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A RE-EVALUATION OF SOVIET AGRICULTURAL
PRODUCTION IN THE 1920s AND 1930s

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A re-evaluation of Soviet agricultural production in the 1920s and 1930s

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This paper is concerned with a re-evaluation of the scale and value of Soviet agricultural production in the 1920s and 1930s and in comparison with the pre-revolutionary period. Particular attention is being paid to the complex of relationships within agriculture and to some of the regional dimensions of this complex. My work on this subject is far from complete. I have carried out a brief survey of available all-union agricultural production indices and have made my own preliminary all-union estimates¹. But more detailed work on each branch of agriculture is required before a final version with a detailed regional and sectoral breakdown can be computed². Work is most advanced on analysing grain production and utilisation in detail up to the end of the 1920s³.

In this paper I intend to provide a brief review of our current knowledge on agricultural production, a guide to the work that I am carrying out to improve this knowledge, and some preliminary results concerning a) my preliminary all-union agricultural production indices and b) a more detailed regional account of the complex of relationships associated with the production of the major agricultural product of this period - namely grain.

1. The available indicators on the scale of Soviet agricultural production

In the 1920s and early 1930s several relatively short series of agricultural production were produced. These were connected with work on the balances of

¹ An earlier version of this survey and estimate entitled 'Soviet agricultural production, 1913-1940' CREES, informal working paper, was presented and discussed at a CREES Soviet Industrialisation Project Series (SIPS) seminar in 1978.

² These will be appearing as CREES (SIPS) discussion papers in the near future.

³ See S.G. Wheatcroft, 'Grain production and utilisation in Russia and the USSR before Collectivisation', unpublished Ph.D thesis, Birmingham, 1980, and 'Grain production statistics in the USSR in the 1920s and 1930s, CREES (SIPS) discussion papers SIPS No.13, Birmingham 1977.

the national economy and the control figures¹.

Apart from these earlier partial series there are three series of agricultural production figures which cover a more lengthy period. These are a) a former Soviet official (but presently discredited) series which was published in the 1930s, b) an American index calculated by D.Gale Johnson and Arcadius Kahan in 1959, and c) a new revised Soviet index which was also first published in 1959².

a) The former (1930s) Soviet official gross agricultural production series has to be pieced together from several sources and even then only spans 1913, 1929-35, 1937 and 1938³. It is not comparable with any of the series produced in the 1920s, although it is given in constant 1926/27 prices. It is divided into arable and livestock sectors and a few major product groups within these sectors. But no regional figures are available.

The major feature in this series is the sharp rise in arable production after 1933. At that time all the major Western experts on Soviet agriculture refused to accept the veracity of this indication of growth. The existence of a 'biological' yield distortion in the data from 1933 to the early 1950s has now been accepted in the Soviet Union.

b) The American series calculated by Johnson and Kahan was worked out at a time before the official Soviet figures had been revised⁴. The American

1 For 1923/24 in prewar prices and with a regional breakdown Balans narodnogo khozyaistva SSSR 1923-1924g., Trudy TsSU, Tom XXIX, M.1926, for 1928, 1929, 1930 in 1928 prices Materialy po balansu narodnogo khozyaistva SSSR za 1928, 1929, i 1930 gg., M.1932, for 1913 and 1922/23 in prewar prices B.A.Gukhman, Produktsiya i potrebleniye SSSR: K narodno-khozyaistvennomu balansu (1922/23 khozyaistvennyii god), M.1925, for 1913, 1924/25 and 1925/26 plan in prewar prices Kontrolniye tsifry narodnogo khozyaistva na 1925/26 god, M.1925, for 1923/24, 1924/25, 1925/26 and 1926/27 plan in prewar prices Kontrolniye tsifry narodnogo khozyaistva na 1926/27 god, M.1926, for 1924/25, 1925/26, 1926/27, and 1927/28 plan in prewar prices Kontrolniye tsifry narodnogo khozyaistva SSSR na 1927/28 god, M.1928, for 1925/26, 1926/27, 1927/28, and 1928/29 plan in 1925/26 prices Kontrolniye tsifry narodnogo khozyaistva SSSR na 1928/29 god, M.1929, for 1925/26, 1926/27, 1927/28, 1928/29 and 1929/30 plan in 1925/26 prices Kontrolniye tsifry narodnogo khozyaistva SSSR na 1929/30 god, M.1930 and for 1925/26, 1926/27 and 1928/29 prices and with a regional breakdown in Selskoe khozyaistvo SSSR: 1925-28, M.1929

2 See below p. 16 for a presentation of these data in comparison with my own estimates.

3 Sotsialisticheskoe stroitelstvo SSSR, M.1936, pp.232-7, Selskoe khozyaistvo SSSR, M.1939, p.281.

4 D.Gale Johnson, Arcadius Kahan, 'Soviet agriculture: Structure and growth,' Comparison of the United States and Soviet Economies, Washington, 1959, part I, pp.201-237.

index was based upon just eleven products. Official physical product evaluations were used for all of these apart from grain which was deflated in line with a fairly obscure Soviet hint and with the generally held belief that such a deflation was necessary. When Johnson came to revise the index and compare it with the official Soviet index in 1963 he then substituted the revised Soviet grain production figures for his earlier estimates and added a 1913 indicator¹. In order to calculate aggregate totals the eleven products were weighted with fairly crude 1926/27 fixed prices taken from the 1929/30 control figures. No regional breakdown was given.

c) The current Soviet index of agricultural production first appeared in the 1958 annual statistical handbook, published in 1959². This is an index based on 1913 = 100. Values are given for arable and livestock production as well as for gross agricultural production. It is evaluated in fixed 1926/27 prices for all years up to 1950 and appears to be based on the former 1930s series with adjustments being made for 1933 and subsequent yield data, with revised coverage of livestock produce for the 1920s and with a revision of the pre World War One indicator. Both the first two points would add to the reliability of the index, but there still remain considerable problems of inter-temporal comparability, between the 1920s and the 1930s and between both of these and the pre-revolutionary period.

Two important conclusions follow from my analysis of the available data. Firstly, there are some fairly important differences between the new official series and the Johnson and Kahan series. The main differences being i) that Johnson/Johnson and Kahan had a much more favourable evaluation of the level of production in 1930 than did the official Soviet index, and ii) that they considered the 1913-1928 growth to have been less than indicated in the official index, and iii) that the absolute low point in production came in 1932 and not 1933. As will become apparent below, my results differ even more strongly from the official series than do the Johnson and Kahan series.

