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Switching Managua on!
**Connecting informal settlements to
the formal city through household
solid waste collection**

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Abstract

This paper explores the organizing of household solid waste management collection and disposal practices in informal settlements. It is based on a case study of an NGO project supporting Manos Unidas (“Joined Hands”), an informal waste-picker cooperative in Managua, Nicaragua. Using horse carts, these people collect household solid waste from informal settlements where there was no previous regular, official waste collection. Unlike many development projects, which try to control people’s agency, the support examined here focused on the residents of illegal neighbourhoods and the waste pickers, who themselves became city constructors and co-producers of basic services such as household waste collection, rather than service recipients of aid programs or municipal governments. By slightly changing the actions of the actors already involved in informal waste handling in the informal settlements, the project succeeded in transforming an agent of pollution into the solution to several interconnected problems: illegal dumping by the cart-men and residents, the cart-men’s low and irregular income, and the lack of household waste collection services.

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1. Introduction

In many Southern cities, it is common for 30–60% of the urban population to live in informal settlements.¹ While informal settlements are anything but homogeneous,² they do share some features: they are often overcrowded, with high levels of insecurity for residents and poor or informal housing; they are often forgotten or abandoned by formal city management, unconnected to most public services, such as roads, pavements, water, sewage, standard housing, street cleaning, and municipal waste collection. In Graham’s³ terms, these informal settlements are not “switched on”—to use the metaphor of the electricity system.⁴

¹ Hardoy, Jorge E, Diana Mitlin and David Satterthwaite (2001), *Environmental Problems in an Urbanizing World: Finding Solutions for Cities in Africa, Asia and Latin America*, Earthscan Publications, London, p.12; UN-Habitat (2003), *The challenge of slums*, UN-Habitat, London; United Nations Population Fund (2007), *State of world population 2007. Unleashing the Potential of Urban Growth*, <http://www.unfpa.org/swp/swpmain.htm>.

² Gilbert, Alan (2007), “The return of the slum: does language matter?”, *International Journal of Urban and Regional Research*, Vol. 31, No. 3, p 9.

³ Graham, Stephen (2005), “Switching cities off”, *City*, Vol 9 No 2, 169–94; Graham, Stephen and Nigel Thrift (2007), “Out of order: understanding repair and maintenance”, *Theory, Culture & Society*, Vol 24 No 1, pages 1-23.

⁴ As with electric systems, waste management is part of the multiple, networked infrastructures that together allow cities to function, and as with electricity, if a part of the city is not connected to the system, it does not function as the rest of the city - it is not switched on.

Household solid waste management collection and disposal practices in informal settlements of Southern cities, more often than not, are ignored by city management authorities and public waste collection services. The informal sector instead frequently provides waste collection service in these areas.⁵ The paper is based on a case study of an NGO project supporting Manos Unidas (“Joined Hands”), an informal waste-picker cooperative in Managua, Nicaragua. Using horse carts, these waste pickers collect household solid waste in informal settlements where there was no previous regular and official waste collection system.

The paper describes how the project succeeded in establishing and stabilizing a number of connections between the collective actions of those involved in the formal and informal waste collection systems (i.e., the local community, waste pickers, and municipality), bridging the gap between the informal settlements and the formal city through the co-production⁶ of household solid waste collection in the informal settlements and a connection with the formal municipal waste collection system.

2. CITY MANAGEMENT, ACTION NETS, AND TRANSLATIONS

As a theoretical framework for this case study we apply Czarniawska’s conceptualization of city management as a complex action net comprising collective actions interconnected according to a specific institutionalized pattern at a given time and place.⁷ “Such collective actions,” according to Czarniawska, “are not necessarily performed within the bounds of a specific organization; an action net may involve a great variety of organizations or people organized into groups of a loose or temporary character.”⁸ From this perspective, city management can be understood as “a set of actions accomplished within a seamless web of interorganizational networks, wherein city authorities constitute just one point of en-

⁵ Arroyo, Jorge, Francisco Rivas and Inge Lardinois, in (editors) (1999) *Solid Waste Management in Latin America: The Case of Small and Micro-Enterprises and Cooperatives*, WASTE, Gouda, The Netherlands, 214 pages; Coad, Adrian (2000) *Planning for sustainable and integrated solid waste management*; report of CWG international workshop, Manila, the Philippines, September 2000, www.skat.ch; Scheinberg, Anne., Justine Anschutz and Arnold van de Klundert (2006) ‘Waste pickers: poor victims or waste management professionals?’, In *Solid Waste, Health and The Millennium Development Goals*. CWG-WASH Workshop. Kolkata, 1-5 February;

⁶ Co-production refers to the joint production of public services between citizen and state. See e.g. Bovaird, T (2007), “Beyond engagement and participation: user and community co- production of public services”, *Public Administration Review* Vol 67, No 5, pages 846–860; Ostrom, Elinor (1996) “Crossing the great divide: coproduction, synergy and development”, *World Development* Vol 24, No 6, pages 1073–1087; Mitlin, Diana (2008), “With and beyond the state; co-production as a route to political influence, power and transformation for grassroots organizations”, *Environment and Urbanization*, Vol 20, No 2, pages 339–360; Whitaker, G P (1980), “Co-production: citizen participation in service delivery”, *Public Administration Review* Vol 40, No 3, pages 240–246.

