# Social aspects of solid waste in the global South

Jutta Gutberlet

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*by*
Jutta Gutberlet

*Municipal solid waste is seen either as a nuisance or as a commodity and social dimensions are less important. Waste problems require an integrated, multifaceted, interdisciplinary approach. Informal but organised recycling in Brazil is an example of an innovative, inclusive resource recovery and environmental awareness strategy that has many benefits for the environment and for the waste collectors. Policies need to safeguard the social dimension and the ecological and economic aspects of waste management.*

## Introduction

Definitions of waste range from "all material unwanted by the generator" (Statistics Canada, 2005), to "any substance or object … which the holder discards or is required to discard" (European Union, 2006: 5), and to waste as a resource recovered through reuse and recycling or as a culturally determined material perception (Pongracz and Pohjola, 2004). According to Gregson and Crang, "waste is seen as historically mutable, geographically contingent, and both expressive of social values and sustaining to them" (2010: 1027). The waste we generate has increased in volume, has a complex material composition and brings associated health risks.

Humans generate more waste than ever because of population growth and as a consequence of increased consumption and discard levels. In particular, discarded plastics are a global problem. Waste is a nuisance when proper treatment or waste prevention strategies are lacking, which results in serious challenges for municipal governments. All waste treatment techniques have some environmental impact, for example by releasing toxins, air pollutants or toxic ash as final residues from incineration, or through contaminated leachate from landfilling (Allsopp, Costner and Johnston, 2001). Although recycling and reuse also create environmental impacts, when energy and water are needed, they spare virgin resources. All other modes of waste management require continuous extraction of new raw materials to maintain the production/consumption cycle.

Waste management following linear techno-economic, end-of-pipe approaches usually falls within the remit of engineering. The social sciences are more often concerned with related environmental policies, environmental education or urban planning, and

with ensuring that the social aspects of waste are visible. For example, Daly (1996), Layard (2005), Victor (2008) and others realised that unlimited economic growth would generate the current environmental and natural resource crisis. According to Schor (2010), humans are already consuming more than the Earth can supply, and generating more waste than it is able to absorb. A one-sided technocratic perspective does not explain the other social aspects of waste, nor does it provide a sustainable solution.

## Social theory of solid waste management

It is therefore critical to reduce the amount of waste generated, and to recover all possible re-usable resources from discarded materials. This article focuses on municipal solid waste. This forms only a small part of the problem, since most waste is generated by industrial, agricultural and construction activities. However, waste avoidance and more responsible consumption will tackle these other forms of waste generation indirectly as well.

Not generating waste in the first place, as suggested in *On The Road to Zero Waste* (GAIA, 2012), and focusing on recycling, seem like natural ways forward, and yet they appear to be the most difficult adaptation activities for society to carry out. Reliable information, and creative forms of knowledge mobilisation and environmental education, should require people to voluntarily alter their consumption habits and participate in resource recovery programmes. However, lifestyle changes and waste reduction activities need to be integrated into government strategy and policy.

Importantly, resource recovery creates jobs in waste collection and sorting, and in education and recycling; indeed reuse and recycling create more employment than landfilling and incineration. According to Tangri (2003), recycling 10 000 tonnes of materials per year employs 296 people in the computer sector, 85 in textiles, 18 in paper recycling, 26 in glass recycling and 93 in plastics recycling. Incineration and landfill create only one job per 10 000 tons of material incinerated or landfilled per year.

It is crucial to include different stakeholders from civil society (non-governmental organisations, universities, community groups) and the recycling business itself when designing waste recovery and consumption strategies or policies for a new perception. Examples from the global South reveal the contribution that organised, co-operative recycling has made and how important these stakeholders' participation in waste management programmes and policies is. Inclusive waste management has developed in Brazil as a concept based on principles of solidarity economy and ecological economy (Gutberlet, 2009, 2012). The purpose is to value and empower the workers involved and ultimately reduce, reuse and recycle, thus addressing responsible lifestyles and refusing to waste resources in general (Barr and Gilg, 2006).

## The benefits of co-operative recycling

Informal, selective waste collection is common in poorer countries of the South. It is partly done in organised co-operatives or associations, with or without municipal support. Sometimes they add value by creating new products from the materials collected and separated, for example, recycled paper products, washing lines from PET (polyethylene terephthalate) bottles, and roof tiles and furniture from TetraPak packaging (Gutberlet, 2012). In Brazil, approximately 800 000 people are involved in

informal, often co-operative, recycling. Most of these individuals live in poverty and work under hazardous conditions.

Although the activity of selective waste collectors, or *catadores*, in Brazil, is a recognised profession, most of this work is still informal. Not all co-operatives or associations are formalised and not all collectors have access to workers' rights. Regional co-operative networks have emerged that promote collective commercialisation and engage in other collective actions to improve working and remuneration conditions (Singer, 2003).

