

PROVISIONAL INTELLIGENCE REPORT

LABOR PRODUCTIVITY  
IN SOVIET AGRICULTURE  
1938, 1951, AND 1953



CIA/RR PR-124  
17 October 1955

10-16-78

0/181

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

~~SECRET~~

**WARNING**

This material contains information affecting the National Defense of the United States within the meaning of the espionage laws, Title 18, USC, Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

~~S-E-C-R-E-T~~

~~CONFIDENTIAL~~

PROVISIONAL INTELLIGENCE REPORT

LABOR PRODUCTIVITY IN SOVIET AGRICULTURE  
1938, 1951, AND 1953

CIA/RR PR-124

(ORR Project 45.587)

NOTICE

The data and conclusions contained in this report do not necessarily represent the final position of ORR and should be regarded as provisional only and subject to revision. Comments and data which may be available to the user are solicited.

CENTRAL INTELLIGENCE AGENCY  
Office of Research and Reports

~~S-E-C-R-E-T~~

S-E-C-R-E-T

FOREWORD

This report examines changes in the productivity of labor in Soviet agriculture from 1938 to 1951 and 1953. It is dependent on a preceding report, CIA/RR 39, Agricultural Labor in the USSR, 31 August 1954, SECRET, which provided the man-day inputs expended on the various agricultural enterprises which were used in the present report. In field husbandry these enterprises consisted of grains, fruits and vegetables (including potatoes), technical crops (oil-bearing, sugar beets, and the like), and feed crops (including meadow hay and pasture as well as silage and feed roots). In animal husbandry these enterprises consisted of dairy cows and beef cattle, swine, sheep and goats, poultry, and horses.

CIA/RR 39 also included inputs of labor for administration, cultural services, construction, and other types of farm work not directly assignable to field and animal husbandry enterprises. The labor inputs on these types of work comprised about 17 percent of total labor inputs in agriculture. These inputs were not included in the calculation of labor productivity in the present report. It is possible, therefore, that the absolute levels of labor productivity may be higher than would be the case if the omitted labor inputs could be assigned. The procedure used, however, is standard practice -- that is, to relate production only to that labor which is engaged in direct production work.

It is important to note that this report on labor productivity is subject to the same weaknesses which are inherent in CIA/RR 39. These weaknesses stem primarily from the methodological procedure of holding certain rates of labor inputs constant from 1938 to 1951. These rates apply to two varieties of operations, mechanized and nonmechanized, and were used to measure labor savings resulting from increases in the mechanization of various types of agricultural work, such as plowing, seeding, and harvesting. The methodology assumes that no change in efficiency had occurred between 1938 and 1951 in Soviet agriculture in these two types of operations.

The estimates for the 1953 agricultural season, covered in this report, also are dependent on the 1938 mechanized and nonmechanized rates, but the procedure used for 1953 differs from the procedure

S-E-C-R-E-T

adopted for calculating labor inputs for 1951 in that the average labor inputs applying in 1951 were used to derive total inputs for 1953.

Although it may be legitimate to question the validity of the methodology of CIA/RR 39, analysis of available postwar Soviet studies bearing on labor inputs would in fact seem to support the thesis that little improvement in the efficiency of either mechanized or nonmechanized operations had occurred. Analysis of labor force data also indicates that it is doubtful that efficiency between 1951 and 1953 in these operations had reduced the number of workers required in agriculture by more than 300,000 workers by 1953, as suggested in CIA/RR 39.

In this report, labor productivity is measured by relating physical volume of output in the major agricultural enterprises to labor inputs in man-days expended in these enterprises. Indexes of labor productivity (1938 = 100) are constructed to measure changes from 1938 to 1951 and 1953. This report does not attempt to weight production with price values or labor inputs with wages.

S-E-C-R-E-T

CONTENTS

	<u>Page</u>
Summary . . . . .	1
I. Introduction . . . . .	3
II. Changes in the Production and Use of Crops, 1938 to 1951 .	5
A. Grains . . . . .	5
B. Other Agricultural Commodities . . . . .	10
III. Changes in Labor Inputs in Total Agriculture, 1938 to 1951 . . . . .	12
A. Field Husbandry Enterprises . . . . .	15
B. Animal Husbandry Enterprises . . . . .	17
IV. Changes in Labor Productivity in Agriculture, 1938 to 1951 . . . . .	19
A. Measures Used for Analysis . . . . .	19
B. Changes in Labor Productivity in Animal Husbandry, 1938 to 1951 . . . . .	21
1. Output of Animal Husbandry Enterprises . . . . .	21
2. Labor Productivity in Animal Husbandry Enterprises . . . . .	26
C. Changes in Labor Productivity in Field Husbandry, 1938 to 1951 . . . . .	26
1. Nonfeed Output of Field Husbandry Enterprises . . . . .	27
2. Labor Productivity in Field Husbandry Enterprises . . . . .	28
D. Analysis of Changes in Labor Productivity in Agriculture, 1938 to 1951 . . . . .	31

S-E-C-R-E-T

	<u>Page</u>
1. Labor Productivity per Enterprise Group . . . . .	31
2. Evaluation of Soviet Indexes of Agricultural Labor Productivity . . . . .	35
V. Changes in Labor Productivity in Agriculture, 1951 to 1953 . . . . .	37
A. Output per Agricultural Enterprise Group . . . . .	41
B. Labor Productivity per Agricultural Enterprise Group .	42
VI. Vulnerabilities, Capabilities, and Intentions . . . . .	43
A. Vulnerabilities and Capabilities . . . . .	43
B. Intentions . . . . .	46

Appendixes

Appendix A. Methodology . . . . .	51
Appendix B. Gaps in Intelligence . . . . .	75
Appendix C. Source References . . . . .	77

Tables

1. Comparison of the Uses of Soviet Crop Production, 1938 (Postwar Boundaries) and 1951 . . . . .	7
2. Comparison of the Use of Man-Days Expended in Soviet Field Husbandry, 1938 (Postwar Boundaries) and 1951 . . . . .	13
3. Distribution of Man-Days Expended in Soviet Animal Husbandry, Including Man-Day Inputs on Feed Production, by Type of Animal, 1938 (Postwar Boundaries) and 1951 . . . . .	18

S-E-C-R-E-T

	<u>Page</u>
4. Production, Man-Days Expended, and Production per Man-Day in Soviet Animal Husbandry, 1938 (Postwar Boundaries) and 1951 . . . . .	22
5. Yields and Labor Productivity in Soviet Animal Husbandry, 1938 (Postwar Boundaries) and 1951 . . . . .	24
6. Production for Nonfeed Uses, Man-Days Expended, and Production per Man-Day in Soviet Field Husbandry, by Crops Produced for Nonfeed Uses, 1938 (Postwar Boundaries) and 1951 . . . . .	29
7. Yields and Labor Productivity of Field Crops for Nonfeed Uses in Soviet Field Husbandry, 1938 (Postwar Boundaries) and 1951 . . . . .	30
8. Comparison of Labor Inputs, Actual and Required (at 1938 Work Capacity), in Soviet Agriculture, by Type of Production, 1951 . . . . .	32
9. Indexes of Production in Soviet Agriculture, by Enterprise Sector, 1951 and 1953 . . . . .	38
10. Indexes of Labor Inputs and Labor Productivity in Soviet Agriculture, 1951 and 1953 . . . . .	39
11. Feeding Rates in Soviet Animal Husbandry, by Type of Feed, 1938 (Postwar Boundaries), 1951, and 1953 . . . . .	56
12. Distribution of Feed Allocated to Soviet Livestock, by Type of Livestock, 1938 (Postwar Boundaries), 1951, and 1953 . . . . .	61
13. Distribution of Sown Hectares in Soviet Field Husbandry, by Crop, 1938 (Postwar Boundaries), 1951, and 1953 . . . . .	66
14. Output per Man-Day of Soviet Agricultural Production, by Productive Enterprise, 1938 (Postwar Boundaries), 1951, and 1953 . . . . .	73

S-E-C-R-E-T



CIA/RR PR-124  
(ORR Project 45.587)

S-E-C-R-E-T

LABOR PRODUCTIVITY IN SOVIET AGRICULTURE\*  
1938, 1951, AND 1953

Summary

At the end of 1953, labor productivity in Soviet agriculture was still below the level achieved in 1938. In 1951 the index of labor productivity was only 94 percent of the 1938 level. By 1953 the index had risen to 96. These findings would seem to cast doubt on the credibility of Soviet claims that the productivity of agricultural labor in 1951 and 1953 was considerably above the levels achieved in 1937 and 1940.

It is estimated that in 1951 almost 7.9 billion man-days were expended in field and animal husbandry production. At 1938 rates of labor productivity, however, 1951 production would have required only 7.4 billion man-days. The excess use of about 500 million man-days spent in 1951 is equivalent to the nonproductive employment of 2.8 million extra workers for 1951 agricultural production.

Although declines in yields and in production were generally prevalent in both field and animal husbandry from 1938 to 1953, associated declines in labor productivity apparently occurred principally in animal husbandry. Indexes of labor productivity for 1951 in field husbandry among the 3 major crop groups (fruits and vegetables, grains, and technical crops) ranged from 99 percent (fruits and vegetables) to 103 percent (technical crops) of the 1938 levels. In 1953 these indexes ranged from 96 percent (fruits and vegetables) to 107 percent (technical crops).

In animal husbandry the indexes of labor productivity for 1951 for all livestock enterprises except poultry were below the 1938 levels, as follows: cattle (dairy and meat products), 85 percent; horses, 88 percent; sheep and goats, 89 percent; and swine, 95 per-

\* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 September 1955.

S-E-C-R-E-T

S-E-C-R-E-T

cent. By 1953 the indexes for swine, poultry, and sheep and goats had risen to 1938 levels of labor productivity. In cattle enterprises, however, labor was still only 87 percent as productive in 1953 as in 1938; and in horse enterprises, only about 88 percent. The index of labor productivity for 1951 in animal husbandry as a whole was about 89 percent of the 1938 level; the 1953 index, about 92 percent. Thus about 4.6 billion man-days were spent in animal husbandry in 1951. Only 4.1 billion man-days, however, would have been necessary at 1938 rates of labor productivity. The subsector which most heavily depressed the general level of labor productivity in animal husbandry was that of cattle (dairy and meat products). In this subsector the excess of labor inputs totaled about 378 million man-days. This excess utilization would be the equivalent of the nonproductive employment of about 2,250,000 extra workers in cattle enterprises.

Soviet capabilities for improving labor productivity in agriculture depend partly on the degree to which Soviet management can increase mechanization of work operations in field and animal husbandry. Many, if not most, farming operations remain nonmechanized. Even within the relatively advanced sectors of grain farming, many operations are still done by labor-consuming "horse and hand" methods. In field husbandry, increased numbers of machines should speed up seeding and harvest operations, thus reducing losses and increasing yields (in the barn). At present, however, increased mechanization appears associated with declining yields for about half the crops. Improvement in labor productivity in animal husbandry may depend on whether or not Soviet management can increase the production of feed grains and succulent fodder (especially potatoes) at a rate faster than the increase in the number of livestock. It appears that feeding rates are below the levels prevailing in 1938. Large increases in electrification and the resulting mechanization of fodder preparation, water supply, and other operations in animal husbandry would undoubtedly serve to reduce the excessive labor inputs currently required for the care and maintenance of animals.

Recent steps in the reclamation of virgin and fallow land will undoubtedly increase total grain production in the long run. Although it is expected that long-run average yields in these areas will fall below the level prevailing in spring grain areas of the older agricultural regions, there may, nevertheless, be large

S-E-C-R-E-T

increases in labor productivity in these areas (as compared with rates in older areas) because of the almost total mechanization of operations practiced in the new areas. Animal husbandry output may conceivably increase per unit of labor input because of increases in the total output of feed grain and reduced requirements for labor in the production of feed grain.

It is clear that Soviet agricultural production has not improved much since 1938. The USSR is far from achieving its double goal of saving labor and of increasing yields. Timeliness of operations has been improved, but not by great amounts. Soviet agriculture is still undermachined. Moreover, the situation in animal husbandry has deteriorated considerably compared with 1938. The significance of the failure of Soviet agriculture to expand appreciably since 1938 becomes obvious in light of the fact that at the present time the Soviet population is growing at the rate of over 3 million persons per year, and the total population on 1 January 1954 was at least 20 million people above the 1938 level.

---

I. Introduction.

This report deals with changes in the productivity of agricultural labor in the USSR from 1938\* to 1951. Trends from 1951 to 1953 are also discussed. Attention is focused on changes in the relation between man-day labor inputs and production in field and animal husbandry.\*\*

This focus should not convey the impression, of course, that labor is the only significant element in agricultural production.

---

\* All references in this report to Soviet agriculture in 1938 are in terms of postwar boundaries unless otherwise specifically noted.  
\*\* Certain labor inputs in agriculture were not included in this analysis. These were man-days expended in farm administration, maintenance, slack-season and communal activities, and other similar work. They constituted 16.7 percent of total inputs in 1938 and 17.3 percent in 1951. 1/ (For serially numbered source references, see Appendix C.) The comparable percentage in US agriculture is about 15 percent. 2/

S-E-C-R-E-T

Other influential factors are (1) land,\* (2) climate and weather conditions, (3) availability and use of machinery, (4) managerial skill and efficiency, and (5) incentives and morale of the workers.

The major purpose of this report is to establish an analytical basis for evaluating Soviet statements of intentions and progress in achieving higher productivity in agriculture.\*\* Heretofore it has not been possible to evaluate Soviet statements because, while including indexes presumably pertaining to labor productivity in agriculture, they fail to specify the methods and data used in their construction. 4/

The basic data in this report are analyzed in four steps. Section II is a study of changes in crop production from 1938 to 1951 and includes the allocation of crops to feed and nonfeed uses. This allocation is made because labor expended on crop production that is fed to animals should properly be assigned as inputs expended on the production of animal products.\*\*\* Section III discusses, therefore, the distribution of the labor expended for feed and nonfeed uses for each crop and the allocation of these labor inputs on feeds among the various livestock enterprises. Sections IV and V consist, respec-

---

\* A study of the relation between land and production is a study of yields. Investigation of grain yields in the US (not including corn yields) would suggest that yields for many crops are fairly constant over a long span of years.

\*\* The assumption that labor productivity in Soviet agriculture must improve with increased mechanization does not necessarily follow in fact. This assumption is based on the logic that less labor is required for the same amount of production after machinery has been introduced. The flaw in this theory is that yields do not necessarily rise with increased use of machines. They may actually decline. 3/

\*\*\* The allocation of labor inputs in this report is subject to error. In the first place, error stems from the fact that some of the feed used for 1 year's livestock production was produced in the previous year. In the second place, the increase in the total livestock herd may be larger in one year than it was in the previous year. Labor inputs on feed used currently might more properly have been derived from feed production in the preceding year. In the same way, inputs on animal husbandry production for livestock such as cows and horses, which take longer to mature than poultry or swine, might more correctly have been derived from feed production produced for increases in herds several years back. In any event, the error involved would not be great.

- 4 -

S-E-C-R-E-T

S-E-C-R-E-T

tively, of an analysis of changes in labor productivity in field and animal husbandry from 1938 to 1951 by crop and livestock enterprise\* and of an analysis of changes in labor productivity by broad aggregates of enterprises from 1951 to 1953.

II. Changes in the Production and Use of Crops, 1938 to 1951.

Data on production per crop and its use for feed and nonfeed purposes are included in Table 1.\*\* The table shows that the production of most crops declined from 1938 to 1951. Declines in the production of certain crops can be accounted for by declines in the number of hectares planted to these crops. More important, however, were significant declines in yields for 14 out of the 20 crops whose production is used primarily for nonfeed purposes.\*\*\* Poor weather conditions were not apparently the principal cause of the declines for most crops.\*\*\*\* The production years 1938 and 1951 are taken as average agricultural years which are reasonably comparable for purposes of comparing the growth of most crops. 6/

A. Grains.

The downward trend in production which was characteristic of most crops between 1938 and 1951 applied as well to grains. Total grain production fell from 940 million centners\*\*\*\*\* in 1938 to about 820 million in 1951, or about 13 percent. Since the decline in the number of grain hectares was only 7 percent, † yields must also have

\* Included in this step is the analysis of animal husbandry production.

\*\* Table 1 follows on p. 7.

\*\*\* See pp. 7 and 8, below.

\*\*\*\* Lower yields in 1951 may have been caused principally by lower efficiency in management and by an apathetic response on the part of the peasants. Increased mechanization in itself could also have caused reduced yields for certain crops. 5/

\*\*\*\*\* One centner equals 220.4 pounds, 100 kilograms, or one-tenth of 1 metric ton. Tonnages are given in metric tons throughout this report.

† The number of hectares per crop for 1938, 1951, and 1953 is shown in Table 13, p. 66, below.

S-E-C-R-E-T

fallen during the same period. Although poor seasonal conditions depressed yields of winter wheat, barley, and corn in the Ukraine in 1951, 7/ the weather was not responsible for declines in yields for other grain crops.

The decline in grain production, however, may be partly statistical. The 1938 data for grain production are 5-year averages (1935-39) and have an upward bias because of the high yields achieved in 1937, which was an exceptionally good agricultural year. Increased collectivization may also have lessened the "material interest" (materialnaya zainteresovannost') of farmers in using good husbandry practices for the kolkhozy (collective farms) and for the sovkhozy (state farms). 8/ About 9.6 million private peasant farmers who were not yet collectivized worked in the USSR in 1938. 9/ By 1951, however, practically all such farmers in the USSR had been collectivized. 10/

The general decline in grain production intensified the problem of whether to use grains for direct human consumption or to feed them to animals to obtain animal products. It would seem that two changes occurred in the allocation of grains. First, relatively less grain was used for feed in 1951 than in 1938, or 18 percent in 1951 compared with 22 percent in 1938.\* Second, great declines in the production of the most important feed crops (oats and barley) caused reductions in the proportional amounts of oats and barley used for feed. These reductions were partially offset by compensating increases in the proportional amounts of the better grains (wheat, corn, and other grains) used for feed.

On the basis of these findings, it seems clear that the grain situation in the USSR is not as bright as it was pictured at the XIX Party Congress, when it was stated that the "grain problem is finally and irrevocably solved."\*\* 11/

\* As shown in Table 11, p. 56, below, grain feed rates per animal in 1951 and 1953 are below rates in 1938.

\*\* Continued on p. 10.

S-E-C-R-E-T

Table 1  
Comparison of the Uses of Soviet Crop Production  
1938 (Postwar Boundaries) and 1951

	1938				1951				Percent Change 1938 to 1951		
	Field Husbandry (Thousand Centners)	Uses of Production (Thousand Centners)	Feed $\bar{L}$	Nonfeed	Production $\bar{L}$ (Thousand Centners)	Uses of Production (Thousand Centners)	Feed $\bar{L}$	Nonfeed	Hectares $\bar{L}$	Production	Feed
Grains											
Winter grains	157,965	3,190	158,775	2-05	138,000	3,618	134,382	2-62	+8-94	-11-52	+13-42
Wheat	224,000	4,276	219,724	1-91	233,000	4,048	229,952	1-74		+4-02	-5-32
Rye											
Total winter grains	379,265	7,466	372,499	1-96	371,000	7,666	363,334	2-07	+5-56	-2-36	+2-68
Spring grains											
Spring wheat	179,624	5,362	174,262	2-99	175,000	6,083	169,917	3-48	+2-95	-2-57	+13-45
Barley	92,500	58,685	33,815	63-14	69,884	42,208	27,676	60-40	-18-22	-84-45	-88-08
Oats	169,000	107,216	61,784	63-14	131,000	75,444	55,556	57-29	-13-63	-22-49	-29-64
Corn	43,200	14,055	29,145	32-53	28,000	11,083	16,917	39-58	-28-40	-35-19	-21-15
Rice	2,820	2,820	0		3,700	3,700	0		+16-13	+31-21	+1-21
Other grains $\bar{L}$	73,461	11,686	61,775	15-91	45,300	8,033	37,267	17-73	-44-02	-38-33	-31-26
Total spring grains	560,605	197,004	363,601	35-14	452,884	112,851	310,033	31-54	-13-09	-19-22	-27-49
Total grains	940,570	204,470	736,100	21-74	823,884	150,517	673,367	18-27	-7-12	-12-41	-26-39
Fruits and vegetables											
Fruits $\bar{L}$	26,146				24,163				-8-70	-8-70	
Potatoes	738,380				707,200				+5-21	-4-22	
Vegetables	175,476				168,000				-4-24	-4-25	
Cucurbits $\bar{L}$	35,095				33,600				-4-31	-4-26	
Total fruits and vegetables	975,097	206,747	531,633	28-00	907,063	116,955	560,245	20-78			-88-92
Technical crops											
Sugar beets (raw sugar)	24,500		24,500		24,500		24,500		+3-65		
Tobacco	2,381		2,381		2,041		2,041		-0-96		-14-28
Oil-bearing crops											
Cotton	24,640		24,640		30,390		30,390		+23-00		+23-34
Flax	14,239		14,239		13,020		13,020		-16-10		-8-56
Hemp	4,660		4,660		3,350		3,350		-26-11		-26-11
Sunflowers	21,300		21,300		19,950		19,950		-18-50		-6-34
Soya beans	2,000		2,000		1,180		1,180		-2-84		-41-00
Other (minor) oils $\bar{L}$	3,770		3,770		4,660		4,660		+0-79		+23-61
Fodder and forage											
Silage crops $\bar{L}$	106,000	95,400		90-00	102,469	92,222		90-00	+27-90		-3-33
Feed roots $\bar{L}$	103,907	53,516		90-00	90,561	81,523		90-00	+31-17		-12-83
Hay crops $\bar{L}$	790,000	750,000		100-00	678,780	678,780		100-00	-9-50		-9-50
Pasture units $\bar{L}$	81,463	81,463		100-00	80,201	80,201		100-00	-1-55		-1-55

\* Footnotes for Table 1 follow on p. 9.

