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Title of the paper

Hunting for tonnage: Waste workers' incentives in a public-private partnership in Bafoussam, Cameroon

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Abstract

Public-private partnerships are often depicted as an effective institutional arrangement to improve urban services towards sustainable development. In sub-Saharan Africa, the involvement of private parties in municipal solid waste management is believed to bring in technical, managerial and financial capabilities, which municipalities generally lack. However, several studies revealed that access to privatised waste collection services is often unequal and disfavours unplanned settlements. This research contributes to an understanding of the production of such socio-spatial inequalities and injustices through public-private partnerships by specifically looking at the everyday collection practices of formal waste workers employed by Hysacam, the private company in charge of waste management services in the medium-sized city of Bafoussam and elsewhere in Cameroon. Drawing primarily upon qualitative data, including participant observation, the paper shows how the weight-based collection target, prescribed in the tripartite partnership contract between the central government, the municipality and Hysacam that theoretically should cover the whole urban area, produced perverse incentives at various scales for uneven garbage collection in Bafoussam. More generally, this case study points to the importance of considering workers and their everyday practices, as well as incentives and accountabilities, for the design of sustainable and socially just solid waste management.

Key words: Public-private partnerships, solid waste management, environmental justice, incentives, sub-Saharan Africa.

1. Introduction

Solid waste management is primarily a problem of urban areas affecting all three pillars of sustainable development. Poorly managed solid waste contaminates the environment (water, soil, air) at local and global scales, has negative social impacts on human health and hygiene of communities and waste workers, and affects economic productivity and the attractiveness of places (Kaza et al. 2018). According to a recent World Bank report, sub-Saharan Africa, in part due to its rapid urbanization rates, is the region with the fastest growth rate in waste production, estimated to triple between 2016 and 2050 (Kaza et al. 2018). This represents a formidable challenge for the region, where today the majority of waste is openly dumped.

However, an increasing number of African cities have started to improve waste collection. Since the mid-1980s, there has also been an increased involvement of the private sector in urban service delivery (Ahmed and Ali 2006). Public-private partnerships, in particular, tend to be seen by international donors and policymakers as a preferable alternative to both municipality-run systems and uncontrolled competition between private firms. Indeed, public-private partnerships often brought important improvements in household waste collection, as an abundant literature reports (Ahmed and Ali 2006; Mohan et al. 2016; Post et al. 2003; Yeboah-Assiamah et al. 2016). However, many public-private partnerships, particularly those with transnational companies, have been a failure in sub-Saharan Africa (Kaza et al. 2018).

Cameroon represents an interesting case, where the privatisation of municipal solid waste management goes back to the late 1960s and is dominated by a single, national company; that is, Hysacam (Hygiene and Sanitation of Cameroon). Public-private partnerships with Hysacam have been expanding gradually since the 1990s; since the mid-2000s, they have been extended to medium-sized cities, where the majority of the country's and the region's urban population lives. Unlike in many privatised systems elsewhere in sub-Saharan Africa, where the costs of solid waste management are covered by user fees, Hysacam has since its beginnings been paid directly by the state at a rate that is based on the weight ('tonnage') of waste collected and transported to the municipal landfill.

This study examines this relatively enduring system at the case of the medium-sized city of Bafoussam and with a focus on (unequal) household collection services. Garbage collection is generally seen as one of the most problematic steps in solid waste management in developing countries (Kassim and Ali 2006); it is closely linked to environmental injustices, as collection rates vary between and within cities generally affecting poor residents of unplanned settlements disproportionately (Baabereyir et al. 2012). Indeed, numerous studies have pointed to public-private partnerships as a source of increasing environmental inequalities (Fahmi 2005; Guerrero et al. 2013). In order to explain this process, most of the studies have focused on the design of the contractual arrangements, the responsibilities and (monitoring) capacities of the public sector, people's awareness and the varying urban topography, morphology and infrastructure (e.g., difficultly accessible roads) (Ahmed and Ali 2006; Awortwi 2004; Baabereyir et al. 2012; Oteng-Ababio et al. 2013; Yeboah-Assiamah et al. 2016). Interestingly, relatively little attention has been given to factors lying with the private partners, the waste collectors on the ground and their economic and institutional incentives for (non-) collection in particular areas. Against this trend, some case studies on waste collection systems based on user fees showed that private contractors and collectors had a preference for high income areas where the households can afford to pay for frequent door-to-door collection (Ezebilo and Animasaun 2011; Kassim and Ali 2006; Mbeng et al. 2009; Tilaye and van Dijk 2014).

However, little is known about (uneven) collection practices where private companies and formal waste workers are not paid through household user fees but by the state, as it is the case in Bafoussam. This paper, therefore, needs to look beyond direct economic incentives for waste workers to examine more complex institutional incentives at different scales within the public-private partnership for an explanation of uneven waste collection. To do this, we address three

questions: (1) What are the terms of reference and the obligations of Hysacam and its workers within the public-private partnership in Bafoussam city? (2) How do these rules of the public-private partnership influence the waste collection practices on the ground, in both planned and unplanned neighbourhoods? (3) What are the outcomes in terms of household waste collection and socio-spatial and environmental justice?

After this introduction, section 2 reviews the literature on the privatisation of solid waste management in sub-Saharan Africa and describes the development of partnerships with Hysacam in Cameroon. Section 3 describes the methodology, including the experiences with participant observation of/with formal waste workers employed by Hysacam. Section 4 provides necessary contextual information on the city of Bafoussam and its waste management, including the techniques and equipment used by Hysacam. Section 5 forms the empirical core part of the paper and addresses the three research questions. It describes the institutional arrangements of the public-private partnership, analyses the incentives leading to a ‘garbage hunt’ in the everyday waste collection and depicts the socio-spatial outcomes in different, planned and unplanned, neighbourhoods of Bafoussam. In section 6, we discuss our findings in relation to existing studies and reflect on the incentive system in place at different levels. In the conclusions (section 7), we synthesize the main arguments of the paper and briefly reflect on alternative partnership arrangements and waste collection systems that could correct perverse incentives to waste workers and reduce socio-spatial inequalities and environmental injustices.

