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# BELGIAN AGRICULTURAL OUTPUT, 1812-1846[1]

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## INTRODUCTION

In this paper on Belgian agricultural output during the period 1812-1846, we distinguish three parts. In a *first part* we give a short description of the methodology and the sources used to calculate the early nineteenth century output. In the *second part* we come to actually calculating the production of arable crops, forestry and livestock products which results in a detailed database that represents Belgian agricultural output during the period 1812-1846. In the *third part* we give a short description of the most interesting aspects of the agrarian growth process during the first half of the nineteenth century and we also summarize the results of an extensive inquiry into the causes of the agricultural growth process during the first half of the nineteenth century.

## I. CALCULATING EARLY NINETEENTH CENTURY AGRICULTURAL OUTPUT: METHODOLOGY AND SOURCES

### *A. Methodology*

Ever since the publications of Kuznets and Deane and Cole on the economic performance of the American and British economies during

1. This article is an abridged version of my Ph.D. dissertation. M. GOOSSENS, *The Economic Development of Belgian Agriculture. A Regional Perspective.* (Koninklijke Academie voor Wetenschappen, Letteren en Schone Kunsten van België, Studies in Belgian Economic History, II), Brussel, 1992.

the pre-World War II period[2] economic historians of all over the world have accepted the framework of the national accounts as being the most appropriate tool to calculate the output of economies in historical perspective. In this system of national accounts the economic output of a country (Gross Domestic Product (GDP)) is calculated in a very systematic way, which means that the national figures are very well comparable. The increase of the GDP through time functions as an internationally accepted parameter for measuring the growth of the economy through time.[3]

In order to calculate Belgian agricultural output during the period 1812-1846, we fell back on the scheme as it was developed by the Belgian National Institute for Statistics (NIS) and which goes on its turn back on the methodology of national accounts as it was developed by the UNO.[4]

Outline 1 visualizes this calculation method of the agricultural production by the Belgian Institute for Statistics.[5]

The total production of the arable, the livestock, the forestry and the horticultural sectors forms the physical production of the agrarian sector: the real agricultural production at the end of year X. Correction for the inputs delivered by the agrarian sector itself (seeds and livestock feeds) gives the gross agricultural production. If one also does an abstraction of the external inputs not supplied by the agricultural sector (commercial fertilizers, seeds, livestock feeds and services) then one arrives at the gross added value against market prices or the agrarian product: the effective surplus value realized by the agrarian sector during year X. Finally, in the net added value against market prices,

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2. Among others S. KUZNETS, *Economic Growth of Nations. Total output and Production Structure*, Cambridge, 1971; Ph. DEANE and W.H. COLE, *British Economic Growth, 1688-1959: trends and structure*, Cambridge, 1962 and 1969[2]. Although economic historians of the so called revisionistic movement have, during the last decade, refined and corrected the figures of Deane and Cole, their method remains based on the method of the national accounts. For a good review article, see R. CAMERON, A New View of European Industrialization, in *EHR*, vol. 38, 1985, pp. 1-23.

3. We will not go into details concerning the theoretical problems that occur when applying the concept of National Accounts to a historical period. For a summary, see M. GOOSSENS, *op. cit.;* pp. 21-30.

4. *A system of National Accounts* (Department of Economic and Social Affairs, Statistical Office of the United Nations, Studies in Methods, Series F, NO2, Rev. 3), New York, United Nations, 1968, pp. 95-96.

5. Production approach.

account is taken of the depreciation which the agrarian capital has undergone during the production process. The annual increase of the agrarian product serves as parameter for the growth in the agrarian sector.

*Outline 1:* Production approach for the calculation of the agrarian product according to the NIS methodology

| | | |
|---|---|---|
| | Physical arable production | |
| + | Physical livestock production | |
| + | Physical forestry production | |
| + | Physical horticultural production | |
| | PHYSICAL AGRICULTURAL PRODUCTION | |
| - | Sowing seed | INTERMEDIATE |
| - | Animal feed | PRODUCTION |
| | GROSS AGRICULTURAL PRODUCTION | |
| - | Value commercial fertilizers | |
| - | Value commercial stock feed | EXTERNAL BUYING |
| - | Value commercial seed | |
| - | Value general expenses | |
| | GROSS ADDED VALUE AGAINST MARKET PRICES (GAVm) or AGRARIAN PRODUCT | |
| - | Depreciations | |
| | NET ADDED VALUE AGAINST MARKET PRICES (NAVm) or AGRARIAN PRODUCT | |

Source: Het Belgisch Nationaal Inkomen van 1948 tot 1954, in *Statistisch Tijdschrift*, vol. 42, 1956, pp. 600-603.

The available statistical data from the early nineteenth century do not allow us to work out the whole of Outline 1: we are only able to give an estimation of the gross agricultural production in 1812 and 1846. For the second half of the nineteenth century however, also the calculation of the the physical agrarian production and the gross and nett value against market prices is possible.[6]

6. Cfr. contribution of J. Blomme, quoted in footnote 16.

## *B. The sources: the early nineteenth century agricultural statistics*[7]

### *1) The challenge*

The putting-into-operation of Outline 1 assumes the availability of statistical material with regard to just about all facets of the agrarian production process, while there is no evidence of the presence of quantitative series with regard to the economic environment for the beginning of the nineteenth century. However, for the end of the French regime (1810-1813) and for the year 1846 we did find enough statistical sources to calculate the agricultural product for these years. In 2). and 3). we give a short description of these sources and in 4). we draw the attention to some additional sources from the period 1812-1846 which we also used in the course of our research.

### *2) The statistical sources from the French period*

During the French period (1795-1813), and more specifically during the last years of the Empire (1810-1813), modern administrative statistics saw its first blossoming. The Napoleonic statistics covered all aspects of social life and, with regard to to the agrarian sector in particular, a series of figures was produced which, subject to some manipulation, lends itself perfectly to the calculation of the agrarian product for the last years of the Empire.

To the most important statistics of the end of the French regime belong the harvest statistics, the livestock censuses (general livestock census of the 11th of March 1809, horse censuses of the 26th of July 1810 and the 17th of April 1812, census of wool-producing sheep of the 10th of August 1811, cattle census of the 22nd of May 1813), the general agricultural survey of the 16th of January 1812, the statistics for the hemp and flax harvests of 30th June 1811, the statistics for the oleaginous plants of the 13th of June 1812, the animal feed census of the 25th of June 1813, the statistics regarding meat consumption of the 10th of June 1813 and the statistics for the consumption of dairy products of the 20th of October 1813.

Seeing that the late-Napoleonic agricultural statistics seem to be very reliable and that they remained preserved for the whole or at least the greater part of the 'Belgian' territory, we retained these counts as

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7. For a more extensive version of this chapter, see M. GOOSSENS, *op. cit.*, pp. 30-48.

the basis from which to calculate the early nineteenth century agricultural product.

*3) The agricultural census of 1846*

The agricultural census of 1846 was the first agricultural inquiry to be organised in the independent Kingdom of Belgium. It was in fact the direct successor of the agricultural censuses of the French period since it was based on the French agricultural statistics of the period 1820-1830 which were on their turn based on the statistics of the late Napoleonic period.

There is no doubt that, methodologically, the agricultural census of 1846 was better done than the individual agricultural statistics of the French period and that also the controls were more strictly applied. Furthermore, the presence of the cadastral statistics limited the possibilities for fraud more than was possible during the French period. Thus, external criticism clearly acted to the advantage of the census of 1846. In its content, however, the census of 1846 is partly richer, but also partly poorer, than the whole of the agricultural statistics from the French period. Work input, exploitation structure, land and rental prices did not make up a part of the Napoleonic agricultural statistics. On the other hand, in the census of 1846 an important theme, such as the yield of the livestock (number of births, meat production, milk yield), was omitted.[8] Nevertheless the agricultural census of 1846 and the late Napoleonic agricultural statistics show sufficient agreement on the whole so as to make it feasible to base a comparative study of Belgian agricultural production in the years 1811-1813 and 1846 upon them.[9]

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8. In the introductory part by Bellefroid this lacuna is partly filled by estimations of the agronomist about these question.

9. As far as the geographical reference frame goes however, such a comparative study becomes sorely hampered. The Napoleonic agricultural statistics refer to the geographical frame of nine 'Belgian' departments whereas the agricultural census of 1846, on the contrary, refers to the geographic frame of the Belgian state as this had definitely come into being in 1839 and both descriptions show serious differences. Furthermore, the Napoleonic agricultural statistics were drawn-up on a basis of provinces and districts of the French period, while the census of 1846 was published on a basis of provinces and administrative districts of the Belgian period which, in most cases, strongly differed from one another, so that a direct comparison of the agricultural statistics of the French period and 1846 is totally impossible. Both sources had to be geographically homogenized, a topic which we dealt with in the extensive version of our thesis but which we will not discuss in this article.

*4) An important additional source: the cadastral survey files from the years 1807-1813 and 1814-1830*

The cadastral survey files prepared for each commune of the French territory during the period 1807-1813 were meant to determine the taxable value ('cadastral income') from the immovable goods – lands and houses – of these communes with the object of fixing the land tax. Because a great part of the land was used for agriculture, its evaluation, to a great extent, came down to a calculation of the value of the farm lands; here also is the explanation for the importance of the cadastral survey files for agricultural history.

The calculation of the value of the cadastral incomes took place as follows: in a first phase the officials of the cadastral services put together statistics of the area of the commune, subdivided according to the use and degree of fertility of each land type (arable, grazing, woodland and heath). Next, for each land type and each quality class, a 'type property' was taken for which the cadastral income or the average annual income was calculated. Finally, it was then possible to calculate the total cadastral income of the commune.

It was primarily the first two phases of these calculations which gave rise to exceptionally rich statistical material with regard to the early nineteenth century agricultural economy. So we get, by means of example, rich statistical information on the number of hectares of arable, grazing, heath and woodland for each commune for which the file is kept, a briefly-worded description of the commune (population figure and the name of the nearby market place, interesting observations with regard to the economic structure of the commune, the possible presence of home industry), the crop-rotation schedule of the various soil quality classes over six or seven years, the amount of sowing seed for the different crops and the proportion between this and the yield (yield-ratio), the market price-lists of the different crops for the years 1785-1803 and, later, 1797-1809, and the production costs for each crop for manuring (the number of cartloads of stable manure, green turf sods, lime, hearth ash ('cendre de Hollande'), the number of work-days for the manure spreading), the number of work-days and the price for the ploughing, harrowing, weeding, harvesting, binding, loading, transporting and threshing of the harvest and the amount and price of the sowing seed and the wages for the sowing.

We are concerned here with truly unique material, all the more since a similar collection was set up during the Dutch period (1826-

1830) and since both series were collected in a uniform manner for the entire Belgian territory.

Apart from the cadastral survey files, we also have to mention the potato census of 1816-1817, the annual livestock censuses of the period 1816-1829, and the – qualitative – Reports of the Commissions of Agriculture of the period 1817-1830 as important addiditional sources for our research.

## II. THE BELGIAN AGRARIAN PRODUCT IN 1812 AND 1846: RECONSTRUCTION OF THE DATABASE

### *A. General explanation*

Part II consists in the working out of Outline 1 up to the level of the gross agricultural product as it was explained in Part I. It was, in the framework of this article, impossible to give a detailed description of the calculation method of the output of each subcategory of agriculture. Instead, we give a very general overview per category. For the elaborate version we refer to the original thesis.[10]

### *B. The physical arable crop production*

#### *1) Definition*

The physical arable crop production consists of the production of cereal crops, potatoes, industrial crops and animal feed crops.

#### *2) Calculation method*

Following the NIS, we calculated the physical arable production as the product of the areas occupied by, and the yields of the different crops. This means that in a first stage we quantified the areas occupied by cereals, potatoes, industrial crops and animal feeds, after which the yields of the subdivisions came under consideration.[11]

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10. M. GOOSSENS, *op. cit.*, pp. 53-148.