The resource recovery rate per recycler and per co-operative depends on different factors including the quality of the material separated at the source; the mode of transport; the equipment used at the processing centre where waste is separated, baled and stored; the topography; the distances in the serviced neighbourhood; and the level of training. On average, a recycler carries up to 200 kg of recyclable material a day or approximately 4 tonnes a month (Conceição, 2005). They often work 12-hour days and, on average, push their carts 20 km per day. Informal and organised recyclers recover an estimated 60% of the paper and cardboard that is recycled in Brazil and up to 90% of all materials used in the recycling industry. Conceição (2005) estimates that informal and organised recyclers recover up to 20% of the municipal solid waste generated in urban Brazil, although the official recycling rate in most Brazilian cities remains very low. Only 1.3% of the total 15 000 tons of solid waste generated daily in the megacity of São Paulo is officially collected for recycling (Arini, 2012).

Recyclers who belong to a co-operative or association supported by the local government often experience previously unknown opportunities for development, training and education. These experiences have contributed to building leadership and empowering the recyclers, thereby playing an important role in the restoration of their full citizenship (Tremblay and Gutberlet, 2011). The participants have a say in decision-making processes within their co-op and in stakeholder meetings to negotiate with government and business. Co-op leaders participate in public events, conferences and exhibitions. These practices further empower the recyclers, and open new avenues for social development (Couto, 2012).

Most importantly, co-operative-run selective waste collection schemes generate social capital by providing these individuals with meaningful work. They contribute to improving the neighbourhood, cleaning up waste materials and demonstrating resource recovery behaviour, thus creating opportunities for greater community cohesion. This effect has been widely observed in cities in Brazil and in other countries, for example, Nicaragua (Zapata Campos and Zapata, 2013) and Argentina (Carenzo, 2011; Carenzo and Fernández Alvarez, 2011). Recyclers are often invited to speak at schools, community centres and universities to educate the public about waste and their resource recovery practices.

The new federal solid waste legislation[1] (Politica Nacional de Resíduos Sólidos) provides opportunities for municipalities to collaborate with recycling groups (Brazil, 2010). The law requires municipalities to adopt selective waste collection and composting. It supports the involvement of *catadores* in shared responsibility for product lifecycles,[2] and prioritises recycling co-operatives in formal recycling programmes. Nevertheless, the same legislation also allows for waste incineration with energy recovery (waste-to-energy). The law does not set out the waste hierarchy clearly, or give precedence to waste prevention, re-use and recycling over waste-to-energy and disposal, as for example the EU Framework Directive[3] on waste does. A recent proposal to build new incineration plants has generated conflicts in many

Brazilian cities and in other countries in the poor Southern part of the world (GAIA, 2012). The national and local recyclers' movement is aware of the risk of a "vacuum cleaner effect" in favour of waste-to-energy – a danger that has also been outlined by the European Commission. Consequently the movement has called for action to promote selective waste collection and recycling rather than incineration.

Incineration might be an effective way to reduce the volume and weight of waste, but it destroys materials that could generate new products, create employment and save natural resources. Furthermore, waste-to-energy technology is very expensive, it pollutes and produces by-products, is energy inefficient and, above all, does not provide incentives for zero-waste behaviours, because the more waste is incinerated, the higher the cost–benefit ratio.[4]

Despite the increased level of organisation and the international extent of the recyclers' movement, there are many hurdles still to overcome. Probably the biggest challenge is related to the extreme poverty and socio-economic vulnerability of most recyclers, as demonstrated by the *catadores*. Furthermore the lack of political will from most local governments to include the recyclers in their waste management programmes, the threat from corporate waste management, including waste-to-energy schemes, the low prices for recyclable resources and the low remuneration for selective waste collection and organised groups' lack of financial resources, remain as persistent threats to recyclers.

## Conclusion

This article highlights the benefits of engaging recycling co-operatives in resource recovery in the global South. Including *catadores* and their equivalents elsewhere in collecting, separating and transforming recyclable material and in re-educating consumers is an opportunity that can help ensure their livelihoods are sustainable. As environmental stewards they can make ground-breaking contributions by spreading information and using knowledge about waste reduction, resource recovery and the many social benefits of organised, selective waste collection. Incineration is not a viable option, given the environmental, social and economic impacts it has. In countries such as Brazil, household waste is high in organic matter, and thus low in heating value for energy recovery through incineration. Shekdar (2009) also highlights the difficulties of maintaining the necessary operating conditions in Asian countries. Organised and informal selective waste recovery and recycling activities are widespread and need to be expanded to recover most of the recyclable resources from the waste. Increasing awareness of what is recyclable at the household level is also important to enhance waste treatment efficiency. These issues, combined with higher costs relative to other municipal solid waste management options (Dijkgraaf and Vollebergh, 2004) mean that incineration is an unsustainable and inefficient method for household waste treatment.