And, secondly, very little detail is currently available about agricultural production, on a regional basis. My work intends to provide such detail.

¹ See D.Gale Johnson, 'Agricultural production', in A.Bergson and S.Kuznets (eds) Economic Trends in the Soviet Union, Harvard, 1963, p.208.

² Narodnoe khozyaistvo SSSR v 1958g., M.1959, p.350. A slightly fuller series appeared in Sel.Khoz.SSSR, M.1960, p.79, and a few explanatory notes were included in the next agricultural and statistical handbook which was published in 1971, Sel.Khoz.SSSR, M.1971, pp.681-5.

2. My work towards making a re-evaluation of Soviet agricultural production and towards producing a more detailed indication of agricultural production.

The first step in this work is to get as clear as possible a definition of the nature of agricultural production and its coverage. We have to ensure that we are in a position to make a meaningful quantitative evaluation of those detailed aspects of production and production flows that we wish to analyse. Then we have to consider these quantitative evaluations in physical terms in order to assess the reliability and comparability of these evaluations. Finally, these physical evaluations have to be transferred into value units for further aggregation.

I will begin by considering the definition of the agricultural system with which I will be working.

a) The agricultural system: product coverage and product flows.

In this paper I am considering two aspects of the agricultural system i) the production and distribution of all the different kinds of agricultural produce throughout the country as a whole, ii) the production and distribution of just one product - grain - throughout the different regions of the USSR.

i) product coverage and all-union distribution.

Diagram i) presents a model of Soviet agriculture indicating the main directions of product flows between the different sectors within agriculture and the flows between agriculture and the other parts of the economy and social system.

The arable sector includes the production of grains, potatoes, vegetables, technical crops and forage. All of these with the exception of forage were included in the Johnson and Kahan calculations. The livestock sector includes milk, meat, eggs and wool, which were all included in the Johnson and Kahan index, but also changes in the herd stocks (as regards both draft animals and meat stock), the production of manure and hides.

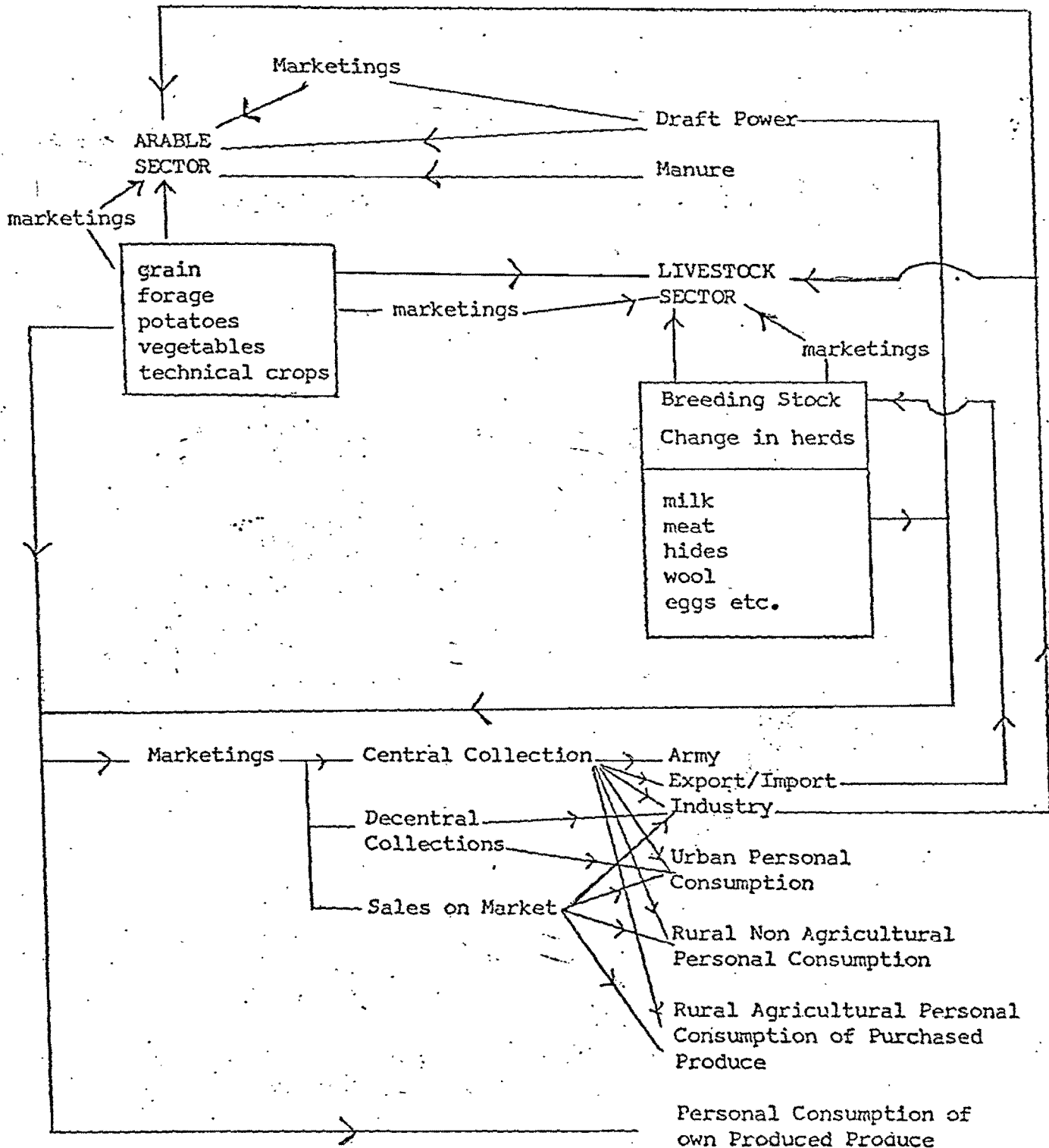
The major differences in product coverage between my and the Johnson/Kahan index are the inclusion of a larger number of products that are used primarily within agriculture itself. My gross agricultural production figure is therefore less commodity oriented than their figure.

