A study was carried out in Ghana on the use and fertilising potential of organic waste from large-scale agro-industries and municipal waste. With present fertiliser prices, agro-industrial by-products that are sold as animal feed can never compete with imported fertiliser. Even subsidised compost cannot compete with imported fertiliser. But maybe the value of organic material is underestimated? A report from Ghana.

Photo: WASTE Consultants

Organic wastes hijacked

E. Owusu-Bennoah and Cinty Visker

In Ghana, ongoing devaluation of the cedi and ending agricultural subsidies increase the cost of imported fertiliser and thus lower farmers' returns. Population growth, increased food demand and decline in soil fertility call for increased use of fertiliser. A substantial part of the nutrients is removed with the harvest. Not all removed products are used, some are thrown away. If waste products could be recycled, brought back to the farms, the nutrient output from the field would diminish and and there would be less demand for expensive imported fertiliser.

The study focused on organic waste in two geographical areas, the triangle Accra-Akosombo-Tema and the northern provinces, where the main consumption areas for fertilisers are found. Some results are summarised in Table 1.

Organic materials can be obtained from by-products of large- or small-scale agro-industries as well as from domestic waste, at municipal level or at village and household level. In order to make agro-industrial by-products and domestic waste products attractive to farmers, the price of these products has to be favourable enough to compete with imported fertiliser. This means that organic waste should be cheaper and/or be of higher quality (i.e. higher nutrient content).

Varying demands

The use of organic waste depends on its nature, where it is generated and on the demand. In the Tamale region and in the palm oil plantations in the Accra-Akosombo-Tema triangle, the demand for alternative, cheap fertiliser has increased. In the last three to four years, farmers in the north started to use slaughterhouse waste products and cotton refuse as fertiliser. Since the last one to two years all by-products have been collected. The oil palm industry uses the by-products for their own consumption. The surplus is available to farmers, who only pay the costs of transporting and handling the materials. After decomposition the slurry is pumped over parts of the farm. By burning the shells and fibers, the palm oil industry is self-sufficient in energy. For the surplus, farmers pay 100 cedi per 25 kg bag of ash, which covers the handling costs.

Fertiliser demand in the Kumasi zone and the Accra-Akosombo-Tema triangle is less than in the Tamale region. In these regions, by-products of the juice industry and slaughterhouse are disposed of. The by-products of the timber industry, like sawdust and woodscraps are low in nutrients and decompose slowly. In Accra, a small part of the sawdust is used in the production of compost (from night soil) and to cover up the refuse disposal sites. In the Kumasi area all the sawdust is disposed of. Scrap wood is used in the timber industry to generate energy and it is locally used to produce charcoal. An attempt to use sawdust as briquets, to reduce firewood consumption, has never taken off. The supply of firewood seems to be sufficient.

However, the demand for animal feed is extensive. The supply of agro-industrial by-products cannot meet this demand. Depending on the nature and marketing possibilities of the by-products, the material is sold within Ghana (copra cake, wheat bran), exported to Europe (cocoa bean shells, cotton seeds), or bought by private people, who dry the material before selling it again (fish waste, brewers' spent grain and yeast).

Night soil hijacked

It is difficult to estimate the quantity of municipal waste (household refuse and night soil), that is generated in Accra, Kumasi and Tamale, because of disposal sites are widely spread and there is a limited collection capacity. In the Tamale municipality, 90% of the collected night soil is used as fertiliser. We were extremely surprised when we found out that farmers in this region hijacked the government trucks that emptied septic tanks. An illegal action! They paid the drivers around 2000 cedis, directed them to their farms and let the night soil pour over their fields. For us it meant that the need for nutrients was high because normally people have quite an aversion for human waste.

The municipal waste of Kumasi town is completely disposed of. In Accra, part of the collected municipal waste is converted into compost by the Accra Municipal

Authority (AMA). The refuse compost is mixed with night soil compost at ratios of 3:1 to 4:1. In 1992, 3,000 tonnes of compost were sold, for a subsidised price of 500 cedi per 20 kg bag, to horticulturalists, vegetable growers, and some private companies and farmers. The compost is produced in a large-scale centralised compost plant. Production of compost adds a lot to the running expenses of AMA. The continuation of the AMA compost plant is doubtful. A large-scale centralised compost plant is economically not viable. AMA is looking into possibilities of mobile composting units.

Nutrient transport

Though the nutrient content of different agro-industrial by-products is relatively low, the volume of waste generated in the system is substantial. By using of agro-industrial by-products and wastes, large quantities of nutrients are moved through the system. With, for example, the export of substandard cocoa beans and cotton seeds around 270 tonnes of N, 120 tonnes of P2O5 and 110 tonnes of K20 per year are exported out of the Ghanaian agricultural system. Ghanian soils are depleted more and more while European soils are enriched.

Can waste compete?

Depending on the type of the material, organic waste can be used for animal feed (copra cake, wheat bran, cotton seeds, spent grain, fish meal). The market for animal feed in Ghana is extensive. With the present fertiliser prices, however, agro-industrial by-products, now sold as animal feed, could never compete as fertiliser. Even with a subsidised price of 500 cedi per 20 kg, also compost cannot compete with imported fertiliser. Still farmers use it. The distance between industrial areas and farm lands is apparently, in the case of animal feed, not important. Animal rearers are willing to pay the price of transport. The transporting distance is, however, important for the use of organic material as fertiliser. The compost that is made in Accra is used only in a relatively small area.

Looking at organic waste only as a nutrient source is underestimating the value of it. Soil fertility has to be seen as a combination of soil physical (soil structure, pH, Cation-Exchange-Capacity, water retention capacity, etc), biological (micro-organisms) and chemical factors (nutrient content, nutrient balance). If soil fertility is to be maintained, it has to be looked at in this broader sense. This means a completely different valuing of organic matter. ■

E. Owusu-Bennoah and Cinty Visker, International Fertlizer Development Center (IFDC), BP 4483, Lomé, Togo.

Table 1:
Quantities, present use, present price and Nitrogen content of (some) agro-industrial by-products and waste products

Agro-industry	quantity	present use	present price	nitrogen content
fish processing	20 tonnes/day	animal feed	65 cedi/kg	
cocoa				
- chocolate processing	1980 tonnes/yr	animal feed[1]	unknown	
- substandard beans	500-1000 tonnes/yr	pharmaceutical industry[1]	25% WMP[2]	
oil mill (copra)	1240 tonnes/year	animal feed	80 cedi/kg	34,3 tonnes/year
cotton industry				
- cotton seeds	8736 tonne/year	animal feed[1]	90-120 USD/tonne	271,8 tonnes/year
- refuse	304-604 tonne/year	fertiliser	nothing	
timber industry				
- saw dust		some for compost		
- scrap wood		charcoal	not known	
		energy	nothing	
juice factory	9-18 tonnes/day	none		
slaughterhouse		some for fertiliser	nothing	
breweries				
- spent grain	15 tonnes/week	animal feed	not known	0.13 tonnes/week
- spent yeast	4 tonnes/week	animal feed	not known	
palm oil industry				
- bunch ash	630 tonnes/year	fertiliser	4 cedi/kg	
- slurry	29,610 tonnes/year	fertiliser	nothing	36.6 tonnes/year
- fibers/shells	28,350 tonnes/year	energy	nothing	
- fibers/ shell ash		road repair	nothing	
municipal waste		some for compost	25 cedi/kg	
- refuse compost				
- night soil compost				

[1] exported
[2] WMP = World Market Price