⁷ Czarniawska, Barbara (2004), “On time, space, and action nets”, *Organization* Vol 11 No 6, pages 773–791.

⁸ Lindberg, Kajsa and Lars Walter (2012), “Objects-in-Use and Organizing in Action Nets: A Case of an Infusion Pump”, *Journal of Management Inquiry*, page 4.

try.”⁹ As we will see, numerous actors and their collective actions are interconnected in Managua in organizing the city, for example, planners, politicians, development aid workers, squatters, waste pickers, community leaders, engineers, volunteers, and labouring children.

Analytically, using the action net concept helps us understand how connections between actions, often loosely coupled, eventually create actors at a given time and place: for example, it is the action of occupying land illegally that makes the actor a squatter. Translation is “the mechanism whereby connecting is achieved”¹⁰ or, put differently, the process whereby collective actions (e.g., the informal waste practices in the informal neighbourhoods and the formal municipal waste collection system) are interconnected.

3. METHODOLOGY

The data analysed here were gathered during three field visits to Managua in December 2009–February 2010, January–February 2011, and June–August 2012. The research was qualitative,¹¹ based on semi-structured interviews, meeting observation, workshop participation, and photographs.

During the course of our fieldwork, we conducted personal interviews with 60 people, including community leaders, residents, waste pickers, NGO workers, development aid organization officers, city managers, public officers, politicians, ambassadors, development aid organization managers and directors, municipal waste operators, waste collection cooperative members, waste handling and recycling corporations, NGO volunteers, engineers, and architects. We also took part in non-participant observations of meetings and events during project implementation. These included meetings of development aid organizations, environmental campaigns involving cleaning brigades, social events at the studied barrios (neighbourhoods) organized by the municipality to promote the project, waste-picker cooperative meetings, and a workshop to evaluate the development project with residents and community leaders. We documented these events by taking photographs and keeping a field diary of our observations.

As Lindberg and Walter put it: “the concept of the action net is a way of studying processes rather than an analytical tool. Therefore, recognition of the existence of an action net is not a desired result of a study of organizing; it is the point of departure.”¹² Accordingly, when coding and categorizing our data,¹³ we treated the new household solid waste collection service provided by Manos Unidas cooperative as our point of departure, together with the connections with

⁹ Czarniawska, Barbara (2010), “Translation impossible? Accounting for a city project”, *Accounting, Auditing and Accountability Journal*, Vol 23 No 3, page 420.

¹⁰ Lindberg, Kajsa and Barbara Czarniawska (2006), “Knotting the action net, or organizing between organizations”, *Scandinavian Journal of Management*, Vol 22, page 295.

¹¹ Silverman, David (2006), *Interpreting qualitative data: methods for analysing talk, text and interaction*, 3rd edition, Sage, London, 428 pages.

¹² Lindberg, Kajsa and Lars Walter (2012), see note 8, page 5.

¹³ Strauss, Anselm and Juliet Corbin (1990), *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Sage, London, 312 pages.

(or “translations” to) the collective actions taken by the city management and local community during project implementation.

4. HOUSEHOLD SOLID WASTE MANAGEMENT IN MANAGUA AND ITS INFORMAL SETTLEMENTS

a. The official municipal waste management service

Managua’s waste management department functions directly under the central city management, which provides funding to run the operations. Every day, the department collects 1200 metric tonnes of waste along 132 routes using a fleet of over 80 vehicles. Approximately 40 of these are modern compaction trucks donated by Italy in 2008,¹⁴ while the rest of the fleet is a mixture of vehicles – a “salad,” as one officer put it.¹⁵ Household waste collection service is provided three times a week. Households must bring their waste out to the waste compaction truck at the precise moment it passes by.