2. Literature review

2.1 Privatisation of waste management in sub-Saharan Africa

Private companies for waste management emerged in sub-Saharan African cities after the independence period of the 1960s and particularly in the 1980s in the context of structural adjustment programs (Awortwi 2004; Sory and Tallet 2015). By the late 2000s, some form of privatisation of urban service delivery existed in at least 93 countries globally, including many Sub-Saharan African countries (Kirama and Mayo 2016), although there is a recent trend in the region toward stronger involvement of the national state in waste management (Kaza et al. 2018).

Both exogenous and endogenous reasons prompted African states to gradually privatise urban services, including municipal solid waste management (Post et al. 2003). The main exogenous factor were the structural adjustment programs that promoted, amongst other measures, privatisation in response to the problematic economic situation of sub-Saharan African countries and cities (Kirama and Mayo 2016). For instance, waste collection in the city of Accra in Ghana was privatised during the 1980s, when budgetary cuts were imposed to the government by the IMF and the World Bank (Post et al. 2003). As for the internal factors, unprecedented rapid urbanisation represented a new challenge for local governments and their waste management that could not be met by their existing technical, institutional and financial capacities (Ngnikam and Tanawa 2006; Ogu 2000; Oteng-Ababio et al. 2013; Post et al. 2003). However, disappointing experiences with unregulated and full privatisation¹, together with a general trend toward public-private partnerships since the 1990s, have encouraged governments to shift toward this latter model of privatisation. In such public-private partnerships, power and responsibilities are shared between the state (most often the local municipality) and the private company, whereby the state acts as the regulator and the company as the service provider.

¹ A waste management system in which there is little or no relationship between public agencies and private companies, the latter of which have full responsibility for a city’s or a neighbourhood’s services, or at least of some of its components, such as collection, transport or treatment (Awortwi 2004).

Accordingly, the public sector remains an accountable stakeholder for the waste service delivery of the contracted private actor(s) (Awortwi 2004). The (re-)integration of municipalities into systems of urban service provision was to ensure more sustainable and equitable systems (Jaglin 2014). State actors may play varying roles in such partnerships: from the simple enforcement of user fees and the general oversight and regulation of private contractors, to the provision of particular services along the waste chain (e.g., collection, transport or processing). Awortwi (2004), furthermore, distinguishes between franchising and competitive bidding arrangements, on the one hand, where the private partners collect user fees, and contracting-out systems, where a public agency pays the private contractors by weight of collected garbage (as in Bafoussam, and in Cameroon more generally). Some authors consider the local and national governments as the most relevant stakeholders in public-private partnerships, as they are not only accountable regulators but also responsible for the enabling environment, in particular the road network, transportation facilities and people's awareness raising (Guerrero et al. 2013). Other authors underline the importance of people's participation in solid waste management and the collaboration with (informal) micro-enterprises in public-private-people partnerships, particularly to ensure waste collection in unplanned settlements (Kirama and Mayo 2016; McKay et al. 2015; Tilaye and van Dijk 2014).

2.2 Experiences with public-private partnerships in solid waste collection

Several studies have indicated that public-private partnerships can improve the coverage, efficiency and effectiveness of waste collection if pertinent providers are included and if the institutional design and the technologies are adapted to the local context of the developing city (Ahmed and Ali 2004; Yeboah-Assiamah et al. 2016; Kapoor 2016; Post and Obirih-Opareh 2003). The latter authors underline the importance of the vertical integration of small-scale operators and the public sector, as well as of incentives for both public and private actors accruing from the particular terms of reference of the partnership. The inclusion of vulnerable and marginalised people involved in waste collection optimises partnership arrangements while creating new employment opportunities (Ahmed and Ali 2004; Kassim and Ali 2006; Fahmi 2005; Ngambi 2016; Tilaye and van Dijk 2014). As the efficiency and equity of public-private partnerships are dependent on institutional designs, incentives, popular participation and other local factors, research and advocacy are required so that the theoretical benefits of partnerships can be translated into ground realities (Ahmed and Ali 2004).

However, Awortwi (2004) found that the results from public-private partnerships in three Ghanaian cities did not match the theoretical and policy expectations. The public actors failed to consider key institutional factors required for effective waste collection under public-private partnerships, that is, the setting up of a system of competitive bidding, the clear definition and division of the roles between the public regulator and the private service provider, the capacity of local governments to effectively monitor the private party and to apply sanctions (see also Oteng-Ababio et al. 2013; Post et al. 2003). As a consequence, the systems were in poor condition and struggling with financial deficiency.

In Accra, furthermore, the public-private partnership brought in foreign technology, including sophisticated compactor garbage trucks designed for developed cities, that proved inappropriate for dealing with the local waste conditions (Oteng-Ababio et al. 2013). Imported technologies, whether used in a public or in a privatised system, often reinforce the underservicing of poor areas. In particular, large garbage trucks are not suitable for the narrow roads in unplanned settlements (Kirama and Mayo 2016). Compactor systems are less effective in developing cities, where household garbage is mostly composed of organic waste, which is hardly compactable.

