

ESTONIAN AGRICULTURAL PRODUCTION DATA: AN INTERPRETATION THROUGH COMPARISON*

Martin KLESMENT

Estonian Interuniversity Population Research Centre, P.O. Box 3012, 10504 Tallinn, Estonia;
martin@ekdk.estnet.ee

This article is about Estonian agricultural production data series from 1920 to 2000. The data are used for international comparisons. The author assumes that possible errors in the statistics of Soviet years, such as unrealistic agricultural yields, may be exposed if the data are used for international comparisons. Also, the author attempts a simple agricultural output aggregation and speculates with the figures of Estonian agricultural labour force after World War II.

Measuring agricultural production of the 20th century Estonia is not an easy task due to serious shortcomings in historical statistics. The largest problem is the Soviet period which produced statistical data of questionable quality¹ and this appears as a major impediment to historical research in general. Agriculture is no exception here. Estonian agriculture during the Soviet years has been dealt with in many works.² However, none has concentrated on creating long-term comparable

* The preparation of this article was supported by research theme No 0132703s05 of the Estonian Ministry of Education and Research.

¹ Soviet statistics and its reliability have been widely discussed by economists and historians throughout several decades. To mention only a few of the important works in this category: **Gerschenkron, A.** The soviet indexes of industrial production. – Review of Economics and Statistics, 1947, 29, 4; **Bergson, A.** The Real National Income of Soviet Russia since 1928. Harvard UP, Cambridge, 1961; **Davies, R. W. et al.** The Economic Transformation of the Soviet Union, 1913–1945. CUP, Cambridge, 1994. Statistical problems of the Soviet system are also present in the discussion on historical national accounts of the Soviet bloc. See **Marer, P. et al.** Historically Planned Economies. A Guide to the Data. The World Bank, Washington, D.C., 1992.

² See for instance **Ekbaum, A.** Destruction of Independent Farming in East Europe. Estonian Information Centre, Stockholm, 1949; **Järvesoo, E.** Progress despite collectivization: agriculture in Estonia. – In: **Ziedonis, A. et al.** (eds). Problems of Mininations. Baltic Perspective. California State University, San Jose, 1973; **Järvesoo, E.** Die Estnische Landwirtschaft während der Sowjetperiode 1945–1972. – Acta Baltica, 1974, XIII; **Laasi, E.** Mõnedest korrigeerimist vajavatest arvestest. Manuscript for Eesti NSV TA Toimetised. Ühiskonnateadused, 1971, 2; **Poom, E.** The productivity of collective and private enterprise in agriculture. A comparative study of soviet and Estonian achievements. – In: Societas Litterarum Estonica in Svecia. Stockholm, 1949; **Purre, A.** Soviet Farming Failure Hits Estonia. Estonian Information Centre, Stockholm, 1964; **Purre, A.**

data series. The latter is due to lack of consistent statistical data. Some agricultural production series of Soviet Estonia have been corrected later by statisticians,³ but the accuracy of the data still needs testing. This article compares Estonian agricultural output series from 1920 to 2000 with five other countries. The author believes that comparisons help to expose large-scale errors in statistical data which is the main purpose of the present article. The secondary purpose is to offer some thoughts for analysis of agricultural development in Estonia using a comparative perspective. From the analytical aspect, there are serious gaps in available data, such as investment in agriculture that make fully acceptable comparisons impossible at this point. However, the present focus is on the organisation and consistency of available data. Comparison countries are Finland, Sweden, Denmark, Poland, and Czechoslovakia.⁴

A short note on Estonian agricultural profile should be presented first. Estonian agriculture of the 20th century evolved mainly around grain and potato production as well as animal husbandry (dairy farming and pig breeding). Debates on specialisation of agriculture occurred notably in the interwar period, characterised as competition between extensive and intensive farming. While grain production was the traditional field of agriculture, it was mostly related to extensive use of land. Dairy farming as a more intensive way of farm production was advocated by many and ideologically supported by examples of Danish agricultural success. Estonian agriculture of the interwar period has been analysed by Anu-Mai Kõll.⁵ Post-World War II agricultural politics is not as easy to outline and this will not be done here. The problems of agricultural production under Soviet rule are well known. Farming during the 1950s was seriously undermined by the collectivisation campaign, but after reorganisations relative success was achieved during the 1960s and 1970s.⁶ It is difficult to assess how efficient collective farming in Estonia became, whether it was actually developing towards more intensive production

Die Landwirtschaft Estlands im Rahmen der allgemeinen Agrarpolitik der Sowjetunion. – *Acta Baltica*, 1966, V; **Taagepera, R.** Soviet collectivization of Estonian agriculture: the taxation phase. – *Journal of Baltic Studies*, 1979, X, 3; **Taagepera, R.** Soviet collectivization of Estonian agriculture: the deportation phase. – *Soviet Studies*, 1980, XXXII, 3; **Kõll, A.-M.** Tender wolves. Identification and persecution of kulaks in Viljandimaa 1940–1949. – In: **Mertelsmann, O.** (ed.). *The Sovietization of the Baltic States, 1940–1956*. Kleio, Tartu, 2003; **Mertelsmann, O.** *Der stalinistische Umbau in Estland. Von der Markt- zur Kommandowirtschaft*. Verlag Dr. Kovač, Hamburg, 2006; **Vint, E.** *Intensiivse põllumajanduse majanduslik efektiivsus Eesti NSV-s*. Valgus, Tallinn, 1971.

³ Eestis kasvatatud tera- ja kaunviljakultuuride külvipind, kogutoodang ja saagikus (aidakaalus) 1955–1990. a. Eesti Statistikaamet, Tallinn, 1991.

⁴ Choice of foreign countries is made on the basis of geographic proximity, agricultural profile and data availability. All foreign statistics are from **Mitchell, B. R.** *International Historical Statistics. Europe 1750–2000*. Palgrave Macmillan, New York, 2003.

⁵ **Kõll, A.-M.** *Peasants on the World Market. Agricultural Experience of Independent Estonia 1919–1939*. Almqvist & Wiksell, Stockholm, 1994.

⁶ About the discussion on Estonian agriculture after World War II and for an overview of Estonian economy during the Soviet rule see **Klesment, M.** *The Estonian economy under soviet rule: a historiographic overview*. – *Journal of Baltic Studies*, forthcoming.

or remained extensive. Something can be said on the basis of crop yields and output/labour ratios presented in this paper, but these are not conventional productivity estimates. Agricultural labour force decreased substantially after regaining independence which should indicate that large-scale farming was inappropriate for a small country's transitional economy. This meant decreasing output volumes. Also, lower yields are not uncommon, because of lesser amounts of chemical fertilisers used.⁷

The discussion in this article relies heavily on information presented in the form of graphs. Many assumptions made in the text are interpretations of included graphs.⁸

GRAIN AND POTATO OUTPUT

Average land used for grain and potato growing as well as their average output and yields in Estonia over decades are expressed in Table 1. There is a significant gap in the series between 1940 and 1955, because the revised post-World War II crop growing data begin in 1955. The relevant statistics from 1941 until 1954 is considered unreliable to be used at the moment.⁹ However, there are