11. The necessary statistics for the calculation of the physical fodder crop production were lacking; this means that we never actually came to calculating total physical agricultural output (cfr. Outline 1). On the other hand calculation of the gross agricultural output was facilitated since we did not have to subtract the cattle-fodder.

*3) Sources and reliability tests*

The area and yield statistics from the 1811-1813 period provided the base material for the French period; for 1846 we used the agricultural census of that year.[12]

For the purpose of testing the reliability of these two main sources for both the areas and the yields, we made use of three kinds of supplementary data: the Reports of the Agricultural Commissions which were published annually between 1817 and 1846, the agronomic literature and the cadastral survey reports from the French period. The *Reports of the Agricultural Commissions* and the *agronomic literature* functioned principally as a qualitative test for the occupied areas. We worked on the assumption that the global trend in the occupied areas according to the quantitative chief sources should be confirmed by these qualitative sources. It seems to be plausible that the gradual expansion or contraction of a given area under a certain crop would receive mention in this literature. The *cadastral survey files* of the French period were kept as a second, this time quantitative, criterion for both the area as well as the yield statistics. This approach calls for further elucidation, particularly in so far as the data on the areas data are concerned. As was described in Part I, the cadastral survey files of the French period contain both a report on the total area of arable land and a description of the 'normal' crop rotation system per commune. As a first step, we calculated on the basis of these two variables and for a limited number of communes from the different agricultural districts of the country[13] the areas which were taken up by the different arable crops during the French period. Next, we repeated this exercise for the same communes with the help of the area data of the different crops according to the agricultural census of 1846. In a third step we calculated, with the help of the communal data, an arrondissemental mean of the areas occupied by the different crops cultivated in 1812 and in 1846. Finally, the relative increase or decrease per crop was compared with the index which was obtained by the analysis of the macro-economic agricultural

12. Which was corrected for underestimation on the basis of a comparison with the cadastral survey of 1834.

13. Dependent upon the availability varying between three and eight communes per district (arrondissement). The sample communes were chosen on the basis of two criteria: quality of the survey file and representativity with regard to land type, degree of urbanization, use of town fertilizer (night-soil, etc.) and related criteria for the district they represented.

statistics from 1812-1813 and the agricultural census of 1846 for the same crops, whereby it was expected that both sources would tend in the same direction.[14] The same method was followed for checking the yields. In the majority of cases the trend was confirmed in a conclusive manner;[15] for those cases in which this was not the case, possible causes and methods of correction for the final estimation were sought.

### *C. The physical livestock production*

#### *1) Definition*

The physical livestock production consists of the total yield of the livestock: meat, dairy and wool production, net increase of the stock and net export of livestock.

#### *2) Calculation method*

In the NIS system the physical livestock production is calculated in essentially the same way as the arable crop production: the effective strength, i.e., the number of individuals constituting a group of animals (horses, cattle, sheep, swine, goats, poultry) is multiplied by the annual per capita yield of the livestock which consists of meat, dairy and wool production, net increase of stock and any possible exportation surplus. The sum of these yields is the total livestock production.

Following the NIS, we quantified in a first stage the different components of the livestock after which we dealt systematically with the various yield-categories (meat, dairy and wool production, net increase of stock and exportation balance).

The scarceness of the source material forced us to introduce a limitation of our research area: diverging from the methodology of the NIS, we only calculated the output of the four most important livestock groups, namely horses, cattle, sheep and swine. Since neither the agricultural censuses of 1846 nor the statistics from the French period contain information referring to the numbers and yields of goats, chickens and rabbits, these categories were left out of consideration.

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14. It needs little explanation that this method is susceptible of much criticism; therefore we only used it as a testing method.

15. Cfr. M. GOOSSENS, *op. cit.*, p. 56.

*3) Sources and reliability test*

For the calculation of the effective strengths we fell back, for 1846, on the agricultural census of that year; for the French period we fell back on the various livestock censuses which were organized between 1809 and 1813. Because the government of the Netherlands organized annual censuses of the numbers of horses, cattle and sheep during the period 1817-1830 and the Belgian government continued this tradition in 1834 and 1840, it was possible to obtain a more detailed picture of the evolution of the livestock between 1812 and 1846. The yields were derived either directly from the sources (milk and wool yield and exportation surplus) or calculated in an indirect manner (meat yield and net increase of the stock).

For checking the reliability of the numbers of animals as given up in the original statistics, we fell back on the method of the so called cattle-fodder balance. A cattle-fodder balance is a state in which the total available cattle-fodder is measured out against the total number of animals which can be kept alive with it.[16] The deviation between the number of counted animals and the number which can be kept alive according to the cattle-fodder balance serves as an indicator for the underestimation margin of the number of counted animals. The underlying idea is that the agrarian sector shall not produce more animal feed than is prescribed by the needs of the livestock. Applying this method, we made, in a first step, a rough estimation of the available cattle-fodder in 1812 and 1846. Next, we divided these quantities by the number of animals according to the original statistics from the French period and from 1846. The quotient gave an average feed-supply per animal from which it could, in the first place, be expected that it would be equally as great in 1846 as in 1812 and from which it could, in the second place, be expected to be regarded as an average feed-package by the contemporary agronomic literature. If both these conditions were satisfied, the testing method could be regarded as a confirmation of the reliability of the original numerical data. If, however, one or both of the conditions were not satisfied then serious questions had to be asked about the validity of the original statistics

16. For a detailed description and a detailed application for the period 1878-1939, see J. BLOMME, *De economische ontwikkeling van de Belgische landbouw, 1878-1939.* [The economic development of Belgian agriculture, 1878-1939] (Ph.D. Dissertation History department Catholic University of Leuven, 1988), pp. 97-120. To be published in English in the course of 1993.

and correction methods had to be introduced. It resulted from this reliability test that especially the number of cattle was largely underestimad in the statistics of the French period; the original figures had to be updated with more than 100,000 units. The yields were mainly checked by means of the qualitative literature. For the calculation of the most important part of the total livestock production, namely the meat production, there were no yields available which implied that we had to fall back on an indirect calculation method. Beneath we give a short review of this indirect calculation method for the meat-production in early nineteenth-century Belgium.

*4) Calculating total meat production for the beginning of the nineteenth century: a detailed description*

Using the NIS methodology, total meat production is calculated by multiplying the number of slaughtered animals per species (cattle, swine and sheep) by the slaughter weight per animal. As we did not have slaughter statistics for the early nineteenth century at our disposal, this methodology was not practicable for our investigation and we were obliged to work out our own method of approach, based upon the demand for meat. This method can be summarized as follows: the first step was to estimate the annual per capita demand for meat by the inhabitants of urban and rural areas in 1812 and in 1846. This estimation was based on the city tolls that were introduced in a large number of Belgian towns during the French period and that were abolished early in 1860.[17] On the basis of this source, the per capita annual meat consumption of the country and city dwellers in 1812 and 1846 was estimated as illustrated in Table 1. It appears – especially from the city tolls but also from qualitative sources – that there was a considerable drop in meat consumption in the cities during the first half of the nineteenth century. The thesis of Kint, namely that the demand for

17. Among others R. LAURENT, Une source: les archives d'octroi, in *AESC*, vol. 11, 1956, pp. 197-204; R. DEMOULIN, De afschaffing van de octrooien [The abolishment of the tolls], in *Driemaandelijks Tijdschrift van het Gemeentekrediet van België*, vol. 54, 1960, pp. 179-186; C. VANDENBROEKE, Voedingstoestanden te Ghent tijdens de eerste helft van de negentiende eeuw [Food conditions in Ghent during the first half of the nineteenth century], in *Belgisch Tijdschrift voor Nieuwste Geschiedenis*, vol. 4, 1973, pp. 109-110 and C. LIS and H. SOLY, Food Consumption in Antwerp between 1807 and 1859: A Contribution to the Standard of Living Debate, in *EHR*, vol. 30, 1977, pp. 460-462.

meat rose between 1820 and 1850, seems to be conflicting with what appears to be the case from the sources of information.[18]

*Table 1: The estimated per capita meat consumption in Belgium in 1812 and 1846 (kg/year)*

| *Year* | *Brussels* | *Big towns* | *Small towns* | *Rural areas* |
|---|---|---|---|---|
| - 1812 | 55.50 | 43.50 | 23.50 | 14.50 |
| - 1846 | 49.00 | 40.00 | 22.50 | 14.50 |

Source: Own estimations based on the city tolls.

The next step was to multiply these per capita consumption figures by the urban and rural population figures of 1812 and 1846. These population figures were found in the Archives Nationales for 1806 and in the population census of 1846 for 1846. After correction for importation, this second stage of calculation gave the required final result, namely the total Belgian meat production in 1812 and in 1846.[19]

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18. Ph. KINT, *Prometheus aangevoerd door Demeter. De economische ontwikkeling van de landbouw in Oost-Vlaanderen, 1815-1850*, [Prometheus fired by Demeter. The agrarian development of East-Flanders], Amsterdam, 1989, p. 114.

19. Based on these final results, the average per capita meat consumption could also be calculated. This – weighted – average per capita meat consumption amounted to 18,54 kg in 1812 and 18,17 kg in 1846. Compared with the high Dutch average of 27 kg per person in 1850, the Belgians of that date ate little meat. In comparison with France and Russia this proportion proved to be better than expected. In France the national average around the year 1800 was 13 kg, in Prussia in 1816 it was 10 kg. In 1880 the average per capita meat consumption in Belgium had risen to 23 kg per person, in 1913 to 36 kg. The real increase appeared only after World War II: in 1945 the Belgians ate on average 40 kg meat per year, in 1975 78 kg. Seeing that the hypothesis of falling per capita meat consumption in the rural areas may not à priori be excluded – as we did in Table 1 – the average for 1846 must be regarded as a maxiumum estimate. According to the agricultural census of 1846, the average per capita meat consumption would only have been 9 kg per person in the 1840's. The commentator implies that this figure may be underestimated when he states that 'cette quantité est fort minime et elle semble insuffisante à tous égards pour réparer les forces et nourrir l'énergie d'une population aussi laborieuse que celle de notre pays'. Nevertheless, Heuschling and Quetelet defend this extremely low figure in a report of 1847. Denis, in a publication of 1913, puts forward an average of 14 kg for 1846 and Vandenbroeke

In order to check the reliability of our calculations, we went one step further and tried to work out the per capita meat yield of each animal species in 1812 and 1846. Analogously with the reliability tests described above, we expected that these yields would mutually show a logical connection. We present the results of our calculations in Table 2.

*Table 2: Evolution of the meat yield of the livestock, 1812-1939 (kg/living animal)*

| *Year* | *Cattle* | | *Pigs* | |
|---|---|---|---|---|
| | *kg* | *1846=100* | *kg* | *1846=100* |
| 1812 | 24,68 | 94,63 | 78,98 | 107,46 |
| 1846 | 26,08 | 100,00 | 73,50 | 100,00 |
| 1880 | 27,93 | 107,09 | 121,87 | 165,80 |
| 1890 | 32,48 | 124,54 | 121,87 | 165,80 |
| 1900 | 43,23 | 165,76 | 121,87 | 165,80 |
| 1913 | 52,46 | 201,16 | 121,87 | 165,80 |
| 1929 | 51,66 | 198,06 | 103,64 | 41,00 |
| 1939 | 66,35 | 254,40 | 83,69 | 113,86 |

Source: - 1812 and 1846: own calculations according to explanation in the text
- 1880-1939: calculated with the aid of J. BLOMME, *op. cit.*, supplements 29 and 37 and 7 and 15

In 1812 the average piece of cattle produced 24,68 kg meat per year, in 1846 this figure had risen to 26,08 kg per year. As this trend is very much in line with the figures we find for the end of the nineteenth century, we believe our calculations of meat production during the first half of the nineteenth century must be quite accurate.