Other studies pointed to the households as a key stakeholder in waste collection and their limited willingness (resulting to some extent from the lack of awareness) and their limited

capacity to pay for the service (Ezebilo and Animasaun 2011; Kaseva and Mbuligwe 2005; Kassim and Ali 2006; 2015; Post et al. 2003; Tilaye and van Dijk 2014). In Dar es Salaam, for example, franchised private companies were discouraged to work in poor neighbourhoods where fee collection rates were lower than in high-income areas (Kirama and Mayo 2016). In Accra, neighbourhood-differentiated collection fees, including the free collection of garbage in the poorest planned settlements, were introduced with the aim to reduce spatial injustices. However, collection became highly irregular in these areas resulting in the underservicing of poorer settlements and even implying the subsidization of regular door-to-door garbage collection in better-off neighbourhoods (Baabereyir et al. 2012). Non-payment of user fees, particularly by poor households, led to wastes remaining (visible) in the neighbourhoods and therefore to a general dissatisfaction with privatised waste management systems (Kassim and Ali 2006; Ogu 2000). Uneven willingness and capacity to pay for waste services also contributed to intra-city disparities in waste collection and cleanliness. At the same time, non-payment of user fees and increased competition between multiple operators reduce the profitability and the attractiveness of the solid waste sector for private contractors (Sory and Tallet 2015). The reviewed literature remains silent whether municipalities actually take their contractual responsibility to enforce household payments to private contractors, but Sory and Tallet (2015) point to political disincentives to do so.

According to Ahmed and Ali (2006), however, (poor) people would be willing to pay for the service if they were considered as partners in solid waste management. Furthermore, substantive people's participation in solid waste management is seen as a necessary condition to improve the accountability and responsiveness of private companies in public-private partnerships (Yeboah-Assiamah et al. 2016). The same authors also point to the complexity of socio-political aspects that can put the success of public-private partnerships at risk, for example, when decisions on landfill sites have to be taken. Again, people's participation, in form of their consultation in meetings with politicians, is seen as a potential solution.

In general, existing studies have focused on the important role of the (local) state and of people's participation for the functioning of solid waste collection under public-private partnerships. Comparatively little attention has been paid to the private companies and particularly to the incentives for their workers to collect waste (from particular household and particular neighbourhoods). Furthermore, most studies examined public-private partnerships based on user fees that seem to be more widespread in sub-Saharan Africa than the contracting-out system prevalent in Cameroon. Finally, few studies (some of which have been cited above) exist that analyse the performance of public-private partnerships in terms of socially and spatially equitable collection and thus their effects on environmental justice.

2.3 The emergence of public-private partnerships in Cameroon

Cameroon seems to be among the first sub-Saharan countries to involve private contractors and to introduce public-private partnerships in municipal waste management. Its gradual privatisation of the municipal solid waste sector is closely linked to Hysacam, the by far most important private waste management company in Cameroon with operations in 17 cities in the country and in some other sub-Saharan African countries, including Benin, Liberia, Niger and Chad (Hysacam 2017).

Hysacam was founded in Douala as a subsidiary of the French Grandjouan Group in 1969. Starting with a dozen (imported) trucks and more than 100 employees, including some Western managers, the company had the necessary technical equipment and human resources to replace the municipality in providing and improving waste management services in Douala, a fast-growing city of about 500,000 inhabitants at the time (Hysacam 2017). In 1979, Hysacam expanded its operations to the political capital of Yaoundé, but the company's near-monopoly in managing the solid wastes of the two capital cities was challenged in the 1980s. Structural

adjustment led to an economic crisis and the deregulation saw many smaller companies, as well as community-based organisations, enter the waste sector (Hysacam 2017). Due to disappointing experiences with unregulated privatisation, Hysacam was able to re-establish itself in the 1990s as the dominant private waste service provider under exclusive public-private partnerships in the two capital cities. Collection methods were further modernised with the introduction of garbage trucks used for door-to-door collection and the so-called *ampliroll* (trucks to pick up the bins at collection points). A formally employed, skilled and effective workforce drives these trucks and collects the rubbish. In 2007, Hysacam also entered a contractual arrangement with the French multinational Veolia Propreté (Hysacam 2017). Today, Hysacam's services include the collection and transportation of solid wastes produced by households, the cleaning and sweeping of streets, squares and markets, and the operation of engineered treatment and disposal facilities. According to its website, Hysacam has more than 5,000 employees and over 500 garbage trucks. It operates several landfills and two biogas capture and treatment plants (Hysacam 2017). The success of Hysacam in the metropolitan cities eventually has since 2006 encouraged its extension to medium-sized cities with the support of international partners, notably the European Union, first to Bafoussam, Limbé and Kribi (Hysacam 2017).

Despite the relatively long history of private-sector involvement in Cameroon's solid waste management, relatively few studies exist on this issue. In a blog, the director of Hysacam proclaimed that the company was efficient in having improved the cleanliness of the metropolitan areas of Cameroun (Oct 29, 2012 posting by J.-P. Ymélé to Secteur Privé & Développement blog² ; unreferenced). In a more nuanced study, Parrot et al. (2009) showed how physical factors (distance, inaccessibility) and livelihood seekers influence Hysacam's waste collection system under the public-private partnership in the hilly city of Yaoundé. Here, a range of other actors, including NGOs and CBOs, fill the gap in marginalised and inaccessible areas. The authors suggest that Hysacam and the municipal authorities should develop or reinforce partnerships with those stakeholders and clearly define their respective roles. In a similar vein, McKay et al. (2015) call for a multi-stakeholder approach in Douala, where solid waste management faces challenges due to increasing waste volumes and disposal costs while the municipal financial capacity remains limited. They see a need to formally involve informal recyclers, micro-enterprises, businesses, NGOs and CBOs in a larger partnership. Furthermore, Manga et al. (2008) found that multiple levels of government – national ministries and the three local communes – have poorly defined and overlapping responsibilities in the waste management of the small touristic city of Limbé. This led to the inefficient use of both human and capital resources and poor waste management. Some researchers also investigated technical aspects and environmental impacts of waste management in Cameroon. For example, poor recovery and disposal practices were outlined as a main problem in the country's waste management system (Manga et al. 2008; McKay et al. 2015; Oct 29, 2012 posting by J.-P. Ymélé to Secteur Privé & Développement blog. See note 2).

By focusing on waste collection in Bafoussam, this paper contributes to the empirical literature on solid waste management under public-private partnerships in Cameroon by extending the discussion beyond the capital cities of Yaoundé and Douala. It furthermore complements the existing studies by analysing the causes of spatial inequalities and environmental injustices in waste collection in more depth and with a focus on the understudied public-private partnerships-based weight-dependent public payment systems.

