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What were demographic crises like in mid-nineteenth century France?

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**What were demographic crises like in mid-nineteenth century
France?**

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What were demographic crises like in mid-nineteenth century France ?

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Historians tend to agree that the first half of the nineteenth century escaped the terrible subsistence crises which, during the *ancien régime*, made life a precarious business for a considerable number of the very poor. Even though epidemics were also a threat, it is subsistence crises which were invoked, in a malthusian conception of the history of the *ancien régime*, as regulators of the level of population. It was as if inevitably, space abhorring a vacuum, population ineluctably pressed against a subsistence ceiling. Crises then erupted, causing population to retreat. Gradually, undoubtedly due to several factors, these famines became scarcities, though this is not to say that they were no longer responsible for mortality peaks. It was during the first half of the nineteenth century that the last of these crises occurred. In this view, the crisis of 1846 marked the final apparition of this kind of mortality.

But what is a crisis ? Being unable to count the number of deaths due to disease, as became feasible during the nineteenth century, historians have measured the effects of malnutrition or famine with the aid of a single measure, price: and perhaps they have relied too much on this measure. For price to give us a good picture of a crisis, there must be a strong correlation between harvests and prices on the one hand, and between harvests and mortality crises on the other. This way of proceeding has given rise to controversy, but controversy which has been productive for French historiography. Guided by Guy Cabourdin's excellent survey, we offer a quick summary of the issues in order to place the crisis of 1846 in context.¹

It all began with contemporaries such as L. Messance, who on the basis of annual data from Paris, Rouen, Lyon, Clermont-Ferrand, and London, posited a positive correlation between wheat prices and mortality.² Using Messance's data, Dr. François Melier posited an even tighter correlation between the two time series, writing in 1841: 'whenever the price of wheat rose, mortality increased ...and whenever it fell, mortality also fell..' A little later, A. Legoyt, again on the basis of Messance's data, stated: 'Under the influence of (high prices), one sees mortality rising, marriages diminishing or becoming less fertile, and movements of population taking place'.

It is this tradition which has influenced historical demographers, and particularly, Jean Meuvret, whose name is so closely linked to subsistence crises.³ As Cabourdin puts it, 'the correlation between exceptional rises in cereal prices, significant increases in deaths, and a falling off in conceptions to him seemed self-evident.' It is within this framework that 'modernist' French historians worked at first. First, Pierre Goubert, according to whom, 'the economic crisis of the traditional type gave rise to a demographic crisis of the traditional type'; then the historical demographers Louis Henry and Etienne Gautier, as well as G. Livet, for whom '*la mercuriale sécrète la mortalité* (the mercuriale secretes mortality)'.

Disagreement was not long in coming, and it came first from R. Baehrel, in his thesis on Basse-Provence. For Baehrel, correlation did not imply causality : high prices and high mortality might well coincide, but both could be driven or influenced by a third factor, the weather. A period of bad weather responsible for a particularly bad harvest was also bound to drive up mortality. Pierre Chaunu went further, claiming: 'There are subsistence crises that don't kill, and demographic crises in times of abundance; even when high prices and high mortality coincide, it is not a question of simple cause and effect...It is not hunger in the literal sense that kills, but the fellow-travellers of hunger...It is disease that kills, epidemics to which the those at risk are more vulnerable.. The subsistence crisis ceased to be the bread and butter of the demography of the *ancien régime*'. Moreover, during crises death did not come through 'literal starvation, but by the

¹ Guy Cabourdin, 'Qu'est-ce qu'une crise ?', in Jacques Dupâquier (ed.), *Histoire de la population française*. Vol. 2. *De la renaissance à 1789*. Paris, 1988, pp. 175-191.

² Messance, *Recherches sur la population*, especially pp. 291-2, 309-30.

³ Jean Meuvret, 'Les crises de subsistances et la démographie de la France d'Ancien régime', *Population*, 1946, n° 4, Reprinted in *id. Etudes d'histoire économique*, Paris, 1971, pp. 271-278.

epidemic route'.⁴ Now, it does not seem to us (although the issue requires further investigation), that Jean Meuvret believed, through induction, that all the excess mortality he encountered was the product of subsistence crises. After all, he warned us that 'a poor harvest entails a rise in burials, but the excess deaths could be due to either hunger or epidemic diseases'.⁵ The ensuing debate ignored this point and, certainly, the critique is off the mark when it seeks to minimize the role of poor harvests on mortality. However, aside from these subsistence crises, it is still true, as with SARS or AIDS today, that not all crises are due to harvest shortfalls. Cholera and plague offer good examples.

If as Cabourdin argues, 'not all price peaks resulted in significant excess mortality, nor can all mortality be inferred from movements in the price of grain', the link between harvest and price implied in the earlier literature is probably too strong. Surely one can envisage harvest fluctuations that are not mechanically reflected in price movements? Effects resulting from human subjectivity, such as rumours for example, can they not impact on markets, exacerbating the effect of a poor harvest? Could it be otherwise in a world where trade grows and information were still imperfect? In such a scenario, one may easily imagine that price increases did not always lead to a rise in deaths.

There remains a tricky problem, that of how to measure crises, which influences in part the characteristics we attribute to them. For Goubert, one can 'speak of a demographic crisis from the moment that the annual number of deaths doubles and when, at the same time, the number of conceptions falls in an indisputable manner, by at least one-third' – this relative to the average in normal years. Since then several authors – T. H. Hollingsworth, Jacques Dûpaquier, Jean-Michel Chevet – have proposed methods that, in the quest of greater rigour, nevertheless also contain an arbitrary element like Goubert's.

One can see that in this context it was still possible to think that subsistence crises could still attack populations in the early part of the nineteenth century. Thus Marcel Reinhard et A. Armengaud could write: 'Economic crises are above all subsistence crises. They still produce brutal drops in births – notably in 1817, 1832, and 1847 – accompanied or followed by epidemics and a rise in mortality – 1832, 1834, 1847, and 1849', and again 'France remains very close in the demographic sense to where it was in the second half of the eighteenth century'.⁶ This conception is also evident in the claim of Labrousse relative to the first half of the nineteenth century that '...subsistence crises continue to hit the agricultural economy..At the level of the region or province, there are years of extreme penury: in 1817, 1832, 1839-40, 1846-47, 1854-56, 1867-68, to cite only some well known cases'.⁷

However, André Armengaud introduces a discordant note in this concert when he writes a little later: 'One can say that their impact lasted until the Second Empire, but in a much attenuated form: famines had disappeared from France since the beginning of the eighteenth century, only scarcities occurred now, and one did not die of starvation in the literal, physiological sense of the term any more. True, in a period of scarcity, malnutrition of large sections of the population could provoke an aggravation of their sanitary state and increase the death rates of children, the elderly, and the sickly. It is no less true that the years of major epidemics, at least at the national level, resulted in higher mortality than years of alimentary crisis'.⁸ With the impact of food deficits thus lessened, the primary role is left to epidemics, so much so that in the early nineteenth century, in

⁴ On these citations see Cabourdin, *ibid.*, pp. 178-180.

⁵ Chevet, 'Les crises démographiques en France', p. 133.

⁶ Reinhard and Armengaud, *Histoire générale de la population mondiale*, p. 242.

⁷ E. Labrousse, 'A livre ouvert sur les élans et les vicissitudes des croissances', in Braudel and Labrousse, *Histoire économique et sociale de la France*, vol. 3(2), p. 994.