### D. *The physical forestry production*

In the same way as for the arable crop production, forestry production was calculated as the product of the total forested area and the annual yield of one hectare of forest.

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agrees with this. Cited in M. GOOSSENS, *op. cit.*, pp. 121-122.

The information for 1846 was taken out of the agricultural census, for 1812 the areas were found in statistics of the pré- and the Napoleontic period, the yields were gathered in the cadastral survey files.

### *E. Gross agricultural production in 1812 and 1846*

Following Outline 1 gross agricultural output was achieved after correcting the physical production for sowing seed and animal feed. The last stage consisted in converting the output in nominal and real prices which resulted in Table 3: Belgian agricultural output in 1812 and 1846 in prices of 1846 (see appendix).[20]

## III. GROWTH IN THE AGRARIAN SECTOR BETWEEN 1812 AND 1846: ANALYSIS AND EXPLANATION

### *A. Main characteristics of the growth process*

#### *1) Evaluating the annual growth figure between 1812 and 1846: the growth of the agrarian product in relation to the population growth*

According to Table 3 (see appendix) Belgian agricultural production would have risen from 376,986,675 fr. in 1812 to 502,877,337 fr. in 1846 which works out to be an increase of 33,39% or an average annual growth of 0,85%.

Between 1806 and 1846, Belgian population increased from 2,942,803 to 4,337,196 units, which works out to be a rise of 47.38% or an average annual growth of 0.97%. This implies that between 1812 and 1846 the per capita agricultural product in Belgium diminished. The lagging of agrarian production behind population increase, quite justifiably, conjures up the spectre of the malthusian threat: a too-slowly growing agrarian sector during the Ancien Régime was an invitation to traditional cereal shortages, fanmine and excess mortality through which the balance between demand and supply could only be reinstalled on a lower level.

One of the typical characteristics of the early nineteenth century agricultural economy is precisely that, in spite of the lagging behind of agrarian production in relation to population increase, the malthusian

20. The original nominal terms: 360,296,737 fr. in 1812 and 502,877,337 fr. in 1846. Using the Laspeyres index – prices of 1812 – gives a growth of 32,48%. The index used in Table 3 – prices of 1846 – is the Paasche index which is usually withheld for historical growth analysis.

threat could, for a time, be warded off. The catastrophe brought about by the failure of the potato harvest of 1846 actually betrayed the great secret of the equilibrium between demand and supply of primary foodstuffs in a situation of increasing population pressure: during the first decades of the nineteenth century population had become enormously dependent on the potato which had the distinguishing feature that from 1 ha occupied by potatoes twice as many people could be kept alive than was possible from one ha occupied by the traditional cereals.[21] This growing dependence of the Belgian population on the potato between 1812 and 1846 is illustrated in Table 4: in 1812 the agrarian sector still provided a per capita supply of bread cereals of 195 kg per annum, in 1846 this had fallen back to 174 kg per annum. In 1812 the population could count on a per capita potato supply of 116 kg per annum, in 1846, however, this was 192 kg. Converted to cereal equivalents – the nutritive value of potatoes was only 25% of that of the traditional bread cereals – this works out to a potato supply of 29 cereal equivalents in 1812 and 48 kg in 1846.

*Table 4: Composition of the per capita supply of cereals and potatoes in 1812 and 1846 (kg/year)*

| *Year* | *Cereals* | *Potatoes* | | *Total* |
|---|---|---|---|---|
| | | *Abs.* | *Gr. eq.* | |
| 1812 | 195 | 116 | 29 | 224 |
| 1846 | 174 | 192 | 48 | 222 |

Source: own calculations

The result was that the food balance remained nicely in equilibrium between 1812 and 1846 – both in 1812 and in 1846 the agrarian sector was in a position to be able to provide a per capita cereal supply of some 223 kg per annum – but the big difference between the beginning and the middle of the nineteenth century existed in the fact that the dependence on the potato in 1812 was about 10%, but in 1846 it had become 22%. And with this, the dependence on the potato is actually

21. We recall that 1 ha planted with potatoes gave a minimum of 10 times the yield delivered by one hectare sown with grain (average potato yield of 140 hl as against 14 hl for wheat or rye in 1812) but that the nutrient value of the potato is only 25% of that of wheat or rye.

still underestimated: the per capita potato supply of 192 kg in 1846 must, after all, be still further increased with the production from the gardens. If this is reckoned with, then the food package in 1846 would have consisted of 72% cereals and 28% cereal-equivalents in the form of potatoes.

2) *The growth of the early nineteenth century agrarian sector in international and intertemporal perspective*

*a) In international perspective*

Although Belgian agriculture grew slowly between 1812 and 1846, in international perspective we can hardly speak of an exceptionally bad performance – quite the reverse (Table 5).

*Table 5: Average annual growth rate of the early nineteenth century Belgian agrarian output in international perspective (%)*

| *Nation* | *Period* | *Growth Pop.* | *Growth Ag.* |
|---|---|---|---|
| - Belgium | 1812-1846 | 0,97 | 0,85/0,90 |
| - Netherlands | 1810-1850 | 0,80 | 0,57 |
| - France | 1812-1844 | 0,51 | 0,84 |
| - Great Britain | 1801-1830 | 1,48 | 1,18 |

Source: See M. GOOSSENS, *op. cit.*, p. 169.

Compared with the Netherlands for example, Belgium does considerably better: the demographic growth in the Netherlands remained much more limited than in Belgium and yet the gap between population increase and increase in the agrarian product in the Netherlands during the first half of the nineteenth century became much greater than in Belgium. The comparison with Great Britain is also favourable, although it must be admitted that England saw an exceptionally rapid population increase during the same period. And, according to recent calculations by Solar, the growth of the agrarian output in Ireland between 1800 and 1850 also fell behind the population growth in Ireland. France, on first sight, seems to do much better yet this performance must be put in perspective. In the first place, France experienced a rather more limited population growth during these years: agriculture was, therefore, not facing such a great challenge as was the case in

Belgium, the Netherlands and England. And in the second place, account must be taken of the exceptionally low level of development of the French agrarian sector in the eighteenth century; in other words, given the state of the technology, France had a much wider margin in which to carry-out a catching-up process compared to the rest of Europe, but no use was made of this possibility, at least in the first half of the nineteenth century. During these years the French agrarian sector only grew equally as fast as the Belgian which, at that moment, was already on a much higher level of productivity and thus, given the state of the technology, had to show much more resourcefulness in order to be able to grow yet further. In the Scandinavian countries and Poland the per capita agricultural product rose sharply during the first half of the nineteenth century.

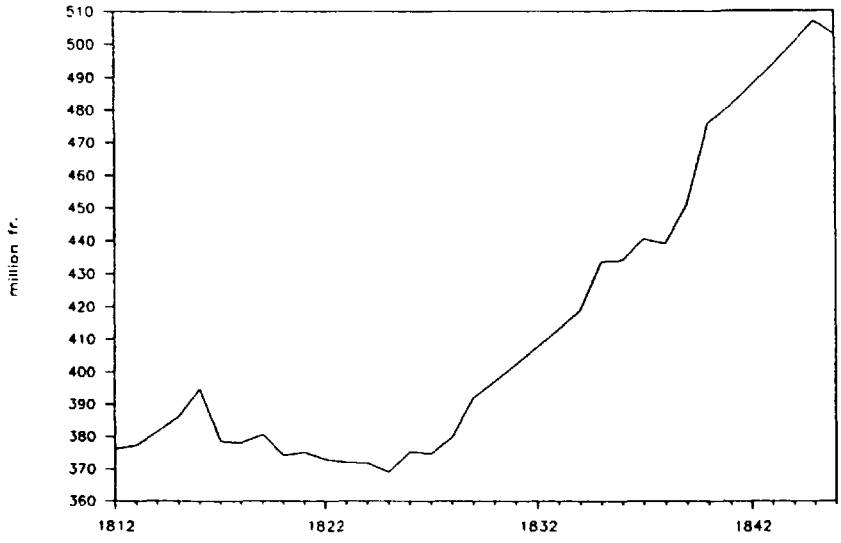
*b) In intertemporal perspective*

In order to estimate the trend of agricultural output between 1812 and 1846, we used two kinds of sources: the counts of the numbers of cattle and sheep between 1817 and 1830, the counts of 1834, 1840 and 1846 and the records of the sales of grain on the Belgian markets which have been kept for 1812, 1824-1829, 1833-1840 and partially for 1846.[22] In order to ouline the evolution of the agrarian product between 1846 and 1939, we used the following basic figures: the data for the period 1878-1939 were taken over directly from Blomme – whose database was evenly set up according to the NIS-methodolgy described in Part I – with the understanding that the quantities published by Blomme were assessed by us at prices of 1846; for the period 1846-1878 we made use of the basic figures published by Gadisseur with the understanding that the undoubtedly underestimated livestock product

22. For a more detailed description of the calculation method, see M. GOOSSENS, *op. cit.*, pp. 157-160.

was updated with approximately 50%.[23] The results of our calculations are presented in Graph 1.

*Graph 1: Belgian agricultural product, 1812-1913 (million fr., prices 1846)*




Source: Own calculations according to information in text

Despite the rough calculation methodology, there can be no doubt about the most important feature of the growth process between 1812

23. On the basis of comparison of our own livestock production figures of 1846 with those of Gadisseur and those of Gadisseur and Blomme for 1878 it is clear that Gadisseurs livestock production figures are gravely underestimated: this can be demonstrated in an indirect way by referring to Table 2 of this article which shows a very logical evolution between the per capity livestock yield according to the figures of Goossens of 1846 and those of Blomme of 1878. For an exentend argumentation of this thesis, see M. GOOSSENS, *op. cit.*, 171-172. J. GADISSEUR, *Le produit physique de l'économie belge, 1831-1913. Présentation critique des données statistiques* (Ph.D. Dissertation State University of Liège, département of economic sciences, 1979-1980), part 5, pp. 1362 a.f. and Contribution à l'étude de la production agricole en Belgique de 1846 à 1913 [A contribution to agrarian development in Belgium between 1846 and 1913], in *Belgisch Tijdschrift voor Nieuwste Geschiedenis*, jg. 4, 1973, pp. 1-48.

and 1846, namely its intermittent character: the Belgian agrarian sector experienced a phase of relatively rapid growth between 1812 and 1816, a phase of depression and stagnation between 1817 and 1825 and a phase of revival and even frankly rapid growth between 1826 and 1845. The relatively rapid growth of the agrarian product between 1812 and 1815 – approximate average annual growth rate of 1.19% per year – clearly lies in the continuation of the rising cyclical phase which started in European agriculture around 1806 and that reached its top with the Napoleontic wars. The decline of the agrarian product between 1817 and 1825 – -0,28% per year – corresponds with the period of agrarian crisis that hit Europe during this period. In Belgium the crisis climate was even stimulated by the negative agricultural policy of Willem I whose attention was in the first place fixed on the well being of the industrial sector and the commercial intrests of the agriculture of the Northern provinces of the kingdom – import – which were totally the opposite of the commercial intrests of the southern part of the kingdom – namely importance of export.[24] As from 1826, the agrarian output in Belgium again followed a rising line: between 1826 and 1846 production increased by 1.44%, a percentage which amply exceeded the growth figure of the late French period. In view of the low level of departure, the robust rise at least partially had the characteristic of a catching-up movement. The increase of the agrarian production seems to have occurred mostly after 1825 and mainly after Belgian independance in 1830. These findings were confirmed for the Netherlands, France and England: here also, the growth of the agrarian product took place mainly after 1830.[25]

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24. For a more detailed description of the agricultural crisis of 1817-1825, based on original sources, see M. GOOSSENS, *op. cit.*, pp. 161-162.

