

## **SOCIAL FACTORS IN THE TREATMENT AND REUSE OF ORGANIC WASTES IN DEVELOPING COUNTRIES**

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### **Contents**

1. Introduction: Attitudes, behaviours and technology for organic waste reuse
    - 1.1. Variety of organic wastes or residues
    - 1.2. Reactions to wastes
  2. Household and community-scale action for treatment and reuse
    - 2.1. Compost latrines
    - 2.2. Urban-waste-derived compost and vermicompost
    - 2.3. Biogas digesters
  3. Technology choice, behavioural change and institutional supports
  4. Conclusion
- Glossary  
Bibliography  
Biographical Sketches

### **Summary**

This article discusses social factors that impinge on effective treatment and reuse of urban organic wastes, cattle dung and agricultural residues, with reference to the developing countries. The focus is on organics generated in households, villages, small farms, and cities. There is particular reference to human excreta. Examples of household and community-based management of biogas digesters, composting and vermicomposting, and of composting latrines point to the difficulties in reusing organic wastes where many actors are involved. Insights gained from some successful or promising interventions suggest ways in which planning and technologies can adjust for social factors in particular settings. It is difficult to change attitudes and behaviours related to organic wastes, but the desire of most people for good waste management and the recognition that resource recovery can improve their quality of life provide a basis for extending appropriate technologies in organic waste reuse.

### **1. Introduction: Attitudes, behaviours and technology for organic waste reuse**

Organic wastes, referring to both plant and animal residues together with human and animal excreta, are inevitable and continually-created materials in human communities.

Of the wastes that modern settlements must manage, the organics are, in principle, the most easily treated, since the treatments and reuse are biotechnical or natural. At the same time, these wastes can be the most problematic for human settlements on a day-to-day basis. This is because they are generated in many ways and contexts, are of enormous bulk and usually very moist, decompose rapidly (giving off odours) and harbour harmful pathogens, while providing breeding sites for disease vectors. The traditional problems of organic wastes are today complicated by their contamination with synthetic and hazardous materials, chemicals and toxins. In urban places, where organic wastes in refuse range from 30% to 80%, the scarcity of land for disposal and the expense of collection and transportation are of great concern for municipal services. In rural areas, if residues are not left to decompose in the fields or secured for fuel, they are burned or dumped on vacant land and into water bodies. Reuse of organic wastes reduces the costs of transportation and disposal as well as returning resources to cycles of use; hence, maximizing safe treatment and reuse is acknowledged as important for public health, resource management and the environment.

This article discusses the social factors that impinge on effective treatment and reuse, with reference to the developing countries. Large-scale, within-industry conversion of bulk organics is not covered as social factors do not affect these processes to any great extent. The focus here is on organics generated at household, community, farm, and city levels. There is particular reference to human excreta: these have the greatest impact on public health if improperly collected and disposed of, while engendering the most negative attitudes and avoidance behaviours. Examples of household and community-based (sometimes called 'decentralised') management utilizing biogas digesters, composting and vermicomposting, and composting latrines point to the difficulties inherent in reusing organic wastes where many actors are involved. Insights gained from some successful or promising interventions suggest ways in which planning and technologies can adjust for social factors in particular settings.

Personal and community attitudes to wastes may be influenced by religious beliefs, long-standing social taboos, ideas about health and disease, and even proverbs or sayings. The collection, disposal or reuse of wastes are often governed by social structures that allocate waste handling to social groups who are greatly stigmatized and hence constrained from equal social participation and socio-economic betterment. Understanding how people regard organic wastes, the extent to which they exploit them for benefit or income, and how they 'interact' with the wastes may help achieve better reuse for social gains, good public health, efficient resource management and environmental improvement.