Table 1. Average grain and potato production in Estonia 1920–1999

Area: 1000 hectares; crop: thousands of tons; yield: hundredweights per hectare ¹⁰												
	Rye			Wheat			Barley			Potato		
	Area	Crop	Yield	Area	Crop	Yield	Area	Crop	Yield	Area	Crop	Yield
1920–1929	151.0	155.1	10.3	24.4	24.2	9.9	120.1	112.9	9.7	67.9	706.0	103.9
1930–1939	146.7	196.0	13.3	57.0	67.3	11.9	100.7	100.0	9.9	73.3	912.3	125.0
1955–1959	96.9	88.4	9.1	61.4	52.4	8.8	57.0	51.7	9.1	94.4	1033.8	109.4
1960–1969	76.4	98.9	13.2	26.3	35.5	13.9	134.5	230.3	16.4	87.3	1283.6	148.5
1970–1979	40.7	75.9	18.3	37.1	78.3	21.0	234.6	470.0	19.9	75.7	1207.7	159.4
1980–1989	55.1	113.7	20.5	34.8	76.0	21.9	265.5	554.6	21.0	62.1	924.8	149.3
1990–1999	42.8	90.8	20.2	44.7	87.5	20.4	207.4	370.7	17.7	39.8	517.6	130.0

Calculation based on: **Klesment, M., Valge, J.** (eds). Eesti rahvastiku majandustegevuse näitarve XX sajandil. EKDK, Tallinn, 2007.

⁷ The transition of agriculture has been dealt with in **Jørgensen, H.** Continuity or Not?: Family Farming and Agricultural Transformation in 20th Century Estonia. Umeå University, Umeå, 2004.

⁸ All graphs have the same sources: foreign data are from **Mitchell, B. R.** International Historical Statistics. Europe 1750–2000; Estonian agricultural production data are from **Klesment, M., Valge, J.** (eds). Eesti rahvastiku majandustegevuse näitarve XX sajandil. EKDK, Tallinn, 2007; all Estonian population related data are from Table 3.

⁹ This has been described in **Klesment, M., Valge, J.** (eds). Eesti rahvastiku majandustegevuse näitarve XX sajandil, 30–36.

¹⁰ Average yields are based on annual data, not area and crop averages.

estimates for this period made by historians on the basis of archival documents.¹¹ Smaller crop cultures have been excluded in this paper, therefore the total arable land is not presented.

Average area of crops should be observed to follow the changes in plant growing, which can be summarised as follows. During the eighty years, rye fields in Estonia diminished three times, wheat area fluctuated but stayed generally lower than rye fields, and barley fields approximately doubled. Acreage for potato increased during the post-war decades compared to the interwar period, but decreased later. For grain and potatoes, traditional unit of yield measurement in Estonia has been hundredweight (100 kilograms), though tons are more common lately.

Obviously it is neither acreage nor total output which provide a basis for comparison, but yield per hectare. This indicator is important not only for estimating the efficiency of crop growing, but also assessing the reliability of statistical data. It is practical to assume that Soviet statistics of product output was more likely to be upward biased, not downward. If yields per hectare in post-WWII Estonia would have been substantially higher than those in, say, Denmark, the possible explanation would be biased data. Since the Estonian interwar grain yields were below of those in Denmark, one would not expect them to exceed Denmark's results during the post-WWII period, unless any radical agricultural techniques were adopted in Estonia. On the other hand, if yield figures of Estonia were fluctuating in parallel with other countries' figures, it could be an indication of similar climatic influence on yields (weather conditions as a variable is not considered in this article), which would support the credibility of the Estonian data. Thus comparisons may be of some assistance when organising available data and checking for consistency of figures.

Yield dynamics of crops in all comparison countries can be followed on respective graphs of this article. For each grain type and potato, two graphs have been composed. One which plots absolute numerical figures of yield per hectare (Figs 1–4), and another that employs the country's 1920–1939 average yield as an index base to measure post-WWII development. The latter (which will be called relative yield growth) demonstrates how well each country has improved against its own previous level (Figs 5–8). This has been done to decrease, at least to some extent, the regional differences in comparisons.¹²

The graphs suggest that Estonian grain and potato yields, in absolute terms, generally stayed relatively low in comparison to more successful countries. Whether this was due to climate, soil or agrotechnical techniques used, cannot be discussed here. Differentiation between countries is less evident during the interwar years and more pronounced in the post-WWII period, when some countries (Denmark, Sweden, and Czechoslovakia) show considerably higher yield levels. This should

¹¹ See **Mertelsmann, O.** *Der stalinistische Umbau in Estland, 187–196.*

¹² Index based graphs use data series that are calculated as 3-year moving average of absolute yield figures. This is used to decrease the intensity of periodical fluctuations.

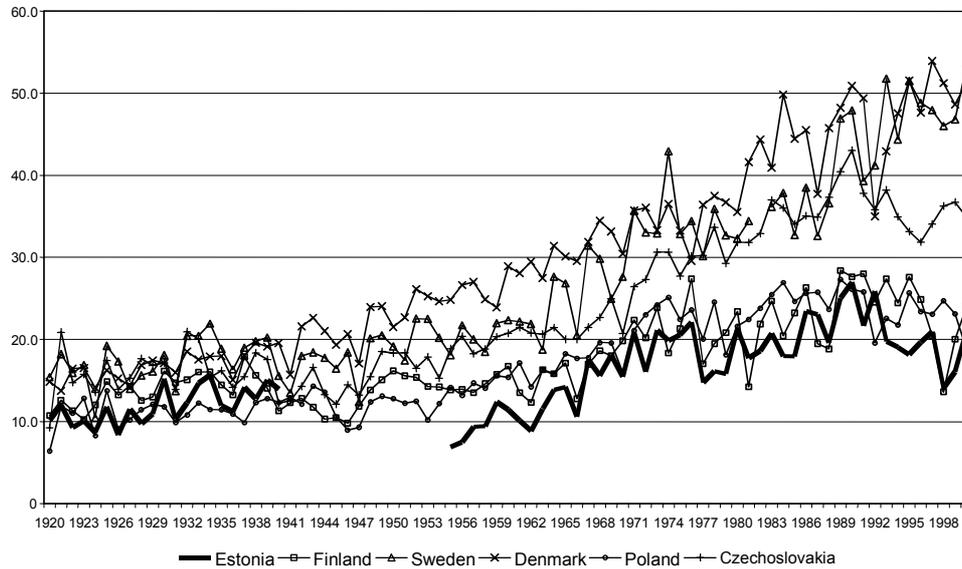


Fig. 1. Rye yield per hectare (hundredweights).

