultural joint venture	32	8	-
	Industrial joint venture	92	8	-
	Independent farmers	17,840	19,972	21,263
Food industry	State farms	76	45	0
	Private companies	669	849	418
	Entreprenours	3,320	3,420	3,009
Services	State farms	59	49	12
	Companies	146	265	777
	Cooperatives	]	]	19
	Independent farmers	]	]	244
	Others	]	]	86

Source: 1. Sprava o polnohospodarstve a potravinarstve v Slovenskej republike 1995.Cislo: 3108/1995. Cited: Yukino Sato (1996)
2. Green Book (2000)

Table B.11.16 Holding of agricultural land by agricultural unit in SR

(Unit: %)

Unit	1993	1994	1997	1999
State farms	18.9	18.8	2	0.25
Agricultural cooperatives	76.1	74	54.6	50.2
Private companies	1.3	2.4	23.1	26.8
Independent farmers	0	2.4	7.9	9
Other agricultural land	3.7	0.4	12.4	13.7

Source: Green Book (2000) and others.

Table B.11.17 Land use, soil type and land location of the farming units

Item			Unit	Farm management type	
				Enterprise	SHR *
<Land holding>					
Land use	Total land area:		ha	2,949	102
	Agricultural land		ha	2,916	102
	Non- agricultural land		ha	33	0
	Arable land		ha	2,300	100
Land ownership	Own land		%	1	44
(Agricultural land)	Rental from private units		%	96	45
	Rental from state		%	3	12
Rental fee	Ratio to buying price of land		%	1.42	1.50
	Unit price		SK/ha	845	633
	Total rental fee		SK	1,246,560	122,700
Change of land holding	Increase		ha	1,635	54.3
(Agricultural land) (ha)	Agricultural land	purchased	ha	67	0.0
		rental	ha	1,568	54.3
	Arable land	purchased	ha	67	0.0
		rental	ha	1,518	53.6
	Decrease		ha	0	0
				0	0
<Soil type>	Sandy soil		%	61	38
	Others		%	39	62
<Location>	CHKO **		%	23	8
	Agricultural areas		%	77	92
<Irrigation>	Contract with Povodi Dunaje		%	80	25
	Average arable land		ha	2,311	106
	Equipment installed		%	36	6
	Irrigated area		%	9	4
	Utilization ratio of equipment		%	26	52

<Notes> * : Registered independent farmers.
**: Natural protection area.

Source: Farming unit survey (2001).

Table B.11.18 Production of milk, beef and pigmeat in the Farming unit survey area

Product	Item	Unit	Enterprises		SHR	
			Average	Range	Average	Range
Milk	Yield	Lit head/year	4,958	4,156-6,855	-	-
	Numbers of animals	Head	670	257-1,613	-	-
	Production	Klit./ Year	3,906	1,156-11,053	-	-
Beef	Yield <a>	Kg/head /year	313	107-500	375	200-550
	Numbers of animals	Head	508	10-1,214	8	6-10
	Production <b>	Ton/year	103	5-272	2.7	2.0-3.3
Pig	Yield <a>	Kg/head /year	144	115-198	111	90-126
	Numbers of animals	Head	1,707	1,048-3,004	37	13-95
	Production <b>	Ton/year	227	128-345	4.4	1-12

<Notes> a : Live weight of animal at selling.
b : Production was obtained by simple average of farming units. Therefore, the production was not equal to the products of Yield x Nbs of animals.

Table B.11.19 Harvested area by crop by enterprise and SHR

Crop	Land area (ha)			Land area (%)		
	Enterprise	SHR	TOTAL	Enterprise	SHR	TOTAL
Cereals	12,314	587	12,901	66.1	73.8	66.4
Oilcrops	2,646	174	2,820	14.2	21.9	14.5
Fodder	3,326	7	3,333	17.8	0.9	17.2
Vegetable	298	27	325	1.6	3.4	1.7
Fruits	52	0	52	0.3	0.0	0.3
Total	18,636	795	19,431	100.0	100.0	100.0

Source: Farming unit survey (2001) <JICA>

Table B.11.20 Changes of arable land use and cropping ratio from 1997 to 2000

Area	Item	Unit	1997	1998	1999	2000	Average
SR	Total planted area <a>	1000 ha	1,338	1,309	1,274	1,271	1,298
	Arable land <b>	1000 ha	1,476	1,472	1,469	1,461	1,469
	Cropping ratio <a/b>	%	91	89	87	87	88
Malacky	Total planted area <a>	ha	24,510	22,106	20,702	20,409	21,932
	Arable land <b>	ha	26,782	26,624	26,169	26,090	26,416
	Cropping ratio <a/b>	%	92	83	79	78	83
Senica	Total planted area <a>	ha	27,498	29,482	21,622	27,673	26,568
	Arable land <b>	ha	33,178	33,174	33,162	32,946	33,115
	Cropping ratio <a/b>	%	83	89	65	84	80

Source: Statiatical Office of Slovak Republic.

Table B.11.21 Application of chemical fertilizers to farm lands

District	Fertilizer	1989/1990	1994/1995	1996/1997	1997/1998	1998/1999	1999/2000	Average 1996/2000
		kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha
SR	N	91.8	30.6	37.7	38.3	29.5	33.3	34.7
	P	69.0	7.8	10.5	9.6	5.9	7.2	8.3
	K	79.1	6.6	8.8	8.0	4.7	6.0	6.9
	Sum	239.9	45.0	57.0	55.9	40.1	46.5	49.9
	Ratio-1	100.0	18.8	23.8	23.3	16.7	19.4	x
	Ratio-2	x	x	100.0	98.1	70.4	81.6	x
Bratislava	N	x	x	38.5	41.8	24.9	27.5	33.2
	P	x	x	11.4	9.8	4.2	9.6	8.7
	K	x	x	13.2	8.3	3.8	10.7	9.0
	Sum	x	x	63.1	59.8	32.9	47.8	50.9
	Ratio	x	x	100.0	94.8	52.2	75.8	x
Malacky	N	x	x	57.3	35.1	24.3	29.5	36.6
	P	x	x	10.8	11.5	2.7	4.1	7.3
	K	x	x	12.8	13.7	3.6	6.7	9.2
	Sum	x	x	80.9	60.4	30.6	40.3	53.0
	Ratio	x	x	100.0	74.6	37.8	49.8	x
Senica	N	x	x	41.3	36.8	29.2	29.9	34.3
	P	x	x	14.6	11.3	6.5	10.9	10.8
	K	x	x	15.1	11.4	5.6	10.6	10.7
	Sum	x	x	71.0	59.5	41.2	51.4	55.8
	Ratio	x	x	100.0	83.8	58.1	72.4	x

Source: Statistical Office of Slovak Republic.

Table B.11.22 Change of pienes of agricultural machines by district in SR and Malacky

Area	Machine	1990	1995	1997	1998	1999	2000
		(Unit: Pieces/arable land 1000ha)					
SR	Tractors	24.46	18.71	17.43	17.03	16.28	16.07
	Ploughs	8.50	6.84	6.67	6.69	6.63	6.64
	Combine harvest	4.33	3.71	3.21	3.02	2.88	2.79
	Vehicles	12.18	9.38	8.04	7.69	7.05	6.84
Malacky	Tractors	n	n	13.59	9.39	9.13	10.39
	Ploughs	n	n	5.30	4.28	4.51	4.48
	Combine harvest	n	n	1.90	1.50	1.49	1.42
	Vehicles	n	n	5.26	3.87	3.90	3.45
				(SR=100)			
Malacky	Tractors	n	n	78.0	55.1	56.1	64.6
	Ploughs	n	n	79.5	64.0	68.0	67.6
	Combine harvest	n	n	59.4	49.8	51.7	50.8
	Vehicles	n	n	65.5	50.3	55.3	50.4

Source: Statistical Office of SR (2001)

Table B.11.24 Root length of major Crops

No.	Name of crop	Root length (m)
1	Sugar beet	3.00
2	Sun flower	2.80
3	Red beet	2.25
4	Rye	2.25
5	Spring barley	2.25
6	Spring wheat	2.25
7	Winter wheat	2.25
8	Peas	1.65
9	Potatoes	1.55
10	Carrot	1.20
11	Flax	1.15
12	Tomatoes	1.10
13	Millet	1.05
14	Beans	0.90
15	Cucumbers	0.90
16	Onions	0.50

Source: RIMLE data.

Table B.11.23 Effects of irrigation on crop yields

<Farmers experience and expectation to irrigation in the interview survey.>

Crop	Crops	No-irrigation (t/ha) a	Irrigation (t/ha) b	Increase b/a	Remarks
Cereals	Wheat, winter	2.9	3.5	1.21	Winter crop
	Triticale	4.1	4.5	1.10	Winter crop
	Rye	1.6	1.9	1.19	Winter crop
	Maize, grain	2.4	4.8	2.00	
	Barley, spring	2.4	4.1	1.71	
Potatoes		16.6	17.5	1.05	
Vegetables	Asparagus	1.6	3.2	2.00	Perenial crop
	Broccoli	(0)	5.0	5.00	
	Carrot	50	70	1.40	
Oil crops	Sunflower	1.5	2.0	1.31	
	Rape	1.4	1.8	1.29	Winter crop
	Soybean	0.41	0.90	2.20	
Fodder	Maize, silage	14.9	25.0	1.68	
	Alfalfa	4.4	4.8	1.10	(Perenial crop) <4-5 years>
<Notes>	The data were obtained by the iterview survey to farmers and agricultural enterprises The data include farmers expecting value to irrigation. Soil type, fertilization, etc. were not identified.				
<Reference>					
Yield in 2000	Wheat, winter	1.7	2.7	1.59	
	Rye	1.6	2.0	1.25	
	Barley, spring	0.3	2.5	8.33	

Source: Farming unit survey (2001)

Figure B.11.1 Trends of consumption per capita of major agricultural products.

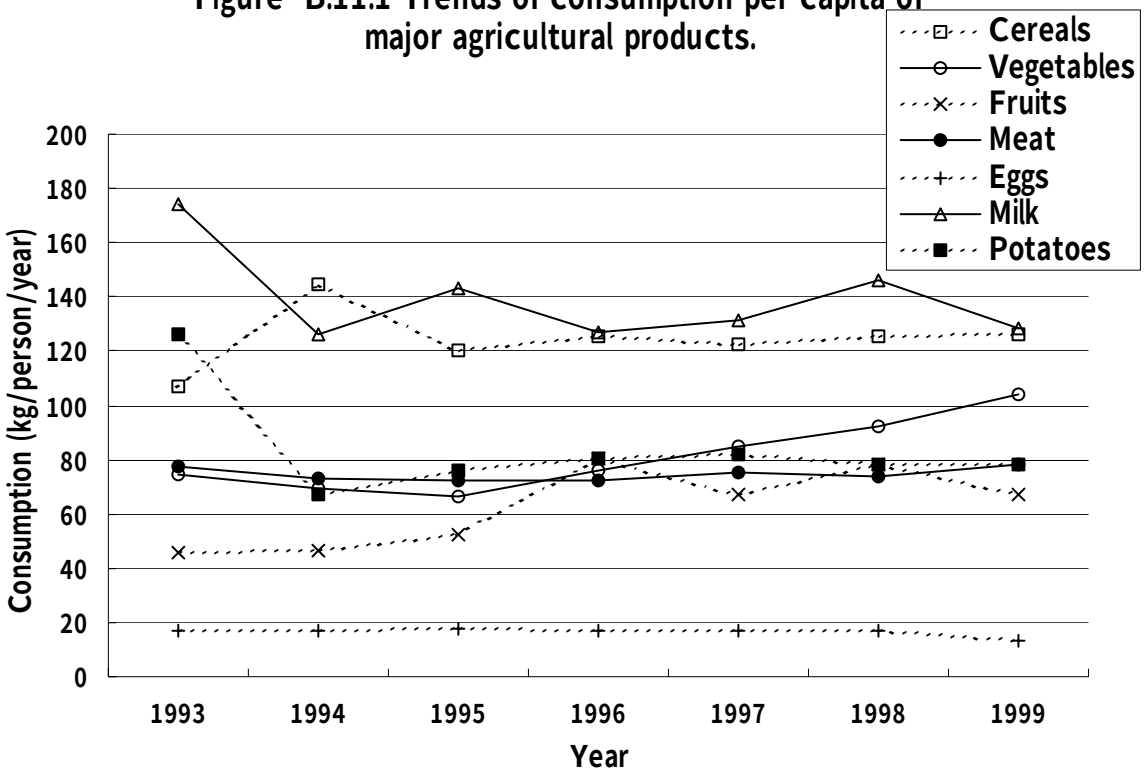


Figure B.11.2 Production and consumption by major items of cereals

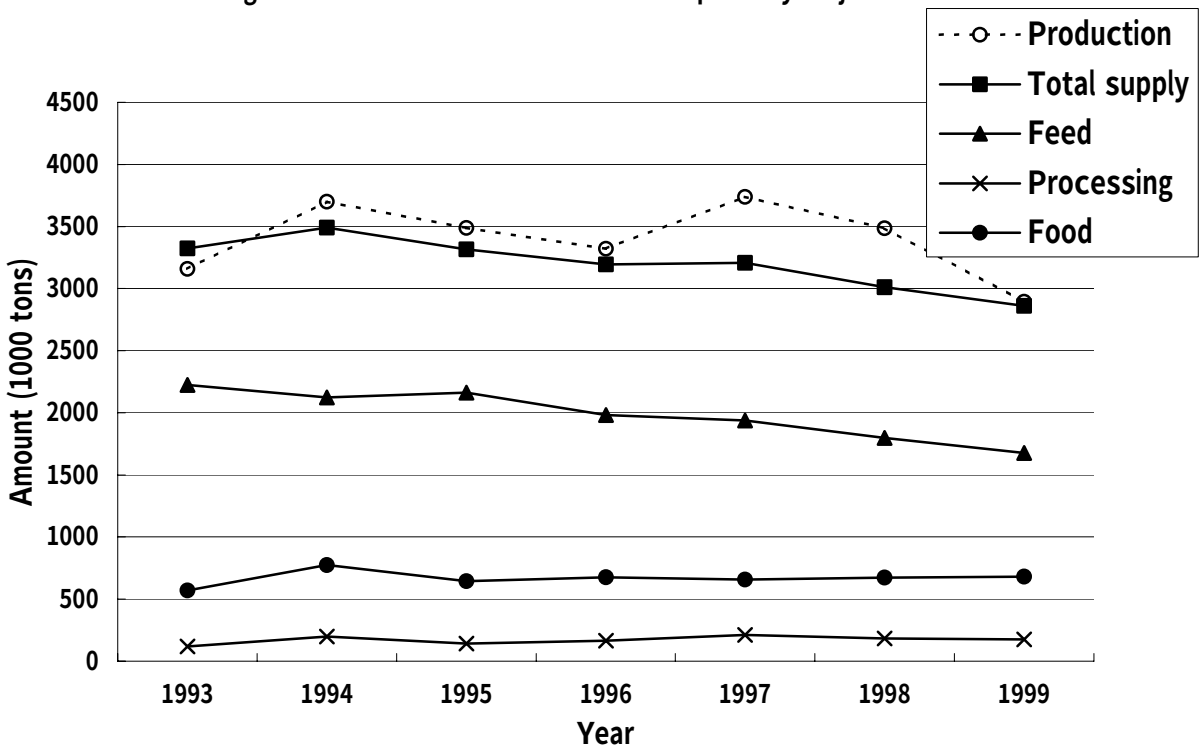


Figure B.11.3 Trend of meat and egg production in SR.

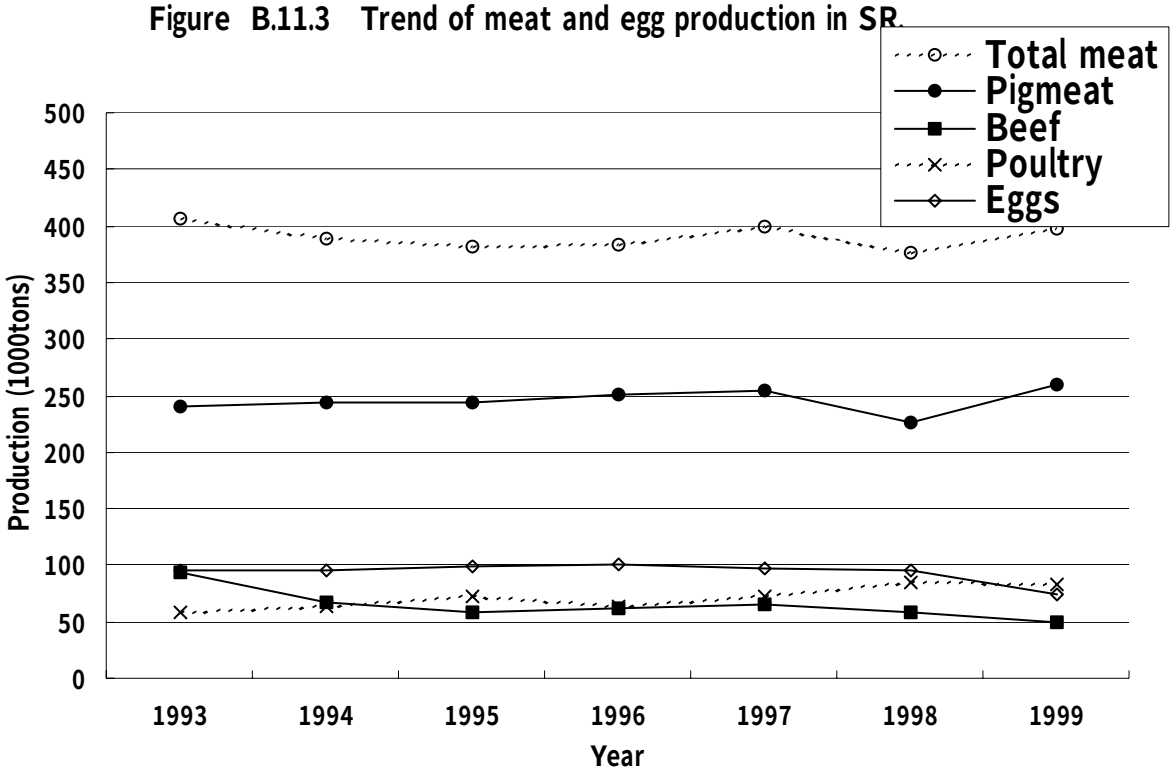
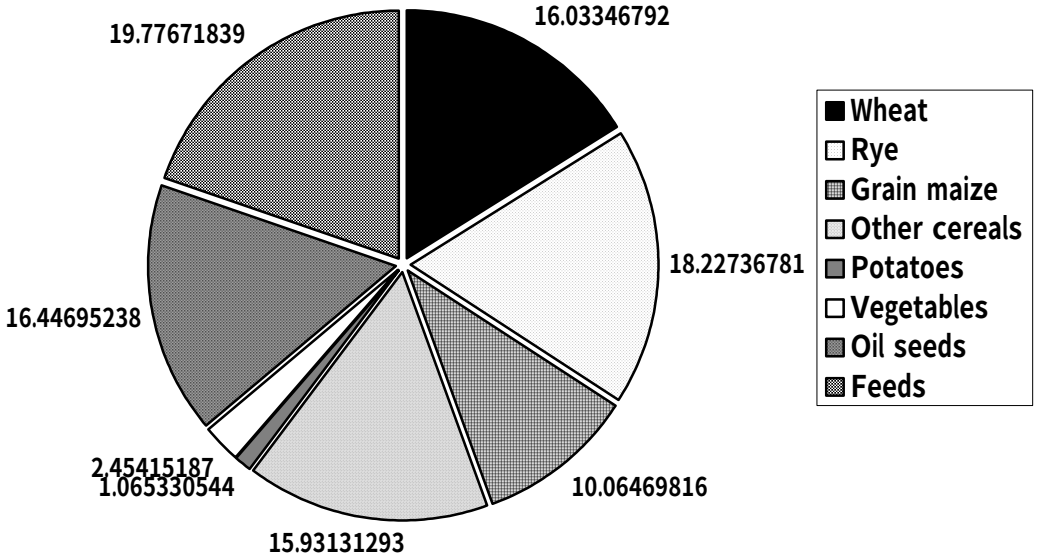


Figure B.11.4 Ratio of planted area by crop in Malacky (Average of 1999-2000).