ii) geographical coverage of the agricultural system

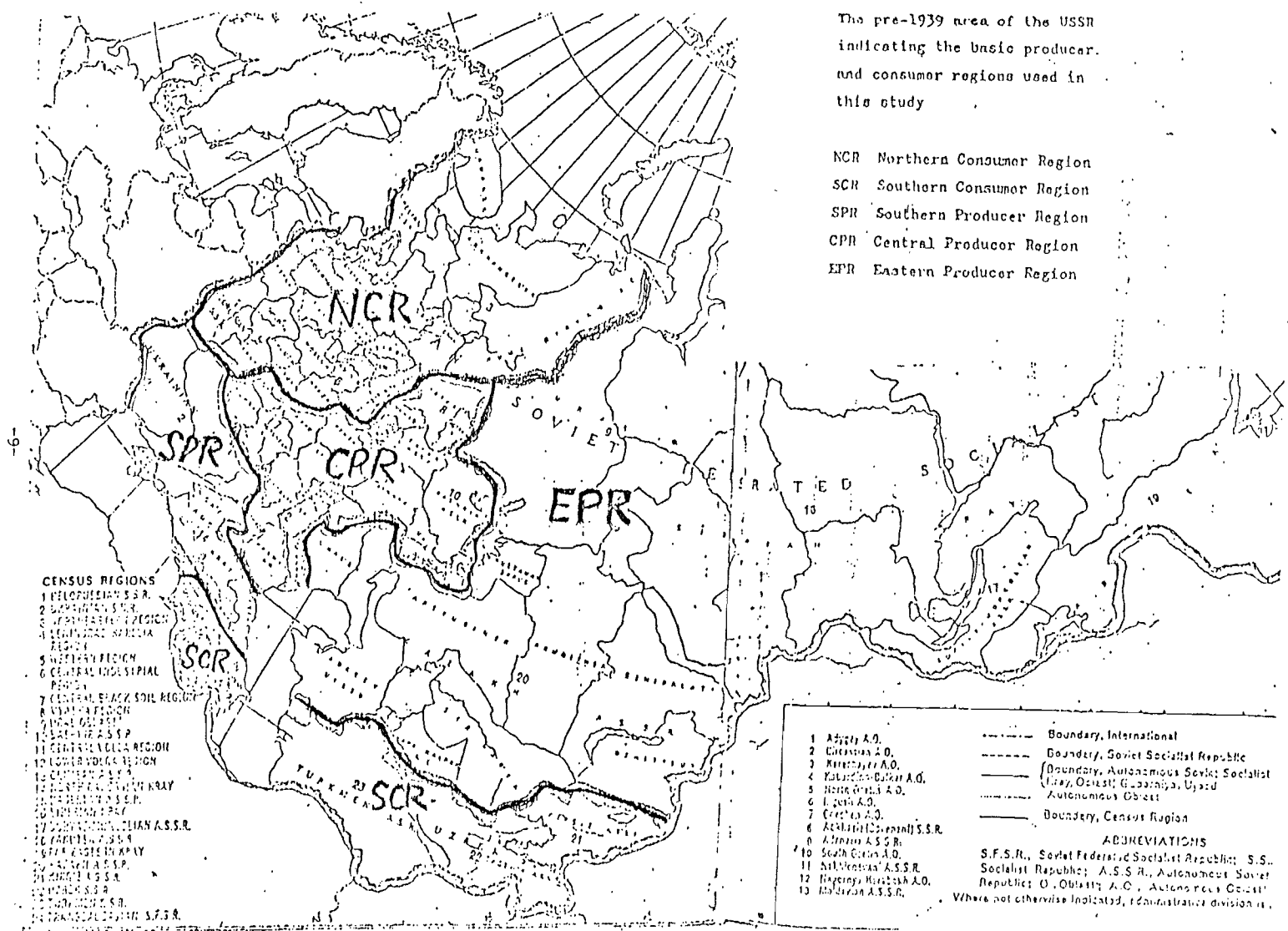
Map ii) divides the country up into five major regions with fairly distinct production and utilisation characteristics. These regions were based on major classifications used in the 1920s with reference specifically to grain production and utilisation but they nevertheless have fairly general significance.

Two of the regions are consumer regions: the northern consumer region

'MODEL' of agricultural inter-relationships



Note: Marketings refers to all forms of marketings
i.e. state collections, free market, hiring etc.



The pre-1939 area of the USSR indicating the basic producer and consumer regions used in this study

- NCR Northern Consumer Region
- SCR Southern Consumer Region
- SPR Southern Producer Region
- CPR Central Producer Region
- EPR Eastern Producer Region

- CENSUS REGIONS
- 1 PELOPONNEUS S.S.R.
 - 2 BALKANS S.S.R.
 - 3 THRAKE S.S.R.
 - 4 BULGARIA S.S.R.
 - 5 WESTERN REGION
 - 6 CENTRAL INDUSIAL REGION
 - 7 CENTRAL BLACK SOIL REGION
 - 8 VOLGA REGION
 - 9 UZBEKISTAN S.S.R.
 - 10 SOUTH UZBEKISTAN S.S.R.
 - 11 CENTRAL UZBEKISTAN S.S.R.
 - 12 NORTH UZBEKISTAN S.S.R.
 - 13 TURKIC S.S.R.
 - 14 TURKIC S.S.R.
 - 15 TURKIC S.S.R.
 - 16 TURKIC S.S.R.
 - 17 TURKIC S.S.R.
 - 18 TURKIC S.S.R.
 - 19 TURKIC S.S.R.
 - 20 TURKIC S.S.R.
 - 21 TURKIC S.S.R.

- 1 Azgys A.O.
- 2 Cherkass A.O.
- 3 Kharkov A.O.
- 4 Kuznets-Balk A.O.
- 5 Novosibirsk A.O.
- 6 Leningrad A.O.
- 7 Gorky A.O.
- 8 Khabarovsk A.O.
- 9 Amur A.S.S.R.
- 10 South Ural A.O.
- 11 Sakhalin A.S.S.R.
- 12 Khabarovsk A.O.
- 13 Malaya A.S.S.R.

- Boundary, International
- Boundary, Soviet Socialist Republic
- Boundary, Autonomous Soviet Socialist Republic (Uyuz, Oblast, Guberniya, Uezd)
- Autonomous District
- Boundary, Census Region

ABBREVIATIONS
 S.F.S.R., Soviet Federated Socialist Republic; S.S.R., Socialist Republic; A.S.S.R., Autonomous Soviet Republic; O., Oblast; A.O., Autonomous District.
 Where not otherwise indicated, administrative division is.