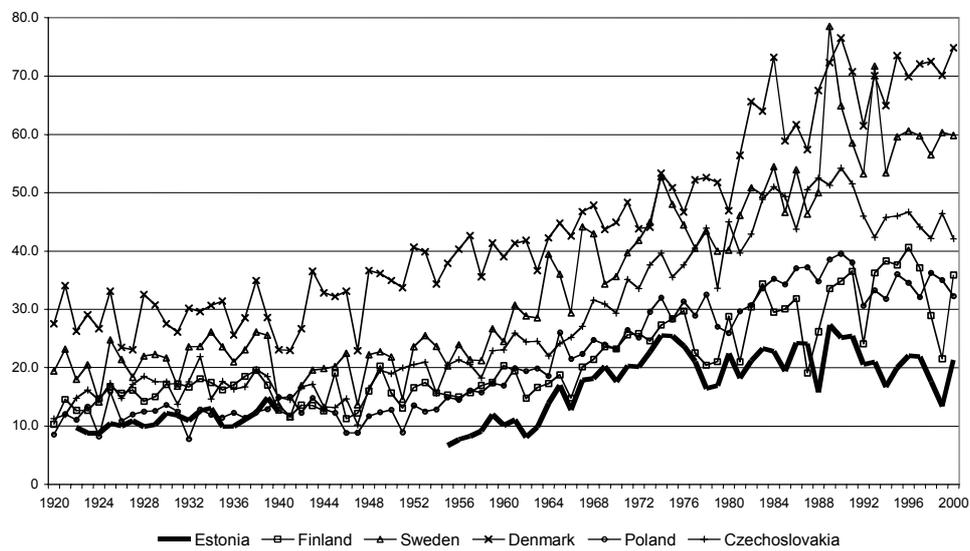


Fig. 2. Wheat yield per hectare (hundredweights).

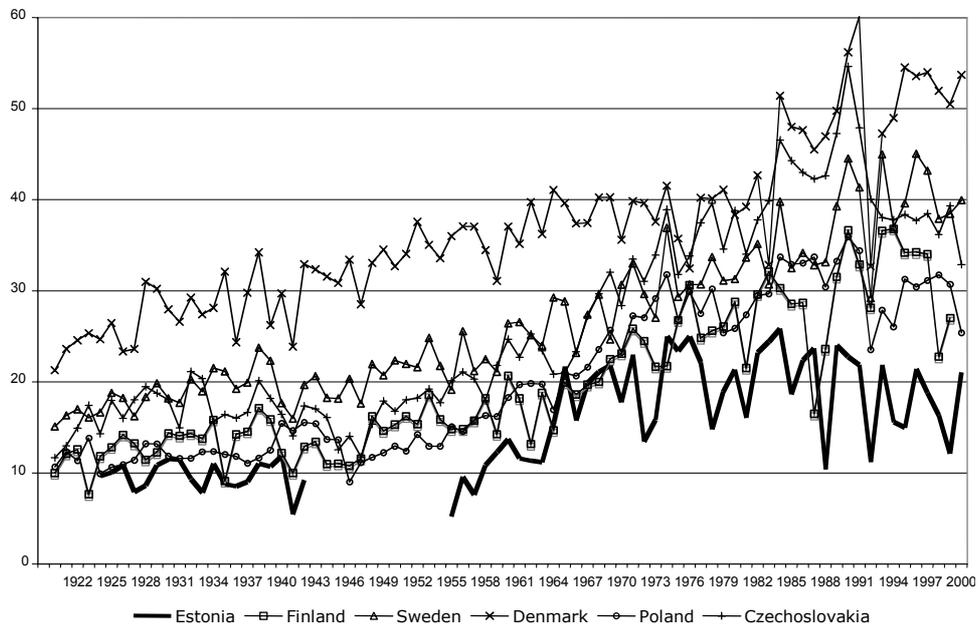


Fig. 3. Barley yield per hectare (hundredweights).

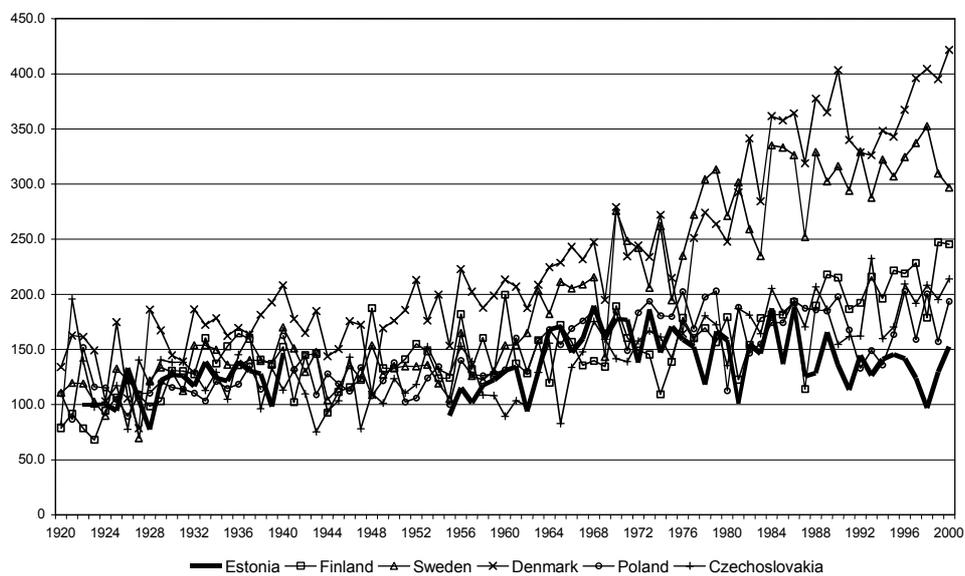


Fig. 4. Potato yield per hectare (hundredweights).

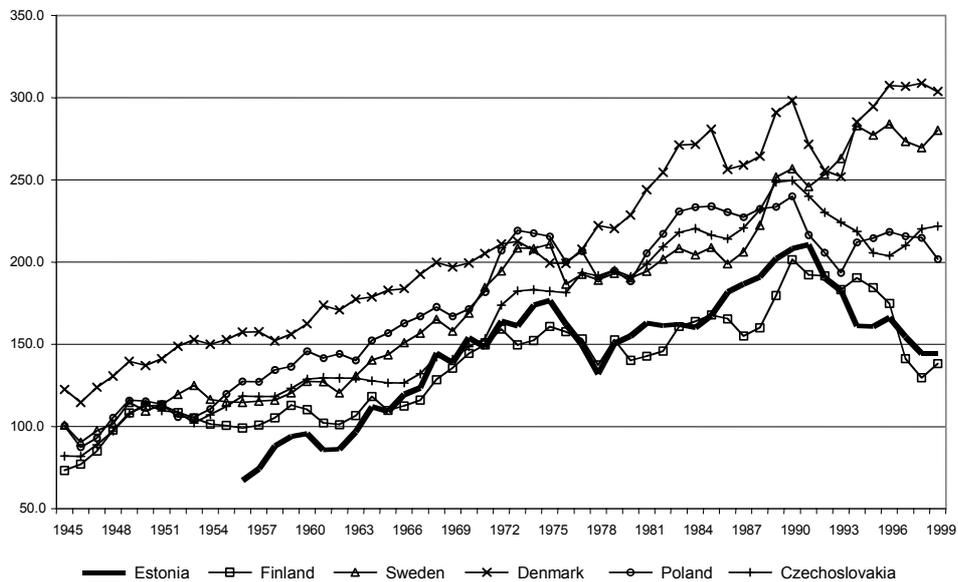


Fig. 5. Relative growth of rye yield (average yield of 1920–1939 = 100).

