Notes

*A Reassessment of Agricultural Production in Italy, 1861-1914: the Case of Lombardy**

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Since the mid-1950's, when the Istituto Centrale di Statistica (ISTAT) published its estimates of Italian agricultural output growth,[1] a controversy has continued over their reliability for the period 1861-1914. The debate is particularly heated for the first two decades of unification during which the ISTAT estimates show healthy output growth whereas many believe it was slow.[2] At the centre of the debate is the reliability of the existing data on which the ISTAT estimates are based, especially for the years of unification. Unfortunately, the new national government did not commission the collection of agricultural output data in 1861. Indeed, 14 years went by before the first data came out, and these only for the quinquennium 1870-74. For 1861 all we possess is output data made available by the various Italian States prior to unification. In some instances these data pertain to periods as far back as the 1840's. More than one observer has pointed out that these data were collected by different criteria and vary in quality; pooling them together will lead to a seriously biased estimate of agricultural production at unification.

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[1] ISTAT, *Indagine Statistica sullo Sviluppo del Reddito Nazionale dell'Italia dal 1861 al 1956* (Roma: 1957); the same data is also reproduced in ISTAT, *Sommario di Statistiche Storiche Italiane, 1861-1955* (Roma: 1958).

[2] For sceptical views on the expansion of agricultural output during the first 20 years of unification see G. Luzzatto, *L'Economia Italiana dal 1861 al 1894* (Milano: Banca Commerciale Italiana, 1963), p. 122; G. Acerbo, "L'Agricoltura Italiana dal 1861 ad Oggi," in *L'Economia Italiana dal 1861 al 1861* (ed.) (Milano: Giuffre, 1961), p. 110; and R. Zangheri, "The Historical Relationship Between Agriculture and Economic Development in Italy" in E.L. Jones and S.J. Woolf (eds.), *Agrarian Change and Economic Development* (London: Methuen, 1969), p. 26.

Many believe these data to be strongly biased in a downward direction, thus making the ISTAT output estimates for the period under review too high. Compounding the problem is that the accuracy of the official agricultural output data for the post-unification period have also been questioned, and for many products data do not exist.

This study proposes to contribute to the debate by focusing on one region, Lombardy, critically reassessing the quality of the existing data and constructing an output index. In the case of products for which output data do not exist indirect estimates have been calculated. The results are supplemented with qualitative evidence. A case is made that for Lombardy the existing data, particularly those pertaining to the period of unification, should not be readily dismissed. While far from perfect, there are plausible grounds to believe that they are reasonably good.

My output estimates suggest that the conventional wisdom of slow agricultural output growth during the first two decades of unification is wrong for Lombardy. This successful period was followed by twenty years of virtual stagnation, and renewed growth from the turn of the century to 1914. The overall growth rate of agricultural output for the period under review was well above the national average and respectable by international standards. While Lombardy cannot be considered representative of the average region in Italy, the fact that it was one of the leading agricultural producers in the country make the results of this study important. Moreover, the findings lend further support to the claim that the success of northern agriculture may have contributed to industrial growth of the North between 1861 and 1914.[3]

This paper is divided into 3 sections. The first constructs an output index for field crops and discusses the data problems. The second does the same for non-soil products. The final section points out the potential implications of the findings.

I

In constructing a field crop output index for Lombardy between unification and World War One, one is faced with three major problems. The first is that output data for the year of unification do not exist.[4] The second, that

[3] For example, R. Eckaus, "The North-South Differential in Italian Economic Development", *Journal of Economic History*, Vol. 21, 1961.

[4] A regional study by Svimez does have output data for 1861 but it does not reveal from where it got the figures except to state that "... they have been estimated from published statistics (official and non-official) and archival sources, both incomplete or erroneous." SVIMEZ, *Cento Anni di Vita Nazionale attraverso le Statistiche Regionali* (Roma: 1961), pp. XIV and 87. However, these output data are about the same as for the 1841-52 period. Using these data would not significantly alter my results.

few sets of comprehensive data are available up to 1914. Finally, the few sets of data that are available must be used critically since there is reason to question some of the numbers.

