

MANAGING COARSE REJECTS FROM COMPOST PLANTS

and ORGANICS FROM BIOMINING

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Composting is increasingly becoming the preferred method of processing organics worldwide. California has just declared a complete halt by 2025 to landfilling of all food scraps and tree trimmings going into landfills and generating methane there.

Composting is the processing method of choice in India. But half of all organic waste is rejected even after processing for compost, though it is a valuable agricultural resource.

That is because FCO standards for compost require it to be finer than 4mm before enrichment and sale, so as to keep out broken glass and plastic fragments and make it easy for spreading.. This fine fraction cannot be obtained in just one sieving. The first screening is usually done through 100 mesh (either before windrow formation or after four windrow turnings). The next sievings are through 35 mesh and 14 mesh screens before the final 4 mm screen.

The coarser bits of twigs etc with high lignin content take longer to break down, so they remain as coarser fractions: plus-100 mesh (but along with plastics and cloth etc), 35 to 100 mesh and 14 to 35 mesh, both organic fractions. The 4 to 14 mesh fraction is usually used to cover fresh waste to control smell and flies and add composting microbes to it. It is also spread as a leachate-absorbing bed around fresh windrows, and then added to the heap. This gives the 4-14 fraction an extra month of 4 turnings to change into humus (ligno-proteins), break down to below 4 mm size and thus increase compost yield.

These 100+, 35-100 and 14-35 fractions are considered problem rejects, to be compacted into RDF (Refuse-Derived Fuel) for industry or brick kilns, or sent to faraway cement plants for co-processing. But as cement plants demand very low moisture content to prevent cooling of their cement kilns, and it is not cost-effective to dry these high-moisture 14-35 and 35-100 fractions, they are simply discarded into landfills where leachate and methane formation can continue.

This is a great pity, because these coarser organic fractions can easily break down over time in the soil and add good humus as well as essential microbes to improve soils and plant growth. They can be mixed with soil and usefully added into tree pits for horticulture (mango, guava, grape etc) or for agro-forestry or forestry. When ploughed into crop fields, coarse organic matter makes the soil porous and water-holding and promotes strong root systems for healthy and productive plants.

Best of all, such coarse fractions of stabilised waste have a wonderful healing effect on saline or alkaline soils, especially fields which have become less fertile over time or have developed a full white crust of salt on the ground, where nothing grows. This has been proven in small field trials in Kutch and Maharashtra. In Karnataka alone, 42 lakh hectares or 22% of arable (cultivable) land suffered from alkalinity or nutrient imbalance in 1990 and recent surveys report an alarming increase in such infertile acreage.

How much of incoming waste ends up as such coarse rejects? Almost half. Fresh organic waste has over 50% moisture, necessary for biological decomposition. After it is stabilised by four turnings in wind-rows which generate their own heat, then spread for drying before sieving, the moisture content comes down to below 20%. So for every 100 tons of segregated waste, 30% is lost as water vapour. Another 10% is lost as carbon dioxide. So the heap volume and weight goes down to 60% of intake.

Compost yields of 4mm and finer are usually 12-15% of fresh waste intake. So 45-48% remains as the three coarse fractions. Thus every town generating 100 tons of waste a day will potentially produce 45 tons a day of coarse organics in addition to the fines sold as compost. If one ploughs in say 3 tons of this per acre of saline/alkaline soil, one can restore 15 acres every day to fertility over time. It may take three years to recover full fertility as vegetation slowly comes back. The first few sowings should be of horsegram or other crops that can be ploughed back into the soil.

The cost of transporting coarse rejects from compost plant to barren fields cannot be borne by farmers who cannot grow crops on these lands. But the benefit to the nation of adding so much cultivable land is enormous, especially when so much good land is lost to growing cities. So such application will need to be subsidized just as gypsum application on them is subsidized.

As a beginning, Karnataka's Director CADA (Command Area Development Authority) has agreed in principle to conduct demonstration field trials in two irrigation basins suffering salinity. In the Cauvery Basin, rejects from the Mysore or Bangalore compost plants will be tried in Maddur Taluk.

Biomining of old open dumps of waste is a method of reclaiming materials and space. Old mixed waste is unmixed, by sieving and sorting, into plastics, cloth, stones and sand, plus a fine mixture of organics and soil called bioearth. This too can be useful in reclaiming saline and alkaline soils, especially if fortified with the soil microbes that plants need for growth.

In the Tungabhadra Basin and Ballari District, biomined organics from a 50 tpd garbage sorter at Raichur's former dump, working since July 2015, will be tried by CADA in degraded lands.

For this, both old and new compost plants and biomining sites will have to organize the transport of their coarse rejects or bioearth trial field plots identified by CADA. This will greatly benefit the compost plants by creating fresh working space. Funding the transport cost is the major challenge. Creative use of the budgets of existing schemes for waste management and agriculture can provide answers. For example, payment for landfilling in existing contracts can be beneficially used to avoid landfilling and extend landfill life and space by paying the same amount for transport to degraded lands instead. Similar opportunities can be sought in schemes for farmer relief and soil reclamation projects.