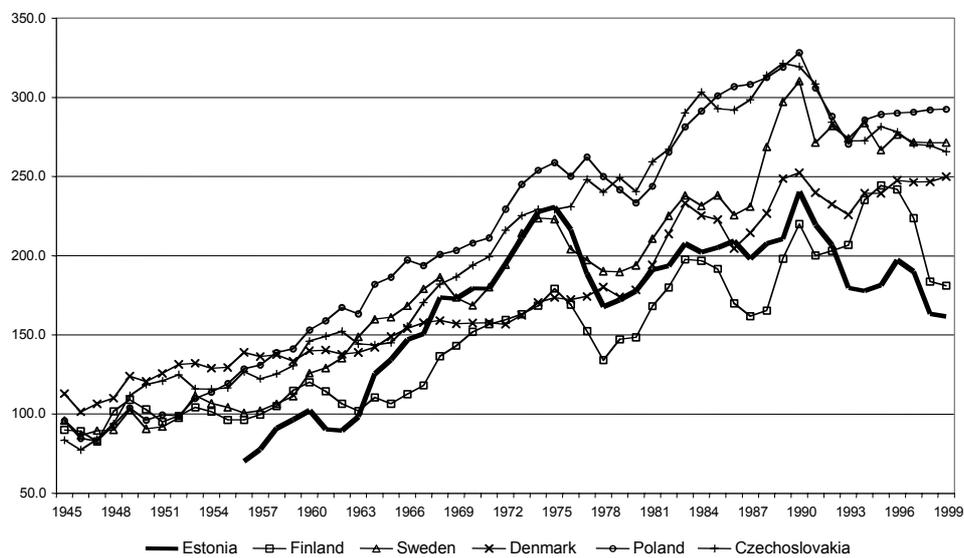


Fig. 6. Relative growth of wheat yield (average yield of 1920–1939 = 100).

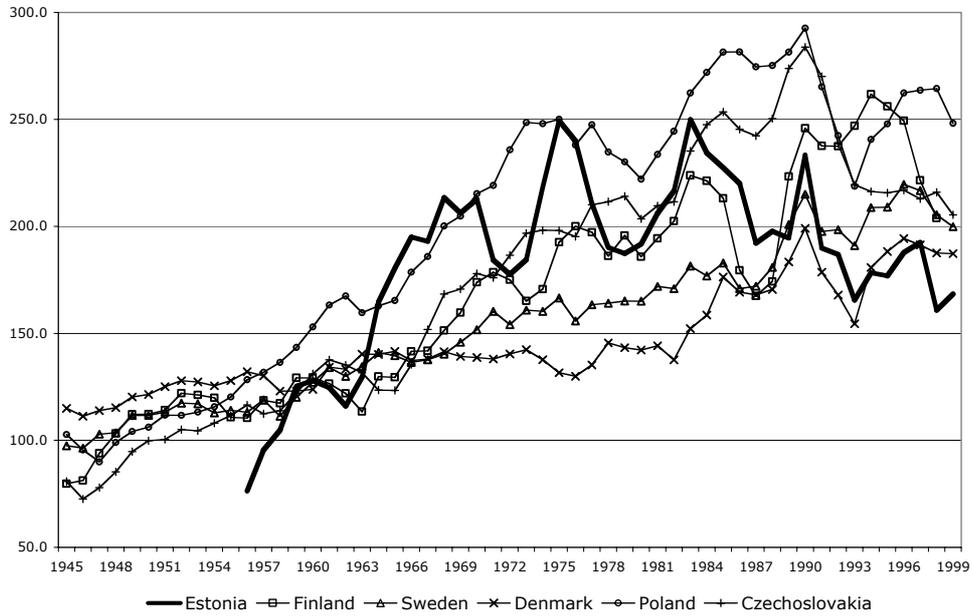


Fig. 7. Relative growth of barley yield (average yields of 1920–1939 = 100).

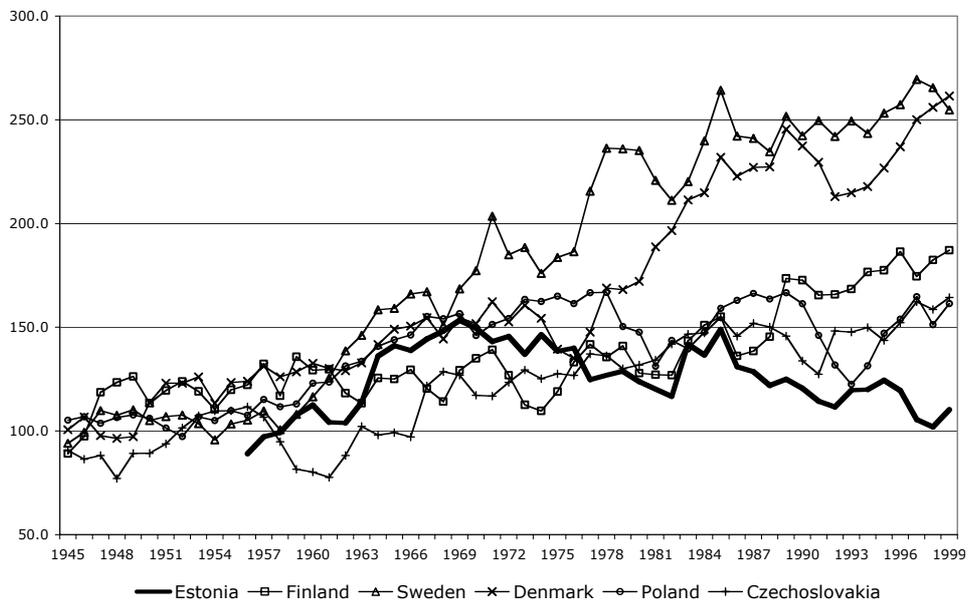


Fig. 8. Relative growth of potato yield (average yield of 1920–1939 = 100).

not be regarded as an indicator of productivity, because this simple output/land ratio does not include other costs of production such as labour. However, it shows that some countries were consistently able to achieve higher yields per land unit as time elapsed.

In order to make this comparison a bit fairer, regarding possible soil and climatic differences, benchmarking should be made in every country's own perspective and not in absolute terms. That is, a country's progress during the post-WWII period must be compared to the country's average results in the interwar period. The results are presented in Figs 5–8. If the comparison is made this way, Estonian grain and potato yield growth in the post-WWII period seems more competitive with other countries.

It also shows that Estonian grain yields in 1955 were considerably below the interwar average. Other countries restored their average interwar level sooner, which suggests that it was not unfavourable weather conditions that kept Estonian yields low. As Mertelsmann describes, Estonian grain yields had been falling mainly during the first half of the 1950s.¹³ The lowering yields coincided with the first years of collective farming, a period that was soon reported as being destructive to agriculture.¹⁴ However, since the mid-1950s there is a general improvement of grain yields and this has been related to reorganisation of collective farm system and the liquidation of machine-tractor stations.¹⁵ Also, extensive use of chemical fertilisers is regarded as one factor that caused rapid yield growth in the 1960s. It is more difficult to explain why rye, wheat and potato yields dropped in the 1970s. The graphs indicate that the same happened in other countries as well. For instance, the rye yield trend is quite similar in Estonia and Finland, the wheat yield trend in Estonia is also quite close to the Finnish and Swedish trend. This would suggest that there may be other reasons than institutional constraints (collective farming) behind decreasing Estonian yields, but of course it is not possible to identify them without considering other variables (use of fertilisers, local weather conditions).

