

# **THE DEVELOPMENT OF GROWING SUGAR BEET AND THE SUGAR MAKING INDUSTRY SINCE 1985 UP TO THE PRESENT IN THE CZECH REPUBLIC**

*A. VĚŽNÍK*

Department of Geography, Masaryk University, Kotlářská 2,  
611 37 Brno, Czech Republic

Received for publication: June 1996

## **SUMMARY**

The objective of this paper is above all to inform about the development of growing sugar beet and the sugar making industry since 1985 up to the present. The paper is divided into two basic chapters, the first paying attention the main trends of the development of sowing areas and hectare yields of sugar beet in the Czech Republic for the period of 1985-1995. In the second part is paying attention some geographical aspects of the sugar producing industry in the Czech Republic.

## **KEY WORDS**

Agriculture - Sugar Beet - Production - Sugar Making Industry - Czech Republic

## **INTRODUCTION**

From the point of view of the energetic value sugar beet belongs among the most productive agricultural crops. It has an irreplaceable importance in the sowing method as an improving crop. It leaves the soil in a favourable biological, chemical and physical state. As a root crop frequently fertilized with mulch it is a suitable preceding crop for all agricultural crops following it. Sugar beet also represents a commodity in which also a number of byproducts are utilized, above all leaves, pulp from which sugar was removed and molasses for feeding livestock (Jeníček, 1986).

## SOME GEOGRAPHICAL ASPECTS OF THE SUGAR BEET PRODUCTION

In the Czech Lands sugar beet started to be grown after the Napoleonic wars and soon it spread a great deal on the territory suitable for it. From the geographical point of view sugar beet belongs to the territorially most stable crops grown in the Czech Republic (CR) and has been grown in the same regions for more than 100 years. The requirements of sugar beet for natural conditions are generally known and they are also respected. In this country sugar beet is grown in the height above sea level to 350–400 m. Soil and weather conditions affect its growing more markedly than is the case with, say, cereals, because it belongs among crops requiring humus soil of good quality with a good structure and good physical qualities. A very serious drawback in growing it is low pH; sugar beet requires above all soils with neutral to weakly alkaline reaction, i.e. with pH 7.0–7.2, but in this country the area of soils with pH lower than 6.5 is systematically increasing, which makes the choice of lands for its growing more difficult. Sugar beet is not grown on beet growing soils situated at a large distance from the individual sugar factories, such as the district of Benešov or the two country districts of Plzeň (Götz, 1988). The share of suitable soils in the individual regions (according to the type structures in value of soils), together with further data, is expressed in Table 1.

Region	suitable soil %	production evaluation	area '000 ha	% of arable land
Prague	59	86	0.8	7.2
Central Bohemian	49	81	33.8	6.0
South Bohemian	3	78	-	-
West Bohemian	13	75	-	-
North Bohemian	47	76	9.4	3.5
East Bohemian	39	83	21.7	4.4
South Moravian	59	83	30.6	4.2
North Moravian	47	83	20.5	5.2
Czech Republic	38	82	116.9	3.7

**Table 1.** Growing beet root on the territory of the CR

Note.: The harvest area is given as the average for the period of 1990–1993, in the column suitable soils it is a percentual share in arable land, in the column production evaluation it is the evaluation of suitable areas in points.

From Table 1 it follows that out of the suitable areas for growing sugar beet only less than a tenth are used, the greatest reserves of areas remaining above all in north Bohemia and in south Moravia. The situation on the world markets orients our sugar production rather in the opposite direction, i.e. towards the limitation of areas sown with sugar beet (see below). At present sugar beet exceeds 10% of arable land only in the districts Kladno, Mladá Boleslav, Nymburk, Hradec Králové, Jičín, Kroměříž, Prostějov and Olomouc, but also in further districts of the main beet growing regions of the Elbe basin and Haná this share exceeds 5%. Besides the above regions only district Opava represents an exception, where areas devoted to sugar beet reach as much as 8% of the arable land of the district.