⁸ A. Armengaud, 'Le rôle de la démographie', in Braudel and Labrousse, *Histoire économique et sociale de la France*, vol. 3(1), pp. 202 et 244.

the words of G. Caudelier, ‘the price of grain no longer had an decisive influence on morality’: the mercuriale no longer secreted mortality.

For others, in the typology they give to crises in the 1800-1870 period, that of 1847-49 is deemed ‘very serious’ and should be placed in the context of ‘the poor harvest of 1846, the economic crisis of 1847-48, and above all the new cholera epidemic’. But here too the cholera seems to dominate: ‘It will be noted that nearly all the mortality had an epidemic origin: subsistence crises – in particular that of 1846-49 – might be an aggravating factor.’⁹

Against the background of the state-of-play just outlined, we propose to re-evaluate the nature of demographic crises in the first half of the nineteenth century : distinguishing those which are of purely epidemic origin and those, if they exist, which deserve to be called subsistence crises. For reasons just cited, we will focus in particular on the crisis of 1847, which seems to historians to be the only one to qualify under this rubric. That will lead us to an analysis in this period of the impact of variations in the food supply on the price of corn.

In Part I demographic variables – mortality, natality, nuptiality, population – are analysed with a view to identifying crises and their intensity in the 1820-1870 period. The crises that stand out will be confronted with price and production data. Account will also be taken of imports as a regulator of crisis. This analysis will be conducted at the national level. In Part II each element in the analysis will be re-focused on the regional or departmental level, which will allow us to judge the role which substitutes for wheat production might play.

I – Crises at the national level.

A – The timing and extent of demographic crises in the first half of the nineteenth century.

If we examine the graph of deaths over the 1800-68 period in Figure I, we see that it is marked by a tendency to rise, which reflects the rise in French population. Moreover, we also note various oscillations, as well as a number of peaks representing various crises. In order to measure the amplitude of the most important crises, we have traced on the same graph a nine-year moving average. If we deem, admittedly rather arbitrarily, deviations of 10 per cent relative to the moving average as characterising a crisis, then apart from the 1820s, the years that stand out are 1832, 1834, 1849, 1854, 1859, or five crises in 49 years. That of 1847, with a deviation of only 4 per cent, does not figure on the list. Indeed it is placed only eighth when one takes account of two peaks of 5 per cent, those in 1826 and in 1837. If one focuses on the post-imperial era, one sees, following A. Armengaud, that the cholera epidemics of 1832, 1834, 1849, and 1854, are far more murderous than the crisis of 1847 because in those years excess mortality levels of 12, 10, 18, and 17 per cent were registered. The crisis of 1847 pales by comparison, so much so, that its existence is placed in doubt.¹⁰

This doubt persists and, indeed, increases, when the intensity of the crisis of 1847 is compared with those of the eighteenth century.¹¹ In effect, quite apart from the famine of 1693 and 1694 when mortality rose by 34 and 60 per cent respectively, or that of 1709 and 1710 when the rises were 22 and 29.5 per cent, there were mortality surges of 25 per cent in 1719, 21.5 percent in

⁹ A. Bideau *et al.*, ‘La mortalité de 1800 à 1914’, in J. Dupâquier, *Histoire de la population française*, vol. 3, De 1789 à 1914, Paris, 1988, p. 293.

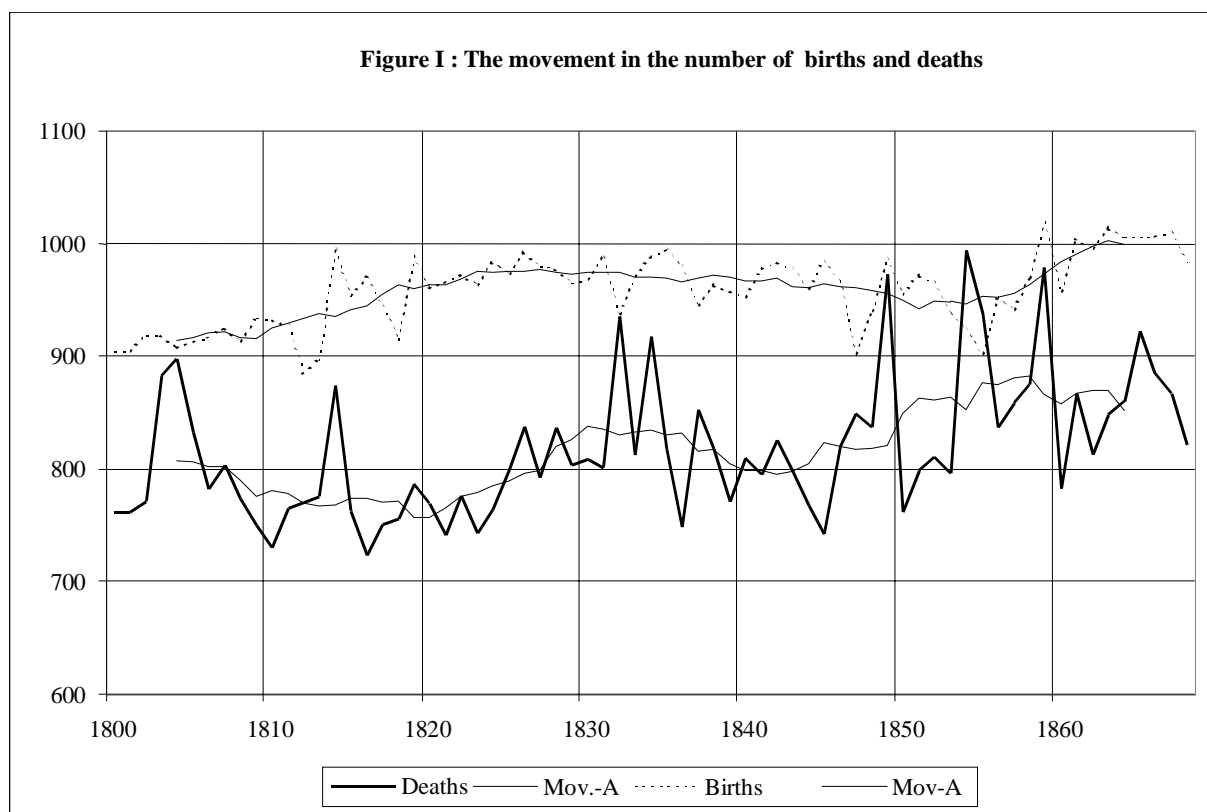
¹⁰ Armengaud, *ibid.* See too Bourdelais and Raulot, *Une peur bleue*.

¹¹ One might object that working with harvest years minimises the gravity of the crisis of 1847. That might be the case if one found a rise in deaths in 1846. That not being the case, taking account of the last six months of 1846 cannot augment the crisis of 1847.

1747, and 23 per cent in 1779.¹² If we apply the measure of moving averages to the same data, crises become more numerous. Seven out of 51 years experience deviations of more than 10 per cent in deaths, and 11 exceed 5 per cent. Not all of these crises were subsistence crises, of course, but the point is that when they were – their size dwarfed that of 1847 : 21.5 to 27.4 per cent in 1747, depending on the denominator used, 12.3 per cent in 1772. It would seem that over the long century between 1740 and 1850, there was a change, and scarcities became considerably milder or, indeed, disappeared.

As in the case of deaths, a tendency for the number of births to rise over time is apparent from Figure I. However, the kind of ‘cycle’ that one sees here are much less marked and longer than those visible for deaths. One also detects in the curve a certain number of falls in births which at first sight are linked to crises. The most severe of these, amounting to just under six per cent, was in 1847, which offers support to partisans of a subsistence crisis. The other deficits are much less serious. We note those of 1831 (-4 per cent) and 1855 (-5 per cent); the rest are lower. Moreover, none of the declines in the number of births coincides with a significant rise in the number of deaths.