25. Based upon J.L. VAN ZANDEN, *De economische ontwikkeling van de Nederlandse landbouw in de negentiende eeuw, 1800-1914*, [The economic development of the Dutch agriculture in the nineteenth century, 1800-1914], Utrecht, 1985, p. 111 and Economische groei in Nederland in de negentiende eeuw. Enkele nieuwe resultaten [Economic growth in the Netherlands in the nineteenth century. Some new results], in *Economisch Historisch Jaarboek*, jg. 50, 1987, p. 59 for the Netherlands, J.-C. TOUTAIN, Le produit de l'agriculture française de 1700 à 1958. II. La Croissance, in *Cahiers de l'Institut de science économique appliquée*, 115, série AF, nr. 2 (supplement), p. 129 for France and N.F.R. CRAFTS, *British Economic Growth during the industrial Revolution*, Oxford, 1985, p. 42 for England.

Apart from the period 1817-1825, the decade 1856-1866 was the least rose-tinted of the nineteenth century: total production fell by 0.08% per annum, the per capita product even by 0.59% per annum; the agrarian product even decreased more than during the period 1812-1846. The decade of 1890-1900 was the most prosperous of the nineteenth century: total output rose by 1.50% per annum, the per capita output rose by 0.65% with which both parameters beat the record for the nineteenth century.

If we now examine the growth of the period 1800-1850 in an intertemporal perspective, then it must be admitted that the absolute growth percentage of the first half of the nineteenth century does not compare badly with that of the period 1847-1910: the growth is the same in both sub–periods. But expressed in per capita growth percentages this is no longer the case: here, the first half of the nineteenth century shows a regression, the second half shows a progression.

From the analysis of the ten-yearly average growth figures it is clear that the agrarian development process of before and after 1846 still fundamentally forms a part of the same historical economic growth epoch of traditional, or slow, economic growth: the growth remained – with the exception of the decade 1890-1900 – always limited to a maximum of 0.75% per annum and the per capita figures to 0.50%.[26] Only after World War I would the agrarian sector enter a new economic era, that of the modern or rapid economic growth: the per capita growth figures of nearly 2% per annum form the illustration of this.

In ending this section, we would like still to explicitly point to the fact that the new estimations which we carried out with regard to the livestock production for the years 1846-1878 lead to a fundamentally differing picture of the agrarian development in Belgium during the second half of the nineteenth century than the picture which until now has won acceptance on the basis of the assessments made by Gadisseur;[27] Table 6 gives the old and the new pictures.

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26. The modern development economy also teaches that annual growth rates of about 1% are normal for a traditional agrarian sector. Y. HAYAMI and V. W. RUTTAN, *Agricultural Development: An International Perspective*, Baltimore, 1985[4], p. 41.

27. Gadisseur's figures were, for example, taken over by J. CRAEYBECKX, Agrarisch Bedrijf, 1830-1873 [Agrarian industry, 1830-1873], in *Nieuwe Algemene Geschiedenis der Nederlanden*, part. 12, Bussum, 1978, p. 21.

*Table 6: Average annual growth rate of the Belgian agricultural product in the nineteenth century. New estimation (prices 1880, %)*

| *Period* | *Gadisseur* | *New estimation* |
|---|---|---|
| 1849-1867 | 1,00 | 0,39 |
| 1867-1888 | -0,12 | 0,48 |
| 1888-1910 | 0,92 | 1,59 |
| 1849-1910 | 0,59 | 0,90 |

Source: - New estimation: Own calculations
- Gadisseur: J. GADISSEUR, *Contribution*, p. 19

According to Gadisseur, Belgian agricultural production increased very strongly between 1849 and 1867, fell between 1867 and 1888 and then rose rapidly again between 1888 and 1910. According to the new estimation, agricultural production between 1849 and 1888 increased gradually and showed no regression and the output between 1888 and 1910 increased much more strongly than according to Gadisseur's data. These important differences between the two series of course trace back to the different estimations of the livestock production: seeing that Gadisseur attaches greater weight to the arable farming sector than is the case in our assessments, his output will rise much more rapidly when arable farming does well and fall much more rapidly when it does badly. Since we have shown above that the relevant estimations made by Gadisseur are in every way underestimated, we feel that we may conclude that the 'new' view of Belgium's nineteenth century agrarian development is, in all respects, much closer to the truth than the picture put about by Gadisseur.

*3) The evolution of the structure of the agrarian product between 1812 and 1846*

When building up the database in Part II, we distinguished three big sectors within the agrarian group: arable farming, forestry and animal husbandry. In the section which now follows, we ask the question about the part played by each of the sectors – and their subsectors – in the total agricultural output in 1812 and 1846 (Table 7, Appendix).

As can be seen from Table 7, the agrarian structure between 1812 and 1846 did not evolve in the direction of more high-quality production, quite the reverse: the share of the livestock production fell from 42.96% of the total output in 1812 to 40.29% in 1846 while the proportion of arable farming increased from 55.03% in 1812 to 57.47% in 1846 and that of forestry from 2.01% to 2.24%. This respective proportioning of cereal, potato, meat and dairy production is revealing: it illustrates the fact that the early nineteenth century farmer, in the first instance, had to rely on income from the arable farming sector and that the market for high-quality goods such as meat and dairy products was limited and that, in other words, the consumer package was poor.

Looking separately at the arable sector, this reasoning does not hold good: here it is rather a question of a polarization of the structure whereby both the share of the high-quality wheat and the potato aimed at the lower income classes gained in importance. This shift took place at the expense of the proportion of rye and buckwheat, but also especially at the expense of the share of the industrial crops: the industrial crops saw their share in the total agricultural production reduced during the first half of the nineteenth century from 11.11% in 1812 to 7.94% in 1846. Summarizing, we can state that during the first half of the nineteenth century there was a re-orientation of the agricultural production in the direction of primary food production.

The differential growth of the different agrarian sub–categories during the first half of the nineteenth century (Table 7) is the reflection of this: we find the most rapid growth in the sectors which are in a position to make safe the primary food supply of the population. The increase of potato production is particularly spectacular: this rose by as much as 140% – and one must remember that this concerns the net output, in other words, corrected for those parts of the production sown in the gardens and destined to feed pigs – which clearly shows that cereal growing alone could not absorb the rapidly rising demand. Wheat production rose by 60%, spelt production even by 65%. Rye production had nearly reached its peak during the French period. The drop in maslin and buckwheat production can undoubtedly be ascribed to the rise of the potato: we have clear examples of 'economically inferior goods', that is to say goods which only survive until a better substitute, in this case the potato, can replace them.

Against the rapid growth of the bread cereals, but especially also the potato, stands the slow, and even negative, growth of the sector of the industrial crops. Between 1812 and 1846, also the production of the only 'industrial' cereal crop, namely barley, fell considerably. The

same, for that matter, is true of the production of wool ascribable to the drastic decline in the number of sheep between 1800 and 1850. Oats and forestry are really the only agrarian categories which are not directly aimed at the primary food supply and of which the production nevertheless increased considerably between 1812 and 1846, respectively by 184% and 48%.

For that matter, we may note that the same trend towards a rise of primary food production during the first half of the nineteenth century also took place in the neighbouring countries. It is noteworthy that production in these countries was apparently even more concentrated on potato growing than in Belgium: while Belgium indeed still achieved an increase of cereal production by easily 36%, this percentage for the Netherlands and France was only respectively 9% and 20%: as against this, there is the fact that Belgium drove its potato production up by easily 140% – or nearly four times the increase of the cereal production – while these percentages in the Netherlands and France were respectively 72% and 150% or respectively eight times and seven and a half times the cereal production.[28]

These ratios once again illustrate the relative strength of the Belgian agriculture at the beginning of the nineteenth century: although the Belgian cereal growing had already reached a very high level by the end of the eighteenth century the farmers still succeeded, during the first decades of the nineteenth, in bringing the traditional grain production to a still higher level than that of the relatively backward neighbouring countries. But then again, it is certain that both in the Netherlands and in France the production of industrial crops still increased during the first decades of the nineteenth century; in view of the relatively limited importance of this output, the argument nevertheless does not carry sufficient weight to take the edge off the above-postulated hypothesis of a still relatively dynamic agrarian sector.

28. Data Belgium: Table 3; the Netherlands: calculated on the basis of J.L. VAN ZANDEN, *De economische ontwikkeling*, p. 111; France: calculated on the basis of J.-C. TOUTAIN, *op. cit.*, p. 153.

*4) Growth in the agrarian sector between 1812 and 1846: regional variants on the national pattern*

*a) The data*

The regional variants on the national pattern manifest themselves in the total growth percentage and especially in the proportion between the total growth of the agricultural product and the total growth of the population. These two parameters are set out in Table 8 and are further discussed respectively under b and c (see Appendix).

*b) Regional differences in the growth rhythm of the agrarian product, 1812-1846*[29]

If we take the national growth rate of 33.39% as a point of departure,[30] then two groups of regions can be distinguished: regions which grow faster than the average and regions which grow slower.

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29. We observe that recently both Vandenbroeke and Kint have presented estimations of the agrarian product for the province of East-Flanders during, respectively, the French period and the period of 1820-1850 which, to be sure, do not altogether agree with our own estimations but also do not contradict them. The estimation made by Vandenbroeke for the end of the French period almost perfectly agrees, as expressed in monetary value for both arable farming and animal husbandry, with our own – namely, global value of 73 million compared with our estimation of 70 million for East-Flanders – but dissected into components, we note an important difference as far as the arable farming sector is concerned: the quantities which Vandenbroeke postulates here are those of the exceptionally good harvest of 1813 and therefore they do not represent an average. Because Vandenbroeke works with the average price level of 1781-1820 – which is lower than the average of 1808-1810 used by us – his total value of the arable farming output still agrees with ours. C. VANDENBROEKE, De sociaal-economische context van de Brabantse Omwenteling: de Vlaamse regio's [The socio-economic context of the Brabant Revolution: the Flemish regions], in *Colloquim over de Brabantse Omwenteling*, Brussel, 1985, pp. 30-53. Kint, for the period of 1820–1846, arrives at a rise of rather more than 53% compared with our estimation of 24%. This considerable difference goes back to the fundamental differences in the production parameters such as occupied land surfaces and yields: as far as the basis period is concerned, Kint's calculations refer to the crisis level of the 1820s instead of to the average level of these years. Ph. KINT, *op. cit.*, p. 274 for the cited increase of rather more than 50% and M. GOOSSENS, *op. cit.*, footnotes 9 and 96 of Part II, chapter 2.

30. In Table 8, we chose to work with the global growth figures in terms of percentage instead of with the annual averages because, in this way, differences between the various regions are better revealed.

To the slow growers again, there belong two kinds of arrondissements: those regions which, since modern times, had built themselves up to be the pioneers of progressive agriculture in Europe, namely, the Flemish regions and the heart regions of the Industrial Revolution in Belgium – the arrondissements of Luik and Henegouwen. For the arrondissements of Ghent and Henegouwen there are, furthermore, overlapping characteristics: the arrondissement of Ghent formed the cradle of the Belgian industrial revolution and that of Henegouwen certainly acquired, towards the end of the Ancien Régime, some fame as a progressive agricultural region.

The group of the fast growers consists of the remaining arrondissements; it can be roughly described as consisting of those regions which, at the end of the Ancien Régime, were not particularly noticeable for progressiveness on the economic level. Agriculture was carried out, more or less, in an extensive manner and industrialization, for the time being, by-passed these regions. This relates to the provinces of the Ardennes and the Campines of Antwerpen, Limburg and Brabant and, generally speaking, the regions of the sandy area bordering on the central zone of the Flemish intensive agriculture, namely the arrondissements of Leuven, Brussels and Bruges.

From Table 8 it looks clear that the discussion around the whether or not occurrence of an 'Agrarian Revolution' in the sense of a strong rise in production cannot be held on the basis of the Flemish example.[31] The growth rates of the Flemish agriculture during the first half of the nineteenth century are not spectacular, but what has so far been overlooked is that they are not representative of the rest of the country: in the province of Limburg, in large parts of Brabant and Antwerp, but especially in the Ardennes regions, the growth rates of the agrarian product during the first half of the nineteenth century were of such a nature that one could speak of a substantial rise of the agrarian production.