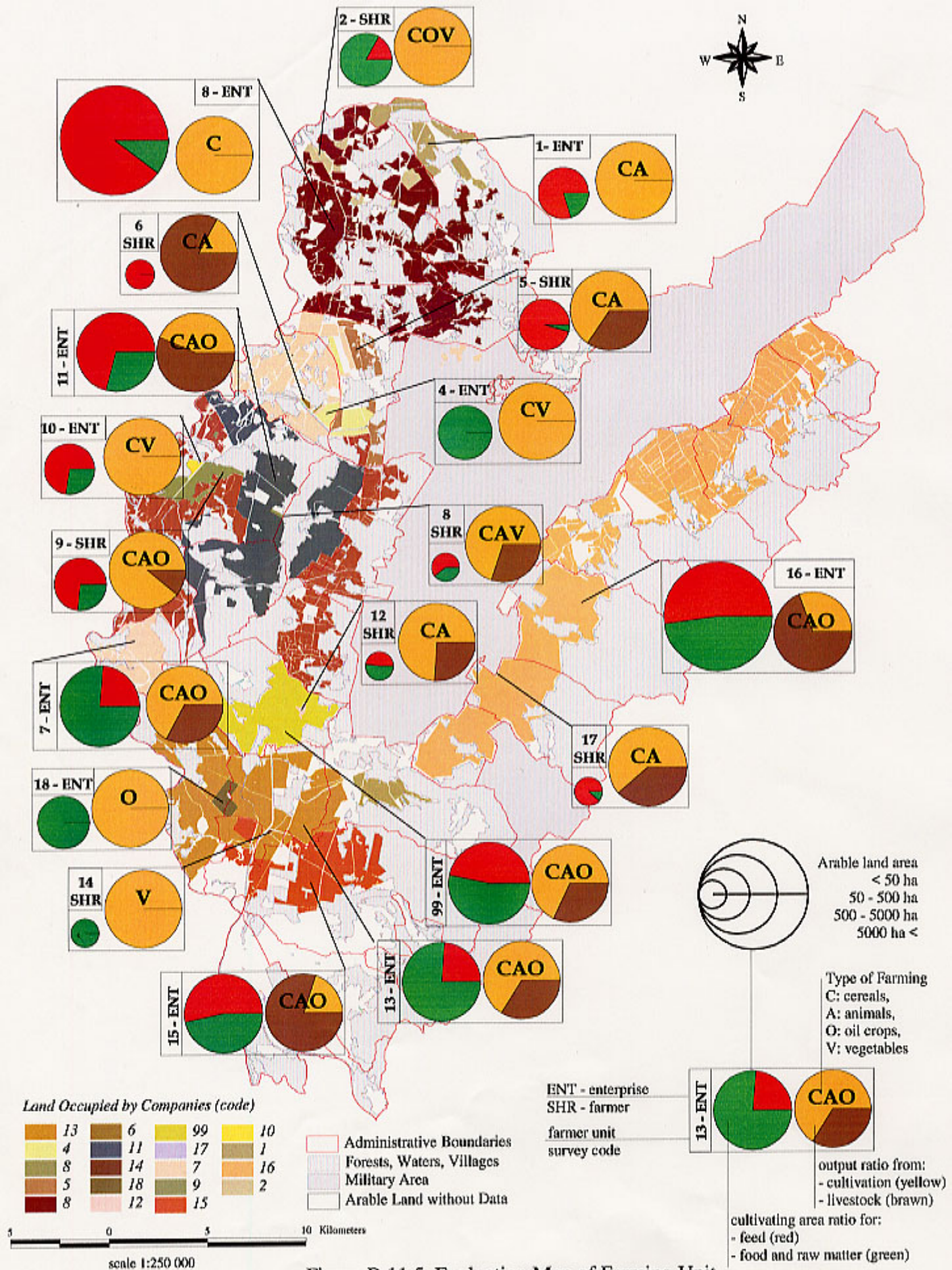


Figure B.11.5 Evaluation Map of Farming Unit

source: JICA Study Team - Farmer Unit Survey

ANNEX B.12

RURAL SOCIETY AND FARMING ORGANISATIONS

B.12 RURAL SOCIETY AND FARMING ORGANISATIONS

B.12.1 INTRODUCTION

The institutional aspects of villages and towns in Slovakia and the Study Area, in particular the administrative structure (region - kraj; district - okres; town/village - mesto/obec) and the roles of State Government and local self-government, have been described in the Chapter B.1. The population distribution and key aspects of the Study Area's demography have been presented in Chapter B.2. This included data and discussion on demographic indicators, especially age structure and migration, and changes during the economic transformation that are important for an understanding of the socio-economic situation in rural and farming society.

However, to understand the present situation in rural Slovakia in general and in Zahorska in particular, it is necessary to consider some of the historical events and social, political and legal changes that have shaped Slovak agriculture, rural activities, settlements and the countryside, especially those of the last fifty to sixty years. The following text (section B.12.2) is based on the studies of Kovacevicova (1997), Slavkovsky (1997), discussions with Lubomir Faltan (Slovak Academy of Sciences), Gejza Blaas (Research Institute for Food and Agricultural Economics) and Iveta Namerova (Department of Regional Policy and Rural Development, Ministry of Agriculture) and interviews with inhabitants of the Zahorska area. After this section, data on the employment situation, which is a key factor in the functioning of rural society, are presented and analysed (in section B.12.3). The initial results of the rural survey are described in section B.12.4.

B.12.2 HISTORICAL CONTEXT

(1) Village Organisation

During the 14th to 17th centuries, secular power lay with the owners of chateaux and manor houses, usually located close to villages where the 'serfs' lived. In some villages and towns that had arisen on the basis of so-called 'German Law', a form of local and public administration was already in place by the Middle Ages. In villages it concentrated on the house of the village mayor, who usually also became an inn-keeper and a miller. Town halls, with Mayors and Counselors, developed in the larger towns. Thus village magistrates and officials have been either appointed or elected in villages and towns for some centuries, and when serfdom was abolished in the 19th century, the administration of villages was taken from sovereign hands into civilian management. This opened the way for the uniform self-government of village, but universal suffrage was established in Slovak villages only after the origin of the Czechoslovak Republic in 1919. In 1922 village management committees were replaced with village representatives and the function of magistrate was given to a mayor. In addition to the 'civil' administration of rural society, Churches have also had a physical presence and a strong influence on village life for many centuries. However, in the majority of villages, schools were only established in their centres at the end of the 19th century and in the first half of the 20th century.

Despite the civil administration of villages being treated in much the same way throughout the country, Slovakia shows considerable variability in its society/culture, for a small state, and this is reflected in the character of its settlements and traditional architecture. This variability reached a peak in the 19th century. However, in the 20th century, the enforced and voluntary migration of the population, the urbanisation of many rural areas, the industrialisation of the building industry, and the development of transport infrastructure, especially roads, resulted in a reduction in regional variability. In the second half of the 20th Century, shops, post offices, health-care facilities, pubs/restaurants and cultural centres were built in many villages and towns, providing basic services but creating a certain drab uniformity - and sometimes a new centre.

(2) Zahorska Region and its Agriculture until 1948

At the end of the 18th Century, the Morava River floodplain was considered to be a well-developed agricultural area, and peasants appreciated working here. However, serfdom was abolished in 1848 and an edict of the Emperor on March 3, 1853 gave some of the forests, fields and pasture, previously owned by the local Manor and Count, to local people through rent, sale and auction. These events led to the re-plotting of boundaries and re-allocation of land, in favour of village settlements and their inhabitants, separating manor land from peasant land, and giving inhabitants the chance to create farms in the 1860's (Lasák *et al.* 1999). Thus between 1848 and 1948 most agricultural land was owned and used by a range of farmers/peasants, while the rest of the land (including floodplain meadows, some forests, arable fields and pasture) were in common ownership.

Corn, hemp, clover, tobacco and potatoes were the traditional **crops** that made Zahorska area famous in the 19th century. In the second half of the 19th century, the agricultural development of the Morava River floodplain was influenced by the introduction of new crops, improved technology (eg for ploughing and harvesting) and the use of artificial fertilisers. Towards the end of the 19th century, sugar beet became financially attractive and its planting is said to have significantly influenced social aspects of the settlements.

The most important types of vegetables for Slovaks - cabbage, carrot, parsley, garlic and onion - have been grown throughout most of Slovakia for several centuries. Some were grown in gardens for home consumption, but others such as cabbage were grown on higher quality land, set aside for this purpose by the sowing system. This land was often situated by a river, to allow watering of the crop if needed. In fertile areas close to market centres, vegetables started to be grown specifically for sale and in Western Slovakia this applied to the southern part of Zahorska in particular.

Thus, while writings of **vegetable** growing in Zahorska exist from the 18th century, it was not until the 19th and 20th centuries that it expanded, with vegetable growing spreading from gardens to fields in order to supply Vienna. Vegetable-growers from Zahorska area were a daily feature of Viennese markets in the first decades of the 20th century. After the breakdown of the Austro-

Hungarian Empire, these vegetable growers sought sales for their products in Moravia and the entire Slovak-Moravian border zone as far as Zilina. The vegetable growing of Zahorska area was characterised by cabbages, cucumbers, cole and the soup vegetables; lettuce, spinach, tomatoes and pepper started to be grown to a larger extent during World War II.

As for **fruit** growing, up until the middle of the 20th century, mulberry and pear dominated, while walnut, cherry, plum and apples were also produced, because of suitable soil and climatic conditions.

Thus root vegetable and cucumber made the Morava River area locally famous and vegetable production became more prevalent because of technological improvements and the markets in Bratislava and Vienna. Thus by the end of the 19th century and at the beginning of the 20th century, private farmers in the Zahorska region were an important source of vegetables and fruit for Vienna, and women in particular were involved in their production and trade. From the point of view of agrarian culture, growing vegetables is more demanding than grain production. Despite this, even as late as the 1930s and 1940s (collectivisation), much of the cultivation was still done with hand tools, on smaller plots, and especially by women.

Animal husbandry also played a significant role in both agricultural production and rural society. Regardless of social status almost everyone owned cattle. Rich families also owned horses, while poorer families reared goats. Animals were essential for survival during the winter, since they were a source of meat and milk (and cheese). Their manure was also important, and the manure of goats was considered of the highest value, being applied every three years - and more frequently for some crops.

Prior to the second half of the 20th century, **horses** were especially important farm animals, and depended in part on the hay from the meadows of the Morava River. The hay was also in high demand in Vienna and Bratislava, because of its exceptional quality. The hay and therefore the meadows were a valuable asset and those farmers who owned large meadows were among the wealthy.

The land reform after World War 1 caused significant changes in farming practices and wealthy people could buy additional land and create larger farms, creating the conditions that could have led to a move towards the independent farming that developed later in Western Europe. Peasants grouped into many associations, which helped both their farming and marketing activities.

The economic crisis just prior to 1938 then created difficulties for agriculture in the Zahorska region and the land was split into many small parcels with an average size of 24 areas (an old unit equivalent to approximately 100m²). Small-scale production was still prevalent, but was losing its position in the market. Peasant farmers were unable to pay taxes and repay loans and their debts increased, and this led to a decrease in agricultural production. World War II then created economic and social havoc and progress towards independent farming was halted when collectivisation started after 1948.

(3) The Socialist Period, Collectivisation and the Economic Transformation

Collectivisation took place after the end of the 2nd World War and a Period of large-scale farming then followed, with widespread ploughing, use of fertilisers and other intensive practices being introduced. Vegetable and fruit production continued in the rural areas, primarily in household plots closely associated with houses in the villages. These provided food for domestic (home) consumption and informal trading rather than for formal urban markets; livestock were also kept. The State Farms and Co-operatives, which used most of the agricultural land, were more orientated to mass production and supplying the basic food requirements of the nation. Private farming, even on a small-scale, was almost non-existent.

One localised impact of the socialist period on the Zahorska area was that the villages bordering the Morava River (on the Slovak side) were closed from public access for 40 years; the Morava was a strategic river separating not just Austria and Slovakia, but the capitalist and socialist blocks. This closure is likely to have contributed to the reduction of the relationship between people and land in this area.

So, while some rural inhabitants worked on collectivised farms, many others and especially the younger generation started to work in new industries in the Zahorska area and in and around Bratislava, where industrialisation was earlier and greater than in central and eastern Slovakia. This trend has continued into the economic 'transformation' period of the 1990's with the establishment of the Volkswagen Factory in Devinska Nova Ves. There were also employment opportunities in various state institutions, especially in the socialist era, though these are now diminishing. Thus some villages and small towns (eg Rohoznik, Stupava and Malacky), that had been predominantly involved in rural/agricultural activities, have diversified and developed alternative sources of employment. Those municipalities closer to Bratislava can, and increasingly do, act as residential (dormitory) settlements for Slovakia's capital (see section on migration in Chapter B.2 and those on employment and 'commuting' later in this chapter).

The affect of the above changes on present day 'farmers' and the organisation of farming are described in Section B.12.4

B.12.3 EMPLOYMENT SITUATION IN THE ZAHORSKA AREA

The distribution of the population within the Study Area and various demographic indicators (e.g. ageing index, migration) related to the social situation have already been already presented in Chapter B.2. Some figures on employment have been presented in Chapter B.4, on the economy and industrial development. A more detailed analysis of the employment situation is presented here.

Table B.12.1 shows the economically active population, and related data, for most villages of the Study Area for 1991 and 1999 (i.e. those villages in the Rural Bratislava District of 1991; this excludes all Study Area municipalities in Bratislava IV and Senica and some in present day Malacky, for which

1991 data were not available at the time of writing). Between 1991 and 1999 the change in the economically active population from 24,030 to 24,017 was negligible. In 1991, 3,642 individuals were employed in the agriculture and forestry sector, which was 15.1% of the economically active population. No equivalent figures, by municipality, are available for 1999; it is hoped that they can be obtained from the 2001 census when the results become available.

There was a considerable variation from municipality to municipality in the percentage employed in the agriculture/forestry sector in 1991, with only 7.5% in Marianka but 45.6% in Suchorad. Figure B.12.1 shows the geographic distribution; as might be expected, it appears that the municipalities nearer to Bratislava, Malacky and Stupava have quite low percentages employed in the agricultural sector, while the more 'remote' villages have a higher percentage. This trend is very clear in Table B.12.2 with data for the year 2001; this shows that less than 1% of employees in all of Bratislava IV work in the Agriculture/Hunting/Forestry sector compared to 10% and 14% in Malacky and Senica respectively (it should be noted that these figures relate to companies with 20 or more employees, so exclude smaller enterprises, private farmers etc).

Table B.12.3 shows that on average (for those Malacky municipalities with available data), 51.1% 'commute' to work in another municipality, ranging from only 33.1% in Malacky to 88.2% in Marianka working outside their 'home' municipality. Figure B.12.2 shows the geographic distribution. There appears to be a trend for people living in municipalities close to Bratislava and Malacky to work away from their home Municipality. Detailed data for 1991 (from the Bratislava Rural District, Branch Office, Slovak Statistical Office; published September 1996), indicate that Bratislava and Malacky were major employment locations for the inhabitants of the Study Area (Table B.12.4). Of those commuting (i.e. working outside their home municipality) 15.3% worked in Malacky and 58.9% worked in Bratislava; therefore only approx. 26% commuted to work in Municipalities other than these.

These data all point to the conclusion that, by 1991, the majority of the population of the settlements in the Study Area is not directly employed in the agricultural or rural economy. The settlements are more a place of residence for work in other sectors and municipalities, especially in the industrial sector in Malacky and Bratislava.

Unemployment, in the 'Bratislava Rural District' municipalities of the Study Area, has risen from 5.3% to 15.2% between 1991 and 1999, which is a major increase (Table B.12.1). This rate of unemployment is at a similar level to the average of 15.92% for Slovakia as a whole in 1999 (see table below). It is somewhat surprising, that the 1999 unemployment levels for the complete okres of Bratislava IV, Malacky and Senica are all somewhat lower than the 1999 unemployment levels for the 'selected' villages in the old Bratislava Rural District. (It is possible that some of the difference can be attributed to changes in the means of calculating unemployment levels).

Unemployment for Administrative Units
Encompassing the Study Area (31.12.1999)

Administrative Unit, District, Region etc	% Unemployed
Bratislava IV	4.04%
Malacky	12.59%
Senica	13.39%
Bratislavsky Region	6.27%
Trnavsky Region	13.15%
Slovak Republic	15.92%

Source: Selected Data on the Regions in the Slovak Republic (Statistical Office of the Slovak Republic, 2000). Percentages calculated from Registered Unemployed and the Economically Active Population (Productive Age Group).

As in Slovakia as a whole, there is considerable local variation in the rates of unemployment (Figure B.12.3). The lowest rates are in the peri-urban Borinka, Marianka and Stupava, where access to employment in Bratislava should be well established. The highest rates are in Zahorska Ves (31.5%), Plavecky Stvrtok (29.7%) and Gajary (28.3%).

B.12.4 INITIAL FINDINGS OF THE RURAL SURVEY

(1) Results

An initial selection of the results of the survey is presented below, by respondent type, with some brief comments after each table. Some general impressions, especially the views of the mayors, are then presented in section B.12.4.2.

Ethnic Group

No answer		Respondent Type	Slovak		Hungarian		Roma	Czech, Moravian, Silesian		Other	
0		Farm Employees	100	94.3	0	0	0	4	3.8	2	1.9
0		Individual Farmers	30	96.8	0	0	0	1	3.2	0	0
1	3.9	Unemployed	25	96.1	0	0	0	0	0	0	0
0		Other inhabitants	92	96.8	1	1.0	0	2	2.1	0	0
0		Mayors	8	80.0	1	10	0	1	10	0	0
1		Total	255		2		0	8		2	

This characterisation of the respondents, indicates that the majority of the population in the area declare themselves to be of Slovak origin. None of the interviewees declared themselves to be Roma. According to the population census of 1991 only 323 out of a population of 60,722 in Malacky District declared themselves as Roma; this is only 0.5% compared to a national average of 1.59% (in 1995).

Residence in Village

Respondent Type	Lived in Village all life		Not lived in village all life	
Farm Employees	67	63.21%	38	35.85%
Individual Farmers	22	70.97	9	29.03
Unemployed	20	76.92	5	19.23
Other inhabitants	57	60	38	40
Mayors	7	70	2	20
Total	173		92	

65% of respondents had lived in the same Municipality all their life, and this applied to all categories of respondents (see also responses to question below). There does not appear to be a big difference between the categories of respondent i.e. whether involved in agriculture or not.

Born in or outside Survey Area (Malacky and Senica District where survey was carried out)

No answer		Respondent Type	Born in Village in Malacky & Senica Districts of Study Area		Not Born in Village in Malacky & Senica Districts of Study Area	
0		Farm Employees	47	44.34%	59	55.66%
1	3.23	Individual Farmers	8	25.81	22	70.97
1	3.85	Unemployed	16	61.54	9	34.62
0		Other inhabitants	44	46.32	51	53.68
1	10	Mayors	8	80	1	10
3		Total	123		142	

These figures indicate that 53.6 % were born outside the study area, which is not consistent with the responses to the previous question. It may be that some respondents answered this question very literally and were referring to the location of the hospital in which they were born (which may have been in Bratislava). While answering the previous question they may have been referring to where they lived during their working life and did not take into account their exact place of birth and/or a very short spell as a child in another municipality.

Emigration/Immigration

Respondent Type	No Household Members Moved Away		One Household Member Moved Away		More Than One Household Member Moved Away		Household Member Moved Into Village		No Household Member Moved Into Village		No answer	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Farm Employees	80.0	75.5	14.0	13.2	12.0	11.3	8.0	7.6	94.0	88.7	4.0	0.0
Individual Farmers	19.0	61.3	4.0	12.9	8.0	25.8	7.0	22.6	21.0	67.7	3.0	9.7
Unemployed	20.0	76.9	2.0	7.7	4.0	15.4	2.0	7.7	22.0	84.6	2.0	7.7
Other inhabitants	79.0	83.2	13.0	13.7	3.0	3.2	4.0	4.2	85.0	89.5	6.0	6.3
Mayors	6.0	60.0	3.0	30.0	1.0	10.0	1.0	10.0	9.0	90.0	0.0	
Total	204		36		28		22		231		15	

Therefore in 23.9% of households (of the interviewees) one or more household members had moved away from the village, whereas only 9.5% of respondents said that a household member

had moved into the village. These figures suggest that there might be net emigration; this contradicts the findings of the analysis of the 1996-1999 statistical data, which indicated immigration into the Study Area. Perhaps the difference here can be explained by household members moving (house, job etc) within the Study Area.

Work in place (municipality) of residence

Category	Absolute number of responses *	Percentage	
		Work in village of residence	Work in another place
Mayors	10	100 %	0 %
Individual Farmers	27	78 %	22 %
Other inhabitants	88	72 %	28 %
Agriculture employees	104	57 %	43 %

* Unemployed not included

All the mayors (and one Deputy Mayor) lived in the village for which they had responsibility. A large proportion, 78%, of the "private farmers" lived in the place where they worked (though it must be remembered that some respondents interviewed as 'private farmers' were not practising farmers and had other work). It is interesting to note that as many as 43% of those working as farm employees lived in another municipality from the farm on which they worked. Only 28% of the other inhabitants interviewed worked in a different municipality. This is considered to be a reflection of the interviews being carried out in the day time, when many employees working outside of the village would not have been present i.e. those interviewed would have been predominantly those working in the same village.

Other Sources of Income (in Addition to Main Employment)

Respon-dent Type	Self-Employment		From Securities		Interest		Pension		Crops		None		Other	
	No.	%	No	%	No	%	No	%	No	%	No.	%	No.	%
Farm Employees	10	9.4	1	0.9	1	0.9	3	2.8	1	0.9	69	65.0	1	0.9
Individual Farmers	5	16.1	0	0	0	0	3	9.7	4	12.9	10	32.3	2	6.4
Other inhabitants	10	11	0	0	3	3	6	6	0	0	60	63	3	3
Mayors	0	0	0	0	0	0	1	10	0	0	5	50	2	20
Total	25		1		4		13		5		144		8	

The majority of respondents (144) claimed that they had no sources of income other than their main employment, but only 32.3% of private farmers gave this response. Five claimed they had income from self-employment, three a pension and 2 from other sources. This suggests that farming alone may not be sufficient to support them; from the interviews it was known that some of the registered individual farmers, as well as practising farming had other jobs. In other cases, though registered as farmers, they were not practising farmers; they had registered to facilitate the restitution of their land and were now renting the land to a commercial farm (see following section).