The two most recent comprehensive sets of field crop output data for the period prior to 1861 are for the decade 1842-51 and for the year 1854.[5] Output for each crop is virtually the same in both sets of data, except for wine production, which by 1854 had been reduced to small proportions by the plant louse phylloxera. A plausible case can be made that these are reasonably good data and approximate Lombardy's output of field crops at unification. Compared to other parts of the peninsula the efficiency of public administration in Lombardy was good, which likely resulted in better reporting of agricultural output data. Throughout most of the 1850's the region's agriculture underwent a severe crisis brought about by bad weather, repeated bouts of phylloxera, and the decimation of silkworm culture by the infectious disease pebrine.[6] No indication exists that between 1854 and 1861 there was either a growth of productivity or an extension of the arable under cultivation.[7] Thus, it is unlikely that using these output data as estimates for 1861 will lead to significant downward bias. I have opted to use the 1841-52 data with the higher wine output figure since at unification the region's viticulture had begun recovering from the phylloxera epidemics of the 1850's (see Table 1).

For the post-unification period comprehensive output data exist for the following quinquenniums: 1870-74, 1879-83, 1890-94, 1910-14. Output for the first of these will not be incorporated in the output index for two reasons. Rye and barley production are aggregated, making comparisons with the other subperiods impossible. More seriously, the reported figures for rice and chestnuts are suspect as grossly overstated.[8] An increase of chestnut production from about 130,000 to 900,000 quintals between 1861 and 1874 is untenable. Subsequent data show output at between 100,000 and 200,000 quintals up to 1914, suggesting that the reported figure for 1870-74 is clearly wrong. For the case of rice a more than eight-fold increase in output is also suspect.

[5] Reported by S. Jacini, *La Proprietà Fondiaria e le Popolazioni Agricole in Lombardia*, Third Edition (Milano: 1857), pp. 76-79. Jacini also has the output data for the decade 1841-52 but they vary slightly from the data for the same period reported by P. Maestri and C. Correnti, *Annuario Statistico Italiano*, 1864, pp. 407-08.

[6] For an account of the crisis see B. Caizzi, "La Crisi Economica del Lombardo-Veneto nel Decennio 1850-59", *Nuova Rivista Storica*, 1958, pp. 205-22.

[7] R. Canetta, "Materiali Statistici sulle Produzioni Agricole della Lombadia nella Prima Metà dell'Ottocento", S. Zaninelli (ed.) *Questioni di Storia Agricola Lombarda nei Secoli XVIII-XIX* (Milano: Università Cattolica del Sacro Cuore, 1979), Vol. 4, p. 185 and *passim*.

[8] The figures for both rice and chestnuts are broken down by province. A check on the addition reveals no mistake. A possible explanation for the unusually high chestnut and rice output data is either a clerical or printing error for one of the provincial figures.

Table 1

GROSS OUTPUT OF SOIL PRODUCTS IN LOMBARDY, 1861-1914*

	1861 (1)	1870-74 (2)	1876-81 (3)	1879-83 (4)	1890-94 (5)	1910-14 (6)
Wheat	1,494,166	2,059,290	2,157,546	2,637,386	2,594,055	4,448,000
Corn	2,189,603	3,253,895	3,632,777	4,549,743	4,221,436	6,264,000
Rice	273,836	2,237,720	2,237,720	1,308,199	1,400,907	2,044,000
Rye	372,343	411,410	–	264,289	224,978	390,580
Barley	22,255		–	10,787	8,321	7,420
Oats	90,790	151,672	–	228,030	294,249	523,420
Legumes	214,153	233,584	232,831	143,913	105,305	55,300
Potatoes	307,434	1,134,457	1,134,457	1,126,819	861,314	1,905,333
Wine	1,228,144 Hl.	1,895,302 Hl.	1,793,705	1,748,190 Hl.	1.296,168 Hl.	2,063,000 Hl.
Chestnuts	132,612	904,409	–	189,830	112,432	271,000
Hemp	17,097	23,282	17,929	20,575	15,752	6,000
Flax	52,877	119,073	120,573	72,982	71,618	10,490

* (Quantities are in quintals except where otherwise indicated).

