The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

RESEARCH ARTICLE

Village Common Land, Manure, Fodder, and Intensive Agricultural Practices in Tamil Nadu from the Mid-Nineteenth Century

Haruka Yanagisawa

Abstract: From the end of the nineteenth century, despite the decline in village common land which had previously supported agrarian production, South Indian farmers managed to maintain agrarian productivity, and partially succeeded in raising it. They did so by resorting to more intensive methods of production, based on the wider use of commercially available manures and on the planting of green manure. The growth of trade in manure and the movement of animals that developed across the Tamil districts facilitated new methods of raising yields. A sharp decline in the prices of agricultural products in the 1930s hampered the further spread of using manure, and resulted in a decline in the productivity of paddy cultivation. There are interesting points of comparison in this regard between the South Indian case and the case of common land in early modern Japan.

Keywords: village common land, agricultural production, manure, paddy, Tamil Nadu, village common land in Japan.

In the early decades of the nineteenth century, only a small part of the village land in Tamil Nadu, in South India, was used as farmland. Further, only a part of the arable land was cultivated with crops, the rest being allowed to remain fallow. The uncropped land played an important role in sustaining the lives of the people of the villages as it provided manure, fodder, fuelwood and house-building materials, and grazing land for cattle and other household animals. The uncultivated land thus served as village common land that was indispensable for sustaining agricultural production, although it was often classified as "waste land" by the colonial administration.

The extent of "waste land" in Tamil Nadu shrank rapidly during the course of the nineteenth century and in the first half of the twentieth century, as villagers extensively reclaimed it and converted it to crop land. According to the 1875 Land Revenue Settlement Report for Coimbatore District, "on an average the area in

Professor Emeritus, The University of Tokyo, h-yanagisawa@eva.hi-ho.ne.jp.

occupation has grown by 64,047 acres a year. It is clear that the rapid increase must come to an end shortly from the absence of new land available for cultivation."[1] The government encouraged this extension of cultivation. The resultant reduction in the agrarian infrastructure was not accompanied by an automatic decline in agricultural production in Tamil Nadu, at least until the 1920s. Though the extent of village common land decreased, rural people managed to not only maintain the yield per acre, but also to raise agricultural productivity by changing their agricultural practices – by resorting to more labour-intensive production methods and by reducing their dependence on village common land.

AREAS UNDER RIVER IRRIGATION

In areas under river irrigation, the cultivation (and resultant decrease) of hitherto uncropped land expanded remarkably in the first half of the nineteenth century. A typical instance was the paddy-cultivating areas irrigated by the Kaveri river and its canal system in Thanjavur (Tanjore) district, where, according to government reports of the 1870s and 1880s, there was almost no waste land to be found by that time. Due to the shortage of pasture land, cattle there were fed only straw and were therefore in a very poor condition.

As reported in the *Manual* of the district published in 1883:

> It is hardly possible that the required quantity of manure can be found for the whole of the Cauvery [Kaveri] delta. There are not sufficient cattle, sheep or goats for it, and owing to the absence of pasture, a sufficiency of these cannot be maintained.

As a rule, in the case of *nanjai* (irrigated land) or land under rice cultivation, it was only fields on which two crops were raised that were manured every year, and even these not invariably, "for it is not always that the required manure is available. Single crop lands are generally manured once in five years: in some cases not at all."[2] Because of the absence of forests nearby and the difficulties in obtaining fuelwood for household purposes, a considerable quantity of the cattle dung was used as fuel.[3] Silt in the river water used for irrigation was the only manure given to the growing paddy crop.[4] It was reported that in Tiruchirapalli (Trichinopoly) district, "in the field under the Cauvery the manure is not applied after the first levelling, as elsewhere, for fear it should be washed away by the first flooding."[5]

1 PBR, No. 1760, 26 June 1878, pp. 5748–49, para 23.
2 Row (1883), p. 348.
3 Ramiah (1937), p. 118.
4 "The rich alluvial deposits alone suffice to prevent the soil in any way deteriorating." PBR, No. 719, 1 November 1892, p. 20, para 68.
5 Hemingway (1907), p. 136.

Table 1 *Yields of rice per acre obtained by crop-cutting experiments before 1940,* lbs

Districts/Year	1870A	1870B	1901	1911	1917
Chingleput	919	813	1,011	1,165	1,136
North Arcot	1,776	1,571	1,206	1,478	n.a.
South Arcot	1,149	1,016	1,201	1,406	1,624
Salem	1,488	1,316	1,378	1,633	2,149
Coimbatore	1,931	1,707	1,405	1,554	1,794
Trichinopoly	1,097	970	1,366	1,569	n.a.
Tanjore	1,046	925	1,022	1,006	1,132
Madura			1,352	1,677	1,872
Ramnad				1,331	n.a.
Tinnevelly	1,770	1,566	1,428	1,649	n.a.

Note: 1870B = 1870A / 2.6 x 2.3.

Source: 1870A: Sumit Guha, ed., *Growth, Stagnation or Decline? Agricultural Productivity in British India,* Delhi, 1992, p. 46, Statement III, except the following. For Coimbatore, I have taken my calculation from the Settlement Report of the district (PBR, No. 1760, 26 June 1878, p. 5759) instead of the yield given by Guha, who adopted Ratnam's data for this district. For Tanjore, I have calculated the yield from GO, No. 719, Revenue, 1 November 1892, pp. 23–24; 1901: GO, No. 2025, Revenue, 22 August 1903; 1911: GO, No. 3374, Revenue, 20 November 1913; 1917: GO, No. 2687, Revenue, 31 August 1917.