(2) General impressions on the rural situation from the survey

1) Individual (Private) Farmers (SHR)

It became apparent early in the survey that the number of SHRs was quite small and that the numbers registered with the Regional Department of Agriculture and with the village/town differed. It could be concluded that the few SHRs registered with the former did so because they wished to receive a subsidy and therefore were likely to be 'active' farmers. Conversely it appeared that the additional SHRs registered with the village/town had done so, not with the intention of seeking a living from agriculture but primarily to facilitate the restitution/acquisition of land in a single block. Some such SHRs did not cultivate the land themselves, but rented it to a larger farming enterprise, with the possibility of using it themselves for other purposes at a later date i.e. there was an element of speculation in their owning such land. Other SHRs could not be considered mainstream farmers but kept land and/or agricultural premises as a hobby or for 'other' purposes e.g. for rearing horses for their own use or (in one case) for commercial purposes, as racing stables.

2) Household Plots

Informal discussions indicated that (as in other parts of Slovakia) many residents of villages had household plots on which vegetables were grown and/or one or two animals (eg pig, goat) might be kept. These informal agricultural/horticultural activities, in effect, supplement household income and are an important element of rural livelihoods. In terms of production, the difference between many of these households (which are not registered as farmers) and some SHRs is, in practice, not very great. Though SHRs are entitled to be entrepreneurs with the opportunity to obtain income from agriculture (having to pay tax and entitled to subsidies), a number work in other sectors and appeared to keep land for speculative/investment and/or hobby (horses) purposes. Household plot owners, typically, also work in another economic sector, with their main cash income from paid employment. However, with their 'hobby' agricultural activities they try to improve their situation with 'self-production'; they do not produce for the commercial market, but for themselves and the informal market and they do not pay taxes for this activity. Additional/more detailed questions on household plots, including area, crops grown and numbers and types of livestock would be useful. A better understanding of such issues can perhaps be obtained as part of a Case Study in just one or two Municipalities in the second phase of the JICA Study.

3) Mayors - Local Self-Government Representatives

The interviewed representatives of local governments were typically people who had been working in this position more than 10 years and some of them more than 15 years. The results from these discussions confirmed well-known problems that local communities are forced to face. Mostly these problems are connected with the small amount of the local budget. Infrastructure development, especially environmental infrastructure (sewage systems), cannot be covered by the

local budget. For instance a village with 1582 inhabitants has a budget of 5 million Sk/per year, but the cost of the required sewage system for this village is 127 million Sk. State support or support from EU pre-accession funds are available but the chance of receiving such support is small; there are too many applicants in relation to the funds available.

Another big issue for the mayors is connected with the diversification of the rural economy. The economic base of the larger villages and the villages situated closer to the regional centre (and in the case of the Zahorska lowland to the capital city Bratislava) is more diverse. There are more entrepreneurs working in the secondary or tertiary sectors. The services are better because the market power of the inhabitants is higher. A small percentage (8-10 %) of local inhabitants may still be working in agriculture, but others have their own business, or work in other sectors, which are characterised by higher salaries, or they may work in the district centre, Malacky. On the other hand, small and rather isolated villages (e.g.Vysoka pri Morave, Male Levare, Plavecke Podhradie) are typically dependent on agriculture. Service provision is rather limited.

With regard to the importance of agriculture in the rural villages all mayors agreed that agriculture is very important in rural areas, not only for its production function but also for its environmental, land use and social functions. "These are the reasons, why we try to have sustainable agricultural development in the rural areas".

B.12.5 FARMING ORGANISATIONS

(1) Background

The following information in section B.12.5, on farm types and business structures in Slovakia, is derived mostly from Blaas (1999), EC (DG Agriculture) (1998) and Futej (2000) and from observations of the situation and data collected in the Study Area. As farming organisations and previously rural communities have changed since World War II, and the situation has changed very rapidly in the last 10 years (and continues to change), some reference is made to previous structures and to the change process. These changes have had a big impact on the rural way of life and especially the involvement of individuals and communities in agriculture; they are discussed at the end of this chapter in section B.12.6.

Before economic transition, three main farm groups were active:

- State Farms – managing 27% of the Utilised Agricultural Area (UAA) of Slovakia
- Collective Farms – mostly 'co-operative' in nature and managing 69% of the UAA
- Small Private Farmers and Household-Plot Owners – managing 4% of the UAA

The situation changed after 1989 and is described in the following section.

(2) Corporate Farms and Co-operatives

As a result of privatisation, collective farms and nearly all state farms disappeared (there are no State Farms in the Study Area now) and co-operative and large private farms emerged, most of the latter organised as corporate farms. As a result of restructuring (following privatisation) many co-operatives went into liquidation and re-emerged as corporate farms. Two types of corporate farm can now be found and also co-operatives; the constitution of these entities can be summarised as follows:

1) Limited Liability Companies – s.r.o

Generally a smaller company that is closely held and managed by its members (spolocnik).
Minimum basic capital: SKK 200,000
Minimum member's contribution: SKK 30,000
Ownership interests are not certificated (and are not securities). Ownership transfers are, typically, subject to the approval of the members. An s.r.o. may be founded by a single individual (or other legal entity) and may have at most 50 members. In the agriculture sector, s.r.o operate almost exclusively on rented land. Example: Spargla (Nove Zamky), but with farming activities in Zahorska also.

2) Joint Stock Company – a.s.

Usually a larger company (than s.r.o) with widely dispersed ownership. Basic capital is divided into shares, which may be registered or bearer, in certificated or book-entry form. Nominal value of the shares is typically SKK 1,000 (must be divisible by 100). There is no limit on the number of shareholders and the company may also issue employee shares. The value of non-monetary investments must be based on a determination by an expert appraiser.

The majority of agricultural business companies (s.r.o and a.s.) are based on privatised State Farm assets and the assets of Co-operatives. Only a few are 'green-field' establishments i.e. new farm businesses that are not derived from the larger state/co-operative agricultural enterprises that existed in the second half of the 20th Century up until 1989.

3) Co-operatives

Many of those existing as collective farms prior to 1989 split-up to become corporate farms, but some still remain. The following participants (resulting from the transformation of collective farms) were entitled to assigned property shares in the Co-operative Farm:

- Members making a property contribution and/or with title to land
- Members without property or land contribution
- Absentee owners with title to land and property used by co-operative

Property shares allotted to individuals could be withdrawn from the Co-operative eg if the individual wished to farm privately. The membership of newly transformed co-operatives mostly comprises their former members, most of whom do not own any land, but approximately 50% of co-operative assets was in the hands of absentee owners (urban dwellers pursuing off-farm professions). Because of the potential inability of Co-operatives to meet claims associated with asset withdrawals (eg by absentee owners), Co-operatives were, in 1995, allowed to convert property shares into equity bonds (i.e. tradable securities). This gave them certain traits of capital companies, but the participation of bond-holders in governance of the co-operative remained limited.

(3) Individual Private Farms

There have been different options for the legal status of 'private' farmers and it is difficult to get an exact picture of the number, size, and economics of these private farmers. During the 1970s, information on private farmers and small-holders were all displayed in one category. The Regional Offices of the Ministry of Agriculture now obtain agricultural information only from those registered with them as private farmers (SHR) but not from those cultivating household plots. Municipalities register additional private farmers who may or may not be active as farmers. It would be helpful to distinguish between and obtain data from (small) private farmers and those (small-holders) with household plots; the agricultural census being conducted in 2001 is expecting to obtain information from both private farmers and those cultivating household plots. Household plots, and garden 'colonies' in rural areas as used by urban dwellers are briefly mentioned in section B.12.5. (4)

The origins of private farmers can be categorised as follows:

- People who were already farmers (mostly part-time and/or retired household members);
- Households which 'previously' owned and operated land, but which were not reported as farming;
- Those who made restitution claims and started farming;
- Those who had withdrawn their own land from Collective Farms.

(4) Household Plots and Gardens for Urban Dwellers

Many village households have continued to cultivate their small household plots, both in the socialist era and in the period of economic transformation. They may be used for fruit, vegetables and livestock i.e. to supplement the household economy, whereas in many parts of Western Europe such household gardens are used more for recreation/relaxation, with grass lawns and flowers pre-dominating over fruit, vegetables and domestic stock. Immediately prior to the economic transformation of the last 10 years, 60%-80% of the economically active population might commute from their village to a nearby place of employment (as shown in Table B.12.3),

and return to the village and work in their gardens in the afternoon. Now, with the development of the market economy, there may be more pressure on the time of employees leading to less time for 'cultural' activities such as gardening.

Nevertheless, even those who have left their home village for an urban apartment and job, appear to retain a strong link to their villages and may retain property there - eg a house and/or small garden. These gardens may be visited/tended at week-ends and/or be looked after by a relative; thus they can contribute to the informal supply of fresh fruit and vegetables to Bratislava. However the role of household gardens and of small 'commercial' orchards in the local economy seems to have decreased in the last 10 years, with cheap produce (eg apples) from Western Europe helping to meet market demand.

Vineyards in particular have suffered from competition with Western Europe and demand for building land; in some areas near Bratislava up to 50% of the land area devoted to vineyards is no longer used for grape production. The subsidy given to vineyards may be increased to address this situation. In the future it is possible that small gardens and orchards may again make a useful contribution to the local market Faltan (pers. comm.).

A number of garden 'allotments' exist in the Study Area, with plots of up to 0.4ha each. These were allocated originally to workers who had left their rural communities and lived in apartments in urban areas (eg Stupava, Malacky, Bratislava). It was intended that the production from each plot could supply the needs of a household in the way of vegetables and some fruit. They continue to play an important role in the way of life in Slovakia and perhaps reduce the local market for fresh vegetables and fruit. Details of those allotments in the Study Area will be available for the Interim Report.

B.12.6 CONCLUSIONS - CHANGES IN THE FARMING COMMUNITY

The following sample 'Case Study' is based on interviews in Male Levare and Vysoke Pri Morave, but appears to be typical of the Zahorska area and much of rural Slovakia. The co-operative in Male Levare was started in 1957. Between 1957 and 1964, all private farmers gave up their land to the co-operative, some after heavy pressure extending in effect to confiscation. Therefore, by the time the restitution of land started to take place in the 1990's, most farming families had lost their close contact with the land and their broad knowledge of farming practices. There was no new generation of private farmers and those families and individuals that took land back from the collective farms (State Farms and Co-operatives), did not have the knowledge and experience to farm it. Nevertheless, in the early 1990s, several individuals in the Male Levare area did try to start farming. However, most found it hard to make an adequate living from this activity and stopped farming. Of the very few registered private farmers (SHR) who now continue this activity, it is understood that most in these two villages can be considered as part-time - with horses featuring in their activities.

Thus, in a relatively wealthy region, in comparison to other parts of Slovakia, and with employment opportunities outside agriculture available, a relatively low interest in work in the agricultural sector may now prevail (either as a private farmer or as an employee). Villages, which until the first half of the 20th century were dependent on agriculture and therefore were rural in the traditional sense, are no longer primarily agricultural settlements. Though most inhabitants value their rural environment and cultivate small household plots, their close linkages with the land, as a primary source of livelihood for their families, no longer exist. This link was broken for the majority by the industrialization of the second part of the 20th century. On the other hand, the proximity to a major market (Bratislava) and good access to others (Austria, Czech Republic) might increase the interest of entrepreneurs and other individuals in the agricultural sector, and help to maintain demand for farmland and support the development of the rural economy.

Most agriculture is now in the hands of corporate entities, run by more or less professional managers, and is not in the hands of families that have farmed for several generations with a real knowledge of and commitment to the land. This is a different situation to that which occurs in many parts of Western Europe where many farms (small, medium and large) remain within a family that has a 'cultural' commitment to farming, even if the farm is very much run as a business. There are a few private farmers in Zahorska, with land holdings that should be sufficient to support a viable 'family farm', and the number of these might increase, but responsibility for the success of farming (in general) now lies with the new businesses, their farm managers and cadre of professional, skilled and unskilled labour. The expectation of the community, many of whom do not work in agriculture, and the mayors that represent them is that these farms, as well as being sources of employment and production, serve to protect and enhance the rural environment. The people of Zahorska, as do the people of Slovakia as a whole, consider the rural landscape and its biodiversity as an important place for recreation and as valuable resources in their own right. The agricultural guidelines should take these views into consideration.

Table B.12.1 Economic activity of population 1991 & 1999 Selected Study Area Villages (i.e. only those in Bratislava-vidiek *Okres)*
Ranked by village according to % unemployment in 1999

District	Municipality	Economically Active		From the total number of economically active							
		Total	Total	Total	Employed in		Unemployed				Unemployed Increase
				Employed	Agricult & Forestry						
		No.	No.	No.	No.	%	No.	%	No.	%	%
		1991	1999	1991	1991	1991	1991	1991	1999	1999	1999-1991
Bratislava-vidiek - total		74452		71084	10763	14.5	3368	**4.5**			
	Záhorská Ves	688	597	638	90	13.1	50	**7.3**	**188.0**	**31.5**	**24.2**
	Plavecký Štvrtok	884	841	798	108	12.2	86	**9.7**	**250.0**	**29.7**	**20.0**
	Gajary	1,216	1,137	1110	285	23.4	106	**8.7**	**322.0**	**28.3**	**19.6**
	Kostolište	398	379	371	105	26.4	27	**6.8**	**80.0**	**21.1**	**14.3**
	Jakubov	668	642	611	188	28.1	57	**8.5**	**133.0**	**20.7**	**12.2**
	Vysoká pri Morave	862	874	814	187	21.7	48	**5.6**	**176.0**	**20.1**	**14.6**
	Pernek	343	340	332	102	29.7	11	**3.2**	**57.0**	**16.8**	**13.6**
	Kuchyňa	773	755	720	201	26	53	**6.9**	**126.0**	**16.7**	**9.8**
	Zohor	1,584	1,525	1514	254	16	70	**4.4**	**230.0**	**15.1**	**10.7**
	Jablonové	520	489	499	172	33.1	21	**4.0**	**71.0**	**14.5**	**10.5**
	Suchohrad	250	237	245	114	45.6	5	**2.0**	**34.0**	**14.3**	**12.3**
	Lozorno	1,299	1,268	1248	250	19.2	51	**3.9**	**174.0**	**13.7**	**9.8**
	Malacky	9,124	9,736	8670	863	9.5	454	**5.0**	**1,303.0**	**13.4**	**8.4**
	Láb	664	631	624	127	19.1	40	**6.0**	**75.0**	**11.9**	**5.9**
	Stupava	4,071	3,904	3884	532	13.1	187	**4.6**	**386.0**	**9.9**	**5.3**
	Marianka	468	440	461	35	7.5	7	**1.5**	**33.0**	**7.5**	**6.0**
	Borinka	218	222	211	29	13.3	7	**3.2**	**13.0**	**5.9**	**2.6**
	Záhorie	*291*	*291*	*278*	*187*	*64.3*	*13*	***4.5***	***38.0***	***13.1***	***8.6***
	Total	**24,030**	**24,017**	**22,750**	**3,642**	**15.2**	**1,280**	**5.3**	**3,651**	**15.2**	**9.9**
	(excluding Zahorie)										

Sources
1991 Bratsilava Rural District, Branch Office, Slovak Statistical Office (published Nov. 1992)
Enumeration of people, houses and apartments as of March 1991
1999 Malacky District Office

Table B.12.2 **Distribution of employees by sector**

	Bratislava IV		Malacky		Senica		Total	
	persons	(%)	persons	(%)	persons	(%)	persons	(%)
Agriculture, Hunting, Forestry	**71**	0%	**778**	10%	**1480**	14%	2329	6%
Industry total	**10341**	45%	3861	48%	4227	40%	18429	44%
of which mining	-	-	346	4%	-	-	-	-
of electric,water supply	-	-	28	0%	-	-	-	-
Construction	547	2%	204	3%	243	2%	994	2%
Transportation	859	4%	328	4%	1351	13%	2538	6%
Hotel and Restaurant	69	0%					69	0%
Post and Telecom	67	0%	47	1%	463	4%	577	1%
Bank, Insurance	107	0%					107	0%
Real Estate, Business Services, Research	3745	16%	174	2%	184	2%	4103	10%
Public and Social Service	1106	5%	423	5%	416	4%	1945	5%
Education	2130	9%	1042	13%	1303	12%	4475	11%
Health	1112	5%	873	11%	499	5%	2484	6%
Other service	2825	12%	291	4%	335	3%	3451	8%
Total	22979	100%	8021	100%	10501	100%	41501	100%

Data is for companies with 20 employees or more

Data Sources

Bratislava IV and Malacky	Bratislava Regional Statistics Office Bulletin 1/2001	1st Quarter 2001
Senica *Okres*	Trnava Regional Statistics Office Bulletin 2/2001	2nd Quarter 2001

Table B.12.3 Numbers Commuting to Work in 1991 for Selected Study Area Villages (i.e. only those in Bratislava-vidiek *O*
Ranked by village according to % commuting to work in another Municipality in 1991

District	Municipality	Economical Total	From the total number of economically active: Total Employed	Employed in Agricult & Forestry		Work in different Municipality		Unemployed	
		No.	No.	No.	%	No.	%	No.	%
		1991	1991	1991	1991	1991	1991	1991	1991
Bratislava-vidiek - total		74452	71084	10763	14.5	42351	**56.9**	3368	**4.5**
	Marianka	468	461	35	7.5	413	**88.2**	7	**1.5**
	Borinka	218	211	29	13.3	174	**79.8**	7	**3.2**
	Jakubov	668	611	188	28.1	490	**73.4**	57	**8.5**
	Láb	664	624	127	19.1	483	**72.7**	40	**6.0**
	Kostolište	398	371	105	26.4	281	**70.6**	27	**6.8**
	Zohor	1,584	1514	254	16	1086	**68.6**	70	**4.4**
	Pernek	343	332	102	29.7	233	**67.9**	11	**3.2**
	Lozorno	1,299	1248	250	19.2	881	**67.8**	51	**3.9**
	Plavecký Štvrtok	884	798	108	12.2	572	**64.7**	86	**9.7**
	Kuchyňa	773	720	201	26	473	**61.2**	53	**6.9**
	Stupava	4,071	3884	532	13.1	2380	**58.5**	187	**4.6**
	Suchohrad	250	245	114	45.6	142	**56.8**	5	**2.0**
	Jablonové	520	499	172	33.1	295	**56.7**	21	**4.0**
	Vysoká pri Morave	862	814	187	21.7	474	**55.0**	48	**5.6**
	Gajary	1,216	1110	285	23.4	604	**49.7**	106	**8.7**
	Záhorská Ves	688	638	90	13.1	290	**42.2**	50	**7.3**
	Malacky	9,124	8670	863	9.5	3019	**33.1**	454	**5.0**
	Záhorie	*291*	*278*	*187*	*64.3*	*176*	***60.5***	*13*	***4.5***
	Total	**24,030**	**22,750**	**3,642**	**15.2**	**12,290**	**51.1**	**1,280**	**5.3**

(excluding Zahorie)

Source Bratsilava Rural District, Branch Office, Slovak Statistical Office (published Nov. 1992)
Enumeration of people, houses and apartments as of March 1991

Table B.12.4
Commuting from Municipalities in Malacky District to Employment
in Malacky and Bratislava, and to all locations, in 1991

Municipality	Malacky	Bratislava	Total Commuting
	No. of Persons	No. of Persons	No. of Persons
Borinka	-	131	174
Lozorno	32	670	881
Gajary	330	164	604
Malacky	-	1622	3019
Jablonové	24	221	295
Malé Leváre	127	106	324
Jakubov	169	118	490
Marianka	-	384	413
Kostolište	153	77	181
Pernek	57	124	233
Kuchyňa	87	219	473
Plav. Podhradie	25	54	178
Láb	93	279	483
Plavecký Štvrtok	128	372	572
Rohožník	94	214	308
Vysoká pri Morave	31	334	474
Sološnica	81	131	523
Záhorská Ves	54	173	290
Studienka	236	136	496
Záhorie	102	23	176
Stupava	37	2176	2380
Závod	237	391	1005
Suchohrad	49	34	142
Zohor	65	894	1086
Veľké Leváre	244	411	843
Total	2455	9458	16043

* Data for Rohoznik include only people commuting to Bratislava and Malacky

Source: Bratislava Rural District, Branch Office, Slovak Statistical Office
(Published September 1996)