² <http://blog.secteur-prive-developpement.fr/2012/10/29/la-voie-camerounaise-vers-une-meilleure-gestion-des-dechets/>

3. Methodology

Empirical data presented in this paper originated from 7.5 months of fieldwork in 2014-15 and in 2016 in Bafoussam as part of a larger study on solid waste management by the first author. The paper draws primarily on data collected through qualitative methods, including semi structured interviews and participant observation.

In order to acquire data on the public-private partnership (research question 1) and to get access to local key informants, a 3-week internship was organised with the municipality (Urban Community of Bafoussam).³ During this time, the key municipal officer in charge of sanitation, including waste management, as well as four other local experts were interviewed on the history and the organisation of the city's solid waste management. These interviews took place in the municipality's office space and lasted about two hours each. There were no further people with in-depth knowledge on waste management available during the time of the internship. Furthermore, the municipal archives were searched for information on the partnership contract, expenses on solid waste management, etc.

Already during the initial phase of the fieldwork, the prominent role of the private company Hysacam in the city's management of household waste became clear through discussions with neighbourhood leaders and households and the observation of the Hysacam-labelled garbage trucks crisscrossing the city. The importance of Hysacam was confirmed by the municipal staff, who also helped the first author to get an internship at the company. After several attempts and the submission of multiple recommendation letters, Hysacam granted the first author an unpaid 2-month internship in 2015 and a one-week internship in 2016. The research purpose of the internship was disclosed from the beginning. During the internships, a total of 10 semi-structured interviews were carried out with personnel at the Hysacam office in order to get more information on the public-private partnership, collection routes, work terms for the waste collectors, etc. Interviews were conducted with the head officer of human resources, who directed the first author to the head officers of the divisions of urban cleanliness, human resources, dumpsite management, and communications. This selection covered all Hysacam officers dealing directly or indirectly with garbage collection. Another five interviews were carried out with zonal work supervisors who conduct field inspections. The length of the interview sessions varied from 30 minutes to one hour. The first author was often spontaneously introduced from one interviewee to the next. Tape recording was therefore seen as too intrusive and most times only notes were taken during the interview and written up later from the field journal.

First and foremost, however, the internships served to engage in participant observation with Hysacam's waste worker teams, each comprising a driver and two or three waste collectors, and to study their concrete waste collection practices and motivations (research question 2). Each of the 15 garbage collection teams was accompanied two or three times on their seven-hour tour along the streets and through the neighbourhoods during which numerous informal conversations took place, particularly with the drivers. About 40 of these conversations were recorded in the cabin of the garbage truck; important passages were later transcribed. The first author being a woman, it was only rarely possible to physically take part in collecting waste, the workers stating that 'this is not a woman's work'. Similarly, the population regarded her as Hysacam office staff rather than a waste worker. However, it was still possible to observe the interactions between the waste collectors and the population. In general, the use of participant

³ A formal affiliation, such as an internship, is often necessary in the Cameroonian context to access and interview officials.

observation with formal waste workers represents a novelty for research on public-private partnerships.

Furthermore, actual collection points and routes were tracked during the tours using a GPS in order to map the waste collection frequency of Hysacam in different areas of the city. This spatial information was complemented by quantitative data from a questionnaire survey with 386 households in four different neighbourhoods (which was mainly used for other parts of the larger study) to appraise spatial inequalities (research question 3). The questionnaire included questions about household waste practices and obstacles encountered with the formal waste collection service.

4. Context

4.1 Solid waste management in Bafoussam

Bafoussam is the fourth largest city of Cameroon with a population of about 400,000 inhabitants on a surface of 7,000 ha (Communauté Urbaine de Bafoussam 2013). The city has experienced rapid urban growth since the 1980s, having doubled its population within twenty years (BUCREP 2010). Bafoussam is the regional capital of West Cameroon. Apart from its administrative functions, the city is an important centre of regional (agricultural) trade.

The Urban Community of Bafoussam is the local government in charge of the city's economic, social and cultural development, including urban planning, infrastructure development, transportation, cleanliness and hygiene. The urban community, whose head is nominated by the central government, is therefore a partner in the public-private partnership for municipal solid waste management with Hysacam. It is subdivided in three communes of urban districts with elected mayors and councils. However, the role of the communes for urban development in general and solid waste management in particular is very limited (to some road cleaning, weeding). The 70 administrative neighbourhoods and the numerous blocs, as well the three main traditional chieftaincies, are currently not involved in solid waste management either, except for funnelling occasional citizen complaints.

The municipal waste production amounts to about 200 tonnes per day (Communauté Urbaine de Bafoussam 2013). Data from the urban municipality shows that the annual tonnage of waste collected by Hysacam in Bafoussam is increasing by about 1,000 tons per year. Solid waste is collected from households and from collection points and ends up in a managed landfill at the periphery of the city.

According to interviewed key informants, municipal solid waste collection represented a big challenge for Bafoussam during the 1990s, as rapid population growth and a steady urban sprawl met with a financial crisis and limited technical capabilities of the municipality for dealing with the increasing amounts of garbage. This led to the accumulation of piles of rubbish in neighbourhoods and streets. In response, the municipality employed a number of local private entrepreneurs on short-term contracts to keep central parts of the city clean. As a municipal officer commented:

In order to 'clean the face' of the city, the urban community contracted some private service providers for street sweeping in the administrative area... This did not cover the whole city because of the municipality's limited material and financial resources.⁴

In addition, some NGOs and community-based organisations organised waste collection in poorer, peripheral neighbourhoods. However, the capacity of the partly privatised solid waste collection system was still insufficient to meet the needs of the growing city. Consequently, the urban community and the central government negotiated between 2005 and 2007 a contract