The rapid rise of agricultural production since the French period, notably in the southern parts of the country, is confirmed in all the

31. As is usually done, in particular by the 'School of Ghent', represented by Vandenbroeke and Vanderpijpen. C. VANDENBROEKE and W. VANDERPIJPEN, The Agricultural Revolution in Flanders and Belgium: myth or reality?, in H. VAN DER WEE and E. VAN CAUWENBERGHE (eds.), *Productivity of Land and agricultural innovation in the Low Countries, 1250-1800*, Louvain, 1978, pp. 164-169. The authors are well aware of possible regional variants when they state that 'it may be that there was an Agricultural Revolution in some areas' (p. 166).

qualitative sources. Thus, we read in the Report of the Agricultural Commission of the province of Namen of 1833: *'L'agriculture a fait successivement depuis 1794 des progrès remarquables...'*. Already in 1801, prefect Jardrinet had expressed himself in the same way: '... *depuis 1790 surtout l'agriculture va toujours en s'améliorant*'. We find analogous testimonies in the Reports of the Agricultural Commission of Luxemburg and in the cantonal reports drawn up by the administration of the cadaster in the years 1830-1840.[32]

*c) Regional differences in the relation between population increase and agrarian production*

In the second column of Table 8 we calculated the ratio between the population increase and the agrarian production. In other words, this variable gives an insight into the evolution of the ratio between the demand for and the supply of agricultural products: a parameter which is smaller than one indicates that the agrarian product grew more slowly than the population, a parameter which is greater than one indicates that the agrarian product grew more rapidly. In view of the underlying methods of estimation, these indicators should not be interpreted too literally.

From this column it appears that the ratio between the demand and supply evolved in a distinctly negative manner, especially in the industrial regions of Henegouwen and Luik, with the exception of the arrondissement of Doornik. It was also the case in Brabant and East-Flanders that the population clearly grew too rapidly in comparison with the agrarian sector. On the other hand, in the remaining Walloon arrondissements, as with the provinces of Limburg, Antwerp and West-Flanders, there was good to even excellent success in keeping the balance in equilibrium.[33]

In all regions, the malthusian threat accompanied an increasing dependence on the potato, but both in 1812 and in 1846 the regional differences in this parameter were considerable: in 1812, the dependence already amounted to a minimum of 40% in, for example, the arrondissement of Oudenaarde, compared to a maximum of 6% in the arrondissement of Marche; in 1846 it amounted to 34% in Oudenaarde

32. Various examplies in M. GOOSSENS, *op. cit.*, p. 182.

33. This means that regions with a rapid agrarian growth show the most favourable development of the ratio between the increase of the population and the increase of the agrarian production.

compared to 18% in the arrondissement of Marche.[34] In 1812, the agrarian sector in Marche produced 36 kg of potatoes per person, in Oudenaarde 444 kg; in 1846 these proportions amounted to 172 kg compared to 384 kg. Taking it globally, the Flemish regions, and especially the provinces of East– and West-Flanders, were, already in the French period, much more dependent upon potato consumption than the Walloon and in 1846 this dependence was still much less in the Walloon provinces than in Flanders. The big regional differences in the impact of the potato crisis of 1846 immediately take on a greater meaning with this.

As a result of the increasing population pressure, a significant change in the inter-regional grain trade arose between 1812 and 1846. In the French period the department of Jemappes and the departement of Ourthe were known as grain exporters.[35] In 1846 Henegouwen and Luik produced significantly fewer grain equivalents than the national average. The industrializing regions in 1846 had become food importers.

Finally, we still have to make this point. Kint believes that he has recently shown that the per capita agricultural product in East-Flanders in the first half of the nineteenth century had still increased and that, with this, East-Flemish agriculture performed better than the national average.[36] As far as the first part is concerned, this conclusion is only partially correct and for the last part even manifestly wrong. Kint arrives at an increase in the per capita product during the first half of the nineteenth century because he sets out from the non-representative crisis-level of the 1820s. If one sets out from the higher production volume of the French period, then there is certainly a sign of a lowering of the per capita agricultural product by which the traditional view is confirmed. In particular, the sad picture which has found acceptance with regard to the arrondissement of Oudenaarde, is confirmed by Table 8: with a nonetheless limited increase of the population – after Ieper, the lowest in the country – but a still poorer increase of the agricultural product, the arrondissement delivers the worst performance

34. These figures are somewhat overestimated for the grain-exporting regions such as Oudenaarde, for the grain-importing regions such as Marche they are frankly overestimated. In this connection, see also the continuation of the text.

35. We found much evidence from this in, anmong others, the harvest statistics of the French period. For an overview, see M. GOOSSENS, *op. cit.*, p. 184.

36. Ph. KINT, *op. cit.*, pp. 278-280 and p. 434.

in the matter of the development of the ratio of demand and supply of agricultural products – in the broad sense – of the Flemish region.[37] When Kint states that the Flemish per capita agricultural product between 1812 and 1846 develops much more favourably than the national average, the author is completely wrong: only in the industrial regions of Wallonia did the per capita agricultural product develop still worse between 1812 and 1846.[38]

### *B. Explanation for growth*

In this last section we try to get a grasp on the factors that determined the development of the early nineteenth century agrarian sector. These factors can be subdivided in exogeneous and endogeneous factors and we will deal with each of them separately.

#### *1) Exogeneous factors*

During the period 1812-1846, exogeneous factors gave an important stimulus to the agrarian sector. In the first place, there was the demand for agrarian products from a population which increased on average by 0,97% during the period 1812-1846 and which obliged the agrarian sector to exploit and develop its production capacity to the full. But, since the urban population did not increase significantly during the first half of the nineteenth century – both in 1812 and 1846 about 25% of the Belgian population lived in towns – this factor probably influenced agrarian development less. Neither did foreign demand or purchasing power during the first half of the nineteenth century provide an extra

37. We admit that our volume of production of 1846 was perhaps somewhat underestimated for East-Flanders but this degree of underestimation will never be of such a nature that it could convert the lowering of the per capita product between 1812 and 1846 into a rise. The 'traditional view' is represented by the 'school of Ghent', among others C. VANDENBROEKE and W. VANDERPIJPEN, Landbouw en platteland in de Zuidelijke Nederlanden, 1770-1844 [Agriculture and countryside in the Southern Netherlands, 1770-1844], in *Nieuwe Algemene Geschiedenis der Nederlanden*, part 10, Bussum, 1981, pp. 183-209.

38. As an indicator of prosperity, the comparison between the two regions, however, does not hold water because the part taken by agriculture in the total output of Henegouwen and Luik was already showing a downward trend from the beginning of the nineteenth century and the per capita income here undoubtedly increased between 1812 and 1846 whereas in the arrondissement of Oudenaarde, which could only count the waning cottage industry among its assets, exactly the opposite happened.

stimulus to drive production up. Institutional factors, on the contrary, were indeed of importance: here we think especially about the abolition of feudalism and the geographical unification during the French period. Finally, the agricultural policy of Willem I exerted a negative whereas the development of the transportation infrastructure had a positive influence on agrarian development.

The *regional differences* in the growth rhytm of the agrarian product during the first half of the nineteenth century can at least partly be ascribed to the different regional impact of these exogeneous factors.

*2) Endogeneous factors*

To what extent can changes in the agrarian production process itself give an explanation for the growth in the agrarian sector between 1812 and 1846? We investigated this topic by means of a simple Cobb-Douglas production function.

This function – cfr. formula – supposes that the growth of agrarian production between 1812 and 1846 can, on the one hand, be ascribed to extra input of acreage, labour and capital whereby the share of the compensations of these production factors in the total agrarian income function as weights for the respective importance of the production factors in the production process, and on the other hand to an increasingly efficient application – productivity – of these production factors.

$$\dot{P} = r\dot{A} + w\dot{L} + i\dot{C} + e$$

where
- $\dot{P}$ = Mean annual growth agric. production
- $\dot{A}$ = Mean ann. grth. agric. acreage
- $\dot{L}$ = Mean ann. grth. agric. labour
- $\dot{C}$ = Mean ann. grth. agric. capital
- r = part of rent in agrarian income
- w = part of wages in agrarian income
- i = part of interest in agrarian income
- e = remainder factor increase productivity calculated as e = (P - rA - wL - iC)

The exact contribution of each factor to the growth of the production P can finally be calculated by working-out the percentage contribution of the terms 'rA', 'wL', 'iC' and 'e' in 'P'. The first three terms convey the information that x% of the growth of P must be assigned to the extra input of the respective production factors. The e-term functi-

ons as residual factor – the increase of the production which is not explained by the extra input of acreage, labour, capital and natural resources is brought together under the denominator 'e' – which implies that this term conceals both the effect of measuring errors in the inputs acreage, labour and capital as well as the real influence of increasing efficiency of the production factors.

Given the quantities of extra acreage, labour and capital that were employed by the agrarian sector between 1812 and 1846[39] we were able to work out this production function. The results are summarised in Table 9.

*Table 9: The sources of growth in the Belgian agrarian sector between 1812 and 1846*

| *Parameter* | *Av. ann. Growth (%)* | *Proportion in Growth (%)* |
|---|---|---|
| - Production | 0,85% | |
| - Labour | 0,52% | 61,17% |
| - Acreage | 0,13% | 15,29% |
| - Capital | 0,03% | 3,52% |
| - Productivity | 0,17% | 20,00% |

Source: Own calculations

From Table 9 it appears that the extra input of work was the most important source of growth for the early nineteenth century agrarian sector. This parameter explains 61.17% of the increase of the total agrarian production between 1812 and 1846. The increasing efficiency with which the production factors were applied again explains 20.00% of the growth, the extra input of acreage and capital respectively explain 15.29% and 3.52%. Translated into agricultural technical terms, the early nineteenth century agrarian growth process is best grasped by the intensification model of E. Boserup which places emphasis on the

39. Calculated on the basis of the database discussed under Part II for the acreages and the employed capital – restricted to cattle stock – and own estimations on the basis of the evolution of the rural population figures between 1812 and 1846 for the labour input.

rising input of labour as the condition for an increase in agricultural production.

If we compare this explanation with what is known for the neighbouring country of the Netherlands, then Belgium connects fully with the Dutch model: here also, the increasing input of production factors was the most important explanatory variable for the early nineteenth century agrarian development. The increasing input of the production factors explains 83% of the growth, the improved productivity explains only 17%.[40] In England, on the contrary, the increase of productivity forms the most important explanation for the rapid rise of the output during the first half of the nineteenth century.[41] According to the calculations made by Crafts, agrarian productivity increased very rapidly as from the end of the eighteenth century: on average by 0,2% between 1760 and 1800, by 0,9% between 1831 and 1830 and by 1.0% between 1831 and 1860. In Belgium the rise in productivity amounted to only 0,17% between 1812 and 1846 and in the Netherlands to only 0,1% (Table 10[42]).

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40. J. L. VAN ZANDEN, *De economische ontwikkeling*, pp. 134-136. Van Zanden distinguishes no separate production factor capital.