In spite of their location in an area benefiting from a highly developed canal irrigation system, most paddy fields in the region produced only one crop a year, and their yield per acre was reported to be lower than in districts where irrigation conditions were less favourable. In 1902–03, of the 8,89,000 acres irrigated by the Kaveri, only a little over one-tenth was cultivated with a second crop. The reason for this, according to a later Settlement Report, was that "shortage of manure frequently prevents the raising of two crops even where the water-supply is adequate."[6] In the crop-cutting experiments conducted in the 1870s, Thanjavur registered the second lowest paddy yield per acre among the eight districts in Tamil Nadu (see Table 1).[7] According to the 1890 Settlement Report, "Tanjore is the worst cultivated district in the Presidency," and the mirasidars referred to "the deplorable want of manure throughout the district."[8]

While relying on river-water silt as the only manure for their paddy fields, for the supply of fuelwood, the people of the Thanjavur delta depended on neighbouring

6 PBR, No. 28, 12 February 1921, p. 20.

7 For a detailed explanation of the tables in this paper, see Yanagisawa (1996), pp. 289–97.

8 PBR, No. 719, 1 November 1892, p. 71, para 21.

districts where waste lands and forests remained. As the 1878 Manual of Trichinopoly District noted,

> large quantities of firewood are carried for sale from different parts of the taluq to Combaconum and other villages in Tanjore District. To such an extent indeed is the exportation of this article carried on, that the jungles with which the country is covered, especially those in the Udaiyarpalayam Zemindari, are rapidly becoming denuded.[9]

This state of affairs changed towards the end of the nineteenth century. Construction of dams in the upper reaches of the Kaveri reduced the quantity and richness of the silt.[10] Thanjavur farmers started penning herds of goats and sheep coming from other districts as a means to enrich the soil of their fields. The Gazetteer of Tanjore District stated as early as 1906 that the construction of anicuts had checked the free flow of silt and caused impoverishment of the water.

> However this may be, the ryots have found that it is not impossible to secure manure for their fields, and enquiries now reveal that its use has greatly spread. It is now apparently not an exaggeration to say that there are few fields which are not manured every year. … Herdsmen from the Marava country bring cattle to manure the fields in the cultivation season.

It is interesting to note, in passing, that the Kaveri farmers sent their cattle to other unirrigated regions to graze. The want of local grazing ground was reported to be "made up for by the ryots driving their cattle across the Coleroon into the forests of South Arcot."[11] In 1921, it was reported:

> Green manure is very expensive, costing as much as Rs. 4 a bandy load delivered in a deltaic village. … Penning of sheep is common; large flocks come on tour from the Ramnad district and the common charge for penning a unit of 100 sheep for a night is 12 marakkals of paddy early in the hot weather, rising to 3 marakkkals or even more shortly before the freshes arrive….In the neighbourhood of the big towns there is a fairly ready sale for night-soil and street sweepings; these are sold at low prices by the local bodies but the purchaser is generally a middleman who sells to the ryots at an exorbitant profit.[12]

In 1907, the Gazetteer of Trichinopoly District, a district neighbouring Thanjavur, described the state of manuring in the district as follows: "writing in 1879,

9 Moore (1878), p. 26.

10 As early as in 1893, a government report pointed out that in Tanjore, since 1883, "the area of cultivation of lands of necessarily poorer qualities has largely increased; and this must have reduced the average outturn per acre, both because a large proportion of poor lands than formerly is cultivated, and because the quantity of water has had to be distributed over a larger area, thus diminishing the supply of water per acre and of the fertilizing silt which it brings." Raghavaiyangar (1893), p. 202, n. 85.

11 Hemingway (1906), p. 102.

12 PBR, No. 28, 12 February 1921, p. 49, para 43.

Mr. C. Benson said that the amount of manure then used on irrigated land was very small," but "nowadays manuring is the rule in the case of all wet fields except those which are near enough to the Cauvery to be fertilized by the silt of that river." Here, green manuring was especially popular. "The favourite leaves are those of the *kolinji,* or wild indigo, which are carted in great quantities from the Coimbatore and Salem districts."[13]

By increasing the use of various kinds of manure, Thanjavur farmers maintained their paddy yield per acre and succeeded in considerably increasing the extent of double-cropped areas after the 1880s, in spite of the deterioration of the extremely important natural environment that had supported canal-irrigated paddy cultivation. As seen in Table 1, the yield of rice per acre obtained by crop-cutting experiments for Thanjavur district did not show any remarkable downward trend between 1870 and 1917: either 1,046 lbs or 925 lbs for 1870 (if the weight of a Madras measure of paddy is calculated as 2.6 lbs or 2.3 lbs respectively); 1,022 lbs for 1901; 1,006 lbs for 1911; and 1,132 lbs for 1917.[14] Neither did the figures listed as "Normal Yield of Rice per Acre for Tanjore District" in the *Season and Crop Reports* indicate a deteriorating trend; rather, they hinted at a slight improvement in paddy cultivation (Table 2). The area of land cropped more than once in Thanjavur district increased from 93,000 acres in 1891 to 1,21,000 acres in 1922, i.e. by 13 per cent (Table 3).

Hence, the increase in the use of manure in canal-irrigated fields was supported by expanding transactions in, and movement of manure and animals between, irrigated and unirrigated regions in some districts of Tamil Nadu.