In times of crisis, the drop in the birth rate has a two-fold explanation. The first, mechanical,



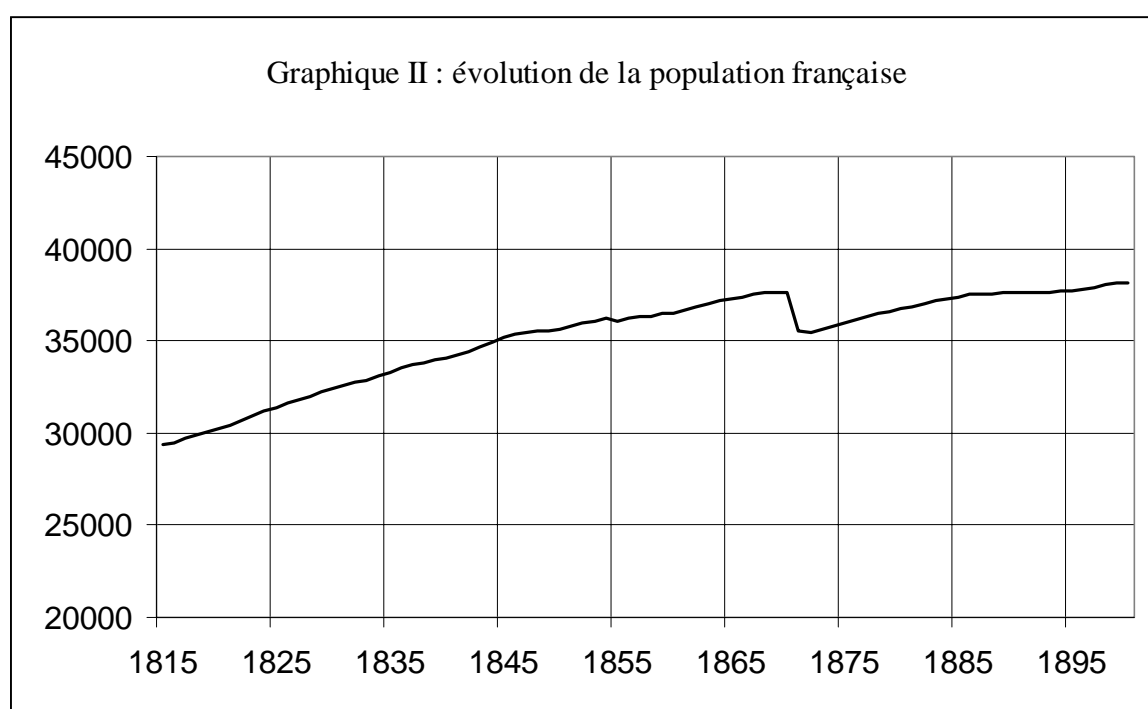
explanation is due to the mortality of mothers-to-be. If such is the case, the deficit in births occurs in the same year as the rise in deaths. Emmanuel Le Roy Ladurie has proposed a second explanation.¹³ According to him, privation increases the sterility of some couples. In this case, the decline in births would occur with a lag after the rise in deaths. It is true that the disappearance of a husband or a wife could produce a similar outcome. With the help of the annual data available, it is difficult to decide between the two hypotheses. We note however that the demographic crisis is supposed to have followed the poor harvest of 1846, is not followed in 1848 by a significant decline in births. The same holds for the other crises occurring in this period.

¹² Chevet, *ibid.*, p. 130 ; Lachiver, *Années de misère*.

¹³ Roy Ladurie, 'L'aménorrhée de famine'.

At this stage of the analysis, one must conclude that the crises of the nineteenth century were far from the conditions defined by Goubert and Meuvret to qualify as subsistence crises. This observation places on the side of those historians who claim that the vigour of these crisis had attenuated compared to the early eighteenth century. We would go a little further, however, and argue that in the nineteenth century they did not resemble either those of the second half of the eighteenth century, to the extent that they had attenuated so much that they had disappeared. This is what we are about to show.

The examination of movements in the number of marriages yields little of interest in this context.¹⁴ In effect, from 1825 on there was a modest rise in the number which tapered off c. 1845 and accelerated slightly c. 1855. There were few significant breaks. The most important, a decline of 11 per cent, was in 1847. Perhaps this had more to do with the industrial crisis of 1847 than with subsistence. The other declines, of under 7 per cent in 1832 and under 6 per cent in 1854, were due to cholera epidemics in those years.



An examination of the evolution of French population during the nineteenth century suggests that it grew at a more or less regular pace. The crisis of 1847 is visible only as a slowing down in the growth of population, which is no surprise since there was no excess of deaths over births in that year. On the other hand, that due to the cholera epidemic of mid-century is more visible. It is for this crisis only that the number of deaths exceeded the number of births in 1859 and 1860. The population curve, referring to a constant geographic territory, shows that the effects of the war of 1870 were much more important and that it is on this occasion that one witnesses a rupture in the trend.

A comparison of this curve with that of the reconstituted French population of the eighteenth century reveals essential differences, the most important being that the latter contains several ruptures, the most important being those associated with famines in 1693-94 and 1709-10. Later crises, though less intense, are nevertheless visible. Thus there were breaks in 1719, 1740,

¹⁴ For this reason we omit the graphics.

1747, and 1779. Here again, it seems to us that the first half of the nineteenth century differs from the second half of the eighteenth.

B – Demographic crises, prices and harvests.

Most of the time, historians of the ancien regime have to do without data on harvests ; they rely on price movements as reflections of movements in output, a big rise in prices being taken to correspond to a deficit, more or less proportionate, in output. To begin with, and because for the nineteenth century we are less destitute than contemporary historians as far as harvest data are concerned, it is prices that we first confront the crises identified above. We will pay particular attention to the price of corn. We focus on this because cereals – corn, meslin, rye – account for the bulk of production in this era. In the north of France, their cultivation represents nearly 95 per cent of the land surface devoted to human food ; among them corn is most important with a proportion over 66 per cent.¹⁵ In other regions, except for the Southwest where they account for only 70 per cent, cereals cover 75 to 90 per cent of land producing human food, corn's share being between 60 and 70 per cent. It reached only 40.5 per cent in the Centre and 53 per cent in the South. If instead of analysing the area under cereal cultivation, one turns to their share in consumption, the landscape is modified due to high potato yields. In the North the share of cereal is reduced to about 71 per cent, and in the Southwest to 60.6 per cent. Three other regions, West, Centre, and South, with a consumption between 50 and 60 per cent, are next, and the the remaining four (Northwest, Northeast, East and Southeast) with between 40 and 50 per cent. For France as a whole, cereals and maize represent about 55 per cent of human consumption. And, since as elsewhere these crops are the main source of urban food, one can see how it makes sense to focus on grain as an indicator of price movements. Note that, as in the case of the demographic variables, we have calculated, from an annual price series based on the harvest year, moving averages of nine years.¹⁶

Between 1820 and 1865, nine price increases of over 10 per cent emerge. Five of these, with deviations of over 20 per cent, are of a more marked character, while the remaining present rises of 10 to 15 per cent. On the other hand, that of 1846, with a rise of almost 50 per cent, stands out - cf. Table I. If this rise is compared to that in the years of famine at the end of the seventeenth and the beginning of the eighteenth centuries, it is seem to be very modest. In effect, during 1693 and 1694 the price of wheat, relative to 1688-91, rose by 147 and 228 per cent, respectively. In the wake of the '*grand hiver de 1709*' there was a rise of 285 per cent.¹⁷ These increases are out of all proportion to those in Table I. Believers in a certain proportionality between harvest deficits and price rises must therefore concede that the crisis of 1846 is on a very minor scale compared to those earlier famines.