Although the recovery from the low point of the 1950s was relatively rapid, yield growth in the long term was less impressive than in some comparison countries. While Denmark, for instance, was able to triple its rye yields, Estonia only doubled; wheat yields in Poland and Czechoslovakia reached over 300% of the interwar average, Estonia remained below 250%. One noticeable improvement for Estonian grain production concerned the barley yield, which periodically (creating a rather hectic trend) reached 250% of the interwar average. Estonian post-WWII potato yields peaked at approximately 150% of the interwar average. Compared to Sweden or Denmark this was a modest improvement.

¹³ **Mertelsmann, O.** Der stalinistische Umbau, 193–194.

¹⁴ See for example **Purre, A.** Soviet Farming Failure Hits Estonia. It should be noted that later even Soviet publications admitted poor agricultural performance in the mid-1950s. See **Vint, E.** Intensiivse põllumajanduse majanduslik efektiivsus Eesti NSV-s, 168.

¹⁵ See **Purre, A.** Die Landwirtschaft Estlands im Rahmen der allgemeinen Agrarpolitik der Sowjetunion.

It would probably be safe to state that in terms of land-saving techniques Estonian agriculture has not been a serious contestant to those comparison countries that managed to substantially increase their yield per hectare. As for the statistics, there does not seem to be any large upward bias in the post-WWII grain and potato yield figures, if judged by relative yield growth. The credibility of figures is probably fostered by the dynamics of yield per hectare numbers that demonstrate the same, presumably climate dependent, fluctuations as in other countries (note the decline in rye and wheat yields in the 1970s, which occurred quite simultaneously in Estonia, Sweden and Finland). It is the heavy fluctuation of Estonian barley yield that remains somehow out of context.

ANIMAL HUSBANDRY

Assessment of animal husbandry output data is more complicated than that of crop growing, due to wider possibilities of product specialisation (for instance, cattle breeding specialising either in milk or meat makes comparisons of output per cattle unit difficult). Therefore, this can be only examined to a limited extent here. It seems reasonable to present these data as ratio of production to inhabitants, because the absolute number of animals in a country is not informative for international comparisons. Production data of milk and meat per capita are presented in Figs 9 and 10. Speaking of animal husbandry, the Estonian trend to enhance dairy farming is quite evident during both the pre- and post-WWII period, but during the latter period it is accompanied by significant growth in pig breeding.

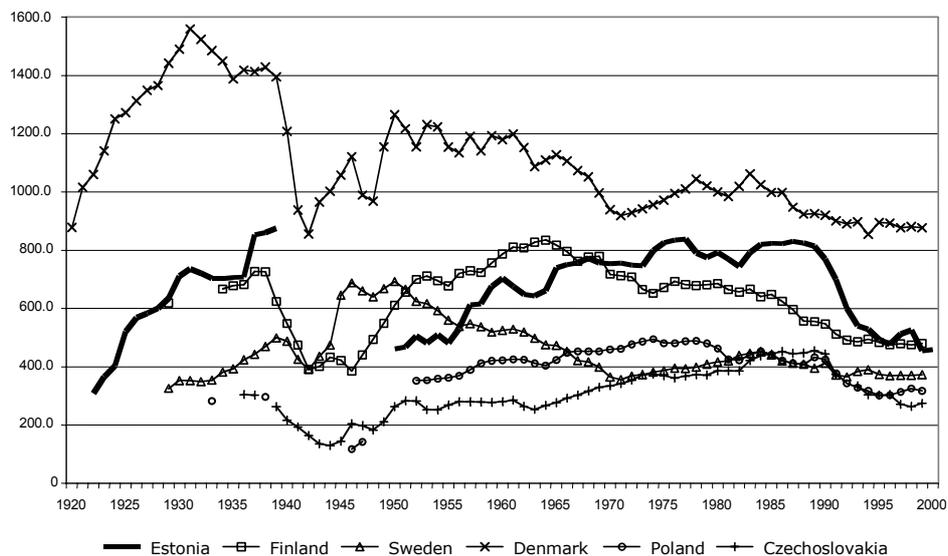


Fig. 9. Milk output per capita (kg).

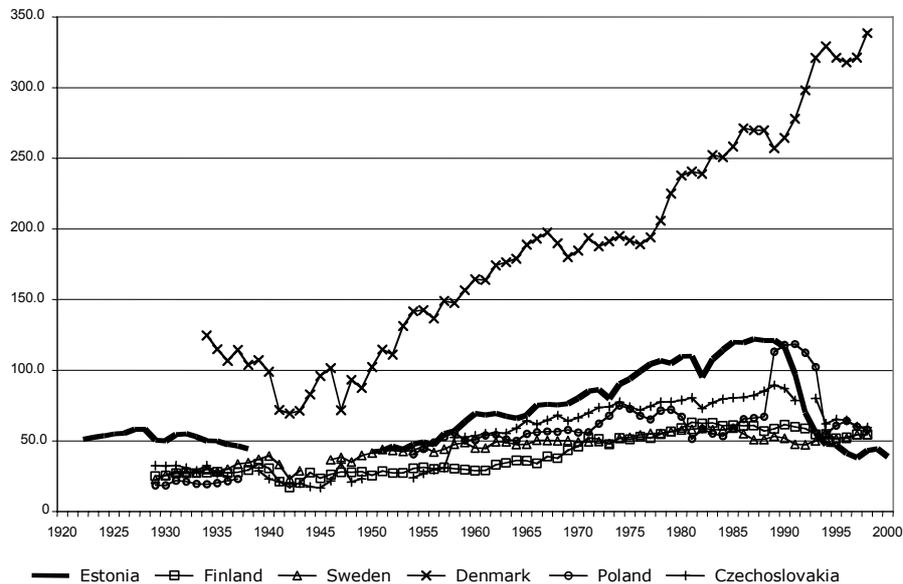


Fig. 10. Meat output per capita (kg).

While the number of cattle in Estonia per inhabitant exceeded that in Denmark in the 1980s for a short period, milk output per capita always stayed behind (see also Table 2). Yet, the increasing animal husbandry production was probably one reason why even authors in exile started speaking about the relative success of collective farming in Estonia during the 1960s and 1970s.¹⁶

Table 2. Average milk output per cattle unit (tons)

	Estonia	Czechoslovakia	Finland	Denmark	Poland	Sweden
1920–1929	1.0	1.5
1930–1939	1.2	...	1.3	1.7	...	0.8
1950–1959	1.4	0.8	1.6	1.7	1.3	1.7
1960–1969	1.6	0.9	1.8	1.6	1.3	1.6
1970–1979	1.4	1.2	1.8	1.6	1.3	1.7
1980–1989	1.5	1.3	1.9	1.9	1.4	2.0
1990–1999	1.9	1.5	2.1	2.2	1.7	1.9

Calculation based on: **Klesment, M., Valge, J.** (eds). *Eesti rahvastiku majandustegevuse näitarve XX sajandil*. EKDK, Tallinn, 2007; **Mitchell, B. R.** *International Historical Statistics. Europe 1750–2000*. Palgrave Macmillan, New York, 2003.