⁴ Interview, 09.02.2015 at 10.00 am

with Hysacam. The new public-private partnership came into effect in 2008 and was to provide coverage for waste collection in ‘a large part’ of Bafoussam city (Communauté Urbaine de Bafoussam and Hysacam 2009). The second five-year contract expanded the service area to cover the ‘entire city’ (Communauté Urbaine de Bafoussam and Hysacam 2014). Hysacam brought in modern equipment and expertise in waste collection and treatment and related logistics, training and human resources management. According to a Hysacam official, the company employed over 200 people when it started operations in Bafoussam, signifying a tenfold increase in the number of formal waste workers.⁵

While waste collection has generally improved in Bafoussam since the arrival of Hysacam, our research indicates that a considerable amount of waste remains uncollected, particularly in the unplanned areas of the city (see below). This observation echoes the assessment of Grelle et al. (2006) before the start of the public-private partnership. A few small community-based organisations therefore continue to operate in some small, peripheral areas. However, the focus of this paper is not on these forms of waste collection but on Hysacam’s practices and the public-private partnership.

4.2 Equipment, tours and workforce

A dozen Hysacam’s garbage trucks crisscross Bafoussam from Monday to Saturday for seven hours each in the morning and in the afternoon to collect garbage from households. The trucks also empty containers of variable sizes from private businesses located on the important transport axes. The collection takes place in 15 routes defined in the public-private partnership contract and allocated to the individual collection teams, usually comprising a driver and two waste collectors. According to the partnership agreement, the drawing of the garbage collection routes took into account demographic, socio-economic and social characteristics, but also urban and natural constraints, particularly the (in-)accessibility of particular areas (Communauté Urbaine de Bafoussam and Hysacam 2014). Waste is collected daily from residential, administrative and commercial areas: door-to-door along the main roads in the central parts, and from collection points in more interior and peripheral parts. All wastes are put together and collected at the same time; there is no waste segregation at source and no local recycling industry. According to a Hysacam official, the initial 12 collection routes, four per urban district, have recently been extended to 15 routes (of which one was yet to be implemented) in order to keep pace with the rapid urban sprawl and intended to cover the entire urban area on a daily basis. The trucks bring their load to the landfill, operated by Hysacam, at the eastern periphery of the city.

Hysacam’s fleet in Bafoussam includes 12 garbage trucks of four different types used for different purposes (see table 1). The trucks are imported without major adjustments to local conditions. The compactor trucks are equipped with a four-tooth and a nine-tooth fork to scrape rubbish from the ground and lift it in the container. The load of a 10-tonne truck is emptied twice a day (at the end of each the morning and the afternoon tour); the five-tonne vehicles go to the landfill four times a day and the 20-tonne crane-truck once a day. This amounts to a total theoretical capacity of 260t/day.

⁵ Interview, 03.08.2016 at 10.00 am

Table 1: *Waste collection trucks in Bafoussam*

Model	purpose	Capacity	Quantity
Compactor truck ('Renault')	Door-to-door and collection points	10 tons	6
'Ville de Paris' compactor truck	Door-to-door and collection points	5 tons	2
'Amplirolls' hook-lift truck	9m ³ containers at fixed collection points	5 tons	3
Crane-truck	Collection from wild dumps	20 tons	1
Total			12

Source: field workSource: *field work*, Communauté Urbaine de Bafoussam and Hysacam 2014

Additional photo 1:



Door to door waste collection by Hysacam in a residential planned area (Tamdja - Banengo), Bafoussam 2015.

Of the 200 employees, 133 are directly involved in garbage collection (including 26 drivers and 107 cleaning agents, that is, waste collectors, sweepers and scrapers). There are a few work supervisors, who record when the workers appear at the office and who conduct spot-checks in the neighbourhoods to see whether the trucks work properly on their routes. Other personnel work at the landfill and a very few at the administrative offices in the centre of town. Waste collectors are given training in Bafoussam; they wear uniforms consisting of protective clothing. Drivers, some of whom got promoted from being waste collectors, receive training at Hysacam's headquarters in Douala. Information on their monthly salary, in part performance-based, was difficult to obtain. According to some drivers and as stated in the second partnership agreement, the company offers social benefits to its workers, including an 80% subsidy on health insurance for them and their family members. They have also access to loans from a partner bank at advantageous conditions.

5. Findings

5.1 Rules and incentives of the public-private partnership

5.1.1 The institutional arrangement

The public-private partnership in solid waste management in Bafoussam involves Hysacam and two public parties: the central and the local government. The central Ministry of Housing and Urban Development pays the lion share of the city's waste collection costs (see below), but

delegated the day-to-day responsibilities to the Urban Community of Bafoussam. The urban community is designated ‘project manager’ in the partnership agreement and mandated to oversee the activities of the private company Hysacam, the ‘service provider’. The contract covers the collection, transportation and processing of municipal solid waste as well as the sweeping and cleaning of Bafoussam’s streets, public squares and markets (Communauté Urbaine de Bafoussam and Hysacam 2014).

As elsewhere in Cameroon, Hysacam has been paid by weight of garbage collected and transported to the landfill since the beginning of the public-private partnership in Bafoussam. A monthly weight-based garbage collection target is fixed each year by the public parties of the partnership based on a week-long campaign during which officers of the central ministry and the urban community oversee waste collection and the weighing of the garbage trucks coming to the landfill. After the week-long campaign, the public actors determine the price per unit of collected household waste to be paid to Hysacam, as well as the fixed amount that the urban community has to pay to Hysacam on a monthly basis. This latter amount is calculated as 15% of the costs for collecting the target weight. The remaining amount (in theory 85%) is to be paid by the central ministry (Communauté Urbaine de Bafoussam and Hysacam 2014). Table 2 shows that in reality the urban community’s monthly financial contributions fluctuated between 10% and 12.5% of the accrued costs in 2014 depending on the total amount of waste collected in a given month. These percentages are comparable to other years for which we have data.