S-E-C-R-E-T

S-E-C-R-E-T

Table 1

Comparison of the Uses of Soviet Crop Production  
1938 (Postwar Boundaries) and 1951  
(Continued)

- 
- a. Most of the production data in this table are estimated. <sup>12/</sup> The footnotes explain estimates specifically provided by this report. Grain production estimates for 1938 are 1935-39 averages.
- b. The figures on the use of various crops for feed in 1938 are based on feeding rates (kilograms per animal) prevalent in 1928. <sup>13/</sup> Grain feed rates for most animals in 1938 were above those of 1928, as were also the roughage rates (for potatoes and fodder and forage). Live-stock numbers and feed rates are given in Tables 11 and 12, pp. 56 and 61, respectively, below. (See also Appendix A, Problems 3 and 4.)
- c. The figures on the use of various crops for feed in 1951 are based on changes in livestock numbers and in the numbers of animals in kolkhoz and sovkhoz herds, <sup>14/</sup> and on changes in feed rates which occurred between 1938 and 1951. On the whole, it was estimated that feed rates for grain and feed rates for potatoes fell between 1938 and 1951 for most animals. Roughage rates (except for potatoes) were held constant. (See also Appendix A, Problems 3 and 4.)
- d. See Table 13, p. 66, below.
- e. "Other grains" include millet, buckwheat, grain legumes (peas, beans, and lentils), and similar crops.
- f. Fruits include orchard crops, grapes, berries, and such sub-tropical crops as tea, citrus fruits, and aromatics. Derivation of the production of fruit is given in Appendix A, Problem 1.
- g. Cucurbits are field vegetables such as squash, pumpkins, cucumbers, melons, and similar crops which may be grown on extensive land areas. Like truck garden crops, however, they are grown primarily for human consumption. (See Appendix A, Problem 2.)
- h. "Other minor oils" include such crops as castor beans, camelina, mustard, peanuts, and similar crops which are primarily used for vegetable oil production.



S-E-C-R-E-T

Table 1

Comparison of the Uses of Soviet Crop Production  
1938 (Postwar Boundaries) and 1951  
(Continued)

- 
- i. The best of the silage crops in the USSR are corn and sunflowers for silage. It is customary practice, however, to use weeds and the waste or refuse of other crops (especially technical crops) for silage. Pre-war estimates of the amount of sugar-beet tops annually used for silage range from 3.0 million to 3.5 million tons. Derivation of the production of silage is explained in Appendix A, Problem 3.
- j. The term feed roots is usually applied to vegetables of the root and tuber varieties, such as beets (mangels), turnips, and similar crops. Soviet data concerning feed root hectares probably are restricted to these types. Production data, however, may also include succulent vegetables such as cabbage and pumpkins which, because of low quality, have been converted from food to feed use. (See Appendix A, Problem 3.)
- k. Hay crops include sown grass and meadow hay. (See Appendix A, Problem 4.)
- l. Pasture production is estimated in terms of animal unit factors for roughage-consuming livestock fed annually in North Dakota. 15/ (See Appendix A, Problem 4.)

B. Other Agricultural Commodities.

As shown in Table 1, fruits and vegetables (except potatoes) and technical crops are not used for feed purposes\* -- these are nonfeed crops.

In general, production and acreage declined for fruits, vegetables, and cucurbits from 1938 to 1951.\*\* Potato production especially deteriorated, because of reduced potato yields. Although potato acreage probably increased by 5 percent, potato production fell

---

\* This assertion must be qualified by the fact that Soviet farmers use the wastes and byproducts of vegetable crops and technical crops, particularly sugar-beet tops, as silage and succulent feed. 16/

\*\* Data for yields of fruits, vegetables (except potatoes), and cucurbits were unavailable for postwar years. Yields for 1938 were held constant.

S-E-C-R-E-T

S-E-C-R-E-T

off by about 4 percent. The lower yield would seem to be caused by increased collectivization of potato hectares, which may have lessened the "material interest" of kolkhozniki (collective farmers) in efficient potato husbandry for the kolkhozy. 17/

The decline in the use of potatoes for feed was much greater than that in total potato production (29 percent as compared with 5 percent). Because feed rates per animal were lower in 1951 than in 1938, more potatoes in 1951 were in fact being used for nonfeed purposes than in 1938 (560,000 centners as compared with 532,000 centners). Apparently the increased use of potatoes for food was intended partially to offset the declining availability of total grains for food.

Among the technical crops, declines in production were generally prevalent from 1938 to 1951, although increases occurred for cotton and minor oil crops. Despite the attempts to raise the production of technical crops by increased use of machinery,\* the yields per hectare of all these crops, except those of flax and minor oil crops, fell from 1938 to 1951.\*\*

Fodder and forage crops are by definition feed crops and, except for small amounts wasted, are fed to animals. The Soviet press has long indicated that production of these crops continues to be unsatisfactory. 19/ Despite probable large increases in the areas devoted to silage crops and feed roots, and stability in the area devoted to pastures, production fell for all these crops. The declines ranged from about 2 percent for pasture to about 13 percent for feed roots.\*\*\* It would seem clear that yields must also have declined for these crops.

---

\* Machinery is being applied especially to the plowing of technical crops, to the seeding of cotton, and to the seeding and harvesting of sugar beets and sunflowers. 18/

\*\* See Table 7, p. 30, below.

\*\*\* In view of official data published in a January 1955 Soviet Plenum report 20/ to the effect that silage production in 1953 totaled 32 million tons, the estimate in Table 1 for 1951 may be low. On the other hand, wastage may have increased.

S-E-C-R-E-T

III. Changes in Labor Inputs in Total Agriculture, 1938 to 1951.

Data for the analysis of changes in the amount of labor expended in field and animal husbandry are shown in Table 2\* and Table 3.\*\* Table 2 distinguishes between labor inputs on crop production for feed and for nonfeed purposes. The total man-days required in field husbandry are derived from two figures in this table. The first figure\*\*\* gives the man-days expended in the use of horse-and-hand methods (principally by the kolkhozniki) and the man-days expended in the use of machinery (principally by the Machine Tractor Stations -- MTS's). 21/ The second figure gives the man-days required for the care and maintenance of horses. These man-days are assigned as labor input costs to the various crops\*\*\*\* inasmuch as the primary purpose of horses in agriculture is to serve in crop operations.

Table 3 shows how labor inputs on feeds are distributed among the various livestock enterprises. To these inputs are added the labor inputs expended on the care and maintenance of animals (except horses) to show total inputs per enterprise. The qualification should be noted that the total labor inputs presented in Table 2 and Table 3 may be subject to error because the 1938 labor input rates (man-days per hectare and per animal) taken from an earlier CIA report on agricultural labor in the USSR 22/ were averages of input rates established by an official Soviet source for 430 kolkhozy in 1937, sampled from 10 krais, oblasts, and republics of the USSR. 23/ These averages purported to be representative of input rates for Soviet agriculture as a whole, although they may have been inadequately weighted by regional differences. The 1938 rates are crucial because the 1951 rates are based on them. Although the 1951 averages bear the influence of labor savings achieved through increased mechanization since 1938, component rates of inputs

\* Table 2 follows on p. 13.

\*\* P. 18, below.

\*\*\* This figure includes the total inputs of all workers and types of farm organizations in Soviet agriculture.

\*\*\*\* See Appendix A, Problem 8, for the method used to allocate labor expended on the care and maintenance of horses to crop enterprises.

S-E-C-R-E-T

Table 2  
Comparison of the Use of Man-Days Expended in Soviet Field Husbandry a/  
1938 (Postwar Boundaries) and 1951

Field Husbandry	1938				1951				Thousands	
	Man-Days in Horse- and-Hand Work and Mechanical Operations	Man-Days Required for Maintenance of Horses b/	Total Man-Days Required	Man-Days Required for Feed Production	Man-Days Required for Production for Nonfeed Uses	Man-Days in Horse- and-Hand Work and Mechanical Operations	Man-Days Required for Maintenance of Horses b/	Total Man-Days Required	Man-Days Required for Feed Production	Man-Days Required for Production for Nonfeed Uses
<b>Grains</b>										
<b>Winter grains</b>										
Winter wheat	228,057	22,720	244,777	5,006	239,771	280,623	14,370	238,993	6,161	228,832
Rye	326,439	37,062	403,701	7,706	399,995	353,934	25,513	409,447	7,114	402,333
<b>Total winter grains</b>	<b>554,496</b>	<b>59,782</b>	<b>614,478</b>	<b>12,712</b>	<b>639,766</b>	<b>604,557</b>	<b>39,883</b>	<b>644,140</b>	<b>13,275</b>	<b>631,165</b>
<b>Spring grains</b>										
Spring wheat	359,426	34,382	393,810	11,756	382,054	344,323	22,206	366,509	12,740	353,769
Barley	133,074	13,651	146,725	93,027	53,698	105,921	7,037	112,958	62,224	44,734
Oats	253,633	25,412	279,045	177,030	102,015	212,320	13,850	226,170	130,233	95,937
Corn	63,127	6,127	69,254	24,809	44,445	50,396	4,007	54,403	21,597	32,806
Rice	3,667	401	4,068		4,068		305	4,373		4,611
Other grains	180,391	19,116	199,507	34,737	164,770	108,356	7,327	115,743	20,525	95,218
<b>Total spring grains</b>	<b>928,320</b>	<b>101,069</b>	<b>1,029,409</b>	<b>132,419</b>	<b>760,990</b>	<b>825,792</b>	<b>54,792</b>	<b>880,584</b>	<b>253,339</b>	<b>627,245</b>
<b>Total grains</b>	<b>1,526,216</b>	<b>161,071</b>	<b>1,747,887</b>	<b>351,131</b>	<b>1,396,726</b>	<b>1,430,349</b>	<b>94,675</b>	<b>1,525,024</b>	<b>386,614</b>	<b>1,138,410</b>
<b>Fruits and vegetables</b>										
Fruits	12,526	1,630	14,216		14,216	12,160	1,104	13,264		13,264
Potatoes	596,535	75,860	672,395	188,271	484,124	620,622	55,168	675,790	110,441	535,409
Vegetables	352,930	45,425	398,355		398,355	337,222	30,476	368,398		368,398
Cucurbits	113,740	14,611	128,351		128,351	102,523	9,794	112,617		112,617
<b>Total fruits and vegetables</b>	<b>1,075,731</b>	<b>137,526</b>	<b>1,213,317</b>	<b>188,271</b>	<b>1,025,046</b>	<b>1,079,827</b>	<b>96,512</b>	<b>1,176,339</b>	<b>110,441</b>	<b>1,035,898</b>
<b>Technical crops</b>										
Sugar beets	176,600	21,994	200,602		200,602	189,796	16,450	206,246		206,246
Tobacco	11,034	1,357	12,391		12,391	10,918	936	11,854		11,854
<b>Oil-bearing crops</b>										
Cotton	298,823	37,951	336,834		336,834	353,412	39,032	395,444		395,444
Flax	213,051	26,796	239,849		239,849	179,597	15,790	195,387		195,387
Hemp	57,957	7,344	65,301		65,301	50,903	4,513	55,416		55,416
Sunflowers	53,695	5,472	59,167		59,167	61,722	4,325	66,047		66,047
Soya beans	20,287	2,656	22,943		22,943	20,326	1,688	22,014		22,014
Other (minor) crops	74,802	9,487	84,289		84,289	75,727	6,674	82,401		82,401
<b>Total oil-bearing crops</b>	<b>719,175</b>	<b>89,688</b>	<b>808,863</b>		<b>808,863</b>	<b>751,705</b>	<b>65,102</b>	<b>816,807</b>		<b>816,807</b>
<b>Total technical crops</b>	<b>908,517</b>	<b>113,030</b>	<b>1,021,546</b>		<b>1,021,546</b>	<b>922,419</b>	<b>82,496</b>	<b>1,004,915</b>		<b>1,004,915</b>
<b>Fodder and forage</b>										
Silage crops	14,129	1,662	15,791	15,791		12,160	1,324	12,544	19,544	
Feed roots	129,488	16,525	146,013		146,013	170,127	15,229	185,416		185,416
Hay crops	454,846	58,240	513,086		513,086	512,393	45,565	557,958		557,958
Pasture	348,000	45,052	393,052		393,052	348,000	31,525	379,525		379,525
<b>Total fodder and forage</b>	<b>946,463</b>	<b>121,480</b>	<b>1,067,943</b>	<b>1,067,943</b>		<b>1,040,740</b>	<b>93,723</b>	<b>1,134,463</b>	<b>1,142,503</b>	
<b>Grand total</b>	<b>5,517,827</b>	<b>533,775</b>	<b>6,051,602</b>	<b>1,662,004</b>	<b>3,443,628</b>	<b>5,511,095</b>	<b>367,476</b>	<b>5,878,571</b>	<b>1,540,528</b>	<b>3,328,043</b>

a. 24/.

b. For the method employed to distribute these man-days by crops, see Appendix A, Problem 8.

S-E-C-R-E-T

on both mechanized and nonmechanized operations were held constant from 1938 to 1951. While criticism of the use of this method may be valid, it is doubtful, on the basis of critical study of postwar Soviet research in agricultural labor, that much increase in labor efficiency on mechanized and nonmechanized work had actually occurred.

A. Field Husbandry Enterprises.

According to data in Table 2, the amount of labor used in field husbandry operations declined from about 5.1 billion man-days in 1938 to less than 4.9 billion in 1951, or about 3.5 percent. This small decline was caused principally by the decrease in inputs on the maintenance and care of horses (assigned to field crops) from about 534 million man-days in 1938 to about 367 million in 1951, or about 31 percent.\* Labor expenditures in the use of horse-and-hand work as well as in mechanical operations on the whole remained stationary at about 4.5 billion man-days in both 1938 and 1951.

Comparison of the following percentage distributions of the labor inputs for the four major crop groupings shows that labor inputs in Soviet agriculture were shifting slightly from grains to other crops -- especially to technical crops and fodder and forage crops.

<u>Type of Crop</u>	<u>Percentage of Total Labor Inputs</u>	
	<u>1938</u>	<u>1951</u>
Grains	34.60	31.26
Fruits and vegetables	24.02	24.11
Technical crops	20.23	21.21
Fodder and forage	21.15	23.42
Total	<u>100.00</u>	<u>100.00</u>

\* This decline is paralleled by a 31-percent decline in the number of horses. See Table 11, p. 56, below.

S-E-C-R-E-T

These shifts probably reflect (1) labor saved on grain crops through increased mechanization, (2) increased emphasis on technical crops to meet industrial and military requirements, and (3) the demands of a growing population for animal products.\*

Changes in labor inputs on certain crops account for most of these shifts. The decline in inputs on grains may be assigned principally to spring grains (except for rice), which fell by about 20 percent.

The increases in labor inputs on technical crops were mostly for sugar beets, cotton, and sunflowers. These three crops in 1951 were grown on about 65 percent of the total hectares devoted to technical crops.\*\* All categories of forage and fodder crops except pasture received increases in inputs of labor from 1938 to 1951.

Labor inputs on the crop production used for feed constitute about 32 percent of the total inputs on crops. In 1938 about 1.61 billion man-days out of the total 5.05 billion man-days expended on crops were allocated to feed production, whereas in 1951 about 1.55 billion man-days out of the total 4.88 billion man-days were thus expended.

The crops which assume the heaviest labor inputs for the production of feed are the fodder and forage crops. These crops required 1.07 billion man-days in 1938, or about 66 percent of the 1.61 billion man-days expended on total feed production. They required 1.14 billion man-days in 1951, or about 74 percent of the 1.55 billion man-days expended. As shown above, over 21.2 percent of the total labor inputs on crop production in 1938 and 23.4 percent in 1951 were expended in the production of fodder and forage -- inputs which must be assigned properly to livestock enterprises.

While labor inputs in feed production were being concentrated increasingly on forage and fodder production, the proportion of labor inputs in grain and potato production for feed to total labor inputs

\* The population apparently increased from about 193 million at the end of 1938 to about 207 million at the end of 1951. 25/

\*\* See Table 13, p. 66, below.

S-E-C-R-E-T

on feed production declined from 1938 to 1951. Labor inputs for grains fed declined from about 351 million man-days in 1938 -- about 22 percent of the total labor in feed production -- to about 267 million man-days, or about 17 percent of the total. Labor inputs for potatoes fed declined from 188 million man-days in 1938 -- about 12 percent of the total labor inputs in feed production -- to about 140 million in 1951, or about 9 percent of the total.

B. Animal Husbandry Enterprises.

The labor expended on the production of feed, shown in Table 2,\* is transferred in Table 3\*\* to animal husbandry. The method used to transfer these inputs from crops to livestock enterprises is based on estimated rates of feeding (kilograms per type of feed per animal) applicable in 1938, 1951, and 1953.\*\*\* One-third of the total man-days assigned to livestock for both 1938 and 1951 were expended on the production of feed. These figures amounted to 1.6 billion man-days expended on feed production out of the total 4.7 billion expended on animal husbandry as a whole in 1938, and 1.55 billion out of the total 4.56 billion in 1951. It seems clear that analyses of the costs of animal husbandry in the USSR are incomplete without consideration of the costs of production of feed for livestock.

Cattle enterprises (especially dairy husbandry) constitute the most significant consumers of labor inputs as indicated in Table 3. These enterprises required over 60 percent of the total labor inputs on maintenance and care in both 1938 and 1951 (2.6 billion man-days in 1938 and 2.5 billion in 1951). They also required about half the inputs on roughage production in 1938 and over half in 1951.

\* P. 13, above.

\*\* Table 3 follows on p. 18.

\*\*\* The only available study on feed rates by a Soviet authority is based on 1928 data. 26/ The methods used in the application of adjusted rates from 1928 to 1953 are given in Appendix A, Problems 3 and 4. In general, the rates are estimated as having fallen somewhat from 1938 to 1951. Rates for 1953 are estimated to have been fairly stable compared with 1951 except for potato feeding, which had fallen 50 percent below the 1938 rates. 27/

S-E-C-R-E-T

Table 3

Distribution of Man-Days Expended in Soviet Animal Husbandry,  
Including Man-Day Inputs on Feed Production, by Type of Animal  
1938 (Postwar Boundaries) and 1951

Type of Animal	Thousand Man-Days									
	1938					1951				
	For Care and Maintenance <u>b/</u>	For Feed Production <u>a/</u>			Total Man-Days	For Care and Maintenance <u>b/</u>	For Feed Production <u>a/</u>			Total Man-Days
	Grains	Roughage	Total Feed		Grains	Roughage	Total Feed			
Cattle										
Cows	1,225,440	47,889	400,177	448,066	1,673,506	1,111,672	37,623	431,425	469,048	1,580,720
Other cattle	683,760	20,564	207,904	228,468	912,228	693,000	17,936	228,780	246,716	939,716
Total cattle	<u>1,909,200</u>	<u>68,453</u>	<u>608,081</u>	<u>676,534</u>	<u>2,585,734</u>	<u>1,804,672</u>	<u>55,559</u>	<u>660,205</u>	<u>715,764</u>	<u>2,520,436</u>
Swine										
Hogs <u>c/</u>	332,717	87,694	143,468	231,162	563,879	253,739	58,009	114,363	172,372	426,111
Pigs <u>c/</u>	155,366	22,020	31,365	53,385	208,751	118,496	14,352	24,806	39,158	157,654
Total swine	<u>488,083</u>	<u>109,714</u>	<u>174,833</u>	<u>284,547</u>	<u>772,630</u>	<u>372,235</u>	<u>72,361</u>	<u>139,169</u>	<u>211,530</u>	<u>583,765</u>
Sheep and goats	265,353	4,266	134,448	138,714	404,067	359,055	5,128	195,610	200,738	559,793
Poultry	421,000	42,699	23,525	66,224	487,224	477,730	49,740	26,825	76,565	554,295
Horses	<u>d/</u>	125,999	315,986	441,985	441,985	<u>d/</u>	83,826	261,135	344,961	344,961
Total animals	<u>3,083,636</u>	<u>351,131</u>	<u>1,256,873</u>	<u>1,608,004</u>	<u>4,691,640</u>	<u>3,013,692</u>	<u>266,614</u>	<u>1,282,944</u>	<u>1,549,558</u>	<u>4,563,250</u>

a. These data are derived from Tables 11 and 12, pp. 56 and 61, respectively, below. The derivations are explained in Appendix A, Problems 3, 4, and 9.  
 b. 28/.  
 c. Hogs are swine which are 4 months old or older; pigs are swine younger than 4 months.  
 d. See Table 2, p. 13, above, in which the labor inputs on the maintenance and care of horses are assigned to field crops.