(NCR) comprising the Moscow Industrial region, the North, North-West (Leningrad Industrial region) and BSSR, and the southern consumer region (SCR) comprising Transcaucasia and the Central Asian republics. The three producer regions are the Southern Producer Region (SPR) comprising the Ukraine and North Caucasus, the Central Producer Region (CPR) comprising the Central Agricultural Region and the Volga Region, and finally the Eastern Producer Region (EPR) comprising the Urals, Siberia, the Far Eastern Region and Kazakhstan.

Despite the fairly frequent changes in regional boundaries in this period, roughly comparable series of regional figures can be computed¹ and at least until 1935 regional transportation data are available. The task of measuring inter-regional flows of agricultural products is therefore quite feasible (until 1935 at least).

b) Product evaluation in physical terms

The procedure used is to study i) different evaluations that were made of the product, the methods of evaluation and reasons for adjustments, and the general political situation in which statisticians were working, ii) indirect data associated with factors affecting production, iii) data on the overall and regional utilisation of the produce, iv) indirect data, associated with product availability.

i) Product evaluation, changes in evaluation and political atmosphere

Arable production was initially estimated on the basis of: sown area statistics, average expected yields (for most of the 1920s this was the accepted prewar level of yields), a condition factor (normally a figure on the 0-5 scale reflecting how much the harvest was above or below average). The level of harvesting losses was incorporated in the level of average expected yield. Corrections were justified on statistical grounds on the basis of a knowledge of utilisation, a belief that peasants and local statisticians always tended to conceal the true level of production, and on the basis of some trial surveys. Several different methods of trial harvesting and threshings were used before the development of the metrovka method in the early 1930s. After 1933 the metrovka measurements began to be substituted directly for the yield assessment rather than be used as a mere control method. The trial harvesting and threshing carried out by the metrovka method involved no or very little harvest losses and so was an indication of the biological rather

¹ See S.G. Wheatcroft, 'Grain production and utilisation in Russia and the USSR before collectivisation', unpublished Ph.D thesis, Birmingham, 1980, volume 3, for an example of how these regional series are derived.

than the barn yield. But it did not necessarily represent a totally new level of distortion. Trial threshings and many other methods had been used earlier to bid up the scale of harvest evaluations. And earlier the use of a highly corrected prewar yield figure as the basic average level upon which to apply condition corrections had also resulted in large corrections. For most of this period it appears to me that the statistical reason for making adjustments to the evaluation of arable production was in any case far less important than the political reasons. I will return to discuss the political reasons later.

During this period livestock production was evaluated on the basis of: changes in the age and sex structure of the different animals in the herd, average yields of non-terminal produce, and their wastage, average slaughter weight indicators for the slaughtered contingent and their wastage. If anything, livestock produce calculations were more difficult than arable ones, but there was considerably less conflict over them.

Throughout the 1920s there were major discussions between the statisticians and the planners over the different evaluations of agricultural production in general and of arable production in particular. Gosplan consistently favoured higher evaluations than TsSU over both current and pre-revolutionary arable production¹.

Given the political atmosphere of the times and the striving for higher and higher plans², agricultural production statistics had taken on 'real political significance', as Ordzhonikidze once described it³. Under such circumstances the resolution of the conflict between the statisticians and the planners was more of a political than a scholarly question.

As early as 1926, the task of evaluating the scale of agricultural production was taken out of the hands of TsSU and placed in the hands of an 'Expert' Council of representatives from various interested agencies who voted on what size crop should be accepted. But even this 'Expert' Council failed to produce politically acceptable figures in 1929, when a correction to production was politically necessary to justify an increase in planned

¹ There was less conflict over how much production had dropped in comparison with the prewar level, than over what these actual levels were. This should be remembered when later attempts are made to adjust the prewar figures and leave the post-revolutionary figures as they are.

² R.W.Davies and S.G.Wheatcroft, 'Further thoughts on the first Soviet Five Year Plan', Slavic Review, no.4, December 1975, pp.790-802.

³ S.Ordzhonikidze, Staty i rechi, M.1957, vol.2, pp.177-8.

procurements¹. However, after the purging of the Expert Council, the arrest and disappearance of its most prominent member and the transfer of TsSU into being a mere accounting sector of Gosplan, the statisticians became less vocal in their opposition to proposed corrections.

For several years the task of making evaluations of agricultural production fell directly upon a department of Gosplan (The Statistics Economics Sector of Gosplan was renamed the Department of National Economic Accounts in 1931 in order to emphasise its subordination to the plans).

Osinsky, the major political figure involved in statistics later characterised this as a period dominated by 'the psychology of planning constructivism; since the plan must be fulfilled and over-fulfilled it follows that the planned figure is ultimately substituted for the result even though this does not always correspond with reality'².

In 1932 the central statistical agency was strengthened, given more independence from Gosplan and Osinsky returned to its directorship³.

In 1932 and the first part of 1933 Osinsky did appear to succeed in producing more independent and objective evaluations and even in building up his own independent network of harvest evaluation inspectors (the inter-regional committees for harvest evaluations MRK), under the Central State Committee for harvest evaluations TsGK, under his own chairmanship. But during the 1933 harvest campaign Molotov and Stalin took direct action to circumscribe Osinsky's committees, to put pressure on local harvest evaluations, through local party groups and particularly through the newly created political departments⁴. This resulted in a great inflation in harvest

¹ See S.G.Wheatcroft, 'Views on grain output, agricultural reality and planning in the Soviet Union in the 1920s', unpublished M.Soc.Sci thesis, Birmingham 1974, pp.167-69.

² V.V.Osinsky, Polozheniye i zadachi narodno-khozyaistvennogo ucheta, M.1932, p.5.

³ For an account of Osinsky's earlier period as director of TsSU see S.G.Wheatcroft, 'Statistics and economic decision making in the USSR under Stalin', unpublished discussion paper Birmingham CREES, 1979, pp. 6, 17. Available on request from the author.

⁴ For more details see S.G.Wheatcroft, 'Statistics and economic decision making under Stalin', op.cit., pp.9-11.

evaluations. The original 1933 mechanism for this inflation was simply local subjective evaluations, but the continuation of this level of inflation soon became institutionalised in the form of substituting the biological yield or quasi-biological yield for a barn yield evaluation.

