

CITY COMPOST USE WITH CHEMICAL FERTILISERS WORKS WONDERS

by

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1. India's Green Revolution rescued our nation from famines and built up huge **surplus stocks of food-grains, but at the cost of over 11.6 million hectares of low-productivity nutrient-depleted soils**, ruined by unbalanced and excessive use of synthetic fertilizers and no organic manures or micronutrients. TERI has estimated the **economic loss of these man-made barren lands at Rs 1 – 3 Billion, Annually**, and attributes this to "increasing intensity of cultivation and inadequate and inappropriate application of fertilizers."

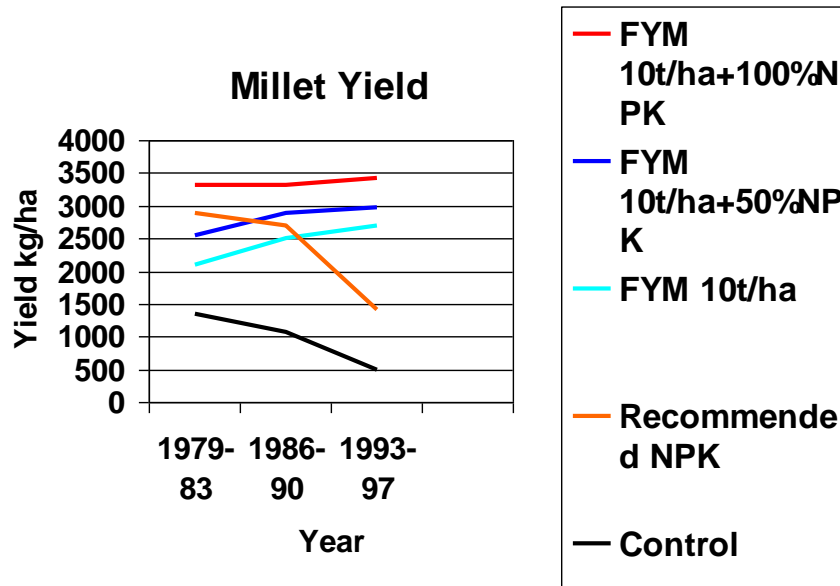
2. **The solution to this paradox has been with us for over a decade, but has not been implemented. It is Integrated Plant Nutrient Supply, (IPNS) wherein the use of synthetic fertilizers is combined with organic manures** rich in humus and soil microbes, which provide essential micro-nutrients and help plants to absorb the NPK (Nitrogen, Phosphorus, Potash) of chemical fertilizers. **IPNS is a wise move that has yet to gather momentum and realize its full potential.**

3. The need for IPNS was suggested decades ago by the results of long-term fertilizers experiments, where application of Nitrogen alone reduced the yield of wheat to zero after 13 years. The Indian Institute of Agronomy found that **combined application of FYM [FarmYard Manure] and inorganic fertilizer was the best.**

4. As long ago as April 1989 the Fertiliser Association of India (FAI) published data showing **the superiority of integrated use of organic manures and chemical fertilisers in providing greater stability in crop production** in intensive farming systems compared to mineral fertilizers alone. **FAI's in 1997 warned of nutrient deficiencies of as many as 8 elements since 1950, which use of composted food wastes can prevent.**

5. Between 1983 and 1997, Bangalore **studies on dryland agriculture showed that plots using FYM along with synthetic fertilizer did the best, with yields immediately increasing 2.5 times** over control plots and holding or improving that yield to 2.55 times in the long term. Five-year-average yields of plots receiving only synthetic fertilizer initially doubled but fell to half later. Plots using only farmyard manure did 56% better initially and rose to 100% better yields over time.

20 Year studies of dry-land millet by UAS Bangalore :



6. India in 2001 had an estimated **shortfall of 6 million tons a year of organic manures**. **City Compost can easily fill this need, even today** if its urban biodegradable waste is composted and returned to the soil. Composting the waste of smaller towns will make it available uniformly all over India. **Adopting IPNS for use of valuable city compost along with synthetic fertilizers will generate enormous national savings for the prosperity of India's farmers as well as the cleaning of urban India**. There is scarcely any other national programme which can bring such huge benefits to both urban and rural sectors.

7. Currently, city compost suffers from the misconception that it is worthless because it contains only 1% of N, P and K, though few would complain of the same in farmyard manures which have similar or lower levels of NPK but **a host of remarkable benefits which have been known since Vedic times**. That is why composting of domestic wastes is uniformly practiced in rural India. Some benefits:

8. **City compost**, like farmyard manure and composted agro-wastes, **contains tremendously useful soil microbes and humus, which helps to aerate the soil, balances nutrient supply, improves water retention and resistance to both drought and water-logging, and reduces irrigation requirements and conflicts over water**.