¹⁶ See **Järvesoo, E.** Progress despite collectivization: agriculture in Estonia. – In: **Ziedonis, A. et al.** (eds). *Problems of Mininations. Baltic Perspective*; **Järvesoo, E.** *Die Estnische Landwirtschaft während der Sowjetperiode 1945–1972*.

AGGREGATED PLANT AND ANIMAL PRODUCTION

It is obvious that the composition of overall agricultural production varied throughout the years, therefore it is not easy to estimate the change in general agricultural output by using the series of single products. Market economies use prices to aggregate different products. For Soviet type economies this is more complicated due to the lack of real market prices. For agriculture, it is possible to aggregate by energy content of products, which is an interesting intellectual exercise but, due to varying consumer preferences (towards low-calorie food), not a very practical application. For instance, specialisation on milk and meat production will yield lower calorie output than concentration on grain production. Therefore, the calorie output level has a limited value for estimates of agricultural performance, but it could work as a very rough aggregate indicator of agricultural production.

The author used common calorie values of grain, potato, milk and meat¹⁷ to aggregate products considered previously in this article. Everything else, including vegetables, fruits etc. is ignored. The results for Estonia suggest that the pre-WWII level of total calories produced was reached in the middle of the 1960s, just like grain and potato yields returned to the pre-war level at the same time (barley yield a bit earlier). Comparison of total calorie output with other countries is pictured on Fig. 11. It is quite striking that Estonian calorie output of these

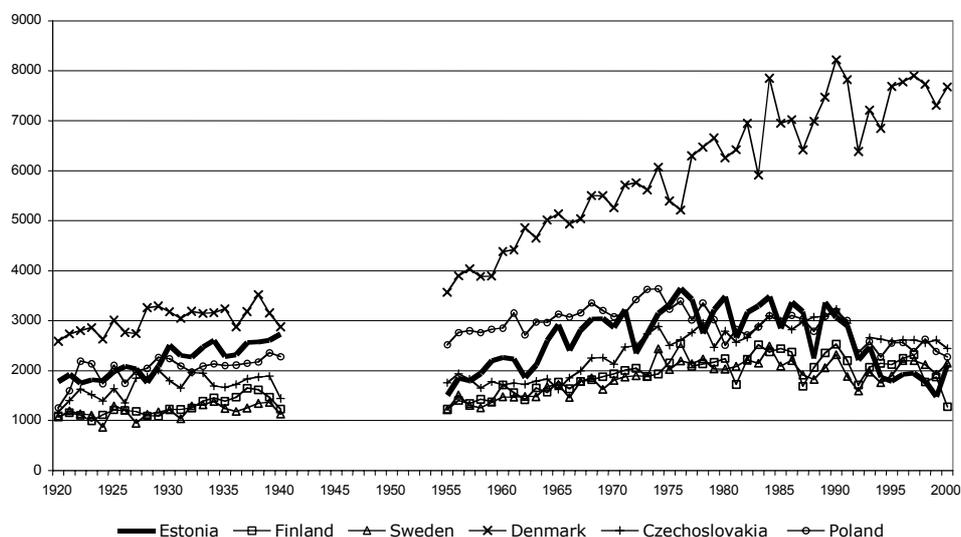


Fig. 11. Output of grain, potato, meat and milk per capita (thousand kCal).

¹⁷ Calorie values used (kCal/kg): rye 3350, wheat 3390, barley 3520, potato 860, all meat combined 3113, milk 660. The data were obtained from or estimated on the basis of US Department of Agriculture, Agricultural Research Service: USDA National Nutrient Database for Standard Reference. Accessed on 24 August 2007 at <http://www.nal.usda.gov/fnic/foodcomp/search/>

products per capita in 1955 was only 56.5% of the 1939–1940 level (compared to Finland's 90.7%, Sweden's 97.6%, Denmark's 118.3%, Czechoslovakia's 105.2% and Poland's 108.5%). Estonia reached the 1939–40 level of calorie output again in 1965. Thus, if one ignores the possibility that Estonia specialized its immediate post-WWII agriculture to lower calorie products only, one should agree that the total agricultural production had significantly fallen by the 1950s. The latter argument is also supported by severely declined crop yields and animal product output.

By such calculation Estonian agricultural output in 1955 was below the level of the 1920s. Later it was lower than that only in 1999, but this is explained by the variation in agricultural workforce (410 thousand in 1922 against 47 thousand in 1999). The question emerges whether the very low production volume of the 1950s and in the beginning of the 1960s can be explained by rapidly falling labour in agriculture. Assuming, for instance, that agricultural labour force had fallen significantly by 1955, its shortage could explain low yields per hectare and low total calorie output. On the other hand, if the labour force figures remained at a relatively high level, explanation should be found in bad management, machinery, low working morale etc. It must be pointed out that agricultural labour force decreased also in the comparison countries, but none of them experienced that steep decline in the overall calorie output during the post-WWII years.

LABOUR FORCE IN AGRICULTURE

The period under observation has generally witnessed a dramatically declining share of agricultural labour force in many countries. This was not caused by diminishing needs for agricultural products, but by improving agricultural techniques and technology.

The proportion of agricultural labour force in the total economically active population can be extracted from population censuses. In Estonia the census years were 1922, 1934, 1959, 1970, 1979, 1989 and 2000. Agricultural occupation generally includes forestry and fishing, although there may be slight variations. For instance, the results of the Estonian 1922 population census divided labour force into major occupational groups and the agricultural group consisted of agriculture, horticulture, forestry and fishing. Overall, 650.8 thousand people qualified as belonging to the agricultural group, 410 thousand of them were economically active. These 410 thousand people constituted 65.6% of the total economically active population. Table 3 presents the agricultural labour force figures.

The interwar period demonstrates a significant differentiation between countries regarding the share of agricultural labour force in the total economically active population. Compared to interwar Estonia, Finland and Poland showed a similar or higher share of economically active population in agriculture (Finland 68.8% in 1920 and Poland 76.6% in 1921), but Czechoslovakia, Denmark and Sweden were considerably lower in this respect. The post-WWII years show less

Table 3. Employment in agriculture

Total number (thousands) and percentage of agricultural labour force in the total economically active population												
	Estonia		Czechoslovakia		Finland		Denmark		Poland		Sweden	
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%
1920					1 032	68.8					1 059	40.7
1921			2 425	39.1			474	34.9	10 270	76.6		
1922	410	65.6										
1930			2 484	36.9	1 107	64.6	560	35.3			1 041	36.0
1931									9 752	65.9		
1934	446	63.0										
1940					1 158	57.4	562	28.5				
1945											733	24.5
1947			2 207	37.7								
1950					912	45.9	518	25.1	7 090	57.2	632	20.4
1959	194	31.5										
1960					721	35.5	367	17.5	6 636	47.7	447	13.8
1961			1 452	23.5								
1970	125	17.3	1 143	16.4	429	20.3	244	11.9	6 544	38.7	277	8.1
1978									5 419	30.2		
1979	114	14.3										
1980			1 026	13.1	279	12.6					226	5.6
1981							194	7.2				
1989	150	17.0										
1990					197	8.5					149	3.3
1991			993	12.4			161	5.6				
1992									3 758	24.8		
1999	47	8.1										
2000					136	5.7	89	3.3			99	2.4
2001			226	4.8					2 719	19.1		