Table I suggests that of the nine price rises, only one, that of 1854, coincides with an increase in the number of deaths. Note that the crisis of 1846 does not feature in the table because it produced only a very minor rise in deaths. The increase in the number of deaths of 5 per cent in that year does is in sharp contrast to the 50 per cent rise in the price of wheat.

On the basis of corn yields, we have calculated deviations from a moving average. The average is an approximation, since substitutions between different food crops are likely to have

¹⁵ Our calculation does not take account of oats and barley they were produced almost exclusive for livestock consumption.

¹⁶ The prices used are those published in Labrousse, *Le prix du froment en France, 1726-1913*.

¹⁷ The prices come from Baulant, '*Le prix des grains à Paris de 1431 à 1788*', 539-540.

taken place.¹⁸ We identify nine deficits of over ten per cent in the 1820-64 period. In six cases, the percentage deficit was in the 10-20 per cent range. In three cases, the percentage exceeded twenty per cent : 1853, 1861 and 1846, the last-mentioned being the biggest with 25 per cent. Comparing these results with those concerning mortality opens up an important result: none of the deficits encountered in yields corresponds with an increase in the number of deaths. The crises occurring between 1820 and 1865 are therefore not subsistence crises. Setting aside those of 1832, 1849 and 1854, which were due to cholera, they must be due to epidemics that yet remain to be identified. The lack of a harvest deficit effect may arise from their mild character but, as we shall see later, it could also be due to compensating changes in other crops.

*Table I : Years of demographic crisis, 'subsistence crisis', and high prices.*¹⁹

	Production deficit	Price increase	Increase in deaths
1820	12.5	Nil	Nil
1828	Nil	11.2	Nil
1830	15.5	Nil	Nil
1831	10.4	13.5	Nil
1832	Nil	Nil	12
1834	Nil	Nil	10
1839	Nil	16	Nil
1846	25.1	49.9	Nil
1849	Nil	Nil	18
1853	22.4	22.8	Nil
1854	Nil	11.7	17
1855	17	27.5	Nil
1856	Nil	21.2	Nil
1859	Nil	Nil	13
1861	23.2	25.3	Nil
1863	16.3	Nil	Nil
1864	16	Nil	Nil

Still referring to Table I, it emerges that only five of the nine deficits coincided with a rise in prices: those of 1830, 1846, 1853, 1855 and 1861. Nor would there seem to be any proportionality between the rise in prices and the size of the harvest shortfalls. That is particularly so in 1846 when the price of wheat rose by 49.9 per cent as the harvest fell by 25 per cent. Attempting to estimate the price elasticity relative to supply for the first half of the nineteenth century faces certain difficulties. That is so for two reasons. The first is that the historian lacks all the data necessary for this kind of calculation. But, one might ask, if the historian or the economist cannot arrive at a clear view of the world studies despite the sources at his disposal, then how did the consumer possess this universal knowledge? This leads to a second consideration, which is that trades multiplied while the elements that regulate price fluctuations (such as information on harvests and prices), are at a premium, irrational elements – rumours, panics, and other subjective phenomena – tend, as in 1846, to arbitrarily increase the price of wheat.

These results suggest, before analysing the so-called subsistence crisis of 1846, an initial conclusion which would seem, at least for the period considered here, a broader significance. It does not seem that one can use price rises as indicators of deficits produced by poor harvests. This finding also suggests care insofar as the ancien régime is concerned, since it is quite likely that

¹⁸ The data on yields, area under cultivation, and production used in this paper come from the following document : Ministère de l'agriculture et du commerce, direction de l'agriculture, *Récoltes des céréales et des pommes de terre de 1815 à 1876*, Paris, 1878.

¹⁹ The years of scarcity have been identified from a annual average price series calculated from all départements between 1833 and 1860. Before and after these two dates, the average national price was based on only one third of départements, which would seem to bias downwards a little the percentage rise in prices.

price increases then could have been the products, not of poor harvests, but of political events. Such events could also have been as much at the origin of a deficit in supply as high prices.²⁰ It does not follow, contrary to what Pierre Chaunu would seem to think that the baby should be thrown out with the bathwater.

C – Substitutes and Imports.

We have seen that wheat, meslin, and rye were not the only items destined for human consumption. Depending on the region, they were supplemented by buckwheat, maize, and the potato. It is unlikely that all these crops were affected in the same way, with the result that some compensation between crops are likely to have occurred. Moreover, since these three crops were sown in April or May, or even June in the case of buckwheat, it was also possible that if the weather compromised the wheat and rye harvests, the area under these other crops was extended as a precautionary measure.

Relative to the 1842-45 average, the volume of the wheat harvest fell by 19 per cent while that of meslin fell by 25.3 per cent and rye by 29 per cent. The total cereal deficit came to 22 per cent, or a little less than indicated by the shortfall in yields. Against this, the buckwheat harvest rose by 29 per cent and the maize harvest by 26.5 per cent. The rise in these two items would have been sufficient to match the deficit in wheat and rye, were it not that the potato harvest was also a poor one. In aggregate the deficit in crops destined for human food was about 17.5 per cent, so that in this particular case, the wheat yield was a good indicator of the variation in output. The fact that the importance of buckwheat and maize across the hexagone varied considerably suggests the need for an geographic analysis of regional disparities in harvest shortfalls. It also bears noting that in 1846 the area under buckwheat rose by 4.4 percent relative to 1842-45, that of maize by 9.6 per cent, and that under potatoes by only 0.05 per cent. It would seem therefore that farmers, in confronting the crisis that was unfolding, increased, where possible, the area under these plants. We need to see whether these rises occurred in those regions where the grain harvest experienced the greatest deficits.²¹

Apart from these substitutes and contrary to what happened later, economies at the beginning of the nineteenth century had another means of counteracting deficits : imports. Did they exploit it during the 1846 harvest year ? That is what we are about to see. In 1846 France imported 4,910 million hl of wheat, either as grain or converted into flour. In 1847 she imported 10,100 millions and in 1848, 1,250 millions. The administrative practice of producing import statistics for the calender year force us to make a few assumptions, in order to evaluate the impact of imports on the 1846 harvest year. Since the 1845 harvest was an average one, we may assume that imports in 1846 are more likely to have been concentrated towards the end of the year, in other words, during the 1846 harvest year. As for imports in 1847, given a surplus harvest that year, the demand for foreign wheat is likely to have fallen, as was surely the case in 1848, another good year. The bulk of imports in 1847 are therefore likely to have been in response to the situation in 1846. So as not to stack the cards in favour of the case we are making, we will claim only the 10,100 millions hl of wheat imported during 1846 for the 1846/7 harvest year. Even that reduces the wheat deficit from 14,150 million hl to 4,150 million hl, or only 5.5 per cent of wheat consumption. If these imports are included in the overall balance reached above, the deficit set at 17.3 per cent is reduced to 13.4 per cent. This leads us to the conclusion that there was no mortality crisis due to a lack of food in 1846. True, for imports to have had the impact described, they would have had to been present during the harvest year, and particularly during the second half of the year. As things stand, we

²⁰ The siege of Paris during the wars of religion may fit this pattern.

