

Experiences With Recycling in Germany

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INTRODUCTION

Waste problems do not arise either in nature, nor in traditional rural human lifestyles as in both these situations all substances are more or less "recycled". Only industrialisation results in the creation of large quantities of waste materials for which there is no immediate use. Rising economic output has been accompanied by an increased consumption of materials and a constant growth of waste volumes. Up to the 1970s sufficient dump space was available to deal with these wastes. But the increasing volume of "garbage heaps", the shortage of resources, the risks, and harmful effects of inappropriately created landfills in connection with an increasing environmental awareness has pushed the waste problem into the centre of public interest.

At the start of the 1970s, waste policy in Germany was geared to environmentally compatible disposal. But from 1986 the Waste Management Act legally defined the order of priorities for dealing with waste as: (1) avoidance; (2) recycling, and [only when the first two are not possible] (3) disposal. Later the Packaging Ordinance (1991), and the Closed Substance Cycle and Waste Management Act (1996), also aimed to reverse the trend of growing waste volumes. Recycling has ever since become an important objective in German waste policy.

DEFINITIONS

Waste. The Closed Substance Cycle and Waste Management Act defines waste as "movable things which the owner wants to or has to get rid of". The act differentiates between "waste for recovery", which should be recycled or reused as secondary raw materials or fuels, and "waste for disposal", which cannot be recycled and should be disposed of. A third category of waste deals with the so-called "special waste". Special waste requires extra supervision, because it could cause hazards to health or contaminate air or water.

Recycling. Recycling means the recovery of raw materials and their return to the substance cycle, or processing into new products. Recycling technologies are used to preserve resources and to reduce waste volumes. Good results in recycling are achieved especially in waste paper, glass, aluminium, and tin plate. Recycling includes the biological, chemical, or energetical transformation of waste.

FUNDAMENTALS OF GERMAN LEGISLATION

Closed Substance Cycle and Waste Management Act 1996. This is the core legislation dealing with waste. It is based on a fundamental waste management concept of extending the producer's responsibility to the entire life cycle of a product. Special attention is paid to the development and the manufacturing of low-wastage products. The producer, as well as the consumer, must ensure that unavoidable residues are fed back into the cycle as secondary raw materials. Only waste which

cannot be recycled may be disposed of in a manner that causes no hazards to the environment or to human health. This newly defined concept of "waste" thus also includes residual materials and commodities, which were formerly beyond the government's influence sphere.

The special emphasis on waste avoidance before recycling and disposal is defined in Section 4 of this law. The imperative of recycling is only necessary if it is technically feasible and economically reasonable. Substance recycling and energy recycling have equal status, the more environmentally compatible method should be given priority.

Packaging Ordinance 1991, Amended 1998. This measure is seen as a major step to closed substance cycles. It requires manufacturers and retailers to accept returned packaging and to recycle it in an extra waste-collecting system outside the public one. Producers and retailers are freed from the obligation to accept returned packaging if they participate in a system for collection and recycling of sale-packaging, which is paid for by the manufacturers. So the "Duales System Deutschland GmbH" was founded to collect and recycle such material. The DSD has to meet certain collecting and recycling quotas.

It also requires producers and retailers to accept packaging containing hazardous residues.

Sewage Sludge Ordinance 1992. This lays down requirements for the utilisation of sewage sludge in agriculture, horticulture, and forestry. It regulates the spreading of sewage sludge on soils. Spreading sewage sludge is prohibited in forestry areas and on areas used for cultivating fruits and vegetables and heavy metal content is limited. The maximum quantity of sewage sludge which can be spread is limited to 1.6 t dry weight per hectare per year.

Biological Waste Ordinance 1998. This new legislation regulates collecting, processing, and utilisation of biowaste as well as the yield on horticultural and agricultural soils. Biowaste is defined as waste from food processing, kitchen waste, and gardening. Quality requirements for compost are specified and maximum yield quantities and limits for heavy metals and pollutant analysis are determined.

Technical Instruction on Waste from Human Settlements 1993. This regulates the handling and disposal of municipal waste, which must be treated in such a way that the proportion of organic matter is below 5% before disposal. At present this can only be achieved by incineration. Until 2005 organic substances are to be collected separately.

WASTE AND RECYCLING

The quantity of waste in Germany should be reduced drastically by the legal regulations detailed above. According to Ministry of Environment statistics, between 1990 and 1993 waste volume decreased about 10% to 337 million tonnes. At the same time the recycling ratio increased to 25%. In industry 59% of waste is recycled. The DSD collects about 5.4 million tonnes of packing waste from a total amount of 6.4 million tonnes. With a recycling level of approx. 77% (4.9 million tonnes) the legal standards are currently being met.

New technologies have been developed for substance recycling, for example the application of plastics as a reducing agent in steel production. However, there are limits to recycling. Thus the most valuable materials are collected, even though capacity or technology is not currently available to process all of them or markets are not yet ready for the recycled product. The latter is the case, for example, with sludge and biocomposts. This waste is often stored for long periods. In some areas only the admixture of small proportions of secondary raw materials is possible for the production of high-quality products.

RECYCLING AND NURSERIES

Organic Waste. Approximately 80% to 90% of the waste volume arising in nurseries is organic waste. Usually it is composted on the nurseries and used as fertilisers or for soil improvement.

Pasteboard and Paper. Pasteboard and paper usually originate from packaging materials. But even office paper is collected separately and recycled as secondary raw material. Very dirty and soaked papers can also be composted.

Plastics. Approximately 1% of the waste arising from nurseries consists of plastics. This waste stems from pots and containers, packing materials, foils, fleeces, and fabrics. Depending upon the degree of contamination and the ability of the nursery to separate different types of plastic, this waste can be recycled to high-quality raw materials or into new products, e.g., pallets, buckets, pots, and foils. Already 50% of all plastic pots are made from recycled plastics. The fuel value of waste plastic corresponds to heating oil.

Wood. Crates, pallets, and used tree stakes are sources of the waste wood. Only untreated materials are recyclable. They can either be composted or converted by the woodworking industry.

Pesticides Packaging. Only a small proportion of waste is due to pesticides packaging. According to the "Packaging Ordinance" pesticide packaging has to be collected separately. The pesticide producing industry introduced a collection system to recycle pesticide packaging chemically.

USE OF RECYCLED PRODUCTS ON NURSERIES

Recycled products are already in use in many areas of horticulture. On nurseries, substrates are currently being tested which are enriched with bio-compost, wood fibres, or bark.

Recycled paper products are used for packing and as pots. Plastic pots are made partially of recycled material, as are pallets, plastic stakes, and fleeces.

Waste avoidance is possible by using multi-use packaging such as "C-C carts", multi-use plastic crates, multi-use pallets or "bigbags" for substrates, and by using biodegradable materials, such as paper pots, degradable fabrics and binding-material, and wooden crates.