Sources: **Mitchell, B. R.** International Historical Statistics; Rahva tööala ja ühiskondline kihitus. 1922 a. üldrahvalugemise andmed, vihk III. Riigi Statistika Keskbüroo, Tallinn, 1925; Tööharud ja leibkonnad. I.III 1934 rahvaloenduse andmed, vihk III. Riigi Statistika Keskbüroo, Tallinn, 1935; Распределение населения по общественным группам, источникам средств существования и отраслям народного хозяйства. Всесоюзная перепись населения 1959 года. Том V. ЦСУ ЭССР, Таллин, 1962; Занятое население Эстонской ССР. Статистический сборник. ЦСУ ЭССР, Таллин, 1974; census data from 1979, 1989 and 2000.

differentiation, perhaps only Poland stands out with a relatively high share of agricultural workers. Official figures, however, must be regarded with reservation, at least in the Estonian case.

The problem is that during the Soviet rule, considerable share of overall agricultural production originated from private plots, but the private producers were not consistently counted by statistics. After independent farming was suppressed in the 1940s, small plots were used to grow potato or other crops, keep a small number of animals and so on. While part of private producers were members of collective farms, thus included in agricultural labour force, a number of producers either had non-agricultural regular jobs or were pensioners. Their production was included in the total production by procurement statistics. Therefore, while statistical figures for active population in agriculture are relatively low, the actual number of agricultural producers may be higher. Relying on archival sources, Olaf Mertelsmann suggests that private production in the mid-1950s was approximately half of the value of total agricultural production.¹⁸ Elmar Järvesoo has argued that in 1960 private producers provided 28% of overall agricultural production. Later their share decreased, but even in the 1970s it was around one fifth of the overall output.¹⁹ Consequently, in calculating the output/labour ratios, official agricultural labour force figures should be adjusted to obtain realistic results.

First, data series of official agricultural labour force figures should be calculated. For the present paper, this series was achieved simply by doing linear interpolation of census years' figures (Table 3). The results for Estonia are most questionable for the 1950s, as for this decade there is only the 1959 census. Interpolation for 1950–59 was therefore performed using the same rate of agricultural labour force decline as it appeared in the 1960s, and as a result the official agricultural labour force in 1950 was estimated to be 250 thousand people (and 219 thousand in 1955). There could be a problem, as the decline rate may have been actually higher in the 1950s. However, if calculated this way, Estonian agricultural labour force in 1955 would be only 55% of the 1940 level (the 1940 level is estimated to be 400 thousand²⁰). Obviously, this is a vast decline for a 15-year period. Using the same interpolation technique to create labour force series for the comparison countries, agricultural labour force in 1955 would be in Finland 70%, in Sweden 64%, in Denmark 79%, in Czechoslovakia 77%, and in Poland 81% of the 1940 level.

In a simple way, output/labour ratio can be expressed as total calorie output divided by total agricultural labour force. Using the obtained labour force data series, calorie output per agricultural worker was calculated (plotted as census data labour force on Fig. 12). In 1955, the latter appears to be 106% of the 1939–1940 level. Yet it is hard to believe that the output per worker in the middle of the

¹⁸ **Mertelsmann, O.** *Der stalinistische Umbau in Estland, 199–200.*

¹⁹ **Järvesoo, E.** *Private Enterprise in Soviet Estonian Agriculture.* Baltic Scientific Conference. Stockholm, 1973; **Järvesoo, E.** *Privatunternehmen in der sowjetestnischen Landwirtschaft.* – Acta Baltica, 1977, XVI.

²⁰ For labour force estimates in interwar Estonia see **Klesment, M.** *Eesti majandusarengu dünaamika näitajaid sõdadevahelisel perioodil.* – Tuna, forthcoming.

1950s, which was rather an unfortunate decade for Estonian agriculture, was higher than during the years of private farming. Although one could argue about spread of machinery in the 1950s, it is still more likely that there is a problem of labour force statistics. That is, private producers who contributed to overall production were not counted as agricultural labour force. The lower labour force figure consequently leads to higher output per worker.

Encouraged by Mertelsmann's and Järvesoo's arguments about the share of production coming from private farming, the author opted for another exercise and arbitrarily adjusted the number of agricultural workforce by factor of 1.3 in 1950, 1.25 in 1964, 1.2 in 1978 and 1.0 in 1989.²¹ Multiplication factor for the years between those was linearly interpolated. As a result, agricultural labour force estimate was changed to 325 thousand in 1950, 281 thousand in 1955, 245 thousand in 1959, 153 thousand in 1970, and 134 thousand in 1979 (compare with Table 3). The adjusted output/labour ratio results together with census data results can be observed on Fig. 12. Calculated with the adjusted labour force, Estonian total calorie output per agricultural worker in 1955 was 83% of the 1939–40 level,

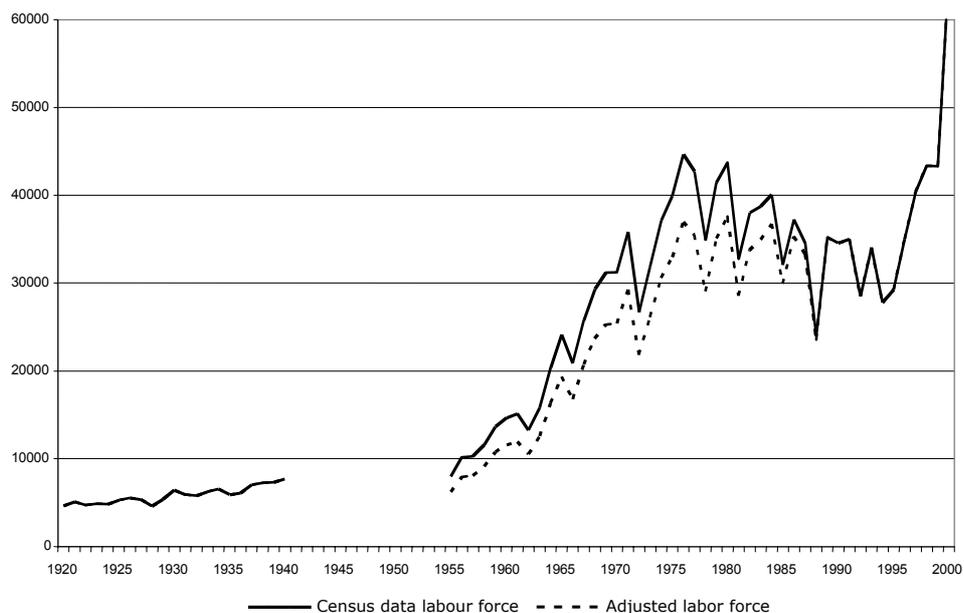


Fig. 12. Output of grain, potato, meat and milk per agricultural worker in Estonia (thousand kCal).