²¹ In certain *départements*, still in the mid-nineteenth century, barley and oats accounted for a share, admittedly small, of the human diet. It is quite likely that their share rose during scarcities.

cannot be certain about this, but the tendency for prices to fall from May 1847 on makes it more likely.

II – Was the crisis of 1847 a regional crisis ?

Perhaps we should have ended this paper here on the basis that the mythical status of the crisis of 1846 would seem to be well established by now. We continue the analysis, however, because it is quite likely that marked regional disparities mask through cancelling out, the existence of regional crises. For this reason, we move from analysis at the national level to one at a regional and *départemental* level in search of possible regional crises. The strategy adopted is the same. Still, at the end of the day, the analysis of the substitute crops, buckwheat, maize, and potatoes will be more precise, since the importance of these crops varied considerably across the hexagon. To begin, we look at the extent of any mortality crises at *département* level.

A – Were there regional demographic crises in 1847 ?

In order to delimit these crises, we proceed as before. The series at our disposal are long enough to generate deviations from a seven-year moving averages for every *département*. An examination of the results reveals a certain number of *départements* where the rise in mortality was in 1846 and not in 1847. It also shows that there was a group of *départements* where the phenomenon is visible only in 1847, and others where the increases in mortality were insignificant. The outcome is summarised in Maps I and II below.

Had we information on mortality trends during the 1846/7 harvest year, the results might have been different, particularly if the mortality in departments that stand out in the 1846 map was limited mainly to the second half of the calendar year. To that extent, we may have underestimated the size of the 1847 crisis. However, lacking the number of deaths during the harvest year has one advantage. In effect, if we were dealing with a genuine subsistence crisis, the worst of the mortality would have been produced at the end of the harvest year, in other words in the first half of 1847 and not in the beginning of the harvest year (i.e. in the second half of 1846). That suggests two remarks. The first is that the spread of deaths argues in favour of epidemics rather than a subsistence crisis. The second is more general, and consists of a caution against reasoning based on annual data, be they harvest or calendar years, without knowing their monthly breakdowns.

In 1846, 28 *départements* out of 86 experience an excess mortality of over ten per cent, and ten of these it exceeded fifteen percent. Moreover, 31 *départements* were above the national average and 56 below it. The change of geographic scale thus gives another vision of excess mortality, though this still remains very modest. The identification of the *départements* affected by this excess mortality reveals an arbitrary distribution spread across French territory. There is no geographic coherence to it. Thus the excess mortality of fifteen percent in the Hautes-Alpes is isolated. If Aisne and, to a lesser extent Aube, Oise and Marne, were hit by the crisis, the Paris provisioning region remained untouched, which is far from characterising a real subsistence crisis. The Southwest was unevenly affected by the crisis. Only the Centre seems to have been fully hit. All in all, these excess mortalities which, it should be remembered, were modest compared to the previous century, seem to have been of a local character. One can infer that they were epidemiological in origin, because a subsistence crisis would have affected a bigger region - one supplying the major cities, for example, or one sharing the same climatic or production mix characteristics. In addition, if it is borne in mind that there was no cereal deficit in that year, the case seems closed.

In 1847, forty of the eighty-six *départements* had an excess mortality of over ten per cent (Map II). Of this forty, twenty exceeded the threshold of fifteen per cent. On this occasion, fewer were below the national average, sixteen compared to fifty-six in 1846. As with 1846, the change in scale is telling. However, the increases in mortality were more or less the same in both years.

This suggests some remarks. We have just seen that in 1846 some *départements* might register excess mortality above ten per cent, while at national level no crisis is visible. This finding can be extended to other years in this period, and even generalised. In 1839, for instance, a year in which mortality was a little below trend, no fewer than eleven *départements* suffered an excess mortality of ten per cent or more, and in Seine-Inférieure a level of 29 per cent was reached. 1842 offers another example, when seven *départements* exceed ten per cent; they included Charente-inférieure (10.65 per cent), Lot-et-Garonne (14.8 per cent), and Somme (10 per cent). In these two years only epidemics are the likely culprits for such local crises. A comparison between these two years, to which one might add 1846 and 1847, shows that a disparity in the number of *départements* touched by this excess mortality is the only difference that concerns them, so much so that one may imagine that all the excess mortality in these *départements* stems from local epidemics.

In 1847, as in 1846, the geographic spread of mortality by *département* seems to be random and lack any of the geographic coherence expected from a subsistence crisis. It would be pointless to give a detailed description of this spread: enough to add that the affected *départements*, the Centre region apart, are spread throughout the whole of France. Which leads to the conclusion that in 1847 too, the likely cause of the crisis was local epidemics that were at best remotely linked to problems of subsistence. A comparative look at local output conditions adds further insight.

B – Demographic crises, price rises and harvest deficits at the regional level in 1847.

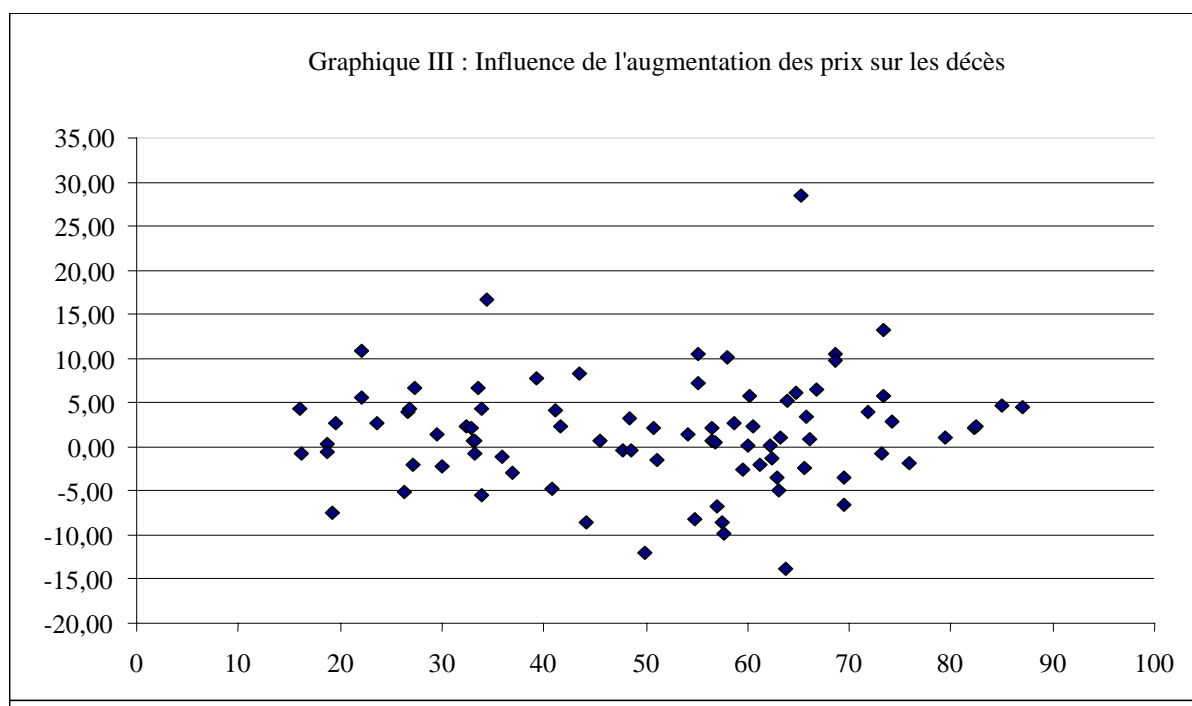
If the supposed increase in deaths in 1847 resulted from insufficient food, the map that would show this ought to bear some resemblance to that of the rise in price. In order to verify this, we have calculated for harvest year 1846/7 the rise in price in each *département*, using a five-year moving average of the price of wheat. The results are shown in Figure III. Clearly there were strong regional disparities.