Sources:

1) P. Maestri and C. Correnti, *Annuario Statistico Italiano 1864*, p. 407-08. The output of potatoes is for the year 1857, taken from R. Canetta, "Materiali Statistici sulle Produzioni Agricole della Lombardia", in S. Zaninelli, *Questioni di Storia Agricola Lombarda nei Secoli XVIII-XIX* (Milano: Università Cattolica del Sacro Cuore, 1979), p. 214.
2) From MAIC, *Relazione intorno alle Condizioni dell'Agricoltura, 1870-74*, Vol. I, pp. 247-469.
3) *Annuario Statistico Italiano* 1886, pp. 834-53. The rice output from C. Bertagnoli, *L'Economia dell'Agricoltura in Italia e la sua transformazione* (Roma: 1886), p. 110.
4) From *Annuario Statistico Italiano*, 1889-90, pp. 630-40.
5) The output is the average of 1891 and 1894 only, from *Annuario Statistico Italiano*, 1892 and 1895, pp. 376-90 and pp. 346-63 respectively.
6) Wheat, corn, rice wine, chestnuts, hemp and flax are from *Annuario Statistico Italiano*, 1915, pp. 124-29. Barley, rye and oats are from *L'Italia Economica*, 1911, 1913 and 1915. Potatoe output is the average for the years 1912-14 only, from Banca Commerciale Italiana, *Cenni Statistici sul Movimento Economico dell'Italia*, 1913 and 1916. Legume output is from *Annuario Statistico Italiano*, 1917, p. 163.

Even assuming that rice production picked up after 1854, the last reported figure prior to 1861, such a jump in output would have required an average annual increase of over 11 percent. For the quinquennium 1879-83 the data show the output of rice as having increased four fold since 1861, which appears more likely. While it is unfortunate that the 1870-74 data cannot be used because of such probable errors, their inclusion would result in obvious untenable growth rates during approximately the first decade of unification.

The production of firewood, fruits and vegetables is not included in the output index for lack of information. Wholesale prices in the region, where available, have been used as weights.[9] In the absence of these, national wholesale prices were employed.[10] A Laspeyres quantity index was constructed.[11] The results appear in Table 2.

Table 2

INDEX OF FIELD CROP OUTPUT GROWTH

1861	100
1879-83	172
1890-94	153
1910-14	230

The index suggests that the first two decades of unification was a period of favourable growth for field crops with an annual average increase of about 2.5 percent. This result contradicts the story implied by Mario Romani, the leading expert on Lombardy's agricultural sector. He suggests that the main field crops remained more or less stagnant up to the early 1880's[12] He dismisses attempts to use the pre-unification data claiming they are not comparable with those collected by the Italian government after 1861.[13] He gives no reason why this should be the case. There is evidence to suggest that the collection of field crop output data remained the same after unification up to 1909 when it was changed.[14] Thus, it is unclear why Romani dismisses the

[9] From A. De Maddalena, "I Prezzi dei Generi Commestibili e dei Prodotti Agricoli sul Mercato di Milano", *Archivio Economico dell'Unificazione Italiana*, Series I, Vol. 5, 1957.

[10] From ISTAT, *Sommario di Statistiche Storiche Italiane, 1861-1955*.

[11] A Paasche quantity index gives slightly higher growth rates.

[12] Romani, *Un secolo di Vita Agricola in Lombardia, 1861-1961*, (Milano: Giuffre, 1963), pp. 32-34. He does not state this explicitly, but implies as much.

[13] *Ibid.*, p. 33.

[14] Research done by Canetta on the method of collecting field crop output data under the Austrian-Hungarian Empire suggests that it remained more or less the same after unification. The procedure required municipal administrations to collect and re-

pre-unification data. Presumably, if a bias exists in the data it would have remained in the same direction given that the system of reporting did not change. Romani's scepticism about any marked improvement in the growth of field crop production stems from his belief that yields per hectare remained stagnant in the region until the turn of the century, except for wheat.[15] He casts doubt over the marked output improvements of corn and wheat during the 1870s in the region by pointing out that the national output data for these crops show stagnation.[16]