²¹ This simulates a situation where 23% of total agricultural producers would appear not counted by statistics in 1950, 20% in 1964, 16% in 1979, and 0% in 1989. This share in the 1960s is lower than private sector's share in total output suggested by Järvesoo. However, it is assumed that a part of private producers were also officially working in agriculture. Moreover, bearing in mind the calorie output calculation it is regarded that private sector was more focused on potato growing, which has lower calorie content than grain.

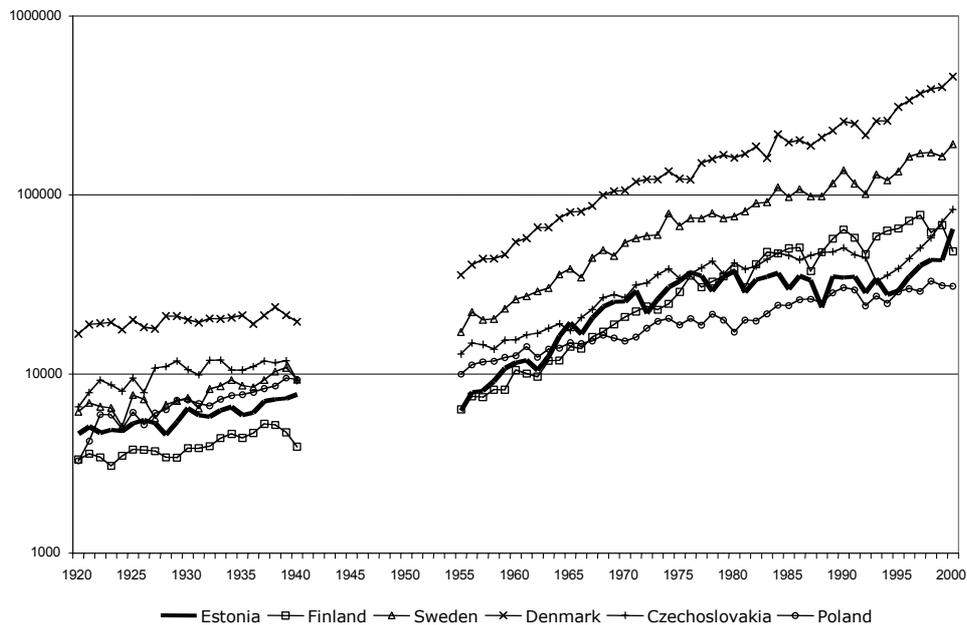


Fig. 13. Output of grain, potato, meat and milk per agricultural worker (thousand kCal).

which is still quite high, if exceptionally low levels of crop yields and low milk output per capita of 1955 are considered. The adjusted series is used for Fig. 13 which compares the total calorie output per agricultural worker in Estonia to other countries' respective data. It must be emphasised that the above labour force adjustments are completely subjective and performed only for this short exercise.

If the adjusted labour force figures were used, the number of Estonian agricultural labour force in 1955 would appear to be 70% of the 1940 level (compared to Finland's 70%, Sweden's 64%, Denmark's 79%, Czechoslovakia's 77%, and Poland's 81%). Nowhere else in comparison countries did the decline of agricultural labour force cause such a sharp reduction of total calorie output as in Estonia (see Fig. 11). Of course, these are rough calculations.

CONCLUDING COMMENTS

As suggested in this paper, the long-term historical statistics of Estonian agricultural production is not an easy topic. Some of the data appears more reliable, some of it may remain the object of debates for a longer time. Figures of grain and potato output are probably not as acutely debatable as agricultural labour force statistics. However, both are necessary in order to estimate the efficiency of Estonian agriculture or compare it to other countries. While it is possible to interpret available statistics and reach some limited conclusions, it is very difficult to build

solid argumentation on ill-organised and not very reliable figures. The question remains about how thorough data proofing should be. It is obvious that simple comparisons may foster belief in the quality of the data, but only for a limited number of cases. A lot more rigorous investigation must be done to obtain data that would describe agricultural labour force of the post-WWII period. As speculative calculations in this article suggest, there is too much space for interpretation if the data is based on indirect estimates. Tested and reliable statistical data remain necessary if Estonian 20th century socio-economic problems are studied.

EESTI PÕLLUMAJANDUSTOODANGU ANDMETE VÕRDLUSI JA TÕLGENDUSI

Martin KLESMENT

On käsitletud Eesti põllumajanduslikku toodangut aastail 1920–2000 iseloomustavaid andmeridu. Selle perioodi suurimaks probleemiks on aastad 1940–1990, mille statistika on teadaolevatel põhjustel küsitava väärtusega. Autor on seisukohal, et andmete usaldusväärsuse kontrollimiseks ja suuremate vigade paljastamiseks on hea kasutada võrdlust teiste riikidega. Sel eesmärgil on mitmeid põllumajandusliku toodangu näitajaid võrreldud Soome, Rootsi, Taani, Tšehhoslovakkia ja Poolaga. Osalt on võrdlused kergemini teostatavad, näiteks saagikuse puhul. Saagikuse võrdluse tulemuste põhjal võiks järeldada, et praegu kasutada olevaid taimekasvatuse statistilisi andmeid pole ebareaalses ülepaisutatuses mõtet kahtlustada. Mõnevõrra keerulisem on sama väita loomakasvatuse tulemuste kohta, kuna otsest väljundit mõõta on raskem.

Hoopis suurema probleemi moodustab põllumajandusliku tööhõive küsimus. Autor on kasutanud rahvaloendustega kogutud andmeid tööhõive kohta ja tekitanud artiklis tehtud arvutuste jaoks nende põhjal põllumajandusliku tööjõu andmerea. Viimast on üsnagi spekulatiivsete meetoditega korrigeeritud, kuna eeldatakse, et Nõukogude Liidu statistika ei loendanud kõiki Eesti inimesi, kes põllumajandusliku eratootmisega tegelesid. Tööjõu ja toodangu suhte arvutamiseks on teravilja, kartuli, piima ja liha toodang ümber arvutatud energeetilisse väärtusse (kaloritesse). Tulemused näitavad, et 1955. aastal oli nimetatud põllumajanduslike toodete energeetiline koguväärtus vaid 56,5% 1939/40. aasta tasemest. Samal ajal moodustas põllumajanduslik tööjõud 1955. aastal autori spekulatiivse arvestuse põhjal 70% sõjajärgsete aastate tasemest. Selle järgi tootis põllumajandustöötaja 1955. aastal 83% 1939/40. aasta põllutöölise nimetatud toodete energeetilisest koguväärtusest, mida autor peab siiski üsna kõrgeks. Probleemaatiliseks jääb põllumajandustöötajate koguarv sõjajärgsel perioodil. Üldisem järeldus on, et ajalooline majandusstatistika vajab täpsemat uurimist ja süstemaatilist korrastamist. Vastasel juhul on väga raske Eesti XX sajandi majandusajaloost tõsiselt võetavaid uurimusi teha.