It goes without saying that the general rise in prices of agricultural products in this period and the increased income paddy farmers received for their products are likely to have been important factors in enabling them to purchase commercial manure for their fields. The average price of paddy for the 20 years ending 1910 in North Arcot district was higher than that for the 20 years ending 1880, by about 70 per cent.[15] As mentioned in a 1910 report on Coimbatore district,

> a rise in the price of paddy enables the ryots cultivating lands irrigated by the Kalingarayan channel to increase their expenditure on manure, hence an expansion in the radius within which employment is provided in plucking and carting wild indigo.[16]

13 Hemingway (1906), p. 141.
14 1 lb=0.454 kg.
15 PBR, No. 527, 30 December 1912, pp. 21–22, para 27.
16 GO, No. 102, Revenue, 10 January 1910, p. 9, para 28.

Table 2 *"Normal yield" of rice per acre as shown in* Season and Crop Reports, lbs

District / Year	1892	1905–09	1911–17	1918–54
Chingleput	694	704	1,005	1,039
North Arcot	1,106	1,106	1,206	1,273
South Arcot	905	905	1,139	1,240
Salem	1,078	1,072	1,273	1,273
Coimbatore	897	905	1,206	1,273
Trichinopoly	999	972	1,206	1,273
Tanjore	928	1,072	1,072	1,173
Madura	676	670	1,340	1,307
Ramnad			1,206	1,206
Tinnevelly		905	1,340	1,340

Source: 1892: assessed yields recorded in GO, No. 2025, Revenue, 22 August 1903; for 1905–09, 1911–17, 1918–54: *Season and Crop Reports of the Madras Presidency*, various years.

Table 3 *Area cropped more than once,* in 1000 acres

Districts /Year	1891	1902	1912	1922	1933	1944	1946
Chingleput	58	153	168	233	213	237	271
South Arcot	175	286	162	267	255	272	242
North Arcot	153	247	203	287	255	287	327
Salem	190	235	202	269	234	269	263
Coimbaore	213	310	276	304	324	348	334
Trichinopoly	85	107	193	171	149	219	183
Tanjore	93	111	98	121	172	341	289
Madura	98	140	171	176	171	231	196
Ramnad	0	0	49	74	56	64	65
Tinnevelly	200	216	232	219	239	214	206
Total	1,265	1,805	1,754	2,121	2,068	2,482	2,376

Note: A division of Tinnevelly district and also one of Madura district were amalgamated into a new district, Ramnad, in 1910.

Source: *Administration Report of the Madras Presidency during the Year 1891–92*, Madras, 1892; *Season and Crop Reports of the Madras Presidency*, various years.

UNIRRIGATED AND TANK-IRRIGATED AREAS

Other than in river-irrigated areas like the Kaveri delta, cropped land formed only a part of the village land, as exemplified by Salem district, where only one-fourth of the total land was cropped in the early decades of the nineteenth century. Farmers used various kinds of manure on their fields, including cow dung, leaf manure and rubbish. Uncultivated common land supported agriculture by providing leaf manure, as well as pasture for cattle and other animals. The cattle there were reported to be in a healthy condition, thanks to forest land being available for grazing. For example, in Hosur taluk of Salem district, where one-third of the arable land still remained uncultivated in 1876, the chief kinds of manure used were vegetable refuse, *yerkam* (*Asclepias gigantean*) leaf, and other brushwood. Cattle-droppings, ash, and other sweepings of houses and enclosures were carefully collected and placed daily in the manure pit. Sheep and goat manure was valued higher than cow dung. For wet lands, in addition to leaves of the *yerkam*, flowers of the *pungam* tree were collected, and the *pungam*-seed *punnakku*, or oil-cake, was regarded as very valuable manure. The cattle of the taluk were "very fine, and large herds of them graze in the forests of the Denkanikota division."[17] North Arcot district also provides us with evidence of the importance of unused lands and forests in agricultural production. It was reported in 1880 that in the northern taluks of the district, "even where the soils seem poor and the more ordinary and indifferent qualities predominate … the yield is much greater than that obtained either in Chingleput or Nellore from similar soils." One great advantage that a large part of the district possessed, in common with some other districts, was the facility with which leaves could be obtained for manuring wet cultivation. "They may be said to be utilized largely by villagers within a moderate distance of the hills and jungles, and are often carted distances ranging up to ten miles." The report emphasized the importance of manuring:

> It is gratifying to thus learn how extensive the yield of paddy is in these taluks and similar tracts, where the greater industry and labour of the cultivator in the matter of manure largely aids the outturn.[18]

People were allowed freely to collect fuelwood from the forest.

Nevertheless, the environment that supported agricultural production deteriorated towards the end of the nineteenth century. Cultivation expanded into what had been waste land previously, and this led to a rapid decrease in village common land. For South Arcot district, the 1917 Settlement Report revealed a reduction in unoccupied dry land during the previous thirty years from 33 per cent to 13 per cent.[19] According to the 1915 Settlement Report for Madura (Madurai) District,

17 Fanu (1883), pp. 158–59, 160, 162.

18 PBR, No. 1495, 11 October 1880, p. 6892 (para 86), p. 6893 (para 89).

19 PBR, No. 239, 3 October 1917, p. 15, para 17. For other areas, see Yanagisawa (2008).

unoccupied land is "steadily being brought under cultivation, and everything points to the fact that no longer period will elapse before all the valuable land is brought under the plough."[20]

The government's forest reservation policy worsened the situation by regulating the collection of leaf manure from forests. This led to a shortage and a resultant increase in the price of leaf manure, as well as in that of bullocks. In 1903, the Settlement Officer for Salem District, pointing to the rise in costs of cultivation as compared to the 1870s, reported that one item for which "the expenses have risen is manure." Expansion of irrigation in both wet and dry lands added to the demand for leaf manure. On the other hand, he reported, the contraction of the waste area near the more populous villages and forest reservation had made it necessary to go farther for leaves or to pay a permission fee for gathering them.[21]

In North Arcot district, too, the price of bullocks was reported in 1912 to have increased enormously, and it was reported that "manure is very difficult to procure and the restrictions of the Forest Department contribute a great deal to the increase under this head."[22]

The people, however, seem to have coped with the new situation by developing a more intensive agricultural production system. R. K. Puckle had already pointed to the "excellent" methods adopted in the use of manure by Salem farmers in 1860, and a 1933 document reported the development of manure markets in the same district.