9. **Synthetic fertilizers, used alone, pollute the groundwater with nitrates, because only 20-50% of the N P and K in synthetic fertilizers is absorbed by plants**. The rest runs off into the soil, wells and water sources. **Addition of compost reduces nitrate pollution and wastage, as its humus acts like a slow-release sponge, retains nitrates for the plants and increases the uptake and efficiency of the chemical fertilizers it is used with**. This is one reason why IPNS increases all crop productivities compared to synthetic fertilizers alone.

10 . **Water-holding capacity** of humus in compost is most important.

Farms using compost do not need 2nd or 3rd sowing if rains fail.

Crops with compost need 4-5 waterings vs 6-7 without it.

For every 1% organic matter content, one foot depth of soil can hold 75,000 litres of plant-available water per acre (ATTRA data).

11. City composts contain all required micro-nutrients, derived from the biodegradable food wastes they are produced from. **Use of city compost in soils can counter the galloping depletion of micro-nutrients in Indian soils** since heavy chemical-fertiliser use began to be used for intensive cultivation.

12. **Compost use makes soil porous so roots are stronger.** This strengthens the plant's natural resistance to pests and decay. Farmers using compost find they need **far less pesticides**, saving input costs with less environmental pollution.

13. **Horticultural produce quality improves** when city compost was applied. Fruit from compost-grown plants are larger, tastier, have better colour and shelf life and fetch better prices.

14. **Quality benefits have been proven in field trials.**

City compost use in tea plantations improved tea yields and flavour.

In paddy there was less plant death after transplanting, and more grains per plant.

Papaya plantations using city compost had plants with 50% thicker trunks, fewer days between flowering and less fruit drop. Compared to plots without compost use, yield was 63% more and the fruits were 28% heavier and smooth and shiny without any black spots.

Fig plantations with city compost showed trees with stronger stems, less disease, 30% more branches and 20% more fruit compared to plots without compost. Fruits were 40% heavier with better colour & longer keeping quality.

Pomegranate trees showed similar benefits, but with fruit size doubled and marked reduction in micronutrient deficiency.

All this meticulous comparative data was compiled by Vennar in Bellary using Mysore city compost produced by them in 2006.

15. Chemical fertilizer companies have been driven to co-marketing of organic manures because of acute fertilizer shortage and soaring costs of their inputs. These costs are not fully covered even though India's subsidy to fertilizer companies at over Rs 1 lakh crores a year currently exceeds our Defence budget. In their own self-interest, there is a great need for fertilizer companies to **pool such comparative data and compile photo-case-studies**, for example through all FAI members, to convince farmers and the bureaucracy in order to promote IPNS for India's food security.

16. **City compost is not toxic.** Samples regularly meet the **specifications for compost quality laid down in Schedule IV (vii) of the Municipal Solid Waste (Management & Handling) Rules 2000.** In fact, heavy-metal levels will come down when city compost is used along with chemical fertilizers, since, for example, **Single**

Super-Phosphate and Rock Phosphate, contain twice as much lead and 9 – 15 times more cadmium than the standards now specified for city composts. Synthetic fertilizers are not currently required to comply with such strict standards for heavy-metal content.

17. **Farmers clearly recognize the value of organic manure.** There is such a shortage that in most cities, waste-transport drivers are bribed to dump reasonably biodegradable raw garbage onto farmers' fields. But uncovered and uncomposted, these raw waste heaps breed rats and insects which carry diseases, and stray dogs which not only carry rabies and rickettsia but form hunting-packs that kill nearby livestock at night and cause dog-bites and traffic accidents by day. **If city wastes are composted before applying them to the soil, the cities would be cleaned up and the fields around cities would cleaner** and spared the infertility induced by accumulated plastic-film waste. Health and hygiene would visibly improve.

18. **Compost can restore saline and alkaline soils to fertility.** TERI estimates that we have a total of **21.7 million hectares of such natural and man-made barren fields in India, awaiting rescue.** UP's Bhoomi Sudhaar Nigam and experiments at Kutch and Sangli have already proved the benefits of using compost. Full yields are restored in 3 years to totally-barren soils.

19. **It is hard to imagine a more beneficial win-win solution than the use of city compost in the city's hinterland.** To overcome the apathy, inertia and resistance to new ideas, **there is tremendous need for urgent agricultural research to include city compost of specified standards in IPNS trials and the latest Package of Practices** for all types of crops. If the Government will not do it, FAI can build an illustrated collection of such case-studies.

20. There is also the mental block of city compost being bulky and hence too expensive to transport and spread. **We need creative solutions for timely and cost-effective compost availability and distribution,** such as decentralized stock-piles near point of use, perhaps in a leased agricultural field, where mechanized loading of unbagged loose compost can be done for a small loading fee during peak demand. Fertiliser producers and distributors are best placed to understand the needs of farmers and evolve solutions, once they have embraced the need and benefits of IPNS.

