In an old country like India where a major portion of the best lands has already been yoked and where the average yield is also low, the need for intensive cultivation becomes imperative. Countries, in our neighbourhood, like China and Japan have specialized in intensive cultivation. Sir Nicholoson while discussing Japanese Agriculture, says, "Japanese field cultivation is remarkable: it utilizes every accessible square foot of soil and tills that soil with the greatest thoroughness ... Not a waste corner is to be seen, nor is any space taken up by hedges and walls." Practically same is the position in China. The old Roman agricultural maxim, "Secundior est cultura exquitus quam magnitude neglecta" — better the well-worked plot than the ill-worked field — has been given a practical shape in these two countries. Besides the utmost thorough tillage of every foot of ground under cultivation, it would be of interest to learn about the various other practices adopted by the Japanese cultivator.

The fields in Japan are kept absolutely free from stones, thorns and weeds. Rains are often heavy, but wash is prevented partly by the depth of the tilled soil which absorbs a large quantity of the rainfall flow (though its healthy porosity permits of natural through drainage) partly by the 'ridge and furrow system', and partly by the care taken in keeping the fields, even the uplands, fairly level by cutting and terracing.

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4. ibid., p.32.
There being hardly any cattle, and even horses, a few, most of the agricultural operations are performed by manual labour and the chief cultivating tools are the spade, hoe, and fork and not the plough. This well resembles the Italian proverb, 'The plough may be silver but the spade is gold.' All this is, however, possible because of the small size of the farms in these countries.

Since the Japanese farmer believes in the direct feeding of the plant rather than the soil, there is practically no system of rotation. But the intense growth each year of beans and other legumes on some part of every upland field, whether in ridges alongside wheat and barley or in separate plots, to some extent takes the place of a rotation and assists the soil to regain nitrogen.

In Roman Italy, tillage is the first and the second essential of the cultivation of the soil, manuring the third; they dig it and dig it and dung it. The utilization of waste in Japan, China and Korea is superb. Every scrap of organic matter is carefully searched out and collected; animal excreta, always excluding human but including those of foals, and pigeons which are often kept for the purpose, leaves, weeds, straw and all sorts of vegetable refuse from the town, farm or house, such as potato peelings, radish tops, and so forth, dead silkworms and their pupae, slaked lime and mussel shells, bones of all sorts pounded small, wood and straw ashes, indigo refuse, astragalus grown after a paddy crop, loamy earth, etc., are all pressed into service.

1. ibid., p. 32. This does not mean that there are no ploughs in Japan. They have their simple ploughs as mentioned by King (op. cit., p. 363). The plough in China, has a long tradition. It is said to have been invented by Shen-nung, who lived 2737-2697 B.C. (King, op. cit., p. 199).
2.Nicholas, ibid., p. 41.
3. For a pen picture of the way in which human and animal waste is preserved in China, refer to Martin O. Yang, A Chinese Village', pp. 23-24.
It is because of this national conscientiousness, that Japan in 1908 prepared and applied to her fields 22,812,787 tons of compost prepared from such waste. It would be interesting to know in this connection that the number of horned cattle then was not more than 1.3 millions, horses - 1.6 millions, sheep and goats - practically non-existent, swine-about 2 lakhs and fowls - from 10 to 11 millions. The livestock population in Japan was thus one hundredth that of the present population of India. India should on this rough estimate produce not less than 2,581 million tons of compost, sufficient to make available about 7 tons of the matter per acre for its present cultivated area.

That is not all. Human waste - excreta and urine - are also preserved there with a religious fervour. If for example, a Japanese farmer gets a crop of 1,000 lb from his field, he expects that the share which he and his family eat, shall, as far as possible, be returned to the soil in the form of human waste. Whatever quantity of his grain he sells to the nearest market, he endeavours to recover by purchasing the town night soil. The result is that the farmer or the scavenger who removes night soil from the cities, instead of being paid anything as practised in India, pays each householder for the privilege.

1. Japan produced and applied to her fields 22,860,295 tons of human manure and 22,812,787 tons of compost and imported 763,774 tons of commercial fertilizers. In addition to these, she must have applied not less than 1,404,000 tons of fuel ashes and 10,188,800 tons of green manure. All this was applied to less than 14 million acres of cultivated fields (Ibid., p. 261-62).

2. Ibid., pp. 41-42.


4. King (op. cit., p. 171) cites the example of a Chinese contractor paying $31,000 gold in 1908 for collecting 72,000 tons of human waste in the city of Shanghai alone.
Objections may be raised to the use of night soil from the point of view of hygiene and the unpleasantness of the job. In so far as hygiene is concerned, it is certainly better to collect the excreta in special reservoirs than to leave it as such to fester on the soil. Sir Nicholson while commenting on this aspect of the problem pointed out that there is no wonder that the village drinking water wells in India are saline and foul, with the products of decaying organic matter in the wrong place.