> The ryots have great faith in the efficiency of green manure. In the paddy cultivation season, *there is a regular market for wild indigo plants, which are sold in bundles and very often by bandy loads.* Where the manure is found costly, they resort to other leaf manure obtainable from the neighbouring reserved or unreserved forests. Sometimes, even margosa leaves are trampled into puddled field. *A tree named Vadanarayana*, which puts on abundant branches and leaves in a few days after it is bereft of its foliage, *is grown on field bunds or along fences, on account of the manurial value of its leaves.* … In some villages, e.g., Thyaganur and Aragalur of the Attur taluks, ryots have been deriving double benefit by raising groundnut as a manure crop; *groundnut is dug out and sold and the stalks and leaves are pressed into the field as manure* for a second crop in the same year. (Emphasis added.)[23]

20 PBR, No. 117, 29 April 1915, p. 15.

21 PBR, No. 205, 15 June 1903, p. 22, para 27.

22 PBR, No. 527, 30 December 1912, p. 29, para 32.

23 *Selections from the Records of the Madras Government, No. LXV,* Papers Relating to the Survey and Settlement of the Salem District, Government Press, Madras, 1879, pp. 8–9; PBR, No. 92, 11 July 1934, pp. 6–7, para 10.

People not only collected leaf manure from forested areas, but also started to grow manure crops in their fields. The 1931 Supplement to the Trichinopoly District Gazetteer delineated the recent changes as follows:

> *The local manures (consisting of cattle-dung, house-sweepings, village rubbish and tank silt) are not sufficient for more than a fraction of the area under cultivation.* Green leaf manure is only available in small qualities in the wet tracts, and the ryots are under advice *trying to grow green manure crops in the paddy fields themselves and in vacant lands and tope* … about 10,000 acres of green manure crops are grown in both [Tanjore and Trichinopoly] districts. … *The practice of growing green manure crops is … gradually extending in the district.* (Emphasis added.)[24]

Groundnuts were also used as manure. Farmers even in unirrigated regions thus started to purchase green manure for their fields, and some even used chemical fertilizers.[25]

As the use of manure increased, so did the number of irrigation wells, which multiplied substantially. As seen in Table 4, the area irrigated by wells increased from 7,83,000 acres to 12,06,000 acres between 1891 and 1922. As a result, the cropping intensity of the cultivated fields strengthened. In North Arcot district, it was pointed out, many wet lands had wells and depended for a second crop on well irrigation.[26] A more typical case was reported in 1906 from South Arcot district, where

Table 4 *Irrigated area in the Tamil districts,* in 1000 acres

	1891–92	1902–03	1912–13	1922–23
Government Canals	1,349	1,389	1,442	1,436
Private Canals	4	7	27	23
Tanks	1,358	1,407	1,970	2,063
Wells	783	796	989	1,206
Other sources	74	93	149	139
Total	3,570	3,690	4,577	4,867

Note: Tamil districts: Chingleput, North Arcot, South Arcot, Salem, Coimbatore, Trichinopoly, Tanjore, Madura, Ramnad and Tinnevelly.

Source: *Season and Crop Reports of the Madras Presidency*, various years.

24 *Madras District Gazetteers (1931),* p. 79.

25 For the increase in the use of chemical manure in Andhra, see Satyanarayana (1990), pp. 114–15.

26 PBR, No. 527, 30 December 1912, p. 18, para 23.

> wells, for example, have greatly increased in number recently and in the decade ending with 1900–01 the area cropped twice advanced 69 per cent over the figure of the preceding ten years.[27]

A 1932 supplement to the Gazetteer of this district emphasized the progress in intensive methods of agricultural cultivation: "Whenever possible, intensive farming has been taken up by adequate manuring and by utilizing all the sources of irrigation." Ryots were generally willing to adopt improved agricultural methods.[28] In Coimbatore district also,

> The progress of the district since settlement has chiefly been in the direction of intensive cultivation and this was inevitable in the southern taluks owing to the want of new land fit to be brought under cultivation.[29]

By thus increasing the application of manure and adopting more intensive methods of agricultural production, in spite of the rapid decline in village common lands and the enactment of regulations in favour of people's use of forests, farmers not only succeeded in preventing a fall in the crop yield per acre but even increased it in some areas, as shown in Tables 1 and 2. The 1910 Settlement Report for Coimbatore District estimated the

> increase in the number of wells at about 30,000, irrigating more than 120,000 acres which now generally produce two full crops instead of one middling one. The present yield of that area is about four times what it was.[30]

In the dry areas of some regions, the farmers seem to have decreased the cultivation of other crops in order to expand pasture lands and to increase fodder production. It was reported as follows for Coimbatore district in 1910:

> In Dharapuram … the forest area is insignificant, and the fodder for the cattle is provided by reserving part of the patta land for pasture, and growing cholum on the land of irrigated by wells.[31]

Further,

> To provide grazing for the cattle, the lands are left fallow there [in Coimbatore, Erode, Karur, Dharapuram, and other taluks of the plains] as the reserved forests are not sufficient to supply grazing for all the cattle, while the demand for

27 Francis (1906), p. 145.

28 *Madras District Gazetteers: Statistical Appendix for South Arcot District,* Superintendent, Government Press, Madras, 1932, p. xxv.