An examination of this graph shows that the rise in prices was very significant. It was not uniform across the hexagon, however; it ranged from 15.98 per cent to 86.94 per cent, the latter number reflecting a near-doubling in the price of wheat in certain *départements*. In the Northeast about ten *départements* suffered, with more than 70 per cent, the biggest increases. In another group of twenty *départements*, further to the west than the first and surrounding it, wheat rose by between 60 and 70 per cent. On the perimeter of this last group, the price of wheat in another fifteen *départements* rose by 50 to 60 per cent. In the extreme west, in Brittany and coastal Normandy, as well as in the Southwest, it rose by between 30 and 50 per cent. The Southwest experienced only a mild increase. Overall, the price of grain in the Northwest fell relative to the rest of France.

It is very difficult to establish a benchmark for a subsistence crisis, or even the existence of a crisis, on the basis of prices alone. Nevertheless, a close examination of the variations in price shows that rises of the order of 25 to 30 per cent were not unusual during the first half of this century, and that such rises were not associated with subsistence crises. That was even sometimes the case when the price rise was greater. We would therefore maintain, somewhat arbitrarily, it is true, that in cases where the price rise of wheat was less than 50 per cent, the existence of a crisis was dubious at the least. In this case, if prices are used as a guide, the crisis held sway north on the imaginary line linking Saint-Malo and Geneva, though omitting Brittany and part of Normandy.

Comparing this map with that describing mortality, discussed above, suggests that there was no association between the two phenomena. The mortality crisis therefore would seem to bear little relation with subsistence crises or with the peaks noted in the price series. Thus if some *départements* in the Northeast and Centre affected by excess mortality experienced a significant rise in prices, others in the same zones did not. To be sure, one might claim that there was a subsistence crisis in the Northeast and the epidemics were at work where no increase in the price of

wheat is observed. But this latter argument does not hold water since many *départements* saw prices rise without experiencing a mortality crisis.

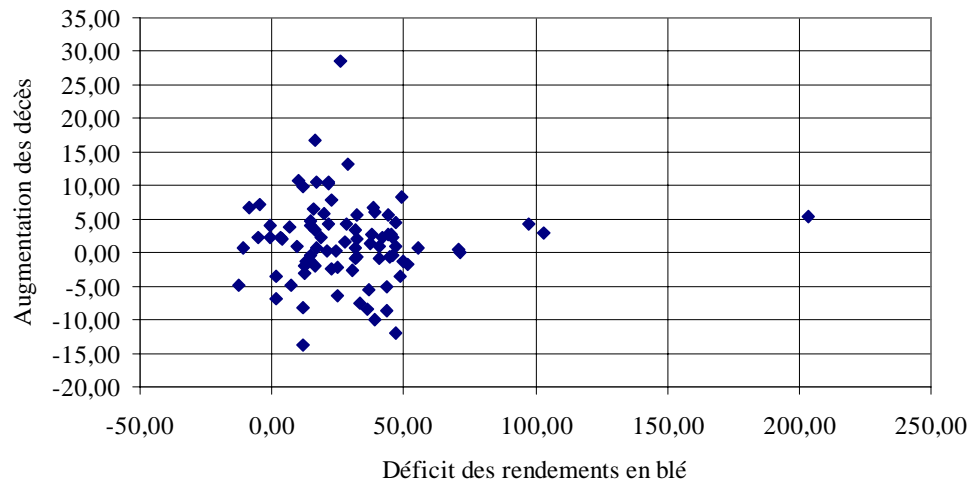


In Figure III we show price increases on the x-axis and changes in the death rate on the y-axis. The horizontal cloud of dots representing the *départements* indicates that there is no relation between the two variables. For those in doubt, the correlation coefficient of 0.05 between the two confirms the conclusions drawn from comparing maps and from the graph. For the same reasons which were invoked at national level, we next examine the relation between the rise in deaths and variations in output, the variation in the wheat yield having been taken as a measure. We calculated the harvest deficit in each *département*, using variations in the wheat yield as an index, relative to the average for 1843-45. The outcome is shown in Map IV.

Clearly the shortfall in grain yields was unevenly distributed across the hexagon. One region of big deficits is apparent in the Northeast, where a group of *départements* (Aisne, Meuse, etc.) saw a deficit of at least 30 per cent in their harvest, and some (e.g. Ardennes, Marne) where the deficit approached 50 per cent. Similar deficits are found along the Mediterranean coast and the Rhône corridor. Yet, in this region, some *départements* were subject to a much smaller decline in their harvest, as in the cases of Bouches-du-Rhône and l'Isère. One also finds a zone of big deficits along the Atlantic coast and in the north of Brittany. A zigzag area between these two areas more or less escaped the deficit, which was more pronounced in Normandie and in a region of the west of Paris.

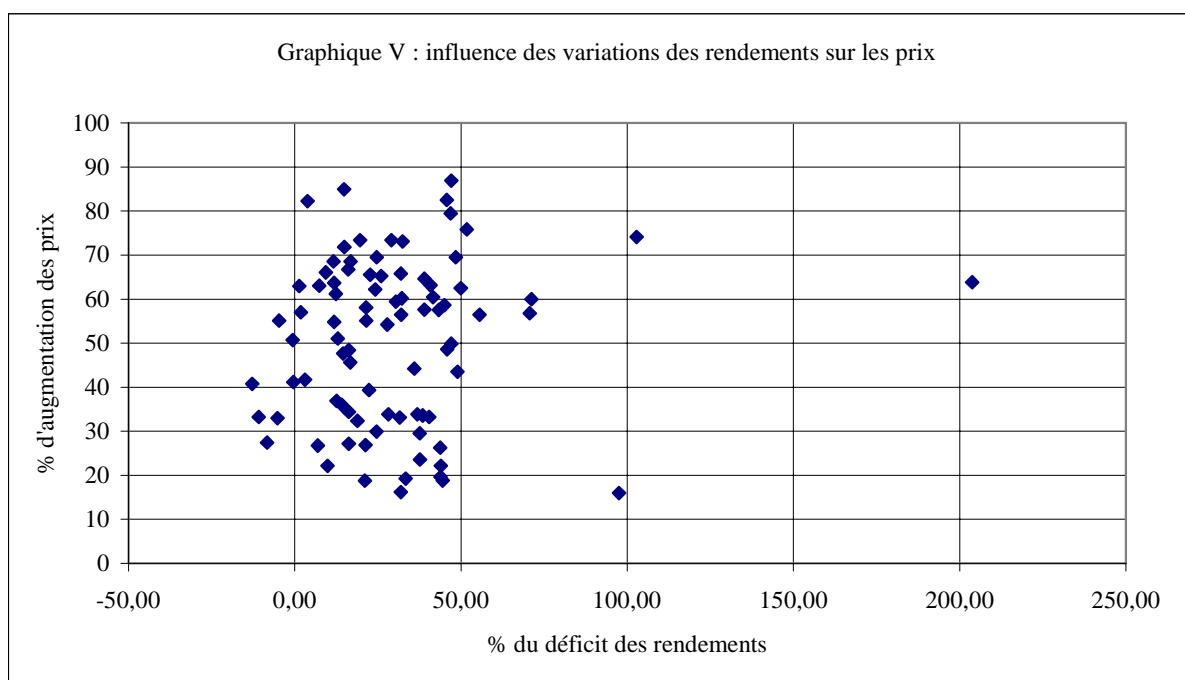
Comparing this last map with that of excess deaths in 1847 suggests that both phenomena were relatively independent of each other. In the Northeast only a few *départements* with a sizeable harvest deficit show excess mortality. Nor does one find in the south either an exact correspondence between the two phenomena. As for the most *départements* in central France which saw increased mortality, they were not subject to food crises.

