

Modernized farming but stagnated production: Swedish farming in the 1950s.

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The 1950s can be seen as an important formative period for Swedish agriculture. This was a time when horse-power and much of the manual labour were replaced by tractors; when artificial fertilizer gained more interest than animal manure; when the rhythmical sound from milking machines accompanied common life; and when pesticides were widely adopted. This picture is well in line with the general story of postwar European agriculture, although the time tables may differ in one way or another. The Swedish case deviates, however, in that it did not follow the general trend of “spectacular growth” that was seen in many other parts of Europe and overseas, but instead experienced stagnation in terms of produced quantities.¹

The claim about stagnant output may seem irrelevant with regard to the contemporary changes in methods of production, and it contrasts common views on Swedish postwar agriculture as a general productivist era.² Output quantities certainly increased when considering the postwar period as a whole, but the history looks different when the agricultural history of the 1950s is distinguished from the later following history. The lack of quantitative growth was known among contemporary authorities, which is illustrated by the following quotation from an official analysis of the 1950s in which it was said that:

Among the industrialized states Sweden thus holds a unique position in that the agricultural production has stagnated since the early 1950s, with the consequence that the production per capita has decreased continuously.³

The authors of the quoted investigation added comparisons with Denmark, the UK, and with what had then become EEC countries, saying that their agricultural production had increased

¹ Martín-Retorillo & Pinilla 2013, p. 6 (quote) and p. 15. Moreover Martín-Retorillo & Pinilla (2012, Table 8, p. 21) has made a similar observation about deviating Swedish behaviour. Of 17 European countries only the Swedish farm output was negative in 1950-62. (Referred to with kind permission of the authors).

² In contrast to frequent narratives the 1950s has been subject to surprisingly little historical analyses. Major sources are Morell (2001) and Flygare & Isacson (2003), both available in synthesized form in English in Myrdal & Morell (eds.), (2011). Other scholars who have published in the field are: Martiin (2012), Jørgensen (2010), Domeij (2008), Lagerqvist (2008), Eriksson (2004), Flygare (1999), Hansen (1998), Hedlund & Lundahl (1986, 1985), Micheletti (1990), Bäcklund (1988), Hellström (1976), and Tiderius (1977), who represents a wide range of perspectives such as agricultural history, economic history, political science, economics and social anthropology. Much of what has been written about postwar times derives from contemporaries who were involved in the transformation processes, for example: Holmström (1988), Osterman (1973), Gulbrandsen & Lindbeck (1971, 1969), Swedborg (1968), Odhner (1953).

³ SOU 1966:30, p. 35, my translation. In original: “Bland de industrialiserade staterna intar sålunda Sverige en unik ställning såtillvida, att jordbruksproduktionen stagnerat sedan början av 1950-talet med följd att produktionen per capita ständigt sjunkit.”

one fourth, one third, and one sixth, respectively from the pre-war years to the early 1960s.⁴ Denmark and the UK were good contrasting examples, with Denmark as a food exporter and the UK lately reminded about the importance of domestic farming - whereas Sweden was fully content with adequate amounts for domestic needs; neither more, nor less. Further studies reveal that the stagnated output of Swedish farm products was in line with a conscious political strategy to change methods of production without increasing the output, a strategy that was said to include both stimulating and hampering measures.⁵

The Swedish case is interesting from several perspectives: economic sense and behaviour; strategies for societal development and the welfare state; food politics, rural-urban issues; resources and environmental aspects; and in view of the just recently hungry Europe. This paper is the result of initial stages of research and focuses primarily on concrete changes in Swedish farming with regard to inputs and outputs. There are two major aims: to examine the relevance of the claims about stagnant output in Swedish farm production in the 1950s, and to suggest reasons for this. The purpose is to search for changes, or absence of changes, not to make any calculations about altered proportions between different categories of inputs, or between inputs and outputs. Focus is on quantities rather than monetary values in order to emphasize the input and outputs as such, rather than their price.

Part I provides an introduction to the Swedish society and Swedish farming in the 1950s, and is structured as four themes: the Swedish food supply situation during and just after WW II; the political ambitions for the welfare state and the new societal roles this brought about for farming, expressed in the 1947 agricultural programme; an overview about Swedish farming; and a brief international comparison with regard to relative changes in farm output during the 1950s. Part II examines the yields of the major crops, plus the output of animal products, and concludes that the quantities were relatively unchanged throughout the 1950s, although with some exceptions. Part III explores the inputs, exemplified by land, farm labour, mechanization, building activities, fertilizers, and pesticides – and finds substantial decreases in land and labour but significant increases with regard to tractorization, use of artificial fertilizer and in spread of pesticides. Finally Part IV provides a concluding discussion.

PART I: SWEDISH FARMING IN A WIDER SOCIETAL CONTEXT

Sweden differs from most European countries in that Sweden escaped the war and managed to sustain already high levels of food production and consumption during the so called war-crisis years.⁶ Accordingly, the early postwar years in Sweden was not about clearing up a

⁴ SOU 1966:30, p. 35.

⁵ SOU 1966:30, pp. 99, 189, 244, 251. (The stimulating and hampering means were not explicitly exemplified).

⁶ SOU 1946:42, p. 73 and SOU 1952:49, p. 143. The term 'war-crisis years' (*'kristiden'*) was generally used for the World War II time period, and will also be used in this paper.

chaos, but rather a time of continued expansion and further development of the welfare state. The authorities were eager to continue and even speed up the transformation of the Swedish society on its way to an increasingly industrialized urban nation. This brave new Sweden imposed new functions on the agricultural sector that, from now on, was urged to contribute not only with food as such, but with certain quantities of efficiently produced food, and, also, to provide other sectors with labour. Thirdly, efficient family farming at farms of rational size was expected to generate improved material welfare to the farm household. In the following the context will be further developed considering: the Swedish food supply situation, the welfare state, the 1947 agricultural programme, Swedish farming at large, and the 1950s stagnant total Swedish farm output in an international light.

The Swedish food supply situation before the 1950s

According to common view the war-crisis years in Sweden are perceived as a time of food shortage, a time when almost everything was rationed, and when one was grateful to the farmers for each and every piece of food.⁷ The domestic share of the food consumption during the war-crisis years was slightly higher than the 1930s average, which was between about 80 and 90 % of the consumption, depending on the impact of imported inputs.⁸ This point of reference was at a high level, with an average consumption well above 3000 calories per capita and day, probably more than sufficient for parts of the population. And even though the menus did not look exactly the same in the 1940s the average level was maintained just over 3000 calories also during the war-crisis years, as shown in Table 1.⁹

Table 1. Average calories per day and capita, Sweden. The two upper indexes refer to both vegetable and animal foods, but with reference to two different sources.

Source: *SOU 1946:42, p. 73; **SOU 1952:49, p. 143.

	1939	1940	1941	1942	1943	1944	1945	1946	1947
Calories*	3360	3220	3040	2960	3080	3100	3090	-	-
Index*	100	96	90	88	92	92	92	-	-
Index**	100	97	92	90	95	98	99	99	99
Index, vegetable foods**	100	96	93	93	97	95	98	97	95
Index, animal foods	100	97	89	86	93	102	102	102	105

Table 1 tells another story than common narratives about struggling for food. Not even in 1942, after two years of harvest failure, did the average calorie intake even come near any

⁷ See for example Ahlqvist et al (2012). Food rationing was practiced 1940-51; for example meat, fats and sugar was rationed until 1949 (Åmark 1952:49, p. 406).

⁸ Åmark, 1952, p. 133.

⁹ Despite the high total levels of production the food rations could be relatively scarce which, it is suggested, often was due to strategic acting, rather than to acute shortages (the author's ongoing research).

critical level. What is more, the share of animal products was high, in average 42 % of the daily calorific intake 1939/40-1944/45, which was just 2 % below the consumption level during the good harvest year 1938/39.¹⁰ There does not seem to be any reason to doubt these figures, due to the reasoning in the official investigations SOU 1946:46 and Åmark 1952 (SOU 1952:49) and their consistency with the agricultural statistics and with the picture that is given in *Lantmannen*, the leading farm journal of that time. As explanation to these contradictory views it is suggested that the food rationing system should be understood as a response to acute shortages but rather as a part of an ambitious planned economy (Swedish style) in order to make people feel safe, in contrast with in the late years of World War I.¹¹

Even though the Swedes had been reminded about the importance of domestic food supply during the war-crisis years but there was far from any average scarcities in the 1940s, and neither in the late 1930s when problems with surplus production were on the political agenda. Accordingly, the Swedes entered the postwar era in good shape and sufficiently provided with food, which made it possible for the politicians to dare change rhetoric, from previous appreciations of each and every potato and each and every glass of milk, to a harsher attitude to agriculture.

Welfare ambitions and the 1947 agricultural programme

The mid-20th century can be seen as a turning point when urban life and industrial based economy came to dominate, clearly, even though countryside was still comparably well populated and, as just mentioned, there was a widespread solidarity with the farmers.

The political climate was heavily influenced by the ruling Social Democrat party that enjoyed a long-term period of governing, from 1936 to 1974, although in broad coalition during the war-crisis years, and together with *Bondeförbundet* ("Farmers' party") in 1951-57.¹² The overall plan was to continue and expand the Swedish welfare state, in terms of material welfare and social security for everybody. In this project agriculture should be an integrated part, expected to contribute actively to more rational utilization of the country's factors of production.¹³ This somewhat theoretical statement was made in the introduction to the greatly influential investigation that preceded the parliamentary adoption of the 1947 agricultural programme.

This was the first overall long-term plan for Swedish agriculture, and it came to be a most influential tool for governmental directing of postwar Swedish agriculture, lasting to the early 1990s. The 1947 agricultural programme structured previously fragmentary aims and

¹⁰ Åmark 1952, p. 135.

¹¹ Planned economy, see Åmark 1952, p. 131.

¹² See Erlander, 1973, 1974 and 1976.