As specified in the partnership agreement and confirmed by our observations, the garbage trucks are measured on a weighing bridge at the entrance to the landfill by a municipal employee each time they empty their load. The weight is entered in a register. When the weighing bridge breaks down, the target tonnage is entered in the register. When the tonnage target is not reached, the company incurs financial losses to be covered from its saved funds. If the collected garbage is more than 20% below the monthly target or if the trucks are found to miss parts of their collection tour, the company has to pay a penalty. By contrast, if garbage collection exceeds the tonnage target (which seems to happen in most months), Hysacam makes a profit. According to a Hysacam manager, the company ‘also keeps garbage “in reserve” as to balance out monthly fluctuations’⁶ (and thus avoid paying penalties).

Additional photo 2: Weighing the waste truck on the weighbridge at the municipal waste dump in Banefo area.

⁶ Interview, 03.08.2016 at 10.00am



This landfill is run by control agents from both Hysacam and the urban community. The small car on the picture is that of Hysacam manager. Fieldwork, 2015

Table 2: Waste tonnage collected by Hysacam and related service payments in Bafoussam during the year 2014

Month	Waste collected (in tonnes)		Unit price of the tonnage (in CAF)	Payment of HYSACAM services (in CFA)	
	Daily	Monthly		Central State (≈85%)	Bafoussam municipality (≈15%)
January	222	6 005.40	16 230	86 985 392	10 482 250
February	192	5 173.40	16 230	73 482 032	10 482 250
March	218	5 889.00	16 230	85 096 220	10 482 250
April	225	5 847.50	16 230	84 422 675	10 482 250
May	205	5 321.00	16 230	75 877 580	10 482 250
June	221	5 748.20	16 230	82 811 036	10 482 250
July	228	5 922.60	16 230	85 641 548	10 482 250
August	224	5 828.50	16 230	84 114 305	10 482 250
September	216	5 625.50	16 230	80 819 615	10 482 250

October	240	6 244.80	16 230	90 870 854	10 482 250
November	222	5 774.00	16 230	83 229 770	10 482 250
December			16 230		10 482 250

Source: *Archival report from the urban community, 2014*

5.1.2 Incentives for Hysacam's waste workers

Hysacam translates the company's overall monthly weight target to their waste collection teams as the goal of collecting 10 tonnes per seven-hour shift (locally referred to as 'tonnage'). As a manager put it: 'The big mission is to urge on the workers.'⁷ This led to the 'hunting for tonnage' referred to in the title, and what the waste workers called 'chercher le tonnage' or 'seeking the tonnage'. A Hysacam officer explained to us that performance-based pay and various sanctions, including enquiries, requests for explanation, warnings, non-paid layoffs or salary reductions, are applied to those waste workers who (regularly) fail to reach this tonnage (as an average at the end of the week). Waste workers confirmed their fear of being laid off for a few days without pay for unsatisfactory performance. Consequently, the first priority of the waste collection crews was to meet the daily 10-tonne target. When the target is not reached, it happens that crews add a tour on Sunday.

By contrast, good performance is compensated by the payment of a premium on the worker's salary or a salary increase. Furthermore, Bafoussam's three best employees of the year are invited to an annual 'celebration of excellence' organised in Yaoundé and Douala and put up free of cost in a hotel. Waste workers also told us that well-performing drivers and collectors tend to be allotted to the central, more prestigious part of the city, where tonnage is more easily reached (see below). According to Hysacam officers, the company tries to foster good relations to and among its employees, not only through the provision of good working conditions, but also the organisation of leisure events for the workers and their families. As a company manager remarked: 'The CEO is very attentive to the social.'⁸

5.2 Waste collection practices on the ground

5.2.1 The hunt for tonnage

The fear of not reaching the 10-tonne daily average target within the period of a week or a month led the crews to maximize collection. As a Hysacam truck driver told us at the beginning of an afternoon tour that led the crew from relatively peripheral to central parts later on:

If we collect at least 10.5 tonnes this evening, it would help to guarantee at least the 10-tonne average for tomorrow.⁹

Exceeding the 10 tonnes was quite common. In fact, the crews tried to maximize daily collection weights, sometimes reaching as much as 13-15 tonnes. However, the Hysacam management advised the crews to stay within the 11-12-tonne limit, the actual weight capacity of the trucks, in order to avoid frequent and costly repairs.

Hysacam allocates the crews, whose composition is relatively stable, to the particular routes. Waste workers preferred the morning shift, when the largely organic (kitchen) waste is fresh, still contains much water and is relatively heavy. Garbage collected in the afternoon is generally

^{7 7} Interview, 03.08.2016 at 10.00am

⁸ Interview, 03.08.2016, 11.30 am

⁹ Conversation, 07.04.2015 at 3:04 pm.

lighter, as it lies around under the sunshine and dries up. Therefore, it is easier to meet and exceed the weight target on the morning shift. The disparity between the morning and afternoon shift is further pronounced through the fact that the morning routes cover disproportionately the central parts and the main roads of the city, where more garbage accrues that can be collected fast (see below). By contrast, the afternoon collection service is performed mostly in less accessible neighbourhoods and in suburbs. As an illustration, table 3 shows the achieved tonnage from the 12 different tours that we accompanied.

Table 3: Waste tonnages during the morning and the evening services

Waste collection		A.m. service		P.m. service	
Main Itinerary	Planned	x	x		
	Unplanned			x	x
	Central	x	x		
	Periphery	x		x	x
	Residential		x	x	x
	Commercial	x			x
Observed tonnages		11.220	12	7	9.801
		11.800	12, 640	9.208	10.520
		11.960	13.780	10.103	10.740

Source: Fieldwork (observations at the weighing bridge), 2015

Furthermore, the pressure to achieve the required tonnage pushes crews to collect materials that are not supposed to go with the household or commercial wastes. A common practice is to take stones and scrape earth when garbage has to be shovelled from the ground. Sometimes the crews deliberately collect heavy soil, construction waste (which should be picked up by municipal services), car tyres, banana trunks, etc. to reach the 10-tonne target.