S-E-C-R-E-T



S-E-C-R-E-T

Cattle enterprises did not, however, lead in labor requirements for grain fed. In this category, they ranked third below horses and swine, and required only 21 percent of the labor inputs for grain fed in 1938, and 24 percent in 1951. In 1951, horses were still the principal consumers of grain and, therefore, of labor inputs on grain fed, despite decreased estimated feeding rates\* and decreased animal numbers from 1938 to 1951.\*\*

IV. Changes in Labor Productivity in Agriculture, 1938 to 1951.

The reallocation of labor inputs, achieved in Sections II and III, above, now makes it possible to calculate the productivity of agricultural labor in the USSR and to examine changes since 1938. Attention is directed in this section to a comparison of labor productivity in Soviet agriculture in 1938 with that in 1951. The discussion of changes from 1951 through 1953 is to be found in Section V, below.

A. Measures Used for Analysis.

Two types of measure are used to show changes in labor productivity per crop and per livestock enterprise. The first of these is the index of labor productivity for the current year (1951, with the base year 1938 = 100). The second is the percentage of increase in output (production) per man-day. These measures are opposite sides of the same coin. For example, if the 1951 labor productivity index for a given crop is 98 percent of the 1938 rate, the percentage change in labor productivity would be minus 2 percent.

These measures are calculated on the same basis -- the rate of output per man-day in 1951 in relation to the rate of output in 1938, by crop or livestock enterprise. Output is given in physical volume -- usually kilograms.

---

\* In this report, it is estimated that horses were being fed total grains in 1938 at the 1928 rate, other animals above 1928 rates. In 1951, however, grain rates for horses were held constant, while for other animals except poultry they were reduced to 1928 rates. All rates were held constant from 1951 to 1953 except those for poultry, which were reduced to the 1928 level. See Appendix A, Problems 3 and 4.

\*\* See Table 11, p. 56, below.

S-E-C-R-E-T

The derivation of the index of labor productivity for a group of enterprises -- for example, grain crops -- was achieved by the use of labor weights for the individual enterprises. Three steps were involved, as follows: the 1951 index of labor productivity for each enterprise was multiplied by the 1951 labor inputs for each enterprise, the products were added, and the sum was then divided by the 1951 sum of labor inputs for all enterprises in the group involved.\*

This procedure avoids the problem of attempting to add together in one sum the total volume of physical production for all enterprises in a group. 29/ The index of labor productivity for a group of enterprises merely expresses the percentage relation of (1) the amount of labor expended for 1951 agricultural production for that group to (2) the amount of labor which would have been required for 1951 production at 1938 rates of output per man-day.\*\*

The index of labor productivity for an enterprise group can be used, within limits, to estimate an index of production in physical volume. This is done by multiplying the index of labor productivity for the aggregate of enterprises by the index of man-day inputs for the same aggregate. This procedure follows mathematically from the fact that an index of labor productivity is theoretically the result of the division of the index of production by the index of labor inputs.

It is well to emphasize at this point, however, that an index of production calculated in this manner is an imperfect substitute for an index determined through the use of proper price weights. The indexes of aggregate production for various enterprise groups, as calculated in this report, can be used only if certain limiting assumptions are kept in mind, not the least of which is that they make no pretense of approximating value indexes. 30/ These assumptions are more fully discussed in Section V, below. Because of these assumptions there has been no attempt to present aggregate indexes of production for field husbandry, for animal husbandry, or for total agriculture, as inclusive enterprise groups.

---

\* This procedure assumes that labor inputs in 1951 constitute the same proportion of total costs of production as in 1938 for each enterprise in the group. Although the enterprises in a given group may be regarded as fairly homogeneous in costs, changes in relative costs may have occurred for some crops in the group.

\*\* See Table 8, p. 32, below, and Appendix A, Problem 10.

S-E-C-R-E-T

The methodology discussed above is referred to in Tables 4 and 5\* for animal husbandry and Tables 6 and 7\*\* for field husbandry.

B. Changes in Labor Productivity in Animal Husbandry, 1938 to 1951.

Most of the pertinent data for a study of changes in labor productivity in animal husbandry in the USSR, 1938 to 1951, are given in Tables 4 and 5. Table 4 gives the data on changes in output per man-day, while Table 5 gives the data on changes in yields per animal, indexes of production, man-day inputs, and labor productivity.

1. Output of Animal Husbandry Enterprises.

The production situation in Soviet animal husbandry in 1951 contrasts unfavorably with that for 1938. As shown in Table 4, the total production of meat, fats, wool, and eggs (all evaluated as meat products -- see footnotes e and f) was about 48 million centners in 1938, but only 44 million centners in 1951. Milk production fell from 341 million centners in 1938 to 259 million centners in 1951. Over 2.6 billion 10-hour work-shifts were obtained from horses in 1938 as compared to 1.8 billion in 1951.

Animal husbandry production was on the rise between 1938 and 1951 only for the two minor branches, sheep and goats and poultry. The 1951 index of production for meat and fats and wool and mohair, evaluated as meat products,\*\*\* for the sheep and goats sector was approximately 124 percent of 1938 production, as shown in Table 5. The 1951 index of production for poultry meat and eggs, evaluated as meat products,\*\*\*\* was about 114 percent of 1938 poultry production. On the other hand, production in the major livestock branches in 1951 was considerably below that in 1938, especially for dairying, swine, and horses. The fall in cattle production (1951 was 83 percent\*\*\*\*\*

\* Tables 4 and 5 follow on pp. 22 and 24, respectively.

\*\* Pp. 29 and 30, respectively, below.

\*\*\* Total sheep and goat production is expressed in meat products equivalents. See Appendix A, Problem 5.

\*\*\*\* Total poultry production is expressed in poultry meat equivalents. See Appendix A, Problem 6.

\*\*\*\*\* Continued on p. 25.

Approved For Release 1999/09/26 : CIA-RDP79-01093A001000020002-4

S-E-C-R-E-T

Table 4

Production, Man-Days Expended, and Production per Man-Day in Soviet Animal Husbandry  
1938 (Postwar Boundaries) and 1951

Type of Animal	Type of Product	1938			1951			Percent Change in Production per Man-Day 1938 to 1951
		Production a/* (Thousand Centners)	Man-Days Expended (Thousands) b/	Production per Man-Day c/ (Kilograms)	Production a/ (Thousand Centners)	Man-Days Expended (Thousands) b/	Production per Man-Day c/ (Kilograms)	
Cattle								
Cows	Whole milk	341,020	1,673,506	20.378	259,000	1,580,720	16.385	-19.59
Other cattle	Meats and fats							
	Beef and veal	14,200			13,600			
	Animal fats	770			700			
	Total meats and fats	14,970 d/	912,228 d/	1.641 d/	14,300 d/	939,716 d/	1.522 d/	- 7.25 d/
Total cattle			<u>2,585,734</u>			<u>2,520,436</u>		
Swine								
	Pork	16,140			11,600			
	Fats, fat cuts, and bacon	4,040			2,900			
	Total meats and fats	<u>20,180</u>			14,500			
Total swine		<u>20,180</u>	<u>772,630</u>	2.612	<u>14,500</u>	<u>583,765</u>	2.484	- 4.90
Sheep and goats								
	Wool and mohair	751 e/			895 e/			
	Mutton and goat meat	4,300			5,350			
	Animal fats	350			450			
	Total in meat products	<u>5,401</u>			<u>6,695</u>			
Total sheep and goats		<u>5,401</u>	<u>404,067</u>	1.337	<u>6,695</u>	<u>559,793</u>	1.196	-10.546
Poultry								
	Eggs	4,820 f/			5,470 f/			
	Meat	2,600			2,900			
	Total in meat products	7,420			8,370			
Total poultry		<u>7,420</u>	<u>487,224</u>	1.523	<u>8,370</u>	<u>554,295</u>	1.510	- 0.854

\* Footnotes for Table 4 follow on p. 23.

S-E-C-R-E-T

Approved For Release 1999/09/26 : CIA-RDP79-01093A001000020002-4

S-E-C-R-E-T

Table 4  
Production, Man-Days Expended, and Production per Man-Day in Soviet Animal Husbandry  
1938 (Postwar Boundaries) and 1951  
(Continued)

Type of Animal	Type of Product	1938			1951			Percent Change in Production per Man-Day 1938 to 1951
		Production a/ (Thousand Centners)	Man-Days Expended (Thousands) b/	Production per Man-Day d/ (Kilograms)	Production a/ (Thousand Centner)	Man-Days Expended (Thousands) b/	Production per Man-Day c/ (Kilograms)	
Horses								
Total horses	Farm power	<u>2,615,115</u> g/	<u>441,985</u>	5.917 h/	<u>1,800,417</u> g/	<u>344,961</u>	5.219 h/	-11.797
Total animals			<u>4,691,640</u>			<u>4,563,250</u>		

- a. The production data supplied in this table, except where otherwise noted, are estimated. 31/ Data on the production of hides for all categories of livestock are not included.
- b. Labor input data are obtained from Table 3, p. 18, above.
- c. One kilogram equals 2.2 pounds, or one-hundredth of 1 centner.
- d. It was believed possible in this report to assign differential labor inputs to dairy and to meat and fats production, on the theory that all cattle meat products always come from "other cattle." Most milk cows are eventually slaughtered for meat. It is assumed that by January of each year the young heifers (other cattle), freshening as milk cows for the first time, will have replaced the old discarded cows slaughtered for meat.
- e. Wool and mohair production is expressed as the equivalent of meat production from sheep and goats in order that a measure of output per man-day might be obtained for sheep and goat production. The equivalence is based on price relations between wool and mohair products and sheep and goat meat products. See Appendix A, Problem 5.
- f. Egg production is expressed as the equivalent of poultry meat production. See Appendix A, Problem 6.
- g. Thousand 10-hour shifts. See Appendix A, Problem 7, for the method of derivation of the number of shifts worked by horses in the USSR.
- h. Ten-hour shifts.

S-E-C-R-E-T

Table 5

Yields and Labor Productivity in Soviet Animal Husbandry  
1938 (Postwar Boundaries) and 1951

Type of Animal	Type of Product	Yield per Animal (Kilograms) <u>g/</u>		Percent Change in Yield 1938-51	1951 Index of Produc- tion (1938 = 100) <u>b/</u>	1951 Index of Man-Day Inputs (1938 = 100) <u>c/</u>	1951 Index of Labor Productivity <u>d/</u>
		1938	1951				
Cattle							
Cows	Whole milk	1,280.030	1,070.248	-16.388	75.953	94.456	80.407
Other cattle	Meats and fats	45.977	43.333	- 5.750	95.524	103.013	92.730
Total cattle					82.855 <u>e/</u>	97.475 <u>e/</u>	85.001 <u>e/</u>
Swine	Meats and fats	63.861	60.166	- 5.786	71.853	75.556	95.100
Sheep and goats	Meat products	7.389	6.763	- 8.472	123.959	138.540	89.475
Poultry	Meat products	3.118	3.100	- 0.577	112.803	113.766	99.154
Horses							
Work horses	Farm power	203.116 <u>f/</u>	203.116 <u>f/</u>		68.847		
Total						78.048	88.211

- a. Yields per animal are calculated by dividing the production data in Table 4, p. 22, above, by the corresponding animal numbers in Table 11, p. 56, below.  
 b. The index of production for specific enterprises is obtained by dividing 1951 production by 1938 production. Thus 1938 = 100.  
 c. The index of man-day inputs is derived by dividing total man-day inputs for 1951 by total man-day inputs for 1938. Thus 1938 = 100.  
 d. The index of labor productivity for 1951 for individual enterprises is obtained by dividing the index of production by the index of man-day inputs per enterprise.  
 e. The aggregated index of productivity for cattle enterprises is the weighted average of cow and other cattle enterprises, using the 1951 man-day inputs as weights. The production index for total cattle enterprises is calculated by multiplying the aggregated productivity index by the aggregated man-day inputs index, thus weighting the cow and other cattle enterprises production indexes with labor inputs. This procedure may, of course, produce a different aggregate from one obtained by using prices as weights.  
 f. Ten-hour shifts.

S-E-C-R-E-T

of 1938) was caused especially by the marked decline in dairying -- the 1951 index of beef production was 95, but the index of milk production was only 76. The 1951 index of swine production was 72 percent of 1938 production, and the index of horse work production was only 69 percent of 1938 production.

The general decline in animal husbandry production is apparently the result of a decline in numbers of the heavy grain-consuming animals\* -- cows, swine, and horses -- as well as scarce supplies of feed grains and potatoes in 1951\*\* and a general decline in yields per animal (except for horses\*\*\*).

The scarcity of supplies of grain for feed probably retarded the growth of the numbers of cows and swine and hence the growth of dairy and swine production. But the decline in the number of horses was in part due to the substitution of tractor power for farm-produced draft power.\*\*\*\* Scarce grain supplies, however, were not wholly responsible for the decline in yield per cow from 1,280 kilograms per year in 1938 to 1,070 kilograms in 1951 and the decline in yield per hog from 64 kilograms in 1938 to 60 kilograms in 1951 -- other factors must have been operating. Although the grain feed rates in 1951 were below rates in 1938, they are estimated to be as high as the 1928 rates which prevailed prior to collectivization when yields per animal in animal husbandry were high. 34/

The fact is that the yields of all animals fell\*\*\*\*\* between 1938 and 1951, in kilograms per animal, according to the data in Table 5. The outstanding decline in yields was exhibited by cows -- over 16 percent less milk was produced per cow in 1951 than in 1938. The yield in meat products per sheep or goat fell from 1.34 kilograms per animal in 1938 to about 1.2 kilograms in 1951, or about 8.5 percent.

\* See Table 11, p. 56, below.

\*\* See Table 1, p. 7, above.

\*\*\* The yield of farm-produced draft power per horse was held constant from 1938 to 1951, principally because yield data were unavailable for 1951.

\*\*\*\* The increase in tractor horsepower in Soviet agriculture, from 9 million horsepower in 1938 to 12 million in 1951, 32/ relieved draft animals of the heavier farm work, such as plowing. 33/

\*\*\*\*\* Except horses, for which the yields of farm power were assumed to be constant.

S-E-C-R-E-T

The decline in production in Soviet animal husbandry may have resulted from the fact that there was a much greater degree of collectivization in animal husbandry in 1951 than in 1938. Apparently the depressing controls of the bureaucratic apparatus of socialized management on Soviet animal husbandry and the official reduction of the agricultural labor force about 1951 35/ lowered the efficiency of labor. Livestock yields were therefore lower, even though grain feed rates were maintained at 1928 levels. The depressing effect of these controls was evident in (a) the apparent unwillingness of Soviet planners to invest in laborsaving machinery for animal husbandry, 36/ (b) the admittedly insufficient prices used by the state for obligatory deliveries of animal husbandry products, 37/ and (c) the relatively low earnings probably accruing to kolkhozniki for work in kolkhoz animal husbandry.

2. Labor Productivity in Animal Husbandry Enterprises.

The general decline in animal husbandry production from 1938 to 1951 is also reflected in declines in labor productivity for all the component enterprises. The declines in production per man-day ranged from about 1 percent for poultry to as much as 20 percent for cows, as shown in Table 4.\* Labor productivity in farm-produced draft power in 1951 was about 12 percent lower than that in 1938; in sheep and goat enterprises, about 10.5 percent lower; in swine enterprises, about 5 percent lower; and in cattle enterprises (meat), over 7 percent lower. As shown in Table 5,\*\* the index of man-day inputs for 1951 was greater for every enterprise than the index of production for 1951. The index of labor productivity for total animal husbandry in 1951 was about 89 percent (1938 = 100).

The single enterprise most responsible for the general decline in labor productivity is dairying. Recent criticisms and complaints about the status of production in dairy enterprises in the USSR would seem to be justified. 38/

C. Changes in Labor Productivity in Field Husbandry, 1938 to 1951.

In the analysis above, the labor expended on crop production used for feed has been assigned to animal enterprises. It is now possible to analyze changes in the productivity of agricultural labor.

\* P. 22, above.

\*\* P. 24, above.



S-E-C-R-E-T

crop production, including that part of production used only for non-feed purposes. The data for analysis are included in Tables 6 and 7\* and correspond to those included in Tables 4 and 5\*\* for animal husbandry.

1. Nonfeed Output of Field Husbandry Enterprises.

Tables 4 and 5 and also Tables 6 and 7, in conjunction with Table 1\*\*\* and Table 13,\*\*\*\* show that since 1938 the USSR has, in its production of grain for nonfeed purposes, emphasized production of the better food grains, wheat and rye. This is demonstrated first by the distribution of sown hectares shown in Table 13. Hectares sown to wheat (winter and spring) and rye constituted 59 percent of the total 114 million hectares sown in grain in 1938, as compared with 66 percent of the total 106 million hectares sown in grain in 1951.

The trend of concentration is similar for production. In 1938, wheat (winter and spring) and rye for nonfeed use constituted about 74 percent of total grain production for nonfeed use (736 million centners), while in 1951 they constituted about 79 percent of the total (673 million centners).\*\*\*\*\*

Indexes of nonfeed grain production by crops show some variation, according to data in Table 7. The 1951 index of total nonfeed production of grain (1938 = 100) is about 91 percent. The index for rye is 104 and for spring wheat 97, both above the index for total grains. The index for winter wheat is below the total index, about 88, however, because of poor winter wheat yields in 1951, according to data in Table 7.

If production of spring wheat is added to production of winter wheat and rye, and a 1951 index of production is calculated for total wheat and rye (1938 = 100), and if a 1951 index is calculated

- 
- \* Tables 6 and 7 follow on pp. 29 and 30, respectively.
  - \*\* Pp. 22 and 24, respectively, above.
  - \*\*\* P. 7, above.
  - \*\*\*\* P. 66, below.
  - \*\*\*\*\* See Table 6, p. 29, below.

S-E-C-R-E-T

for all other grains, the results are as follows: (a) the 1951 index of wheat and rye production for nonfeed use is about 97 percent, while (b) the 1951 index of production for all other grains is only about 74 percent.

It thus appears that the 1951 production of wheat and rye generally is comparatively close to the production level in 1938. This achievement may not necessarily be regarded as successful, since the Soviet population at the end of 1951 was probably about 16 million greater than in 1938 (postwar boundaries). <sup>39/</sup> The situation probably has not improved since 1951, because the rate of production of grain has not increased at a rate greater than the increase in population. <sup>40/</sup> It is clear that both the 1951 population and the current population of the USSR had less wheat and rye for nonfeed purposes per capita than in 1938, and, similarly, there was less production of other grains for nonfeed purposes than in 1938.\* The grain problem, contrary to Soviet pronouncements in 1951 and 1952, has not been "irrevocably solved." <sup>41/</sup>

2. Labor Productivity in Field Husbandry Enterprises.

Despite the declines in yields shown for most crops in Table 7, labor productivity in Soviet field husbandry (for nonfeed purposes) in 1951 was slightly above the 1938 level (1938 = 100), the 1951 index of labor productivity being about 101 percent. Variations for the three major crop groups were rather minor. The index for grains was almost 101 percent, for fruits and vegetables 99 percent, and for technical crops 103 percent. While labor in animal husbandry production in 1951 generally was considerably less efficient than in 1938, labor in field husbandry production (for nonfeed purposes) in 1951 was slightly more efficient than in 1938.

Too much labor apparently was employed in the production of soya beans, sunflowers, hemp, tobacco, and winter wheat. According to yield data in Table 7, improvement in labor productivity among these enterprises undoubtedly will depend primarily on increasing the yields of these crops. From 1938 to 1951 the declines in yields for these crops ranged from 39 percent for soya beans to 11.5 percent

\* No attempt is made in this section to discuss production for nonfeed purposes for crop enterprises other than grains.