29 GO, No. 102, Revenue, 10 January 1910, p. 12, para 42. For Tinnevelly (Tirunelveli) District, the Gazetteer described in 1917, the growing tendency towards intensive methods as the most satisfactory feature of the economic outlook (*Madras District Gazetteers Tinnevelly,* by Pate, 1917, p. 192).

30 GO, No. 102, Revenue, 10 January 1910, p. 10.

31 *Ibid.,* p. 11, para 36.

> *kolinji* [wild indigo] for the wet lands under the Kalingarayan channel is such that at certain seasons of the year strings of carts are to be seen on all the roads bringing in enormous loads of *kolinji* from villages 20, 30, or 40 miles away.[32]

Interestingly, the 1932 Supplement to the South Arcot District Gazetteer noted that indigo was coming into importance once again both as an industrial and a green manure crop, and also that casuarina was becoming important on account of its fuelwood, for which there was always much demand.[33] Thus farmers responded to the growing market for manure, fodder, and fuel by expanding the cultivation of these commercial crops.[34]

It is important to remind ourselves here that the rise in prices of commercial crops like groundnut formed the background against which the intensification of agricultural practices proceeded. According to the 1910 Settlement Report for Coimbatore District, the increase in prices of crops cultivated on dry lands, like *cumbu, cholum*, and *ragi*, in the forty years between 1864 and 1904, ranged roughly from 69 per cent to 55 per cent.[35] The 1932 Supplement to the South Arcot District Gazetteer highlights the connection between the introduction of manure to cultivate dry crops and the increased income farmers earned by cultivating groundnut.

> Recently green manuring has become common in the district and large areas of dhaincha, *kolingi* and indigo are grown year after year in wet lands for being ploughed in as manure. Groundnut cake has also come to be used largely for manuring paddy and sugarcane crops. Artificial fertilizers like ammonium sulphate and superphosphates are coming into use gradually. All the available cattle manure is applied to garden lands where most intensive cultivation is done. *Owing to the increased profits obtained from groundnut crop grown in dry lands, the manuring of this kind of land has only lately been taken up by the ryots.* (Emphasis added.)[36]

CHANGES IN CROP PRICES, USE OF COMMERCIAL MANURE, AND PRODUCTIVITY

Our observation of the connection between the intensified use of commercial manure and other inputs in agriculture, and the rise in agrarian prices, offers a clue to understanding the changes in agrarian productivity after the 1880s. Though rainfall and weather may still have been the most important factors that determined annual changes in the extent and yield of crop cultivation, as farmers increased their use of purchased manure and the payment for penning animals on their fields, cultivators –

32 *Ibid.*, p. 34, para 111.
33 *Statistical Appendix for South Arcot District,* Superintendent, Government Press, Madras, 1932, p. xviii.
34 The increase in the area under fodder crop has been already revealed by Nair and Dhas (1991).
35 PBR, Revenue, No. 102, 10 January 1910, p. 29.
36 *Statistical Appendix for South Arcot District, p. xvi.*

particularly those producing commercial crops extensively – may have become more concerned about the prices of the crops they cultivated and therefore changed the quantities of their cultivation inputs.

While it is difficult to be conclusive about actual trends in agricultural productivity in Tamil Nadu, it is probable that the paddy yield per acre increased up till 1920, stagnated in the 1920s, and went into a decline in the two decades after 1930 (see Tables 1, 2, and 5).[37] The price of rice moved along a more or less similar trajectory until 1930: a rise up to 1920 and stagnation in the 1920s. It then declined sharply in the early 1930s and revived in the 1940s (see Figure 1).

For the period between the 1880s and the 1920s, the sources already cited in the previous sections indicate a connection between a rise in crop prices and an increase in the use of commercial manure. For the period after 1930, as the Deputy Director of Agriculture for Trichinopoly Circle reported in 1935, though the system of growing green manure crops was increasing, "the use of phosphates like bone-meal, bone sinews, etc., as manure to wet and garden lands, though popular, the low prices of produce preclude such investments."[38] K. Ramiah's comments on the use of manure in Madras Presidency, presented in a 1937 government publication, also suggest that the low price prevailing at that time prevented the further spread of manuring. According to him, compound manures were slowly coming into use, but "their extensive use is limited by the prevailing low price for rice." Among the artificial manures, ammonium sulphate was a quick-acting manure quite suited to rice, and "its use was generally coming into practice *in spite of its high price until recently, before the price of rice went down*" (emphasis added).[39]

Ramiah's observation was corroborated by the report of a 1936 survey of a Tirunelveli (Tinnevelly) village, which said:

> But the fall in price of village produce has so heavily affected the ryots that of late many of them have abandoned the application of chemical manures, even for this important purpose of stimulating plants that languish. It is said that generally the agriculturist is now content with applying whatever manure he himself gathers and is growing more and more reluctant to buy from outside even the necessary cattledung.[40]

Thus, though farmers seem to have either weakened their efforts towards intensive cultivation or failed in producing expected yields per acre in the 1930s and early 1940s, under conditions of lowered prices and unfavourable weather respectively, intensive

37 Yanagisawa (1996), pp. 284–97.

38 *Reports of Subordinate Officers of the Department of Agriculture, Madras, for 1935–36, 1936,* p. 49.

39 Ramiah (1937), p. 120. Ramiah also suggested (*ibid.,* p. 204) that manuring formed an important item of the cost of cultivation and that it varied widely: "One of the chief items in the cost of cultivation will be that due to manures and manuring. This again may vary from practically nothing to as much as Rs. 15 to Rs. 20 an acre."