41. N.F.R. CRAFTS, *op. cit.*, p. 43.

42. According to Crafts, the increase in the efficiency of the early nineteenth century agrarian sector was even higher than that of industry which latter was only 0.3% between 1800 and 1831 and 0.8% between 1830 and 1860, from which the author concludes that the agrarian sector achieved an even more spectacular progress than industry itself during the period of the Industrial Revolution. N.F.R. CRAFTS, *op. cit.*, 83-84. The most important cause of the rapid rise in productivity in English agriculture after 1800 lies in the rapid fall in agrarian employment in England after 1750. In 1840 only 25% of the occupational population was still active in agriculture as against at least 30% full-time and 58% full-time and part-time workers in Belgium. Nevertheless, intuitively we have our reservations about the exceptionally rapid increase of English productivity between 1800 and 1850. Namely, Crafts maintains that the contribution of the wage-incomes to the agrarian income in England at the beginning of the nineteenth century would only have ammounted to 40% as against likewise 40% for the land-income and 20% for the capital-income. Through this, the variable which grows the most rapidly, namely the input of work, gets a much lower weight in the growth function than in our calculations (namely 62%) whereby automatically a greater share of the growth is transferred to the e-factor. We now especially have our doubts about the exceptionally high contribution of the capital-income to the total agrarian income. English agriculture was technically better equipped than the Belgian or Dutch, but whereas the difference could only have lain in more material – England, between

*Table 10: Increase of productivity in Belgium, the Netherlands and England (annual growth rate, %)*

| *Period* | *England* | *Netherlands* | *Belgium* |
|---|---|---|---|
| - 1760-1800 | 0,2% | ? | ? |
| - 1800-1830 | 0,9% | ? | ? |
| - 1812-1850 | ? | 0,10% | 0,17% |

Source:
- England: N.F.R. CRAFTS, *op. cit.*, p. 84
- Netherlands: J.L. VAN ZANDEN, *op. cit.*, p. 136
- Belgium: M. GOOSSENS, *op. cit.*, annexe 3/4

We now come to a short comment on the sources of growth. As explained, more than 50% of the increase of the agricultural production between 1812 and 1846 can be ascribed to the extra input of labour. This extra input of labour – from 162 million days in 1812 to 217 million days in 1846 or an increase with 33% – made, in the first place, the *extension of the production potential* possible. It requires little explanation to understand that the reclamation of land and the pushing back of fallow (cfr. infra) only became possible when there were sufficient hands present to tackle this heavy task. In the second place the extra-availability of labour made the *widening of the production package* possible. During the first half of the nineteenth century the area under cereal crops grew with 7%, the area under potatoes with

1800 and 1850, did not have highly sophisticated machines and tools either – it looks to us to be highly doubtful that this difference in equipment could explain the big difference in contribution in the agrarian income. If the English contribution is overestimated, which looks likely to us, the portion of the wage-incomes would automatically rise very high and the productivity, also in England, would rise less than the above-cited figures suggest. But even so, the English productivity rise would still be significantly higher than that of Belgium: if we should accept the English coefficients for Belgium, the productivity between 1812 and 1846 would still only increase by 0.22% as against the cited 0.9% for England. The unusually high value of the e-term for the early nineteenth century England may also emerge from the fact that Blomme still only calculated for Belgium, even for the period 1880-1910, an increase of the agrarian efficiency of 0.42% per annum. For the period 1910-1950 the rise in productivity seems to have remained limited to 0.39% per annum but after World War II an annual increase of 3.50% was reached.

73% and the area under fodder crops with 49%.[43] This insertion of highly-productive, non-cereal crops into the production packet would have been impossible with the amount of labour available in 1812.[44] This is the more true if we take into account that especially the quickly expanding potato was a very labour-intensive crop, demanding about 150 working days a year, versus about 70 for the traditional cereal crops. Finally, the extra availability of labour made possible the *raising of the yields* of the different crops. According to a regression analysis which we set up on the basis of the cadastral survey files of the French period, the adding of more work, be it in the form of more ploughing or be it in the form of more weeding, always had a significant influence on the yield, and this in contrast to the addition of extra seed and extra town-manure which did not necessarily give statistically significant parameters. The extra input of labour between 1812 and 1846 is the most important explanatory variable for the raising of the yield of, for example, wheat from 14,06 hl to 17,71 hl, rye from 16,44 hl to 18,50 hl, barley from 20,55 hl to 28,19 hl[45] and the potato from 131

43. While the area under industrial crops shrunk with only 17%.

44. Demonstrated in M. GOOSSENS, *op. cit.*, pp. 265-269.

45. According to Kint, the East Flemish grain yields rose much more rapidly between 1812 and 1846 than we imply in Table 8: whereas, for example, we report an increase of 9% and 6% respectively for wheat and rye, Kint arrives at 21% and 35% respectively for these two crops. In view of the fact that both Kint's data and the data of Table 8 trace back to the same 'normal' yields in the agricultural census of 1846, the cause of the important differences between the two databanks lies in the suppressed yields for the basis period. We feel that we can state that the yields which Kint suppressed for 1820 concern an underestimated account of the average East-Flemish yields from the first two decades of the nineteenth century and that the enormous increase of the yields between 1820 and 1846 does not correspond to reality. The basis of our criticism is formed by the source suppressed by Kint, namely the cadastral survey files for the period of the Dutch occupation. This source gives a picture at a given moment in time – an instantaneous photographic exposure – of the yield in a period of crisis (see also in this connection Part I), during which the yields undoubtedly were lower than normal while the data for 1846 which were held back by Kint, on the contrary, refer to a 'normal' year. The two sources are thus mutually imperfectly comparable. Moreover, the line of reasoning followed by Kint not to use the survey files with the higher yields from the French period, but rather to use those from the Dutch period, namely the fact that the Dutch administration had caused the survey files to be re-worked because they were no longer trustworthy, can be used against the author: the files had indeed to be revised because the general agricultural climate during the period 1817-1826 was significantly worse than during the French period and because the

hl to 198 hl[46] during the same period. Our data, therefore, clearly confirm the findings of Van Zanden for Holland, namely that the yields of the cereal crops still increased significantly in the first half of the nineteenth century. Bieleman's criticism of Van Zanden's findings finds no support in the Belgian test-case.[47]

About 20% of the growth of the agricultural production between 1812 and 1846 can be explained by a rise in productivity. This rising productivity – the realisation of more output with a constant input of production factors – can be ascribed to an increasing use of town manure, qualitative improvement of the production factors, first indications of a specialisation-trend in Belgian agriculture and especially the organisational progress in the field of the rotation systems.

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profits for the farmer were thus smaller than during the French period. Finally, Kint himself undermines his criticism of the – according to him – too highly-estimated yields from the Napoleonic agricultural statistics and the survey files of the years 1806-1815: on the one hand he rejects the original material from the French period, but on the other hand he nevertheless raises the yields from the cadastral survey files of the Dutch period by 5% for wheat and 10% for the other crops. Ph. KINT, *op. cit.*, spread over pp. 83-95.

46. Kint also arrives at an exaggerated increase of the potato yield for the period 1820-1846 in East-Flanders, namely of 107 hl per ha in 1820 to 202 hl in 1846, which amounts to a rise in the yield of 87% instead of 27% according to our calculations.

47. This discussion arises in J.L. VAN ZANDEN, De landbouw op de zandgronden van Oost-Nederland [Agriculture on the sandy soils of Oost-Nederland], in *Tijdschrift voor Geschiedenis*, vol. 101, 1988, pp. 190-205; J. BIELEMAN, Boeren en rekenmeesters. Een repliek [Farmers and mathematicians. An answer], in *Tijdschrift voor Geschiedenis*, vol. 101, 1988, pp. 206-221 and J.L. VAN ZANDEN, Dupliek, in *Tijdschrift voor Geschiedenis*, vol. 101, 1988, pp. 222-224 and then especially respectively pp. 195-201, pp. 213-pp. 218 and p. 223. This series of discussions links up directly with the doctorate dissertations of both historians on the subject of the early nineteenth century agriculture, respectively of the Netherlands and Drente. Respectively J.L. VAN ZANDEN, *De economische ontwikkeling* and J. BIELEMAN, *Boeren op het Drentse zand, 1600-1910. Een nieuwe visie op de 'oude landbouw'*, [Farmers on the sands of Drente, 1600-1918. A new view on the 'traditional agriculture], *AAG bijdragen*, nr. 29, Wageningen, 1987. The authors criticise each others' methodological approach to, and interpretation of the factual material and one of the most important points of discussion concerns precisely whether or not the idea of an important rise of the grain yields between 1700 and 1850 is plausible.

Between 1812 and 1846 the Belgian agricultural area increased with 14%. This extra input of land explains about 15% of the growth of the agricultural output. The extension of the agricultural acreage was the result of the conversion of woodlands and pasture in arable land – especially in Brabant, the two Flanders and Henegouwen –, the development of wastelands – especially in the Campines and in the Ardennes – and the driving back of the fallow – also especially in the Campines and the Ardennes, including Walloon-Brabant.

The contribution of capital formation to the growth process between 1812 and 1846 was rather unimportant – explaining only 3 % of the growth – and consisted mainly in the increase of the supply of manure by the cattle stock.

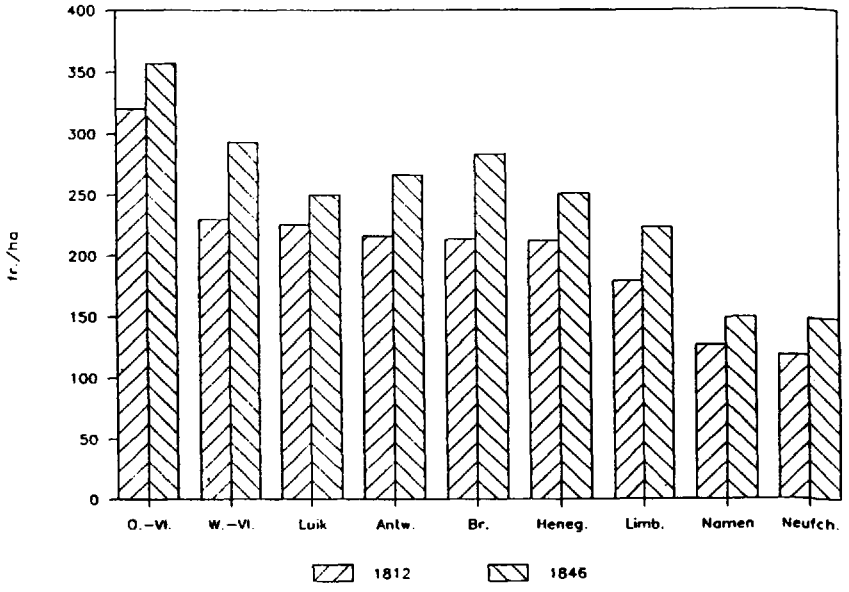
As was the case for the exogeneous factors, the endogeneous explanation model shows important *regional differences*. Summarizing, we can state that in the quickly growing Ardennes regions the emphasis lies on the extra input of both the production factors labour and acreage, in the provinces of Limburg, Henegouwen and East-Flanders the extra input of work explains the biggest part of the growth whereas in Antwerp, Brabant and West-Flanders the rise in productivity was the driving force behind the growth.

In all provinces the extra input of labour resulted in an increase of land-productivity. The average increase amounts to 14% but in the provinces of Brabant, West-Flanders, Luxembourg, Limburg and Antwerp it runs up to 32%, 27%, 25%, 24% and 23%. In the provinces of Henegouwen, Namen, East-Flanders and Luik, however, the percentage increase remained limited: respectively to 18%, 17%, 12% and 11%. *If we interpret the term Agrarian Revolution in the sense of the occurrence of an important rising of the land-productivity between roughly 1750 and 1850, then it must be recognized that the authors who deny the existence of this Revolution for the early nineteenth century in Belgium have drawn hasty conclusions:*[48] in all the regions

48. This is the case for C. VANDENBROEKE and W. VANDERPIJPEN, *The agricultural revolution in Flanders and in Belgium*, pp. 163-170; Van der Wee however does believe in a rise of land-productivity after 1750. H. VAN DER WEE, The agricultural development of the Low Countries as revealed by the tithe and rent statistics, 1250-1800, in H. VAN DER WEE en E. VAN CAUWENBERGHE,

we note an important rise in the land-productivity between 1800 and 1850, but the rise is the most pronounced in the northern provinces. Perhaps even more striking, is the fact that despite the very rapid rise in the land-productivity between 1812 and 1846 the differences in level between the different regions remain very substantial (Graph 2): both in 1812 and in 1846 East-Flanders occupied an absolute and untouched top position with a land-productivity of respectively 320 fr. and 357 fr. per ha.