S-E-C-R-E-T

Table 6  
Production for Nonfeed Uses, Man-Days Expended, and Production per Man-Day  
in Soviet Field Husbandry, by Crops Produced for Nonfeed Uses  
1938 (Postwar Boundaries) and 1951

Crops Produced for Nonfeed Uses	1938			1951			Percent Increase in Production per Man-Day (1938 to 1951)
	Production for Nonfeed Uses (Thousand Centners) <sup>a/</sup>	Man-Days Expended (Thousands) <sup>b/</sup>	Production per Man-Day (Kilograms)	Production for Nonfeed Uses (Thousand Centners) <sup>a/</sup>	Man-Days Expended (Thousands) <sup>b/</sup>	Production per Man-Day (Kilograms)	
<b>Grains</b>							
<b>Winter grains</b>							
Winter wheat	152,775	239,771	63.717	134,382	228,832	58.725	- 7.835
Rye	219,724	395,995	55.487	228,952	402,333	56.906	2.557
Total winter grains	<u>372,499</u>	<u>635,766</u>	58.591	<u>363,334</u>	<u>631,165</u>	57.566	- 1.749
<b>Spring grains</b>							
Spring wheat	174,262	382,094	45.612	168,917	353,769	47.798	- 4.683
Barley	33,815	53,658	63.043	27,676	44,754	61.868	- 1.864
Oats	61,784	102,035	60.564	58,956	95,917	57.921	- 4.364
Corn	29,145	51,445	56.653	16,917	32,966	51.317	- 9.419
Rice	2,820	4,068	69.322	3,700	4,641	79.724	15.005
Other grains	61,775	167,770	36.821	37,267	95,218	39.139	6.295
Total spring grains	<u>363,601</u>	<u>760,990</u>	47.730	<u>310,033</u>	<u>627,245</u>	49.428	3.449
Total grains	<u>736,100</u>	<u>1,396,756</u>	52.701	<u>673,367</u>	<u>1,258,410</u>	53.509	1.533
<b>Fruits and vegetables</b>							
<b>Fruits</b>							
Potatoes	25,466	14,216	186.171	24,163	13,264	182.170	- 2.149
Vegetables	531,633	484,124	109.813	560,245	535,409	104.639	- 4.712
Cucurbits	175,476	393,355	44.050	168,000	368,398	45.603	3.526
Total fruits and vegetables	<u>35,095</u>	<u>128,351</u>	27.343	<u>33,600</u>	<u>118,617</u>	28.326	3.595
<b>Technical crops</b>							
Sugar beets	24,500	200,602	12.213	24,500	206,254	11.879	- 2.735
Tobacco	2,381	12,391	19.216	2,041	11,854	17.218	-10.398
<b>Oil-bearing crops</b>							
Cotton	24,640	336,834	7.315	30,390	395,444	7.685	5.058
Flax	14,239	239,849	5.937	13,020	192,307	6.664	12.245
Hemp	4,660	69,301	7.136	3,350	55,416	6.045	-15.259
Sunflowers	21,300	59,167	36.000	19,950	66,025	30.216	-16.067
Soya beans	2,000	23,423	8.539	1,180	22,094	5.341	-37.452
Other (minor) crops	3,770	84,289	4.473	4,660	82,441	5.653	26.381
Total oil-bearing crops		<u>808,863</u>			<u>816,807</u>		
Total technical crops		<u>1,021,856</u>			<u>1,034,915</u>		
Grand total		<u>3,413,658</u>			<u>3,389,013</u>		

a. Production data used in this table are obtained from Table 1, p. 7, above.  
b. Labor inputs were obtained from Table 2, p. 13, above.

Table 7

Yields and Labor Productivity of Field Crops for Nonfeed Uses  
 in Soviet Field Husbandry  
 1938 (Postwar Boundaries) and 1951

Field Crops	Yield <sup>a/</sup>		Percent Increase 1938 to 1951	1951 Index of Production (1938 = 100) <sup>b/</sup>	1951 Index of Man-Day Inputs (1938 = 100) <sup>c/</sup>	1951 Index of Labor Productivity <sup>d/</sup>
	Per Hectare (Centners) 1938	1951				
<b>Grains</b>						
<b>Winter grains</b>						
Winter wheat	10.398	9.200	-11.521	87.961	95.438	92.166
Rye	9.106	8.694	- 4.524	104.200	101.601	102.559
Total winter grains	9.595	8.876	- 7.493	98.076 <sup>e/</sup>	99.276	98.791 <sup>f/</sup>
<b>Spring grains</b>						
Spring wheat	6.628	6.272	- 5.371	96.933	92.597	104.683
Barley	8.597	7.941	- 7.630	81.845	83.400	98.136
Oats	8.437	7.572	-10.252	89.920	94.022	95.637
Corn	10.667	9.655	- 9.487	58.044	64.080	90.581
Rice	18.194	20.556	12.982	131.206	114.086	115.007
Other grains	6.119	6.741	10.165	60.327	56.755	106.294
Total spring grains	7.566	7.098	- 6.186	84.413 <sup>e/</sup>	82.425	102.412 <sup>f/</sup>
Total grains	8.272	7.802	- 5.682	90.632 <sup>e/</sup>	90.095	100.596 <sup>f/</sup>
<b>Fruits and vegetables</b>						
Fruits	17.446	17.446		91.298	93.303	97.851
Potatoes	82.033	74.678	- 8.966	105.382	110.593	95.288
Vegetables	120.025	120.000	- 0.021	95.740	92.480	103.525
Cucurbits	55.973	56.000	0.048	95.740	92.416	103.597
Total fruits and vegetables				100.232 <sup>e/</sup>	101.038	99.202 <sup>f/</sup>
<b>Technical crops</b>						
Sugar beets	19.007	18.338	- 3.519	100.000	102.818	97.260
Tobacco	11.447	9.908	-13.445	85.720	95.666	89.604
<b>Oil-bearing crops</b>						
Cotton	11.829	11.310	- 4.388	123.336	117.400	105.056
Flax	5.689	6.200	8.982	91.439	81.463	112.247
Hemp	6.744	5.510	-18.300	71.888	84.862	84.712
Sunflowers	6.451	5.098	-20.973	93.662	111.591	83.933
Soya beans	7.092	4.307	-39.270	59.000	94.326	62.550
Other (minor) crops	3.714	4.555	22.644	123.607	97.807	126.378
Total oil-bearing crops				105.719 <sup>e/</sup>	100.982	104.691 <sup>f/</sup>
Total technical crops				104.354 <sup>e/</sup>	101.278	103.037 <sup>f/</sup>
Grand total					96.671	100.921 <sup>f/</sup>

a. Yield is the result of division of production data in Table 1, first column for 1938 and 1951, p. 7, above, by the hectares shown in Table 13, p.66, below.  
 b. The 1951 index of production is the result of division of the 1951 production data by the 1938 production data per crop. See Table 1, p. 7, above.  
 c. The 1951 index of man-day inputs is the result of division of the 1951 labor inputs by the 1938 inputs. See Table 2, p. 13, above.  
 d. The 1951 index of labor productivity for an individual enterprise is the result of division of the 1951 index of production by the 1951 index of man-day inputs.  
 e. The 1951 index of production for an aggregate of crops is the product of the 1951 index of man-day inputs multiplied by the 1951 index of labor productivity. See explanation on p. 20, above.  
 f. The 1951 index of labor productivity for an aggregate of crops is derived as explained on p. 20, above. See also Appendix A, Problem 10 for examples of derivation.

S-E-C-R-E-T

for winter wheat. Other crops with large declines in yields are oats, over 10 percent; corn, almost 10 percent; potatoes, about 9 percent; and barley, almost 8 percent. The indexes of labor productivity in 1951 for these crops were all below the 1938 level, as follows: oats, 96 percent; corn, 91 percent; potatoes, 95 percent; and barley, 98 percent.

Wide-scale efforts currently being applied to mechanize all these branches of field husbandry may improve labor productivity by reducing the amount of labor required for production, assuming that further declines in yields do not occur. Although field husbandry enterprises seem to be carried on more efficiently and productively than animal husbandry enterprises, it is clear that there is much room for improvement among many crop enterprises in Soviet agriculture.

D. Analysis of Changes in Labor Productivity in Agriculture, 1938 to 1951.

Changes in the productivity of Soviet agricultural labor from 1938 to 1951 are summarized in this section from two points of view, as follows: (1) the influence of changes in labor productivity of the various sectors as aggregates of enterprises is determined in relation to changes in total labor productivity in Soviet agriculture as a whole. For this purpose the aggregate indexes in Tables 5 and 7\* are organized in Table 8\*\* as a group of sectors, along with other clarifying data. (2) Soviet indexes of labor productivity published in official releases on agriculture are critically evaluated.

1. Labor Productivity per Enterprise Group.

The Soviet agricultural labor force in total husbandry, as shown in Table 8, was about 94 percent as productive in 1951 as in 1938. Labor inputs in 1951 totaled about 7.9 billion man-days as compared with more than 7.4 billion man-days required if the workers had been as productive in their work in 1951 as they were in 1938. The excess of labor expended above requirements in 1951 (at the 1938 productivity level) was about 480 million man-days.

\* Pp. 24 and 30, respectively, above.

\*\* Table 8 follows on p. 32.

S-E-C-R-E-T

Table 8

Comparison of Labor Inputs, Actual and Required (at 1938 Work Capacity)  
in Soviet Agriculture, by Type of Production  
1951

Type of Production	Index of Labor Productivity in 1951 (1938 = 100)	Thousand Man-Days			Percent	
		Expended 1951 a/	Required 1951 b/	Excess Man-Days Expended over Man-Days Required 1951	Man-Days Expended in 1951 (Actual)	Man-Days Required in 1951 (at 1938 Work Capacity)
<b>Field Husbandry (Nonfeed uses)</b>						
<b>Grains</b>						
Winter grains	98.791	631,165	623,529	7,636	7.997	8.412
Spring grains	102.412	627,245	642,376	-15,121	7.948	8.667
<b>Total grains</b>	100.596	<u>1,258,410</u>	<u>1,265,895</u>	- 7,485	<u>15.945</u>	<u>17.079</u>
Fruits and vegetables	99.202	1,035,688	1,027,417	8,271	13.123	13.862
Technical crops	103.037	1,034,915	1,066,364	31,449	13.113	14.387
<b>Total field husbandry</b>	100.921	<u>3,329,013</u>	<u>3,359,676</u>	-30,663	<u>42.181</u>	<u>45.328</u>
<b>Animal Husbandry</b>						
Horses	88.211	344,961	304,307	40,654	4.371	4.105
Cattle	85.001	2,520,436	2,142,388	378,048	31.935	28.904
Swine	95.100	583,765	555,101	28,664	7.397	7.490
Sheep and goats	89.475	559,793	500,881	58,912	7.093	6.758
Poultry	99.154	554,295	549,589	4,706	7.023	7.415
<b>Total animal husbandry</b>	88.804	<u>4,563,250</u>	<u>4,052,266</u>	510,984	<u>57.819</u>	<u>54.672</u>
<b>Grand total</b>	93.915	<u>7,892,263</u>	<u>7,411,942</u>	480,321	<u>100.000</u>	<u>100.000</u>

a. Man-day inputs for field husbandry were taken from Table 6 p. 29, above, and those for animal husbandry from Table 4, p. 22, above.  
b. The derivation of these data is explained in Appendix A, Problem 10.

S-E-C-R-E-T

It is estimated that in 1951, kolkhozniki averaged about 169 man-days per year per worker <sup>42/</sup> in collectivized agriculture and on their individual plots.\* If this annual rate of labor inputs is applied to the excess of 480 million man-days, an excess of about 2.8 million kolkhozniki is calculated as having been employed in Soviet agriculture in 1951.

This excess may not be unduly large, because the kolkhozy in 1951 may have hired as many more workers from off-the-farm sources during the peak agricultural seasons at planting and harvest time. During the prewar period the kolkhozy reportedly hired 3.5 million workers in 1935, 2.5 million in 1937, and 2.2 million in 1938. <sup>45/</sup> In 1937 these workers, primarily from the town and city labor force, contributed about 34 man-days per worker to kolkhoz production. The excess of kolkhozniki in 1951 would therefore consist primarily of labor idle during seasons when the pressure of kolkhoz work activity had slackened off.

Table 8 shows the agricultural sectors having large excesses of labor inputs. When a comparison is made of changes in 1951 over 1938 in the two major sectors of field and animal husbandry, it is clear that animal husbandry is the principal laggard in the productivity of labor. Labor in field husbandry in 1951 was generally more efficient than in 1938, by about 31 million man-days. But in animal husbandry, labor was much less efficient, working an excess of 511 million man-days above 1951 requirements at 1938 rates.

According to the findings of this report, if the USSR expects success in improving labor productivity in animal husbandry production, it must either increase yields or reduce labor inputs in animal husbandry, or both. As shown in Table 6,\*\* the USSR has failed thus far to increase yields, particularly for cattle and swine, the heavy meat and dairy producers. On the other hand, it has increased

\* This rate is to be compared with 174 man-days averaged by all kolkhozniki in 1938 <sup>43/</sup> and about 180 man-days averaged by able-bodied kolkhozniki (aged 16 to 59) in 1938. <sup>44/</sup>

\*\* P. 29, above.

S-E-C-R-E-T

the labor force in animal husbandry. Concomitant with the growth of the livestock herds, 46/ in 2 years alone\* the number of kolkhozniki occupied in animal husbandry was reported as increasing by 800,000 men 47/ for the country as a whole. Thus far, retrogression rather than progress has characterized developments in Soviet animal husbandry.

The achievement of success in the double goal of increasing yields and reducing labor requirements would be significant in animal husbandry production because of the fact that animal husbandry, as a production sector, requires more labor inputs than field husbandry. In 1951, over 4.5 billion man-days were invested in animal husbandry production. This quantity of labor, as shown in data in Table 8,\*\* constitutes 58 percent of the total 7.9 billion man-days expended in total Soviet husbandry in 1951.\*\*\* If labor in animal husbandry had been as efficient in 1951 as in 1938, about 55 percent of the total husbandry inputs would still have been expended in animal husbandry.

The single sector in animal husbandry most responsible for the excess of labor inputs in 1951 was the cattle enterprises (dairy and meat). These enterprises required 378 million more man-days than 1951 enterprises would have called for at 1938 rates of labor productivity.

---

\* End of the year, 1950 and 1951.

\*\* P. 32, above.

\*\*\* This is to be compared with an estimate made by a Soviet academician that labor inputs in animal husbandry are expected to constitute over 50 percent of total labor inputs in agriculture, including inputs in productive animal and poultry husbandry and in feed production and preparation. 48/ He also estimated that current labor inputs in the maintenance and care of animals constituted over one-third of total labor inputs in agriculture. This percentage is to be compared with about 38 percent calculated in this report -- see the inputs in Table 3, p. 18, above, and in Table 8 for 1951.



S-E-C-R-E-T

2. Evaluation of Soviet Indexes of Agricultural Labor Productivity.

Published Soviet indexes of agricultural labor productivity show greater increases than the indexes given in this report. The Soviet indexes which are apparently most authoritative are given as follows 49/:

<u>Year</u>	<u>Gross Kolkhoz Agricultural Production</u>	<u>Gross Production per Able-Bodied Kolkhoznik</u>
<u>1937 = 100</u>		
1940	109	138
1949	115	172
1950	124	180
<u>1940 = 100</u>		
1949	106	125
1950	114	130

The study from which these indexes are taken probably is the only major report in Soviet sources which includes indexes on labor productivity. Several other reports state that labor productivity in 1953 was about three times higher than in prerevolutionary Russia. One report gives labor productivity in 1937 as 159.8 percent of 1913 and productivity in 1953 as about 300 percent of 1913. 50/ Converting to 1937 as the base, an index of labor productivity of about 63 is obtained for 1913 and about 180 for 1953.

It is clear that these indexes are prepared from data different from those used in this report. On the basis of official sources, it is probable that gross production is measured not according to physical volume but in comparable prices (1937 as the

S-E-C-R-E-T

base year, with 1926-27 prices). Furthermore, the units of labor inputs are persons, rather than man-days worked. This fact does not necessarily reduce the validity of these indexes for purposes of comparison. Questions are raised, however, about the relationship between the indexes of production and of labor productivity above, and the resulting implication for changes in labor force requirements. Indexes of labor inputs, derived by dividing the index of production by its corresponding index of labor productivity, give the following changes in manpower requirements: 1937 = 100, 1940 = 80, 1949 = 67, and 1950 = 69. Indexes given in the Soviet source thus imply that the labor force of able-bodied kolkhozniki must have declined 31 percent from 1937 to 1950. This estimate varies widely from estimates carried by CIA for these years.

If attention is directed toward changes between 1937 and 1940 rather than those between 1937 and 1950, the probable errors in these figures become clearer. It does not seem possible that a 20-percent decline in manpower utilization occurred in the USSR between 1937 and 1940. According to a reliable estimate, 51/ the number of kolkhozniki participating in kolkhoz work remained fairly stable between these years, increasing, if anything, from about 40.8 million in 1937 to about 41.2 million in 1940. Furthermore, during these years the absorption of territory and peasants from the Baltic states, Poland, Rumania, and Finland probably added about 7 million peasant workers to the Soviet labor force. If the total labor force in the USSR (postwar boundaries) was about 53 million farm workers in 1937, including workers and employees, kolkhozniki, and private peasant farmers, a reduction of 20 percent by 1940 would give a 1940 labor force of only 43 million workers in Soviet agriculture. This would mean the complete elimination of the private peasant labor force from agriculture between 1937 and 1940, particularly in the acquired territories. Since full-scale collectivization in these areas was not carried out until after the war, there seems to be no evidence that the complete elimination of private peasants in the acquired territories could have occurred by 1940.

Another possible source of error along this line is that the acquired farm lands were considerably more productive than those within the prewar boundaries of the USSR. Because acquisition occurred after 1937, labor force data may have been manipulated to make the 1940 labor productivity situation appear more attractive than in 1937.

S-E-C-R-E-T

The year 1937, however, is generally regarded as being the most productive year in Soviet agriculture since before World War I. It is therefore difficult to understand how production and labor productivity could have been greater in 1940 than in 1937.

In view of the inconsistencies inherent in the base years used in the Soviet indexes, there seems to be good reason to believe that the Soviet indexes do not invalidate the labor productivity indexes presented in this report.

V. Changes in Labor Productivity in Agriculture, 1951 to 1953.

The changes which occurred between the 1951 and 1953 agricultural seasons for the major enterprise groups are shown in Tables 9 and 10,\* using 1938 as the base year for comparison. Table 9 gives the indexes of production for the major sectors of agriculture, and Table 10, the indexes of labor inputs and of labor productivity.

The method by which indexes of production were aggregated for the enterprise groups or sectors was to multiply the index of labor productivity for the enterprise group by the corresponding index of labor inputs. This method of aggregating indexes of production for enterprises within the group is the equivalent of weighting production per enterprise with labor inputs instead of with prices. This procedure, although used by competent scholars 52/ for international comparisons of national production, involves assumptions which should be clearly understood. When applied to a group of fairly homogeneous enterprises these limitations are probably not so critical. In such a case, the relationships between costs of production, such as investment, rent, and labor, for all enterprises of an enterprise sector are likely to change in the same direction over a period of time. When applied to enterprise sectors this is not necessarily true.

It is clear that in the USSR machinery investment in technical crops increased from 1938 to 1951, so that the proportion of costs of production for machine use increased as compared with the proportion of costs for labor. At the same time the proportional costs of machinery and of labor in animal husbandry enterprises remained fairly\*\*

\* Tables 9 and 10 follow on pp. 38 and 39, respectively.

\*\* Continued on p. 41.

S-E-C-R-E-T

Table 9

Indexes of Production in Soviet Agriculture, by Enterprise Sector  
1951 and 1953

<u>Enterprise Sector</u>	<u>1938 = 100</u>	
	<u>Index of Production a/*</u>	
	<u>1951</u>	<u>1953 b/</u>
Field husbandry		
Grains		
Winter grains	98.08	86.59
Spring grains	84.41	90.42
Total grains	90.63	88.67
Fruits and vegetables	100.23	98.48
Technical crops	104.35	113.41
Animal husbandry		
Cattle		
Cows	75.95	76.24
Other cattle	95.52	98.20
Total cattle	82.86	83.99
Swine	71.85	84.74
Sheep and goats	123.96	151.45
Poultry	112.80	125.07
Horses	68.85	76.89

\* Footnotes for Table 9 follow on p. 39.

S-E-C-R-E-T

Table 9

Indexes of Production in Soviet Agriculture, by Enterprise Sector  
1951 and 1953  
(Continued)

a. Production for nonfeed uses. The index of production for a particular enterprise sector is derived as the product of the index of man-day inputs multiplied by the corresponding index of labor productivity. See Table 10 for the indexes of man-day inputs and of labor productivity.

b. 53/.