Year	area sown - ha CR	area sown - ha Bohemia	area sown - ha Moravia and Silesia	ha yield - t CR	ha yield - t Bohemia	ha yield -t Moravia and Silesia
1985	146 405	81 259	65 146	39.64	36.84	41.22
1986	139 436	77 844	61 592	39.13	41.01	37.58
1987	138 393	77 316	61 077	37.18	35.81	40.44
1988	112 993	54 002	58 991	33.89	31.89	37.94
1989	127 124	70 452	56 672	35.52	35.86	36.02
1990	118 813	66 246	52 567	34.01	31.07	38.27
1991	118 988	66 542	52 446	33.73	33.42	33.79
1992	124 536	70 734	53 801	31.19	31.30	31.06
1993	107 245	60 328	46 915	40.38	40.74	39.92
1994	91 096	51 529	39 567	35.57	34.16	37.40
1995	93 104	54 686	38 419	39.86	37.06	43.86

**Table 2.** The development of areas sown and hectare yields of sugar beet in the CR for the period of 1985-1995

In the development of areas sown of sugar beet on the territory of the CR it is possible to follow a relatively stable development which, however, is strongly deformed after 1985. From the beginning of the first republic our country was a sugar beet and sugar great power and many world specialists also learned from us. In the period of the first republic sugar beet was grown on the average on 175 thousand hectares a year in the Czech Lands, the greatest area - more than 200 thousand hectares being reached in the years 1924 to 1927. Since that time, however, more than 60 years elapsed and our republic experienced a different stage of development than did the rest of the world. In the 1950s and 1960s the areas

sown of sugar beet reached more than 170,000 ha, but the progressive world chose another path. The 1970s are characterized by a relative stability of the areas sown of sugar beet whose value varied about 150,000 ha. Only after 1985 there is an abrupt reduction of the areas sown, which culminates in 1988 by a drop to a mere 113,000 ha. The world market is saturated with the production of sugar, the pupils became teachers who absorbed fully the market mechanism and gradually start entering our sugar making industry, our market with sugar beet seeds and the mechanization for growing it. The varieties cultivated by them guarantee by their quality high hectare yields with guaranteed sugar content. Despite that, however, due to favourable economic conditions for growing sugar beet in the years 1991 and 1992 the cultivators increased the areas up to 124,000 ha, but the produced sugar surplus was sold only on the basis of subsidized export. A really difficult situation of our sugar producing industry is documented by a further reduction of the area sown to only 91,096 ha in 1994.

The greatest share in the areas for growing sugar beet in the long run is that of the Central Bohemian and the South Moravian Regions, in the south and the west of Bohemia sugar beet has been grown to only a minimum extent since the 1960s for feeding purposes and in recent years its cultivation has been stopped altogether in those regions. The distribution of sugar beet areas in the individual regions depends on natural conditions and on our territory it is considerably non-uniform. In 1991-1993 about 54% of the area was concentrated in the Central Bohemian and South Moravian Regions, followed by the East Bohemian Region. As for the share of sugar beet area in the area of arable land, sugar beet takes up the greatest shares in the Central Bohemian, North Moravian and East Bohemian Regions.

The complex situation is also documented by the development of the hectare yields (see Table 2). Thus, in the period of 1934 to 1938, on the territory of today's CR the mean hectare yield was 29.33 t/ha, for the whole postwar period this value has not increased substantially. In 1960 the mean yield reached the value of 35.67 t/ha, but in 1965 only 24.59 t/ha and in 1976 even as little as 23.55 t/ha. For comparison the mean for the period of 1985-1987 reached in the CR the value of 38.65 t/ha, whereas in the neighbouring Austria it was 54.47 t/ha and on the territory of the former FRG 50.69 t/ha. We can state maliciously that on the territories of Hungary, the GDR and Poland the above values were still lower, 36.13, 34.38 and 33.47 t/ha, respectively. In comparison with advanced beet growing countries of Europe, producing from one hectare as much as 7 t refined sugar, the CR achieves only 50-60% of that level. Thus, the production of refined sugar in Austria surpasses our production 2-2.5 times. These differences are above all due to different agroecological conditions and observing technological discipline, and the sugar content of our sugar beet is deep below the average of advanced countries. In the estimation of influences for increasing the production of refined sugar in this country, the greatest stress was put on the state of the soil (22%), further the quality of the harvest, sowing and the number of individual plants (15% each), the nutrition (12%) and the quality of the seed (11%)

(Kaštánková, Perlin, 1986). Among other influences are included the autumn soil preparation and the spring work, storage of beet root, acceptance and manipulation with it, effects of diseases and pests, etc. In the CR still a great share of ballast material is transported, dirt often reaches as much as 40% of heads as against 5% in the FRG and Austria, that is why it is necessary to see to the rationalization of the transport of sugar beet.