Only approximately 30% of the waste collection costs are covered by the waste collection fee.¹⁶ This means the service depends on funding from the municipal budget, allocated every year in the course of the annual strategic planning. A recent report compiled by UN-Habitat in Managua calculated that a decentralized model of household solid waste collection could save up to 50% of the current costs per year.¹⁷ The report recommended constructing waste transfer stations in each of Managua’s seven districts. It also recommended replacing compaction waste trucks with dump trucks for primary household waste collection. According to the recommendations, waste would be disposed of at waste transfer stations in the city districts and then transported by container trucks for final handling in the municipal landfill. The new decentralized waste management system would reduce the transportation routes of the primary collection vehicles, which do not need to run to the municipal landfill to dispose of the collected waste. Similarly, the use of dump trucks instead of compaction trucks would reduce the costs since they are cheaper to run and maintain, especially on bad roads. Despite the huge savings that would be realized by a more decentralized waste management system, city management is still reluctant to replace modern waste compaction trucks with a “less modern” technology¹⁸. At the time this paper was being written, the waste management model comprising waste transfer stations supported by a fleet of more appropriate vehicles for household waste collection was being tested in pilot projects in city districts 5, 6 and 7.

¹⁴ Interview with Managua waste management department director.

¹⁵ Interview with Managua waste management department officer.

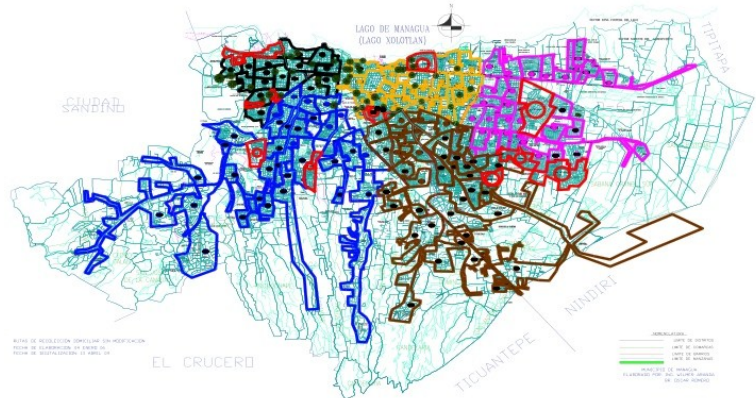
¹⁶ Interview with Managua waste management department director.

¹⁷ UN-Habitat 2010 ‘Plan Estratégico para la Gestión Integral de los Residuos Sólidos de Managua Parte B: Plan de Acción Diciembre 2010’, Managua.

¹⁸ Interview with Managua waste management department director

b. Household solid waste management in informal settlements in Managua

The Managua local government's city map shown here (Map 1) indicates the city waste collection routes, and shows a number of blank white spaces unserved by these routes. These blank spaces represent the spontaneous settlements created after illegal land invasions by squatter communities, mostly in the 1980s and 1990s.



Map 1. Managua map with the city waste truck routes (thick lines), note the un-routed areas. Source: City of Managua

Up to 40% of the city of Managua consists of these informal settlements,¹⁹ which are represented on city planning maps as undeveloped areas or open space, as if (in the words of Hardoy and Satterthwaite), “the illegally developed sites occupied by thousands of households somehow did not exist.”²⁰ Maps like this clearly “illustrate official attitudes to these settlements.”²¹ Many of Managua’s informal settlements, which appear as blank spaces on city management maps, are ignored by official city plans, documents, city management, and municipal services.

Official waste collection services are no exception. Even where city government chooses to provide service to these settlements, it is impractical given the current system. Narrow alleys full of potholes, a multitude of hanging cables, and other hindrances which are typical of the informal settlements of Managua, mean that new and technologically advanced, but delicate, compaction waste trucks cannot enter or, if they do, they soon break down.

Although municipal statistics ignore the fact, the residents we interviewed in some of these informal settlements confirm that municipal waste trucks collect waste occasionally at best and only in the main streets. Since residents have to

¹⁹ Parés Barberena, María Isabel (2006), ‘Estrategia municipal para la intervención integral de asentamientos humanos espontáneos de Managua Nicaragua’, CEPAL, Naciones Unidas.

²⁰ Hardoy, Jorge E and David Satterthwaite (1989), *Squatter Citizen: Life in the Urban Third World*, Earthscan Publications, London, UK, page 39.

²¹ See footnote 20.

take out their waste bags at the exact moment when the truck passes, it is impossible for many residents of inner streets to make use of the service.



Photo

Photo 1. Narrow street where the compaction trucks cannot enter due to low hanging cables, trees and the condition of the street



Photo 2. Compaction waste truck on a dirt street in an informal settlement where it can enter. Note the low cables, and the hanging sacks on the back of the truck containing sellable recyclables that the workers have sorted out while collecting

Even in informal settlements that are accessible to modern compaction trucks, the waste collection service is reportedly very irregular and unreliable.²² In 2010 in Managua districts 6 and 7, it was estimated that 33 percent of households were not served at all by official municipal waste collection, while the service provided to other households was inadequate.²³



Photo 3. River bank with illegally dumped waste

²² Interviews with residents in informal settlements in districts 5, 6 and 7 in Managua.