¹³ SOU 1946:42, p. 16.

decisions, such as price regulation issues deriving from the 1930s and early 1940s.¹⁴ Among the new elements were claims about rationalization and efficiency. The programme distinguished three major goals, referring to efficiency, production and income.¹⁵ The efficiency goal was distinguished as a separate goal, but was also an overall goal without which the two others would not materialize. Secondly the production goal, formally termed the goal for emergency preparedness, discussed needs for domestic food supply, future risks for trade blockades, and various interpretations of national self-sufficiency. Thirdly the so called income goal emphasized the necessity to improve the rationality in farming, up to a level where it would be relevant for farmers to enjoy a material standard of living on par with comparable categories.¹⁶ According to its advocates the three pillars were considered as a win-win concept that would generate improved wealth to the entire Swedish society: Efficient farmers would benefit from improved living standards and those who left the business would be happy for better paid jobs somewhere else, where they would contribute to the general Swedish development.

With the 1947 agricultural programme the authorities' messages to farmers thus switched from encouraging production of as much food as possible, to urge for efficiency rather than production as such. The message about efficiency contrasted widely with the somewhat heroic role that agriculture had been given during the war-crisis years, which probably contributed to the rage with which many Swedes received the 1947 program. Irrespective of perspective on these issues it is interesting to consider that the altered political approach was due to circumstances such as: the fact that Sweden did not starve during the war-crisis years; the authorities' fears for a looming overproduction; the Social Democratic governments' strong emphasis on urban and industrial development but weak interest in agriculture; close relations between the government and the two farmers' associations SL and RLF; and access to an extensive administrative apparatus that had been built up during the 1930s and the war-crisis years.

Among the tools to achieve these aims were the yearly price negotiations between the state, and farmers' and consumers' representatives that were introduced during the early war-crisis years. These negotiations have often been seen as the backbone of Swedish postwar agricultural politics. In addition to regulation of prices paid to farmers, the state was directly engaged in structural rationalization and methods of production, including advisory service about inputs and outputs. By that the 1950s Swedish agriculture was involved in a thoroughly constructed institutional framework, at farm level and nationally. A rapidly expanding cadre

¹⁴ As regards the 1930s, see Morell 2003 and Hellström 1976; as regards the 1940s, see Martiin 2012.

¹⁵ As can be seen, the Swedish aims of the late 1940s have much in common with those of the CAP today.

¹⁶ SOU 1946:42, pp. 16-21.

of bureaucrats and enthusiastic advisers were employed, providing good advice about inputs and methods of production.

Swedish farming by the mid-20th c, an overview

Sweden is well endowed with arable land, pastures, forests and water courses, which was favourable for the 1950s small-scale mixed farming with intensive animal production, and made it possible for many farmers to combine agriculture with forestry and/or fishery. By the 1950s the railway net and other communications were comparably well developed, and most farmers had access to electric power. Moreover producer cooperatives were particularly strong and something of a rural movement with great impact on farmers' economy and social life. At least until the late 1940s methods of production were largely based on manual labour, horse power and animal manure, what today's parlance would call eco-friendly forms of production. As earlier said, this model was able to feed the Swedish population. The model required a lot of manual work, gave little cash in return, was highly dependent on internally produced inputs, and required far-reaching use in kind in the farm household. Many people got well along with this, and were far from attracted by the 1947 agricultural programme's ideas about moving farm people to town.

The number of farms and smallholdings was abundant by the late 1940s when the 1947 agricultural programme was adopted. In 1944 Sweden had totally 296 000 farm units with more than 2 hectare arable land, spread across the country. In 1951 the number had been reduced to 282 000 and in 1961 233 000 units remained, Table 2.

Table 2. Number of farm units by area of arable land.

Source: Statistical Yearbook of Agriculture 1970, Table 2, p. 46f.

Arable land, ha	Total number of farms	
	1951	1961
2,1-5,0	95 945	66 635
5,1-10,0	89 755	75 017
10,1-20,0	59 790	53 446
20,1-30,0	17 719	18 266
30,1-50,0	11 234	11 960
50,1-100,0	5 417	5 410
100,1-	2 325	2 186
Total	282 187	232 290

In 1951 as many as two thirds of all holdings had less than 10 hectares of arable land (exclusive eventual lease), which was the size that the 1947 agricultural programme

suggested as minimum for an efficient farm.¹⁷ In 1961 the number of holdings with up to 10 hectares had been reduced with about 25 %, whereas the other size categories were relatively unchanged. The gap between ideal and reality was still gigantic - but the gap was also the potential for change, with regard to structural rationalization and accompanying reduction of the number of smallholders. Before continuing the analysis of the 1950s Swedish farming, its inputs and outputs, the claimed stagnant total Swedish output will be considered in an international perspective.

Stagnant output, unique in an international comparison

As highlighted in the introduction Swedish agriculture appears to have held a unique position among the industrialized countries, unique in that the total agricultural production did not increase significantly in the 1950s. The same message is indicated in Table 3, where the total Swedish farm production is compared with Western Europe and North America. After an increase in the late 1940s Sweden seems to have reached a plateau, whereas the increases continued in Western Europe and North America.

Table 3. Total farm production (shadowed) and production per capita in Western Europe (including Sweden), Sweden, and North America. Index 100 = 1934/39.

Source: SOU 1966:30, p. 35f, with reference to FAO statistics.

	1934/38		1948/53		1953/58		1958/63		1960/61	
	Total	Per capita								
Western Europe	100	100	105	96	126	110	141	110	144	122
Sweden	100	100	111	99	106	94	110	91	110	91
North America	100	100	139	116	152	124	168	148	168	146

A similar Swedish deviation, compared with other European countries, has been observed by Miguel Martín-Retorillo and Vicente Pinilla (2012) as regards changes in factors of production and TFP (total factor productivity) 1950-62. Table 4 shows the Swedish case in

¹⁷ Statistical Yearbook of Agriculture 1970, Table 2, p. 47 and SOU 1946:42, p. 140. According to official statistics 26% of the total Swedish arable land was on lease in 1951 and 29% in 1961. The figures include both whole farms on lease, and additional lease. The proportion between these can, according to the statistics, very approximately, be estimated to 50/50, which means that the average acreage may have been 12-14 % larger. For example, a 10 hectare farm cultivated in average just above 11 hectares. (Statistical Yearbook of Agriculture 1970, Table 1, p. 45).

comparison with average changes in 16 other European countries.¹⁸ Together with Table 4, Table 4 strengthens the indications about stagnant production in Sweden during the 1950s.

Table 4. Changes in factors of production and TFP 1950-62.

Source: Miguel Martin-Retorillo and Vicente Pinilla (2012), Table 8, p. 21. (Referred to with kind permission of the authors).

	Output	Labour	Land	Capital	TFP
Sweden	-0.31	-3.11	-0.71	+3.37	+0.19
European average	+2.88	-2.57	-0.02	+6.51	+2.09

To sum up this far, Part I shows that the large-scale societal changes in Sweden after the end of World War II went towards increased urbanization and industrialization while farming was urged to reduce labour, improve efficiency in methods of production, and to speed up the structural rationalization. It is argued that Sweden by that time had good margins as regards food supply, especially in relation to Sweden's explicit purpose to produce for the domestic market, neither more, nor less.

PART II: OUTPUT OF CROPS AND ANIMAL PRODUCTS

In the next following part the Swedish output of crops and animal products will be examined in more detail, to find out if the unchanged total production is the result of increases and decreases, or if there seems to have been general tendencies of stagnation. The decision to begin with outputs rather than inputs is due to the need to convince about stagnant output before it is interesting to seek for explanations in the use of inputs. The major interest is paid to output quantities, whereas the study bypasses aspects on quality improvements.

Crop yields in the 1950s

Initially, attention will be drawn to the total output of the major bread grains: winter wheat, spring wheat and winter rye.¹⁹ As can be seen in Figure 1 the total production of bread grains fluctuated over the years, with a minimum of 652 000 tonnes (1951) and maximum of 1322 000 tonnes (1954). The trend was however maintained around 1000 000 tonnes, although a slight increase can be distinguished.

¹⁸ Martin-Retorillo & Pinilla 2012, Table 8 p, 21.

¹⁹ Spring rye was marginally grown by this time, roughly about one per cent of the total bread grain production, and has therefore been excluded.

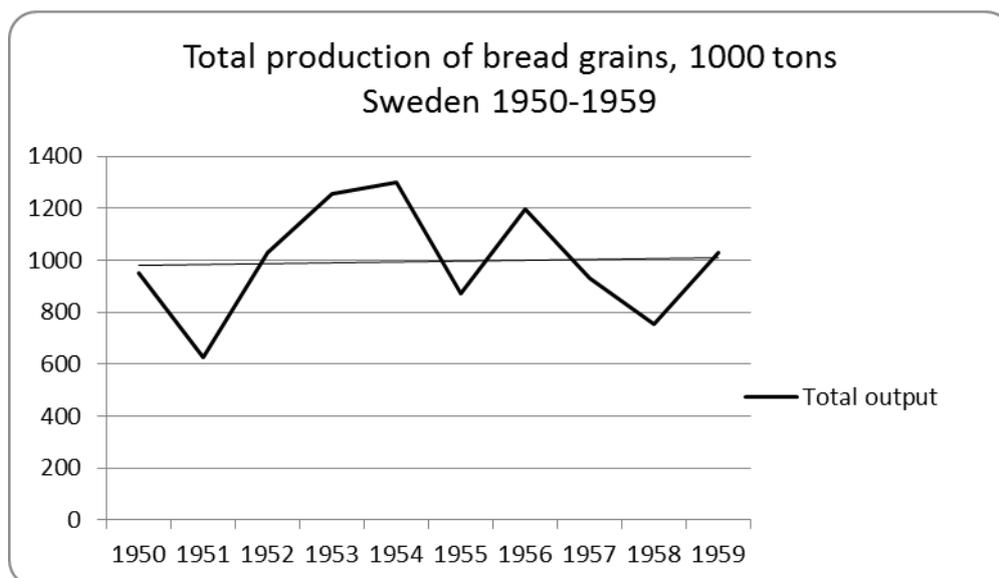


Figure 1. Total production of bread grains in Sweden 1950-1959, 1000 tons.
Source: Statistical Yearbook of Agriculture 1970, Table 62, p. 169.

