

Contribution of organized informal sector recycling to the reduction of São Paulo's greenhouse gas emissions

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RESEARCH PURPOSES:

- To define a model that calculates recycling cooperatives' contribution to the reduction of São Paulo's greenhouse gas emissions through recovery and recycling of resources from the municipal solid waste stream.
- To assess the opportunities for recycling cooperatives to receive payment for environmental services, and participate in the Brazilian carbon credit market.

RESEARCH CONTEXT: Waste-related greenhouse gas accounting and the development of economically, environmentally, and socially sustainable waste management systems are key areas for both developed and developing countries. In São Paulo, Brazil, the establishment of efficient waste management programs has been logistically, economically and politically problematic, and waste collection is often insufficient or nonexistent. In such cases, urban residents often rely on the informal organized recyclers to provide municipal solid waste management services such as door-to-door collection of recyclables.

RESEARCH METHODS: The proposed research is a participatory, community-based project using participant observation, semi-structured interviews, and a life cycle assessment of cooperative recycling.

- Study Area: Diadema, in the Metropolitan Region of São Paulo, Brazil.
- Study Population: *Cooperlimpa* recycling cooperative members, recycling industry actors, and municipal and state government representatives

BACKGROUND: Recycling delivers environmental, social and economic benefits for the recyclers, the communities they serve, and for the municipal governments who are ultimately, responsible for waste management. These benefits include:

- Job creation and income generation
- A cleaner urban environment
- Increased consumer awareness about waste minimization and responsible consumption
- Waste diversion, reducing the landfill burden
- The financial viability of a municipal waste management system
- **Resource recovery!**

Resource recovery means the recuperation of recyclable resources from the waste stream, providing a source of secondary material for the manufacturing industry. Replacing raw materials with recyclables reduces energy expenditure and the necessity of primary resource extraction, thus reducing greenhouse gas emissions.

Energy expenditure and global warming impact for production using raw vs. recycled materials

	Electric energy spent on the production (MWh/ton)*:			Global warming impact (kg CO ₂ eq/ton)†
	From raw materials	From recycled materials	energy savings	
Aluminum	17.6	0.70	96.0%	- 9855
Plastics	6.74	1.44	78.63%	- 1120
Steel	6.84	1.78	74.97%	- 405
Paper	4.98	1.47	70.48%	- 557
Glass	4.83	4.19	13.25%	- 772

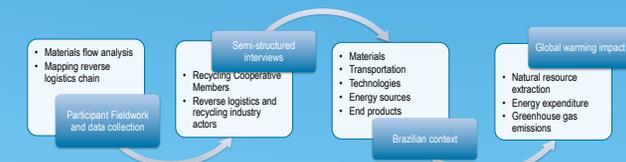
*Data for Brazilian industry. Adapted from Calderoni (1997)

†Data for Italian industry and municipal solid waste management system; emissions released during production from virgin raw materials subtracted from emissions derived from the recycling processes. Adapted from Rigamonti, Grosso & Giugliano (2009)

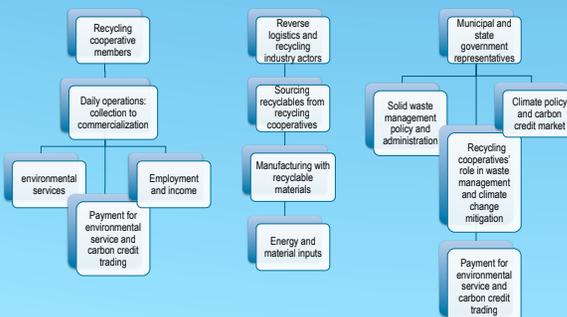
Participant Observation with Cooperlimpa



Life Cycle Assessment



Semi-Structured Interviews



Photos: © Gutberlet

The proposed research is part of the Participatory Sustainable Waste Management (PSWM) project, founded and directed by Dr. Jutta Gutberlet, and based at the Community-Based Research Laboratory at the University of Victoria. The PSWM project is a CIDA-funded initiative committed to the improvement of socio-environmental and economic conditions for informal independent recyclers and recycling cooperatives, and to environmental sustainability through support for participatory municipal waste management. Learn more at pswm.uvic.ca