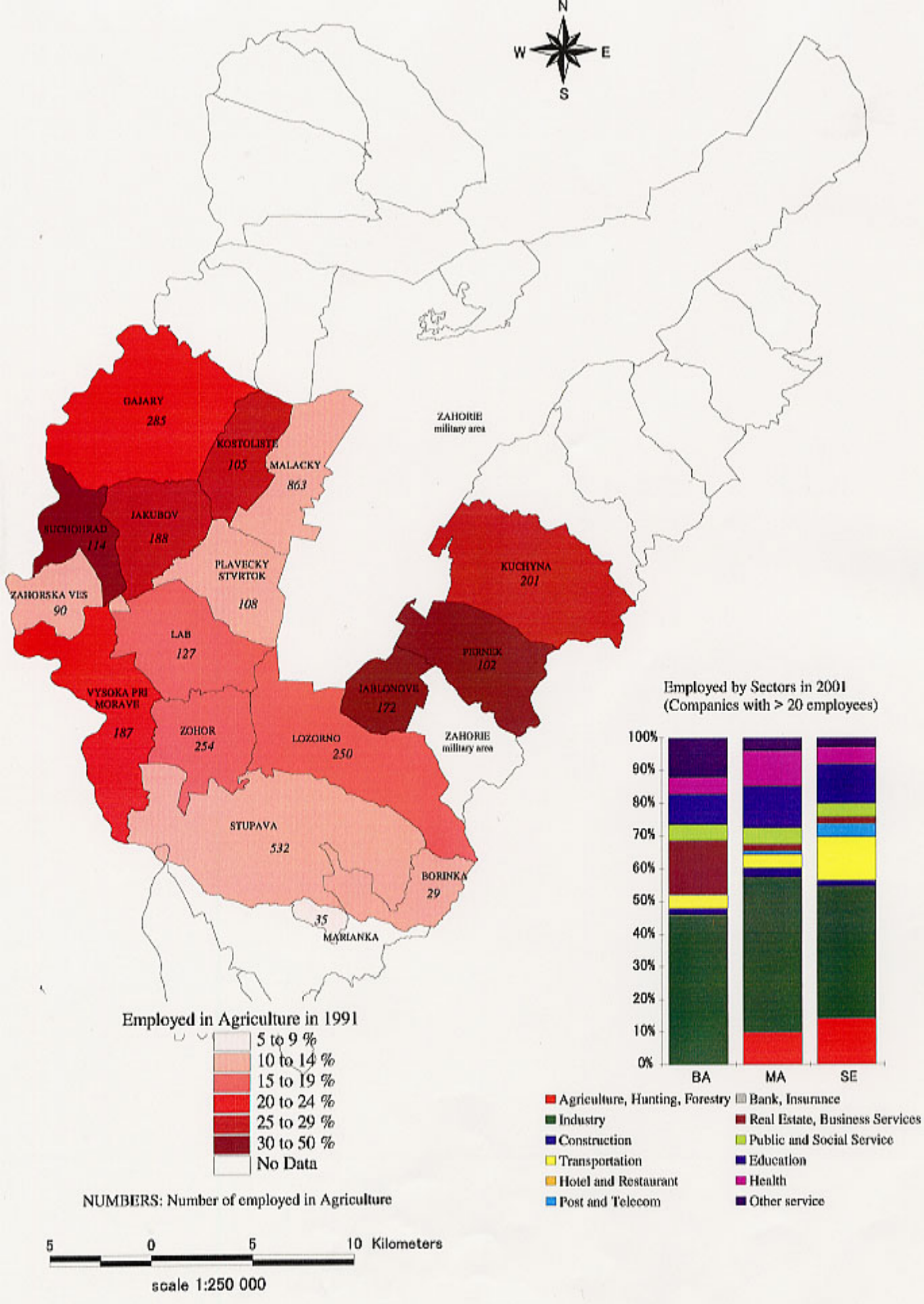


Figure B.12.1. Map of Employed in Agriculture in 1991

source: Statistical Office

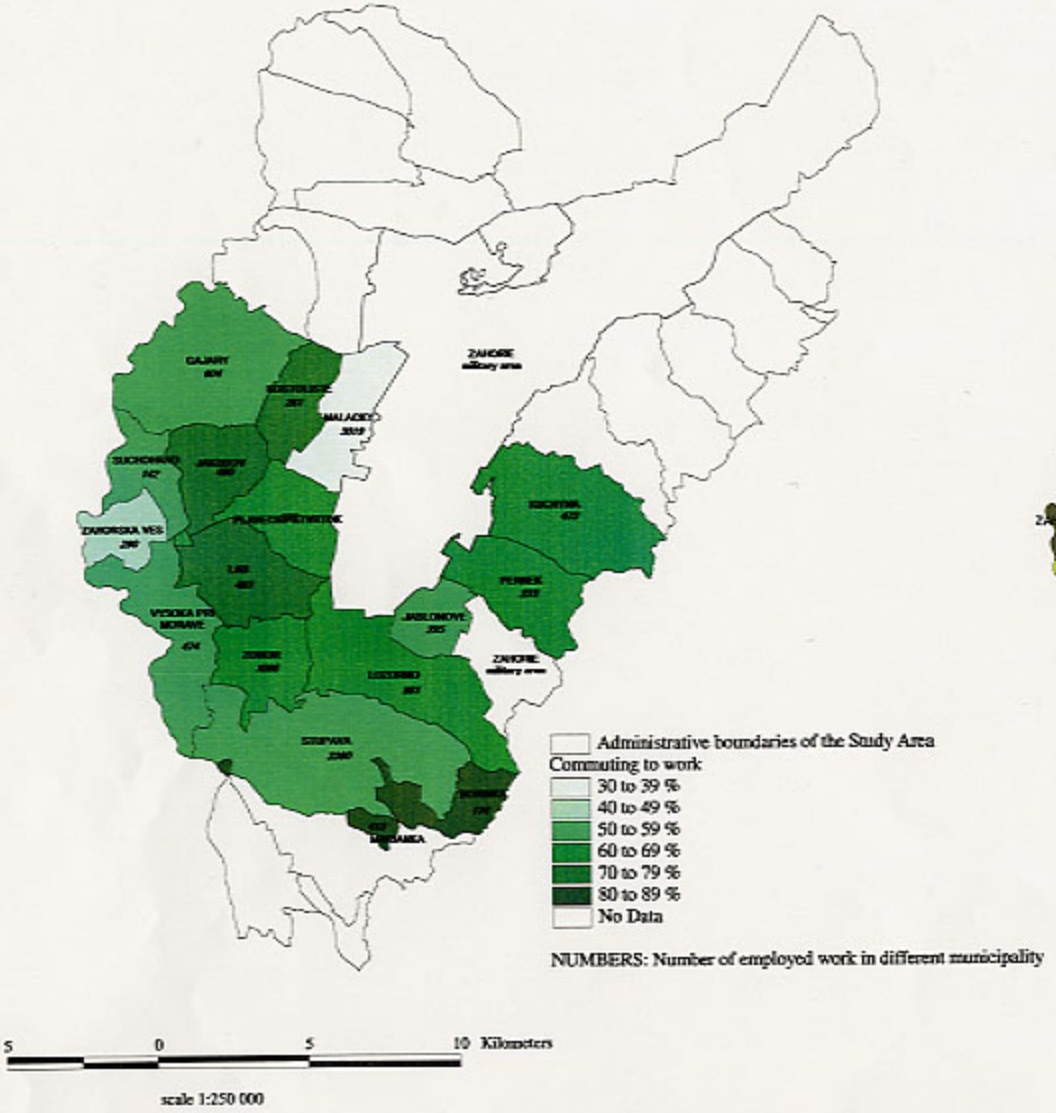


Figure B.12.2. Map of Employed work in different municipality in 1991

source: Statistical Office

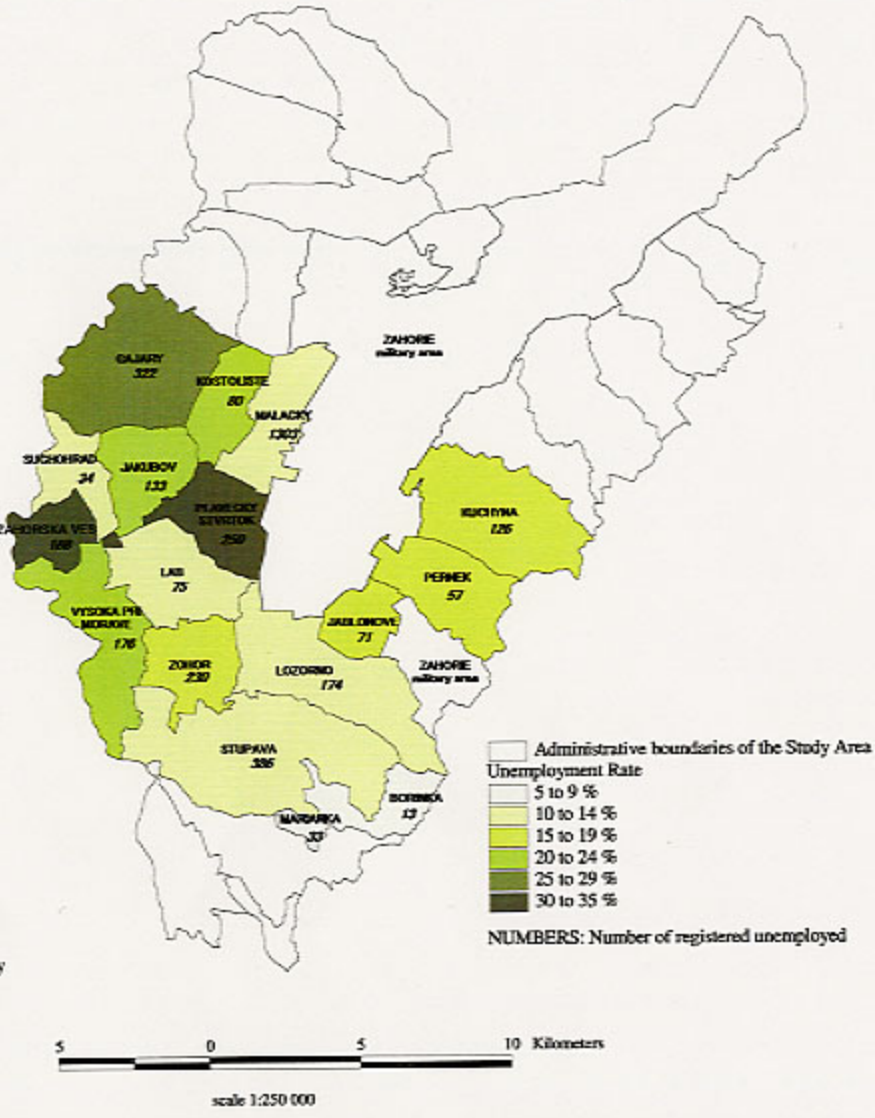


Figure B.12.3. Map of Unemployed Distribution in the Study Area (1999)

source: Statistical Office

ANNEX B.13

AGRICULTURE EXTENSION AND INFORMATION SERVICE

B.13 AGRICULTURAL EXTENSION AND INFORMATION SERVICE

Extension and information service should be defined as:

- The service should be related to regional development.
- There are two focus points. One is that the item must be noted by the state; the other is that it should be requested by the end user such as the farmer.

The problem analysis of the sector should be considered based on the following items

- Information content
- Is it information which should be provided by Government (state)?
- Does an item offered to a farmer meet his requirements?
- Is the information offered to a user easy-to-use?
- Method of information system
- Is the information provided with appropriate timing?
- Is the information provided by suitable method (system)?

In analysis and evaluation, the time, necessity and methods are focus points. A sample of evaluation is shown in TABLE B.13.1 Check the information list.

B.13.1 EXISTING SITUATION

(1) Existing Conditions of Information Use

The results of the agricultural unit survey are shown on the next page.
Usually a farmer uses the data given by the supplier and newspaper. If it is necessary, the farmer will find someone who can advise about his problem. Farmers have their own way to collect information that does not seem to be systematic. They get general information about Laws, regulations and subsidiary system from agricultural newspapers and government notice letters sent by post. If they want to get more detailed data, they purchase the government publications.

Actual Connection to the Agriculture Information in the Study Area

Farmer's own channel	- From supplier of seeds, fertilizers and machinery along with their necessary information on their purchased product - Demand from traders, buyers, and end users - Specialized organizations with which they have some connection
Publication	Agriculture Press Government publication

Source: agricultural unit survey (JICA STUDY TEAM 2001)

Farmer's main source of agricultural technical information is a supplier of agriculture materials like seed, fertilizer and machinery. This information is given as a technical package and is usually useful. But it is difficult to manage their farming only on this package information; especially as it is impossible to respond in sudden unforeseen circumstances such as a disaster or a disease.

When the farmer faces some trouble in his field, he asks some special organization such as the chamber of agriculture or institute, with which he has some connection.

This is the natural way to find a solution but it is not systematic and sometimes it requires a long time to find a suitable person. In order to find the suitable person easily, the MoA established the advisory system. However, it is not known to function on local level.

(2) Needs of Farmers for Agriculture Information

The highest needs of agricultural information in the Study area is practical information such as field techniques, with easy to use information. On the other hand, the accession to EU and international trade are not interesting topics for them.

Needs for Agriculture Information in the Study Area

High necessity	Necessity	Not urgent
Production technique as - Species and/or varieties - Machinery - Cost of inputs	Marketing information, Management information Processing	Accession to EU Export and import

Source: agricultural unit survey (JICA STUDY TEAM 2001)

Usually, the farmer wants the information for stable production development. The information is something about new and/or highly effective product material, such as variety, crop, fertilizer, machinery, techniques and management. This need is also found in the Study area. On the other hand, they did not mention irrigation or suburb farming which are the most effective way of farming. It seems that they recognize the priority for farming as the growing of products with cultivation techniques like a cropping system.

Information for EU accession is the priority subject of Ministry of Agriculture (hereinafter MoA) and because of that enough information is provided in this section.

In Zahorska area, it is difficult to produce highly profitable products for international markets with present techniques, so that most of the products should be consumed in the internal area. It is also one reason for the low interest in information about international trade.

B.13.2 EXTENSION SERVICE SYSTEM

(1) Existing Extension System

The basic concept of the extension system is that someone who needs the information should collect it himself and the state provides information and support for these activities.

This system was established in 1999 and corresponds to the suggestion of preparation study for joining the EU. Before that, the extension service was provided by the chamber of agriculture and food industry (hereinafter the Chamber) and most of the agriculture advisors belonged to the Chamber. They responded to the requests from farmers. But the actual activity of the old system is unclear and a large budget was needed to keep the system. Consequently the Slovak government accepted the suggestion to change from the old system to the existing one.

According to the study suggestion, PHARE carried out a small project to advance the user-collect Information system via Internet. About 100 personal computers were distributed to farming bodies to access the Internet and establish the advisory system.

1) Extension Service System

Existing frame of the extension service and information system is shown in Figure B.13.1. The role of major organizations is described in the following.

a. MoA (Ministry of Agriculture)

MoA has three major functions in the extension system; they provide general information and Agricultural advisors (individual person) or consulting companies for farming bodies. They support their activities by subsidy system as well.

UVITP (Institute of scientific and technical information for agriculture) is responsible for publication of the technical and political documents of the MoA and also manages its web site and database. Therefore, most of the information about agriculture techniques is issued through them.

b. Regional Office of MoA

There are 36 regional offices of MoA in Slovakia (TABLE B.13.2). These offices should manage subsidy distribution in all areas. As the part of extension activities, they send some notice letters containing information about seminar, policy and subsidy system etc. from MoA to registered farming bodies. All farming bodies that request the subsidy should present their business plan for each year to regional office of ministry of agriculture. At that time, the office gives them some advice about farm management.

c. The Advisors and Consulting Companies

Technical advice is given to farmers by personnel who belong to a state institute, consulting company or are private persons called advisors. More than 350 persons and 100 consulting companies are registered as agricultural advisors in an advisory system database in “Agroinstitute” which is the lower office of MoA. They have to pass training for agricultural advisor annually. However, in fact it is only regulation to get a license of “registered” advisor and so meet the requirement for the subsidies for consultation.

d. The Extension Center

There are 22 extension centers listed in the MoA but these centers do not exist independently, since many of them are the same as the regional office of the Chamber and the others are research institutes.

The main task of these centers is to take part in the consultation with a farmer and introduce suitable agricultural advisors if they cannot solve the problem. In the Study area, there are three centers in Bratislava. These offices should cover Malacky and Bratislava IV district. North part of the Study area in Senica should be covered by the one in Myjaba.

e. The Chamber of Agriculture and Food Industry

There are 42 regional offices of the Chamber in Slovakia. Half of them have the function of the Extension Center. In such listed extension-chamber offices, they still employ some agricultural advisors funded by the budget of MoA, For example, the one in Bratislava has contracts with five agricultural advisors (experts for fertilizer, vineyard, animal husbandry, quarantine and farm management) and they respond to the questions in a given field.

The Chamber is a mutual aid enterprise, which relates to the agriculture organization. Now, only education activities are consigned to it, but in fact they are still playing the extension role on a regional level.

2) Subsidy Support System

It is free of charge if the consultation service is by an agricultural advisor who is contracted with the extension office. However, if farmers ask non-contracted persons for consultation, farmers should pay this cost. The farmer can request the MoA for repayment of some part of this annual subsidy. The subsidies for consulting service are paid as reimbursed subsidies.

The Upper limit of the percentage of subsides depends on the unemployment rate, and it is also justified by the regional office.

Subsidy for consulting services

Category	Regulation
in districts with registered unemployment rate up to 20 %	Up to 50 % of justified annual costs
in districts with registered unemployment rate from 20.1 to 25 %,	Up to 60 % of justified annual costs
in districts with the unemployment rate above 25 %,	Up to 70 % of justified annual costs
for consulting services related to the production of energy from bio-mass	Up to 70 % of justified annual costs
for starting businesses	Up to 75 % of justified annual costs
for graduates of specialized schools, who have started their operation in the year following the year of their graduation	Up to 85 % of justified annual costs

In Bratislava region, they never paid these subsides, because they had not been requested. Also in the whole country, only 39% of the whole budget was used in 1999. The government analysed that it is due to the introduction of a new consulting system in the Green report 2000.

It seems that the regional office does not have enough budget to pay for all subsidies. That is why the farmer does not apply for subsides because he does not think his request would be met.

3）Education and Other Activities

Agriculture education program policy is decided by MoA and implemented by “Agroinstitute” which is the lower institute of MoA. They provide some programs for each level such as manager or engineer. Also the Chamber office should hold some seminars for the education of the members.

(2) Problems and Constraints

After evaluation according to the description in B.13.1, some problems are found in the existing situation.

1) Unclear Access Point for Agricultural Information and Extension Service

Position of extension center is not clear and total extension service system is also unknown to farming bodies. Therefore, the farmer can not use this new system and has to find a suitable connection for the extension service and information himself.

2) Farmer does not Use the New System because of Lack of Time and Ability

Nobody mentioned the Internet and the advisory system as the source of his/her information in the agriculture unit survey. Many of the farming bodies do not have enough time and ability to collect the agricultural information from this new system, especially in small-size farmers.
The ability to understand the importance of information is essential to collect the information. This importance should be judged on the future general picture of their farm management.

3) Farmer does not Volunteer to Obtain Agriculture Information

MoA is establishing information system via Internet and other ways. The information transfer system is moved to the Internet. This system will not function, if the user will not volunteer to access the information.

However, many of them do not recognize the importance of agricultural information very much. For that reason, most of the farmers are using only the information that is given by others and they do not collect information voluntarily except when they have difficulties.

4) Not enough Agricultural Information and Techniques Corresponding to the Regional Situation

a. Lack of Local Agricultural Information to Support Decisions of Farming Bodies

Agriculture is not a stable industry and conditions depend on location. Therefore, the government should support farmer’s decisions on a regional level, even if the farmer has to collect the information voluntary. For such support, information suitable for the present regional situation is needed. For

example, short-term forecasts and counter measures for droughts is not passed to agricultural bodies. Due to the lack of such information, the agricultural bodies always delay to take the measures.

b. Difficult to Find Suitable Advisors who Know the Local Situation Well

The advisory system will be the main extension service in Slovakia but the farmer and also the regional office do not know this system well.

Agricultural advisors belonged to each regional chamber office until 1999. At that time, they were each focused on a specific field. But now, they have to cover a wide area because all of them are registered in the government institute and they have to find clients themselves.

Therefore the link between agricultural advisor and local agricultural bodies is not direct and the number of agricultural advisors who know local conditions well is reduced.

B.13.3 MARKET SYSTEM

(1) Marketing of Agricultural Products

1) Marketing of Cereals

The marketing system of all agricultural products has been liberalized, however, the government fixes minimum supporting prices for some commodities. The marketing of cereals like wheat, maize, barley etc. is mostly dominated by big traders who procure it directly from producers and sell it to processors or other traders. In the Study Area, cereal producers/farmers, generally make contract or arrangement with the traders and sell it to them after the harvest. According to the Green Report 1999, during the year 1998 in the whole country, farmers made contracts for only 9.5% of wheat, 14.6% of rye, 6.9% of barley, 5.8% of oats and 5% of maize (Green Report, 1999, p.29).

In the Study Area, comparatively big companies, like Dolejsi, PMD Union, RWA etc. bought cereals from the producers. The general flow of cereals is illustrated in Figure B.13.2(a)

2) Marketing of Potato, Sunflower and other Vegetables

In the case of marketing of potatoes that are grown mostly by small farmers, it is dominated by small traders who operate both from inside and outside of the Study Area. Marketing of potatoes, vegetables and fruits is characterized by comparatively large number of traders. Some local farmers are also the traders. As far as marketing of sunflower is concerned, producers generally sell it to a processor like Palma company (oil company) etc. (refer to Table B.13.2 (b), (c)).

3) Vegetable and Fruit Markets in Bratislava

The major destination of agricultural products in and around the Study Area are the markets in Bratislava. There are 8 comparatively big markets in Bratislava of which 2 are roofed. Those are retail

markets and either the farmers themselves bring the commodities to the market and sell it or the retailers go to the farmer/large traders and bring the commodities and sell it. According to the this survey, in big markets without a roof or in open markets, the majority of traders were farmers. In Trznica market (roofed) which is rather small, there were between 10 and 15% farmers selling their own products and between 85 and 90% were retailers who procured commodities directly from the farmers or they bought from big traders or middlemen and comparatively high quality of commodities were sold. Other everyday use commodities are also sold in the market. In the Study Area, there is a market in Malacky where most of the sellers of agricultural commodities are farmers.

In the market, every retailer or seller pays a certain amount and occupies a space. In the case of Trznica market, there were 150 selling places or tables ranging between $3m^2$ and $5m^2$. The prices of selling spaces differ from market to market and the space they occupy. Sellers must make a contract with the city administration.

(2) Marketing of Agricultural Inputs

There are several comparatively big companies who supply fertilizers, agro-chemicals or seeds to the farmers on a contract basis. Generally, the contract is made before the season and the suppliers get payments after the harvest. Some suppliers accept payments in kind too. In case of cereal seeds, big farmers sell non processed seeds to the seed companies and buy it again after processing.