The horizontal trend in Figure 1 may however conceal differences between the various crops. Figure 2 thus illustrates the yields of the different kinds of bread grains, plus the total yield of bread grains (the upper double graph, which includes the graph in Figure 1). As an exception from the focus on the 1950s, the figure presents the total production between 1935 and 1962. The extended time period in Figure 2 is justified because it is also interesting to get an idea about levels of production before, during, and after the war-crisis years. According to the previous text Figure 2 includes a time when the production to great deal was based on horse power and fertilizing with animal manure. It should be added that the harvests of 1938 and 1939 are known as very favourable and may give an overly positive impression of the second half of the 1930s.²⁰

According to Figure 2 the long-term trends were positive for winter and spring wheat but about unchanged for winter rye. As wheat dominated over rye, the total production increased slightly over time, from about 900 000 to 1100 000 tonnes from 1935 to 1962. The contemporary population increase was however stronger, more than 20 per cent, which meant that the production per capita was reduced also in this longer perspective. The same was true for the 1950s, when the Swedish population increased almost 6 per cent while the average bread grain production was about unchanged, well in line with Table 3 in Part I.

²⁰ Official statistics of agriculture and animal husbandry, yearly publications.

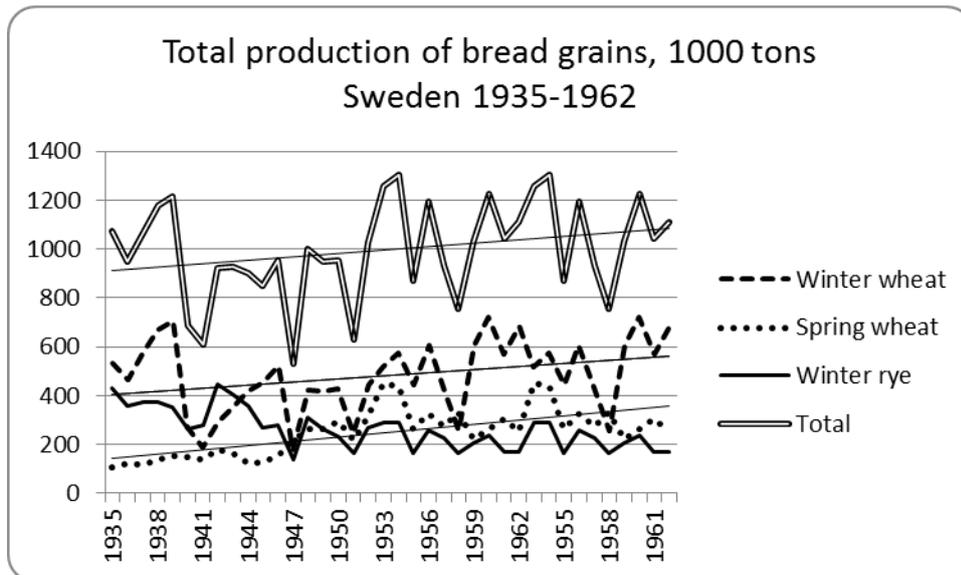


Figure 2. Production of major bread grains in Sweden between 1935 and 1962. The upper line shows the total production of which 1950-1959 coincides with the graph in Figure 1. Sources: 1935-1944: Official agricultural statistics, yearly publications; 1945 - 1962: Statistical Yearbook of Agriculture 1970, Table 62, p. 168.

As the total production is the result of cultivated areas and yields per hectare the almost unchanged total production in Figures 1 and 2 might be explained by increased yields per hectare in combination with reduced acreage. According to Table 5 in Part III the arable area declined almost 10 per cent between 1951 and 1961 which, in the Swedish authorities' perspective, gave room for some increases in yield per hectare without higher total production. It is therefore surprising to find that the hectare yields increased modestly, or hardly at all. As shown in Figure 3 the trend line for winter wheat shows approximately 10 per cent increase, from about 2 400 to by 1950 and about 2 650 kilo per hectare by the end of the decade.²¹ Spring wheat, the dotted line in Figure 3, increased slightly, winter rye rose marginally, and spring rye was unchanged.

²¹ Morell 2001, p. 212 shows winter wheat yields per hectare 1870-1990 as five year averages. Morell's graph over the 1950s coincides with Figure 3 in this paper, although five-year averages give a slightly different slope.

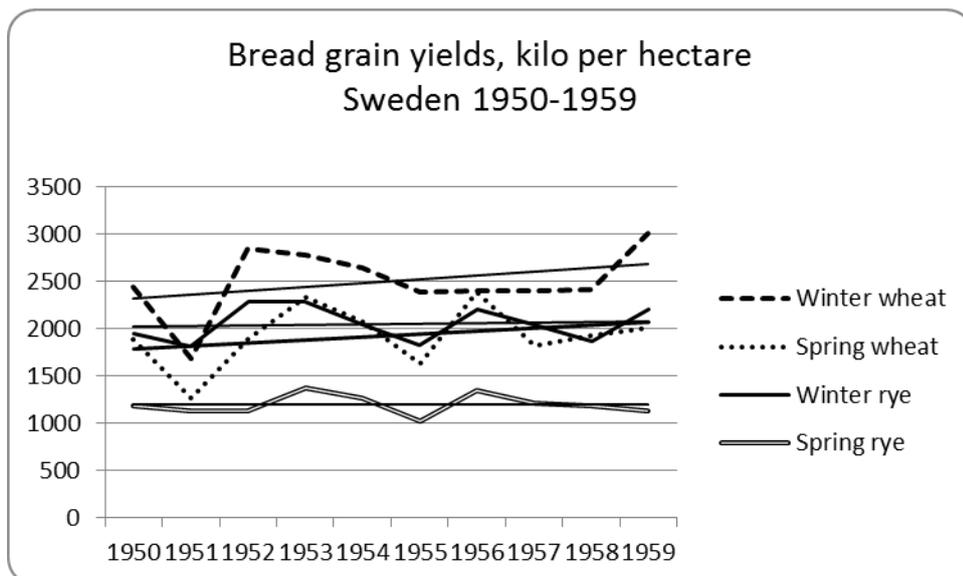


Figure 3. Hectare yields of winter and spring forms of wheat and rye, Sweden 1950-59.
Source: Statistical Yearbook of Agriculture 1970, Table 61, p. 155.

Among many possible reasons for the different trends for wheat and rye it is suggested that wheat was less complicated to breed and thereby made more rapid progress in comparison with rye. The increased hectare yields of wheat in the 1950s were however accompanied by unchanged or slightly reduced hectare yields of oats and barley, primarily feed grains, and by substantially declined hectare yields of hay from arable land, Figure 4.

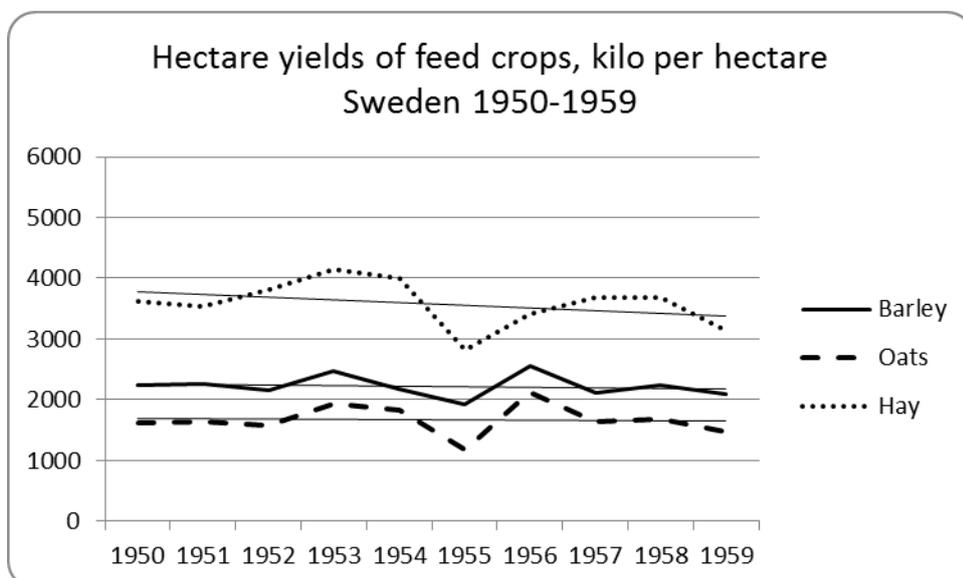


Figure 4. Hectare yields of barley, oats and hay, 1950-59.
Source: Statistical Yearbook of Agriculture 1970, Table 61, p. 155.

It is suggested that the decreased average yields of hay in Figure 4 were not due to constant failures but rather explained by earlier harvests in order to obtain more protein per hectare, on expense of the amount of hay. Moreover there may have been increased interest in a second harvest, which required an earlier and thereby smaller first harvest.²² Such improvements may have been implemented as a result of the state-financed advisory service that was part of the 1947 agricultural programme. As about one third of the total arable area was used for hay the reduced hectare yield had substantial impact on the total Swedish production and may, so to say, have compensated for increases in wheat, grown at about 5 % of the arable area.²³

Output of animal products in the 1950s

The 1950s saw 20 % decline in the number of cows and an even greater fall in the number of dairy suppliers. These changes were closely connected with the general situation in Sweden, as described in Part I, and have often been seen as symbolizing the 1947 agricultural programme and modified succeeding programmes. The total milk volume sank almost in proportion to the fewer cows, from a very high level, close to 5 million kilo, to a still high level of 4 million kilo or about 530 litres per capita and year. Somewhat surprisingly the average yield per cow was almost unchanged, just below 3000 kilo per cow and year. Herds in official milk control increased some hundred litres however, illustrated by Figure 5.