Table 10

Indexes of Labor Inputs and Labor Productivity in Soviet Agriculture  
1951 and 1953

	1938 = 100			
	<u>Man-Day Inputs</u>		<u>Labor Productivity</u>	
<u>Enterprise Sector</u>	<u>1951 a/*</u>	<u>1953 b/</u>	<u>1951 a/</u>	<u>1953 b/</u>
Field husbandry				
Grains				
Winter grains	99.28	92.98	98.79	93.12
Spring grains	82.43	86.29	102.41	104.78
Total grains	90.10	89.34	100.60	99.26
Fruits and vegetables	101.04	102.75	99.20	95.84
Technical crops	101.28	105.92	103.04	107.08
Total field husbandry	96.67	98.25	100.92	100.69

\* Footnotes for Table 10 follow on p. 40.

S-E-C-R-E-T

Table 10

Indexes of Labor Inputs and Labor Productivity in Soviet Agriculture  
1951 and 1953  
(Continued)

<u>Enterprise Sector</u>	1938 = 100			
	<u>Man-Day Inputs</u>		<u>Labor Productivity</u>	
	<u>1951 a/</u>	<u>1953 b/</u>	<u>1951 a/</u>	<u>1953 b/</u>
Animal husbandry				
Cattle				
Cows	94.46	94.39	80.41	80.78
Other cattle	103.01	100.27	92.73	97.93
Total cattle	97.48	96.46	85.00	87.07
Swine	75.56	85.00	95.10	99.69
Sheep and goats	138.54	152.71	89.48	99.18
Poultry	113.77	124.26	99.15	100.65
Horses	78.05	87.38	88.21	88.00
Total animal husbandry	97.26	101.45	88.80	92.18
Total agriculture	97.01	100.10	93.92	95.72

a. The indexes for 1951 are taken from Tables 5 and 7, pp. 24 and 30, respectively, above.

b. The indexes for 1953 are derived from agricultural data for 1953, calculated in the same manner as the data for 1938 and 1951. Animal numbers and feeding rates for 1953 are given in Appendix A, Problems 3 and 4, and in Table 11, p. 56, below, while the number of hectares in the various crop enterprises in 1953 is given in Table 13, p. 66, below.

S-E-C-R-E-T

S-E-C-R-E-T

stable between 1938 and 1951. The calculation of an aggregate index for total agricultural production with labor weights, as compared with the calculation of an index involving cost analysis, might, therefore, underweight the influence of the more heavily machinery-endowed sectors (technical crops, for example) in the total index and overweight the influence of such labor-consuming sectors as animal husbandry enterprises. 54/

For these reasons, no attempt is made in this report to present indexes of aggregate production for total field husbandry, total animal husbandry, or total agriculture.

A. Output per Agricultural Enterprise Group.

Changes in the indexes of production from 1951 to 1953, as shown in Table 9, indicate that the USSR has during this period improved its agricultural economy as a whole, although only for three sectors -- technical crops, sheep and goats, and poultry -- were the indexes of production above 1938 levels of production. All three of these enterprise groups had already in 1951 surpassed 1938 production levels and in 1953 were still rapidly increasing their production. Thus the 1953 index of production for technical crops was 113 percent of the 1938 level of production, as compared with 104 percent in 1951. The 1953 index for sheep and goats was 152 percent of the 1938 production, as compared with 124 percent in 1951. The 1953 index of production for poultry was 125 percent of the 1938 production, as compared with 113 percent in 1951.

The 1953 indexes of production for total grains and for fruits and vegetables were fairly stable, although slightly below the 1951 levels. The 1953 index of grain production was 89 percent of 1938 as compared with 91 percent in 1951, while the 1953 index of fruit and vegetable production was 99 percent of 1938 as compared with 100 percent in 1951. This latter decline was due to the poor potato harvest in 1953. 55/ Production of winter grains fell between 1951 and 1953,\* but this decline was almost offset by increased spring grain production.

\* As indicated in Table 7 (p. 30, above), winter wheat yields in 1951 were 11.5 percent below the 1938 level. By 1953 they had fallen 18 percent below the 1938 level. 56/

S-E-C-R-E-T

All branches of animal husbandry increased livestock production between 1951 and 1953, although changes for dairying and beef production were only slightly upward. Swine production increased considerably, from 72 percent of 1938 levels in 1951 to 85 percent in 1953. Horse work production climbed from 69 percent of 1938 levels in 1951 to 77 percent in 1953.

Finally, it is clear from Table 9 that the enterprises that were lagging in 1951 behind 1938 production were still lagging in 1953. These are the very important agricultural enterprises -- grains, cattle, swine, and horses. Recent reports indicate that grains were still lagging in 1954 57/ and were at about the same level as in 1953.

B. Labor Productivity per Agricultural Enterprise Group.

Labor productivity in 1953 tended to improve generally above the 1951 level in a manner similar to that of production. Labor productivity in 1953, according to Table 10, was about 96 percent of the 1938 level in Soviet husbandry as a whole, as compared with about 94 percent in 1951.

Labor in animal husbandry was responsible for the 2-percent rise in labor productivity in total husbandry, as it increased from 89 percent in 1951 to 92 percent in 1953 of the 1938 level of productivity. Labor productivity in field husbandry in 1953, on the other hand, remained on a par with labor productivity in field husbandry in 1951, and on about the same level as in 1938.

Labor productivity had increased by 1953 to about the 1938 level in "other cattle" enterprises and in swine, sheep and goats, and poultry enterprises. In 1951, however, labor in all these enterprises except poultry was 5 or more percent less productive than in 1938. Labor productivity in dairying has not improved since 1951, the index remaining at about 81 percent of the 1938 level. This lack of improvement is undoubtedly related to lack of improvement in milk yields from 1951 to 1953, which remained over 16 percent below yields in 1938. 58/

Declines in yields also tend to explain declines in labor productivity from 1951 to 1953 for winter grains (wheat) and for fruits and vegetables (especially potatoes). Labor productivity



S-E-C-R-E-T

in these enterprises dropped from about 99 percent of the 1938 productivity level in 1951 to between 93 and 96 percent in 1953.

VI. Vulnerabilities, Capabilities, and Intentions.

A. Vulnerabilities and Capabilities.

One of the most important vulnerabilities of the position of Soviet agriculture is the attempt to achieve two goals simultaneously -- (1) to save labor through increased use of machinery and electrical equipment and (2) to increase yields per enterprise.

In field husbandry, only slight success was achieved in the reduction of labor inputs between 1938 and 1951 -- between 3 and 4 percent,\* while acreages were increased about 5 percent,\*\* and production for nonfeed purposes was reduced between 2 and 3 percent.\*\*\* The result is that only about 31 million man-days were saved in field husbandry production (for nonfeed purposes) in 1951 over 1938.\*\*\*\*

These labor savings in field husbandry production were not accompanied by increases in yields per hectare in 1951 over 1938. The yields for most crops declined from 1938 to 1951 and to 1953. Part of the reason for the Soviet inability to save labor and to increase yields in crops at the same time may lie in the fact that increased use of machinery may actually waste the harvests. 59/ It is also probable that the kolkhozniki are not as careful with the kolkhoz crops as they are with their own garden plot crops. 60/

One of the most important obstacles to the attainment of the double goal in Soviet agriculture is the unfavorable climatic conditions prevailing over much of the agricultural zone.\*\*\*\*\* It is clear that these conditions are so depressing that an extremely high degree of timeliness in field operations, particularly during the harvest, is

\* See Table 2, p. 13, above.

\*\* See Table 13, p. 66, below.

\*\*\* See Table 9, p. 38, above.

\*\*\*\* See Table 8, p. 32, above.

\*\*\*\*\* The Ukraine, which is south of most of the rest of the USSR, lies in about the same latitude as Minnesota and North Dakota.

S-E-C-R-E-T

necessary in order to get the harvest in good yield into the barn. In the US, on the other hand, the harvests, especially of grain, may lie in the fields without great loss for comparatively long periods of time.

The fact that yields declined from 1938 to 1951 while mechanization of operations increased, in conjunction with the important problem of timeliness, suggests the following conclusions: (1) if the achievement of timeliness in field operations will increase yields (in the barn), then the increased mechanization necessary for timeliness should increase the yields. (2) The degree of mechanization currently prevailing in agriculture would seem to be far below the level required to achieve timeliness of operations, despite vaunted statements in the Soviet press about advances in mechanization.\*

The problem is that under conditions of adverse climate, the USSR is undermachined. For example, grain harvesters may be used to cut most of the grain acreage (82 percent in 1954), 62/ but there are still too few combines available in the fields to do the work quickly before rain or frost. Labor is cheap, and large quantities of labor must be used to keep the scarce machines in repair and operating every moment possible for extensive periods. In contrast, the weather in the US permits farmers to allow some of their abundant machinery to remain idle during peak periods, because labor costs are so high that they would rather not hire additional manpower at higher wages than they currently wish to offer.

In animal husbandry production the attempt to achieve the double goal of increasing both labor savings and yields was not successful in 1951 and in 1953. In 1951 an excess of about 511 million man-days above 1951 requirements at 1938 rates was expended in animal husbandry production. About 74 percent of this excess was expended in production by cattle enterprises, although there were excesses for all livestock enterprises.\*\* At the same time, yields per animal were falling for probably the most important livestock enterprises, cattle (including dairying), sheep and goats, and swine.\*\*\*

---

\* Soviet scientific agricultural journals point out that many operations even in grain farming, such as weighing, transportation, cleaning, drying, and storing grain, are still labor consuming, being completed principally by horse-and-hand methods. 61/

\*\* See Table 8, p. 32, above.

\*\*\* See Table 5, p. 24, above.

S-E-C-R-E-T

One of the most important obstacles to increases in production, yields, and labor productivity in animal husbandry may be the declines in the production of grains and potatoes, and in the rates of feeding per animal, from 1938 to 1951.\* It is likely that the production and feeding rates of good quality coarse fodders have not increased enough to compensate for declines in grains and potatoes fed to animals.\*\* It is clear that progress in animal husbandry production is inextricably tied up with progress in field husbandry.

It is possible also that shelter construction in the USSR is lagging so badly that the inadequacy of livestock shelters in 1951 may be greater than in 1938. The severe winters in the USSR under these conditions may have increased livestock mortality and hence depressed yields in animal husbandry. 63/

One of the principal obstacles to the development of the national economy of the USSR is undoubtedly the depressing system which governs peasant incentives. Up to the end of 1953 the price structure for agricultural deliveries and for goods offered to the state by peasants was seriously out of balance as compared with the retail trade price structure. This situation was improved in 1954, when higher prices offered by the state for meat, milk, and vegetables and smaller amounts of obligatory deliveries were required, especially from private plots.

Nevertheless, the bureaucratic institutional system (the sovkhozy, kolkhozy, and MTS's) in which the Soviet peasant works remains cumbersome, aggrandizing, and repugnant to his entrepreneurial sensitivities. The peasant remains at the bottom of the occupational ladder, subject in his work to state-fixed labor-days (trudodni) values.\*\*\*

\* See Table 11, p. 56, below.

\*\* More than likely, feed rates for coarse fodders have not increased. See Table 11, p. 56, below.

\*\*\* Trudoden (singular) is a unit value credit for the amount of work done according to the norm by a peasant. It is used to establish a scale of values for the different types of agricultural work. It is also an accounting device for distributing kolkhoz income among the kolkhozniki after the deliveries to the state, payments to MTS's, and contributions to indivisible funds (investments) of the kolkhozy are made. It thus avoids the use of price values for labor and permits bureaucratic determination of labor credits. 64/

S-E-C-R-E-T

He is forced to spend considerable amounts of time in processing, transporting, and marketing his earnings in kind (natury platy) and the products of his own private plots. He thus evades the attempts of consumer cooperatives to appropriate his profits in commission trade.

It is clear that Soviet agriculture, especially animal husbandry, was not managed properly in 1951 and 1953 to meet the needs of a growing population. The USSR was far from achieving its double goal of saving large quantities of labor and increasing yields. Timeliness had not been improved to any great extent in field husbandry, and the situation in animal husbandry had deteriorated to such an extent as to suggest sabotage. At the same time the population was growing at the rate of over 3 million annually. 65/

B. Intentions.

It would seem that the Soviet regime since Stalin's death has at last become aware of the critical obstacles to national progress presented by agriculture, particularly animal husbandry. Beginning with the Malenkov speech of August 1953 and placing particular emphasis during September 1953 and February-March 1954, the Soviet press has dwelt continuously on agricultural problems.

The program of land reclamation in areas beyond the Urals by August 1954 66/ had envisioned 30 million hectares of additional "new land" sown annually, principally to spring grains, starting with the spring of 1956. This drive would seem to recognize belatedly the fact that more grain, especially more feed grain for animal husbandry, is needed for a balanced agriculture. Yields of over 9 centners per hectare were postulated for the new areas. Preliminary estimates for 1954 indicate that the current new lands have higher yields than this. 67/ Over the long run, however, it is doubtful that these new lands will yield as high as the older areas of the country currently devoted to spring grains (about 6 centners per hectare). 68/

Increases in production through the new lands program may be profitable despite low yields. The intention to mechanize all operations fully in these areas, if carried out, will probably reduce labor costs considerably. This saving may be greater than the losses from low yields. The result of these trends, if successful, should be fairly high labor productivity in the new lands areas.

S-E-C-R-E-T

S-E-C-R-E-T

The advances in mechanization in the new areas will probably be offset by increased labor inputs necessary for the construction of new buildings for storing grain and for housing families, and also for the construction of new roads, wells, and water facilities. For several years, labor requirements in the new areas will undoubtedly remain high. 69/

Large increases in labor productivity in the older agricultural areas of the USSR within the next few years seem doubtful. Savings of labor may be achieved in the production of specific crops. Labor productivity on the whole, however, may not be sharply increased along with the planned increases in mechanization 70/ because of shifts in the crop pattern -- that is, shifts in the use of some of the older lands from light labor-consuming crops, such as grains or hay crops, to heavy labor-consuming crops, such as potatoes and vegetables. 71/ Furthermore, labor savings through the use of machinery in the production of row crops, such as potatoes and vegetables, may be offset by declines in yields (in the barn) caused by improper use of the machinery.

Evidence of the future shifts in crop patterns is already available. At the January 1955 Plenum of the Communist Party it was announced that Soviet agriculture would increase the cultivation of corn for grain and for silage from a 1954 level of about 3.5 million hectares to about 28 million to 30 million hectares by the end of 1956. 72/ By June 1955, almost 17 million hectares had been sown for the 1955 harvest. 73/ It is planned, apparently, to plant about half this corn hectarage on low-yielding spring grain lands, meadows, and pastures, and the other half on summer fallow which would be sown in the fall to winter wheat. It is clear that this development may create serious difficulties in the management of farming activities in the seasonal cycle of work. Since labor requirements are at least 70 percent higher 74/ per hectare on corn than on spring grains,\* more labor will be required, especially at the peak

\* A recent Soviet publication indicates that labor requirements in corn may be 2.6 times as great as in spring grains. 75/ It is estimated on the basis of US experience that labor requirements in corn may be four times as great as in spring grains. 76/ Both of these estimates assume that no substitution for other crops would be made and that corn production would be achieved under fairly ideal conditions. It is more likely in the immediate future that corn cultivation may be slighted in the USSR, that corn production for silage and for grain will be low and of poor grade, and that many fields will be neglected.

S-E-C-R-E-T

seasons for corn cultivation and harvesting. The problems of ensilaging corn before fall rains set in and in time to sow winter grains will probably be very difficult. It is highly probable that both corn yields and labor productivity in corn will decline under these conditions. Since the corn hectareage is so much larger this year, it is quite likely that this decrease in labor productivity will depress labor productivity in grain crops generally. The outlook for corn production in the immediate future seems depressing. 77/ It is possible in the long run, however, that corn yields and labor productivity may rise, with more experience in corn production and with increased mechanization.

Several Soviet agencies during the past year have made gestures in the direction of extending aid to agriculture which may prove fruitful in improving labor productivity. The first of these is the organization of consumer cooperatives which, operating from cities, contract with the kolkhozniki to sell the surplus farm produce of the latter. 78/ The development of this movement on a large scale would undoubtedly reduce the labor time of the kolkhozniki involved in home processing of their products for sale, transporting and delivering the products to kolkhoz markets or sales booths in cities and villages, and selling them there or through delivery routes to a regular clientele. The cooperatives would permit the kolkhozniki more time to work on the kolkhozy and would reduce the number of full-time men required on the kolkhozy, thus increasing the output of kolkhoz products per man. Unfortunately for Soviet planning, the kolkhozniki have not as yet accepted this aid in any great amount. 79/ The government has yet to invest sufficient money in the equipment necessary to process and handle the contracted products in volume, and the workers and employees currently engaged in handling and selling them are apparently very inefficient in dealing with the perishable kolkhoznik plot products.

The second gesture was made by the Ministry of Agricultural Procurement in the new lands. An effort was made last summer (1954) to send trucks of the Ministry directly to the fields to the grain combines and to haul the grain direct to the procurement points. 80/ At these points the grain was handled, dried, and stored. This effort, like the first above, has so far been quite limited in scope. 81/ Storage facilities were unavailable or in poor repair, not enough trucks were supplied, the supply of grain-dryers to the Ministry of Agricultural Procurement

S-E-C-R-E-T

was limited, and probably the Ministry's labor force was kept at a minimum. 82/ The result is that on the new land areas last year most of the grains were harvested according to methods prevailing in other highly mechanized grain areas.\*

A third gesture in the direction of increasing the role of the state in agriculture is in construction activity. In the new lands during 1954-55 the state will build 425 new sovkhozy. 84/ In the USSR as a whole the state apparently may build several thousand new MTS's within the next few years. 85/ More extensive mechanization and higher labor productivity undoubtedly will result from the incorporation of these units -- especially the MTS's -- in agricultural activities.

---

\* In these older areas the labor inputs of kolkhozniki are about one-third of their labor inputs when using nonmechanized methods. 83/

S-E-C-R-E-T

S-E-C-R-E-T

APPENDIX A

METHODOLOGY

This appendix presents methods used to derive data which were not fully explained in the text. These methods apply to three types of problems, as follows: derivation of production data, assignment of labor inputs to enterprises, and calculation of labor productivity.

I. Problems in the Derivation of Production Data.

Problem 1: To Determine the Production of Fruits.

The production of fruits was determined on the bases of the 1928 area planted in fruit, 1,261,000 hectares, and the total average production of fruit for 1925-28, about 2.2 million tons. <sup>86/</sup> Calculation of the yield per hectare gives 17.45 centners of fruit per hectare for 1928. Application of this yield figure to hectares in fruit\* gives the production of fruit as listed in Table 1.\*\*

Problem 2: To Determine the Production of Cucurbits and Silage Crops.

Production data on these crops are based on yields per hectare applicable in 1938,\*\*\* multiplied by the number of hectares planted.\*

Problem 3: To Determine the Production of Feed Roots and Silage Crops.

The production data for these crops for 1938 were derived by applying the yield of 10.69 tons of feed roots per hectare prevailing in 1932 <sup>87/</sup> to the hectarage for 1938 (postwar boundaries), given in Table 13. This gives the total 1938 production, estimated at about 104 million centners as shown in Table 1.

\* See Table 13, p. 66, below.

\*\* P. 7, above.

\*\*\* See Table 7, p. 30, above.



S-E-C-R-E-T

Table 1 gives 1938 production data for silage, for the prewar Soviet boundaries. <sup>88/</sup> Since this silage consisted partly of weeds, <sup>89/</sup> it seemed feasible to let this prewar boundary production figure stand as representing the better quality production for the postwar boundaries of 1938.

The 1951 and 1953 production data for these two crops were based on feeding rates (kilograms per animal, as shown in Table 11\*) established for 1938 for the various livestock production enterprises. Only the rates for 1928 were available. <sup>90/</sup> The 1938 rates (which were higher than the 1928 rates) were derived by applying the 1928 rates to livestock numbers in 1938, as shown in Table 11. Then the percentage distribution among the various animals, based on the 1928 rates, was determined for each of the feed roots and silage crops. These percentages were applied to the total feed production data for feed roots or silage crops. The 1938 feed rates, based on 1938 production, were then calculated and applied to 1951 and 1953 livestock numbers to determine 1951 and 1953 production of feed roots and silage crops. This procedure assumes constancy of feed rates from 1938 to 1953.

A final consideration has to do with the problem of wastage of production due to neglect or decay of feed roots and silage in storage.. In 1928 this wastage was estimated as 10 percent for feed crops. <sup>91/</sup> This percentage was applied to the production of feed roots and silage derived from feed rates for 1938, 1951, and 1953, thus increasing the total production of these crops to include the wastage.\*\*

Problem 4: To Determine the Production of Hay and Pasture.