It is indeed likely that overall yields per hectare in Lombardy, except wheat in the lower plains, did remain stagnant up to the early 1880's. However, the arable under cultivation did increase substantially according to official sources. For example, the average annual area under cultivation between the quinquenniums 1870-74 and 1879-83 increased 42 percent for corn and 46 percent for wheat. In the upper plains and hill zones more land was brought under cultivation with the introduction of a second planting for corn and wheat in the fall. The impetus behind bringing more land under cultivation was provided by the strong demand for agricultural products in Europe until about 1880, which stimulated agricultural prices and profits. Italian agricultural exports to other European countries expanded continuously during the first two decades of unification.[17] Since domestic food consumption did not rise by much during this period, growing food exports suggest that agricultural output must have been rising.[18] A growing urban population in Lombardy also added to the rising demand for food.[19]

port the data to the provincial prefectures which then sent them to the central government. R. CANETTA, *op. cit.*, p. 101, footnote 20. In 1909, under the direction of Valenti, the Ministry of Agriculture, Industry and Trade changed its method of collecting agricultural output data. The reason for changing it was Valenti's belief that the reports of the provincial prefectures were not always accurate. The system adopted was to break down Italian agriculture into 73 typical zones, and samples of each were directly inspected by government officials. Output from the other zones was estimated on the basis of the 73 typical zones. If there was a downward bias in the pre-1909 data then the relatively rapid output growth of field crops after the turn of the century may be overstated. By how much is impossible to tell. Nevertheless, the fact that there was significant land productivity growth make it likely that output growth was significant.

[15] Romani, *op. cit.*, pp. 37-39.

[16] *Ibid.*, p. 34.

[17] For a detailed discussion of the increase of agricultural exports see B. STRINGHER, "Gli Scambi con l'Estero e la Politica Commerciale dal 1861 al 1910" in (ed.) *Cinquant'Anni di Storia Italiana*, Vol. 3 (Milano: 1911).

[18] For a discussion of Italian food consumption after unification see B. BARBIERI, *I Consumi nel Primo Secolo dell'Unità d'Italia*, 1861-1960 (Milano: Giuffre, 1961), pp. 140-42.

[19] Romani, *Ibid.*, p. 44.

Qualitative evidence supports the notion of a favourable growth of field crop output in Lombardy between 1861 and the early 1880's. A number of participants in the *Agricultural Inquiry*, commissioned in the late 1870's, reported improvements of field crop output, and generally a more prosperous condition of agriculture compared to the past.[20] Jacini, who headed the *Agricultural Inquiry*, and had written extensively on Lombardy's agricultural sector in the middle of the 1850's, felt that by the early 1880's food production had increased and thus the peasantry was better off than a quarter century earlier when for most a meal consisted of dried out corn bread.[21]

Among those that maintain field crop output did not expand significantly up until the early 1880's much has been made of a partial set of output data for the period 1876-81, which shows average annual rice and wheat output unchanged and corn output up only slightly over the quinquennium 1870-74, to support their claim.[22] Much confusion exists whether these data, in fact, all pertain to the 1876-81 period.[23] The output of rice and potatoes, for example, are exactly the same as for the quinquennium 1870-74. However, it is true that during the late 1870's the region suffered a few years of relatively bad harvests, probably causing the average annual output of the main crops, corn, wheat, and rice, to remain more or less stagnant over the quinquennium 1870-74. It can be argued that choosing the quinquennium 1879-83 over the six year period between 1876-81 will bias the average growth rate of field crops upward in the first 20 years of unification since the latter period was abnormally productive. It is unlikely that this was the case. The output data for the quinquennium 1890-94, regarded as the depth of the agricultural crisis, shows that the output of the main crops was down, but not by a large amount from 1879-83, suggesting that the latter quinquennium was not an anomaly.

The index also shows the effects of the agricultural crisis, caused by following agricultural commodity prices, which began in the early 1880's. Field crop output fell 11 percent by the quinquennium 1890-94 from the post-unification high previously attained. It was not until the turn of the century that field crop output began to climb again, this time driven by increases in land productivity, thanks to the rapidly rising use of chemical fertilizers, particularly superphosphates. For example, the amount of land under wheat cul-

[20] See, for example, the comments made by E. POLLINI, "Il Circondario di Mortara", p. 49; G. BELLINZONA, "Il Circondario di Lodi", p. 286; and P. DONATI, "Notizie sul Circondario di Crema, pp. 546-47, in (Ministero dell'Agricoltura, Industria e Commercio), *Atti della Giunta per la Inchiesta Agraria e sulle Condizioni della Classe Agricola*, (Agricultural Inquiry) (Roma: 1884), Vol. 6, Tome 2.