²³ UNDP and Habitar 2010 'Análisis del sistema financiero sobre la Gestión de los Residuos Sólidos en la Alcaldía de Managua', Managua.



in a storm canal is being cleaned in preparation for the rain season

Photo 4. Waste dumped

5. THE MANOS UNIDAS WASTE MANAGEMENT PROJECT

Manos Unidas is a cooperative of eighteen cart-men who collect household solid waste from several barrios in District 5, as a result of a waste management project supported by Habitar, a local NGO, and the United Nations Development Program (UNDP) in Nicaragua. Prior to the project, the cart-men collected debris and garden waste from wealthy barrios, disposing of it in nearby clandestine dumps. They had low and irregular incomes, were persecuted by the police, and were stigmatized by local communities as sources of contamination.

According to Habitar “for the city officers and their experts, the cart-men were nothing but a problem.” In the opinion of the Habitar representative, this preconception simply implied that these officials were “unaware of what the real

city of Managua is. They just do not know the reality at the informal settlements. For example, in many pulperías [local stores] horse shoes and horse food are sold,” making it obvious to those who choose to look that horses and therefore cart-men are operating in the city. The institutionalized dimension of the informal waste practices in the spontaneous settlements was largely unseen by city authorities, but familiar to local NGOs like Habitar which had been implementing other waste infrastructure projects in the barrio for several years.



Photo 5. Informal settlement with clandestine dump, District 5, central Managua

The familiarity with informal waste collection practices that Habitar had gained was crucial to identifying the Manos Unidas cart-men as a potential agent to provide household waste collection services in district 5. As a result, in 2009 the necessary funds were approved for the project, which was named ‘Proyecto Alianza para el Manejo de los Desechos Sólidos en el Municipio de Managua’ [Public-private partnership for household solid waste management in the city of Managua]. The project, which had a total budget of 214.930 USD, was to be implemented from 2009 until 2012. It was funded through the UNDP Public-Private Partnerships for Service Delivery (PPPSD) in partnership with WASTE, Advisers on Urban Environment and Development of Gouda, the Netherlands. The executing entities were the local NGO Habitar and the municipality of Managua.

During 2009 the cart-men were trained in the necessary competencies (i.e. accounting, management, law, waste management, labour risks, care of animals) to perform this new service. The project also supported Manos Unidas in the design of the service (e.g. frequency, prices) and the collection routes. Simultaneously, during the first year of the project, Habitar started campaigns with the

support of community leaders and other grass-root organisations in the barrios both to increase the awareness of more appropriate waste handling practices and to introduce the household waste collection service by Manos Unidas.

In 2010 the cart-men were temporarily licensed by the city authority to collect household solid waste in District 5. After a first pilot-year, in 2011 a formal agreement was signed between the Managua city management and Manos Unidas to collect household solid waste in agreed routes in District 5.

The collected waste was disposed of at a waste transfer station in District 5, where the municipal waste trucks could collect and evacuate it to the municipal landfill. The project initially planned to use the waste transfer station as a model for more sustainable waste handling practices such as recycling, composting and reusing. However, legal issues with regard to the tenancy of the land, and difficulties engaging with the municipality, hindered the renovation of the place and the construction of new infrastructure. Instead, the waste transfer station remained simply a place to dispose of the household waste collected at the barrios, from which it would be removed by municipal trucks.

The project officially ended in 2012, although at the time this paper was written, Habitar and UNDP continued to support Manos Unidas and the barrios in district 5 through other programs. Since then, the municipality has irregularly fulfilled the signed agreement. During the first months in 2012 the waste transfer station was not emptied regularly, causing considerable pollution in its surroundings and the complaint of neighbours. Order was restored at the waste transfer station a few months later when municipal waste trucks started removing waste regularly again. The municipality had formulated a project to gain the necessary resources to equip the waste transfer station with more appropriate physical facilities, and during our last field visit in July 2012 we could witness ongoing construction at the place.

Further complicating the situation, during 2012, a year of municipal elections, the city began collecting household solid waste from some of the main streets in the informal settlements where Manos Unidas operates, an infringement of the signed contract. As a result Manos Unidas continues to struggle to provide a stable and regular service in the agreed routes.