(3) Maintain the Market System

There is no doubt that the government has to maintain the Market system to integrate into EU. At present, the proposal was approved by the Government to establish the agency to harmonize the regulations, information and control systems similar to EU principles.

The Members of Council of The Intervention Agricultural Agency are MoA, Slovak Agricultural and Foodstuffs Chamber and business associations in agriculture.

First target group contains important commodities like grains, potato (main source of energy), meat, milk and dairy products.
But this market does not mean a wholesale market, the purpose of it is to make the prices fair and to mitigate the wide difference between the expense and sale price.

(4) Market Information

Market information is provided by ATIS (Agrarian Market Information in Slovakia) which is one department of the Research Institute of Agriculture and Food industry.

1) Activity of ATIS

They collect the price information on farmer and trader level by themselves. They make some contracts with a farmer and a trader and these contract persons provide prices and market situation information

for them. Based on this information, they make analysis and prepare regular reports for the main 5 agrarian commodity groups.

Since 1999, ATIS's reports are available on their web site free of charge but at the same time, the delivery of the report (paper copy) is charged. After this was applied the number of users fell sharply (in 1998 total number of the users was 1565, but now it is less than half)

They also provide information to agriculture newspapers once a week (every time, it is a different commodity). They also prepare a special report according to individual requests of the consultant.

Periodicity of data collecting and dissemination of reports

Commodity groups	Periodicity	No. of Annual publication	No. of User	No. of subscribers
Slaughter animals and meat	bi-weekly	25	110	32
Fruit and vegetables	bi-weekly (in season weekly)	32	125	9
Grain and potatoes	bi-weekly	25	180	39
Milk and dairy products	monthly	12	124	14
Poultry and eggs	bi-weekly	25	84	13
Foreign information's	monthly	12	57	12

Periodicity of data collecting and dissemination of reports

Dissemination Groups	Cost
Department directors at Ministry of Agriculture.	Contract budget
Contact persons from firms, who give us information's about prices and market situation (free of charge).	Free of charge
Subscribers.	50 SKK / one report (annual apply)

Source: JICA study 2001

(5) Problem and Constraints

In market information, there are two important items. One is the price according to the quality of products and the other is the market trend (trend of demand and supply). On the other hand, proper timing is also a focus point of the evaluation.

1) Unsatisfactory Market Information System for Data Collection and Distribution

In the existing situation, the market information is provided by ATIS every two weeks by the report and via Internet. This information is useful for long-term decision-making. However, it cannot be used for short-term management, especially in vegetables and fruits that are difficult to stock for long.

Farming bodies cannot manage their future amounts according to the price if they don't have market price information. They also do not have negotiating power in trade because they do not know exact prices at the time.

2) Unclear Relation between the Quality and Price

Nowadays, the quality of products from Zahorska area and also Slovakia is not high. These points are also suggested in many reports that are part of preparation work for EU accession.

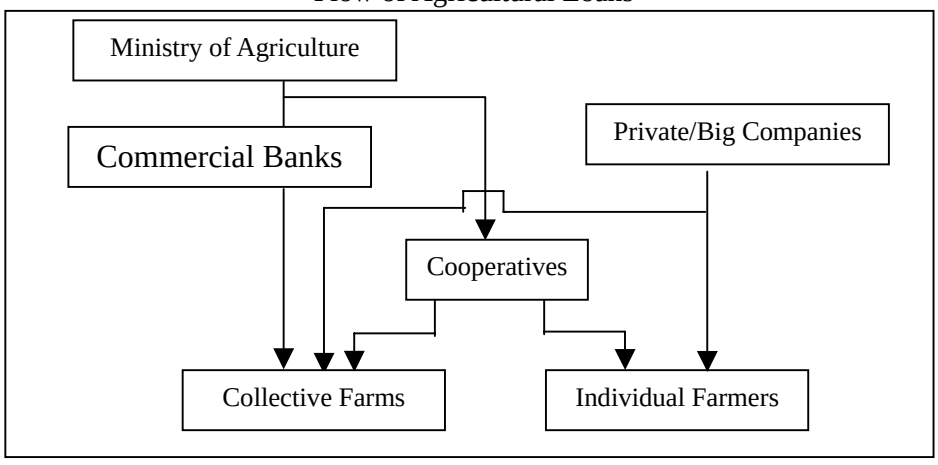
One of the constraints of development of quality is lack of incentive for the farmer to produce high quality products. To make such incentive, farmers have to be able to recognize the relationship between the quality and price. However, in the existing system, the trader sets a one-sided price and this price is not according to the quality and market demand, since there are no public markets in Slovakia and the traders buy the products directly from the farmer. Thus, farmer does not have an incentive to make high quality products.

B.13.4 AGRICULTURAL CREDIT

Effective credit mechanism is a major incentive to farmers who need help. Nearly 90% of agricultural loans are supplied by the commercial banks in the country. The loan is arranged by the Ministry of Agriculture, who asked the commercial banks to respect the specific needs of farmers. The MoA compensate the commercial banks from the subsidy budget for making credit available under favorable terms and conditions. The loans are provided for short term and medium term and the rate of interest ranges between 18% and 25%. Collateral is demanded valued at 2 to 3 times the value of the loan. Machinery, buildings, stocks were accepted as collateral. And when the prices of collateral dropped, additional collateral was requested. Land was not accepted as collateral because of unsettled titles and the fact that agricultural undertakings are for the most part on leased land. According to the Green Report (1999), in 1997 the volume of loans provided to the farmers was 12,134 million SKK but it decreased to 9,889 million SKK in 1999.

Other sources of agricultural loans were big private companies i.e. upstream big companies like Palma, Tumis Sugar refineries, breweries etc. The rate of interest on loans provided by those industries was rather low at 5 to 8% and the loan was generally provided for short term to buy agricultural inputs. The flow of agricultural credit is shown in the following Figure.

Flow of Agricultural Loans



The Concept of Agriculture and Food Policy of the Slovak Republic till 2005 (MoA, p32) has suggested deferred repayment of old debts for a period of 5 to 10 years, to create a complete system of funding for operational needs in agriculture. This system will be based on significantly subsidized interest on loans and the use of state guarantee through the Slovak Guarantee and Development Bank, the State Support Fund for Agriculture and Food Industries and State Fund for Market Regulations.

Table B.13.1 Check List of Information System and Contents

Category	Check-category	Critical point	Example	
Contents of information	The information that should be provided by Government (state)	Policy, plan and laws	Subsidy system, regulation	
		Environmental information	Preparation for EU entry	
		Forecast information which affects agricultural production	Climatic trend as precipitation Forecast of insect or decease threat	
		Counter measures on right time	Especially for pest, quarantine system	
	The item meets farmer's request	How to find out farmer's needs	Hearing survey, agriculture census, etc. Output sample - In-field techniques - Management knowledge	
	Easy-to-use information to the user offered	Actual use conditions It's effective and influential	Number of access	
Method of information system	The information provided with appropriate timing	Long term (regular) information	Law, regulation, governmental system New field techniques Market information (trend)	
		Short term (timely) information	Forecast, disaster control, Immediate counter measure Market information (price)	
	The information provided by suitable method (system)	According to the urgency	Urgent	Mass-media (press, radio, TV) Explain meeting In-field advice
			Not urgent	Document delivery (post) Internet Education, seminar
		According to the user level	Accessibility ex. To Internet To seminar, education To agricultural advisor Receptivity	

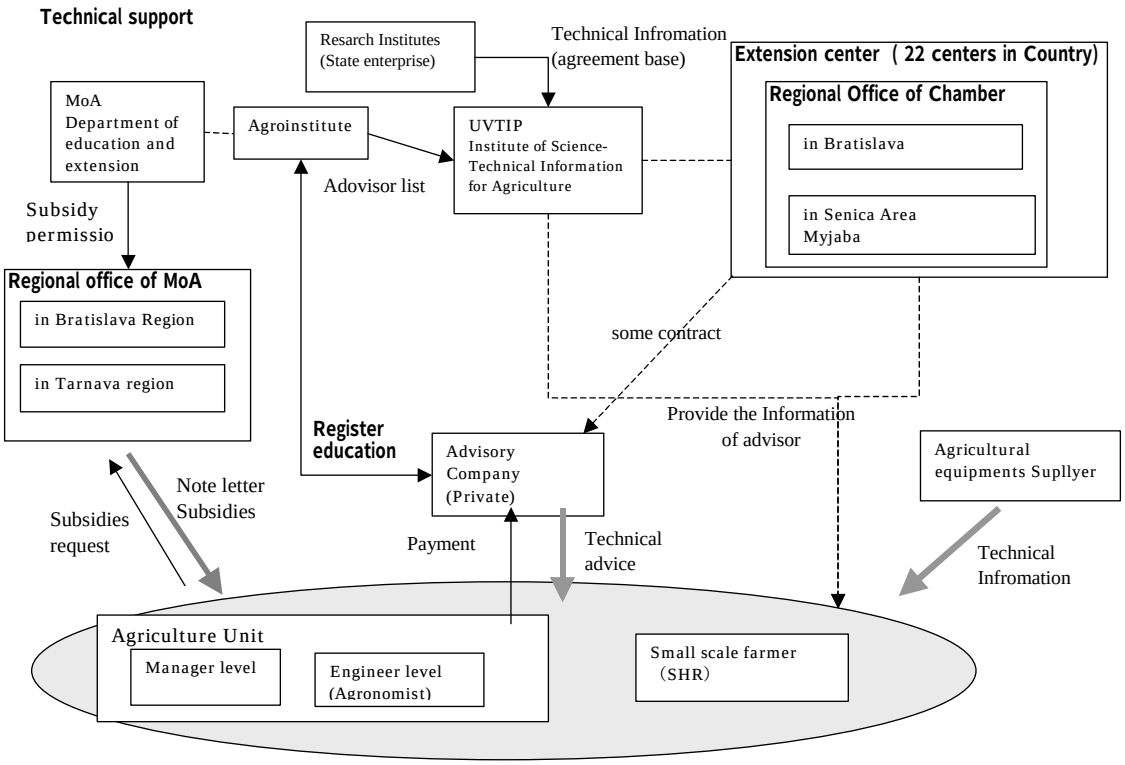


Figure B.13.1 Technical Support Cycle

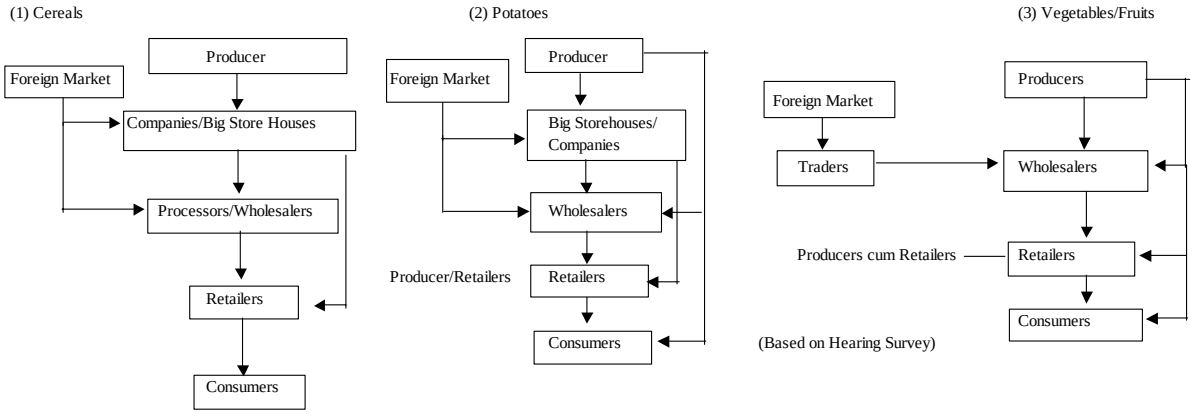


Figure B.13.1.2 Flow of Grains and Vegetables

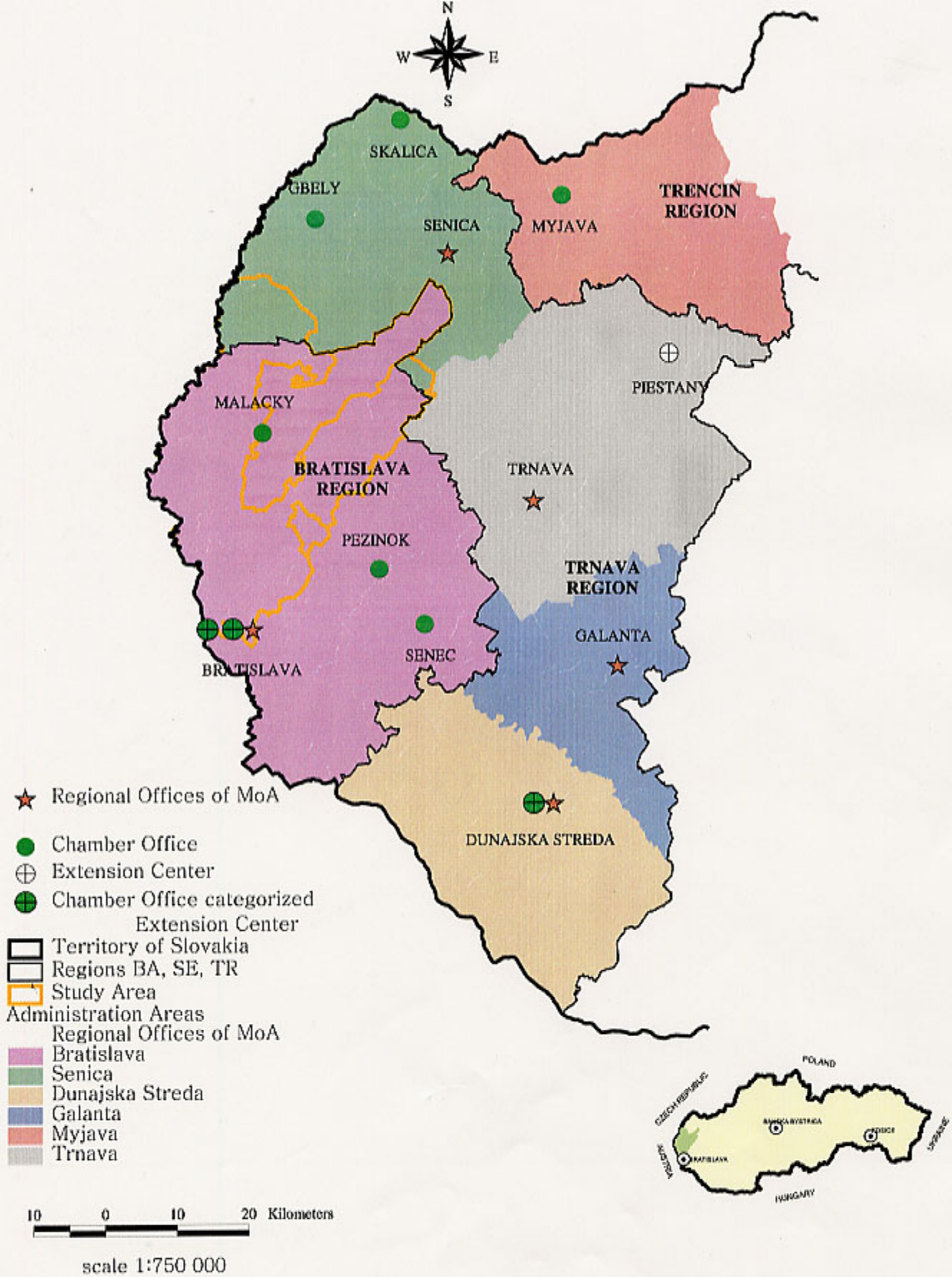


Figure B.13.3 Extension Offfice Map

ANNEX B.14

ENVIRONMENT

B.14 ENVIRONMENT

B.14.1 CONSERVATION AREAS

(1) Categories and Occurrence in Zahorska

The principal way of protecting nature and biodiversity is via the establishment and good management of conservation (or protected) areas. These are designated and declared according to the specifications of Act No. 287/1994: On Nature and Landscape Protection. The Act recognises five levels of protection, with the degree of protection increasing with each level, with Reserves and Monuments being distinguished but receiving the same level of protection. The five levels are described in the following Table.

Protected Area System of Slovakia - Levels of Protection for Nature and Landscape

Protection Level	Name	Type of Area and Protection
I	-	Country-wide except for Levels II-V. Regulation of 15 specified activities and other preventive measures.
II	Protected Landscape Area and National Park buffer zones	Large area, usually more than 1,000 ha, with fragmented ecosystems which are significant for conservation of biological diversity and ecological stability, with characteristic landscape features or specific forms of historical settlements. Regulation of a further 14 specified activities.
III	National Park core zones	Large area, usually more than 1,000 ha, with mainly ecosystems substantially unaffected by human activities, or with unique and natural landscape structures that form national biocentres and the most significant natural heritage in which nature protection is a higher priority than other activities. Regulation of a further 12 specified activities.
IV	Protected Site	Small area, usually up to 1,000 ha, representing mainly biocorridors, inter-active elements, or biocentres of local or regional importance. Prohibition of a further 15 specified activities.
V	Nature Reserve and National Nature Reserve	Small area, usually up to 1,000 ha, of mainly original or those ecosystems not generally affected by human activity and biocentres of national importance. Prohibition of a further 18 specified activities
V	Natural Monument and National Natural Monument	Point, linear or other smaller ecosystems usually smaller than 50 ha with scientific, cultural, ecological, aesthetic or landscape significance, especially outcrops, rock formations, stone seas, narrow valleys, dunes, sections of streams, springs, sinks or lakes.

Source: Act 287/1994 *On Nature and Landscape Protection*

The following of Slovakia's categories of protected area are found in the Study Area:

- Protected Landscape Area (PLA) - Level II
- Protected Site (PS) - Level IV
- Buffer Zone of Nature Reserve (BZNR) - Level IV
- National Nature Reserve (NNR) - Level V

- Nature Reserve (NR) - Level V
- Natural Monument (NM) -Level V

These areas are shown on Figure B.14.1.

Two areas in the Study Area, Niva Moravy and Rudava are also recognised as Ramsar Sites. Ramsar sites are of international importance declared under the *Convention on Wetlands of International Importance, Especially as Waterfowl Habitats.* Niva Moravy Ramsar site is also shown on Figure B.14.1, but the boundary of the Rudava Ramsar site was not available in digital form at the time of writing; further information on this site is provided in section B.14.1.3. Niva Moravy is also an Important Bird Area (IBA). Important Bird Areas (IBAs) are sites declared as Special Protection Areas under the European Community Directive 79/409 *On the Conservation of Wild Birds*. The Directive is intended to safeguard the habitats of migratory birds and birds generally under threat of decline or extinction. There are 18 IBAs in Slovakia.

(2) Activities Permitted in Conservation Areas

This section is written with special reference to Zahorska PLA (Protected Landscape Area) and Nature Reserves in the Zahorska area and to agricultural activities within them.

These are covered by Act. No. 287/1994 on Nature and Landscape Protection. Five levels of protection are established under this Act (see previous Table), the first level being valid throughout Slovakia, while stricter protection/restrictions on activities apply as the protection levels increase from 1 to 5. Unless otherwise specified, the second level of protection applies to Protected Landscape Areas and therefore the "approval of the nature conservation body" is required for activities described in Part 2 § 7 and Part 3 § 13 of the Act. These include:

Part 2 § 7
b) "covering and draining of peat-bogs, lakes, wetlands and other lands"
k) "spraying of chemicals and fertilisers from airplanes"

Part 3 § 13
c) "land works that change the shape of relief and changes of land use"
j) "use of chemicals mainly pesticides, toxic substances, fertilisers and ensilage in agriculture and forestry and other activities in an area larger than 2 ha".

The fifth level of Protection applies to Nature Reserves, which are usually less than 1,000ha, and are not generally affected by human activity and/or are biocentres. Various activities are prohibited including "changing the natural water flows and water areas, swamps, wetlands, springs, and abysses" (Part 3 § 17 e). Some may be closed to public access, according to the advice of the Nature Protection Bodies.

Nature Protection Bodies and their responsibilities for determining permitted activities in Protected Areas are described in part 5 of the Act. It is understood that for Protected Landscape

Areas the PLA Office in Malacky gives advice on permitted activities, but it is the District Office that makes the final decision and issues any permit.

There is no Management Plan for PLA Zahorska that provides general guidance on the preferred land use and activities in the area. However, over the next 3 years, Daphne intends to evaluate the exiting data on the Zahorska PLA, obtain additional data and prepare some form of Management Plan, with Guidelines that are in harmony with those set out in the EU's Natura 2000 Programme. This work will apply primarily to the portion of the PLA along the River Morava, as opposed to the separate pine forest portion between the Morava River and the Male Karpaty PLA.

According to Daphne the EU have concerns regarding Act. No. 287/1994 and it is undergoing a process of review and amendment by the Ministry of Environment, in consultation with nature conservation NGOs in Slovakia.

(3) Rudava River Ramsar Site

1) Description

The area consists of an unusually high diversity of natural and near-natural habitats, including peat bogs and fens. It is considered to be one of the best preserved small lowland river ecosystems in Slovakia. A large number of plant and animal species with differing ecological requirements are to be found at this relatively small site due to the rich variety of habitats. Many of these species are rare, vulnerable or endangered, including some species of invertebrates that do not occur anywhere else in Slovakia. It is an important area for fish migration and the over-wintering of aquatic invertebrates, as well as breeding of fish, amphibians and aquatic invertebrates, especially dragonflies.

There are a few small settlements within the area. The main activities are forestry, fishing, agriculture, hunting and recreation. The ownership of land is complicated at this time due to the process of land restitution but the majority of the surrounding area is state owned and used for military training. Other uses in the surrounding area include sand and gravel extraction, oil drilling and small-scale industry.