Figure 1: Piles of banana trunks and soil collected from the urban periphery



Source: Fieldwork, Bafoussam 2015

These dubious practices were hidden from Hysacam’s management, as some of them can also damage the trucks. A truck driver said to us:

I also told [the waste workers] to stop picking up car tires. They thought that it would help to reach the tonnage. On the contrary that’s what blocks the compaction of garbage in the truck. Actually, when the garbage compaction

system gets blocked, we have to leave the routes and go to the landfill just to be informed that we have only 8 tons or 9.8 tons of waste collected.¹⁰

5.2.2 *The workers' bias toward central and planned settlements*

As indicated, waste workers also preferred the routes leading through the city centre and planned settlements, because overall consumption and thus waste production are higher in these relatively prosperous neighbourhoods. At the urban periphery, by contrast, we observed that garbage is often composed of a lot light rubbish, such as corn leaves, which does not allow the crews to reach the tonnage quickly.

Figure 2: Collecting lightweight waste from the street in a peripheral neighbourhood



Source: Fieldwork, Bafoussam 2015

However, the preference for central and planned neighbourhoods was also due to the prevalent door-to-door collection in these areas that allows the waste crews to work and achieve the required tonnage faster and more easily. A waste truck driver explained to us that in the city centre ‘... there are much more bins distributed along the street to collect waste and ... it’s easier to empty and go ahead on these routes.’¹¹ In these areas, the drivers alert the households by horn, inviting them to bring out their garbage in big bags and to give them directly to the waste workers who throw them in the compactor truck. Waste workers confirmed to us that garbage collected in this way facilitates the loading of waste and speeds up the operation so that they can keep their tight time schedule. We observed the teams rushing from corner to corner in these parts in order to collect the trash quickly.

Figure 3: A waste collector running to collect waste on a main road of the city

¹⁰ Conversation, 20.03.2015 at 10am.

¹¹ Conversation, 16.03.2015 at 3.30pm.



Source: Fieldwork, Bafoussam 2015

In unplanned settlements, by contrast, waste is collected from collection points along the main roads as the trucks are unable to reach the interior of these mostly peripheral neighbourhoods with narrow streets. Here, mostly women and children bring their household rubbish to large bins and containers put up at strategic points.

Figure 4: Garbage collection from a collection point on the main street of a peripheral neighbourhood.



Source: Fieldwork, Bafoussam 2015

A garbage truck driver remarked:

The general problem in this sector is that people do not know the Hysacam transit schedule, so they do not go out with the trash on time. They wait for the truck's horn before bringing their bins to us.¹²

Some people in unplanned areas can neither afford to wait for the Hysacam truck to pass at a specific time during the day, as all household members have to pursue livelihood activities. Therefore, garbage is often poured on the street at the collection points. Driving through a south-western unplanned suburb, a waste truck driver lamented:

In this area, many people pour garbage on the ground.... Collection from the ground can last easily up to 10 minutes of pitchforking....¹³

This practice occurred even where containers were provided, as another waste worker commented:

People pour garbage on the floor when they can't see a container around. However, even when a bin is available, people's behaviour remains almost the same. It seems like they do not realize how difficult it is for Hysacam agents to pick up on the floor instead of directly emptying the trash into the truck....¹⁴

Many people whose house is relatively far from the collection bring their rubbish by wheelbarrow. As they are unable to lift the wheelbarrow to the container opening, they dump the garbage on the ground. Children also fail to reach the height of the container and are thus forced to leave the refuse on the ground. In order to pick up garbage from the ground more quickly, the drivers get down from the truck to lend a hand to the collectors.

Apart from the above-mentioned practical reasons for littering, some people do not feel any responsibility to keep the city clean and facilitate the work of the waste crews. The above-cited truck driver complained:

[People] seem not to perceive their part of the responsibility to make it easier for urban cleaners and to help ensure a clean environment that benefits everyone.¹⁵

In a similar vein, another waste worker commented:

The students' behaviour from the bilingual high school in this neighbourhood is death. Despite our repeated warnings to fill the bins, they always drop almost everything on the ground while the bin is empty.... When we question some of them, they tell us that we are paid to do it. But if in an area, where you have to serve at least 1,000 customers, you have to lose up to 15 minutes for a single customer, you cannot cover the area.¹⁶

Another waste truck driver confirmed the difficulty of covering unplanned neighbourhoods:

When you spend time picking up waste from the ground, it takes longer and you can't cover the area.... In this neighbourhood block, you'll see how it's going to be slower. That's why we do not cover the area. We could make it if we could just carry the bins, empty them and drop them; empty and drop. If we were not wasting our time at a place like this, we would have progressed as we go: gently, gently and speed up in places that have less garbage to save time. We spend almost all the time pitchforking garbage from the ground. For example, we started at 2:55 pm, it is already 3:30 pm and we are still at the beginning of the route [Laughs] The time to fork, that's what wastes all the time.¹⁷

¹² Conversation, 23.03.2015, 6:30am.

¹³ Conversation, 6.04.2015 at 3.00pm.

¹⁴ Conversation, 10.03.2015, 9.00am

¹⁵ Conversation, 10.03.2015, 9.00am

¹⁶ Conversation, 6.04.2015 at 3.00 pm.

¹⁷ Conversation, 16.03.2015 at 3.30 pm

As the quotes above indicate, waste crews often do not serve the more problematic parts of their route (unplanned, poor and peripheral areas) as regularly as they are supposed to according to the instructions from the Hysacam management and the urban community. Instead, it happens, particularly when they wasted time collecting garbage from the ground and are under time pressure to reach the tonnage, that waste teams change the prescribed route to make a detour through the rubbish-rich city centre before driving to the landfill at the end of their shift. It seems that the crews do not always agree on which route or deviation to take, as a truck driver indicated:

Even when I was newly introduced in this 3.1C route, I had (already) 9 years of professional experience in waste collection. I am one of the oldest employees of Hysacam in Bafoussam. I master the field and I do not appreciate the garbage collectors of this route sometimes tell me the way to follow.¹⁸

Our observations confirm the assertion in the above quote: It is usually the drivers, who are senior to the collectors, who take the decisions whether to follow or deviate from the prescribed route. Our observations also indicate that work supervisors from Hysacam and controllers from the urban community conducted hardly any spot-checks in peripheral, unplanned areas so that the crews had little to fear if they short-circuited these.