[21] S. JACINI, "Relazione del Commissario, Conte S. Jacini sulla X Circonscrizione" in MAIC, *Agricultural Inquiry*, Vol. 6, Tome 1, p. 89.

[22] Romani, *op. cit.*, pp. 33-34.

[23] *Ibid.*, p. 33, footnote 7.

Table 3

AVERAGE CROP YIELDS, 1909-13, SELECTED EUROPEAN COUNTRIES
(Quintals per Hectare)

Country	Wheat	Rye	Barley	Oats	Corn*	Potatoes
Denmark	33.1 (1)	16.8 (5)	23.1 (3)	18.9 (4)	n/a	148.3 (2)
Belgium	25.3 (2)	22.1 (1)	27.5 (1)	23.7 (1)	n/a	186.4 (1)
Netherlands	23.5 (3)	18.1 (4)	25.8 (2)	20.1 (2)	n/a	142.9 (4)
Germany	21.4 (4)	18.2 (3)	20.7 (4)	19.7 (3)	n/a	137.0 (5)
U.K.	21.3 (5)	18.9 (2)	19.0 (5)	18.2 (5)	n/a	145.4 (3)
Lombardy[c]	16.0 (6)	13.7 (7)	14.8 (7)	17.6 (6)	26.0 (1)	120.0 (6)
Austria	13.6 (7)	13.8 (6)	15.1 (6)	12.8 (8)	12.2 (5)	99.3 (7)
France	13.2 (8)	10.4 (10)	13.9 (8)	13.0 (7)	12.1 (6)	85.7 (8)
Romania	12.9 (9)	9.2 (12)	10.2 (11)	9.4 (11)	13.1 (4)	85.5 (9)
Hungary	12.6 (10)	11.7 (8)	13.3 (9)	11.1 (9)	17.2 (2)	79.7 (10)
Bulgaria	10.6 (11)	9.9 (11)	10.7 (10)	7.7 (12)	11.3 (7)	39.7 (12)
Italy	10.5 (12)	11.0 (9)	8.9 (12)	10.6 (10)	15.8 (3)	57.6 (11)
European Average[b]	12.8	14.9	15.0	15.0	14.6	114.4

* Note: Rank among enumerated countries given in parentheses.

[a] Rank among those reporting only.

[b] Excluding Russia, for which data were unavailable, but including other European countries not enumerated in this table.

[c] For the quinquennium 1910-14.

Source: For Lombardy, see Table 1. Other data from International Institute of Agriculture, *International Yearbook of Agricultural Statistics*, 1909-21, (Rome: Institut International d'Agriculture, 1922), pp. 163-75.

tivation decreased by 5 percent while output advanced by 71 percent between 1890-94 and 1910-14; for corn the amount of arable under cultivation dropped by 27 percent while output increased 48 percent. Corn yields for the region as a whole doubled from 13 to 26 quintals per hectare and for wheat they increased from 9 to 16 quintals. Most of this improvement began in the late 1890's so that the actual growth of output was about 3,0 per cent per annum from the turn of the century to 1914.[24] For the period under review the overall growth rate of field crop output was 1,6 percent per annum.

As Table 3 demonstrates, by the eve of World War One yields per hectare of a number of field crops in Lombardy compared favourably with many of the leading agricultural producers in Europe and were significantly higher than the Italian national average. In the case of corn, yields per hectare were one of the highest in Europe. Yields per hectare in selected zones of the irrigated plains were much higher than the regional average,[25] ranking these as some of the most productive zones on the continent.

II

There are only scant data on regional output of animal products between unification and 1914, thus the figures reported in Table 4 are in most cases indirect estimates. The output of beef, pork, lamb, sheep and goat is estimated by taking the annual national liveweight slaughtered in each category, assuming Lombardy slaughtered the percentage it possessed of the national livestock population. For example, if the region had 10 percent of the national hog population, I assumed that 10 percent of the hogs slaughtered in Italy orginated in Lombardy.