Both new techniques introduced to manage and reuse wastes, and new products derived from organics impact on customary behaviours and uses. Successful technological changes require new behaviours and alter social roles and statuses, as well as beliefs and attitudes. Understanding these impacts may result in the modifications of a technology, improvement in the adoption of a technology, or even the rejection of the technology in a particular context. Although such factors are usually acknowledged as important, there is very little empirical research pertaining to the socio-cultural aspects of organic wastes. By drawing on insights gained from project reports, this article aims to contribute to a wider understanding of social aspects in order to guide the

implementation of technologies for organic waste treatment and reuse.

### **1.1. Variety of organic wastes or residues**

Before the advent of large-scale farming and forestry, and the proliferation of manufactured synthetic materials, the reuse of organics was widespread in rural and urban fringe communities. Residues were exploited for fuel, fodder, animal bedding and manure by simple, if labour-intensive, endeavours. As garbage dumps grew on the edges of cities and towns, farmers mined the dumps for decomposed biomass, cultivated old dump land, and grazed animals upon it. By the 1990s, where chemical fertilizers were available, reuse of urban organic wastes began to decline. The growing contamination of urban wastes with synthetic materials, broken glass, biochemical and industrial toxic wastes have led to injuries for farm workers and draft animals while yields are reduced because of large amounts of plastics in the soil. Heavy metal contamination is suspected but rarely investigated. Rising fuel costs have made the transport of wastes from cities to farms costly. At the same time, contamination of sewage waters and sewage sludge has impacted on urban aquaculture and agriculture. These impediments to ready reuse of urban organics have greatly augmented urban solid waste management crises. Now detailed ‘separation-at-source’ protocols are required if the organic fraction of municipal waste streams is to be rescued for compost-making or energy production without expensive processing to capture and remove non-biodegradable pollutants. As a result, even more complicated attitudinal and behavioural adjustments are required of waste generators to enable reuse and to reduce the volumes of wastes requiring final disposal.

The contexts in which organic wastes are generated, managed and reused vary considerably. Urban areas have bulk generation or accumulation points, where the wastes are relatively homogeneous (such as green markets, slaughterhouses, restaurants and hotel kitchens, food processing plants, and pig and poultry farms, together with sites such as sewage treatment facilities). Some human and animal excreta in urban areas may be scattered in the environment according to how effective the collection systems are, or whether animals are stabled. The organics that are discarded by households, however, are mixed in with other garbage, and further contaminated during municipal collection. This contamination is now a major concern in the treatment and reuse of urban organics. The enormous amounts of organic waste generated in cities and towns in a variety of ways, the scarcity of land for disposal, and the difficulty and expense of changing the attitudes and behaviours of many different actors to enable reuse, make the management of urban organic wastes extremely complex, much more so than the rural residues.

In rural areas, residues are found on farms and plantations, mainly after harvesting, and accumulate at processing plants. Animal excreta are scattered if the animals forage freely, or massed if they are penned. In the majority of rural areas of developing countries, human excreta are scattered by defecation in fields. There are often competing uses for agricultural wastes: poor villagers may depend on them for fuel and fodder while commercial interests aim to process wastes for energy production, or to make them amenable for feed. Technologists and administrators unfamiliar with the practices in rural areas frequently overestimate the availability of residues for

exploitation because they are unaware of the local demand for residues. In the case of large-scale farming and processing plants, the scale of operation may result in the accumulation of animal excreta, quantities of polluted sludge, and crop residues that cannot be efficiently exploited by further processing but which are inaccessible to farm families who might have used them for fuel or fodder. The main social issues with respect to rural residues concern whether the living conditions of households or communities can be improved with reuse or conversion techniques, and whether new techniques in reuse may require social and institutional changes.