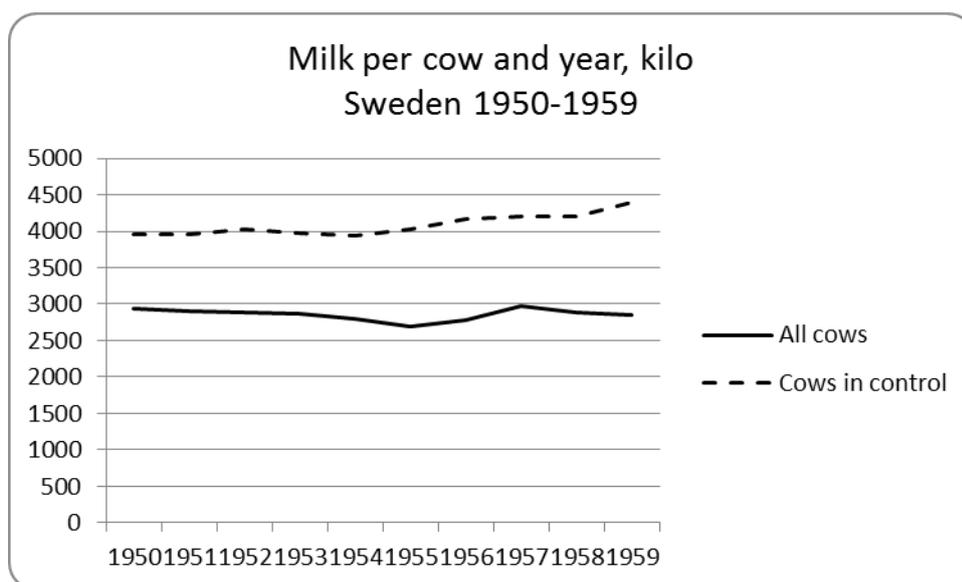


Figure 5. Average yields of milk per cow 1950-1959. The dashed line illustrates the yearly average yield for all cows and the solid line the yield for cows in official control.

Sources: Statistical Yearbook of Sweden, yearly publications; Statistical Yearbook of Agriculture 1970, Table 91, p. 235 and Table 105, p. 251.

²² The hay quantities in Figure 4 refer to the first harvest per season.

²³ Statistical Yearbook of Agriculture 1970, Table 49, p. 127.

The reasons for lack of increased output in dairy farming were, it is suggested, of another character than in arable farming. Whereas crop cultivation experienced far-reaching changes in the use of inputs, dairy farming was generally a step behind and to great deals based on similar principles as in the 1930s and 1940s. Breeding was generally based on local bulls, relatively nutrient-poor roughage was fed in large amounts, and the average use of imported feed per cow was at similar level as in the late 1930s.²⁴

While grains, hay and milk exhibited modest or no increases in the 1950s, the picture was different as regards meat from cattle and pigs, of which especially the latter increased largely. This is demonstrated in Figure 6 that also includes stagnant or reduced quantities of meat from calves, horses and sheep. The lack of increases in these categories can be related to various kinds of the contemporary societal changes.

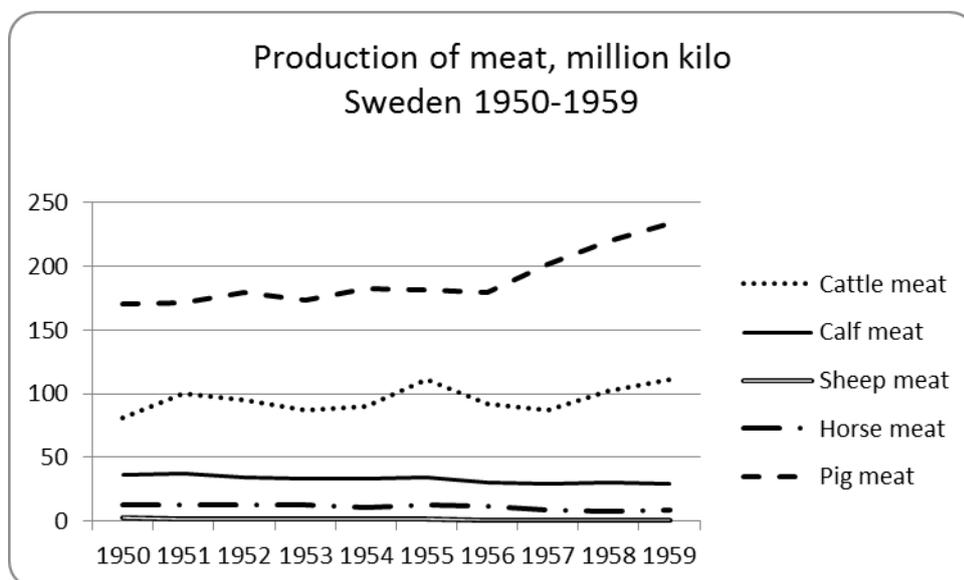


Figure 6. Meat production in Sweden 1950-1959.
Source: Statistical Yearbook of Sweden 1955 and 1963.

Like the major kinds of meats, the production of eggs experienced an upward trend in the 1950s. The about 17 % increase was even high enough to compensate for the contemporary population growth, and to increase the supply from 12 to 13 kilo per capita and year.²⁵

Concluding Part II, the claims about stagnant or even reduced Swedish farm output appears relevant with regard to rye, barley, oats, hay, milk and some meats, whereas the 1950s saw

²⁴ As regards feed concentrates, see *Jordbruksekonomiska meddelanden* 1965:5. pp. 151-172.

²⁵ *Statistical Yearbook of Agriculture* 1970, Table 124, p. 270.

increases outputs of winter and spring wheat, pig and cattle meat, and eggs. The absence of increased production at national level does, of course, not exclude improved yields at some individual farms.

PART III. CHANGES IN THE USE OF INPUTS

The 1950s Swedish farm output apparently seems to have been relatively unchanged, surprisingly unchanged. This takes the study to a next stage, to find out if the input side was unchanged too, if farming was stagnant as a whole – despite the 1947 agricultural programme and the rapidly changing society – or if and if so, how, Sweden combined stagnant output and changes in the use of inputs. The continued study is structured in terms of land, labour and capital factors, and seeks changes such as: altered proportions between factors of production, typically between labour and technologies; changes in input quantities, such as fertilizers; and expanded use of more or less new technologies, exemplified by tractors and pesticides.

Land

According to the early postwar agricultural politics reduced total acreage was considered a possible means to hamper eventual increases in total production. In line with this, the total arable area declined 9.6 % between 1951 and 1961, of which 1.3 % during the first half of the decade and as much as 8.3 % during the latter half.²⁶ Farmers were not explicitly forced to stop cultivating, except in case of expropriation, but there is no doubt that the authorities' impact was huge, based on various economic instruments and the legislative framework about generation shifts and state pre-emptive rights that accompanied the 1947 agricultural programme. Table 5 shows the changes in arable and pasture land and that the decline of pasture land was even more dramatic, almost halved. Much of the former pasture was probably turned to forest land.

Table 5. Changes in arable and pasture areas, Sweden 1951, 1956 and 1961. (The published figure for pasture was the same in 1951 as in 1944.)

Sources: Arable land: Statistical Yearbook of Agriculture 1970, Table 49, p. 127; Pasture land: Yearly published official agricultural statistics.

Year	Arable land, hectare	Pasture land, hectare
1951	3 647 287	942 130
1956	3 597 939	723 950
1961	3 296 418	510 746

²⁶ Statistical Yearbook of Agriculture 1970, Table 49, p. 127.

According to the authorities' view, the almost ten per cent decline in arable land allowed for some increases in yield per hectare, without increasing total production. A similar effect was obtained by fallow. In spite of artificial fertilizers and pesticides, the area of fallow land increased slightly in the fifties, from just below to just above 5 per cent of the arable area.²⁷ An idea to possible explanation is that fallow still can have been considered as obligatory in a good crop rotation plan, and that such a model can have been least as widely applied in the 1950s as in the 1930s and 1940s.

The Swedish case differs in comparison with Europe in general as regards changes in arable area. In Sweden large-scale reduction of the total arable acreage began in the 1950s, even in the late 1940s, while corresponding processes started in the 1960s in Europe in general.²⁸ The difference in time can be seen a logic consequence of Sweden's favourable situation with high degree of self-sufficiency since the 1930s and the ability to focus on industrial and urban expansion directly after World War II, while other countries had to deal with another reality.

Labour

The labour factor paid frequent attention in the 1947 agricultural programme where it stands out as a major driving force for agricultural and rural change. The then large number of people in farming was considered an important source of labour that was supposed to be released from farming and moved to other sectors in the Swedish economy.

The arguments for reduced labour in farming referred to a combination of different circumstances, although some aspects were imagined rather than reality when the so called 1942 Agricultural Committee looked into the crystal ball and drew up what would become the 1947 agricultural programme. First, low birth rates in the 1930s would mean that few young people entered the labour market in the 1950s. Second, the expected expansion of the Swedish economy would increase the general demand for labour. Third, the political ambitions for improved welfare among farmers were considered as possible only if the farm labour force was reduced.²⁹ A fourth, later experienced argument was the rapidly increasing wage levels in other sectors that made farm labour increasingly expensive and rising faster than incomes and other costs of production in agriculture. As example average wages for farm labour increased from 1:91 per hour in 1950 to 3:74 in 1958 and from 2:73 to 6:62 for factory work.³⁰ The predominance for family farming did however reduce the direct exposure for increased wages, although a farmhand or two could be found even at relatively small farms.

²⁷ Statistical Yearbook of Agriculture 1970, Table 49, p. 127.