No information exists on the poultry population in the region prior to 1914. Thus, the national data are used to approximate it. On the basis of Zamagni's work,[26] I assumed that there was direct relationship between poultry population and the amount of corn produced in the region: for example, if the region produced 10 percent of Italy's corn it also had 10 percent of the national poultry population. While this procedure leaves much to be desired,[27] it is not altogether unrealistic. Corn was a major food source for poultry. The region throughout the period under review was one of the largest producers of corn and it is known that poultry raising was a significant activity. From the poultry population estimate, I arrived at the number

[24] See footnote 14.

[25] In the district of Olgiate Olona, for example, wheat yields per hectare reached as high as 35 quintals. G. Porisini, "Produzione e Produttività del Frumento in Italia durante l'Età Giolittiana", *Quaderni Storici*, Vol. 14, 1970, p. 525.

[26] V. Zamagni, "Le Radici Agricole del Dualismo Italiano", *Nuova Rivista Storica*, Vol. 22, 1975, p. 74.

[27] It assumes non-poultry corn use were comparable across regions.

Table 4

ESTIMATES OF THE OUTPUT OF MEAT AND DAIRY PRODUCTS IN LOMBARDY, 1861-1914*

	1861 (1)	1879-83 (2)	1890-94 (3)	1910-14 (4)
Beef	284,734	537,046	698,298	758,625
Pork	228,276	324,389	384,934	505,231
Sheep, Lamb, Goat	17,493	25,387	24,715	14,346
Milk	4,477,200Hl.	6,963,090Hl.	6,963,090Hl.[a]	10,054,815Hl.
Cheese	111,930	174,077	277,578	351,919
Butter	55,965	87,038	125,103	125,685
Poultry	69,488	94,103	87,810	120,042
Eggs	303,924	411,772	396,313	565,364
Silk Cocoons	75,302	156,859	156,067	155,000

* (Quantities are expressed in quintals except where otherwise indicated).

Sources:

1) Silkcocoons output is half the 1855 level of 150,604 quintals reported in Correnti and Maestri, *Annuario Statistico Italiano*, Anno II, 1864, p. 449.

2) Silk cocoon output is from *Annuario Statistico Italiano*, 1886, p. 858 and is the annual average output for 1880-85.

3) Butter and cheese output is the average for 1890, 1891 and 1894 only, from *Annuario Statistico Italiano*, 1889-90, 18922 and 1895. Silk cocoon production is the average of 1891 and 1894, from *Annuario Statistico Italiano*, 1892 and 1895 respectively.

4) Silk cocoon production is from *Annuario Statistico Italiano*, 1915. p. 127.

a) Milk production was not reported. Since the closest animal census was taken in 1881 it is assumed that the number of dairy cows, on which the milk output estimate is based, remained the same as a decade earlier.

slaughtered and eggs produced each year by the same procedure as for beef, pork, lamb, sheep and goat.

Maestri and Correnti estimated that in 1861 dairy production was approximately the same as in 1855, the last pre-unification year for which official data were published,: 430,080 quintals of all types of cheese, and 206,640 quintals of butter.[28] These two figures appear to be grossly overstated. The first regional data on dairy production appear for 1890 when 386,173 quintals of cheese and 193,881 quintals of butter were produced. In the 30 years after unification, however, the dairy cattle population in Lombardy had doubled. I can only conclude that dairy production figures reported by Maestri and Correnti are too high and I have disregarded them. To arrive at an estimate of cheese and butter production I took the number of dairy cows in the region in each subperiod and estimated the total number of hectolitres of milk produced.[29] According to Maestri and Correnti, approximately one-half of

[28] P. Maestri and G. Correnti, *op. cit.*, p. 447.