*Graph 2: Regional differences in the land–productivity, 1812 and 1846*




Source: Own calculations

During the first half of the nineteenth century labour-productivity evolved in a significantly less favourable way: the average increase amounted to only 1% as against 14% for land-productivity. During the period 1812-1846 the production factor labour had to contend with the phenomenon of the diminishing returns: only in the regions where extra

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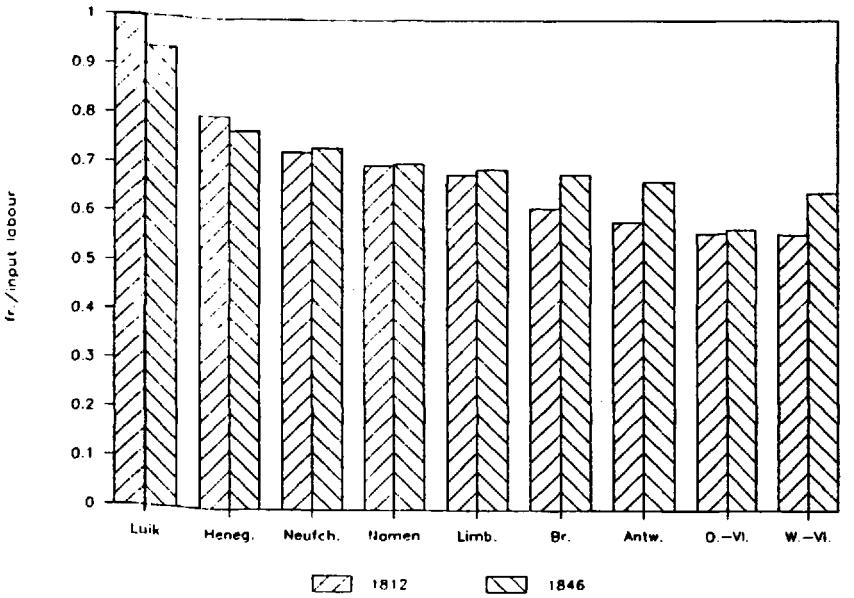
*Productivity of Land and Agricultural Innovation in the Low Countries, 1250-1800*, Louvain, 1978, pp. 19-22.

acreage and capital were made available to the workers and/or where use was made in increasing measure of external inputs such as town manure and/or where success was achieved in pushing up the total efficiency could the extra amount of labour applied between 1812 and 1846 also be applied more productively. This was the case in the provinces of Antwerp, Brabant and West-Flanders where labour-productivity still increased with more than 10%. In the rest of the provinces the increase of the labour-productivity per worker remained very limited, and in the provinces of Luik and Henegouwen it even diminished. Taking it globally, *the idea of an Agrarian Revolution in the case of the labour-productivity between 1750 and 1850 looks difficult to defend.*

*Graph 3: Regional differences in labour-productivity, 1812 and 1846*




Source: Own calculations

Finally, if we examine the global efficiency – total factor productivity (TFP) – with which the production factors were applied in 1812 and 1846, then it appears that this only increased significantly during the period 1812-1846 in those provinces where the extra input of

labour went together with an increasing use of external inputs such as town manure and an increase of the efficiency, namely in the provinces of Antwerp, Brabant and West-Flanders. If one understands by the term Agricultural Revolution the increase of TFP, the term is for the first half of the nineteenth century only applicable to the provinces of Antwerp, Brabant and West-Flanders and only for those provinces it can be stated that the rapid growth of the agrarian product was made possible through a fundamental improvement of the agrarian production methods.

Although labour was the most important growth factor during the first half of the nineteenth century and although the extra input of labour explains the biggest part of the growth of the agrarian sector in the province of East-Flanders, this province was, during the period under view, a slow grower. Due to the lack of productivity gains, the extra input of labour could in this province no longer result in extra output. In fact, even during the French period, the TFP-level of Flemish agriculture was not so high and, in relative terms, it even receded between 1812 and 1846: as much in 1812 as in 1846, total factor-productivity in the industrialized regions of Henegouwen and Luik was higher than in East-Flanders and in 1846 it was also overtaken by Antwerp, Brabant as well as West-Flanders. By 1846 only the agricultural systems of Limburg and the Ardennes were less well organized than that of East-Flanders.[49]

To sum up, it can be said that the fame of the Flemish agriculture in 1812 as well as in 1846 was only based upon the significantly higher land-productivity; the so highly-praised Flemish agricultural model had, in terms of global efficiency, already in the French period, to yield pride of place to the agricultural systems of Henegouwen and Luik and, between 1812 and 1846, it was further overtaken by the surrounding provinces of Antwerp, Brabant and West-Flanders. This relative decline perhaps explains both the waning foreign interst towards the middle of the nineteenth century[50] as well as the quickly

49. As well in 1812 as in 1846 the province of East-Flanders had the biggest degree of hidden unemployment in agriculture: according to our estimates this degree of hidden unemployment would have been about 65% in 1812 and 82% in 1846. These figures contrast heavily with the situation in the Ardennes regions where agriculture was, at least during the French period, confronted with a lack off labour of about 20%. M. GOOSSENS, *op. cit.*, p. 274-281.

50. C. VANDENBROEKE and W. VANDERPIJPEN, *Landbouw en platteland*, p. 183.

diminishing standard of living of the once-so-prosperous Flemish rural population.[51]

## CONCLUSION

Although statistical material on the early nineteenth century agrarian economy is not really abundant it was – thanks to the statistics of the late Napoleontic period and the agricultural census of 1846 – possible to give a rough estimate of Belgian agricultural output in the beginning and the middle of the nineteenth century. During this period output grew slower than the population but nevertheless, in international perspective, the expansion of the agrarian sector was not at all bad, on the contrary. One of the most striking features of the development of the agricultural sector during this period was undoubtedly the big regional differences in the growth rhythm. Especially in the Ardennes and the Campines regions the agricultural economy was very expansive; in East-Flanders, the old progressive region, the growth rhythm remained far beneath the national average. In explaining the growth and the big regional differences in it, as well exogeneous as endogeneous factors should be taken into account. It is especially interesting to see that during the first half of the nineteenth century the extra input of labour was – in most regions – the main driving force after agricultural development. In East-Flanders however, the effect of extra input of labour had reached its saturation point. Due to lack of productivity gains the growth of the agrarian sector was, probably for the first time in its remarkable history, structurally hampered.

51. In other words, the secret of 'Poor Flanders'.

# APPENDIX

*Table 3: Belgian agricultural output in 1812 and 1846. Quantities and real terms (prices 1846)*

| Category | Quantity 1812 | Quantity 1846 | Unit | Prices 1846 1812 | Prices 1846 1846 |
|---|---|---|---|---|---|
| **A. Arable Farming** | | | | 207,445,414 | 289,004,315 |
| 1. Cereals | 10,900,157 | 15,108,260 | hl | 142,951,122 | 194,966,527 |
| - Wheat | 2,432,218 | 3,908,584 | hl | 47,044,770 | 75,614,370 |
| - Spelt | 743,360 | 1,216,560 | hl | 7,204,913 | 11,855,652 |
| - Maslin | 723,780 | 689,901 | hl | 10,740,964 | 10,444,614 |
| - Rye | 4,237,232 | 4,962,192 | hl | 51,816,544 | 60,875,186 |
| - Oats | 965,353 | 2,670,070 | hl | 6,237,201 | 17,719,835 |
| - Barley | 1,186,441 | 1,134,338 | hl | 12,774,385 | 12,167,248 |
| - Buckwheat | 611,773 | 526,615 | hl | 7,132,345 | 6,289,621 |
| 2. Potatoes | 5,255,082 | 12,908,139 | hl | 22,615,102 | 54,084,369 |
| 3. Industrial crops | | | | 41,879,190 | 39,953,419 |
| - Flax | 15,218,400 | 18,247,565 | kg | 15,218,400 | 18,247,565 |
| - Hemp | 3,388,861 | 1,242,936 | kg | 2,880,532 | 1,056,496 |
| - Madder | 606,000 | 1,058,336 | kg | 624,180 | 1,090,086 |
| - Tobacco | 2,777,087 | 1,164,212 | kg | 2,082,815 | 873,159 |
| - Hops | 3,740,569 | 3,309,873 | kg | 4,114,626 | 3,640,860 |
| - Chicory | 3,337,335 | 31,228,336 | kg | 116,807 | 1,092,992 |
| - Flaxseed | 183,518 | 138,364 | hl | 3,562,084 | 2,685,645 |
| - Hempseed | 51,405 | 17,688 | hl | 740,232 | 254,707 |
| - Rapeseed | 579,996 | 509,339 | hl | 12,539,514 | 11,011,909 |
| **B. Forestry** | 1,009,358 | 1,499,011 | bundle | 7,570,185 | 11,242,583 |
| **C. Cattle Stock** | | | | 161,971,076 | 202,630,440 |
| 1. Meat-production | 54,553,556 | 78,823,127 | kg | 59,725,628 | 86,279,047 |
| - Beef (oxen) | 4,989,973 | 6,147,408 | kg | 5,704,418 | 7,027,570 |
| - Beef (cow) | 17,812,657 | 25,911,777 | kg | 16,972,091 | 24,689,019 |
| - Veal | 5,443,369 | 8,160,563 | kg | 6,125,935 | 9,183,927 |
| - Pork | 24,851,699 | 36,499,457 | kg | 29,306,954 | 43,042,849 |
| - Mutton | 1,455,858 | 2,103,922 | kg | 1,616,229 | 2,335,682 |
| 2. Dairy | | | | 68,071,520 | 91,112,517 |
| - Full milk | 434,269 | 581,261 | hl | 4,950,667 | 6,626,375 |
| - Butter | 24,608,540 | 32,938,067 | kg | 42,080,603 | 56,324,095 |
| - Buttermilk | 3,691,272 | 4,940,710 | hl | 21,040,250 | 28,162,047 |
| 3. Wool | 1,493,274 | 1,267,084 | kg | 2,986,548 | 2,534,168 |
| 4. Increase stock | 516,267 | 544,589 | pieces | 14,242,380 | 16,105,447 |
| - Foals | 22,476 | 24,427 | pieces | 2,921,880 | 3,175,510 |
| - Calves | 213,853 | 261,841 | pieces | 6,415,590 | 7,855,230 |
| - Piglings | 58,820 | 99,991 | pieces | 1,588,140 | 2,699,757 |
| - Lambs | 221,118 | 158,330 | pieces | 3,316,770 | 2,374,950 |
| 5. Export | 110,000 | 70,996 | pieces | 16,945,000 | 6,599,261 |
| - Horses | 17,000 | 13,576 | pieces | 6,970,000 | 1,240,576 |
| - Cattle | 30,000 | 12,920 | pieces | 6,300,000 | 2,715,090 |
| - Piglings | 60,000 | 43,752 | pieces | 3,600,000 | 2,625,120 |
| - Sheep | 3,000 | 739 | pieces | 75,000 | 18,475 |
| Total | | | | 376,986,675 | 502,877,337 |
| Increase | | | | | 33,39 % |

**Source: Own calculations, M. GOOSSENS, *op. cit.*, pp. 146-147. For a regional breakdown of this table, see ibidem, pp. 330-363.**