## **SUGAR PRODUCING INDUSTRY IN THE CR**

The sugar producing industry on the territory of the Czech Republic is a typical representative of the food industry which in the fundamental production activity is linked up with agricultural primary production. The main task of our sugar making industry is to safeguard the procession of sugar beet with minimum losses with the reduction of the energetic requirements, thus securing the sources of sugar for the home production. And in this very sphere a number of our sugar factories lag relatively very much behind the present trend in the world. The basic trends in the development of the sugar producing industry abroad are characterized for the period of the last 40 years by reconstructions, modernization of processes, continualization, improvement of machines and equipment and at present a high degree of automation. On the other hand, the technological equipment of the sugar making industry in the CR have a high degree of wear, low technical level (in comparison with sugar factories abroad), and particularly low processing capacities (Řepařské noviny, 1994). This situation is the reason of deep lagging of the sugar making industry behind the world standard in all main technical and economic indices. Thus, in the early 1990s the mean processing capacity of one sugar factory was only 1,450 t of processed sugar beet per day and it was practically the lowest in the whole of Europe (even Poland was ahead of us). The smallest factories had already been closed down; in 1938 there had been 100 active sugar factories on the territory of the whole Czechoslovakia. In the late 1980s it was 65, out of which on the territory of the CR 55 sugar factories were operating. Their location in essence corresponded to the main production regions, 20 of them being on the territory of the Central Bohemian Region and Prague, 5 in the North Bohemian Region, 8 in the East Bohemian, 13 in the South Moravian and 9 in the North Moravian Regions. The degree of wear of the production assets in the sugar making industry is the highest of all branches of the food industry. Although the engineering plants at Hradec Králové have built 50 sugar factories since 1945, but only 2 on the territory of the CR. Old are both buildings - most sugar factories operating in buildings dating back to the mid-19th century - and the machines.

After the war only sugar factories at Opava, Hrochův Týnec and Hrušovany nad Jevišovkou have been built, the one at Hrušovany being our largest, its processing capacity being 4,200 t. On the other hand it is necessary to state that in the neighbouring countries large capacity sugar factories have been built with the daily capacity of processing 10 or more thousand tons of sugar beet and which, besides, correspond to all ecological require-

ments. After 1989 only 52 sugar factories remained in operation on the territory of the CR, a number of them renovated and maintained only with great expenses. For these reasons and for those mentioned above, particularly after 1991 they are being closed down, so that in 1993 the campaign was started with only 39 sugar factories and the campaign in 1995 was started with even only 29 ones, their mean daily procession capacity increasing to 1,590 t of beet root per day. The main reason of closing down the individual sugar factories was their obsolete procession equipment, lack of money for buying a sufficient amount of sugar beet, but also further financial problems, when a number of sugar factories are unable to pay the farmers for the beet root. The crisis in the sugar making industry thus continues and in 1994 only 30 sugar factories started the procession campaign. It is evident that for the above reasons the economically stronger ones can replace those turning bankrupt without any problems. Therefore it is necessary to consider the future of our sugar producing industry, the admission of foreign capital and the further utilization of sugar beet for non-food industry uses. With respect to the age and state of the sugar factories including their economic expenses to the production of sugar it will evidently be necessary to build up gradually new production capacities with the production output of about 8,000 tons of sugar beet per day. The new plants will have to be built in the centres of the production regions with a high concentration of areas of sugar beet. An important factor of the economic activity of work of the sugar factories is also the length of the campaign which should be at least 90 days. A longer campaign would be more advantageous, but our climatic conditions do not permit it. An essential condition for the activity of sugar factories is also the fulfilment of ecologic regulation and standards (Cukrovka, cukr, 1994).

Sugar consumption in the Czech Republic is stable in the long run. Sugar consumption per one CR inhabitant ranks among one of the top places in the world. In recent years the consumption of sugar has become stabilized at about 39 kg per capita, which is by about 30% more than the recommended amount (28 kg). From the overall sugar production which in the years 1991-1993 reached about 570,000 t, about 40% is direct consumption, i.e. purchase in the retail network, and about 41% falls to indirect consumption. The remaining amount goes to export, final reserves or to the unregistered transfer to the Slovak Republic (SR). As can be seen, in the CR there is a very high, particularly indirect, sugar consumption, in which above all sugar consumption in the products of sweet pastry, sweets and non-alcoholic and alcoholic drinks dominates. Another amount of sugar is consumed in the fermenting and tinning industry. All that consumption is covered from our own sources. Besides sugar, sugar beet yields a number of important by-products which represent valuable sources of fodders for the livestock production. But, on the other hand, it is necessary to realize that the production of sugar in the CR is high and sugar often does not find its place on the internal market. Particularly in recent years, when the sugar market goes through a complex restructuralization in the region of transformation and privatization of the agriculture, there is often an excess of offer over the demand. On foreign markets sugar produced in our country is often marketable only with the state export subsidy. Also the