ECONOMICS OF COMPOSTING CITY WASTES

21. **The pricing out of low-analysis nitrogenous fertilizers** which are not subsidized like urea **has led to the highly disproportionate use of NPK** which has been so damaging to our agriculture. Emphasis on IPNS using City Compost, which can be produced all over the country, can be a successful strategy to restore balance. **Once a market for city compost is created through a sustained push for IPNS, entrepreneurs will follow and economies of scale will be achieved.**

22. **Improved soil productivity through IPNS will increase rural prosperity and food-purchasing power** when compost reaches the farmers, who really deserve the benefit of India's massive fertilizer subsidy which now exceeds our Defence budget.

23. Compost returns P (phosphorus) and K (potash) to the soil. So IPNS will also reduce our huge foreign exchange burden for import of P and K.

24. The real economic benefits of compost use are improved soil quality, water retention, biological activity, micro-nutrient content and improved pest resistance of crops. **With acute fertilizer shortage, we can grow more with less chemical fertilizers.** Replacing half of recommended levels of chemical fertilizer with equivalent monetary value of city compost has shown marvelous results in paddy: less plant death after transplanting, less water and pesticide use, slightly higher yield, and greatly increased net profit to the farmer.

Paddy, 6 wks after transplanting. City compost used on left-side plot



Sona Masuri paddy benefited from compost use AT NO EXTRA COST:

With Mysore city compost	Without compost
0.5t city compost = Rs 1750	0
15 th day DAP 100 kg Rs 800	200 kg Rs 1600
35 th “ 19:19:19 100kg 800	200 kg 1600
55 th day urea 50 kg 230	100 kg 460
potash 75kg <u>350</u>	150 kg <u>700</u>
Total Cost = Rs <u>3,930</u>	Rs <u>4,360</u>

Bellary photo March 2004 Bellary and data from Vennar Organics.
City compost used from next year on 60 acres after this 1 acre trial.

25. **It is now viable for individual fertilizer firms to set up their own compost plants** and run them directly or through contract operators, with many benefits.

26. The capital cost for city-compost plants **is an extremely modest investment for fertilizer factories**, a very tiny fraction of the capital cost of fertilizer plants. A two-crore investment on one hectare of land can produce 5-6000 tons a year of quality compost in a state-of-the-art plant for a one-lac-population town. Capital costs per ton decline with plant size.

27. Fertiliser factories also have vast, possibly surplus, **manpower resources and in-house technical expertise to rapidly set up such compost plants.**

28. This route for funding the capital cost of compost plants for cities will have the **following financial advantages for the respective fertilizer producer companies:**

- * They can claim **100% depreciation** on the plant cost for city pollution abatement.
- * They can claim **100% tax-free profits on compost sales u/s 80JJA** of the IT Act.
- * They can claim **State subsidies for soil conditioners** if they use their compost **for reclamation of degraded and saline soils.**
- * **Co-marketing of compost with urea will be a long-term investment in their business**, as it will increase acreage and customers for their products and the benefits of IPNS will increase the yields, prosperity and purchasing power of their existing customers and acreage. **This marketing can be done at negligible additional cost** as all fertilizer companies already have an excellent sales and distribution network countrywide. **Increasing both market size and market share is especially important today.**

* **Compost quality control is crucial**, and its many intangible properties like microbial composition, humus content, pathogen and weed content are easier to control in company-owned plants than from outsourced suppliers whose mistakes can damage a firm's good name.

29. What is immediately required is a widespread program of field trials both by ICAR's Institutes and by all fertilizer companies to establish the best practices and proportions for combined use of City Compost with chemical fertilizers for all crops & soils. Sufficient City Compost is already available at a dozen locations in India today having compost plants, for such IPNS trials.

30. Co-marketing of city compost with chemical fertilizers was recommended in an Inter-Ministerial Task Force Report on IPNS submitted to the Supreme Court, which has approved the Report and directed its implementation. As a result, the Central Govt has written to all Fertiliser Companies to consider the co-marketing of their products with city compost. Sincere implementation is now the need of the hour.

31. Voluntary guidelines for co-marketing have been issued to all fertilizer companies since years but without much impact. So it is now time to make them mandatory.

32, It is also worth requiring fertilizer companies to invest in and operate one or more captive compost plants for one or more municipalities which they can adopt under CSR, and market its compost with their chemical fertilisers. Installed capacities totaling 1000 tons a day of wet waste would generate collectively about 200 tons a day of city compost, extremely easy to co-market.

33, Combined use of city compost with chemical fertiliser can halve the need for the latter, easing import burden created by shut-down of naphtha-based plants.

34, Maximum use of nitrogen in urea can reduce growing demand for both fertiliser and the fossil fuels needed to produce them.