2) Threats

There have been some instances of environmental damage to the area due to the re-privatisation of land, especially agricultural land. One of the most species-rich meadows of the area was ploughed and part of the valuable peat bog was partially drained. In 1996, there were proposals for a development project - the Studienka Dam project which, if implemented, would destroy approximately 10 km of the most valuable middle section of the Rudava River floodplain. Agricultural run-off from adjacent fields and municipal wastewater pollution are affecting the water quality of the river. Recent unsustainable logging practices in the surrounding area, including clear-cutting and planting of pine mono-cultures are also having adverse effects, as well as increasing the risk of forest fires.

3) Protection Measures

In 1994 some measures were adopted to restore the natural channel conditions in the regulated part of the upper reaches of the Rudava River. As at 1996 the site had no protected area status and no officially approved management plan, although an unofficial, draft management plan for the area was developed by the Slovak Rivers Network, an NGO, in 1996. At the same time regional authorities responsible for nature conservation were preparing proposals for the designation of "The Rudava Valley Nature Reserve" in co-operation with NGOs. The first comprehensive river restoration project in Slovakia, the "Rudava River Restoration Project" was prepared in 1996 and is being further developed including a PHARE-funded project for the restoration of fish sites, and a Slovak River Network project for co-operation with local residents for planning and implementation of restoration measures. This model project contains technical, environmental and economic measures to restore the natural state and ecological functions of the regulated reaches of the Rudava River and its main tributaries.

B.14.2 ENVIRONMENTAL LEGISLATION, PERMITTING AND ENFORCEMENT

(1) Legal Instruments

The Slovak legal system contains four main levels of national legislation. In descending order of supremacy, these are:

- the Constitution;
- Acts of Parliament;
- Governmental Orders, where powers are delegated by an Act; and
- Ministerial Regulations, where powers are delegated by an Act or by a Government Order.

The Constitution contains several provisions of a general nature in relation to the environment. Thus the Constitution provides a basic foundation for more specific legislation in the environmental sphere. Further baseline legislation is elaborated in Act number 17/1992 on Environment, which defines basic concepts and principles of environmental protection and the obligations of natural and legal persons in protecting and improving the environment. There are then a number of Acts relating to specific environmental matters, among which are Act number 138/1973 on Water, Act number 309/1991 on Air Protection against Pollutants, and Act number 238/1991 on Waste, all of which have been followed by numerous subsidiary Orders and Regulations.

As a result of Slovakia's intention to join the European Union it is in the process of aligning its legislation with that of the European Union and this includes legislation on the environment and water resources. This process is sometimes called "approximation" and Slovakia has a National Programme for the Adoption of the *Acquis Communautaire*, which represents the body of EU legislation. Directives are issued by the EU and member states are expected to incorporate these

into their own legislation. Examples are given here of two EC Directives that are especially relevant to agriculture and water use.

1) Water Framework Directive

This Directive 2000/60/EC was approved on 29 June 2000. It sets out a six-year management plan that will compel EU member states to ensure that their waters are up to a reasonable standard by 2015, though concerns have been expressed that it is not sufficiently strong in its provisions in preventing "industrial agriculture" from contaminating water resources. The Directive effectively pulls together all water policy and provides a framework for policy decision making within the context of river basins. It requires the integration of industrial, agricultural, rural development, nature conservation and forestry programmes at the catchment scale, with the aim of protecting water quality and ensuring sustainable use of water resources.

2) Nitrates Directive

The Nitrates Directive 91/676/EEC is a response to contamination of groundwater by nitrates; typically these have an agricultural origin. In order to comply with this Slovakia, under a Phare project, is in the process of identifying vulnerable zones, developing an action programme for nitrate reduction and preparing a "Code of Good Agricultural Practice".

(2) Permitting Arrangements

Permits for environmental protection are issued by the offices of Slovakia's eight administrative Regions and 79 Districts. The Regions and Districts are instruments of the national administrative system, and their overall operation falls under the control of Slovakia's Ministry of the Interior. From a procedural and policy perspective, however, the environment departments of the Regions and Districts, which deliver the licensing functions, take their direction from the Ministry of the Environment.

Permitting activities can generally be divided into two categories: those relating to construction and those relating to pollution during operation.

1) Construction Permits

These permits, which are issued by the Districts, control environmental impacts during the construction phase of new installations, e.g. a reservoir, as well as specifying construction requirements. In order to obtain a construction permit, applicants proposing to build certain types of large new installations must first submit a report prepared in accordance with Act number 127/1994 on Environmental Impact Assessment (EIA).

The first stage in obtaining construction permission is to elaborate the so-called 'intent' to construct at a particular site, which must be accompanied by submission of an EIA report. A number of interested parties, including members of the public, then have an opportunity to comment, before the District decides whether to approve or refuse the intent. Where the intent is

approved, the District issues a construction permit, setting conditions which take account of the comments received from the interested parties as well as the requirements of the relevant environmental and other legislation.

2) Operating Permits

As regards permits to protect against environmental harm during operations, there are three different types. These are waste permits, water permits and air permits, which are issued in accordance with the separate legal acts controlling these matters. An installation that is covered by all three acts will require three distinct permits. All of the air permits and most of the waste and water permits are issued by the Districts, each of which will typically have one member of staff for each of the three permitting regimes. Only the largest waste and water permits are granted by the Regions rather than the Districts.

With respect to permits for ***water discharges***, national law specifies that any entity that discharges polluted material to water may be subject to permitting. In practice, there are about 200 large, industrial sources for which permits, with time limits, have been issued. Emission limit values (ELVs) are included in the permits, following different standards set in national law for new plants and for existing plants. The national ELVs are usually reproduced in permits without change, although the controlling Region or District may impose stricter requirements in order to ensure that water quality standards are achieved. At present there are no controls, nor permits issued, for irrigation discharges (e.g. from drainage canals to rivers). Pollution from most agricultural sources (e.g. from irrigation schemes and applications of fertilizers) have been regarded as diffuse sources and difficult to regulate and manage, whereas industries constitute point sources that can be monitored and controlled.

(3) Monitoring and Enforcement

1) Waste, Water and Air

The Regions and Districts issue permits as outlined above, and also have competence to undertake monitoring and enforcement. However, their capabilities in respect of the latter are limited because, for example, they have little appropriate equipment or resources. The functions of monitoring and enforcement are therefore the primary responsibility of the Slovak Environment Inspectorate, operating under the direction of the Ministry of the Environment.

The Slovak Environment Inspectorate undertakes site visits and checks to see if installations are operating within the requirements of their permits. Separate inspections are undertaken in respect of waste, water and air permits, although inspectors for different disciplines may choose to visit a site at the same time.

If an installation is not in compliance with its permit, measures to correct the situation can be specified and a fine can be imposed – by the regional or district office. If the installation fails to

comply with the measures specified, a further penalty can be determined. The relevant Region or District also has powers to order suspension or closure of the installation, although it appears that neither of these powers has been used in practice.

2) Nature, Landscape and Forests

The monitoring and enforcement of the provisions of the Nature and Landscape Protection Act is carried out primarily by the State Nature Protection Authority (SOP) of the Ministry of Environment. The overall responsibility is with SOP head office, the Nature and Landscape Protection Centre in Banska Bystrica, supported by 7 National Park Administrations and 16 Protected Landscape Area (PLA) Administrations, including one in Malacky for the Zahorska PLA and one in Trnava for the Male Karpaty PLA. These local offices have no direct responsibility for Level IV and V protected areas, which are cared for by the head office.

The monitoring and enforcement of activities in National Parks and Protected Landscape Areas is carried out under regulations of Act 287/1994 through the head office of Nature and Landscape Protection Centre in Banska Bystrica. This office is assisted by the individual offices responsible for the day-to-day management and planning for each National Park and PLA. Additionally the regional offices of the Nature Protection Department of the Slovak Environmental Inspectorate has responsibility for monitoring and enforcement of Act 287/1994. This is done mainly via inspection (monitoring) visits to check on legal (permitted) and illegal activities being carried out in protected areas. The Inspectorate works closely, via joint monitoring visits, with the national park and protected landscape authorities.

B.14.3 ENVIRONMENTAL WATER QUALITY STANDARDS

(1) Method of Evaluation and Classification of Water Quality

The evaluation of surface water quality in Slovakia is made according to the methods provided by the State Standards STN 75 7221. The quality of surface water is grouped into 5 main classes and then into 6 groups of parameters as shown in the following Tables, where a comparison is also made with Japanese standards.

Comparative Table of Surface Water Quality Standard between Slovakia and Japan

Permissible water quality in surface water based on the Slovak Government Order No. 232/1994					**Environmental quality standard for water pollution in Japan**
			Valid values		
Indicator	Symbol	Unit	in water courses	in other surface waters	Valid values for public water
Nitrite nitrogen	N-NO2-	mg/l	0.005	0.02	10
Nitrate nitrogen	N-NO3-	mg/l	3.4	7	
Fluorides	F-	mg/l	0.5	1	0.8
Cyanides total	CN-	mg/l	*	0.2	*
Mercury	Hg	µg/l	0.1	0.5	0.5
Cadmium	Cd	µg/l	5	10	0.01
Lead	Pb	µg/l	20	50	10
Arsenic	As	µg/l	20	50	10
Chromium (VI)	CrIV	µg/l	10	20	50
Selenium	Se	µg/l	10	50	10
Benzene	BZ	mg/l	0.01	0.05	0.01

Notes :

* Below the limit of sensitivity of specification

The classification of water in each group is made based on the measured parameter values with a 90% probability of non-exceedence of the limit value specified for each parameter. For the classification, monitoring data must cover a continuous period of at least one year, with a minimum of 24 samples. When the monitoring frequency is 12 times per year, two years data are required for the classification.

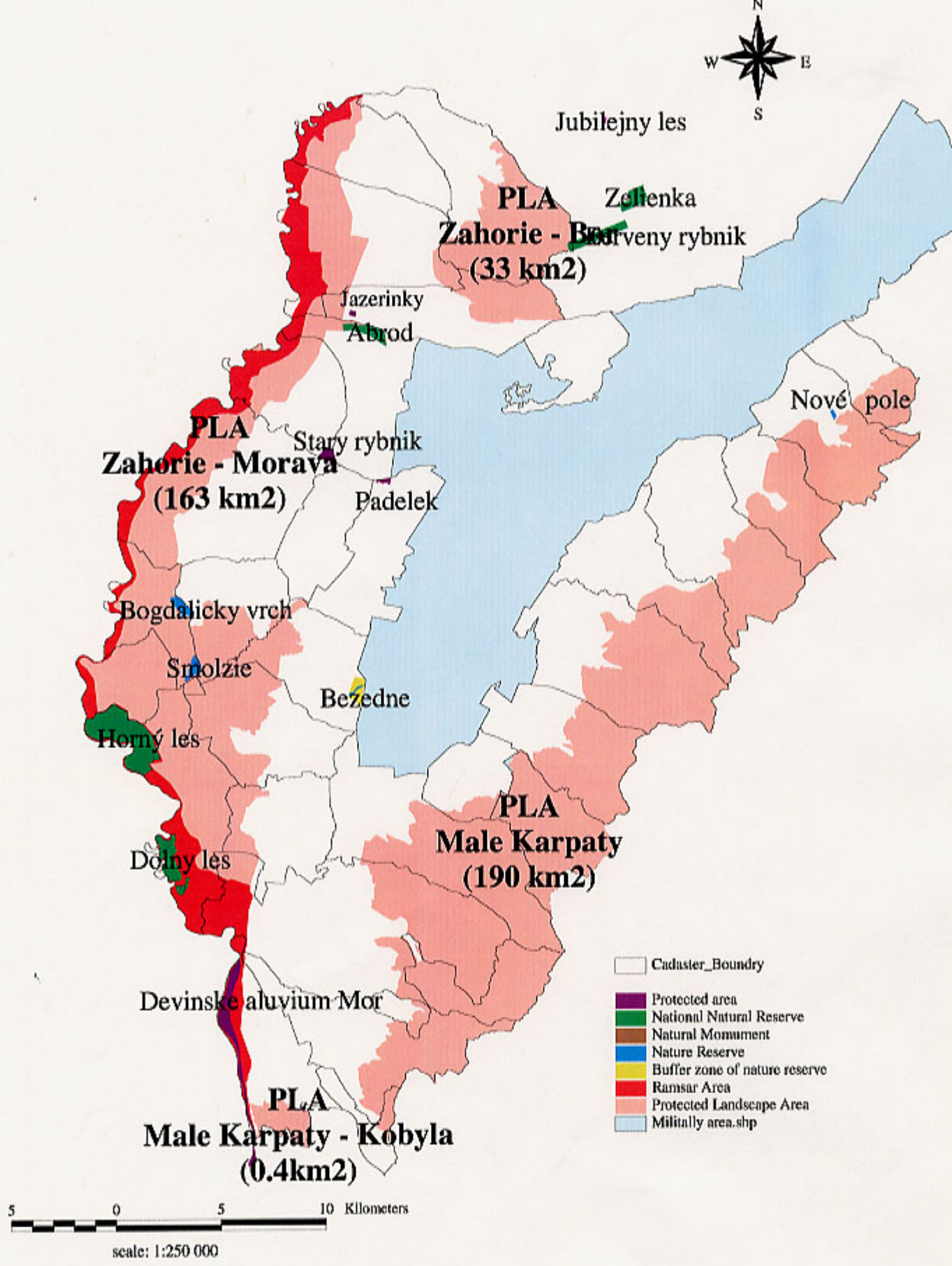


Figure B.14.1 Conservation Areas

source: SEA

ANNEX B.15

FEED CROPS AND LIVESTOCK

B.15 FEED CROPS AND LIVESTOCK

B.15.1 SITUATION OF LIVESTOCK SECTOR IN STUDY AREA

Milking is carried out by large scale farming units, and breeding cattle and pig for meat production are mainly carried by small scale units. The common type of cattle in beef breeding is categorized as dual purpose for milking and slaughter in Slovakia, and the breeding of cattle specialized for meat products is not observed in study area.

BSE infected cattle were found in Slovakia last year, and it caused a significant drop in the price of beef in milking cows. About 12,100 ton of Pork is imported annually in the last two years, on the other hand export is less than 1,000 ton. Thus, it can be said that domestic demand is higher than production.

B.15.2 NUMBER OF LIVESTOCK IN THE STUDY AREA

The scale of farming unit is larger than cadastral and it is difficult to divide into each cadastre, so that the number of livestock is not known at cadastral level. Due to that, the actual number of livestock in the study area is not obtained. In the Malacky district, which covers most of the study area; the average number of livestock between 1997 and 2000 is 9,890 cattle and 11,979 pig.

Number of Livestock in Malacky District

Year	*Total Cattle (Pieces)*	*Reduction Percentage*	*Total pigs (Pieces)*	*Reduction Percentage*
1997	12,459	100	15,175	100
1998	9,652	77	11,113	73
1999	8,598	69	11,528	76
2000	8,849	71	10,100	67
Average	9,890		11,979	

The number of livestock is decreasing in the Malacky district and in the whole of Slovakia. The number of livestock between 1997 and 2000 and its reduction ratio when 1997 is set as the basis is shown in Table 15.1.

Only the total number of livestock in Malacky district is obtained in the statistics data. However the structure of growing stage of livestock could not be found at district level. Due to that, in order to estimate the structure of Malacky in 2000, the structure of growing stage of livestock in Bratislava region (date at end of October, 2001 from agriculture census 2001) was applied to Malacky district. The result is shown as follows.

Structure of Livestock animals in Malacky

Beef Cattle Breeding

	Category of cattle	Assumed Head in Malacky
1	Grow, up to 1 year, Male	1,864
2	Female	1,213
3	Fattening, 1 to 2y. Male	1,062
4	Female	527
5	Fattening, over 2y, Male	158
6	Female	0
7	Cows, beef calf reprod	310
8	Cows,calf repr.unmated	59
	Total	5,191

Milking

	Category of cattle	Assumed Head in Malacky
1	Grow, Male, Breeding	83
2	Female	599
3	Breeding heifers, mated	433
4	unmated	327
5	Breeding, Dairy, mated	184
6	unmated	40
7	Cows,Milking, mated	1420
8	unmated	572
	Total	3,658

Pig Breeding

	Category	Assumed Head in Malacky
1	Growing , up to 20 kg	2,040
2	Fattening, 21 to 50kg	2,889
3	51 to 80kg	2,040
4	81 to 110kg	1,808
5	over 110kg	162
6	Breeding, 21 to 50kg	162
7	Breeding boars, over 50kg	30
8	Breeding sows, over 50kg, mated	141
9	ibid, unmated	111
10	Sows, mated	495
11	ibid, unmated	222
	Total	10,100

B.15.3 NUTRIENT REQUIREMENTS OF LIVESTOCK ANIMALS IN STUDY AREA

The energy requirement of livestock animals was estimated in Malacky district with the purpose of evaluating the regional feed balance in the area.

The structure of growing stage of animals of Bratislava region (date at end of October, 2001 from agricultural census 2001) was applied to estimate total energy requirements of Malacky district due to lack of information. Based on that, total energy requirements were calculated in each livestock sector. (Table 15.2)

Energy requirements are calculated based on the Metabolizable Energy (hereafter ME) in cattle and Digestible Energy (hereafter DE) in pig, and both are converted to Total Digestible Nutrients (hereafter TDN), it is used among livestock farmers universally. In milking, the amount of milk produced is assumed to be about 5,000 liter per year.

The total energy requirement of all livestock in Malacky district was estimated at about 24,629 ton in TDN. By animal types, annual requirement per head was 2,176kgTDN in cattle, and 532kgTDN in pig breeding and total requirements of each type in Malacky becomes about 19,255tonTDN and 5,373tonTDN respectively.

TDN requirement in Malacky Area

		Cattle	Pig
Malacky	Total number of head (head)	9,890	11,979
	Demand per day/head (kg/day)	5.96	1.46
	Demand per year/head (kg/year)	2,176	532
	Total demand per year (ton/year)	21,521	6,373

Total TDN Requirement in Malacky District per Year 27,893 ton

B.15.4 TDN CONVERSION

The percentage of TDN in feed crops is called TDN rate. The TDN rate differs among the types of crop, especially between concentrated crop and roughage. TDN rate is shown as fed basis, in which some moisture is contained. Due to that, the moisture content at feeding or harvesting time should be considered when the TDN rate is used in TDN conversion. Especially in roughage, the rate should be used carefully because of the big difference of moisture contents between the harvest time and feeding time.

(1) Alfalfa

In the case of Hay, TDN rate of fed basis becomes 45.8% when assuming its moisture content is 12.4%. On the other hand, if moisture content is 79.7% in forage fed green then TDN rate is 12.4%. However, TDN rates of dry basis are about the same level in hay and forage fed green being 52.2% and 61.08% respectively.

The TDN rate of fed basis become 39.68% when assuming the moisture content is 30% at feeding time and the TDN rate of dry basis is 56.68% which is the average of hay and forage fed green.

(2) Grass

The type of grass growing in disadvantaged fields is assumed to be equivalent to the Reed Canary Grass in TDN content, it is expected that its yield is 3.0 ton per hectare and moisture content is 65%, that is dried from fed green. If the decrease of TDN rate is assumed to be 10% when it is dried, and moisture content from 79% to 65% when it is feeding, then TDN rate of dry basis becomes 51.84% and fed basis is 18.4%.

(3) Silage Maize

The total amount of silage becomes 26.34 ton when the moisture content of silage is managed as 75.7% from a one hectare field in which the yield is 16 ton and moisture content is 60%. In such silage maize, TDN rate of fed basis is 15.52% and dry basis is 63.8%, so that the TDN rate in harvest time was 25.5% in fed basis and 63.8% in dry basis.

TDN amount in 1 hectare is 2.80 ton in Grain maize. However, it becomes as high as 4.08 ton when it is used as silage maize because the stem and panicles are also used.

TDN Rate in Roughage

TDN rate		moisture content	TDN rate	
			as fed basis	as dry basis
		%	%	%
Alfalfa	Hay	12.4	45.8	52.28
	Forage fed green	79.7	12.4	61.08
	Feeding in Malacky	30	39.68	56.68
Natural Grass	Forage fed green	79	12.1	57.6
	Feeding in Malacky	60	20.74	51.84
Maize	Grain	13.5	79.9	92.37
	Silage	75.7	15.5	63.8

TDN rate in Grain Crops

	As fed basis		
		for cattle	for pig
	Moisture	TDN	TDN
Wheat	11.5%	78.7%	79.7%
Barley	11.8%	74.1%	70.4%
Maize	13.5%	79.9%	81.0%
Rye	12.3%	75.9%	78.0%
Soybean	11.3%	91.0%	85.9%

All TDN rate are shown as fed basis

B.15.5 REGIONAL SUPPLY CAPACITY OF MANURE

The use of animal waste as manure is an important activity for the impact not only of soil fertility management but also environmental conservation by reducing input of chemical fertilizers and preventing illegal disposal of animal waste. Regional supply capacity of manure was estimated in the Malacky district in order to evaluate the possibility of manure use in the field.

The annual production of manure from one cattle is 19,031kg and that from pigs is 1,704kg when their average animal weights are assumed to be 474kg, 63kg respectively. Total annual production of manure in Malacky district becomes 185,616 ton, of which 168,406ton is from cattle and 17,210ton is from pig.

This amount of manure can supply up to 6,187 ha of field, with the precondition of 30 ton/ha of manure application in the field. According to the farming unit survey conducted by JICA Study Team, manure was applied in 1,710 ha of the fields in 2001, that is equivalent to 20% of regional supply capacity.