In determining the production of hay and pasture, feed rates had to be first calculated, based on the numbers of horses for 1938, 1951, and 1953. Horses of all ages are expressed as adult horse equivalents for all crops except hay and pasture, in which cases horses are counted in original total numbers. An adult horse is usually defined as 3 years old or older. Horses under 3 years old may be converted to adult horse equivalents at the ratio of 3 to 1, on the basis of the amount of feed grain required for the

\* P. 56, below.

\*\* See Table 1, p. 7, above.

S-E-C-R-E-T

younger as compared with the older horses. <sup>92/</sup> The horse numbers listed in Table 11\* are given as adult horse equivalents, but the feed rates for hay and pasture apply to all horses.

Feed rates of hay for all animals, as given in Table 11, are derived from revisions of a set of previously published hay production figures for 1938 and 1951. <sup>93/</sup> These figures, when divided by live-stock numbers, give the following feed rates:

<u>Animals</u>	<u>1938 (Kilograms per Head)</u>	<u>1951 (Kilograms per Head)</u>	<u>Index (1938 = 100)</u>
Horses	1,230.00	1,298.54	105.57
Cows	720.00	782.40	108.67
Other cattle	313.42	296.24	94.52
Sheep and goats	76.00	76.00	100.00

These rates yield a 1938 production figure which is considerably lower than the 1938 production figure used for this report, 750 million centners. <sup>94/</sup> Hence the 1938 feed rates for hay were boosted upward, on the basis of the distribution of hay derived from the unrevised 1938 feed rates listed above.\*\* This distribution was converted to a percentage distribution which was then applied to the estimate of 1938 hay production, 750 million centners. Hay feed rates could then be approximated by division of the revised 1938 figures for the quantity of hay per livestock enterprise by the number of livestock per enterprise. These rates are shown in Table 11.

The 1951 rates were determined by adjusting the revised 1938 rates upward on the basis of the indexes of feeding tabulated above. These rates are also shown in Table 11 and, when applied to live-stock numbers, give the 1951 hay production data shown in Table 1.\*\* The 1951 rates were held constant for 1953 to determine 1953 hay production.

\* P. 56, below.

\*\* P. 7, above.

S-E-C-R-E-T

S-E-C-R-E-T

Pasture production for 1938, 1951, and 1953 was estimated on the basis of pasture units per head of livestock. This unit is based on the amount of roughage of all types fed to 1 beef cow, 2 years old or older, in North Dakota\* for the 1948-49 feed year. 95/ The relative roughage units required per year per animal in North Dakota are shown as follows:

<u>Type of Animal</u>	<u>Animal Unit Factors for Roughage-Consuming Livestock Fed in One Year</u>	
	<u>North Dakota</u>	<u>US</u>
Milk cows 2 years old or older	0.90	1.00
Heifers and calves for milkers	0.40	0.44
Beef cows 2 years old or older	1.00	0.88
Cattle on feed	0.30	0.33
All other cattle	0.50	0.44
Stock sheep	0.20	0.20
Horses and mules 2 years old or older	0.80	0.75
Horse and mule colts	0.50	0.48
Chickens	0.0012	0.0012
Hogs	0.01	0.01

\* North Dakota was selected on the assumption that production and feeding practices there more than in any other US state resemble conditions in the USSR.

S-E-C-R-E-T

This distribution of pasture unit requirements per head for North Dakota livestock was for the purposes of this report converted to milk cow unit equivalents -- that is, the milk cow pasture unit was made the unit basis for application to animal husbandry in the USSR. The rate for "all other cattle" was made the basis for the pasture unit rate for "other cattle" enterprises in the USSR, listed in Table 11.\* By multiplying these converted rates by the respective livestock numbers, the estimates of pasture production for each year shown in Table 1\*\* were obtained. The distribution of feed allocated to livestock, by type of livestock, is given in Table 12.\*\*\*

The theory on which the use of these units is based depends on the composition of roughage in the US, in which roughage includes hay, silage, stover (shredded cornstalks), straw, pasture, range forage, and other coarser fodders, and excludes such succulent feeds as feed roots, pumpkins, and other vegetables used as feed in the USSR. The assumption, therefore, is that in the USSR the amount of pasture used is probably correlated with the amount of other kinds of coarse fodders used per livestock enterprise. This theory is probably tenable. Cows are heavy consumers of hay and also of pasture forage. Hogs, which use practically no coarse hay, use but little pasture. The use of the roughage unit to represent pasture requirements thus facilitates the determination of pasture production.

Problem 5: To Measure Wool and Mohair as Sheep and Goat Meat Equivalents.

The problem of assigning labor inputs separately for the production of wool and mohair on the one hand and of meat products from sheep and goats on the other seemed so difficult that it was believed to be more convenient to express wool and mohair production, by means of farm value relations, as sheep and goat meat products equivalents (in centners). Total labor inputs to sheep and goats then could be related to total meat products.\*\*\*\*

- 
- \* Table 11 follows on p. 56.
  - \*\* P. 7, above.
  - \*\*\* Table 12 follows on p. 61.
  - \*\*\*\* Continued on p. 62.

Table 11

Feeding Rates in Soviet Animal Husbandry, by Type of Feed a/\*  
1938 (Postwar Boundaries), 1951, and 1953

Type of Feed	Kilograms per Head						
	Horses	Cows	Other Cattle	Hogs	Pigs	Sheep and Goats	Poultry
1938							
(Number of livestock b/ -- thousand head)	(15,217) c/	(26,640)	(32,560)	(17,728)	(13,872)	(73,100)	(238,000)
Grains							
Winter wheat d/							1.34
Rye d/		4.82		2.94	1.25		0.97
Spring wheat d/							2.25
Barley	35.30	62.47	21.05	131.04	36.49		0.64
Oats	453.70	34.10	11.49	71.51	19.91	3.53	3.08
Corn	13.00			38.27	8.48		1.73
Other grains e/		5.78	3.97	35.33	18.66		
Total grains f/	502.00	107.162	36.51	279.10	84.79	3.53	10.01
Potatoes g/	55.62	151.82	45.09	605.76	186.39	4.51	2.78
Silage crops h/		225.15	40.93	40.93	17.06	17.06	
Feed roots h/	66.10	151.09	37.09	126.30	34.23	3.54	0.06
Hay crops i/	1,603.28	888.01	386.56			93.74	
Pasture units j/	0.72	1.00	0.56	0.01		0.22	0.0013
1951							
(Number of livestock b/ -- thousand head)	(10,476) c/	(24,200)	(33,000)	(13,520)	(10,580)	(99,000)	(270,000)
Grains							
Winter wheat d/							1.34
Rye d/		4.09		2.50	1.06		0.97
Spring wheat d/							2.25
Barley	32.63	53.05	17.89	111.27	30.99		0.64
Oats	419.36	28.95	9.75	60.73	16.91	3.00	3.08
Corn	12.01			32.50	7.20		1.73
Other grains e/		4.91	3.38	30.00	15.84		
Total grains j/	464.00	91.00	31.00	237.00	72.00	3.00	10.01
Potatoes k/	47.79	130.44	38.75	520.47	160.14	3.88	2.39
Silage crops h/		225.15	40.93	40.93	17.06	17.06	
Feed roots h/	66.10	151.09	37.09	126.30	34.23	3.54	0.06
Hay crops i/	1,692.62	964.97	365.37			93.74	
Pasture units j/	0.77	1.00	0.56	0.01		0.22	0.0013
1953							
(Number of livestock b/ -- thousand head)	(11,699) c/	(24,300)	(32,300)	(15,988)	(12,512)	(109,900)	(300,000)
Grains							
Winter wheat d/							1.14
Rye d/		4.09		2.50	1.06		0.82
Spring wheat d/							1.91
Barley	32.62	53.05	17.87	111.27	30.99		0.54
Oats	419.36	28.95	9.76	60.73	16.91	3.00	2.62
Corn	12.02			32.50	7.20		1.47
Other grains e/		4.91	3.37	30.00	15.84		
Total grains j/	464.00	91.00	31.00	237.00	72.00	3.00	8.50
Potatoes m/	27.81	75.91	22.55	302.88	93.19	2.26	1.39
Silage crops h/		225.15	40.93	40.93	17.06	17.06	
Feed roots h/	66.10	151.09	37.09	126.30	34.23	3.54	0.06
Hay crops i/	1,692.62	964.97	365.37			93.74	
Pasture units j/	0.77	1.00	0.56	0.01		0.22	0.0013

\* Footnotes for Table 11 follow on p. 57.

S-E-C-R-E-T

Table 11

Feeding Rates in Soviet Animal Husbandry, by Type of Feed a/  
1938 (Postwar Boundaries), 1951, and 1953  
(Continued)

- 
- a. The feeding rates in this table were derived from 1928 data in a Soviet publication. 96/ Other sources and interpretations 97/ used here were also based on this source. The percentage distribution of feed per crop among the various livestock enterprises was important, especially in the distribution of grain fed. These percentages are found in Table 12, p. 61, below.
- b. Livestock numbers used in computing these data are taken from a recent publication, 98/ except that horses have been converted to work horse equivalents.
- c. Horse numbers were converted to work horse equivalents (practically all 3 years old or older) for all crops except hay and pasture. (See Problem 4, p. 52, above.) In 1938 the actual number of horses of all ages was 19.9 million; in 1951, 13.7 million; and in 1953, 15.3 million. 99/ Of the 1938 total, 12.9 million were work horses, or approximately 65 percent. This percentage applied to 1951 horse numbers gives about 8.9 million work horses and 4.8 million others, and applied to 1953 horse numbers gives about 10 million work horses and 5.3 million others. In estimating the amount of grain fed, 3 "other horses" are equivalent to 1 work horse. 100/
- d. The average amount of wheat and rye fed annually in 1925-30 was about 7 million tons, or about 16 percent of the total production. 101/ It was fed principally as meal or whole grain flour (muki) or as bran or millfeed (otrubl). Most of the meal apparently was whole rye meal. 102/ The predominant part of the rye and wheat fed, however, consisted of millfeed. 103/ Of the total 22.7 million tons of all grains fed in 1925-30, about 4 million tons were millfeed. 104/
- This relatively large amount of millfeed declined greatly, however, during the 1930's. From 1933-34 to 1936-37 the total millfeed (all grains) was only about 1.5 million tons, and by 1938 (prewar boundaries), about 1.3 million tons. 105/ On the basis of this development and on the theory that wheat and rye were desired by Soviet officials for the growing urban proletariat, the estimated amount of wheat and rye used as feed was cut drastically by this report to only about 2 to 3 percent,

S-E-C-R-E-T

Table 11

Feeding Rates in Soviet Animal Husbandry, by Type of Feed a/  
1938 (Postwar Boundaries), 1951, and 1953  
(Continued)

as shown in Table 1, p. 7, above. Slight increases above the 1938 levels were made in these percentages for 1951 and 1953, due to the fact that production was cut so low for other grains, especially oats and barley. Because the amount of wheat and rye in millfeed was small in 1938 and most of the millfeed was produced from other grains, the decision was made to consider in this report only grain used whole (or as meal). Whole wheat fed was based on 1928 wheat-feeding rates to poultry, and allocated to poultry only. Whole rye (meal) was allocated to cows, hogs and pigs, and poultry, also on the basis of 1928 feed rates.

e. "Other grains" fed include buckwheat and millet (groats) -- predominantly millet -- about 600,000 tons in 1926-27. This amount is slightly less than 16 percent of the total buckwheat and millet produced in 1926-27, less than 3.7 million tons. 106/ This percentage was adopted as applicable, with slight variations, for the years listed in this report, and applies to all other grains, including grain legumes such as peas and beans. (See Table 1, p. 7, above.)

f. Total grains (whole) fed to livestock enterprises in 1938 are estimated at over 200 million centners, 107/ as shown in Table 1. This total applies to the postwar boundaries of the USSR and is about the same as for the 1937 prewar boundaries. 108/ The 1938 prewar boundaries produced about 18 million tons. 109/

On the basis of 1928 feed rates, the total grain required would have been only 185 million centners in 1938 (postwar boundaries). Thus the 1938 rates shown in Table 11 were raised above the 1928 rates, except for horses, which were assumed to have been fed at the 1928 levels, on the assumption that under advancing collectivization horses would become unnecessary in great numbers and probably would not receive increased feed grain rations, since they probably would not be required to perform as much heavy labor as before.

The 1938 rates for all livestock except horses were increased. The total increase of the 1938 rates above the 1928 rates, about 19.3 million centners, when applied to 1938 livestock numbers had first to be distributed to the various livestock enterprises

S-E-C-R-E-T

Table 11

Feeding Rates in Soviet Animal Husbandry, by Type of Feed a/  
1938 (Postwar Boundaries), 1951, and 1953  
(Continued)

---

(except horses). The distribution was done by subtracting the grain which was fed horses, 76.4 million centners, from the total grain fed at 1928 rates (for 1938), 185 million centners. The remainder was then converted to a percentage distribution by enterprises (excluding horses). This percentage distribution was then applied to the increase of 19.3 million centners. This procedure gave the absolute increases for all livestock categories except for horses. To obtain the 1938 quantities fed at 1938 rates, these increases in grains were added to the amounts of grain fed in 1938 at 1928 rates. The 1938 quantities then were divided by the number of livestock per enterprise to obtain the rates as shown in Table 12, p. 61, below.

g. Potato production in 1938 in the USSR was so poor 110/ that the purposes of this report required a different estimate, one which would approach more normal production levels. Hence the 1933-37 average for the USSR (postwar boundaries), 738,380,000 centners of potatoes, 111/ was adopted as the production figure for 1938.

Potatoes used as feed in 1924-28 averaged about 28 percent of total production. This percentage when applied to the 1938 production figure gave less than 207 million centners fed for 1938. 112/ (See Table 1, p. 7, above.) The rates in use in 1928, 113/ when applied to 1938 livestock numbers, give a total of potatoes fed of only about 138 million centners. On the basis of the distribution of 1938 potatoes at 1928 rates, a percentage distribution was determined and then applied to the 1938 actual production figure, 207 million centners. Rates were then obtained by dividing the quantities fed various livestock enterprises by the respective livestock numbers in 1938. The resulting 1938 rates were about 50 percent above the rates applicable in 1928. 114/

h. See Problem 3, p. 51, above.

i. See Problem 4, p. 52, above.



S-E-C-R-E-T

Table 11

Feeding Rates in Soviet Animal Husbandry, by Type of Feed a/  
1938 (Postwar Boundaries), 1951, and 1953  
(Continued)

---

j. Because of the reduction in total grains produced in 1951, as compared to production in 1938, grain feed rates in 1951 were reduced below the 1938 rates except for poultry, for which the rates were maintained at the 1938 level. The reduced rates for cattle, swine, and sheep and goats are essentially the same as the rates which prevailed in 1928 for these livestock. The 1951 rate for horses is the 1928 grain ration minus the meal (muki).

k. The 1951 estimate of potatoes fed, 147 million centners, is approximately 21 percent of total potato production. 115/ (See Table 1, p. 7, above.) When 1928 rates are applied to 1951 livestock numbers, the total amount of potatoes for feed thus obtained is only about 114 million centners. The 1928 feed rates for the various livestock were adjusted upward on the basis of the application of the percentage distribution of feed based on 1928 rates to the 1951 total feed potatoes. The rates were then determined by dividing the new quantities of feed potatoes per livestock enterprise by the number of livestock per enterprise.

l. Feed rates of grains for 1953 were maintained at 1953 levels, except that the rate for poultry was reduced to the 1928 level.

m. A recent article reports that rates of potatoes fed to livestock (per head) had decreased by 50 percent per head in 1953 by comparison with 1940 116/ and are half the 1938 rates. Since the 1938 rates are in reality average rates for 1933-37, the latter may also stand for 1940 rates. It seems clear that 1953 was a poor agricultural season for potatoes.

The application of these reduced potato rates to 1953 livestock numbers gives less than 96 million centners fed in 1953, or less than 14.4 percent of the total production of potatoes. This percentage is approximately half the percentage applicable to the quantity of potatoes fed in 1938.

Table 12

Distribution of Feed Allocated to Soviet Livestock, by Type of Livestock a/  
1938 (Postwar Boundaries), 1951, and 1953

Feed Crop	Total Feed (Thousand Centners) <sup>b/</sup>	Distribution of Feed (Percent)							Total
		Horses	Cows	Other Cattle	Hogs	Pigs	Sheep and Goats	Poultry	
1938									
Grains									
Winter wheat	3,190							100.00	100.00
Rye	4,276		30.00		12.19	4.07		53.74	100.00
Spring wheat	5,362							100.00	100.00
Barley	58,685	9.15	28.36	11.68	39.58	8.63		2.60	100.00
Oats	107,216	64.39	8.47	3.49	11.82	2.58	2.41	6.84	100.00
Corn	14,055	14.07			48.27	8.37		29.29	100.00
Other	11,686		13.18	11.07	53.60	22.15			100.00
Total grains	204,470	37.36	13.96	5.82	24.20	5.75	1.26	11.65	100.00
Potatoes	206,747	4.09	19.56	7.10	51.94	12.51	1.59	3.20	100.00
Silage crops	95,400		62.87	13.97	7.60	2.48	13.07		100.00
Feed roots	93,516	10.76	43.04	12.91	23.94	5.08	2.77	1.50	100.00
Hay crops	750,000	42.54	31.54	16.78				9.14	100.00
Pasture units	81,463	18.84	32.70	22.21	2.42		19.94	3.90	100.00
1951									
Grains									
Winter wheat	3,618							100.00	100.00
Rye	4,048		24.46		8.32	2.79		64.43	100.00
Spring wheat	6,083							100.00	100.00
Barley	42,208	8.10	30.41	13.99	35.64	7.77		4.09	100.00
Oats	75,444	58.23	9.29	4.27	10.88	2.37	3.94	11.02	100.00
Corn	11,083	11.36			39.65	6.87		42.12	100.00
Other	8,033		14.79	13.86	50.49	20.86			100.00
Total grains	150,517	32.30	14.63	6.80	21.29	5.06	1.97	17.96	100.00
Potatoes	146,955	3.41	21.48	8.70	47.88	11.53	2.61	4.39	100.00
Silage crops	92,222		59.08	14.65	6.00	1.96	18.32		100.00
Feed crops	81,523	8.49	44.85	15.01	20.95	4.44	4.30	1.95	100.00
Hay crops	678,780	34.16	34.40	17.76				13.67	100.00
Pasture units	80,201	13.17	30.17	22.86	1.87		27.43	4.49	100.00
1953									
Grains									
Winter wheat	3,414							100.00	100.00
Rye	3,986		24.94		10.01	3.34		61.72	100.00
Spring wheat	5,739							100.00	100.00
Barley	45,783	8.34	28.16	12.61	38.86	8.47		3.57	100.00
Oats	82,217	59.67	8.56	3.83	11.81	2.57	4.01	9.55	100.00
Corn	11,906	11.80			43.64	7.57		36.99	100.00
Other	9,062		13.17	12.03	52.93	21.87			100.00
Total grains	162,107	33.49	13.64	6.18	23.38	5.56	2.03	15.73	100.00
Potatoes	95,716	3.40	19.27	7.61	50.59	12.18	2.59	4.36	100.00
Silage crops	95,359		57.37	13.86	6.86	2.24	19.66		100.00
Feed roots	86,565	8.93	42.41	13.84	23.33	4.95	4.50	2.04	100.00
Hay crops	714,453	36.25	32.82	16.52				14.42	100.00
Pasture units	84,243	14.01	28.85	21.30	2.11		28.99	4.75	100.00

a. The percentages in this table are obtained by dividing the feed fed per livestock enterprise, per crop, by the total centners of feed per crop. The amounts of feed fed per crop and per animal were determined as in Table 11, p. 56, above, and in Problems 3 and 4, pp. 51 and 52, above, respectively.

b. See Table 1, p. 7, above.

S-E-C-R-E-T

The expression of wool and mohair production as meat products equivalents started with the following data for 1951:

<u>Products</u>	<u>Estimated Production (Centners)</u>	<u>Estimated Farm Value (1951 Rubles per Kilogram)</u>
Mohair	37,990	20.45
Wool	1,600,000 <u>117/</u>	8.34
Sheep and goat meat (including fats)	5,800,000 <u>118/</u>	15.78

Some additional data were available, as follows: mohair production in 1938 (prewar boundaries) was about 2,700 tons, 119/ wool production in 1938 (prewar boundaries) about 130,300 tons, 120/ and wool production in 1953 about 175,000 tons. 121/

Mohair and wool production for 1938 (postwar boundaries) was derived on the basis of mohair yields per goat. In 1938 (prewar boundaries) there were about 9.3 million goats. 122/ The yield in mohair was therefore about 0.29 kilograms per goat. This yield figure was applied to the 1938 (postwar boundaries) number of goats -- 9,654,000 123/ -- to obtain the mohair production of about 2,800 tons. Since, in the prewar boundaries, mohair production for 1938 was about 2.03 percent of total wool and mohair production, 133,000 tons, 124/ this percentage figure could be applied to mohair production for the postwar boundaries to obtain total wool and mohair production, 138,074 tons. Wool production subsequently was 135,271 tons.