²⁸ Martín-Retorillo & Pinilla 2013, p. 9.

²⁹ SOU 1966:30, p. 251.

³⁰ Statistical Yearbook 1960, Table 237, p. 196.

In terms of goal achievement the political aim to reduce farm labour can be seen as a formidable success. As displayed in Figure 7, the number of people in farming was reduced more than one third within less than a decade, from nearly 870 000 to about 560 000 people over 15 years of age, including farmers, family members and hired labour.³¹

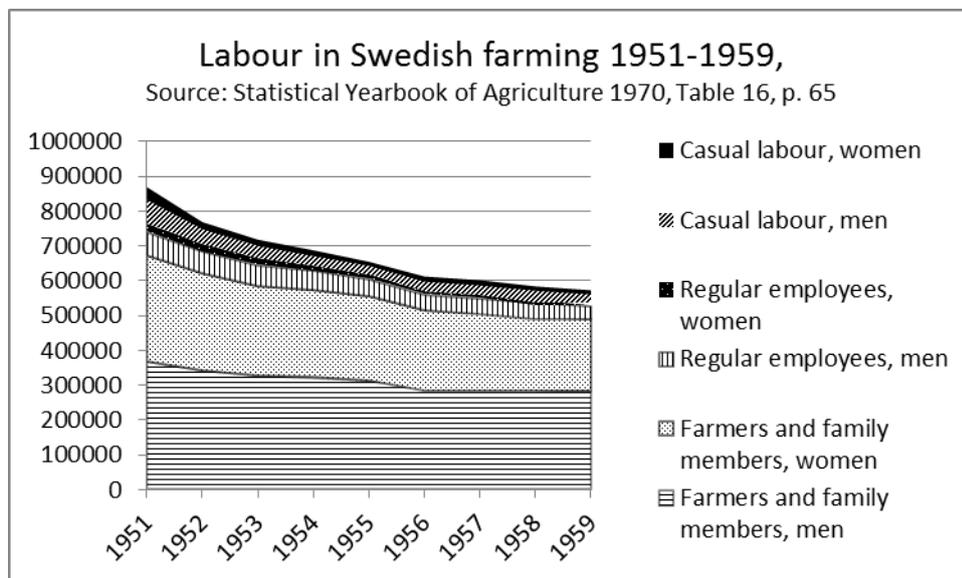


Figure 7. Number of people over 15 years of age, engaged at farms with more than 2 hectares, 1951-1959. Source: Statistical Yearbook of Agriculture 1970, Table 16, p. 65.

The two big fields at the bottom of Figure 7 illustrate farmers and family members, men and women respectively. The two next following strips show regular male and female employees and the two upper narrow strips represent male and female casual labour. There might have been some difficulties to specify tasks and working hours. This said, there is no doubt that farming engaged many people in the early 1950s, that parts of these came to serve as a labour-pool for other sectors, and that the combination of less labour and unchanged output meant increased production per worker and thereby also improved efficiency.³²

³¹ The statistics were basis of information about specific days. The number of days was increased over time, from one to two and then three days (Statistical Yearbook of Agriculture 1970, p. 64.). The total Swedish population was 7.04 million people by 1950, of which 1.65 million below 15 years of age (Statistical Yearbook of Sweden).

³² The released work force was substantial but not always enough to cover the general needs. Sweden welcomed many immigrants to be employed in various industrial sectors. Between 1951 and 1959 the net immigration was 95 000 people of which 65 000 from Finland (Statistical Yearbook 1961, Table 36.).

The decrease in farm labour was not evenly distributed between the farm size categories. Between 1954 and 1959 the male workforce was reduced 24 % and the female 29% at holdings with 2-5 hectares, whereas the decline was only 8% men and 11% women at farms with 10-20 hectares.³³ The reduction was again higher at larger farms, for example 18 % men and 15 % women at farms with 50-100 hectares. The picture is however nuanced when considering the concurrent reduction in number of farms: 24 % (2-5 hectare) 10 % (10-20 hectare) and 0 % (50-100 hectare). As shown in Table 6 the number of men and women was maintained or even slightly increased at farms with 2-5 and 10-20 hectares, respectively, whereas the workforce decreased at 50-100 hectare farms, primarily the number of men.

Table 6. Workforce at farms in three different size categories, 1956 and 1961.

Sources: Statistical Yearbook of Agriculture 1970, Table 2, p. 46 and Table 17, p. 66.

	2-5 hectare		10-20 hectare		50-100 hectare	
	1956	1961	1956	1961	1956	1961
Workforce	154 570	120 300	142 170	131 290	23 670	20 650
Farms	87 554	66 635	59 561	53 446	5 373	5 410
Men	0.98	1.01	1.40	1.44	3.42	2,88
Women	0.79	0.79	0.99	1.02	0.99	0.94
Workforce per farm	1.77	1.80	2.39	2.46	4.41	3.82

The reduced average number of people in the category 50-100 hectares was logic because of their possibilities to reduce the labour force, due to mechanization or other changes, and still have a functional workforce. At small farms a decline could mean no people at all - especially in family farming labour is far from a fully divisible resource. Moreover gender patterns and other structures have to be taken into account. The average number of men and women in Table 6 is seldom below one which indicates a labour force with one man and almost one woman, for example a married smallholder couple. One can also imagine a 10-20-hectare farm run by a married man and woman, plus one full- or part-time employed man. A similar pattern is also suggested to have been common at larger farms, a pattern with a married man and woman plus a number of employees, usually men.

If the statistics provide the true picture, the political efforts to release people from farming appear to have been most relevant with regard to the relatively few numbers of large farms, less than 7 % of all farms had more than 30 hectares arable land (excl. lease) and not even 3 % had more than 50 (excl. lease).³⁴ Most of the released labour is however suggested to have been the result of reduced number of smallholdings, through which all adult household

³³ Statistical Yearbook of Agriculture 1970, Table 17, p. 66. This information is not available before 1954.

³⁴ Statistical Yearbook of Agriculture 1970, Table 2, p. 46 f.

members could be made available for other businesses. This suggestion probably deviates from common beliefs about fewer and fewer people, also at those small farms that remained.

Concluding Part III this far, the 1950 experienced about one tenth decline in arable land and up to as much as one third in farm labour. It is shown that the average number of people per farm was reduced at larger farms where parts of the staff could be replaced by machinery, but hardly at smallholdings where it was difficult to get rid of the farmer him/herself. The difficulties to replace people by machinery in smallholder farming did not mean that mechanization did not materialize, which is discussed in the following section.

Capital

Neither tractors and harvesters, nor artificial fertilizers and (some) pesticides, were newcomers in the Swedish fields, but they were not fully established until after the war.³⁵ By then their existence and functions as timesaving technologies came to be clearly related to aims and ideas about rational and modern farming. As Paul Brassley discusses, inputs of capital factors can be distinguished in terms of labour saving (exemplified by tractors and milking machines) and output increasing (exemplified by seed varieties, fertilizers and feed).³⁶ The different kinds of capital inputs that are discussed below can theoretically be considered as either or both of these categories. Swedish farming of the 1950s referred to machinery as labour saving, but also fertilizers were primarily given the function to save labour, rather than to increase yields. This was also true for pesticides in their role to replace manual weeding.

None of these technologies were for free, and especially the machinery brought about high investments and accompanying debts. According to the previous reasoning about labour saving one cannot take for granted that these costs were covered by saved labour. This was also observed by the authors of the official investigation SOU 1966:30, who stated that machinery investments had often brought about over-capacity and a disharmonious production apparatus with inadequate proportions between land, labour and (fixed) capital.³⁷

The following reasoning about capital inputs is limited to mechanization, fertilizers and pesticides, although the list could have included several other kinds of investments and purchases, for example: farm buildings, electricity, improved seed varieties, milking machines, minerals and vitamins for the animals, cleaning agents, and barbed wire. The list reflects that the 1950s was a decade of commodification, a decade when flows of commercial

³⁵ As regards time gaps between introduction and general use, see Brassley (2000).

³⁶ Brassley 2000, p. 71.

³⁷ SOU 1966:30, p. 182f.

commodities reached Swedish farming.³⁸ Many or even most inputs were supplied by the strong Swedish producer cooperatives that, besides, probably had considerable impact on the range of products and how these were marketed to the farmers.

Tractors and other machinery

The 1950s was the break-through decade for Swedish tractorization, as in Europe.³⁹ The largest relative increase took place at smaller holdings, whereas many of the comparably few larger farms had been tractorized during the interwar period or in the 1940s. As shown in Table 7 and Figure 8 the number of tractors more than doubled between 1951 and 1961, after which the expansion was phased out in the 1960s, at least temporarily.⁴⁰

Table 7. Total and average number of tractors at farms of different size, 1951 and 1961. Sources: Statistical Yearbook of Agriculture 1970, Table 2, p. 46 and Table 34, p. 96.

Arable land, ha	1951			1961		
	No. of tractors	Total no. of farms	Tractors per farm	No. of tractors	Total no. of farms	Tractors per farm
2,1-5,0	2 424	95 945	0.03	10 147	66 635	0.15
5,1-10,0	7 783	89 755	0.09	30 534	75 017	0.41
10,1-20,0	20 115	59 790	0.34	45 141	53 446	0.85
20,1-30,0	13 479	17 719	0.76	21 635	18 266	1,18
30,1-50,0	11 465	11 234	1.02	19 446	11 960	1.63
50,1-100,0	7 664	5 417	1.42	12 386	5 410	2.29
100,1-	6 362	2 325	2.74	8 956	2 186	4.10
Total	69 292	282 187	0.25	148 245	232 290	0.64

According to Table 7 the average number of tractors increased from about 0.25 to 0.64 per farm within the decade. In 1961 farms with more than 20 hectares of arable land had more than one tractor in average. Least as interesting are the 40 000 tractors that were found at holdings with less than 10 hectare arable land in 1961. This indicates tendencies of over-tractorization in smallholder farming, where small areas and even smaller fields made it difficult to utilize the investments efficiently, although some lease might have increased the usage.⁴¹ As regards tractors per hectare the Swedish average was high in an international

³⁸ Mirrored in advertises and articles in *Lantmannen*; Martín-Retorillo & Pinilla 2013, p. 12.