The Manos Unidas project was, however, one of the six Managua development projects in the area of urban waste governance funded by various international aid organizations, namely, European Union URBAL Program, Italian Agency for International Development Cooperation, Spanish Agency for International Development Cooperation, UN-Habitat and the Norwegian Agency for International Development Cooperation. The projects dealt with the formulation of a waste municipal plan; the upgrading of La Chureca, the municipal dumpsite; siting, design and development of new sanitary field, waste recycling station & compost infrastructure; the creation of a number of waste transfer stations in the city districts 6 and 7; eradication of child-labour related to waste collection; elimination of illegal dumping and the improvement of public health; and the establishment of micro-enterprises and cooperatives, such as Manos Unidas, for collecting, recycling and transforming household solid waste in neighbourhoods

out of the reach of the formal municipal service. The encounter of different projects within the Managua city management resulted in the diffusion of ideas, strategies and even infrastructural solutions within the projects. This explains for example how the construction of waste transfer stations or the support of informal waste collectors became a similar solution with somewhat different forms in the Managua districts 5, 6 and 7 (Zapata Campos and Zapata, 2011).

In the following section, we analyze how the *Manos Unidas* project succeeded in establishing and stabilizing a number of connections between the collective actions of *Manos Unidas*, the local community, and the city authority.

a. *Manos Unidas* and the community

During the first phases of the project, the introduction of this new service, provided by a very stigmatized social group, was not easy. It was crucial to anchor this new idea among barrio residents through the work of community leaders:

The first week that *Manos Unidas* collected the household waste, almost no residents used their services. The carts were empty. “For 3 Cordobas [approximately EUR 0.10] I would rather dump the waste in the river!” said many. But there was an awakening after community leaders started visiting the barrio, household by household. And this is how awareness was raised. Every project, if it has good community leaders, will work.²⁴



Photo 6. Horse cart-man from *Manos Unidas* collecting waste

²⁴ Interview with resident, District 5.

Once the new service, or new collective action, became better established, trust in critical urban services such as waste collection was restored: “local residents now have the certainty that they will have this service, regularly.”²⁵ This growth of trust “in an impoverished community that does not believe in what the authorities say”²⁶ is significant. The establishment of this service also had consequences for the waste accumulated in spontaneous dumps. Local residents mobilized themselves in environmental brigades to clean up the *barrios* and storm canals, and to raise awareness among residents.

As a result, only a few months after Manos Unidas started collecting household waste in 2010, the *barrios* became cleaner. As one local resident told us in our second field trip to Managua in January 2011: “My *barrio* is cleaner now because my community is supporting the Manos Unidas waste collection service.” Compared with the municipal trucks, the cart-men provide a more personal, efficient, and precise service. Since they always take the same routes and collect the fees directly when they collect the waste, they have established more personal relationships with residents²⁷. A more personal, market-driven relationship means that both the cart-men and their customers are concerned with service quality. A symbiotic relationship has thus been established between the population and the cooperative:

I am concerned about the health of the cart men and their risks of getting sick if they do not wear gloves. If he gets sick, I will not get the service!²⁸

If I had to choose between the modern municipal waste truck and the cart-men, I'd choose Manos Unidas. The service is more personal, they wait for you if necessary, it is more environmentally friendly, and it does not break down the way the municipal trucks do.²⁹

The stabilization of a symbiotic relationship with the community is, in words of an Habitar officer “what protects Manos Unidas from the municipality”, which licenses operators in the *barrio*: “The local residents are aware of the importance of this service and will support its continuance. They will promote it to the municipality.”³⁰

b. Manos Unidas and the city authorities

The relationship between municipality and cooperative was to have been consolidated through the creation of both a public–private partnership and a district waste transfer station, from which the waste collected by the cart-men would be transported for disposal at the municipal landfill by the municipal waste management department. In 2011, the official agreement between Manos Unidas and

²⁵ Interview with Habitar officer.

²⁶ Interview with BasManagua officer.

²⁷ By contrast, in the formal city waste management system payment is handled to a tax collector that irregularly visits households to collect the fee.

²⁸ Interview with resident that uses Manos Unidas' service

²⁹ Interview with Community leader

³⁰ Interview with Habitar officer

the city of Managua was signed by the mayor in a ceremony that received considerable media attention. It was a two-year licence to collect household waste along a limited route in District 5. In July 2012, Manos Unidas was still struggling to exercise their right to the route, as the District 5 administration (which is not the formal waste collecting body) also collects there at times, confusing the inhabitants about who actually should collect the waste, and who should get paid for it:

Look, I pass here on Tuesdays, Thursdays, and Saturdays. But the district's truck now passes on Wednesdays and Sundays. So, when I come, there is nothing to collect, and I don't get paid. Or, sometimes people save their waste for the truck and then it does not come, so when I come they give me six sacks, but they pay only the same 3 cordobás. ... It shouldn't be like this.³¹

Despite the difficulties, Manos Unidas continues to provide the service, hoping that the relationship with the municipality will be clarified in the future.