Mohair production in 1951 and 1953 was obtained by determining goat numbers and applying the 1938 mohair yields. In 1938 (postwar boundaries), goats numbered about 13.215 percent of the total sheep and goats. This percentage applied to the 1951 total sheep and goats, 99 million, gives about 13 million goats. At the prewar rate of yield, mohair production in 1951 was 3,799 tons. In 1953, of the 109.9 million sheep and goats, 14.5 million were goats. Mohair production was therefore about 4,200 tons.

S-E-C-R-E-T

The next step was to calculate the ratio of farm value of wool and of mohair to the farm value of sheep and goat meat. The ratio of the value of wool to the value of sheep and goat meat is estimated to have been about 0.53 and of mohair, about 1.30. The meat products equivalents of wool and mohair production are as follows:

<u>Year</u>	<u>Centners of Meat Equivalents</u>		
	<u>Mohair</u>	<u>Wool</u>	<u>Total</u>
1938 (postwar boundaries)	36,000	715,000	751,000
1951	49,000	846,000	895,000
1953	55,000	925,000	980,000

Problem 6: To Measure Egg Production as Poultry Meat Equivalents.

Egg production for 1938 is calculated as 480,000 tons; for 1951, 550,000 tons; and for 1953, 600,000 tons. <sup>125/</sup> The dressed, ready-to-cook weight production of poultry meat is calculated as about 260,000 tons in 1938, about 290,000 tons in 1951, and about 320,000 tons in 1953. Estimation of egg production is based on the rate of production of about 52.7 eggs per chicken prevailing in 1928 <sup>126/</sup> and on the weight of about 50 grams per egg. Estimation of poultry meat production is based on a 1938 yield figure of about 1.5 kilograms live weight per head of poultry. This figure is derived from the poultry meat production in 1938 (prewar boundaries), about 299,400 tons, and the total number of poultry, about 200 million. <sup>127/</sup> Dressed, ready-to-cook weight is estimated at about 73 percent of live-weight production, based on US experience.

S-E-C-R-E-T

Price ratios are necessary for the 3 years in order to express eggs as poultry meat equivalents. These are estimated as follows:

<u>Year</u>	<u>Average Value per Metric Ton (1951 Rubles)</u>		<u>Ratio of the Value of Eggs to the Value of Meat</u>
	<u>Eggs</u>	<u>Poultry Meat</u>	
1938	16,325	16,250	1.0046
1951	16,173	16,250	0.9953
1953	16,465	16,250	1.0132

These ratios applied to egg production give 4,820,000 centners of poultry meat equivalents for 1938, about 5,470,000 centners in 1951, and 6,080,000 centners in 1953. Total meat products equivalents are shown in Table 4.\*

Problem 7: To Measure Farm-Produced Draft Power.

Farm-produced draft power produced by horses in 1938, 1951, and 1953 was determined by estimating the average number of shifts worked per animal on the kolkhozy.

In 1938 (prewar boundaries) the number of work oxen 2 years old or older on the kolkhozy is given as 2,713,000 and the number in total agriculture, 3,551,000. 128/ The number of work horses (practically all over 3 years old) on the kolkhozy is given as 7,820,000 and the number in total agriculture, 10,498,000. 129/ The expenditure of power hours by kolkhoz work stock is reported as 14,668 million hours. 130/ Since each draft ox is equivalent to 0.50 horsepower and each draft horse to 0.75 horsepower, there were 1,356,500 ox horsepower and 5,865,000 horse horsepower on the kolkhozy in the prewar area. The average number of power shifts (10 hours per shift) per kolkhoz horsepower (for farm-produced draft) was, therefore, 203.116 shifts per year.

\* P. 22, above.

S-E-C-R-E-T

This rate may now be applied to the number of draft horses 131/ for the 3 years compared in this report. In 1938 (postwar boundaries), 12,875,000 draft horses worked over 2.6 billion shifts; in 1951, 8,864,000 horses worked about 1.8 billion shifts; and in 1953 about 9.9 million horses worked about 2 billion shifts. These data are found in Table 4.\*

II. Problems in the Assignment of Labor Inputs to Enterprises.

Problem 8: To Assign Labor Inputs on the Care and Maintenance of Horses to Field Husbandry.

In the accounts of Soviet agricultural bookkeepers, labor expended on the care and maintenance of horses, 132/ like that in the operation of MTS machinery, 133/ is registered separately from the labor assigned to the cultivation of crops. From the point of view of economics, however, labor on the care and maintenance of horses should be regarded as a cost to field crops. Because horses are used on the farm principally for the production of crops, farmers must trade feed for farm-produced draft power.

The problem in methodology was to determine the criterion by which to assign this type of labor inputs to field husbandry enterprises. No direct data were available bearing on these inputs. The criterion adopted was the percentage distribution of labor inputs on field crops, using "horse-and-hand" methods. These inputs consist of all manual labor in field husbandry, including labor using horses, which is directly employed neither in the operation of MTS or sovkhov machinery (such as the labor of tractor drivers) nor in auxiliary support of MTS or sovkhov machinery (such as the labor of water and fuel haulers). 134/ A good example of labor using horse-and-hand methods is the worker cultivating vegetables. Machinery is difficult to adapt to this type of cultivation.

In 1938 the distribution of labor inputs estimated by these methods totaled over 4.1 billion man-days as compared with 4.06 billion man-days in 1951. 135/ This distribution depends on the labor inputs required per hectare per year for each of the crops in field husbandry. The distribution of hectares in Soviet field husbandry for 1938, 1951, and 1953 is shown in Table 13.\*\*

\* P. 22, above.

\*\* Table 13 follows on p. 66.

S-E-C-R-E-T

Table 13

Distribution of Sown Hectares in Soviet Field Husbandry, by Crop a/\*  
1938 (Postwar Boundaries), 1951, and 1953

Thousand Hectares			
<u>Type of Crop</u>	<u>1938</u>	<u>1951</u>	<u>1953</u>
Grains			
Winter grains			
Winter wheat	15,000	15,000	16,900
Rye	24,600	26,800	22,000
Total			
winter grains	<u>39,600</u>	<u>41,800</u>	<u>38,900</u>
Spring grains			
Spring wheat	27,100	27,900	31,300
Barley	10,760	8,800	8,200
Oats	20,030	17,300	16,100
Corn	4,050	2,900	2,800
Rice	155	180	180
Other spring crops	12,005	6,720	9,120
Total			
spring grains	<u>74,100</u>	<u>63,800</u>	<u>67,700</u>
Total grains	<u>113,700</u>	<u>105,600</u>	<u>106,600</u>
Fruits and vegetables			
Fruits	1,517	1,385	1,385
Potatoes	9,001	9,470	9,308
Vegetables	1,462	1,400	1,330
Cucurbits	627	600	570
Total fruits and			
vegetables	<u>12,607</u>	<u>12,855</u>	<u>12,593</u>

\* Footnote for Table 13 follows on p. 67.

S-E-C-R-E-T

Table 13

Distribution of Sown Hectares in Soviet Field Husbandry, by Crop a/  
1938 (Postwar Boundaries), 1951, and 1953  
(Continued)

Thousand Hectares			
<u>Type of Crop</u>	<u>1938</u>	<u>1951</u>	<u>1953</u>
Technical crops			
Sugar beets	1,289	1,336	1,500
Tobacco	208	206	210
Oil-bearing crops			
Cotton	2,083	2,687	2,687
Flax	2,503	2,100	2,100
Hemp	691	608	608
Sunflowers	3,302	3,913	4,200
Soya beans	282	274	300
Other (minor) oils	1,015	1,023	1,100
Total oil-bearing crops	<u>9,876</u>	<u>10,605</u>	<u>10,995</u>
Total technical crops	<u>11,373</u>	<u>12,147</u>	<u>12,705</u>
Fodder and forage			
Silage crops	828	1,059	1,199
Feed roots	972	1,275	1,446
Hay crops	74,600	86,872	89,561
Pasture	348,000	348,000	348,000
Total fodder and forage	<u>424,400</u>	<u>437,206</u>	<u>440,206</u>
Grand Total	<u>562,080</u>	<u>568,266</u>	<u>572,104</u>

a. 136/.



S-E-C-R-E-T

These distributions, which allowed for labor savings produced by the use of MTS machinery, were each converted to percentage distributions. Each of these was then applied to the total inputs per year involved in the care and maintenance of horses.\* Each resulting distribution of labor inputs on the care and maintenance of horses as allocated per crop could then be added to the corresponding distribution of inputs of labor involved in horse-and-hand methods and to the work employed in the operation of machinery. Total inputs are shown in Table 2.

The assumption in the above percentage distributions of labor involved in the care and maintenance of horses to field husbandry enterprises is that the amount of human labor employed in horse-and-hand methods of agricultural cultivation is closely correlated with the amount of horse labor involved. The more human labor employed in such methods, the more horse labor is used per crop; the less human labor employed, the less horse labor.

Problem 9: To Assign Labor Inputs on Feed Crops to Animal Husbandry.

The assignment of labor spent on feed production to livestock enterprises involved two calculations. The first was to determine the amount of production used as feed. The percent of production per crop which was used as feed could then be determined, as in Table 1.\*\* This percent could then be applied to the amount of total labor spent on feed production per crop. This calculation assumes that the quantity of labor expended per hectare per crop for feed is essentially the same as the quantity of labor expended per hectare for the same crop for nonfeed purposes.

The second, more difficult calculation involved distribution of labor inputs on feed production per crop among the various livestock enterprises which use the feed. This distribution was achieved by the use of the percentage distributions listed in Table 12.\*\*\* Each percentage distribution applies to a particular crop and measures the relative amounts of feed per crop and of labor spent on the amount that feed required for livestock enterprises using the feed.

\* See Table 2, p. 13, above.

\*\* P. 7, above.

\*\*\* P. 61, above.

S-E-C-R-E-T

Although the absolute quantities of feed fed per crop for livestock enterprises have not been given in this report, they may be calculated by applying each percentage distribution, as given in Table 12,\* to the total feed fed per crop, also listed in Table 12. These absolute quantities were derived from data in Table 11\*\* by multiplying feed rates per head of livestock by the number of stock per enterprise.

The absolute quantities of labor expended on feed fed per crop for the various livestock enterprises have not been given in this report. They may, however, be determined by applying each percentage distribution given in Table 12 to the total labor inputs on feed per crop given in Table 2.\*\*\*

III. Problem in the Calculation of Labor Productivity.

Problem 10: To Determine Indexes of Labor Productivity  
by Aggregates of Enterprises.

The calculation of indexes of labor productivity by aggregates is complicated by the fact that, although it may be feasible to aggregate labor inputs, it is not economically legitimate to aggregate production for groups of enterprises. In agriculture this rule sometimes may be violated, as in the case of an aggregate of closely related products such as total grain production. In industry, however, it is clearly impossible, for example, to aggregate production for an industry which produces nails and also steel girders. Changes in demand, in the value of the various products, and in the value of labor inputs on the various products are not necessarily in the same direction and at the same rates of change over a period of time. In the case of those agricultural products which are not closely related, it is also impossible -- for example, to construct indexes of labor productivity over a time span for the aggregates 137/ by adding physical volumes of soya bean oil and of grain and then adding their respective labor inputs.

\* P. 61, above.

\*\* P. 56, above.

\*\*\* P. 13, above. Also see Table 3, p. 18, above.

S-E-C-R-E-T

The solution of this problem was to use the following formula 138/ for the derivation of labor productivity:

$$\text{Formula (A)} \quad L_{1951} = \frac{\frac{V_{1951}^1}{V_{1938}^1} \times E_{1938}^1 + \frac{V_{1951}^2}{V_{1938}^2} \times E_{1938}^2 + \dots + \frac{V_{1951}^n}{V_{1938}^n} \times E_{1938}^n}{\text{Total } E_{1951}}$$

where

L equals the Index of Labor Productivity.

V equals the production of a particular enterprise, the number associated with V indicates the enterprise, and the date indicates the year.

E equals the man-days required for the production of the enterprise, the number associated with E indicates the labor required for the production of the same enterprise associated with V, and the date indicates the year.

n is a symbol which when associated with the others indicates that mathematical operations are to be carried out for all other enterprises included in the aggregate.

The above formula may be shortened, as follows:

$$\text{Formula (B)} \quad L_1 = \frac{\text{Sum} \left( \frac{V_1}{E_1} \frac{E_1}{V_0} \right) E_1}{\text{Sum } E_1}$$

S-E-C-R-E-T

It may be shortened even further, as follows:

$$\text{Formula (C)} \quad L_1 = \frac{\text{Sum} \left( \frac{V_1}{V_0} \right) E_1}{\text{Sum } E_1}$$

where

Subscript 0 refers to 1938 and subscript 1 to 1951 for particular enterprises.

The mathematical steps involved in Formulas (A) and (B) consist of weighting the 1951 indexes of labor productivity per individual enterprise by the 1951 labor inputs per enterprise, summing the results of the weighting, and dividing the weighted sum by the sum of 1951 labor inputs for all enterprises in the aggregate.

Data for winter grains taken from Table 6\* may be applied as follows:

	<u>1938</u>		<u>1951</u>	
	<u>Labor Inputs (Thousand Man-Days)</u>	<u>Output per Man- Day (Kilograms)</u>	<u>Labor Inputs (Thousand Man-Days)</u>	<u>Output per Man- Day (Kilograms)</u>
Winter wheat	239,771	63.72	228,832	58.73
Rye	395,995	55.49	402,333	56.91
Total	<u>635,766</u>		<u>631,165</u>	

\* P. 29, above.

S-E-C-R-E-T

Then 58.73/63.72 times 228,832 gives 210,905, and 56.91/55.49 times 402,333 gives 412,627. The sum of 210,905 and 412,627 equals 623,532. This sum divided by 631,165 equals 98.79, which is the index of labor productivity for winter grains as a whole

Table 14\* gives output rates per man-day (absolute labor productivity figures) for 1938, 1951, and 1953 for use in determining indexes of labor productivity for aggregates of enterprises according to Formulas (A) and (B). The data are given in kilograms per man-day, except in the case of horses, when the unit of production changes to work-shifts (by horses) per man-day.

Although Formula (C) gives the same index as Formulas (A) and (B), it also allows calculation of the excesses of labor expenditures shown in Table 8.\*\* Its function is to compare the distribution of actual labor inputs for an aggregate of enterprises for 1951 with the distribution of inputs which would have been required if 1951 production per enterprise had been handled with the same rate of output per unit of labor as prevailed in 1938. The difference between the actual labor inputs and the theoretically required inputs is labeled "excess."

An example of the calculation of the 1951 index of labor productivity using Formula (C) for winter grains is as follows:

	Production for Nonfeed Uses (Thousand Centners)		Man-Days Expended (Thousand)		Production Ratio (2) + (1) (5)	Man-Days Re- quired at 1938 Rates of Production (5) + (3) (6)	1951 Index of Labor Productivity (6) + (4)
	1938 (1)	1951 (2)	1938 (3)	1951 (4)			
Winter Grains							
Winter wheat	152,775	134,382	239,771	228,832	87.96	210,905	92.17
Rye	219,724	228,952	395,995	402,333	104.20	412,627	102.56
Total			<u>635,766</u>	<u>631,165</u>		<u>627,532</u>	<u>98.79</u>

\* Table 14 follows on p. 73.

\*\* P. 32, above.

S-E-C-R-E-T

Table 14

Output per Man-Day of Soviet Agricultural Production,  
by Productive Enterprise a/\*  
1938 (Postwar Boundaries), 1951, and 1953

Productive Enterprise	Kilograms		
	Output per Man-Day		
	1938	1951	1953
Field husbandry (production for nonfeed use)			
Winter wheat	63.72	58.73	54.05
Rye	55.49	56.91	55.28
Spring wheat	45.61	47.75	49.07
Barley	63.04	61.87	63.25
Oats	60.56	57.92	56.19
Corn	56.65	51.32	48.99
Rice	69.32	79.72	79.26
Other grains	36.82	39.14	39.48
Fruits	186.17	182.17	180.63
Potatoes	109.81	104.64	99.13
Vegetables	44.05	45.60	45.22
Cucurbits	27.34	28.33	28.09
Sugar beets (raw sugar)	12.21	11.88	11.99
Tobacco	19.22	17.22	16.75
Cotton and cotton seed	7.32	7.69	7.62
Flax fiber and flax seed	5.94	6.66	6.35
Hemp and hemp seed	7.14	6.05	6.13
Sunflowers	36.00	30.22	32.38
Soya beans	8.54	5.34	8.20
Other (minor) oil crops	4.47	5.65	7.88

\* Footnotes for Table 14 follow on p. 74.

S-E-C-R-E-T

Table 14

Output per Man-Day of Soviet Agricultural Production,  
by Productive Enterprise a/  
1938 (Postwar Boundaries), 1951, and 1953  
(Continued)

Productive Enterprise	Kilograms		
	Output per Man-Day		
	1938	1951	1953
Animal husbandry			
Cows (whole milk)	20.38	16.39	16.46
Cattle (meat products)	1.64	1.52	1.61
Swine (meat products)	2.61	2.48	2.60
Sheep and goats (wool, mohair, and meat products measured in terms of meat production)	1.34	1.20	1.33
Poultry (eggs and poultry meat drawn on the farm measured in terms of meat production)	1.52	1.51	1.53
Horses	5.92 <u>b/</u>	5.22 <u>b/</u>	5.21 <u>b/</u>

a. These data are derived by dividing the centners of production by the inputs in man-days. The centners are converted to kilograms, 1 centner = 100 kilograms. The production data for 1938 and 1951 are shown in Table 4, p. 22, above and in Table 6, p. 29, above. The 1953 data were analyzed in the same manner as the data for 1938 and 1951. 139/

b. Ten-hour shifts.

S-E-C-R-E-T

APPENDIX B

GAPS IN INTELLIGENCE

Three major gaps in intelligence may contribute to error in this report. First, more adequate production data are needed, particularly for the detailed schedule of enterprises required for a study of this character. Data on the production of fruits and vegetables since the beginning of the war are lacking. Prewar estimates of yields per hectare had to be used as a basis for determining current production. Data on the production of fodder and forage in the postwar period are very uncertain. Announced production data for these enterprises may be spurious, because of the imperfect quality of the silage and hay stored. The amount of wastage currently apparent in fodder crops in the USSR is much higher than in the prewar era. This may be due to lack of manpower to store the feed before it is damaged by weather. The data for livestock production in the USSR as a whole are uncertain, although estimates are available in Soviet reports on socialized production. The data on poultry husbandry and farm-produced draft power are especially uncertain.

Second, current information on feeding practices in Soviet animal husbandry is noticeably lacking, although there are occasional articles indicating practices for limited areas, and others which suggest norms of feeding derived from experience on the best livestock farms. Because of the lack of current information and because of the dependence in this report on adjusted prewar feeding practices, estimates of the distribution of labor inputs to the production of feed for animal husbandry must be considered provisional. This gap in information also affects the estimates of the distribution of labor inputs in field husbandry enterprises, since the inputs on feed must be transferred from field to animal husbandry enterprises.

Finally, adequate price and wage schedules are lacking for an analysis of labor productivity in a value frame of reference. It is possible that such an analysis might produce results at variance, at least in some respects, from those indicated in this report. Information on wages and wage costs per hectare, per animal, and

- 75 -

S-E-C-R-E-T



S-E-C-R-E-T

per unit of production, by regions, would seem desirable. A detailed price schedule for agricultural commodities at the farm might also prove to be useful for the determination of labor productivity by enterprise, by enterprise group, and for total field husbandry, total animal husbandry, and total agriculture. These prices would need to be adjusted to account for the influence on production of obligatory delivery prices, state retail prices, and free market (kolkhoz bazaar) prices, and for the influence of value added in the processes of production, processing, and marketing.

- 76 -

S-E-C-R-E-T

S-E-C-R-E-T

APPENDIX C

SOURCE REFERENCES

Nine major sources were used for this report. CIA/RR 39, Agricultural Labor in the USSR, 31 August 1954, SECRET, provided the labor input data. CIA ORR Project 21.9.1, The Food Situation in The Soviet Bloc in 1952, unpublished, SECRET, and CIA ORR Project 21.147, The 1953-54 Food Situation in the Soviet Bloc, unpublished, SECRET, provided most of the production data for 1938, 1951, and 1953. V. P. Nifontov, Zhivotnovodstvo SSSR v tsifrakh, 1932, UNCLASSIFIED, was the best source for feed rates for livestock, needed to facilitate the correct assignment of labor inputs to field and animal husbandry. The rates given by Nifontov applied to 1928 and had to be adjusted to 1938, 1951, and 1953 agricultural and governmental conditions. The adjustments are of course subject to error because of the lack of current information. CIA/RR PR-28, Livestock Numbers and Meat Production in the USSR, 17 Jun 1953, SECRET, contributed greatly to this report by providing information on livestock and supplementary information on feeding practices. Much of the data on feeding practices in this report is taken from Nifontov.