³⁹ Martín-Retorillo & Pinilla 2013, p. 13.

⁴⁰ Statistical Yearbook of Agriculture 1970, Table 34, p. 96. The official statistics does not distinguish between individually and joint owned machinery. It is however relevant to assume that comparatively few tractors were jointly owned, compared with for example harvesters.

⁴¹ SOU 1966:30, p. 182.

perspective; 0.0196 tractors per hectare in 1951 and 0.044 in 1961, to compare with a lower Western European average of 0.009 tractors per hectare in 1950 and 0.034 in 1970.⁴²

In line with previous comments about over-mechanization of smallholdings, Figure 8 reveals that in 1961 the number of tractors per hectare was as highest at 10-20 hectare farms, and was about twice as high at small farms compared with larger farms, at which the acreage and field size can be assumed to have harmonized better with the capacity of one tractor.

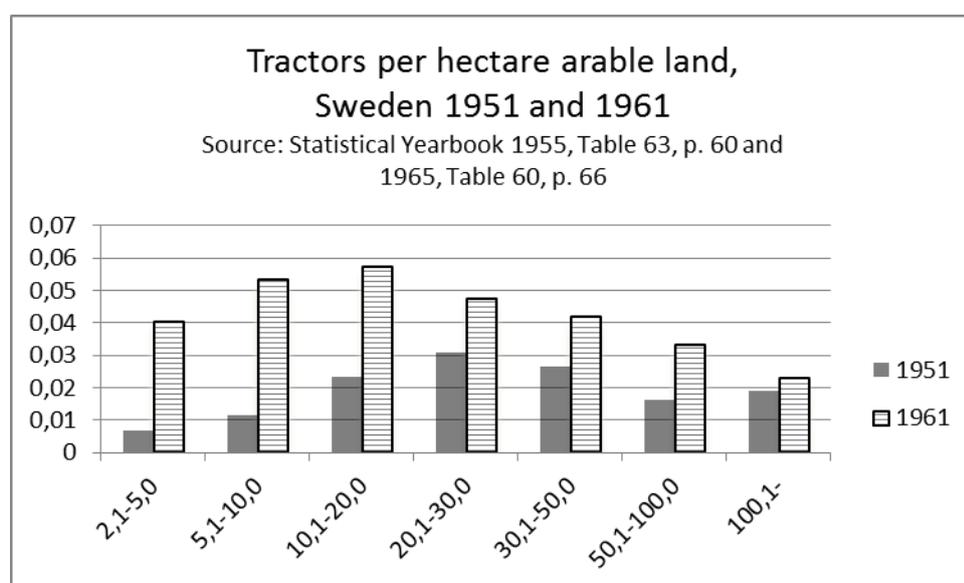


Figure 8. Tractors per hectare arable land at farms of different size. Sweden 1951 and 1961. Sources: Statistical Yearbook 1955 (Table 63, p. 66) and 1965 (Table 60, p. 66).

In line with Table 8 the bars in Figure 8 illustrate that in the 1950s the biggest changes took place at smaller farms. This meant comparably high machinery costs for smallholders, who had difficulties to compensate for these costs through reduced number of people. Reflections about these issues were ventilated in the journal *Lantmannen*. In a comparison between costs per horse-hours and tractor-hours the author (manager of a big farm) concluded that the choice between horse and tractor first and foremost had to be due to the situation at the individual farm, and that the tractor was the best economic choice only at farms where it would be fully utilized.⁴³ Expenditures for tractors and other machinery were certainly taken into account in the aforementioned yearly price negotiations between the state, and farmers' and consumers' representatives. The final payments were, however, negotiated averages that did not always mirror the machinery costs at the individual farm. Figure 9 illustrates the increased machinery costs during the 1950s.

⁴² Federico 2005, p. 101.

⁴³ *Lantmannen*, 1950, p. 373f.

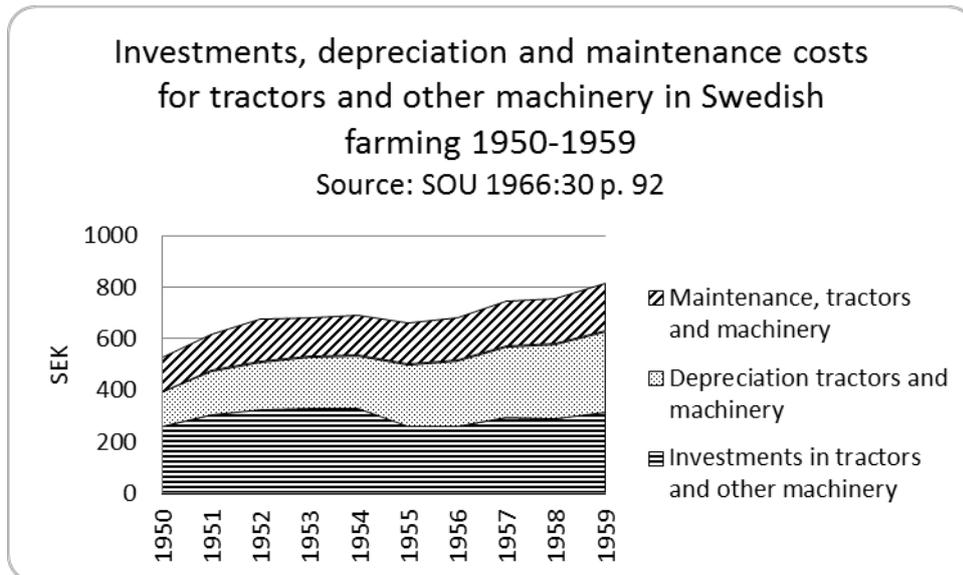


Figure 9. Farmers' machinery costs 1950 to 1959, including purchases, depreciation and maintenance costs. Million Swedish crowns (SEK) per year. Source: SOU 1966:30, p. 92.

The comparably high proportion of depreciation in Figure 9 can partly be explained by generous tax rules that could allow almost tax-free replacement of tractors and other machinery.⁴⁴ Once the initial investment was made it was economically attractive for the individual farmer to make frequent replacements and to build up a modern machinery park within a relative short period of time. This certainly also had an impact on the level of Swedish agricultural mechanization at large.

Fertilizers

As earlier said, the use of artificial fertilizer in the 1950s Swedish farming should not be considered in line with the classic understanding of nutrients as means to increase the production of food. In the Swedish case - with sufficient food, abundant of land and millions of manure producing animals - artificial fertilizer came instead to be seen as a comfortable, cheap, and first and foremost timesaving technology.

According to Table 8 the purchased amounts of N-fertilizer was about 80 % higher in 1959/60 than in 1949/50. The increase of K-fertilizer was about 60%, while the purchases of P-fertilizer were at the same level by the beginning and end of the decade.⁴⁵ As shown in Part

⁴⁴ Andersson & Nilsson, 1961, pp. 36-40.

⁴⁵ The use of artificial fertilizers can be supposed to have differed greatly at farm level in the 1950s, due to individual practices, regional differences, cultivated crops, the authorities' advisory measures, and access to plant nutrients through animal manure. Text book example of recommended fertilizing per hectare, as example:

II the extended purchases did not materialize in significantly increased yields of grains, which would have been the rule and also the driving force behind.

Table 8. Average purchases of artificial fertilizer in Sweden 1949/50 and 1959/60. Kilo substance per hectare arable land. N (nitrogen), P (phosphorous), K (potassium). Some of the nitrogen may have been spread in pastures, which makes it relevant to reduce the nitrogen figure, approximately not more than about a kilo.

Sources: Substances according to SOU 1974:35 p. 35; arable area according to Statistical Yearbook of Agriculture 1970, Table 49, p. 127.

1949/50			1959/60		
N	P	K	N	P	K
17	13	13	31	14	21

The increased fertilization but none or little increase in output leads back to the initial question of this paper: why did not the output increase when the inputs did? Questions like these were also made by contemporaries in the field. According to an article from 1953 the author explains the absence of increased yields as related to efforts to save time. Due to shortage of labour, the author wrote, farmers were especially short of time in spring and were no longer able to cope with the labour-requiring distribution of animal manure. Therefore the time table had been changed, so that the animal manure was spread in winter. This meant considerable losses of nutrients, because of melting snow etcetera, losses that to great extent were compensated for through spread of relatively cheaply purchased fertilizers.⁴⁶ Obviously, efforts to save labour appear to be part of the answer to this paper's question about stagnant outputs but increased inputs.⁴⁷

Another nutrient related issue goes in the same direction, namely increased waste of nutrients because of reduced investments in storage facilities for manure and urine, through which the nutrients could be better cared for, illustrated by Figure 11. The decline may, it is suggested, be related to altered priorities in favour of machinery investments, and can have been

winter wheat 70 kilo, oats 50 kilo, grass and clover 60 kilo, oil seeds/rape seed 115 kilo, sugar beets 110 kilo (Bengtsson & Kristiansson 1943, reprinted 1966, p. 208).

⁴⁶ *Lantmannen* 1953, p. 205. The author may have referred to large farms with reduced number of employees (in line with the previous discussion about labour), but even smallholders can have welcomed artificial fertilizers as a labour-saving technology. Other similar articles in *Lantmannen*, among others: 1950, p. 324 f.; 1951, p. 946 ff.; 1953, pp. 197-199 and 205; 1954, p. 823; 1955, p. 717 f.; Textbook example: Bengtsson & Kristiansson (1943, 1966) pp. 60 and 70. In addition, one can expect earlier seeding time without having to handle the manure just before.