Graphique IV : influence des variations des rendements sur l'augmentation des décès (en %).



In Figure IV the deficit in wheat yield in each département on the x-axis is plotted against the rise in deaths on the y-axis. Most of the resultant dots form a circle, indicating that the two variables are independent of each other. The correlation coefficient of -0.098 confirms this.

The reader will not have failed to notice that the map describing harvest deficits does not square easily with that describing the rise in prices. In order to see whether there is a relationship between the two we plotted the deficits and prices in Figure V. There too, albeit more loosely, most of the points are grouped in a circle, indicating the lack of a correspondence between the two phenomena. Given the correlation coefficient of -0.12 between the two, one would be hard put to argue that the price rises were due to harvest shortfalls. One therefore cannot mechanically infer a subsistence crisis from a high price. This would seem to lend credence to those who reacted against Meuvret. However, one may ask where the extent of the price rise matters. A rise of two hundred per cent has little in common with the rises encountered in the course of the first half of the nineteenth century.



C – Did substitutes play a bigger role at the regional level?

Since the wheat harvest need move in line with those of other cereals (meslin, rye, and maize), **hybrids** (buckwheat), and root crops (potatoes) destined for human consumption and, in addition, since some of these crops can act as substitutes for cereals, an approximate measure of the aggregate crop deficit is desirable. For this purpose, we have used the division into the nine zones used by the Ministry of Agriculture²² (see Table II). For all zones we have calculated the mean harvest for wheat, meslin, rye, buckwheat, maize, and potatoes in 1842-45. We then calculated the 1846 deficit as a percentage. For aggregation purposes we converted harvests expressed in hectolitres into quintals. Inevitably, this adds another element of approximation. The results of these calculations are given in Table II.

Tableau II : Deficits, expressed as percentages, of the harvests of different crops destined for human consumption, by region, in 1846.

	Wheat	Meslin	Rye	All Cereals	Buckwheat	Maize	Potatoes	Total
Northwest	- 19,9	- 30,5	- 37,6	- 25,7	32,7	64,5	- 53	- 26,2
North	- 16,3	- 19,7	- 36,6	- 19,2	- 21,8	- 8,1	- 6,9	- 15,6
Northeast	- 23,5	- 26,6	- 32,5	- 25,5	- 12,8	5,9	- 20,4	- 22,4
West	- 20	- 25,8	- 37,8	- 25,1	28,5	15,2	- 28,9	- 24,1
Centre	- 16,1	- 22,3	- 37,2	- 25,6	- 1,5	- 21,6	42,2	3,3
East	- 22,4	- 36	- 24,1	- 24,4	31,8	35,9	- 42	- 29,5
Southwest	- 5,2	-16,8	- 31,8	- 11,5	64,8	19,7	- 26,6	- 6,3
South	- 24,9	- 20,5	- 23,1	- 23,9	19,2	47	10,4	- 4
Southeast	- 26,2	- 50,2	- 27,8	- 12,7	12,6	5,8	- 6,8	- 10,3
Total	- 18,9	- 25,3	- 29	- 22,1	29,2	26,5	- 18,9	- 17,4

The above table shows first of all that outside the Southwest, the deficit in the wheat harvest, to a greater or lesser extent, affected the entire hexagon, as already indicated by the yields

²² In the text the zones are henceforth denoted by a capital letter, e.g. East, Centre.

map. The deficit is biggest in the North and East. The deficit in the corn harvest is by no means compensated by a rise in production of meslin or seigle output. On the contrary, these two cereals registered declines of 25 and 29 per cent respectively in their output, declines greater than that for wheat. The relative importance of meslin and rye in certain regions – whereas the wheat represented 70.5 per cent of the production of three cereals in the Northeast, it accounted for only 40.5 per cent in the Centre zone – modifies the ranking of deficits. In most cases the deficit is greater and sometimes by a considerable margin. For example, the wheat deficit in the Southwest was 5.2 per cent, but rose to 11.5 per cent for all three cereals combined. Only two zones don't follow this pattern, South and Southwest. At the national level, taking all three cereals into account increases the deficit from 18.9 to 22 per cent.

The output of other crops reinforce considerably the inequality in deficits. Buckwheat, though only 6 per cent of output in France as a whole, played an important part in the Northwest, where it accounted for 27 per cent of output. Its place in farming was much less in other regions, only six per cent in the East, and barely cultivated at all in the North. Significantly, outside the North and Northeast the production of buckwheat rose in 1846, sometimes by a huge factor relative to the reference years. The same holds for other regions in the case of maize. Its production also increased in practically all regions. That helped, as in the Southwest, to compensate for the deficit in wheat, meslin, and rye, since maize accounted for about 23 per cent of production and its production rose by over 19 per cent. The role of the potato is more varied. In the East, where it accounted for 13.6 per cent of production, the shortfall of 42 per cent in output in 1846 increased the overall food deficit from 24.4 per cent to 29.5 per cent. By contrast, in the Centre the potato helped greatly to compensate for the deficit in cereals. Thus although the cereal shortfall amounted to 25.6 per cent, thanks to the potato, the overall harvest was above normal. However, unlike buckwheat and maize, the potato in general did not help to reduce the overall food deficit – except in the Central and South regions. On the contrary it amplified the shortfall.²³ Overall, the Centre, Southwest, South and Southeast, with a maximum deficit of 10.3 per cent and a minimum deficit of 3.4 per cent, seem to have escaped the 'crisis'. The North with a loss of 15.6 per cent occupied an intermediate position, whereas the other four regions saw their aggregate output fall by between 22.5 and 29.5 per cent.

If the results in Table 2 are now compared to excess deaths in 1847 (Map II), it is apparent that most *départements* experiencing an increase in mortality were in regions where the production deficit was smallest. Six of the eleven *départements* with a rise of over twenty per cent in deaths are in the Centre, where food production was 3.3 per cent above the norm; two are in the Southwest where the deficit was only 6.3 per cent; and one is in the South which suffered an output shortfall of four per cent. Only two *départements* were located in a zone with a deficit exceeding twenty per cent. If one examines next those *départements* where the rise in deaths was in the 15-20 per cent range, one finds five *départements* out of nine where the output deficit was less than 10.5 per cent, and therefore did not represent a real food crisis. As for twenty *départements* where the rise in deaths was in the 10-15 per cent range, they were spread across all groups. Another significant fact is that only two *départements* in the zone with the biggest deficit, the East, saw a rise in mortality, and a very weak one at that. There is hardly any point into going into greater

²³ In half a dozen *départements* in the west of France (the three Breton *départements* plus Ile-et-Vilaine, the Vendée, and Loire-Atlantique) the decline in the cultivated area under potatoes exceeded thirty per cent in 1847, and elsewhere in the west, south, and south-east the cultivated area also declined. Finistère was the only *département* in the hexagon in which the area under potatoes exceeded that under either wheat or barley in 1845. Even given the considerable increase in the area under buckwheat, one might expect the failure of the potato to have caused some problems there. Yet there is little sign of this in Maps I or II. On the other hand, in several *départements*, particularly in the north and east, there was an increase in the area under potatoes between 1846 and 1847. Such shifts were dwarfed by what was happening in Ireland and in the Low Countries. Compare Ó Gráda, *Black '47*, 23-24; Bourke, *Visitation of God*; Bourke and Lamb, *Spread of the Potato Blight*; Jacquemyns, *Histoire de la crise*, 254-57.

detail in an analysis which allows us to conclude that the increase in the number of deaths cannot have been due to a subsistence crisis.