The benefits from recycling are greenhouse gas reduction and, ultimately, climate change mitigation through the recovery of materials that would otherwise end up in landfills, generating detrimental gases and leachate (Sunil et al., 2004; King and Gutberlet, 2013). As highlighted in the European Commission's Green Paper (2013), plastics recycling and the consequent material savings alone contribute most to preventing climate change impacts, resource depletion and freshwater aquatic ecotoxicity. Reuse and recycling reduce the pressure on natural resources, diminishing environmental damage and contamination in developing countries (Troschinetz and Mihelcic, 2009).

The author suggests a bottom-up approach to achieving sustainable communities where citizens become responsible consumers, concerned with avoiding and reducing waste and providing an appropriate final destination for materials that need discarding. Inclusive resource recovery generates income and addresses poverty mitigation (one of the United Nations Millennium Development Goals). Moreover, inclusive waste management targets a reduction in public spending on conventional waste management practices and generates carbon credits.

Appropriate practices and efficiency in logistics and scale are fundamental to reducing the ecological footprint of resource recovery practices. Organised selective waste collectors such as those in Brazil contribute to these benefits. Capacity building for effective and efficient resource recovery, adaptive policy design, and public awareness building for efficient stakeholder collaboration in source separation are all critical and should be addressed with research. Community engagement, environmental stewardship and social economy can take endless creative and different forms. The organised activity of the *catadores* is important for waste reduction, zero waste and the creation of a more balanced and responsible society.

### *Notes*

1. Law No. 9 12.305, 2 August 2010.
2. Chapter II, Art. 6, XII.
3. 2008/98/EC.
4. For discussion of the contested nature of waste incineration, see, for example Allsopp, Costner and Johnston (2001), Corvellec, Zapata Campos and Zapata (2012), Gutberlet (2011), Ngoc and Schnitzer (2009), Rocher (2008), Shekdar (2009), Themelis and Millrath (2004) and Weaver (2005).

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**Jutta Gutberlet** is an associate professor of geography at the University of Victoria, Canada, and visiting professor at the University of São Paulo, Brazil. Her research and community outreach over the past fifteen years has focused on integrated waste management in Latin America.

World Social Science Report 2013
Changing Global Environments


# 50. Incentives for low-carbon communities in Shanghai, China

*by*
Lei Song

*It is essential for China's fast-growing cities to reduce their environmental impact. Vanke, a major housing development in Shanghai, has been a test case of what is possible in the area of waste reuse and recycling. It shows that considerable issues remain unsolved in terms of altering the behaviour of Chinese householders.*

Around half of all people in China live and work in cities (Wenyuan, 2012). Their involvement in global solutions for climate change mitigation is essential. It could have an enormous impact on policies at many levels, including the city level (Abrahamse et al., 2005). Low-carbon community development could empower local people by supporting them to become increasingly self-reliant (Heiskanen et al., 2010). However, community-based approaches lack resources and effective decision-making processes (Kollmuss and Agyeman, 2002). Local actors and institutions do not have legislative or regulatory powers. The central government still leads most low-carbon community projects in terms of providing funds, new technologies and mandatory policies. If the local level is not allowed to provide these, sustainable collective action is impossible (Jackson, 2005).

In Shanghai it is the Vanke Corporation, the largest residential real estate developer in China, rather than the government or non-government organisations, that is piloting a low-carbon community: the Vanke Green Community Project. There are several reasons for the lack of refuse sorting in China, including the fact that residents are not used to sorting their refuse for recycling, institutional failures such as the lack of a garbage classification processing system, and the lack of quality control. Where residents do sort their refuse, it can get mixed again later. Even in communities where a refuse-sorting service is provided, the residents are still not willing to sort their refuse themselves.

The Vanke Green Community Project set out to establish the following process:

- Residents sort their own refuse in their homes.
- Vanke then sorts and compresses the refuse.
- Food waste is disposed of by biochemical treatment equipment.

According to social learning theory, behaviour change can be reinforced through social interaction, especially in groups with strong social networks (Jones et al., 2012). Besides providing free refuse bins, educational lectures and other resources, Vanke employs administrators in every building who are responsible for helping the residents understand the sorting process, helping them sort their refuse, and helping with the second sorting. The administrators' bonuses are linked to positive results.

Initially, the residents were not interested in taking part. But gradually, as the administrators built up a rapport with residents and as a social network developed between the residents within a building, they felt more inclined to become involved. They may have felt too embarrassed if they did not take part, or if they did not comply with the first stage of sorting, as this would create extra work at the second stage. In addition, the administrators monitored the results and accuracy rates. Over time, the residents' behaviour gradually changed, to the extent that a culture emerged in which anyone not conforming with the rules would lose their neighbours' trust. The residents supporting the project were given cash obtained from selling recycled goods and materials to recycling centres, or prizes from refuse-sorting community activities.