It seems impossible to develop an analysis of data on agricultural economics in the USSR without Naum Jasny, The Socialized Agriculture of the USSR, 1949, UNCLASSIFIED, and Lazar Volin, "A Survey of Soviet Russian Agriculture," August 1951, UNCLASSIFIED. These authorities, especially Jasny, provide a mass of data and analysis which should always be consulted.

Walter Galenson, Russian Labor Productivity Statistics, 10 May 1950, UNCLASSIFIED, provides the formula which was adapted for use in this report. His new book, Labor Productivity in Soviet and American Industry, 1955, UNCLASSIFIED, was valuable for theoretical orientation. CIA/RR PR-68, Industrial Labor Productivity in the USSR, 9 August 1954, SECRET, gives explanations, theory, and procedures applicable to the use of labor productivity indexes.

S-E-C-R-E-T

Evaluations, following the classification entry and designated "Eval.," have the following significance:

<u>Source of Information</u>	<u>Information</u>
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

- 
1. CIA. CIA/RR 39, Agricultural Labor in the USSR, 31 Aug 54, Table 3, p. 21, S.
  2. Agriculture. "Gains in Productivity of Farm Labor," by R.W. Hecht and G.T. Barton, Technical Bulletin, no 1020, Dec 50, p. 4, U. Eval. RR 2.
  3. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 43, 449-450, U. Eval. RR 1.

STATSPEC

4.

Ibid., 21 Aug 52, p. BB 20, 24, U/OFF USE. Eval. RR 2.  
Ibid., 7 Oct 52, p. BB 58-59, U/OFF USE. Eval. RR 4.

S-E-C-R-E-T

S-E-C-R-E-T


- STATSPEC 5. CIA. CIA/ORR Draft Paper, Current Developments in the Agriculture of the USSR, nd (about Nov 53), unpublished, p. 5, S.
- 25X1A 6. [REDACTED]
- STATSPEC 7. [REDACTED]
8. [REDACTED]
- STATSPEC 9. CIA. CIA/RR 39, op. cit. (1, above), Table 7, footnote a, p. 31, and Table 9, p. 37, S.
10. [REDACTED]
11. [REDACTED]
12. CIA. ORR Project 21.9.1, The Food Situation in the Soviet Bloc in 1952, unpublished, S.  
CIA. ORR Project 21.147, The 1953-54 Food Situation in the Soviet Bloc, unpublished, S.
13. Nifontov, V.P. Zhivotnovodstvo SSSR v tsifrakh (Animal Husbandry of the USSR in Figures), 1932, p. 128-146, U. Eval. RR 2.  
CIA. CIA/RR PR-28, Livestock Numbers and Meat Production in the USSR, 17 Jun 53, p. 45-61, S.
14. CIA. CIA/RR PR-28, op. cit. (13, above).
15. Agriculture, Bureau of Agricultural Economics. FM 64, revised, Animal Units of Livestock Fed Annually, 1919-1920 -- 1948-1949, Washington, Oct 49, Table 4, p. 15, U.
- STATSPEC 16. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 618, U. Eval. RR 2.
17. [REDACTED]
18. Ibid.
19. Khalturin, V. "MPS -- glavnyaya reshayushchaya sila v razvitii kolkhoznogo proizvodstva" (The MPS is the Chief Decisive Force in the Development of Kolkhoz Production), Planovoye khozyaystvo, no 2, 1954, p. 18-30, U. Eval. RR 2.
- STATSPEC 20. [REDACTED]
21. CIA. CIA/RR 39, op. cit. (1, above), Table 5, p. 26, S.
22. Ibid., Tables 1 and 2, S.
23. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 394, 423-432, U. Eval. RR 2.

S-E-C-R-E-T

24. CIA/RR 39, op. cit. (1, above), Table 1, p. 6-10, and Table 2, p. 11-13, S.
25. Prokopovich, S.N. Narodnoye khozyaystvo SSSR (National Economy of the USSR), book 1, p. 104, U. Eval. RR 1.  
CIA. CIA/RR PR-32, Postwar Trends in Manpower of the USSR and the European Satellites, 1947-57, 27 May 53, Table 2, p. 7, C.
26. Nifontov, op. cit. (13, above), p. 128-146, U. Eval. RR 2.
27. Lutsenko, M. "Moshchnoye razvitiye zhivotnovodstva -- nasushchnaya zadacha v sel'skom khozyaystve" (The Powerful Development of Animal Husbandry is the Vital Task in Agriculture), Kommunist, no 15, Oct 53, p. 30-42, U. Eval. RR 2.
28. CIA. CIA/RR 39, op. cit. (1, above), Table 2, p. 11-13, S.
29. State, External Research Staff. "Russian Labor Productivity Statistics," by Walter Galenson, series 3, no 15, 10 May 50, U.  
RAND Corporation. R-257, Labor Productivity in Soviet and American Industry, by Walter Galenson, New York, 1955, chaps 1-4, 13, U. Eval. RR 2.  
CIA. CIA/RR PR-68, Industrial Labor Productivity in the USSR, 9 Aug 54, p. 1-4, S.
30. RAND Corporation. R-257, Labor Productivity in Soviet and American Industry, by Walter Galenson, New York, 1955, chap 13, U. Eval. RR 2.
31. CIA. ORR Project 21.9.1, op. cit. (12, above), S.  
CIA. ORR Project 21.147, op. cit. (12, above), S.
- 25X1AGN10 32. Agriculture. "A Survey of Soviet Russian Agriculture," by Lazar Volin, Agriculture Monograph, no 5, 7 Aug 51, p. 56, U. Eval. RR 1.  
[REDACTED]
33. Agriculture. "A Survey of Soviet Russian Agriculture," by Lazar Volin, Agriculture Monograph, no 5, 7 Aug 51, U. Eval. RR 1.  
Sotsialisticheskoye zemledeliye, 28 Feb 51, U. Eval. RR 2.
34. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 638-654, U. Eval. RR 2.
35. Volin, Lazar. "The Malenkov-Khrushchev New Economic Policy," Journal of Political Economy, Jun 54, vol 62, no 3, p. 197-209, U. Eval. RR 2.
36. Ibid.
- STATSPEC 37. [REDACTED]
38. [REDACTED]

S-E-C-R-E-T

STATSPEC

39. Prokopovich, op. cit. (25, above).  
CIA. CIA/RR PR-32, op. cit. (25, above).
40. CIA. ORR Project 21.9.1, op. cit. (12, above).  
CIA. ORR Project 21.147, op. cit. (12, above).  
CIA. OCI, Current Intelligence Digest, no 1055, 10 Nov 54, p. 3, S. State, Moscow. T 713, 7 Nov 54. C. Eval. RR 2.
41. 
42. CIA. CIA/RR 39, op. cit. (1, above), Table 10, p. 47-48, S.
43. Ibid.
44. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 393-394, U. Eval. RR 2.
45. RAND Corporation. RM-1248, The Agricultural Labor Force and Population of the USSR, by W.W. Eason, 4 May 54, p. 52, 198, U. Eval. RR 2.
46. CIA. CIA/RR PR-28, op. cit. (13, above).
47. Benediktov, I. "Za dal'neyshiy pod"yem sel'skogo khozyaystva" (For Further Development of Agriculture), Kolkhoznoye proizvodstvo, no 1, Jan 52, p. 1-6, U. Eval. RR 2.
48. Nemchinov, V. "Ekonomicheskiye voprosy razvitiya zhivotnovodstva" (Economic Problems in the Development of Animal Husbandry), Voprosy ekonomiki, no 2, Feb 55, p. 14-30, U. Eval. RR 3.
49. Shabalin, N. "O znachenii sovremennoy tekhniki dlya rosta sel'skokhozyaystvennogo proizvodstva v SSSR" (About the Significance of Modern Techniques for the Growth of Agricultural Production in the USSR), Voprosy ekonomiki, no 8, Aug 53, p. 45-56, U. Eval. RR 4.
50. Kal'm, P.A. "Ob intensifikatsii sotsialisticheskogo zemledeliya" (About the Intensification of Socialist Agriculture), Sotsialisticheskoye sel'skoye khozyaystvo, no 12, Dec 54, p. 100-104, U. Eval. RR 4.
51. RAND Corporation. RM-1248, The Agricultural Labor Force and Population of the USSR, by W.W. Eason, 4 May 54, Table 5, p. 25, U. Eval. RR 2.
52. RAND Corporation. R-257, Labor Productivity in Soviet and American Industry, by Walter Galenson, 1955, chap 13, U. Eval. RR 2.
53. CIA. ORR Project 21.147, op. cit. (12, above).
54. CIA. CIA/RR IP-385, Soviet Capabilities and Probable Courses of Action, 1954-60, 7 Mar 55, S.
55. Lutsenko, op. cit. (27 above).
56. CIA. ORR Project 21.147, op. cit. (12, above).

S-E-C-R-E-T

S-E-C-R-E-T

STATSPEC

57.

[REDACTED]

58. CIA. ORR Project 21.147, op. cit., (12, above).

59. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 63, 449-450, U. Eval. RR 1.

CIA. CIA/ORR Draft Paper, Current Developments in the Agriculture of the USSR, nd (about Nov 53), unpublished, p. 5, S.

STATSPEC

60.

[REDACTED]

61. Demchenko, M. "Reshayushchiye usloviye dal'neyshego pod'yema narodnogo khozyaystva" (The Decisive Condition for a Further Development of the National Economy), Sovetskiye profsoyuzy, no 5, May 54, p. 40-49, U. Eval. RR 3.

Kaplun, S. "Iz opyta MTS Rostovskoy oblasti po mekhanizatsii obrabotki zerna na tokakh" (From the Experience of the MTS's of Rostov Oblast in the Mechanization of the Handling of Grain on Threshing Floors), Sotsialisticheskoye sel'skoye khozyaystvo, no 6, Jun 54, p. 55-59, U. Eval. RR 3.

62. "Za dal'neysheye povysheniye proizvoditel'nosti truda v sel'skom khozyaystve" (For Further Increase of the Productivity of Labor in Agriculture), Sotsialisticheskoye sel'skoye khozyaystvo, no 12, Dec 54, p. 3-10, U. Eval. RR 2.

63. Nosyrev, S. "Organizatsionno-khozyaystvennoye ukrepleniye kolkhozov i sel'skokhozyaystvennyy kredit" (Organizational and Economical Strengthening of Kolkhozy and Agricultural Credit), Sotsialisticheskoye sel'skoye khozyaystvo, no 5, May 54, p. 68-74, U. Eval. RR 2.

64. Agriculture. "A Survey of Soviet Russian Agriculture," by Lazar Volin, Agriculture Monograph, no 5, 7 Aug 51, p. 56, U. Eval. RR 1.

65. Beriya, L.P. "34-ya godovshchina velikoy Oktyabr'skoy sotsialisticheskoy revolutsii" (Thirty-Fourth Anniversary of the Great October Socialist Revolution), Voprosy ekonomiki, no 11, Nov 51, p. 3-18, U. Eval. Doc.

Malenkov, G.M. "Otchetnyy doklad XIX s"yezdu partii o rabote tsentral'nogo komiteta VKP(b)" (The Current Annual Report of the 19th Congress of the Party on the Work of the Central Committee of the All-Union Communist Party, Bolshevik), Bol'shevik, no 19, Oct 52, p. 5-63, especially p. 42, U. Eval. Doc.

STATSPEC

66.

[REDACTED]

S-E-C-R-E-T

S-E-C-R-E-T

STATSPEC 67. CIA. CIA/RR IM-391, 1953 Soviet Agricultural Results, Future Plans, and Prospects, 13 Aug 54, C.

[REDACTED]

68. CIA. CIA/RR IM-391, op. cit. (67, above), p. 18, C.

69. Daniels, Clifton. New York Times, 13 Sep 54, p. 4C, U. Eval. RR 2.

70. Sollertinskaya, Ye. "Rasshirennoye vosproizvodstvo sotsialisticheskogo sel'skogo khozyaystva" (The Expanded Production of Socialist Agriculture), Planovoye khozyaystvo, no 1, 1954, p. 43-57, U. Eval. RR 3.

STATSPEC 71. [REDACTED]

72. [REDACTED]

73. [REDACTED]

74. CIA. CIA/RR 39, op. cit. (1, above), p. 6-7, S.

75. Nemchinov, op. cit. (48, above).

STATSPEC 76. CIA. CIA/RR IP-385, op. cit. (54, above), p. 56-58, S.

77. [REDACTED]

Schwartz, Harry. "Corn Neglected, Pravda Charges," New York Times, 30 Jun 55, U. Eval. RR 2.

78. State, Moscow. Joint Press Reading Service, 16 Jun 54, "Organize Commission Trade on Collective Farm Markets Correctly," U. Eval. RR 2. (tr of Sovetskaya trgovlya, no 3, 1954, U)

79. "Improve Organization of Purchases of Farm Products," Current Digest of the Soviet Press, vol 5, no 47, Dec 53, p. 31-32, U. Eval. RR 2. (tr of Izvestiya, 24 Nov 53, U)

25X1A

[REDACTED]

State, Moscow. Joint Press Reading Service, 16 Jun 54, "Organize Commission Trade on Collective Farm Markets Correctly," U. Eval. RR 2. (tr of Sovetskaya trgovlya, no 3, 1954, U)

80. Izvestiya, 25 Aug 54, U. Eval. RR 2.

STATSPEC

CIA. OCI, Current Intelligence Digest, no 7229, p. 3, S.

81. [REDACTED]

S-E-C-R-E-T



S-E-C-R-E-T

Ibid., 8 Sep 54, p. CC 1-4, U/OFF USE. Eval. RR 2.  
State, Moscow. Joint Press Reading Service, no 260, sec B, 17 Sep 54,  
"Why Are Payments in Kind not Coming in Properly," p. 8-9, U.  
(tr of N. Karabikhin. Sel'skoye khozyaystvo, 15 Sep 54, U)

82. State, Moscow. Joint Press Reading Service, no 240, sec B, 1954,  
"An Indifferent Attitude Toward Construction of Elevators and  
Granaries," p. 5, U. Eval. RR 2. (tr of A. Babsev. Sel'skoye  
khozyaystvo, 28 Aug 54, U)

STATSPEC

83. CIA. CIA/RR 39, op. cit. (1, above), Table 21, p. 74, S.  
84. State, Moscow. Joint Press Reading Service, no 50, sec B, 19 Feb 55,  
p. 1-2, U. Eval. RR 2.  
85. Ruzin, B. "Voprosy organizatsii sel'skogo stroitel'stva" (Organizational  
Problems of Building in Agriculture), Sotsialisticheskoye sel'  
skoye khozyaystvo, no 12, Dec 54, p. 65-72, U. Eval. RR 3.  
86. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford,  
1949, p. 604-605, U. Eval. RR 1.  
87. Ibid., p. 609, U. Eval. RR 1.  
88. Ibid., p. 618, U. Eval. RR 1.  
89. Ibid.  
90. Nifontov, op. cit. (13, above).  
91. Ibid., p. 127, U. Eval. RR 2.  
Jasny, Naum. The Socialized Agriculture of the USSR, Stanford,  
1949, p. 607-608, U. Eval. RR 1.  
92. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford,  
1949, p. 752, U. Eval. RR 1.  
93. CIA. CIA/RR PR-28, op. cit. (13, above), p. 47, S.  
94. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford,  
1949, p. 612-617, U. Eval. RR 1.  
95. Agriculture, Bureau of Agricultural Economics, op. cit. (15, above).  
96. Nifontov, op. cit. (13, above).  
97. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford,  
1949, p. 752-756, U. Eval. RR 1.  
CIA. CIA/RR PR-28, op. cit. (13, above), p. 47-62, S.  
CIA. ORR Project 21.147, op. cit. (12, above).  
98. CIA. CIA/RR 39, op. cit. (1, above), Table 2, p. 11-13, and  
Table 14, p. 56-58, S.  
99. Ibid.  
100. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford,  
1949, p. 752, U. Eval. RR 1.

S-E-C-R-E-T

S-E-C-R-E-T

101. Board of Economic Warfare, Enemy Branch. The Russian Grain Crops and Their Disposition Since 1925-26, by Naum Jasny, 1 Feb 43, p. 61-62, U. Eval. RR 1.
102. Ibid.
103. Ibid., p. 61-63, U. Eval. RR 1.
104. Ibid.
105. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 754-755, U. Eval. RR 1.
106. Board of Economic Warfare, Enemy Branch, op. cit. (101, above), p. 63, U. Eval. RR 1.
107. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 751, 755, U. Eval. RR 1.  
CIA. ORR Project 21.147, op. cit. (12, above).
108. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 609, U. Eval. RR 1.
109. Ibid., p. 754, U. Eval. RR 1.
110. CIA. ORR Project 21.147, op. cit. (12, above).
111. Agriculture. "A Survey of Soviet Russian Agriculture," by Lazar Volin, Agriculture Monograph, no 5, 7 Aug 51, p. 129, U. Eval. RR 1.
112. CIA. ORR Project 21.147, op. cit. (12, above).
113. Nifontov, op. cit. (13, above).
114. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 594, U. Eval. RR 1.
115. CIA. ORR Project 21.9.1, op. cit. (12, above).
116. Lutsenko, op. cit. (27, above), U. Eval. RR 3.
117. CIA. CIA/RR IM-391, op. cit. (67, above), Table 1, p. 5, C.
118. CIA. CIA/RR PR-28, op. cit. (13, above), Table 3, p. 23, S.
120. Ibid.  
Volin, Lazar. "The Malenkov-Khrushchev New Economic Policy," Journal of Political Economy, Jun 54, vol 62, no 3, p. 164, U. Eval. RR 2.
121. CIA. CIA/RR IM-391, op. cit. (67, above), Table 1, p. 5, C.
122. Volin, Lazar. "The Malenkov-Khrushchev New Economic Policy," Journal of Political Economy, Jun 54, vol 62, no 3, p. 159, U. Eval. RR 2.
123. CIA. CIA/RR PR-28, op. cit. (13, above), p. 43, S.
124. Volin, Lazar. "The Malenkov-Khrushchev New Economic Policy," Journal of Political Economy, Jun 54, vol 62, no 3, p. 164, U. Eval. RR 2.

S-E-C-R-E-T

~~S-E-C-R-E-T~~

125. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 228, 652-653, U. Eval. RR 1.  
CIA. CIA/RR 39, op. cit. (1, above), Table 2, p. 11-13, and Table 14, p. 56-58, S.
126. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 652, U. Eval. RR 1.
127. Ibid., p. 624, 646, U. Eval. RR 1.
128. Sautin, I.V., ed. Zhivotnovodstvo v SSSR, 1916-1938 (Animal Husbandry in the USSR, 1916-38), 1940, U. Eval. RR 1.
129. Ibid.
130. Matskevich, S. "Power Balance in Soviet Agriculture," Planovoye khozyaystvo, no 12, Dec 40, p. 55-63, U. Eval. RR 3.  
Belosar, S. Kolkhoz Mechanization, East European Fund, Inc., Research Program on the USSR, no 33, New York, 1953, p. 17, U. Eval. RR 3.
131. CIA. CIA/RR 39, op. cit. (1, above), Table 1, p. 11-13 and Table 14, p. 56-58, S.
132. Jasny, Naum. The Socialized Agriculture of the USSR, Stanford, 1949, p. 424, U. Eval. RR 1.
133. Ibid., p. 423-424, U. Eval. RR-1.
134. Ibid., p. 416, U. Eval. RR 1.
135. CIA. CIA/RR 39, op. cit. (1, above), Table 3, p. 21-23, S.
136. Ibid., Table 1, p. 6-10, and Table 13, p. 52-55, S.
137. State, External Research Staff. "Russian Labor Productivity Statistics," by Walter Galenson, series 3, no 15, 10 May 50, U. RAND Corporation. R-257, Labor Productivity in Soviet and American Industry, by Walter Galenson, New York, 1955, chaps 1-4, 13, U. Eval. RR 2.  
CIA. CIA/RR PR-68, op. cit. (29, above).
138. State, External Research Staff. "Russian Labor Productivity Statistics," by Walter Galenson, series 3, no 15, 10 May 50, U. RAND Corporation. R-257, Labor Productivity in Soviet and American Industry, by Walter Galenson, New York, 1955, chaps 1-4, 13, U. Eval. RR 2.
139. CIA. ORR Project 21.147, op. cit. (12, above).

~~S-E-C-R-E-T~~

Approved For Release 1999/08/26 : CIA-RDP79-01093A001000020002-4

~~SECRET~~

SECRET

Approved For Release 1999/09/26 : CIA-RDP79-01093A001000020002-4