While in the Indian villages or even in the Western countryside, night-soil may be polluting most of the residential places, in China, Japan and Korea, it goes to the fields well preserved. Japanese also found as a result of careful experiments that the addition of phosphate of lime or dry powdered clay, sawdust or powdered charcoal helps to prevent the loss of nitrogen from night-soil.

The passage of any organic matter in China is considered nothing short of race suicide. The extent of intensive cultivation there would be judged from the fact that in Shantung Province, a plot of 2.5 acres could well maintain a family of 12 members together with his team, consisting of a cow, a small donkey and two pigs. This works out to a population density of 3,072 people, 256 cows, 256 donkeys and 512 swine per square mile of cultivated land.

1. Sir John Russell (World Population, p. 48) for example, says on the basis of some observations that "measles, diarrhea, dysentery, summer diarrhoea, round worms, hook worm blood, and river flukes and others" may be due to the excessive use of night soil. High infant mortality has also been attributed to this very factor. This may, however, be due to many other causes. King (cit. p. 29) mentions the habit of feeding the infants with meat, before they have even cut their teeth, as the possible cause of high mortality rate. Again, infant mortality is high even in India and many other countries where night soil is not used at all.


3. King, cit., p. 100. He cites many more examples of such families.
A Chinese farmer in order to supplement his manurial requirements practises the formation of nitrates in soils. The floors of dwellings are charged with potassium nitrate. The overcharged soils of floors are removed by contractors who pay for the privilege. Nitro-farming as it is called thus helps to increase uncropped virgin soils.

Fuel and manurial economy is again found at its best in the practice, both in China and Japan, of rice hulls and rice straw being used as fuel and mulch. Coal dust mixed with clay is patted into small cakes to serve as fuel. The burnt soil is then used as manure. It has been found that if soil is heated to dryness at a temperature of 110 degree centigrade the solvent-power of water finds it more easy to recover from it plant food.

In southern China there is again an equally more laborious practice of periodic exchange of soil between mulberry orchards and the rice fields. They have found by experience that such an exchange goes a long way in improving both mulberry and rice. There is also the practice of the use of canal mud, some times at the rate of even 76 tons or more per acre.

1. The application of soil as a fertilizer to the fields of China must have played an important part in the permanency of agriculture in the Far East, for all such additions have been positive accretions to the effective soils, increasing its depth and carrying it all plant food elements." (Ibid., p.227).

2. Such a practice does exist in the big cities of India also among mid class families, but no heed is paid to the manurial value of the earth, or the heated soil. The object here is only to economise some expenditure on fuel.

3. Ibid., p.155.

4. Ibid., p.22.

The laborious process of the spread of river and canal mud by the system called "warping" serves the same purpose as is automatically done by the Nile in Egypt (French, Q.T.I., p.50).
The importance of manuring there would be judged from the fact that a Japanese cultivator looks on the soil rather as an instrument for converting his manure into crop than as a source of crop in itself. In keeping with their principle of the direct feeding of the plant and not of the soil, manure is supplied in small doses which are spread over the period of the plant growth as against its application in one big dose. The application of manures in small and frequent doses is not only economical but also prudent and sensible. The process assures a continuous supply of nitrogen at every stage of the development of the plant. What happens in the case of a single heavy dose is that a part of it is washed down into the sub-soil before the roots can absorb and assimilate it. The plant would no doubt tiller abundantly, but suffer from nitrogen hunger at later stages.

Another feature of agriculture in China and Japan is that it is economical of seed. Only so much of it is sown as is absolutely necessary. This also is never scattered broadcast. The practice normally is of hand sowing or even dibbling in rows. In China generally, in Japan perhaps less often, seed is steeped in dilute liquid manure until it begins to swell and germinate. This not only ensures good germination but also saves seeds, assists early growth and destroys fungoid diseases, so much so that China has four crops of rice in a year from the same field, although the crop does not take less than 115 days in all.


2. Wilcox (ibid., p. 207) says that the seed takes about 25 days to sprout. This is done away from the field. For four crops not less than 150 days are thus saved. Each crop which would normally occupy the field for four months, is actually allowed to grow on the field only for about three months; sprouting of the seed being done outside the field.
The whole of agricultural economy of China and Japan may be summed up in the words of King himself who says,

"Almost every foot of land is made to contribute material for food, fuel, or fabric. Everything which can be made edible serves as food for men or domestic animals. Whatever cannot be eaten or worn is used for fuel. The wastes of the body, or fuel and of fabric are taken back to the fields; before doing so they are housed against waste from weather, intelligently compounded and patiently worked at through one, three or even six months, in order to bring them into the most efficient form to serve as manure for the soil, or as seed for the crop. It seems to be a golden than an inviolable rule, that whenever an extra hour or day of labour can promise even a little larger return, it must be given, and nothing be permitted to cancel the obligation or defer its execution."

1. King, ibid., p. 25.