40 Thomas and Ramakrishnan (1940), p. 84.

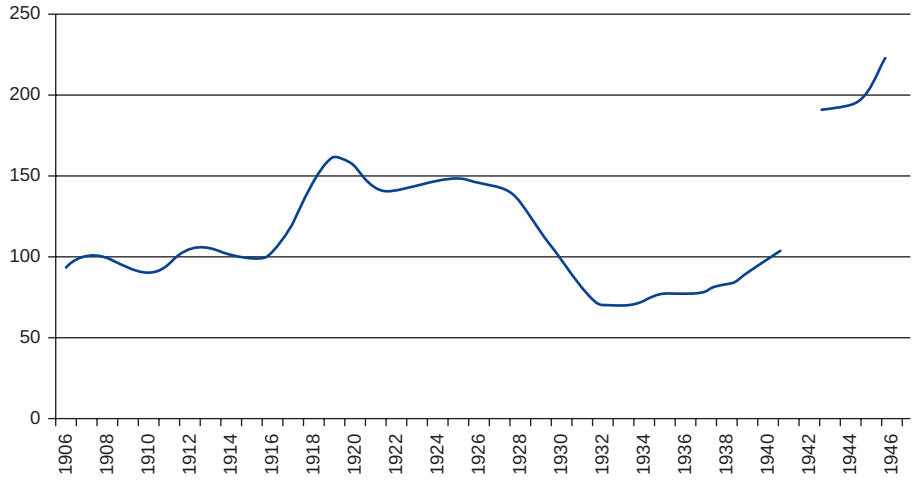
Table 5 *Average yields of rice per acre as obtained by multiplying normal yields by seasonal factors*, lbs

District/Years	1917–19	1920–24	1925–29	1930–34	1935–39	1940–44	1945–49	1950–52	1953–54
Chingleput	1,053	1,049	1,006	1,020	869	984	652	662	966
North Arcot	1,175	1,181	1,181	1,161	1,110	1,184	896	942	1,248
South Arcot	1,169	1,121	1,141	1,141	1,104	1,125	870	773	1,166
Salem	1,235	1,186	1,186	1,258	1,298	1,379	1,069	1,018	1,235
Coimbatore	1,235	1,235	1,227	1,199	1,189	1,146	1,026	1,002	1,235
Trichinopoly	1,213	1,176	1,214	1,186	1,204	1,218	998	1,018	1,254
Tanjore	1,032	1,046	1,091	1,016	1,100	1,091	988	1,036	1,132
Madura	1,359	1,317	1,286	1,331	1,281	1,324	1,098	1,046	1,248
Ramnad	1,520	1,252	1,134	1,247	1,059	1,154	719	563	1,152
Tinnevelly	1,179	1,257	1,235	1,198	1,179	1,233	1,061	1,089	1,327

Note: The figures for 1940–44 are the average of only three years, 1940, 1941 and 1944; for a more detailed account of the method of computation involved, see Yanagisawa (1996), pp. 289–97.

Source: *Season and Crop Reports of the Madras Presidency*, various years.

Figure 1 *Index number of three-year average of prices of rice in the Madras Presidency (1915–16=100)*



Note: For 1941–42 and 1943–44, two-year averages are used.

Source: *Season and Crop Reports of the Madras Presidency*, various years.

methods of cultivation are likely to have revived after India's Independence. As seen from Tables 1 and 6, the paddy yield per acre in the districts of Tamil Nadu showed a remarkable increase between 1945 and 1955, though the 1955 figures were still below the yields recorded in 1917. This sharp rise in productivity was backed by the "Grow More Food Campaign", under which schemes like subsidizing the supply of chemical fertilizers, green manure, and oil-cakes to farmers contributed considerably to additional output of foodgrain.[41] The spread of intensive methods of cultivation among South Indian farmers in the early decades of the twentieth century, and the long experience they had accumulated in the use of these kinds of manure, might have formed the background against which the rapid recovery in productivity was achieved after Independence.

CONCLUSION

Thus, in spite of the decline in village common land and the deterioration of other natural environmental features which had previously supported agrarian production, South Indian farmers managed to maintain agrarian productivity, and partially succeeded in raising it, by resorting to more intensive methods of production based on wider use of commercially available manures and on the planting of green manure – thereby reducing their dependence on the natural common resources available in

41 Natarajan (1953).

their localities. The growth of trade in manure and the movement of animals that developed over the Tamil districts facilitated the farmers' adoption of new methods for raising yields.

Table 6 *Yields of rice per acre as obtained by 1945–49 and 1955–57 crop-cutting experiments*, lbs

District /Years	1945–49	1955–57
Chingleput	676	958
North Arcot	948	1,470
South Arcot	893	1,362
Salem		1,541
Coimbatore		1,589
Trichinopoly	1,051	1,317
Tanjore	876	1,121
Madura	1,123	1,454
Ramnad	655	864
Tinnevelly	1,163	1,498

Source: For 1945–49: ICAR, *Sample Surveys for the Estimate of Yield of Food Crops*, Table 9.4; for 1955–57: for Tanjore, Madura and Ramnad districts, my calculations are from *Season and Crop Reports for Madras State for 1955–57*, and for other districts, from Sumit Guha, "Introduction," in Guha, ed., *Growth, Stagnation or Decline? Agricultural Productivity in British India*, Delhi, 1992, p. 46, Statement III.