## **1.2. Reactions to wastes**

Societal values and religious beliefs underpin many waste behaviours and reuse practices. Human excreta evokes the most pronounced reactions. Cultures have been classified as falling along a continuum from faecophilic (willing to handle excreta) to faecophobic (excreta seen as extremely defiling). Islam is the major world religion that has the strongest strictures against faeces (although behaviours pertaining to excreta do vary across and within Islamic-majority societies). One of the reasons given for not eating pork is that the pig will eat human excreta. Mistaken beliefs about excreta affect hygiene behaviour and have great consequences for household health. A study in Lucknow India found that both Muslim and Hindu parents believed that the stool of breast-feeding infants could not be polluting and so did not need to be managed; people did not wash their hands after handling it. In general the excreta of infants are not thought to carry any risk in many societies whereas infant excreta are actually more pathogenic than adult excreta. The polluting nature of excreta can even inhibit hand-washing with soap after defecation, as it is believed that the soap would become polluted and could not be used again.

Negative values may present strong barriers to adopting new treatment/reuse techniques, to the extent that certain technologies are ruled out for some cultures or communities. Not all values relating to wastes are negative, however. In some Islamic societies, stale bread is not mixed with other kitchen wastes but is kept separate and sold to itinerant buyers for animal feed, or given away to street children. The reason is that bread is regarded as a gift from God; it is told that Mohammed, after the battle for Mecca, visited his cousin and asked for food. She had only some stale bread, which Mohammed accepted, moistened with vinegar, and said it was excellent. This belief is also the basis for charitable feeding of poor people in some Islamic cities.

“Resource recognition” is widespread in societies with scarce resources. China, Vietnam and India stand out as cultures that have traditionally regarded organic wastes and residues as valuable resources. “Waste is food” is a well-known proverb in one region of India. Indeed, in rural communities, agricultural wastes are rarely thought of as “wastes” since they are widely exploited for fuel, animal fodder and bedding, and materials for housing, as well as being ploughed back into the soil. Introduced techniques for the use of these wastes may impact on the lives of the rural poor, who regard the materials as free goods if they gather them.

Resource recognition is not absent in cities where there are very poor people. The use of wastes for fuel, building or repairing shelters, and feeding animals is widespread. In

China and Vietnam, urban human wastes are still used as fertilizer in urban-fringe agriculture, and in parts of East and Southeast Asia, sewage waters, excreta and solid wastes are fed to fishponds.

Technical designers, then, cannot assume that wastes are merely materials and neutral in value. While there is ready recognition of taboos associated with wastes, the reuse behaviour that represents positive values tends to be overlooked, whereas it could be built upon to encourage new behaviours necessary to manage the large quantities of organic wastes, especially in metropolitan areas.

## **2. Household and community-scale action for treatment and reuse**

Observations from household or multi-household biogas generation from dung and organics, small-scale composting and vermicomposting, and “eco-sanitation” (excreta disposal in composting latrines) illustrate how attitudes and social relationships can be significant in the adoption or rejection of biotechnology and suggest some social implications of successful treatment and reuse.

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### **Biographical Sketches**

**Christine Furedy** received a bachelor of Arts with honours in social anthropology and history, and prizes in social anthropology and psychology from the University of Sydney, 1962 and a D.Phil, in African and Asian Studies from the University of Sussex in 1971. She was associate professor, Urban Studies, Fac of Arts, and Fac. of Environmental Studies, York University, Toronto 1969-1998. Ontario Confederation of University Faculty Association's award for contribution to university teaching in 1976. Visiting professor, Human Settlements Division Asian Institute of Technology 1990. Since retirement: associate professor emerita and senior scholar, Faculty of Arts, York University. She has done consultancies, mainly on aspects of solid waste management, with: Canadian International Development Agency; United Nations Centre for Regional Development; United Nations Centre for Human Settlements (Habitat); International Development Research Centre; United Nations Environment Programme; International Environment Technology Centre; World Bank; United Nations Development Programme; Harvard Institute of International Development. Her research and writing on: the social aspects of solid waste management in Asian cities (including informal waste behaviours and waste pickers); urban agriculture and use of urban organic wastes; community-based waste management; waste recovery and recycling; waste-to-energy policies and projects, India and Kenya. She is a reviewer for several international environmental journals and a member of organizations such as the Asian Society for Environmental Protection.

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