The 1933 and subsequent biological yield distortions appear therefore not so much as the initiation of a distortion, but as a method of continuing a distortion already present, the removal of which was being threatened.

Livestock production evaluations in the 1920s were less closely affected by political factors. Unlike grain whose marketings were planned by the state from the early 1920s, livestock produce marketings remained almost exclusively private right until the late 1920s. TsSU were consequently allowed to keep control over these evaluations throughout this period.

The decline in meat weight of the herds was apparent in 1928/29¹ following the severe grain procurement crisis of spring 1928, but for a while in the late 1920s and early 1930s the livestock produce production figures were offered exclusive of changes in the meat weight in the herds. These, therefore, indicated increases in the level of livestock produce production in the catastrophic years of 1928/29 and 1929/30, when the level of production including the loss in weight of the herds was falling very dramatically².

The leading TsUNKhU livestock expert was later to complain about the mistaken tendency to confuse livestock output (vykhod) with livestock production³. He went on to say that there were still serious methodological as well as technical problems associated with livestock production evaluation and he even presented a revised schema of how he considered the calculation of livestock production should be changed. Several of the elements that he recommended have subsequently been adopted like the giving of considerably more emphasis to changes in the meat weight of herds. But other eminently sensible suggestions have not been accepted, such as including the value of rearing draft animals and breeders, and of changes in their stock. These were two aspects of livestock production which were very important and appear to me to be directly analogous to tractors or machine tools, whose value is certainly included in the value of gross industrial production. Their exclusion is to some extent symbolic of a tendency to underestimate the complex internal inter-relationships within agriculture,

¹ Kontrolniye tsifryi Nar.Khoz.no.1929/30, M.1929, pp.534-5.

² Narodnoye khozyaistvo SSSR no porogye tretogo goda pyatiletki i Kontrolniye tsifryi no.1931g.,M.1931, p.253.

³ A.Nifontov, Produktsiya Zhivotnovodstva,M.1937, pp.104-5. Of course 1937 was a very different year, and such 'confusion' in 1937 would have led to an under-estimation of livestock production and not to its over-estimation.

but it must be admitted that Western economists are also guilty of this tendency¹.

Nancy Nimitz is correct in claiming that the currently accepted series of meat and milk production data are non-comparable with the data of the 1930s², because the latter covered cow meat, pig meat and sheep meat only or just cows milk, but they were normally presented as such. (Incidentally, a large share of the increase in non-main animal meat in the early 1930s indicated in the current data must have been due to the consumption of horse meat). But she seems to me to be wrong in claiming that the inclusion of offal has changed the data. The reason why Nancy Nimitz appeared to get a change in the ratio of meat to slaughter weight for the main three animals was that she inadvertently classified bacon, hams and sausage meat as offal³.

As regards comparing the post-revolutionary data with the pre-revolutionary, the situation is very complicated. I have argued that there was initially little statistical justification for adding a large correction to the pre-revolutionary arable data, that this correction was added mainly to assist Gosplan in bidding up the size of their evaluations of the 1920s harvests, and that it has to be accepted to maintain comparability with the late 1920s harvest evaluations. The removal of this correction in the 1930s and a further deflation of these figures in the 1950s is consequently unjustifiable and makes these figures non-comparable with the currently accepted figures for the 1920s⁴.

Comparisons with the level of pre-revolutionary livestock produce are highly uncertain because of the uncertain nature of pre-revolutionary livestock figures. The official attitude has been to totally reject the standard pre-revolutionary livestock registration statistics and to accept the level of livestock as indicated by the 1916 livestock census as being more indicative of the prewar level. But the Soviet economist A.L.Vainshtein has argued, convincingly, that the prewar level of livestock was much higher than the 1916

¹ See for instance Berger and Lonsberg, American Agriculture: 1899-1939, NBEP, New York, 1942, pp.95-6. Another interesting similarity with Soviet statisticians is their reluctance to include stock changes which have a negative value.

² 'Soviet statistics of meat and milk output: A note on their comparability over time', Nancy Nimitz, RAND Research Memorandum, R.M.2326, Santa Monica, 1959.

³ See N.Nimitz, ibid., pp.8-9, and Sotz.Stroi.SSSR, M.1936, p.215.

⁴ S.G.Wheatcroft, 'The reliability of Russian pre-war grain output statistics', Soviet Studies, no.2, April 1974, pp.157-80, and S.G.Wheatcroft, 'Grain production....', Birmingham 1980, volume 1.

level and that consequently considerably higher correction figures should be accepted¹.

ii) Indirect data associated with factors affecting production

Unfortunately work along these lines has not progressed far enough yet for any great reliability to be put in these elements. But they are mentioned in this account for the sake of completeness, and to provide an indication of what work is being carried on and where it is hoped to lead to.

The effects of agro-meteorological data on yields, the level of veterinary diseases on animal wastage and the level of livestock feed data on livestock numbers may all be considered as relationships which could provide us with background data.

iii) The overall utilisation of the produce

An investigation of the total utilisation of the produce will ensure that very large errors will not be made. Under normal circumstances the reliability of production figures based on a consideration of utilisation cannot be very high and cannot be considered as comparable with the reliability of direct production data. But these were certainly not normal circumstances, we are dealing with fairly large distortions in production data, very detailed balances had been drawn up and special statistical investigations had been made in the 1920s to improve knowledge on general utilisation norms. Apart from which an understanding of utilisation is important in itself and for an understanding of the scale of marketed production.

In the 1920s very detailed material balances of the production and utilisation of most agricultural products were drawn up. There was a whole sector of TsSU under the distinguished statistician A.E.Lositsky, and they organised a whole series of sample survey consumption and feed investigations. As Zemstvo statisticians before the Revolution Lositsky and his colleagues were already heirs to a great tradition of detailed peasant budget studies. During the first world war the government had employed many of these statisticians in working out food consumption plans. And after the Revolution when they had been given their own statistical office, they had set about enthusiastically gathering their utilisation data. If anything Lositsky was too enthusiastic in his claims and too ambitious for his consumption and utilisation balances².

¹ A.L.Vainshtein, 'Iz istorii predrevolyutsionnoi statistiki zhivotnovodstva', in Ocherki po istorii statistiki SSSR, No.3, M.1960, pp.86-115. See also S.G.Wheatcroft, 'Grain production and utilisation in Russia and the USSR before collectivisation', unpublished Ph.D thesis, Birmingham, 1980, vol.1, pp. 121-8.