APPENDIX: A COMPARISON WITH JAPANESE COMMON LANDS (IRIAICHI)

Our observation of the pattern of use of common local resources in South India reveals that changes in the manure and fodder used by farmers for agricultural production were closely connected with the transformation of village common lands and other common property resources. The experience of Japanese farmers in the pre-modern period also points to changes in the customary use of manure and fodder as a crucial factor in determining the state of the local natural environment, including village common lands (*iriaichi)* and forests. To locate the South Indian case in a wider historical perspective and to compare it with the Japanese case, we shall briefly delineate the history of the Japanese village commons and other common property resources (CPR).

Changes somewhat similar to the nineteenth-century South Indian case were witnessed in Japan from the seventeenth to the nineteenth century, where the man–land ratio seems have reached a watershed point much earlier than in India. Before

the Tokugawa period (1603–1867), and also early in this era in Japan, the size of a farm was generally large. Village notables who managed such large farms were the main beneficiaries of common lands and forests. However, this CPR control system dominated by elites gradually declined in the seventeenth century. Servile labourers became independent small farmers, and the incidence of large farmers hiring labour decreased considerably. Hence, the period witnessed a transformation of hierarchically structured villages into egalitarian village communities consisting mainly of small peasant farmers. The transformation in the village structure was accompanied by a change in the CPR control system. Farmers, so far as they held agricultural lands, enjoyed more or less equal rights over common lands *(iriaichi*) and forests, even though the larger land-holders were generally entitled to a larger share of CPR products.[42]

Elsewhere we have argued that in South India, in the early decades of the nineteenth century, a handful of the village elite not only dominated the holdings of cultivated land, but also the use of village common lands. But here also, later years witnessed a decline in the elite-dominant CPR system and the gradual emancipation of the subordinate sections of villagers, some of whom came to hold small plots of land and developed as small farmers.[43] The Japanese and South Indian cases seem to indicate that the decline in the elite-dominant form of CPR control and its transformation into a less inegalitarian one is a typical path along which common lands could proceed.

The new system of managing village common lands (*iriaichi*) in Japan seems to have had a strong impact on forests and other natural environments surrounding the villages. Like in nineteenth-century South India, in seventeenth-century Japan, too, village common lands were the main source for the supply of green manure and fodder, and they also served as grazing ground for cattle. To cultivate a 1-acre field, farmers needed about 10 acres of common lands to provide green manure and to feed the animals. According to the recent work of Kunihiko Mizumoto, village societies, which controlled and managed the common lands, encouraged villagers to cut the trees that grew on these lands in order to ensure the growth of grass that could be used as manure and fodder. Japan's climatic conditions allowed trees to grow so vigorously as to impede the growth of grass. Thus, according to Mizumoto, in the middle of the seventeenth century, deforested mountains were a common feature of the Japanese countryside.[44] This interpretation is in accordance with the other literature on Japan's forest history, which indicates that serious deforestation was witnessed from the end of the sixteenth century to the first half of the seventeenth century. [45]

42 Furushima (1956).
43 Yanagisawa (2008).
44 Mizumoto (2005).
45 See Saito (2009).

Developments in the system of managing Japanese common lands are also interesting to note. In a considerable number of agrarian villages in Japan, the villagers were involved in an arrangement called *wariyama*, literally meaning 'divided uplands'. Instances of *wariyama* were a regular feature of the latter half of the seventeenth century and rapidly increased in number in the nineteenth century, especially in the Meiji period, after 1868. According to this arrangement, the village divided its common woodlands among its households, assigning them usage rights for the areas they received. Upland division seems often to have occurred when communities failed to protect their common lands (*iriaichi*). In the seventeenth century, the gradual acquisition of arable land by formerly subordinate villagers, as seen above, and the reclamation of uncultivated land increased the demand for fertilizer and fodder, resulting in a relative paucity of common land and, subsequently, its overuse. One of the purposes of dividing the commons was to prevent further deterioration of CPRs by assigning to every household, usage rights as well as maintenance responsibility for the plot allocated to it.

According to the *wariyama* arrangement, assignees were allowed to collect grass and other CPR products under regulations set by the village. Assignees were generally prohibited from either selling or alienating assigned plots to others. Violation of the rules by an assignee could lead to confiscation of his *wariyama* right. Thus the *wariyama* arrangement was a form of regulated use of CPRs, tightly controlled by the community. The plots were periodically redistributed among the villagers, usually by lots, say, every five years. The most important function of the divided uplands was to produce grass and fodder, without which farmers could not grow crops. Therefore, settlements usually allotted *wariyama* plots in proportion to the household's arable land, and hence, in terms of acreage, these plots were unequally distributed.[46]

An important change occurred in agricultural practice some time in the eighteenth century. Farmers increased the consumption of purchased fertilizers, like dried sardines and oil-cakes, in place of the leaf manure collected from the common lands and forests – thereby reducing their dependence on common lands as the source of fertilizer. According to Mizumoto, the shift in the type of manure used was prompted by a growing shortage of green manure, as a result of the expansion of cultivation to previously uncultivated lands. The process accompanied an adoption of other new agricultural technologies, like the introduction of new rice varieties, and a new type of thresher and hoe. The new methods of production were more labour-intensive in character and required much more careful management.

This led to a change in the role of village common lands. The main function of CPRs gradually shifted from the production of grass manure to providing fuelwood and timber. At this point, the role of common lands as an indispensable complement

46 For the *wariyama* system, see Harada (1969).

to agricultural production became less important, and, instead, villages gave more weight to the CPRs' role as suppliers of fuelwood and timber to the villagers including the landless. A result of this shift in the main role of the CPRs was that the intervals between the redistribution of plots became longer. It was reported that in cases where plots were redistributed every five years, assignees cut down the immature trees on their assigned lands just before redistribution was expected, and so contributed to deforestation. To avoid such deforestation, in the later phase, common lands were assigned for longer periods of time – for example, 20 years, 50 years, etc. – and in some cases permanently. In the Kinki region, a new type of *yamawari* was witnessed in the latter half of the eighteenth century. Prolongation of the term of assignment was accompanied by a change in the rights of assignees over the land. Though their rights were still confined to the use of the land, they could now sell them to others, sometimes even to non-villagers. In this way, the assigned rights gradually became private holdings of forest land.