The activities of the Vanke Green Community Project have reduced refuse disposal by 46% from 2006 to 2012. The annual reduction in 2012 was over 0.7 million tonnes, compared with 0.5 million tonnes in 2008; the average annual reduction since 2008 is 25%. Participation has also increased; survey results from 2006-10 indicate that in 2006 the participation rate was below 30%, but that this had risen to 70% by 2010, with a more than 80% sorting rate accuracy.

The development of green industries and low-carbon technologies is slow. This slow progress is hindering market-based refuse disposal, making it prohibitively expensive. It is uncertain how long the project can keep going or if it can be replicated elsewhere. These problems need to be investigated and resolved.

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**Lei Song** is associate professor of urban sustainable development at the China Executive Leadership Academy, Pudong, China. She is also a postdoctoral researcher at the Chinese Academy of Social Sciences.

# 51. Climate change education and Education for Sustainable Development

*by*
UNESCO

*Under the auspices of the UN Decade of Education for Sustainable Development (2005-2014), UNESCO is leading efforts to integrate educational responses to climate change, mitigation and adaptation. Education for Sustainable Development (ESD), which is growing in schools around the world, encourages pupils to think broadly about pressing scientific, technological and human issues. It also recognises that a sustainable environment is essential if children are to live a secure and rewarding life.*

## Introduction

Education is widely conceived as a catalyst for sustainable development. Yet our education systems are not always prepared for or responsive to challenges such as climate change. Accelerating geopolitical, demographic and environmental changes, and their associated uncertainty, risks and disasters, mean that there is an urgent need to reorient education systems to empower everyone to make informed decisions for environmental integrity, economic viability and a just society, and to respond to current and future challenges.

### *Climate change education*

UNESCO promotes climate change education as part of Education for Sustainable Development (UNESCO, n.d.). Sustainable development cannot be achieved through political agreements, financial incentives or technological solutions alone. It requires changes in how we think and act. This is where Education for Sustainable Development is a critical lever for the global transition to sustainability. Its importance was reaffirmed in the Rio+20 outcome document, "The future we want", in which governments agreed to "promote Education for Sustainable Development and to integrate sustainable development more actively into education beyond the UN Decade of Education for Sustainable Development" (paragraph 233) (Rio+20, 2012).

## Integrating educational responses to climate change

As the lead agency of the UN Decade of Education for Sustainable Development (2005-14), UNESCO is leading the effort to integrate the various educational responses to climate change, including educational strategies for mitigation and adaptation.[1]

### *Promoting children's rights*

Climate change education now goes beyond its original focus on climate science. Most climate change education aims to increase understanding of the causes and consequences of climate change, and encourages people to take action to reduce greenhouse gas emissions. Climate change disproportionately affects developing countries, and vulnerable citizens in those countries. So it is important to use education as a means of safeguarding and promoting children's rights to survival, development and protection, as well as their right to participate in decision-making processes that affect their lives. Several international children-focused organisations are already doing this.

### *Enhancing climate responses through education*

UNESCO is developing policy guidelines on climate change education, which have two strands, mitigation and adaptation. The idea is to help establish a common framework to enhance climate responses through education, and to advocate education as a largely untapped strategic resource for building resilient and sustainable societies.

Enhancing climate responses through education will involve specific dedicated measures as well as the integration of Education for Sustainable Development into existing education and development processes. The immediate tasks are to promote education for sustainable consumption in developed countries, and to ensure safe learning environments in countries which are most vulnerable to climate change impacts, integrating disaster risk reduction into their education systems. The longer-term task – common to all countries – is to improve and reorient education systems to foster the knowledge, skills and dispositions needed to deal with current and future challenges. This may not appear entirely new. Indeed, it has always been at the heart of a quality education agenda. It nevertheless emphasises that climate change education in the context of Education for Sustainable Development has to go far beyond inserting new thematic content into overcrowded curricula. Instead it stresses the importance of participatory and solution-oriented learning that encourages systems and critical thinking, engages with uncertainty and complexity, and draws on learners' cognitive, affective and practical potential both in and out of the classroom.

### *Note*

1. In 2012, the Conference of the Parties to the United Nations Framework Convention on Climate Change, "recognizing that a goal of education is to promote changes in lifestyles, attitudes and behaviour needed to foster sustainable development and to prepare children, youth, women, persons with disabilities and grass-root communities to adapt to the impacts of climate change", adopted the eight-year Doha work programme on UN Framework Article 6, which focuses on education, training and public awareness (UNFCCC, 2012).

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