² See S.G.Wheatcroft, 'Grain production.....' Birmingham 1980, vol.2, pp.505-26.

They often served as the basis for inflating already high production figures. Great care has to be taken in using them and it should be remembered that balances can always be made if the statistician wants to make them. But they are nonetheless a unique source of data. Much detailed procurement, transportation and industrial utilisation data are available. Population figures and livestock figures can be estimated from the demographic censuses and the far more frequent livestock censuses. Changes in per capita food consumption and per livestock type capita consumption of feed, in comparison with their late 1920s levels are somewhat problematical, but there are a few scattered indicators upon which to base hypotheses. And it is only unindicated significant changes from the 1920s norms that will catch us out.

Seed utilisation is relatively straightforward given abundant sowing data and the assumption that seed ratios did not change much.

Wastage and stock changes are the greatest problems. We do have the 1920s data but these were very controversial questions even then. As I emphasised above great care has to be taken with these data, possible margins of error have to be carefully watched and even then only approximate indicators can appear.

iv) Indirect data associated to some extent with product availability

Finally we come to the kolkhoz market price data, which may be considered as relatively free market price data. These can serve as useful indicators of changing availability over time and by region of the different products. They should however be used in conjunction with the utilisation balance data to ensure that there is nothing significant happening to change matters on the demand side.

The detailed results of these analysed production and utilisation series are planned to appear as SIPS discussion papers.

c) Product evaluation in value terms

From the late 1920s until 1933 there was considerable inflationary pressure on the private market for agricultural goods, while the state procurement and retail prices were kept more or less stable. This could only be achieved by fracturing the markets, by making state procurements obligatory and by rationing retail sales. The deflationary measures of 1933 (the great increase in state retail prices and the sharp reduction in money supply) produced a stability in agricultural prices that remained more or less to the end of the decade. The gap between state retail prices and agricultural retail prices closed, but both were at a level considerably higher than in the 1920s. For procurements and

market prices the position was very different. State procurement prices remained at the very low 1920s level for grain, although there was a considerable improvement in the prices for technical crops and livestock produce. There was a slight moderation in the severity of the very low state grain procurements prices, by means of quality and assortment bonuses and the slightly higher prices for decentralised state purchases (zakupki) that were authorised after the fulfilment of the state procurements plan. But the difference between the state procurement price and the private market price remained very large. (Of course private market sales could only be carried out after the fulfilment of the state procurement plan).

The multiplicity of prices, the existence of severe market restrictions and the great inflation of the late 1920s and early 1930s have all contributed to making the task of measuring agricultural production especially difficult. Agricultural production can either be measured in physical terms by using fixed prices, or in current value terms by using the prices actually current in the different markets at the different times. In this paper I am primarily concerned with fixed price evaluations.

Most fixed price evaluations in this period were in 1926/27 prices¹ and there are sound reasons for this. In 1926/27 the agricultural markets (both procurement and retail) were not as artificially divided as they were later to be. Consequently the differences between state and private prices were not very large² and so the overall average price was not very susceptible to changes in the shares of marketed and non-marketed production.

The all-union 1926/27 prices for individual products are readily available in the 1929/30 control figures and this source was used by Johnson and Kahan³. Less aggregated regional prices, however, can only be calculated for grain from this source. The 1926/27 regional prices for grain in the major regions are given below:

¹ The 1923/24 balance and other early works used prewar prices and the 1928, 1929 and 1930 balance of the national economy used 1928 prices.

² On an all-union basis, state procurement prices even in 1926/27 appear much lower than private market prices. But this is mainly due to regional differences. Most collections occurred in the producer regions where prices were low anyway. A comparison of prices within these regions indicates that the state prices were not unduly low.

³ See Kontrolniye tsifry nar.khoz.SSSR na 1929/30, M.1930, pp.581-3, and D.Gale Johnson and Arcadius Kahan, op.cit., p.204.

NCR	81.9 roubles per ton
SCR	105.2 roubles per ton
SPR	53.4 roubles per ton
CPR	50.9 roubles per ton
EPR	48.6 roubles per ton
USSR	57.8 roubles per ton

Major shifts between the importance of the regions in all-union production could lead to an increase in the overall 1926/27 grain prices if the NCR and SCR became more important, and a decrease if they became less important in all-union production.

My calculations, weighting regional production figures with these different prices, have indicated that regional changes would increase the overall average value of grain production by 1-5% in the period from 1927-1936 (due to the relative increase in the share of NCR and SCR in total production) and decrease it by 2-4% in 1937-1940 (as the share of NCR and SCR fell sharply).

Unfortunately a much more complex procedure is necessary to establish the regional significance and regional values for non-grain products.

3. Results

So far only very incomplete and preliminary results are available. A rough set of all-union figures has been calculated and weighted with all-union 1926/27 prices and is presented below in comparison with the current official Soviet series and the Johnson and Kahan series. More detailed regional figures characterising the complex of relationships associated with grain production and utilisation are also presented.

a) All-Union aggregated results

The following table indicates the differences between my preliminary estimates of gross agricultural production and those given by other series, (in 1926/27 prices):

	All agricultural production			arable		livestock		
	J&K	Off.	My	Off.	My	J&K	Off.	My
1913	86	81	92	85	94	87-83	73	87
1928	100	100	100	100	100	100	100	100
1929	101	98	94	99	97		94	87
1930	104	94	88	108	101		73	65
1931	92	92	84	108	100		68	57
1932	82	86	77	107	93	61	55	48
1933	85	81	81	103	97		47	51
1934	85	85	85	107	98		53	62
1935	96	96	102	118	118		63	74
1936	90	88	90	101	98		70	76
1937	113	108	114	128	131	71	80	83
1938	99	97	106	103	108		88	100
1939		98	101	107	109		87	86
1940	120.3	114				102		

Sources: J&K D.Gale Johnson and Arcadius Kahan, 'Soviet agriculture: structure and growth', Comparisons of the United States and Soviet Economies, Washington, 1959, part I, pp.204-6, and D.Gale Johnson, 'Agricultural production', in Abram Bergson and Simon Kuznets, Economic trends in the Soviet Union, Harvard, 1963, p.208.

Off. Official Soviet series Selskoe khozyaistvo SSSR, M.1960, p.21.