Conclusion

This study has allowed us to show that no genuine subsistence crisis occurred during the period under scrutiny, and only epidemics of a more or less national scope posed a regular threat to the population. We have also seen that harvest deficits do not seem to have been severe enough to result in genuine food crises. Moreover, when deficits occurred, they were uncorrelated with rises in mortality. As for price rises, given that they were uncorrelated with harvests, it would seem that one cannot use them as a guide to variations in production. Nor should one concentrate so exclusively on the wheat harvest : buckwheat, maize and the potato, as well as imports, could compensate for a deficit in wheat. Finally, because it less affected by *phytophthora infestans*, the potato did not play the catastrophic role that it played in Ireland and Belgian Flanders. All these changes mean that this first half of the nineteenth century marks a diametric break, as others have already noted, with earlier centuries and even with the second half of the eighteenth century.

Why has 1846 become a crisis year when on the graph it exceeds the moving average by only a few per cent and is dwarfed by the peak that represents the cholera epidemic of 1849 ? Surely because, in the first place, contemporaries saw a food availability crisis in the undeniable rise in prices in 1846, which they linked too hastily with deaths that remained unexplained. Surely also because of the over-mechanistic vision of historians for whom price rises can only mean crises : ‘*La mercuriale sécrète la mortalité*’. Armed with this conviction, why bother scrutinising a mortality curve when that showing prices is its spitting image, and the price graph offers a photographic negative of output?

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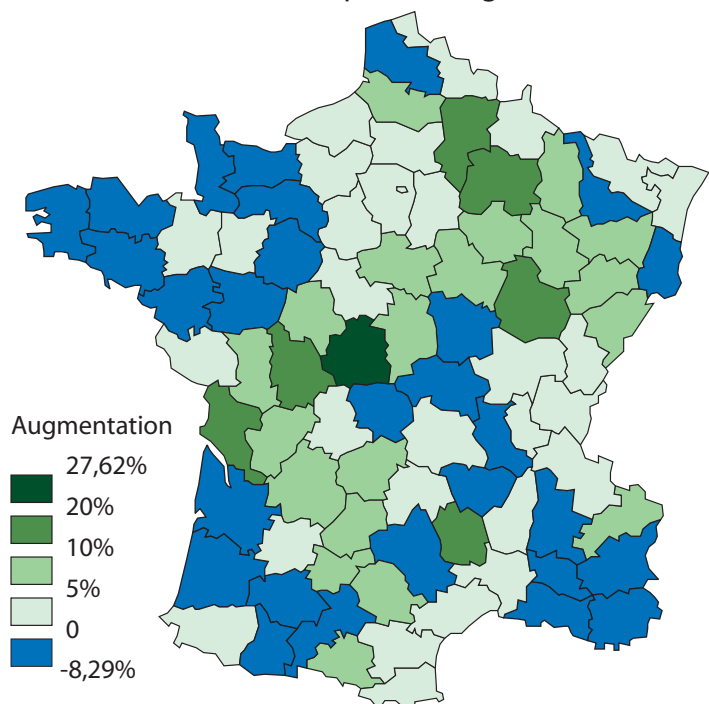
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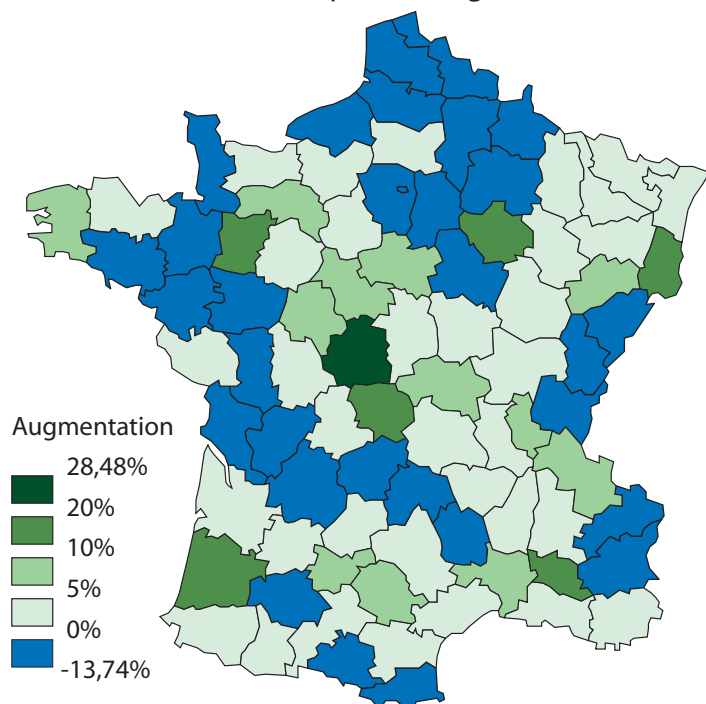
Carte I.

Augmentation du nombre des décès en 1846
(en pourcentage)



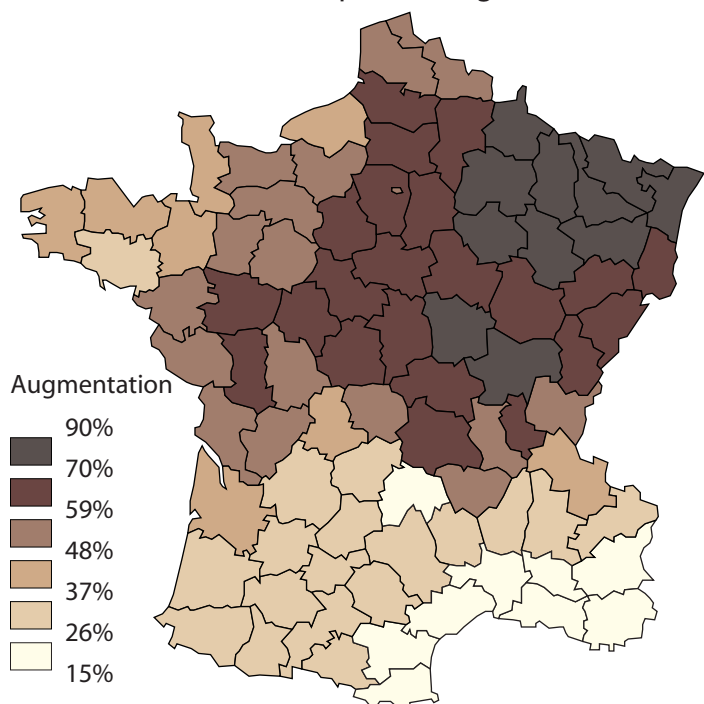
Carte II.

Augmentation du nombre des décès en 1847
(en pourcentage)



Carte III.

Augmentation du prix du blé en 1846 (année récolte)
(en pourcentage)



Carte IV.

Déficit de la production du blé en 1846
(en pourcentage)