⁴⁷ Articles in *Lantmannen*, among others: 1950, p. 324 f.; 1951, p. 946 ff.; 1953, pp. 197-199 and 205; 1954, p. 823; 1955, p. 717 f.; Bengtsson & Kristiansson (1943, reprinted 1966) pp. 60 and 70.

supported by the aforementioned possibilities to replace nutrient losses through cheap purchases.

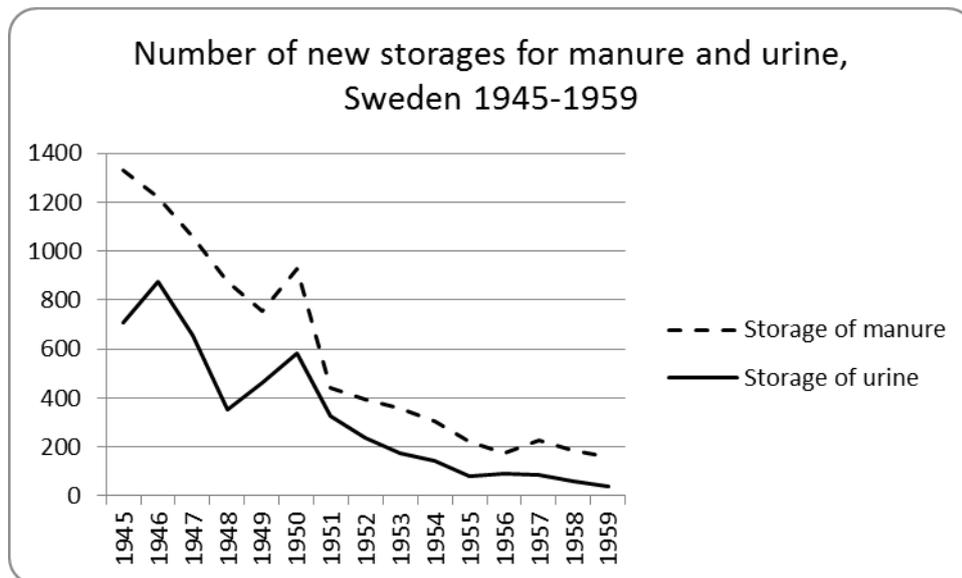


Figure 11. The decline in new storage for manure and urine, 1945-1959.

Source: Statistical Yearbook of Agriculture 1970, Table 28, p. 84.

The waste with nutrients was, among others, criticised by Sven L. Jansson, later professor in plant nutrition at the Swedish Agricultural College (now the Swedish University of Agricultural Sciences), who expressed his scepticism about the wasteful handling with the nutrients. Jansson was also critical to the political pressure that urged scientists to develop and push for labour saving farming methods on expense of economizing with nutrients.⁴⁸

In addition to the direct motives for increased use of artificial fertilizers it is also suggested that this was a way to be a modern farmer, efficient and skilled, and rapidly distributing the fertilizer. This could also be observed and appreciated by advisors at the agricultural county boards in be important for future investments and other efforts to manage the farm in line with the 1947 agricultural programme.

Whereas the 1950s use of fertilizers was chiefly a matter of expanded use of an already known technology, the use of pesticides was more of a new part of agriculture, even though earlier known and practiced on a relatively small scale. Like fertilizers, pesticides were also considered as a labour saving technology, rather than their more common international roles to increase the production.

⁴⁸ Lantmannen 1955, p. 718

Pesticides

The use of pesticides in Sweden was more or less at an experimental stage in the 1930s, and was then promoted by the authorities during the war-crisis years, for example in order to safeguard the production of potatoes. According to articles and debates referred to in *Lantmannen* the Swedish agricultural market was more or less flooded by new kinds of pesticides from the USA after WW II, such as 2-4 D. As can be seen in Figure 12 there was a peak by the mid-1950s after which the total purchased quantities were somewhat reduced.

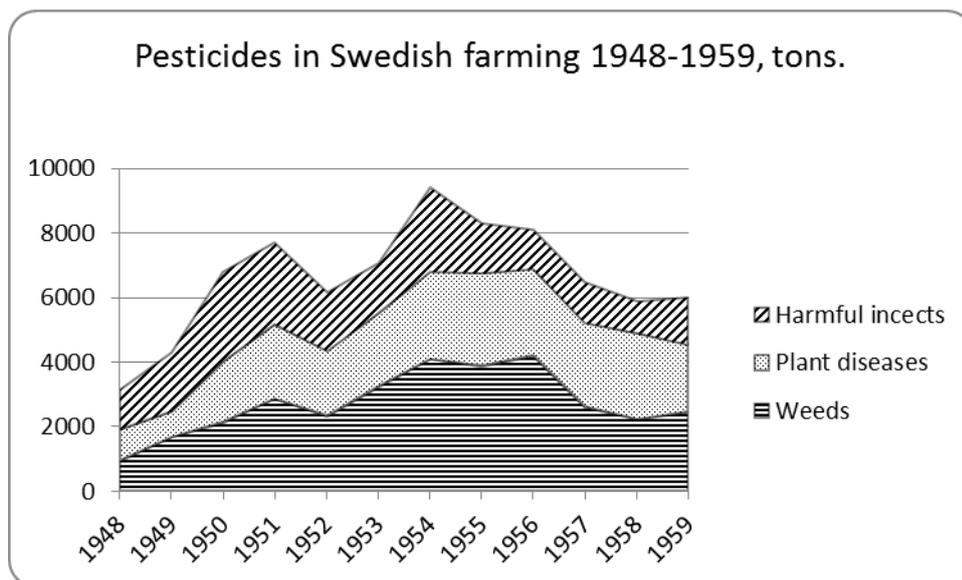


Figure 12. Purchased pesticides in Swedish agriculture (horticulture has been excluded), 1948-1959, tons. Figures for pesticides against plant diseases include treatment of seed. Source: Statistical Yearbook of Agriculture 1970, Table 47, p. 110.

The increased use of pesticides was intensively discussed in *Lantmannen*, criticised for being used without distinguishing the needs, for eventual toxicity, and for flooding the market. It is interesting to note this scepticism against pesticides, long before Rachel Carsson's "Silent Spring" (1962). It is even more interesting to find a debate on this topic at the traditional yearly event *Lantbruksveckan* in 1955 (The agricultural week), and that the pioneering scientist and author Georg Borgström was part of the panel. During this debate the head of the National Plant Protection Institute (*Statens Växtskyddsanstalt*), Bror Tunblad, claimed the difficulties to estimate the gains of these products and claimed, somewhat frustrated, that many people seemed to have got a blind faith in chemicals, expecting chemicals to manage almost all kinds of cultivation problems and assessing farmers' skills in terms of how many times the fields are sprayed, rather than considering the final harvest.⁴⁹

⁴⁹ *Lantmannen* 1955, p. 338.

Concluding Part III with regard to machinery, fertilizer and pesticides: Sweden was rapidly tractorized, also at small holdings which meant increased costs but not always optimal utilization of the technology. Artificial fertilizers were to substantial extent seen as a labour saving technology that made it possible to save labour. Moreover access to cheap fertilizer opened for more wasteful handling of animal manure, including nutrient losses and increased leakage. Similarly, pesticides were also considered a way to save labour, for example timewasting weeding, in spite of the fact that critical voices were heard, and that the authorities did not always seem to have this market under control.

CONCLUDING DISCUSSION

The text outlines a somewhat wasteful picture of the 1950s Swedish agriculture. It was a time when farming was given new roles and was urged to take active part in the societal transition towards an increasingly urban and industrial based welfare state. According to the 1947 agricultural programme farming was now expected to deliver not only food and fibre, but also labour for other sectors, plus material welfare to efficiently operated farms.

The possibility to impose such requirements on agriculture was due to the combination of factors such as: safe and sufficient domestic food supply both before and during the war; access to plenty of arable land and comprehensive animal production; well-developed contacts between farmers' representatives and the government; social stability in the countryside. These circumstances created a rural potential that could be exploited for urban and industrial expansion and for the general development of the Swedish welfare state. The ability to materialize this potential was closely related to a most favourable situation after the war when Sweden, unhurt and undamaged, was able to take advantage of fossil energy, machinery and other labour-saving technologies.

Sufficient level of production was already obtained and increased production was anything but welcome - surpluses would lower the price paid to farmers and thereby hinder political ambitions for improved material living standard in the farm households. Accordingly, Sweden feared more for eventual surpluses already in the 1940s when the 1947 programme was outlined, despite the opposite situation in most of Europe.

In the words of the authorities the way forward for Swedish agriculture required both gas and brake at the same time, although without specifying exactly how. This paper makes an effort to understand this combination of stimulating and hampering of Sweden's farm production in the 1950s, primarily by searching for changes in major kinds of outputs and inputs. According to the study the quantitative total and per hectare output of rye, barley, oats, hay, milk and some meats was actually stagnant or even reduced, whereas the 1950s saw increased output of winter and spring wheat, pig and cattle meat, and eggs.

Farming methods were however far from stagnant in the 1950s. On the course of the decade the number of tractors increased more than ever, and was more than doubled. Purchases of nitrogen and potassium fertilizer rose 80 % and 60 % respectively, and the purchases of pesticides can be described as doubled. At the same time the arable acreage was reduced about one tenth, the farm labour about one third, and the number of smallholdings almost one fourth.⁵⁰

In addition to these imbalances between inputs and outputs this paper highlights that the 1950s reduction of farm labour in primarily seems to have taken place at large farms with several employees, whereas the average workforce appears to have been unchanged or even slightly increased at maintained smallholdings. The paper thus indicates that major parts of the reduced labour force in farming was due to abandoned smallholdings, rather than adopting of labour saving technologies in active farming. In spite of this, far-reaching capitalization took place in smallholder farming in the 1950s, indicated by extensive tractorization. As regards the fact that the increased fertilization did not result in significantly increased grain yields, part of the explanation is found in the more wasteful but labour-saving handling of manure that was compensated for through purchases of cheap artificial fertilizer. As a whole the paper outlines Swedish farming in the 1950s as a time of transition when farming was urged to produce the same of the same although in a modern, labour saving way.