*Table 7: Growth and composition of the early nineteenth century agrarian product (annual growth rate and share in the total agricultural product, %)*

| Category | Growth (%) | Composition | |
|---|---|---|---|
| | | 1812 | 1846 |
| Arable farming | 39,32 | 55,03 | 57,47 |
| 1.Cereals | 36,39 | 37,92 | 38,77 |
| - Wheat | 60,73 | 12,48 | 15,04 |
| - Spelt | 64,55 | 1,91 | 2,36 |
| - Maslin | -2,76 | 2,85 | 2,08 |
| - Rye | 17,48 | 13,74 | 12,11 |
| - Oats | 184,10 | 1,65 | 3,52 |
| - Barley | -4,75 | 3,39 | 2,42 |
| - Buckwheat | 11,82 | 1,89 | 1,25 |
| 2.Potatoes | 139,15 | 6,00 | 10,75 |
| 3.Industrial Crops | -4,60 | 11,11 | 7,94 |
| - Flax | 19,90 | 4,04 | 3,63 |
| - Hemp | -63,32 | 0,76 | 0,21 |
| - Madder | 74,64 | 0,17 | 0,22 |
| - Tobacco | -58,08 | 0,55 | 0,17 |
| - Hops | -11,51 | 1,09 | 0,72 |
| - Chicory | 835,73 | 0,03 | 0,22 |
| - Flax seed | -24,60 | 0,94 | 0,53 |
| - Hemp seed | -65,59 | 0,20 | 0,05 |
| - Rape seed | -12,18 | 3,33 | 2,19 |
| B.Forestry | 48,51 | 2,01 | 2,24 |
| C.Total Animal Husbandry | 25,10 | 42,96 | 40,29 |
| 1.Meat production | 44,46 | 15,84 | 17,16 |
| - Ox meat | 23,20 | 1,51 | 1,40 |
| - Beef | 45,47 | 4,50 | 4,91 |
| - Veal | 49,92 | 1,62 | 1,83 |
| - Pork | 46,87 | 7,77 | 8,56 |
| - Mutton | 44,51 | 0,43 | 0,46 |
| 2.Dairy 33,85 | 18,06 | 18,12 | |
| - Full milk | 33,85 | 1,31 | 1,32 |
| - Butter | 33,85 | 11,16 | 11,20 |
| - Buttermilk | 33,85 | 5,58 | 5,60 |
| 3.Wool production | -15,15 | 0,79 | 0,50 |
| 4.Increase livestock | 13,08 | 3,78 | 3,20 |
| - Foals | 8,68 | 0,78 | 0,63 |
| - Calves | 22,44 | 1,70 | 1,56 |
| - Piglets | 69,99 | 0,42 | 0,54 |
| - Lambs | -28,40 | 0,88 | 0,47 |
| 5.Export | -61,05 | 4,49 | 1,31 |
| - Horses | -82,20 | 1,85 | 0,25 |
| - Cattle | -56,90 | 1,67 | 0,54 |
| - Piglets | - | 0,95 | 0,52 |
| Total | 33,39 | 100 | 100 |

**Source: Own calculations based upon Table 3 (prices 1846)**

*Table 8: Regional differences in the rhythm of expansion of the agrarian sector, 1812-1846*

| Province | Growth Agric. (%) | Ag/Pop. (pop.=1) |
|---|---|---|
| 1.Province Antwerpen | 46,02 | 1,08 |
| a]Antwerpen | 39,17 | 0,74 |
| b]Mechelen | 55,46 | 1,65 |
| c]Turnhout | 45,11 | 1,22 |
| 2.Province Brabant | 46,01 | 0,77 |
| a]Brussel | 49,15 | 0,64 |
| b]Leuven | 53,26 | 1,31 |
| c]Nijvel | 32,34 | 0,65 |
| 3.Province Limburg | 43,18 | 0,98 |
| a]Hasselt | 44,56 | 1,01 |
| b]Tongeren | 41,39 | 0,94 |
| 4.Province Oost-Vlaanderen | 24,34 | 0,64 |
| a]Dendermonde | 24,92 | 0,71 |
| b]Gent | 33,28 | 0,63 |
| c]Oudenaarde | 11,18 | 0,55 |
| 5.Province West-Vlaanderen | 36,48 | 1,18 |
| a]Brugge | 73,69 | 1,59 |
| b]Ieper | 21,70 | 1,44 |
| c]Kortrijk | 23,04 | 0,95 |
| d]Veurne | 26,26 | 0,67 |
| 6.Province Henegouwen | 30,32 | 0,59 |
| a]Charleroy | 40,36 | 0,50 |
| b]Doornik | 29,42 | 1,02 |
| c]Mons | 23,65 | 0,42 |
| 7.Province Luik | 26,39 | 0,48 |
| a]Huy | 30,48 | 0,53 |
| b]Luik | 28,78 | 0,54 |
| c]Verviers | 16,80 | 0,31 |
| 8.Province Namen | 66,45 | 0,91 |
| a]Dinant | 105,90 | 0,77 |
| b]Marche | 52,26 | 1,07 |
| c]Namen | 52,52 | 0,85 |
| d]St.-Hubert | 43,94 | 1,31 |
| 9.Neufchâteau | 75,54 | 1,31 |
| National average | 33,39 | 0,70 |

**Source: Own calculations.**

# Belgische landbouwopbrengsten (1812-1846)

DOOR
MARTINE GOOSSENS

## Samenvatting

Het doel van dit artikel was de regionale ontwikkeling van de Belgische landbouw tijdens de eerste helft van de negentiende eeuw te *beschrijven, ontleden* en *verklaren.*

In een *eerste deel* behandelden we de theoretische en heuristische problemen van het onderwerp. In het *tweede deel* bouwden we een gegevensbank op, op basis waarvan we de totale landbouwopbrengst van België in 1812 en 1846 berekenden. Deze totaalopbrengst – landbouwprodukt – fungeerde als een indicator van de verworvenheden van de agrarische sector en tevens als een groeiparameter. In het *derde deel* probeerden we het groeiverloop van de agrarische sector tussen 1812 en 1846 te analyseren en te verklaren.

In het *eerste hoofdstuk* van dit derde deel zetten we de voornaamste kenmerken van het groeiverloop uiteen. Eén daarvan is dat de agrarische sector geen opmerkelijke groei doormaakte gedurende de eerste helft van de negentiende eeuw, maar er niettemin in slaagde de voedselvoorziening te verzekeren van een snel groeiende bevolking. Het belangrijkste aspect van de vroeg-negentiende-eeuwse agrarische groei ligt in de aanzienlijke regionale verschillen op het nationale groeipatroon: tussen 1812 en 1846 steeg de landbouwopbrengst in de zuidelijke provincies Namen en Luxemburg erg snel. In de Antwerpse en Limburgse Kempen, en in de regio's Brussel, Leuven en Brugge was de groei beperkt maar nog steeds belangrijk. In de progressievere landbouwstreken van België, namelijk Oost- en West-Vlaanderen, en in de kernzones van de Belgische Industriële Revolutie, namelijk Luik en Henegouwen, nam de agrarische opbrengst erg weinig toe.

In *hoofdstukken twee en drie* probeerden we exogene en endogene verklaringen te vinden voor de groei van de landbouwsector in het

algemeen, en voor de regionale varianten op het nationale groeicijfer in het bijzonder. De voornaamste resultaten kunnen als volgt worden samengevat. De snellere groei in de regio's van de Ardennen moet in de eerste plaats toegeschreven worden aan exogene factoren die een grotere betekenis en invloed hadden in Namen en Luxemburg dan in de rest van het land: de bevolking groeide sneller, de vraag voor landbouwprodukten in de industriële bastions van Luik en Henegouwen gaven een extra stimulans aan de agrarische sector, de ontvoogding van de boeren vanaf 1795 en de ontwikkeling van de transportinfrastructuur vanaf 1830 kwamen de zuidelijke streken zeer ten goede. Voor alles betekende de eenmaking van het Belgische grondgebied in 1795 voor de zuidelijke provincies de eerste stap naar economische integratie in de stadseconomie van België. Vanaf de aanbodzijde was de snelle groei in de Ardennen het gevolg van een verhoogde inbreng van land, arbeid en kapitaal. Op het einde van het Ancien Régime was de Ardense landbouw nog erg extensief, zodat de belangrijke toename in arbeid – bevolkingsgroei – en land – minder braakland en landwinning – de totaalopbrengst snel deed groeien. De tragere groei van de landbouw in de Antwerpse en Limburgse Kempen, en de streken van Brussel, Leuven en Brugge moet in de eerste plaats toegeschreven worden aan een beperkte exogene impuls; bekeken vanaf de aanbodzijde werd de landbouw in deze streken gekenmerkt door een relatief belangrijke toename van de produktiviteit. In de Vlaamse provincies, Luik en Henegouwen bleef de groei van de landbouwopbrengst beperkt omdat de invloed van exogene factoren onbelangrijk was of niet beantwoord werd doordat in het begin van de negentiende eeuw de capaciteit voor de expansie van de landbouwopbrengst door technische verandering zeer beperkt was.

# La production agricole belge (1812-1846).

PAR
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## Résumé

Le but de cet article était de *d'écrire, d'analyser* et *d'expliquer* le modèle de développement régional de l'agriculture belge durant la première moitié du dix-neuvième siècle.

Dans la *première partie*, nous avons observé les problèmes d'ordre théorique et heuristique. Dans la *seconde partie*, nous avons construit une base de données à partir de laquelle nous avons calculé la production agricole totale en Belgique en 1812 et en 1846. Cette production totale – le produit agricole – sert d'indicateur pour la performance du secteur agricole ainsi que de paramètre de croissance. Dans la *troisième partie* nous avons essayé d'analyser et d'expliquer le modèle de croissance du secteur agricole entre 1812 et 1846.

Dans le *premier chapitre* de cette troisième partie, nous avons décrit les caractéristiques principales du modèle de croissance. La première est que le secteur agricole n'enregistra pas de croissance spectaculaire durant la première moitié du dix-neuvième siècle, mais qu'il réussit néanmoins à assurer l'alimentation d'une population qui augmentait rapidement. L'aspect le plus important de la croissance agricole du début du dix-neuvième siècle est constitué par les variations régionales importantes face au modèle de croissance national: entre 1812 et 1846 la production agricole augmenta très rapidement dans les provinces méridionales de Namur et de Luxembourg. Dans la Campine anversoise et limbourgeoise et dans les régions de Bruxelles, Louvain et Bruges, la croissance était plus limitée mais toujours importante. Dans les régions agricoles belges plus progressives, c'est-à-dire la Flandre-Orientale et la Flandre-Occidentale, et dans les secteurs-noyaux de la Révolution Industrielle belge, c'est-à-dire Liège et le Hainaut, la production agricole augmenta fort peu.

Dans les *chapitres deux et trois*, nous avons essayé de trouver des explications exogènes et endogènes à la croissance dans le secteur agricole en général et aux variations régionales face à la configuration de croissance nationale en particulier. Les résultats les plus importants peuvent être résumés comme suit. La croissance plus rapide dans les régions ardennaises doit être attribuée en premier lieu à des facteurs exogènes ayant une plus grande signification et influence dans le Namur et le Luxembourg que dans le reste du pays: la population y augmentait plus rapidement, la demande de produits agricoles dans les basins industriels de Liège et du Hainaut donna un stimulant particulier au secteur agricole, la libération des fermiers à partir de 1795 signifia pour les provinces méridionales le premier pas vers l'intégration économique dans l'économie urbaine belge. Du côté de l'offre, la croissance rapide dans les Ardennes était le résultat d'adjonctions augmentées de terrain, de travail et de capital. A la fin de l'Ancien Régime, l'agriculture ardennaise était toujours pratiquée de façon très extensive, ce qui signifia que les accroissements importants de travail (l'augmentation de la population) et de terrain (réduction de la jachère et défrichement) résultèrent en une augmentation rapide de la production totale. La croissance plus lente de l'agriculture dans la Campine anversoise et limbourgeoise et dans les régions de Bruxelles, Louvain et Bruges doit être attribuée en premier lieu aux apports limités des facteurs exogènes; du côté de l'offre l'agriculture dans ces régions était caractérisée par une croissance relativement importante de la productivité. Dans les provinces de Flandre, de Liège et de Hainaut, l'accroissement de la production agricole demeura limitée en raison de l'influence trop peu importante ou demeurée sans réponse des facteurs exogènes ainsi que de la capacité d'expansion très limitée de la production agricole à partir de changements techniques au début du dix-neuvième siècle.