Although the existing infrastructure at the waste transfer station was temporary, and plans to use it as a model for the city's other districts did not succeed, the establishment of a formal physical place for waste transfer in the district facilitated the institutionalization of the service provided by Manos Unidas and the shift from illegal dumps to a controlled waste transfer point. Anchoring this change in the community once again supported the stability of this new arrangement. While another development project funded by UN-Habitat had initially failed at building more sophisticated waste transfer stations in city district 7, due to not-in-my-backyard (NIMBY) mobilization, the district 5 transfer station was supported from the beginning by the local residents, who understood its importance.³²

In district 6, another waste transfer station was constructed and started operating at the end of 2011, supported by the Italian development aid project Bas-Managua. Its construction went ahead despite NIMBY mobilization: "At the beginning, the population voiced their disagreement with the waste transfer station. Now they all know about it. We have explained that the station will not become a second Chureca."³³ The efforts of community leaders and environmental brigades to raise awareness within the community both in districts 5 and 6, together with the opportunity to create new jobs associated with waste collection in the *barrio* through the creation of additional cooperatives, contributed to the acceptance and embeddedness of the project.

Despite that, later in 2011, the district 5 transfer station suffered a crisis: waste overflowed when the central waste management department did not collect the waste as planned, due to a lack of vehicles and resources. We conclude

³¹ Interview with a Manos Unidas member.

³² Interview with Habitar officer.

³³ La Chureca is the Managua city dump, see Zapata Campos, María José, and Patrik Zapata (2012), "Changing La Chureca: Organizing City Resilience Through Action Nets", *Journal of Change Management* Vol 12, No 3, pages 323-337.

that waste transfer stations are very vulnerable arrangements that require well-established connections and coordination, since they depend completely on municipal services for regular waste removal.



Photo 7. Horse cart-man from Manos Unidas at the temporary waste transfer station

6. DISCUSSION

a. Connecting actions for more sustainable waste collection service in informal settlements

By slightly changing the actions of the actors already involved in informal waste handling in the informal settlements, the Manos Unidas project succeeded in turning the cart-men from an agent of pollution into the solution to several interconnected problems: illegal dumping by the cart-men and residents; the cart-men's low and irregular income; and the lack of household solid waste collection services. In essence, the cart-men in Manos Unidas still do what they did before: they collect waste and dispose of it. However, now they collect household solid waste regularly, earn regular salaries from the fees households pay, dispose of waste at a legal waste transfer station in the city district, and are respected and valued by the local community because of the social and environmental services they provide. Furthermore, the informal settlements that once were unserved by a waste collection service today enjoy a regular, economical, and efficient service, and illegal dumping has been eradicated in the barrios. Trust in this regular basic service was established, as illegal dumps were transformed into legal trans-

fer points, illegal squatters into responsible citizens, and cart-men into environmental heroes. Furthermore the new waste transfer station, situated at the nexus between the formal and informal city, physically “switched on” the informal settlement, connecting it to the formal city.

These transformations – “translations” or “connections” in action net theory terms – were possible thanks to the enduring connections established between Manos Unidas, the local residents, and the city government. Anchoring ideas, new services, actors, practices, and even infrastructure was crucial to the success of the project. Institutionalizing the co-production of waste collection services calls for regular, long-term relationships and arrangements.³⁴ Far from being formal, these arrangements, such as the agreement signed between Manos Unidas and the municipality, could remain flexible, or as Joshi and Moore put it in their work on co-production, “undefined, informal and renegotiated almost continuously.”³⁵

As in other waste collection projects elsewhere, such as in a community-based waste management project in Madras,³⁶ policy arrangements can break down and local residents and waste pickers need to ask for help. Here, for example, when the District 5 administration started to collect waste using trucks in streets near Manos Unidas’ routes, or when municipal waste management staff stopped collecting waste regularly from the transfer station.³⁷ Once the program ended, the role of the local NGO Habitar and the UNDP, which were behind the program, was to help stabilize these undefined and vulnerable connections; which they still do either by supporting Manos Unidas ongoing negotiations with the municipality or by funding an small project to the cooperative through the UNDP’s small donations program.

b. Connecting the informal settlements to the formal waste city management

As a result of the Manos Unidas project, and others promoting waste-picker cooperatives and micro enterprises for household waste collection services in districts 6 and 7, Managua’s waste management system is becoming a hybrid of formal and informal services, public and private suppliers, legal and illegal practices, and modern and traditional technologies, all in the setting of the formal and informal city.