LITTERATURE⁵¹

Ahlqvist, C., Nordström, A., Skarin Frykman, B. (eds.) 2012, *Vardagsliv under andra världskriget: Minnen från beredskapstiden i Sverige 1939-1945*. Göteborg: Institutet för språk och folkminnen.

Andersson, K.O. & Nilsson, F. (1961) *Deklarationshandbok för lantbrukare*, Stockholm: LTK förlag.

Bengtsson, G. & Kristiansson, S. 1966 (1st ed. 1943), *Gödsling och kalkning*, Stockholm: LTs förlag.

Brassley, P., Segers, Y., Van Molle, L. (2012) *War, Agriculture, and Food: Rural Europe from the 1930s to the 1950s*, New York: Routledge.

⁵⁰ When considering farms with 2-10 hectares as smallholdings.

⁵¹ Referred to and background studies

Brassley, P., 2000, Output and technical change in twentieth century British agriculture, in *Agricultural History Review*, Vol. 48 (I), pp. 60-84.

Bäcklund, D. (1988), *I industrisamhällets utkant: Småbrukets omvandling i Lappmarken 1870-1970*; Umeå: Umeå Studies in Economic History.

Carson, R. (1962) *Silent Spring*, Greenwich: Fawcett.

Dagens Nyheter, (1939, 1940 and 1945), selected volumes.

Domeij, Å. (2008) *Jordbrukets hållbarhet i ett historiskt perspektiv*, Uppsala.

Eriksson, F. (2004) *Det reglerade undantaget: Högerns jordbrukspolitik 1904-2004*, Stockholm: Santérus.

Erlander, T. (1976) *1955-1960*, Stockholm: Tidens förlag.

Erlander, T. (1974) *1949-1954*, Stockholm: Tidens förlag.

Erlander, T. (1973) *1940-1949*, Stockholm: Tidens förlag.

FAO (1950) *World Outlook and State of Food and Agriculture – 1950*, Washington.

FAO (1949) *The State of Food and Agriculture: A survey of world conditions and prospects*, Washington.

FAO (1948) *The State of Food and Agriculture 1948: A survey of world conditions and prospects*. Washington.

FAO (1947) *The State of Food and Agriculture: 1947*. Geneva.

Federico, G. (2005) *Feeding the World: An economic history of agriculture, 1800-2000*, Princeton and Oxford: Princeton University Press.

Flygare, I. & Isacson, M. (2003), *Jordbruket i välfärdssamhället, 1945-2000*, Vol. 5 of *Det svenska jordbrukets historia*, Stockholm: Natur och Kultur/LTs förlag.

Flygare, I. (1999) *Generation och kontinuitet: Familj jordbruket i två svenska slättbygder under 1900-talet*, Uppsala: Upplands fornminnesförening och Hembygdsförbund.

Gulbrandsen, O. & Lindbeck, A. (1971) *Jordbruksnäringens ekonomi*, Stockholm: Aldus/Bonniers.

Gulbrandsen, O. & Lindbeck, A. (1969) *Jordbruksnäringens ekonomi*, Stockholm: Industriens Utredningsinstitut and Almqvist & Wiksell.

Hansen, K. (1998) *Välfärdens motsträviga utkant: Lokal praktik och statlig styrning I efterkrigstidens nordsvenska inland*, Lund: Historiska media.

Hansson, P.A. (1945) *Svensk hållning och handling: Uttalanden under krigsåren*, Stockholm: Tidens förlag.

Hedlund, S. & Lundahl, M. (1986) Emergency considerations in Swedish agriculture: A retrospective look, in *European Review of Agricultural Economics* 13(1), pp. 89-105.

Hedlund, S. & Lundahl, M. (1985) *Beredskap eller protektionism? En studie av beredskapsmålet i svensk jordbrukspolitik*, Stockholm, Liber.

Hellström, G. (1976) *Jordbrukspolitik i industrisamhället – med tyngdpunkt på 1920- och 1930-talen*. Stockholm: LTs förlag.

Holmström, S. (1988) Svenskt jordbruk 1930-1987, in *Kungl. Skogs- o. Lantbruksakademiens Tidskrift*, Suppl. 20, pp. 281-305.

Jordbruksekonomiska meddelanden 1965:5.

Jørgensen, H. (2010) Neutrality and national preparedness: State led agricultural rationalization in cold war Sweden, in Lundin, P., Stenlås, N., Gribbe, J. *Science for Welfare and Warfare: Technology and State initiative in cold war Sweden*, Sagamore Beach: Science History Publications.

Lagerqvist, Christopher, 2008, *Kvarboende vid vägs ände: Människors försörjning i det inre av södra Norrland under svensk efterkrigstid*, Uppsala: Uppsala University.

Lains, P. & Pinilla, V. (eds.), (2009) *Agriculture and Economic Development in Europe since 1870*, Oxon: Routledge

Lantbruksstyrelsen (1967) *Regional fortbildningskurs i planering av det kombinerade jord- och skogsbruksföretaget*, (Course material for agricultural county boards).

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 Preliminary paper for the Rural History Conference in Bern 19-22 August 2013.
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Lantmannen, (1945-1960)

Martiin, C. (2012) Farming, Favoured in Times of Fear: Swedish agricultural politics, 1935-1955, in Brassley, P., Segers, Y., Van Molle, L. (eds.), *War, Agriculture, and Food: Rural Europe from the 1930s to the 1950s*, New York: Routledge.

Martín-Retortillo, M. & Pinilla, V. (2013) *Patterns and causes of growth of European Agricultural Production, 1950-2005*. <http://www.aehe.net/2013/01/dt-aehe-1302.pdf> (Accessed July 5, 2013)

Martin-Retorillo, M. & Pinilla, V. (2012), *European agriculture following World War two: Patterns and causes of growth, 1950-2005*.

http://www.unizar.es/departamentos/estructura_economica/.../Glasgow2.pdf (Accessed July 5, 2013)

Micheletti, M. (1990) *The Swedish Farmers' Movement and Government Agricultural Policy*, New York: Praeger.

Morell, M. (2001) *Jordbruket i industrisamhället 1870-1945*, Vol. 4 of *Det svenska jordbrukets historia*, Stockholm: Natur och Kultur/LTs förlag.

Myrdal, J. & Morell, M. (eds.) (2011) *The Agrarian History of Sweden: From 4000 B.C. to AD 2000*. Lund: Nordic Academic Press.

Myrdal, G. (1938) *Jordbrukspolitiken under omläggning*, Stockholm: Kooperativa förbundets förlag.

Ny tid över tegarna (1948) Film produced in order to encourage new methods of production and joint machinery investments in farming. Stockholm: SF film and Jordbrukets upplysningsnämnd.

Odhner, C.E. (1953) *Jordbruket vid full sysselsättning*, Stockholm: Kooperativa förbundets förlag.

Olsson, G. (red.) (1997) *Den svenska växtförädlingens historia: Jordbruksväxternas utveckling sedan 1880-talet*. Skogs- och lantbrukshistoriska meddelanden nr 20, Stockholm: Kungl. Skogs- och Lantbruksakademien.

Osterman, S. (1973) *Satt och osatt: Fyra decennier i och runt Jordbrukarnas Föreningsblad*, Stockholm: Land/LTs förlag.

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Preliminary paper for the Rural History Conference in Bern 19-22 August 2013.
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- SOU 1946:42 (1946) *Riktlinjer för den framtida jordbrukspolitiken: Betänkande avgivet av 1942 års jordbrukskommitté, Del I*, Stockholm: Ministry of Agriculture.
- SOU 1946:46 (1946) *Riktlinjer för den framtida jordbrukspolitiken: Betänkande avgivet av 1942 års jordbrukskommitté, Del II*, Stockholm: Ministry of Agriculture.
- SOU 1946:61 (1946) *Riktlinjer för den framtida jordbrukspolitiken: Betänkande avgivet av 1942 års jordbrukskommitté, Del III, Bilagor*, Stockholm: Ministry of Agriculture.
- SOU 1963:66 (1963) *Det svenska lantbrukets effektiviseringsvägar*, Stockholm: Ministry of Agriculture.
- SOU 1966:30 (1966) *Den framtida jordbrukspolitiken. Betänkande avgivet av 1960 års jordbruksutredning, A. Bakgrunden*, Stockholm: Ministry of Agriculture.
- SOU 1966:31 (1966) *Den framtida jordbrukspolitiken. Betänkande avgivet av 1960 års jordbruksutredning, B. Mål och medel*, Stockholm: Ministry of Agriculture.
- SOU 1974:35 (1974) *Spridning av kemiska medel: Betänkande angivet av utredningen om spridning av kemiska medel*) Stockholm: Ministry of Agriculture.
- Statistical Yearbook* (Official statistics of Sweden) Stockholm: National Central Bureau of Statistics.
- Statistical Yearbook of Agriculture* (Official Statistics of Sweden) Stockholm: National Central Bureau of Statistics.
- Swedborg, E. (1968) *Jordbrukspolitiken 1967: Bakgrund, riktlinjer, tillämpning*, Stockholm: LTs förlag.
- Tiderius, G. (1977) *Effekten av den statliga rationaliseringspolitiken*, Lund: Studentlitteratur.
- Tracy, M. (1982) *Agriculture in Western Europe: Challenge and response 1880-1980*, Granada Publishing: London.
- Trentmann, F. & Just, F. (2006) *Food and Conflict in Europe in the Age of the Two World Wars*, Hampshire and New York: Palgrave MacMillan.
- Åmark, K. (1952) *Kristidspolitik och kristidshushållning i Sverige under och efter andra världskriget*, (SOU 1952:49), Stockholm: Handelsdepartementet.