My 'Soviet agricultural production, 1913-1940', CREES informal working paper, Birmingham CREES, 1978, appendix 3. Available from the author. This preliminary work is currently being revised and it is hoped that a revised version of this appendix will be available at the conference.

My series differs from the other series in being generally lower in the period from 1929-1932 and higher after 1935. This applies to both the arable and livestock sectors. The trough in both arable and livestock production comes in 1932, whereas for the official series it comes a year later in 1933.

As regards comparisons with the pre-revolutionary situation, my series indicates that there had been far less growth between 1913 and 1928 in both arable and livestock produce than is indicated by the official series or by the Johnson/Kahan series.

b) Regional grain production and utilisation relationships¹.

Despite a slight increase in the production of grain in the two consumer regions in the 1920s it was insufficient to offset the increase in demand in those areas. By the late 1920s the Northern and Southern Consumer Regions still needed to import about a quarter of their needs (They produced about 15 million tons a year and needed to import about 5 million tons).

The three producer regions were already in the late 1920s finding it extremely difficult to satisfy these domestic needs, let alone provide large export surpluses.

Before the Revolution the Southern Producer Region (SPR) had been supplying more than 8 million tons of grain a year surplus to its own requirements. These had been mainly exported. But in the late 1920s a combination of factors, namely: a level of production 1-3 million tons below the prewar level, an increase in population leading to a rise in personal consumption by 0.6-1.0 million tons and an uncertain and probably higher level of livestock feed consumption, resulted in the quantity of available surpluses being about 4 million tons less than before the Revolution.

Before the Revolution the main source of grain surpluses for the domestic market was the Central Producer Region (CPR) which had produced about 5 million tons of grain surplus to its own requirements. This region had been suffering somewhat from over-population even before the Revolution and it suffered most seriously from the drought and famine in the early 1920s. Production levels here in the late 1920s were still about 3-5 million tons below the prewar level, mainly due to the sown area being still 15% lower. The famine and wretched conditions had led to much migration, so there had been little growth in population in this region. Livestock levels were also much lower than before the Revolution, but since those animals that did exist were probably better fed, it is doubtful whether there had been any reduction in demand from this source. Overall, therefore, surpluses from this region were only about 1-2 million tons (i.e. 3-4 million tons lower than in 1913).

The Eastern Producer Region was the only one that showed any improvement as regards grain production and surpluses over this period. Before the

¹ This section relies heavily on the conclusions from my thesis, S.G.Wheatcroft, 'Grain production.....' unpublished Ph.D thesis, Birmingham 1980, and the required data on grain production and transportation given in appendix.

Revolution it had provided less than 1 million tons of grain surpluses. In the 1920s there was a very sharp increase in production. (An increase of about 30-40% - 4-5 million tons in comparison with 1909/13). The population had risen substantially in this region by 4-5 million by the late 1920s and so would have required an additional 1½ million tons of grain. The livestock level was still much lower than before the war, but again it is uncertain whether this meant that the level of livestock consumption of grain was lower. Overall there would consequently be about 1-2 million tons of surplus grain from this region as opposed to less than 1 million tons before the Revolution.

Taken together then the three producer regions would probably under normal circumstances have been in a position to have provided about 5 million tons of grain surpluses in the late 1920s. This would normally have been sufficient to just provide for the current requirements of the two consumer regions in the late 1920s, but would not have provided any further surplus for an increase in demands from these regions or for exports.

Unfortunately, two factors disturbed this potential balance. Firstly, the government attempted to enforce a level of grain exports through increased state procurements, and secondly in 1928 the SPR suffered from an exceptionally bad spell of winter killings, which destroyed 40% of the winter sowings, lowered production there by about 5 million tons and effectively removed the SPR as a surplus producing region for that year¹. This led to extreme strain on the already tight utilisation balance, the application of extreme measures in procurements and the subsequent decline in livestock. It also pushed the regime into the momentous step of rapidly collectivising agriculture. The 1928 harvest had been fairly high in the EPR and record extractions were made from this region (more than 2 million tons). The severity of the Urals-Siberian method of procurement was such that it effectively ruined the growth potential of both arable and livestock farming in the EPR. Not only did livestock levels plummet, but so did the levels of grain production and extra-regional marketings. It was not until 1934 that the level of production in this region rose again to its 1926 and 1928 level (over 16 million tons) and the extra-regional marketings to over 1 million tons (in fact 2 millions).

¹ See S.G.Wheatcroft, 'The significance of climatic and weather change on Soviet Agriculture (with particular reference to the 1920s and 1930s)', SIPS No.11, Birmingham CREES, 1977.

The position in the SPR and CPR was more complicated due to the influence of the fine weather conditions in 1930 which produced exceptionally high harvests allowing large collections to be made. And provided a false indicator of the successes of collectivisation and of the severe procurements system. The exporting of the surpluses produced in this year (almost 10 million tons was exported in the calendar years 1930 and 1931) instead of building up reserves was to have disastrous consequences for Soviet agriculture in the following years.

There was little subsequent growth in production in these areas in the early and mid 1930s, but they nevertheless had to take the full brunt of providing the surpluses for the growing population in the consumer regions. This they could only do at the expense of their own consumption with extremely unfortunate consequences, both for the rural population itself and for livestock husbandry.

4. Conclusions

In this paper I have attempted to indicate the nature of the work that I am carrying out in order to make a re-evaluation of Soviet agricultural production and to consider it in more regional detail.

My analysis of the statistical data indicate that the level of arable and livestock production in the 1920s was much lower in comparison with the prewar data than is currently accepted, either in the Soviet Union, or in the West, and the level of decline in both arable and livestock sectors in 1932 was more severe than indicated by other sources and actually resulted in a level of production lower than the prewar level.

These differences come about partly because of my different evaluations of production in physical terms for those products covered by the other indices, partly due to my inclusion of some products that are primarily utilised within agriculture itself and have not been included in the other indices, and partly due to the fact that my index and the Johnson/Kahan index use crude aggregate weights instead of more detailed (by product type and by region) weights.

My regional analysis of grain production and utilisation relationships provides, I hope, a different dimension to our understanding of the complexities of the grain problem in these years.