It may be concluded that the shift in the kind of manure used by farmers – from naturally grown green manure to purchased manure like dried fish – not only led to a change in the form of CPR management, but also contributed, at least to some extent, to the revival of forests in nineteenth-century Japan.

When we examine the South Indian and Japanese cases, we notice some important similarities between the two: (i) there was once a system of controlling local natural resources by influential local people, which later gradually declined; (ii) the most important role of common lands was to supply green manure and fodder in the early stages; and (iii) there occurred a shift in the main type of manure used from natural green leaves to purchased manure, which was accompanied by the farmers resorting to more labour-intensive methods of production and weakening their reliance on common lands as suppliers of manure.

The influence of the changes in the use of manure on forests seems to have been more remarkable in Japan than in India. One reason for this might be the differences in the natural environment. While trees grow vigorously enough in Japan to impede the growth of grass, this is not the case in South India. Another difference might be that Japan witnessed the establishment of a system to strictly control the use of common lands by village communities consisting of homogeneous peasant households, which later contributed to transforming the common lands to forest lands in their locality, whereas India has still to establish such an egalitarian CPR-controlling system. These are, however, just some tentative hypotheses for interpreting the differences between the two regions.

These findings suggest that there is a need to consider the history as well as the future scenario of India's common lands, in the context of their changing role in local production and the economy.

REFERENCES

Fanu, H. Le (1883), *A Manual of the Salem District in the Presidency of Madras*, Vol. II: *The Taluks*, Government Press, Madras.

Francis, W. (1906), *Madras District Gazetteers: South Arcot*, Superintendent, Government Press, Madras, 1906.

Furushima, Toshio (1956), *Nihon nogyoshi (History of agriculture in Japan)*, Iwanamishoten, Tokyo.

Harada, Toshimaru (1969), *Kinsei iriaiseido kaitaikateino kenkyu: yamawariseidono hasseito sono henyo (A study of the disintegrating process in village common lands: The growth and transformation of dividing mountain system)*, Kakehashishobo, Tokyo.

Hemingway, F. R. (1906), *Madras District Gazetteers, Tanjore*, Superintendent, Government Press, Madras.

Hemingway, F. R. (1907), *Madras District Gazetteers: Trichinopoly*, Superintendent, Government Press, Madras.

Mizumoto, Kunihiko (2005), "Kinseino shizento shakai" ("Nature and society in early-modern Japan")," *Nihonshi Koza 6: Kinseishakiron*, Tokyodaigaku Shuppankai, Tokyo.

Moore, Lewis (1878), *Manual of Trichinopoly District in the Presidency of Madras*, Government Press, Madras.

Nair, K. N., and Dhas, A. C. (1991), "Agricultural Change in Tamil Nadu: 1918–55," in Sabyasachi Bhattacharya, Sumit Guha, Raman Mahadevan, Sakti Padhi, D. Rajasekhar and G. N. Rao (eds.), *The South Indian Economy: Agrarian Change, Industrial Structure and State Policy, c. 1914–1947*, Oxford University Press, Delhi.

Natarajan, B. (1953), *Food and Agriculture in Madras State*, second edition, The Director of Information and Publicity, Government of Madras.

Pate, H. R. (1917), *Madras District Gazetteers Tinnevelly*, Vol. 1, Superintendent, Government Press, Madras.

Raghavaiyangar, S. Srinivasa (1893), *Progress of the Madras Presidency during the Last Forty Years of British Administration*, Superintendent, Government Press, Madras.

Ramiah, K. (1937), *Rice in Madras: A Popular Handbook*, Superintendent, Government Press, Madras.

Row, T. Venksami (1883), *Manual of the District of Tanjore in the Madras Presidency*, Madras.

Saito, Osamu (2009), "Forest History and the Great Divergence: China, Japan and the West Compared," *Journal of Global History*, 4.

Satyanarayana, A. (1990), *Andhra Peasants under British Rule: Agrarian Relations and the Rural Economy 1900–1940*, Manohar, New Delhi.

Thomas, P. J., and Ramakrishnan, K. C. (1940), *Some South Indian Villages Resurvey*, University of Madras, Madras.

Yanagisawa, Haruka (1996), *A Century of Change: Caste and Irrigated Lands in Tamil Nadu, 1860s–1970s*, Manohar, New Delhi.

Yanagisawa, Haruka (2008), "The Decline of Village Common Lands and the Changes in Village Society: South India, *c.* 1850–2000," *Conservation and Society*, 6, 4.

Other Government Documents

Madras District Gazetteers, Statistical Appendix for Trichinopoly District, Superintendent, Government Press, Madras, 1931.

Madras District Gazetteers: Statistical Appendix for South Arcot District, Superintendent, Government Press, Madras, 1932.

Reports of Subordinate Officers of the Department of Agriculture, Madras, for 1935–36, Superintendent, Government Press, Madras, 1936.

Selections from the Records of the Madras Government, No. LXV, Papers Relating to the Survey and Settlement of the Salem District, Government Press, Madras, 1879.

Abbreviations

GO	Madras Revenue Proceedings, Government Orders
PBR	Proceedings of the Board of Revenue, Madras