As Gerry and Bromley state in relation to formal and informal work in cities, “Dualism has never been able to satisfactorily handle the complexities of urban life in Third World situations.”³⁸ In our study, the informal and the formal

³⁴ Mitlin, Diana (2008), see note 6.

³⁵ Joshi, Anuradha and Mick Moore (2004), “Institutionalized co-production: unorthodox public service delivery in challenging environments”, *The Journal of Development Studies* Vol 40, No 4, page 40.

³⁶ Furedy, Christine (1992), “Garbage: exploring non-conventional options in Asian cities”, *Environment and Urbanization* Vol 4, No 2, pages 42–61; Anand, P.B. (1999), “Waste management in Madras Revisited”, *Environment and Urbanization*, Vol 11, No 2, pages 161-176.

³⁷ Furedy 1992, see footnote 37.

³⁸ Bromley, Ray and Chris Gerry (1979), *Casual Work and Poverty in Third World Cities*, David Fulton Publishers, page 306.

become embedded categories in the urban setting, “not only inseparable and interdependent but also indefinable.”³⁹ This hybrid quality has been described as urban informality, meaning “the manifestation of informal processes in the urban environment.”⁴⁰ Urban informality hence becomes constitutive of the urban condition itself,⁴¹ as the boundaries between the informal and formal spaces in the city become more permeable.

The hybridization of waste management in Managua and the co-production of waste collection services in some neighbourhoods are understood as temporary by some city officers whom we interviewed, who feel it will last only until the streets are paved and the cables lifted. However, other interviewees, also from within city management, believe that a hybrid system, in which an increasing number of waste-picker cooperatives collect household solid waste from informal settlements in collaboration with the formal waste collections system, represents a more efficient and lower-cost management model.

This hybrid waste management model, created through the co-production of basic services, needs social capital (stemming from the participation of the community and its leaders) as much as it need technical know-how, financial capital, and local government political support. As Anand has noted regarding waste collection in Madras, projects such as the one supporting Manos Unidas would be impossible without the regular removal of the waste from the transfer station by the municipal waste trucks.⁴²

In this project, as in many others elsewhere related to waste management collection in informal settlements, we observed governmental resistance to relinquishing control over a critical and popular service that is a core municipal function around the world, especially when political elections are approaching.⁴³ Occasionally, public officers or politicians might ban waste-picking activities simply to prevent health hazards related to their irregular performance.⁴⁴ A common governmental response is to consider these organized communities more as threats than opportunities⁴⁵. One challenge to the stabilization of these arrangements between informal collectors and authorities is the fragmentation of

³⁹ Hernández, Felipe and Peter Kellett (2010), “Reimagining the informal in Latin America” in Felipe Hernández, Peter Kellett and Lea K Allen (editors) *Rethinking the informal city. Critical perspectives from Latin America*, Berghahn, New York, page 6.

⁴⁰ AlSayyad, Nezar and Ananya Roy 2004, “Urban informality: crossing borders”, in Ananya Roy and Nezar AlSayad (editors), *Urban informality. Transnational perspectives from the Middle East, Latin America, and South Asia*, Lexington, Oxford, page 1.

⁴¹ Fiori, Jorge and Zeca Brandão 2010 ‘Spatial strategies and urban social policy: urbanism and poverty reduction in the favelas of Rio de Janeiro’ in Felipe Hernández, Peter Kellett and Lea K Allen (editors), *Rethinking the informal city. Critical perspectives from Latin America*, Berghahn, New York, page 184.

⁴² Anand, P.B. (1999), see footnote 37.

⁴³ Furedy, Christine (1992), see note 37; Wilson, David C, Adebisi Araba, Kaine Chinwah and Christopher Cheeseman (2008), “Building recycling rates through the informal sector”, *Waste Management Vol 29*, pages 629–635; local elections were held in Managua 2012.

⁴⁴ Hardoy, Jorge E, Diana Mitlin and David Satterthwaite (2001), see note 1, page 233.

⁴⁵ Mitlin, Diana (2008), see note 6, page 355.

city management interests, in which politicians, city officers, and districts each have different agendas and interests, as illustrated above.