Appendices

Grain production by region in million tons

year	NCR	SCR	SPR	CPR	EPR	USSR
1909/13	10.9	(3.2)	27.4	24.6	11.9	78.0
1920	8.2	(3.2)	18.6	13.2	8.7	51.9
1921	10.1	(3.2)	13.8	9.7	7.0	43.8
1922	10.9	(3.4)	17.7	18.0	7.1	57.1
1923	9.5	(3.4)	20.8	15.3	7.8	56.8
1924	10.4	3.5	15.9	11.9	10.2	51.9
1925	11.2	3.5	27.0	17.7	13.4	72.8
1926	11.4	3.6	24.1	21.5	15.8	76.4
1927	11.4	3.2	24.7	20.1	13.5	72.9
1928	10.9	3.8	18.8	21.5	17.5	72.3
1929	11.9	3.8	24.6	19.4	12.1	71.7
1930a)	12.6/	4.0/	29.8/	22.4/	14.8/	83.5/
b)	11.7	3.7	27.6	20.8	13.7	77.4
1931	11.5	4.0	26.1	18.6	9.4	69.5
1932a)	11.7/	3.1/	21.1/	21.7/	12.3/	69.9/
b)	11.7	3.1	19.0	19.5	11.1	65.0
1933	11.3	3.7	21.7	19.4	10.9	67.0
1934	12.7	4.2	16.4	20.7	16.4	70.4
1935	13.5	3.9	22.6	22.6	14.1	76.7
1936	(10.0)	(2.0)	(14.4)	(19.7)	(13.0)	59.1
1937	11.8	1.9	29.3	33.0	19.8	95.8
1938	7.4	2.6	24.3	16.6	23.4	74.3
1939	8.6	3.2	29.7	16.2	16.9	74.6
1940	9.6	2.8	32.0	25.9	16.2	86.5

Sources: 1909/13-1929, S.G.Wheatcroft, Grain production and utilisation in Russia and the USSR before Collectivisation, unpublished Ph.D thesis, Birmingham, 1980, volume 3, p.99

1930a), 1931 and 1932a) Sotsialisticheskoe Stroitelstvo SSSR, M.1934, pp.

1930b) Narodnoye khozyaistvo SSSR, M.1932, p.172-3

1932b) estimate

1933-1940 complex estimation from sown area data and region kolkhoz barn yield data (1932-1933 from I.E.Zelenin, 'Dinamicheskiye obsledovaniya kolkhozov za 1933-1934gg', in Istochnikovedeniye Istorii Sovetskogo Obshchestva, vyp.I. M.1968, p.350, 1937-1940 from Yu.V.Arutunyan, Sovetskoye krestyanstvo v gody velikoi otechestvennoi voiny, M.1970, pp.430-431. 1935 barn yields are estimated from 1935 biological yields and the relationship between 1933 and 1934 barn and biological yields. 1936 barn yields are estimated on the assumption that a low overall figure was needed.

Regional grain transportation balances (despatches net of receipts)
inclusive of foreign trade unless stated, in million tons.

Year	NCR	SCR	SPR	CPR	EPR	USSR
1901	-2.9	+0.2	+4.6	+2.3	+0.2	+4.5
1913	-4.3	+1.3	+8.3	+3.3	+0.8	+9.3
1920	-1.8	+0.1	+0.1	+0.3	+0.3	-0.5
1921	-0.9	+0.1	+0.0	-0.0	+0.1	-0.7
1922	-1.3	+0.1	+0.8	-0.2	+0.3	-0.8
1913	-3.9	-0.5	+8.7	+4.9	+0.8	+10.0
1922/23	-1.5	-0.2	+1.4	+0.9	+0.9	+0.6
1923/24	-2.3	-0.2	+3.8	+1.0	+0.2	+2.7
1924/25	-2.5	-0.4	+1.7	+0.2	+1.5	+0.6
1925/26	-4.0	-0.8	+4.8	+0.9	+1.1	+2.1
1926/27	-3.8	-0.7	+3.3	+2.1	+1.7	+2.7
1927/28	-4.3	-0.9	+2.9	+1.7	+1.1	+0.6
1928/29	-3.6	-0.8	+0.3	+2.0	+2.1	-0.2
1929/30	-4.0	-1.0	+3.7	+2.2	+0.2	+1.0
1930	-2.7	-1.0	+5.6	+2.9	-0.1	+4.8
1931						
ex f.t.	-4.1	-1.3	+2.3	+3.6	+0.2	0
f.t.			(+4.1)	(+1.0)		+5.1
inc.f.t.	-4.1	-1.3	+6.4	+4.6	+0.2	+5.1
1932						
ex f.t.	-3.7	-0.9	+1.9	+3.4	+0.7	0
f.t.			(+1.2)	(+0.3)		+1.5
inc.f.t.	-3.7	-0.9	+3.1	+3.7	+0.7	+1.5
1933						
ex f.t.	-3.1	-1.3	+1.2	+3.4	+0.7	0
f.t.			(+1.3)	(+0.4)		+1.7
inc.f.t.	-3.1	-1.3	+2.5	+3.8	+0.7	+1.7
1934						
ex.f.t.	-4.0	-1.5	+1.8	+4.0	-0.1	
f.t.			(+0.6)	(+0.2)		+0.8
inc.f.t.	-4.0	-1.5	+2.4	+4.2	-0.1	+0.8
1935						
ex.f.t.	-4.4	-1.2	-0.1	+3.5	+2.0	
f.t.			(+1.2)	(+0.3)		+1.5
inc.f.t.	-4.4	-1.2	+1.1	+3.8	+2.0	

Sources:

1901,13,20-22, Trudy TsSU, Tom XIX,vyp.II,M.1925, pp.6-11,

1913, 22/23-26/27, G.Vasilyev in Statisticheskoe Obozrenie, 1928, No.8pp.68,72.

1928/29, 1929/30 and 1930, Narodnoe khozyaistvo SSSR, M.1932, p.268.

excluding foreign trade: 1931 Dinamika i geografiya gruzovogo dvizheniya na putyakh soobshcheniya SSSR (1928-31gg), M.1932, pp.15-17.

1932 Sotsialisticheskoe Stroitelstvo SSSR, M.1935, pp.265-6

1934 Sotsialisticheskoe stroitelstvo SSSR, M.1936, p.493.

1933 from Transport i svyaz SSSR v 1933g., M.1934, pp.107-112

1935 Gruzooborot zheleznodorozhnogo i vodnogo transporta za 1935 g., M.1936, p.14.