[29] According to Jacini, in 1855 a dairy cow in the irrigated plains produced up to 32 hectolitres of milk annually. The detailed records from a 60 hectare farm in the

the milk produced was transformed into butter and cheese.[30] I then got information from various sources on the amount of cheese and butter that could be produced from a hectolitre of milk,[31] and assumed that milk destined for cheese and butter was equally apportioned. This procedure was employed in all cases except for the quinquennium 1890-94 for which the available butter and cheese output data are used.[32]

There is no information on silk cocoon production for the region at unification. The last available figure prior to 1861 is for 1855 when 150,603 quintals of silk cocoon were produced.[33] This was the year the pebrine epidemic started to spread throughout the region and therefore had yet to take its full toll. Data available for a number of provinces in the region between 1855 and 1861 show that the output fell anywhere between one-half and three-quarters from their 1855 level.[34] At unification silk cocoon production was just starting to recover from the crisis, and was not to reach levels attained in the first half of the 1850's until the second decade of unification. I have thus estimated silk cocoon production in 1861 at one-half the 1855 level. For all subsequent periods the available data were used.

The animal product output growth index appears in Table 5. Up to the early 1880's output expanded at an average of 2.2 percent per annum, a growth rate not be achieved again before 1914. Leading the way was dairy and beef production. Between 1861 and 1881 the number of dairy cows had increased by more than half, while the total beef livestock had almost doubled. Also responsible for the favourable growth rate up to the early 1880's was the recovery of sericulture. The importation of Japanese silk-worm eggs

province of Milan in 1866 shows that the average yields per dairy cow was 28 hectolitres (G. MAINONI and A. ZANCA, *Descrizione del Podere Denominato di Vigonzino situato nella Provincia di Milano* (Milano: 1867), p. 41. On the basis of these two sources I have assumed an average yield per dairy cow in 1861 of 30 hectolitres. Twenty years later the yield per dairy cow had remained stationary at about 30 hectolitres per annum. See E. POLLINI, *op. cit.*, p. 35. By 1914 the average was still about 30 hectolitres per annum. MAIC, *Catasto Agrario* (Roma: 1914), Vol. 2, p. 88, footnote 3.

[30] Maestri and Correnti, *op. cit.*, p. 447.

[31] The average yield from a hectolitre of milk at unification was about 2.5 kg. of butter and 5 kg. of "grana", the most popular cheese. MAINONI and ZANCA, *op. cit.*, p. 48. The yields are confirmed by M. ROMANI, *op. cit.*, p. 37. Twenty years later yields of butter and cheese from a hectolitre of milk had remained at the same level. G. BELLINZONA, *op. cit.*, p. 243. By 1914 the butter yield from a hectolitre of milk was still at 2.5 kg. while that of grana had increased to about 7 kg. Romani, *op. cit.*, p. 110, footnote 48.

[32] My cheese production estimate for 1861 is also much lower than the 231,895 quintals average annual output for the 1842-51 period reported by Jacini. Jacini, *La Proprietà Fondiaria e le Popolazioni Agricole in Lombardia*, p. 82.

[33] MAESTRI and CORRENTI, *op. cit.*, p. 449.

[34] CANETTA, *op. cit.*, pp. 1-19 and 214.

TABLE 5

INDEX OF THE OUTPUT OF ANIMAL PRODUCTS IN LOMBARDY

1861	100
1879-83	163
1890-94	181
1910-14	221

and crossbreeding of the resulting worms with local varieties had created a hybrid that was more resistent to the pebrine virus.

Apart from the rapid growth of the dairy livestock population,[35] the increase and diffusion of dairy production after unification is substantiated by a number of different sources. As early as the quinquennium 1870-74 almost all districts of the lower plains, the heart of dairy production, reported large improvements in the output of butter and cheese.[36] In 1880 one of the contributors to the *Agricultural Inquiry* noted that in the district of Lomellina,

> "butter, *grana*, and *gorgonzola* have come to represent one of the most important outputs of our agriculture. All indications point to better qualities and progressive development in the size of the output."[37]

In the province of Cremona, which had only a very small dairy industry in 1861, the local agricultural organization reported in 1879 that:

> "The dairy industry in our province has been progressing, and now the production of milk is one of the principal sources of income in our district."[38]

The agricultural crisis slowed the output growth of animal products but its impact was not as severe as it had been on field crops. Between the quinquenniums 1879-83 and 1890-94 the production of animal products still managed an average annual growth rate of 7 percent, while during the same period field crop output had declined. The relative success of animal products output during the crisis is probably explained by the fact that meat and dairy prices did not fall as much as field crop prices, leading some farmers to switch.