Manure Production in Malacky District

		Produced Manure		Of which Nitrogen (kg)	
		Cattle	Pig	Cattle	Pig
Average Weight	kg/Head	474	63		
From Feces	kg/day/head	38	1	0.152	0.009
From Urine	kg/day/head	12	3	0.083	0.015
From Bedding	kg/day/head	2	0	0.012	0.001
Total	kg/day/head	52	5	0.246	0.025
Annual product	Kg/year/head	19,031	1,704	89.965	9.271
Number of Head in Malacky	Head	8,849	10,100		
Total Manure in Malacky	ton/year	168,406	17,210	796,102	93,642
Total in Malacky		185,616		889,744	
Cover Area in Malacky	Manure 30 ton/ha		6,187 ha		

B.15.6 REGIONAL FEED BALANCE IN EXPECTED CROPPING PATTERN AND CULTIVATION AREA

The draft land evaluation was carried out over the Study Area in the Interim Report and the expected farming type and cultivation were proposed. The agricultural production in the Zahorska Lowland needs to satisfy the demand of self-supplied feed for animals because the mixed farming with cereal production and livestock is dominant in the area. The validity of the proposed farming type and cropping pattern needs to be verified from the viewpoint of balance of feed supply.

The results of draft land evaluation in the study area are summarized below. In this evaluation, category (2) and (3), which shows difference of soil moisture conditions in the area without irrigation, has not yet been classified. (Refer to the Interim Report Chapter 3.)

Results of Land Resources Evaluation (ha, %)

	Zone-I		Zone-II	
	(1)	(2)(3)	(1)	(2)(3)
A	221 (2%)	1,021 (11%)	554 (3%)	1,529 (7%)
B	462 (5%)	4,716 (51%)	3,464 (16%)	4,803 (22%)
C	41 (0%)	2,868 (31%)	4,372 (20%)	6,953 (32%)

	Zone-III		Zone-IV	
	(1)	(2)(3)	(1)	(2)(3)
A	0 (0%)	5,131 (45%)	287 (10%)	657 (23%)
B	5 (0%)	4,141 (37%)	118 (4%)	667 (23%)
C	128 (1%)	1,914 (17%)	5 (0%)	1,124 (39%)

	Total	
	(1)	(2)(3)
A	1,062 (2%)	8,338 (18%)
B	4,048 (9%)	14,326 (32%)
C	4,546 (10%)	12,859 (28%)

As a first step to verify the proposed farming type and cultivation, the expected crops and cropping patterns were applied to lands according to their draft land evaluation. The expected cultivated area of each crop was allocated based on the cropping pattern by average share of crops. During the allocation of cultivation area, the following assumptions were applied:

- Allocation and summarizing area of crops and cropping pattern were conducted in the Malacky district due to preparation of statistical data.
- Representative cropping patterns proposed in the guidelines were applied to each land category so as to simplify the model.
- The total arable land was assumed to be the level of year 2001, that is 25,428 ha in Malacky district. The cropping ratio of 100% for irrigated area and 90% for rain-fed area were applied for future cases. As a result, the average cultivating rate in the model was to be 88%.
- Distribution of area in a category that was not divided in the draft land evaluation, i.e., B(2) and B(3), C(2) and C(3), was divided into each category in the assumed proportions of 1:1.
- 10% of the land category C(3) was assumed to be unsuitable land for crop cultivation, where land use diversion to grassland was recommended.
- The farmland introducing vegetable cultivation was assumed as 50% of A(1) and B(1) in the Zone II.

Cultivation Area in Expected Farming Type and Cropping Pattern

(ha, %)

Crops	Actural Record Average 1997-2000[1]		Expected Cultivation Area[2]		(2)/(1)	
Sunflower	869	(4%)	1,312	(6%)	151%	[3]
Rapeseed	2,108	(10%)	2,138	(10%)	101%	
Spring Barley	2,169	(10%)	2,041	(9%)	94%	
Food Wheat	3,987	(3%)	1,941	(9%)	114%	
Wheat for Feed			2,598	(12%)		
Grain Maize	2,016	(9%)	3,737	(3%)	74%	
Silage Maize	3,034	(14%)				
Soybean	-		762	(3%)	-	
Alfalfa	1,390	(6%)	2,731	(12%)	197%	
Rye	4,137	(19%)	3,360	(15%)	81%	
Vegetables	900	(4%)	1,767	(8%)	196%	
Others	1,283	(6%)			-	
Total of Arable Land	21,891	(100%)	22,387	(100%)	102%	
Grassland	5,969		7,105		119%	
Total	27,860		29,492			

[3] : Increment ratio of sunflower from the average of 1999 to 2000 that was 1,160ha is 113%.

The allotment and summary of cropping pattern and cultivation area are shown in Table B.15.5 and summarized below:

For the purpose of evaluating the total balance of feed supply by several crops and livestock types, the supply capacity of self-supplied feed was estimated based on the cultivation area of current situation and expected farming of the guidelines with the average yield of current and expected situation.

The demand for feed in the area is calculated based on the actual feeding sample shown in table B.15.8. The assumed annual demand for feed in Malacky district is 14,206 ton in concentrated feed and 77,949 ton in roughage based on the actual feeding and number of livestocks.

The production amount is calculated with these areas and average yield. In the calculation results with average cultivation area, the amount of concentrated feed is 24% over the demand and also roughage can fill the demand. On the other hand, in the calculation with expected area, the production amount of roughage is at the same level as the result of average area and production of concentrated feed is more than production based on average area. Finally, the feed crop production in the expected cropping is more than that produced by the average data.

B.15.7 THE COST ESTIMATION IN LIVESTOCK SECTOR

The cost of livestock had been estimated based on the cost estimation data issued by Agricultural Economy and Food Industry Research Institute (VUEPP) in year 2000. This estimated data is prepared based on the collected actual cost of 100 feeding days from agricultural companies. This data contains not only the break down of cost but also profit and obtained subsidy of 100 feeding days.

Total cost of 100 feeding days for a milking cow is 13,654 SKK and it is three times the other cow's average cost at 4000 SKK. One reason for such high cost in the "Milking Cow" is that the feed cost is double the other cow's cost because of the high demand for expensive concentrated feed for milking, and the other reason is that the direct cost is large because of the milk processing cost in sterilizion.

In pig breeding, category "Sow" is most expensive and its 100 feeding days cost becomes 4,310 SKK because of the high reproduction cost. Next, the cost of "Young Growing Pig", which is high because of the expensive feed and other needs, it becomes higher than "Fattening Pig". These costs are 2,648 SKK and 1,817 SKK in respectively.

The profit only occurs in "Milking Cow", "Fattening Cattle" and "Fattening Pig" which produce the final products. However, the profit balance became minus in the other categories because the income is issued only from sub-products and subsidies.

The descriptions of obtained subsidies are also included in this cost-profit data issued by VUEPP. However, the amount of subsidy was changed between 2000 and 2002. Therefore, the subsidy is set in this report as year 2002 in "Fattening Cattle" and "Fattening Pig" reflecting the change in subsidy between 2000 and 2002. In the result, milking cow got high subsidies like 1,544 SKK for 100 feeding days and the next was the fattening cow at 312 SKK. The others did not get so high a subsidy.

In Malacky district, the product cost of each livestock sector is estimated based on this calculated cost. It becomes 40.73 SKK for beef cattle breeding, 25.91 SKK for pig breeding, and 74.06 SKK for Milking, for one feeding day.

Expenses and profits in SKK per 100 feeding days

Indicator	Cattle					Pig		
	Milking Cows	Calves up to 6 months	Young Breeding cattle	Highly Calving Heifers	Fattening Cattle	Sows	Young Breedin Pig	Fattening Pig
Purchased feed and bedding	1,185	843	178	169	154	631	560	305
Self-supplied feed and bedding	3,560	1,858	1,407	1,587	1,964	1,257	680	862
Other direct expense	6,789	1,142	1,049	1,659	1,271	1,707	969	398
Production expenses	1,152	449	267	425	343	390	248	127
Administration expenses	968	431	258	347	291	325	191	125
Cost Total	13,654	4,723	3,159	4,187	4,023	4,310	2,648	1,817
Profits per 100 FD	15,222	3,101	2,157	3,693	4,544	2,492	1,883	2,307
out of: subsidy for 100 FD total:	1,823	71	27	74	546	38	50	130
in disadvantaged areas	279	52	14	7	234	15	4	85
for entrepreneur subsidy	1,544	19	13	67	312	23	0	45

Source:Vuepp

B.15.8 VALUES OF FEED CROPS

(1) Concentrated Feed

The livestock sector is a profit center of mixed farming. Even in the low yield, feed crops are cultivated in the Study Area to satisfy demand of self-supplied feed. In this section, a trial calculation of value of feed crops through livestock progress was carried out.

1) Conversion of Feed Crop production to Livestock Products

The yield of feed crop is converted to production of livestock products to evaluate the value by introducing feed crop.

Based on the TDN requirement of the Malacky district estimated above, TDN requirement corresponding to unit product, that is 1kg of meat or 1liter of raw milk, is calculated. The results are 5.81kg in beef cattle, 2.40kg in pig for 1 kg of meat and 1.18kg for 1 liter of raw milk.(Table 4.8.4)

Composition of actual feeding in the area is shown in Table 4.8.5. The TDN requirement per unit products is divided into two categories of concentrated feed and roughage. And also, this concentrated feed consists of self-supplied feed and purchased feed in the area. Wheat, barley and maize can be regarded as self-supplied feed. Estimated TDN requirements are shown in the next table.

With above TDN requirements per unit product, the yield of self-supplied feed can be converted to livestock products by the following equations.

- TDNf = Yield * TDN rate
- TDN demand = TDN d-sc + TDN d-sr +TDN d-p
- Livestock product (kg or lit. of product/ha) = TDNf / TDNd-sc or TDNd-sr

TDNf : Product TDN in 1 ha (kg/ha)
TDN demand : TDN demand to unit product (kg/kg or lit.)
TDN d-sc : TDN demand for self-supplied concentrated feed
TDN d-sr : TDN demand for self-supplied roughage
TDN d-p : TDN demand for purchased feed

TDN Requirement by Livestock Type and Feed Type

		Cattle Breeding		Pig Breeding		Milking	
TDN Requiremnet per Unit (TDN-kg or lit. of product)		5.81	100%	2.40	100%	1.18	100%
Of which							
Purchased Feed		0.45	8%	0.50	21%	0.17	14%
Self-supplied Feed	Concentrated Feed	1.42	24%	1.90	79%	0.20	17%
	Roughage	3.94	68%			0.82	69%

Source : JICA STUDY Estimation

2) Production Cost of Livestock

The production cost of each livestock type was estimated based on the cost estimation data issued by Agricultural Economy and Food Industry Research Institute(VUEPP). The estimated production costs by livestock type are shown below, which considered the structure of growing stage of animals breeding in the Bratislava Region.

The cost is estimated in two parts, i.e., self-supplied feed cost corresponding to cereal for concentrated feed and grasses for roughage, and the remainder. The proportion of the self-supplied concentrated feed and roughage was estimated by the cost proportion in the actual feeding in the Study Area.

Production Cost per Unit Product (SKK)

Unit	Cattle Breeding		Pig Breeding		Milking	
	1kg		1kg		1lit	
	SKK	%	SKK	%	SKK	%
Self-supplied Feed	21.04	43%	12.38	29%	4.27	30%
Of Which						
Concentrated Feed	6.97	14%	12.38	29%	1.12	8%
Roughage	14.07	29%			3.15	23%
Purchased feed	4.86	10%	8.47	20%	1.07	8%
Other direct cost	14.21	29%	14.88	35%	6.36	46%
Administration expense	8.38	17%	6.91	16%	2.23	16%
Total Cost	48.49	100%	42.64	100%	13.93	100%

3) Evaluation of Profitability

Total selling amount is calculated with the amount of livestock product and average purchase price in 2001, and the meat ratio is set as 60% of live weight in beef and 65% in pork. In the milking sector, income is not only from milk production but also from selling the cow meat. The sale value from this meat production is also included in the calculation as other income, and calculated as equivalent to 1 liter of milk.

The subsidies for livestock sector were considered in the calculation as of 2002.

Total income consists of the sum of sale value, subsidy and other income. The profit is the deduction from total income of total cost. The result of the evaluation of feed crop profitability through livestock process are shown in the table 4.8.6 and summarized below:

Result of the Evaluation
Crop :Wheat

Average Yield		Total Income	Total Cost	Profit	Profit ratio
ton/ha		SKK	SKK	SKK	%
3.2	Cattle breeding	85,654	84,809	845	1.0%
	Pig breeding	52,356	51,784	572	1.1%
	Milking	173,140	172,419	721	0.4%
	Feed Selling	12,260	12,227	34	0.3%

Caliculation Condition

				Cattle Breeding		Pig Breeding		Milking	
Demand of TDN per Unit product (1kg or 1lit.)			kg	5.81		2.40		1.18	
Of which	Purchased Feed	Concentrated	kg	0.45	7.7%	0.50	20.8%	0.17	14.0%
	Self-supplied Feed	Concentrated	kg	1.42	24.4%	1.9	79.2%	0.20	16.8%
		Roughage	kg	3.94	67.9%			0.82	69.2%
Production Cost per Unit Production (SKK/kg or lit.)			SKK	48.49		42.64		13.93	
Of which	Purchased Feed		SKK	4.86	15.5%	8.47	19.9%	1.07	7.7%
	Self-supplied Feed	Total	SKK	21.04		12.38		4.27	
		Concentrated	SKK	6.97	14.4%	12.38	29.0%	1.12	8.0%
		Roughage	SKK	14.07	29.0%			3.15	22.6%
	Other direct cost		SKK	14.21	29.3%	14.88	34.9%	6.36	45.7%
	Administration expense		SKK	8.38	17.3%	6.91	16.2%	2.23	16.0%
Selling Price per Unit Production (in live weight kg			SKK	78.06		59.67		8.54	
Carcass Ratio (%)			%	60%		65%			
Subsidy per Unit Production (SKK) *2			SKK	1.42		0.17		1.16	
Other Income			SKK					4.05	

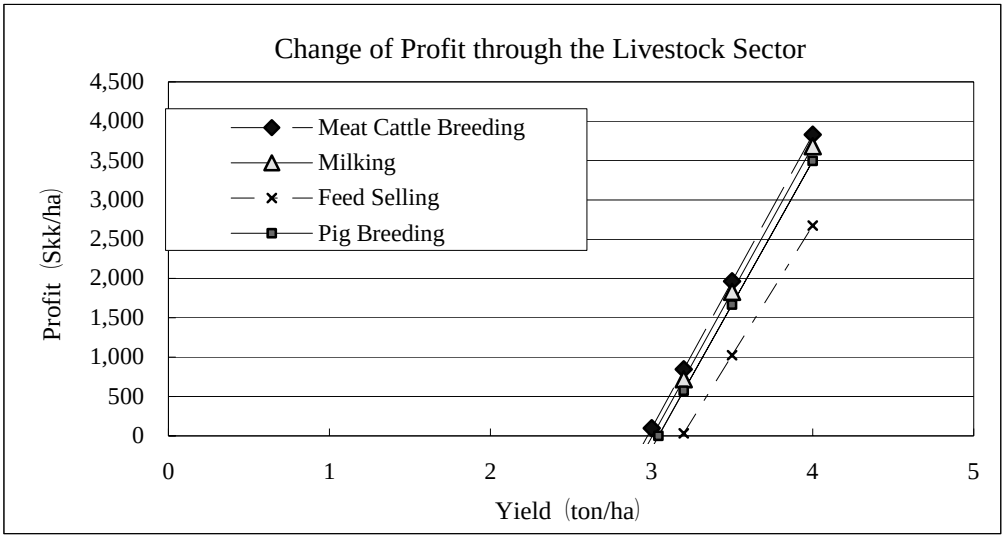
Source:JICA Estimati

*1 Average Purchase price in 2001 in Bratislava region (Source: ATIS)
*2 modified with 2002 subsidy condition

4) Calculation Result and Consideration

The calculation is carried out with wheat feed. Its rate of TDN is set at 78.7% and calculates profit according to several yields.

The economic balance of yield of crops is defined as a crop yield at the break even point in each farming activity. The difference between the balanced yield for selling feed and that for livestock can be understood as an added value generated by the livestock farming process. In feed wheat, this balance yield was calculated at about 3.0 ton/ha in milking and pig breeding and beef cattle breeding is the same as 3.2 ton/ha in feed selling. Because of that, it can be said roughly that it is difficult to secure the profit from selling of wheat when the yield is less than 3.2 ton/ha, but it can be profitable when it is used as feed for livestock. However, the balance becomes a loss from the field where yield is less than 3.0 ton/ha.



(2) Values of Artificial Meadows

The market prices of feed grass do not exist because it is not distributed in the market. However, its price should correspond to its value, and it is assumed from other feed. This value is represented by TDN rate which means the total content of usable energy in unit weight for livestock.

The unit price of Alfalfa becomes 3.02 SKK/TDN-kg, when its market value is converted to the contained TDN amount. The gross output value of grass becomes 1,667 SKK from one hectare field with this unit price corresponding to TDN.

Gross Output Value = TDN amount in Unit area × price equivalent unit TDN
= 3.0 ton-TDN/ha×18.4%×3.02 SKK/kgTDN
= 1,667 SKK

To calculate the economic balance of grass fields when gross output in 1 ha is as shown below.

The basis of the economic calculation is as follows. In the beginning of the period ploughing and seeding is carried out to make grass land. After that, the harvesting is carried out twice a year and grass shall be maintained for 10 years. The total cost including the land rental fee becomes 22,550 SKK during the 10 years and 2,255 SKK for one year.

The 6,000 SKK subsidies will obtain, when someone maintains the grass land for 5 years after seeding. The gross income becomes 2,267 SKK for one year from subsidy and gross output under the condition that this subsidy is obtained at the beginning and grass land is maintained for 10 years. This income has exceeded annual cost 2,255 SKK and about 30 SKK profit is generated.

In the other crops, rye is cultivated in the poorest soil condition and its profit is about 200 SKK annually. This profit is calculated for the average condition. It can be expected that it is better to use the field for grass than rye if the yield becomes less than an average of 2.8 ton per hectare.

Table B.15.1 Energy Requirement in Livestock Type

{Beef+Dairy} Cattle Energy Requirement

Category of cattle	Head in Bratislava Region	Share of animals	Average body weight(W) (kg)	Daily W gain (WG) (kg/day)	ME maintain.	ME prod. 1	kf	ME pr.1/kf	ME prg +milk	MEm+ME prod.	ME demand * Shareof Bratislvava Region (Mcal/day)	TDN demand with share of Bratislava region (kg/day)
1 Grow, up to 1 year, Male	1,680	0.083	260	1.20	7.61	4.10	0.48	8.56		16.17	1.33	0.37
2 Female	1,093	0.054	185	0.80	5.35	2.56	0.43	6.00		11.35	0.61	0.17
3 Grow, Male, Breeding	354	0.017	225	1.00	7.35	8.42				15.78	0.27	0.08
4 Female	2,565	0.126	150	0.70	5.43	4.35				9.78	1.23	0.34
5 Fattening, 1 to 2y. Male	957	0.047	610	0.70	15.85	4.38	0.49	9.01		24.86	1.17	0.32
6 Female	475	0.023	420	0.60	10.28	3.39	0.44	7.67		17.95	0.42	0.12
7 Breeding heifers, mated	1,857	0.091	415	0.40	11.64	5.33			1.88	18.85	1.72	0.48
8 unmated	1,403	0.069	415	0.40	11.64	5.33				16.97	1.17	0.32
9 Breeding bulls	0	0.000	600	0.70	15.88	4.48	0.48	9.24		25.12	0.00	0.00
10 Fattenig, over 2y, Male	142	0.007	840	0.60	14.26	4.77	0.51	9.32		23.58	0.16	0.05
11 Female	0	0.000	530	0.60	12.24	4.04	0.44	9.13		21.37	0.00	0.00
12 Breeding, Dairy, mated	788	0.039	640	0.10	16.28				1.88	18.15	0.70	0.19
13 unmated	170	0.008	640	0.10	16.28					16.28	0.14	0.04
14 Breeding bulls	0	0.000	840	0.20	20.44	1.65	0.43	3.87		24.31	0.00	0.00
15 Cows,Milking, mated	6,084	0.299	640	0.10	15.54				18.97	34.51	10.32	2.85
16 unmated	2,452	0.120	640	0.10	16.28					16.28	1.96	0.54
17 Cows, beef calf reprod	279	0.014	640	0.10	14.24	0.81	0.35	2.35	7.09	23.67	0.32	0.09
18 Cows,calf repr.unmated	53	0.003	640	0.10	14.24	0.81	0.35	2.35		16.59	0.04	0.01
	20,352	1.000										
TDN Demand for Cattle in Malacky												
Average demand/head/day											21.58	5.96
Demand per year											7,876	2,176
Total Cattle in Malacky	8,869									Year 2000	69,850,123	19,295,614
of which Beef cattle per Year	5,191									Year 2000	40,883,075	11,293,667
of which cattle in milking per Year	3,658									Year 2000	28,809,533	7,958,435