In Nicaragua, the idea of a hybrid model of waste collection, or the co-production of waste collection in informal settlements between informal waste pickers and the formal waste management system, is very recent. The model of waste-picker cooperatives associated with waste transfer stations has spread and, at the time this was being written, was being expanded into districts 6 and 7. However, it is still too early to conclude that this idea for the governance of waste in informal settlements will take root in the Managua city management. As other case studies have found, it can take decades for an innovative and alternative solution to be scaled up, as in the case of Karachi's wastewater project.⁴⁶ One of the challenges lies in the continuation of these projects: the stabilization and institutionalization in city management of ideas that when translated into practice on a larger scale, can contribute to the improvement of the household solid waste management⁴⁷ in informal settlements around the world.

c. Co-production of household waste collection services in informal settlements

In a context of weak municipalities unable to provide basic services, such as in Managua, low-income citizens do not just remain passive. Occasionally, co-production processes emerge, such as the public–private partnership supported by the local NGO, the community leaders and other grassroots organisations in District 5 for the collection of household waste.

We have also demonstrated that the informal city is not only about low-income residents being supplied with illegal and non-official services. The residents of informal settlements also enact entrepreneurial and innovative strategies based on the available local resources to cope with their situation of scarcity; strategies that, as the service provided by Manos Unidas, can often be sustainable.⁴⁸ In this urban informality, the forgotten residents of the informal settlements and the waste pickers became city constructors. They do this in two ways, first, by illegally invading land to gain their right to the city and, second, by self-organizing their settlements. Residents struggle to gain legal title to their houses and to be “switched on” as part of the city through the provision of basic urban services such as water and electricity. They may do this by providing themselves with services either through spontaneous and illegal practices or through the self-organization of their the communities to provide them.

Informal settlements are gradually consolidated by the efforts of their own–residents who collectively organise themselves to construct basic infrastructures⁴⁹. In our story, as in those of other Latin American cities *favelados*, squat-

⁴⁶ See note 1, page 233.

⁴⁷ Furedy, Christine (1992) see note 37, page 54.

⁴⁸ Mehrotra, Rahul (2010), ‘Foreword’ in Felipe Hernández, Peter Kellet and Lea K Allen (editors) *Rethinking the informal city. Critical perspectives from Latin America*, Berghahn, New York, page xiii.

⁴⁹ Hernández and Kellett (2010), see note 41, page 11.

ters, and ordinary citizens become the real city builders.⁵⁰ These processes of co-production constitute an urban social movement that unintentionally challenges the nature of the state and civil society.⁵¹ While in cities in wealthy societies, participatory democracy and citizenship are undergoing a crisis whereby citizens are being reduced to mere recipients of services, in cities of the Global South such as Managua, residents literally construct the city, brick by brick. Citizenship here is something one must fight for and win, and not take for granted.

Examples of democracy and community participation constitute valuable material to enrich the urban and organization studies literature and to inform city management praxis elsewhere in the world. The co-production of basic services has been understood as an urban social movement⁵² in which the collective activities of residents of informal settlements may not involve direct political claims but rather involve engagement with the state and with city management.

7. CONCLUSIONS

In this paper, we have examined how the development project supporting the Manos Unidas cooperative succeeded through an understanding of existing local waste management practices in the barrio, and by trying to establish and stabilize new connections through processes of co-production. In the case of Manos Unidas and the support it received from the Nicaraguan NGO Habitar, funded by the UNDP and other international aid organizations, the project supported both the local residents and the cart-men by enabling informal sector activities to flourish and by providing low-income households with adequate basic services. Unlike projects that bulldoze informal settlements or simply provide services and goods to local residents, the support here focused on the informal settlement residents and the waste pickers who, acting for themselves, were able to construct their homes, as well as their waste collection systems, in the informal city.⁵³ The acknowledgement and the connection to existing initiatives underlies the success of many innovative development projects.⁵⁴ In other words, cities need waste management policies that incorporate existing informal waste practices⁵⁵ and that recognize the need to develop innovative, unconventional and sustainable solutions that match local resources and needs⁵⁶.

⁵⁰ Hernández and Kellett (2010), see note 41, page 12.

⁵¹ AlSayyad and Roy (2004), see note 42; Mitlin, Diana (2008), see note 6.

⁵² Mitlin, Diana (2008), see note 6.

⁵³ Mitlin, Diana (2008), see note 6; Kellett, Peter 2005 'The construction of home in the informal city', in Felipe Hernández, Mark Millington and Lain Borden (editors), *Transculturation: cities, space and architecture in Latin America*, Rodopi, New York pages 22-42.

⁵⁴ Hasan, Arif (2006), "Orangi Pilot Project; the expansion of work beyond Orangi and the mapping of in-formal settlements and infrastructure", *Environment and Urbanization* Vol 18, No 2, pages 451-480;

Mitlin, Diana (2008), see note 6; Furedy, Christine (1992) see note 37.

⁵⁵ Furedy, Christine (1992) see note 37.

⁵⁶ Hardoy, Mitlin and Satterthwaite (2001), see note 1, page 227.

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