[35] Qualitative evidence also suggests a large increase of the region's livestock population. Jacini noted in 1881, 25 years after completion of his detailed study of Lombardy's agricultural sector: "Visiting again the same countryside I note the number of livestock has, if not doubled, at least increased by two-thirds; at almost every step one encounters larger stalls filled to capacity..." Jacini, "Relazione del Commissario", p. 70.

[36] MAIC, *Relazione Intorno alle Condizioni dell'Agricoltura, 1870-74*, Vol. 4, *passim*.

[37] Pollini, *op. cit.*, p. 43.

[38] Comizio Agrario di Cremona, *Relazione sulle condizioni dell'Agricoltura nel Circondario di Cremona negli anni 1878-79* (Cremona: 1880), p. 18.

After 1894 output of animal products continued to expand at a relatively slow rate compared to the 1861-83 period. The average annual growth rate was about 1 percent between the mid-1890's and 1914. For the period under review output growth averaged a respectable 1,5 percent per annum.

Despite almost 20 years of virtual stagnation total agricultural output in Lombardy grew at an average annual rate of 1.6 percent per annum between 1861 and 1914. During the first two decades of unification agricultural production expanded at a rate of 2.4 percent per annum; during the crisis total production remained stationary; from the turn of the century to 1914 output agricultural increased at an average annual growth rate of 2.2 percent.

The overall output growth rate achieved in Lombardy during the period under review was a third higher than the national rate of 1.2 percent per annum.[39] While it cannot be claimed that the region's performance was outstanding by international standards, it was certainly respectable compared to many countries. For example, between 1880 and 1915 the average annual rate of output growth was 2.2 percent in Japan, 1.6 percent in the United States, and 1.7 percent in Denmark.[40] Between 1880 and 1915 the average annual rate of output growth was 2.2 percent in Japan, 1.6 percent in the United States, and 1.7 percent in Denmark.[41] For the United Kingdom, Deane and Cole claim a maximum growth of agricultural output of about 1.8 percent per annum in the period between 1821/31 and 1851/61, which included "The Golden Age of Agriculture."[42]

Conclusions

The fact that output data for the year of unification do not exist will undoubtedly keep the controversy over the trend of agricultural production in Italy after 1861 alive for a long time to come. This study has tried to make a plausible case that Lombardy experienced a favourable agricultural output growth in the post-unification period up to 1914. In particular, it appears that the generally accepted wisdom of slow output growth from 1861 to the early 1880's does not hold for this region.

[39] The national growth rate estimated by ISTAT, *Indagine Statistica sullo Sviluppo del Reddito Nazionale dell'Italia dal 1861 al 1956*, p. 204.

[40] S.M. Eddie, "Agricultural Production and Output per Worker in Hungary, 1870-1913", *Journal of Economic History*, Vol. 28, 1968, p. 207.

[41] Y. Hayami and V. W. Ruttan, *Agricultural Development: An International Perspective*, (Baltimore: Johns Hopkins Press, 1971), pp. 327-29. Obviously, these should be treated as rough comparisons since they refer to a different time period. Moreover, comparing a region with a country can be misleading.

[42] P. Deane and W.A. Cole, *British Economic Growth 1688-1959: Trends and Structure*, (Cambridge: Cambridge University Press, 1962), pp. 170-72.

It can be argued, with some credibility, that the experience of Lombardy, along with some other regions in the North, is not representative of Italian agriculture since Lombardy already had a fairly advanced agricultural sector at unification. If in fact this was the case, perhaps those who argue, such as Eckaus,[43] that there is a connection between the successful performance of industry in the North after 1861 and a prosperous agricultural sector there are right. However, the analysis has to be refined. By 1911 only a small part of the North, notably the "industrial triangle" between Milan, Turin and Genoa, had undergone substantial industrial development; Lombardy leading the way with over 40 percent of the manufacturing value added of the entire North.[44] Whether in fact the favourable performance of agriculture in Lombardy contributed to industrial growth in Lombardy, and the nature of that contribution, will be the subject of another paper.

[43] ECKAUS, *op. cit.*

[44] ZAMAGNI, *Industrializzazione e Squilibri Regionali in Italia*, pp. 194-95.