Pig

Category	Head in Bratislava Region	Share of animals	Average body weight(W) (kg)	Daily W gain (WG) (kg/day)	E for maintenance (kcal/day)	E for protein prod (kcal/day)		E for fat prod (kcal/day)		DE total (Kcal/head)	DE demand * Shareof Bratislvava Region (Mcal/day)	TDN demand with share of Bratislava region (kg/day)
1 growing , up to 20 kg	8,271	0.202	7.5	0.250	611.8	351.8		341.4		1,305.1	0.3	0.060
2 fattenning, 21 to 50kg	11,710	0.286	35	0.675	1,942.6	749.3		2,180.7		4,872.6	1.4	0.316
3 51 to 80kg	8,271	0.202	65	0.803	3,090.4	810.3		3,666.6		7,567.3	1.5	0.347
4 81 to 110kg	7,329	0.179	95	0.850	4,108.0	809.1		4,798.2		9,715.2	1.7	0.394
5 over 110kg	655	0.016	115	0.850	4,740.9	785.6		5,338.9		10,865.3	0.2	0.039
6 breeding, 21 to 50kg	655	0.016	35	0.700	1,184.4	5,113.9				6,298.3	0.1	0.023
7 breeding boars, over 50kg	123	0.003	175	0.250	5,922.0	1,761.4				7,683.4	0.0	0.005
8 breeding sows, over 50kg, mated	573	0.014	175	0.250	5,292.6	184.8		-1,005.2		4,472.2	0.1	0.014
9 ibid, unmated	450	0.011	175	0.250	5,922.0	1,761.4				7,683.4	0.1	0.019
10 sows, mated	2,006	0.049	200	0.250	5,850.1	15,036.3		-3,227.6		17,658.8	0.9	0.196
11 ibid, unmated	901	0.022	200	0.250	6,768.0	1,761.4				8,529.4	0.2	0.043
TDN Demand for pig in Malacky												
Average demand/head/day											6.42	1.46
Demand per year / head											2,343	532
	10,100									Year 2000	23,667,330	5,368,847

Table B.15.2 Summary of Expected Cropping Pattern and Cultivation Area Based on Draft Land Evaluation in Malacky District

Zone and Land Evaluation	Cultivated Area (ha)	Expected Representing Cropping Pattern	Cultivated Area by Crops (ha)														
			Sunflower	Rapeseed	S. Barley	Food Wheat	Wheat for Feed	Grain Maize	Silage Maize	Soybean	Alfalfa	Rye	Vegetables* *	Others	Total of Arable Land	Grassland	Total of Arable and Grass Lana
Zone I	**5,166**		**74**	**517**	**175**	**171**	**981**	**924**		**64**	**832**	**1,337**	**0**			**91**	
(A) (1)	41	Sunflower+S.Barley+F.Wheat+Rapeseed	10	10	10	10	0	0		0	0	0	0			0	
(B) (1)	256	Sunflower+F.Wheat/S.Barley+Rapeseed+Soybean	64	64	32	32	0	0		64	0	0	0			0	
(C) (1)	18	S.Barley+Maize+Maize+Alfalfax3	0	0	3	0	0	6		0	9	0	0			0	
(A) (2)	517	Rapeseed+S.Barley/F.Wheat	0	258	129	129	0	0		0	0	0	0			0	
(B) (2)	739	Wheat+Maize+Maize+Alfalfax3	0	0	0	0	123	246		0	369	0	0			0	
(B) (2)	739	Wheat+Maize+Maize+Rapeseed	0	185	0	0	185	369		0	0	0	0			0	
(B) (3)	1,044	Wheat+Rye	0	0	0	0	522	0		0	0	522	0			0	
(C) (2)	906	Wheat+Maize+Maize+Alfalfax3	0	0	0	0	151	302		0	453	0	0			0	
(C) (3)	815	Rye	0	0	0	0	0	0		0	0	815	0			0	
(C) (3)	91	Artificial meadow	0	0	0	0	0	0		0	0	0	0			91	
Zone II	**12,762**		**442**	**1,016**	**1,089**	**516**	**766**	**1,848**		**382**	**2,759**	**2,023**	**1,767**			**154**	
(A) (1)	240	Sunflower+S.Barley+F.Wheat+Rapeseed	60	60	60	60	0	0		0	0	0	0			0	
(A) (1)	240	Vegetables	0	0	0	0	0	0		0	0	0	240			0	
(B) (1)	1,527	Sunflower+F.Wheat/S.Barley+Rapeseed+Soybean	382	382	191	191	0	0		382	0	0	0			0	
(B) (1)	1,527	Vegetables	0	0	0	0	0	0		0	0	0	1,527			0	
(C) (1)	3,442	Maize+Maize+BarleyLAlfalfax3	0	0	574	0	0	1,147		0	1,721	0	0			0	
(A) (2)	882	Rapeseed+S.Barley/F.Wheat	0	441	220	220	0	0		0	0	0	0			0	
(B) (2)	532	S.Barley/F.Wheat+Maize+Maize+Alfalfax3	0	0	44	44	0	177		0	266	0	0			0	
(B) (2)	532	Wheat+Maize+Maize+Rapeseed	0	133	0	0	133	266		0	0	0	0			0	
(B) (3)	752	Wheat+Rye	0	0	0	0	376	0		0	0	376	0			0	
(C) (2)	1,544	Wheat+Maize+Maize+Alfalfax3	0	0	0	0	257	257		0	772	257	0			0	
(C) (3)	1,389	Rye	0	0	0	0	0	0		0	0	1,389	0			0	
(C) (3)	154	Artificial meadow	0	0	0	0	0	0		0	0	0	0			154	
Zone III	**5,597**		**796**	**796**	**796**	**796**	**507**	**507**		**507**	**0**	**0**	**0**			**891**	
(A) (2)	3,185	Sunflower/Rapeseed+S.Barley/F.Wheat	796	796	796	796	0	0		0	0	0	0			0	
(B) (2)	1,521	Wheat+Maize+Soybean	0	0	0	0	507	507		507	0	0	0			0	
(C) (2)	891	Artificicial meadow	0	0	0	0	0	0		0	0	0	0			891	
Smmary of Expected Cultivation Area			**1,312**	**2,329**	**2,060**	**1,483**	**2,254**	**3,279**	**0**	**953**	**3,591**	**3,360**	**1,767**		**22,388**	**7,106**	**29,494**
			6%	10%	9%	7%	10%	15%	0%	4%	16%	15%	8%				
Summary in Irrigation Area			**516**	**516**	**870**	**293**	**0**	**1,154**		**446**	**1,730**	**0**	**1,767**		**7,291**		
			7%	7%	12%	4%		16%		6%	24%		24%				
As for reference																	
Actual cultivated area of 1997*			288	2,071	2,422	4,489		2,419	3,619		1,886	4,646	1,145	1,345	24,330	5,551	29,881
Actual cultivated area of 1998*			x	1,918	2,316	4,865		1,506	2,789		1,480	4,408	1,090	961	21,333	5,729	27,062
Actual cultivated area of 1999*			1,137	2,183	2,178	2,850		1,774	2,684		1,104	4,098	892	1,751	20,651	6,256	26,907
Actual cultivated area of 2000*			1,183	2,258	1,759	3,742		2,364	3,043		1,088	3,396	473	1,073	20,379	6,341	26,720
Average 1997-2000			**869**	**2,108**	**2,169**	**3,987**		**2,016**	**3,034**		**1,390**	**4,137**	**900**	**1,283**	**21,891**	**5,969**	**27,860**
			4%	10%	10%	18%		9%	14%		6%	19%	4%	6%			

*: Statistic Office

**: Vegetables including potatos

Table 15.3 Balance of Feed Crops by TDN in Malacky District

Items	Feed Crops							Total
	Wheat	Barley	Grain Maize	Silage Maize	Alfalfa	Rye	Natural Grass	
Average Cultivated Area 1997-2000								
Cultivation Area (ha)	2,658	723	2,016	3,034	1,390	2,069	5,969	
Unit Yield (ton/ha)	3.2	2.8	3.5	16.0	8.4	2.4	3.0	
Yield (ton)	8,506	2,024	7,056	48,544	11,676	4,966	17,907	
TDN Conversion Ratio	0.787	0.741	0.799	0.152	0.124	0.759	0.121	
Produced TDN (ton)	6,694	1,500	5,638	7,379	1,448	3,769	2,167	
Total TDN Produced in Malacky (ton)								28,594
Expected Cultivation based on Draft Land Evaluation								
Cultivation Area (ha)	2,254	687	1,154	2,125	3,591	1,680	7,105	
Unit Yield (ton/ha)	3.8	3.1	5.9	16.0	8.4	2.8	3.0	
Yield (ton)	8,565	2,130	6,809	34,000	30,164	4,704	21,315	
TDN Conversion Ratio	0.787	0.741	0.799	0.152	0.124	0.759	0.121	
Produced TDN (ton)	6,741	1,578	5,440	5,168	3,740	3,570	2,579	
Total TDN Produced in Malacky (ton)								28,817
Demand of Feed in 2000								
For Cows								
Total TDN demand (ton)								19,296
Share of self-supplied feed (%)								84%
Demand of TDN for self-supplied feed (ton)								16,209
For Pigs								
Total TDN demand (ton)								5,369
Share of self-supplied feed (%)								78%
Demand of TDN for self-supplied feed (ton)								4,188
Total								
Demand of TDN for self-supplied feed in Malacky (ton)								20,396

Remarks:

Wheat (actual): 2/3 of wheat production is assumed to be consumed as self-supplied feed.

Barley: 1/3 of Barley production is assumed to be consumed as self-supplied feed.

Maize (plan): Maize cultivated by irrigation is for Grain Maize and rain-fed cultivation is for silage use.

Rye: 1/2 of Rye production is assumed to be consumed as self-supplied feed.

Soybean: Planned soybean is excluded from the balance calculation because soybean is to be replaced to purchased feed.

Table B.15.4 TDN Requirement for Livestock Product

Beef Cattle Breeding : TDN Requirement and Production Cost

Category of cattle	Assumed Head in Malacky	Weight Gain	Increase of Meat	TDN	Cost(SKK) Purchased Feed	Produced Feed	Other Direct Cost	Administration expense	Total Cost	Price Selling Price	Subsidy Subsidy
	head	kg/day	kg/day	kg/head	SKK	SKK	SKK	SKK	SKK	SKK	SKK
Grow, up to 1 year, Male	1,864	1.20	2237	4.47	8.43	18.58	11.42	8.8	47.23	81.74	0.19
Female	1,213	0.80	970	3.13	1.78	14.07	10.49	5.25	31.59	67.33	0.13
Fattening, 1 to 2y. Male	1,062	0.70	743	6.87	1.54	19.64	12.71	6.34	40.23	81.74	3.12
Female	527	0.60	316	4.96	1.54	19.64	12.71	6.34	40.23	67.33	3.12
Breeding bulls	0	0.70	0	6.94						81.74	
Fattening, over 2y, Male	158	0.60	95	6.51	1.54	19.64	12.71	6.34	40.23	81.74	3.12
Female	0	0.60	0	5.90						67.33	
Breeding bulls	0	0.20	0	6.71						81.74	
Cows, beef calf reprod	310	0.10		6.54	1.69	15.87	16.59	7.72	41.87	67.33	0.67
Cows,calf repr.unmated	59	0.10		4.58	1.78	14.07	10.49	5.25	31.59	67.33	0.13
Total in Area	5,191		4,361	25,349.6	21187.523	91726.9448	61951.728	36537.29561	211403.49	340379.89	6175.05
In 1 kg of Meat				5.81	4.86	21.04	14.21	8.38	48.49	78.06	1.42

Pig Breeding : TDN Requirement and Production Cost

	Category	Head in Malacky	Weight Gain	Increase of Meat	TDN demand in Malacky district	Cost Purchased Feed	Produced Feed	Other direct cost	Administration expense	Total Cost	Income subsidy
		head	kg/day	kg	kg/head	SKK	SKK	SKK	SKK	SKK	SKK
1	growing , up to 20 kg	2,040	0.250	510	604	5.60	6.80	9.69	4.39	26.48	0.00
2	fattening, 21 to 50kg	2,889	0.675	1,950	3,192	5.60	6.80	9.69	4.39	26.48	0.00
3	51 to 80kg	2,040	0.803	1,638	3,501	5.60	6.80	9.69	4.39	26.48	0.00
4	81 to 110kg	1,808	0.850	1,537	3,983	3.05	8.62	3.98	2.52	18.17	0.45
5	over 110kg	162	0.850	137	398	3.05	8.62	3.98	2.52	18.17	0.45
6	breeding, 21 to 50kg	162	0.700	113	231	5.60	6.80	9.69	4.39	26.48	0.00
7	breeding boars, over 50kg	30	0.250	8	53	5.60	6.80	9.69	4.39	26.48	0.00
8	breeding sows, over 50kg, mated	141	0.250	35	143	6.31	12.57	17.07	7.15	43.10	0.23
9	ibid, unmated	111	0.250	28	194	5.60	6.80	9.69	4.39	26.48	0.00
10	sows, mated	495	0.250	124	1,982	6.31	12.57	17.07	7.15	43.10	0.23
11	ibid, unmated	222	0.250	56	430	5.60	6.80	9.69	4.39	26.48	0.00
	Total in Area	10,100		6,136	14,710	51,989	75,934	91,321	42,411	261,655	1,034
	In 1 kg of Meat				2.40	8.47	12.38	14.88	6.91	42.64	0.17

Milking : TDN Requirement and Production Cost (5000 lit /head/year)

	Category of cattle	Head in Malacky	Weight Gain	Milk Production	TDN (kg)	Unit Cost per 1 Feeding Day Purchased Feed	Produced Feed	Other direct cost	Administration expense	Total Cost	Income Cow Meat increase	Subsidy
		head	kg/day	lit	kg/head	SKK	SKK	SKK	SKK	SKK	kg	SKK
1	Grow, Male, Breeding	83	1.00		4.36	1.78	14.07	10.49	5.25	31.59	82.62	0.13
2	Female	599	0.70		2.70	1.78	14.07	10.49	5.25	31.59	419.06	0.13
3	Breeding heifers, mated	433	0.40		5.21	1.69	15.87	16.59	7.72	41.87	173.37	0.67
4	unmated	327	0.40		4.69	1.78	14.07	10.49	5.25	31.59	130.98	0.13
5	Breeding, Dairy, mated	184	0.10		5.01	1.69	15.87	16.59	7.72	41.87	18.39	0.67
6	unmated	40	0.10		4.50	1.78	14.07	10.49	5.25	31.59	3.97	0.13
7	Cows,Milking, mated	1420	0.10	19,452	9.53	11.85	35.60	67.89	21.20	136.54	142.00	15.44
8	unmated	572	0.10		4.50	1.78	14.07	10.49	5.25	31.59	57.23	0.13
	Total in Area	3,658		19,452	22980.35	20754.85	83151.33	123644.7	43377.92	270928.77	1,028	22,549
	In 1 lit of Milk				1.18	1.07	4.27	6.36	2.23	13.93		1.16

Other Shadow Income

Category of cattle	Head in Malacky	Weight Gain	Cow Meat increase	TDN	Unit Cost per 1 Feeding Day Purchase feed	Produced Feed	Other direct cost	Administration expense	Total Cost
	Head	kg/day	kg	kg/head	SKK	SKK	SKK	SKK	SKK
1 Sold, Male Calf	3,493	1.20	4191.31	4.82	8.43	18.58	11.42	8.80	47.23
Total in Area									164962.88

14,965		Income Selling price	Selling amount	Subsidy	subsidy amount	Total Income
		SKK/kg	SKK	SKK/head	SKK	SKK
		51.99		0.19		
Total in Area			217,906		663.6237032	218,569.83
Balance in Area						53,607
In 1 lit of Milk						2.76

Subsidy of disadvantage area is not cc

Table B.15.5 Actual Feeding Mixture in Case Study Area

Growing Cattle

	weight kg			kg	TDN %	TDN kg	TDN Share	Unit Price SKK/kg	Price SKK	Price Share
Concentrated Feed	2.5	Self-Supplied Feed	Wheat	1.12	0.787	0.88	30%	3.47	3.89	30%
			Barley	0.45	0.741	0.33		3.52	1.58	
			Maize	0.35	0.799	0.28		3.62	1.27	
		Purchased Feed	Soybean	0.40	0.910	0.36	9%	7.8	3.12	21%
			DKZ-2201	0.13	0.900	0.11		10	1.25	
			Fodden lime	0.01		-		10	0.05	
			Salt	0.05		-		10	0.5	
Roughage	25	Self-Supplied Feed	Grass(Reed Canarygrass)	25.00	0.121	3.03	61%	0.45	11.25	49%
Total						4.99	100%		22.91	100%

Pig

	weight kg			kg	TDN %	TDN kg	TDN Share	Unit Price SKK/kg	Price SKK	Price Share
Concentrated Feed	2.5	Self-Supplied Feed	Wheat	1.05	0.797	0.84	79%	3.47	3.64	63%
			Barley	0.30	0.704	0.21		3.52	1.06	
			Maize	0.58	0.810	0.47		3.62	2.08	
		Purchased Feed	Crash Soybean Extract	0.25	0.709	0.18	21%	6.00	1.5	37%
			K-2111-VUL/A	0.13	0.900	0.11		10.00	1.25	
			Malt extract	0.08	0.561	0.04		6.00	0.45	
			Dried rape cake	0.13	0.598	0.07		6.00	0.75	
Total				2.50		1.92	100%		10.73	100%

Milking Cow

	weight kg			kg	TDN %	TDN kg	Share	Unit Price SKK/kg	Price SKK	Price Share
Concentrated Feed	5	Self-Supplied Feed	Wheat	1.00	0.787	0.79	26%	3.47	3.47	21%
			Barley	1.00	0.741	0.74		3.52	3.52	
			Maize	0.60	0.799	0.48		3.62	2.17	
		Purchased Feed	Crash Soybean Extract	1.23	0.766	0.94	21%	6.00	7.35	24%
			DKZ-milking cow	0.13	0.766	0.10		6.00	0.75	
			Wheat Bran	1.00	0.639	0.64		1.70	1.7	
			Limestone	0.05		-		1.00	0.05	
Roughage	30	Self-Supplied Feed	alfalfa	15.00	0.124	1.86	53%	1.07	16.05	55%
			silage maize	15.00	0.152	2.28		0.45	6.75	
Total						7.83	100%		41.81	100%

Table B.15.6 Calculation of Feed Crop Value in Livestock Process

Feed Wheat

Meat Cattle Breeding

Yied	Live stock Product	Income			Cost			Profit	
		Selling amount	subsidy	sub-total	CCsc	Other	sub-total	amount	ratio
(ton/ha)	(kg/ha)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	
1	2=1*A/C	3=2*I*H	4=2*J	5=3+4	6	7=2*G	8=6+7	9=8-5	10=9/5
2	905	42,387	1285	43,672	11115	36,653	47,768	-4,096	-9%
2.5	1,131	52,972	1606	54,578	11115	45,806	56,921	-2,343	-4%
3	1,357	63,556	1927	65,483	11115	54,959	66,074	-590	-1%
3.2	1,447	67,772	2055	69,826	11115	58,604	69,719	108	0%
3.5	1,583	74,141	2248	76,389	11115	64,112	75,227	1,163	2%
4	1,809	84,726	2569	87,295	11115	73,265	84,380	2,916	3%
3.1673	1,433	67,116	2035	69,151	11114	58,037	69,151	0	

Pig Breeging

Yied	Live stock Product	Income			Cost			Profit	
		Selling amount	subsidy	sub-total	CCsc	Other	sub-total	amount	ratio
(ton/ha)	(kg/ha)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	
1	2=1*A/C	3=2*I*H	4=2*J	5=3+4	6	7=2*G	8=6+7	9=8-5	10=9/5
2	840	32,580	143	32,723	11115	25,418	36,533	-3,811	-12%
2.5	1,050	40,725	179	40,903	11115	31,773	42,888	-1,985	-5%
3	1,260	48,870	214	49,084	11115	38,128	49,243	-159	0%
3.2	1,344	52,128	228	52,356	11115	40,669	51,784	572	1%
3.5	1,470	57,015	250	57,265	11115	44,482	55,597	1,667	3%
4	1,680	65,160	286	65,445	11115	50,837	61,952	3,493	5%
2.995	1,258	48,788	214	49,002	11114	38,064	49,178	-176	

Milking

Yied	Live stock Product	Income			Cost			Profit	
		Selling amount	subsidy	sub-total	CCsc	Other	sub-total	amount	ratio
(ton/ha)	(kg/ha)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	(SKK)	
1	2=1*A/C	3=2*(H+I)	4=2*J	5=3+4	6	7=2*G	8=6+7	9=8-5	10=9/5
2	4919	64386	5706	70,092	11115	61,976	73,091	-2,999	-4%
2.5	6148	80483	7132	87,615	11115	77,470	88,585	-970	-1%
3	7378	96580	8559	105,138	11115	92,964	104,079	1,059	1%
3.2	7870	103018	9129	112,148	11115	99,162	110,277	1,871	2%
3.5	8608	112676	9985	122,661	11115	108,458	119,573	3,088	3%
4	9838	128773	11412	140,184	11115	123,953	135,068	5,117	4%
2.74	6736	88171	7813	95,985	11114	84,871	95,985	0	

Feed Selling

Yied		Income			Cost		total	Profit	
		Selling amount	subsidy	sub-total	Production Cost			amount	ratio
(ton/ha)		(SKK)	(SKK)	(SKK)	(SKK)		(SKK)	(SKK)	
1	2	3=1*H	4=1*J	5=3+4	6	7	8=6+7	9=8-5	10=9/5
2		6600	1700	8300	12227		12,227	-3,927	-47%
2.5		8250	1700	9950	12227		12,227	-2,277	-23%
3		9900	1700	11600	12227		12,227	-627	-5%
3.2		10560	1700	12260	12227		12,227	33	0%
3.5		11550	1700	13250	12227		12,227	1,023	8%
4		13200	1700	14900	12227		12,227	2,673	18%
3.19		10527	1700	12227	12227		12,227	0	