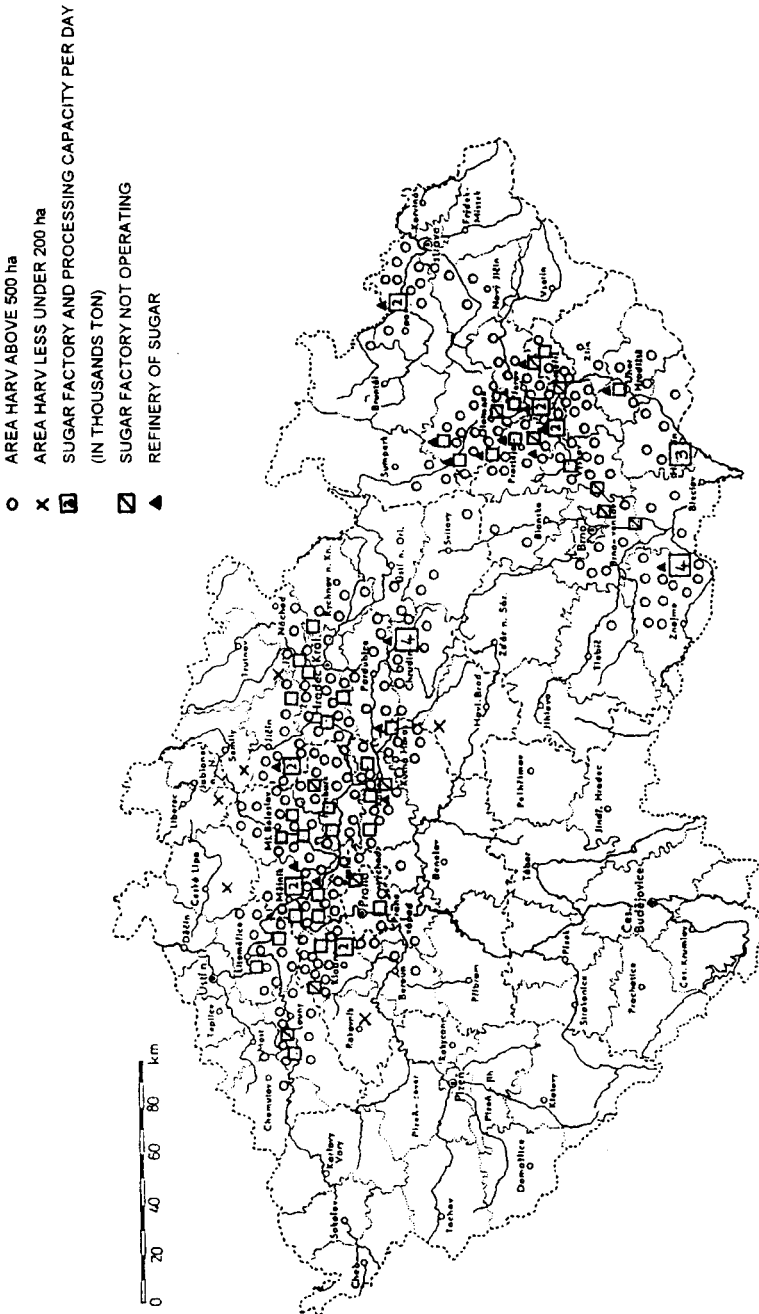


Fig. 1. The production of sugar beet in the Czech Republic (Source: Götzt, 1995)

pro-export rate of exchange of the Czech crown to freely exchangeable currencies does not compensate the selling price at European or world exchanges with the selling prices of the other sugar producers. With respect to the reducing areas of sugar beet also a reduced sugar production is assumed in this country. It reached 480,000 tons in the economic year 1994/95 and in the future it should not exceed 430,000 tons. Higher sugar production would only hardly find its place on internal and foreign markets.

## CONCLUSIONS

In the future, however, it is not necessary to become completely embittered against sugar beet whose importance for agriculture cannot be doubted. In most countries of the world where sugar beet is grown the growing areas are also reduced, but the scientific and technical basis has started research projects of the alternative utilization of sugar beet. It is a crop with a high energetic yield and a broad alternative utilization. The most suitable can be considered the production of ethanol with the possibility of utilizing it as engine fuel. In its production it is also possible to use also beet root qualitatively less suitable for sugar factories. Another possibility is the utilization of sucrose as a raw material for chemical industry. These alternative utilizations are, however, economically still very expensive.

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