5.2.3 Hysacam management's bias toward central administrative parts

The waste workers' informal practices favouring Bafoussam's central areas pronounce an in-built official bias toward the city centre, administrative district, high streets, main arteries and the neighbourhoods where the majority of senior bureaucrats, politicians and rich people live. The urban community and Hysacam set the routes in such a way that many morning crews start their tour along the main roads of the administrative district and the high streets. These parts of the city are officially included again on afternoon routes so that they are served at least twice a day. Furthermore, Hysacam spontaneously deployed special teams to keep these politically strategic places clean. Very often the most dynamic crews were attributed to these zones. A waste truck driver explained to us:

There are also so-called catch-up teams who collect waste in the zones that we could not reach during the service... They work especially on the main axes of the city to clean the face of the city. The city centre should be cleaned all the time so that the mayor or the delegate of the government believe that the whole city would be that clean.¹⁹

It appears that the city centre and the main arteries are kept clean in order to present a good image of the city, as well as of Hysacam's services. As Hysacam's engagement in Bafoussam's waste sector is dependent on political decisions, they have an interest in providing good services in areas that are well visible to the political decision makers.

4.5 Socio-spatial outcomes

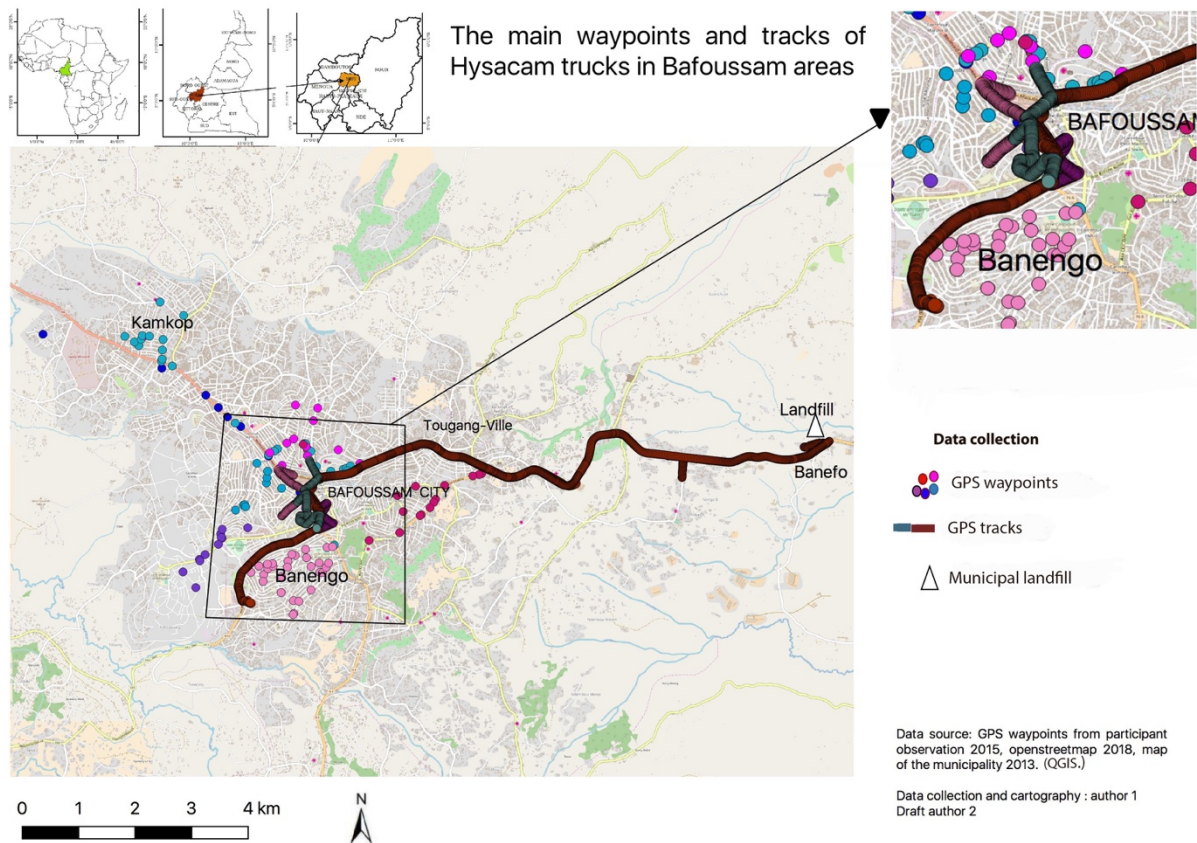
Morphological features, such as the uneven (quality of the) urban road network or the density of settlements, influences undoubtedly the waste collection (by garbage trucks) in different parts of Bafoussam. However, the spatial inequality of waste collection in this city is not just 'natural' but also influenced by political decisions determining the routes and by the informal collection practices described above. Given the incentive system in place, Hysacam and the waste workers are primarily interested in achieving the tonnage. Peripheral and unplanned neighbourhoods are therefore neglected, while the city centre and the main roads are kept

¹⁸ Conversation, 20.03.2015 at 10.00 am

¹⁹ Conversation, 6.04.2015 at 3.00pm

very clean. The map in fig. 5, based on the GPS tracking of every collection point of each of the 15 routes, shows the high density of service delivery in the city centre, in planned areas and along main roads while garbage pickup points are sparse or absent in the urban periphery and in unplanned settlements.

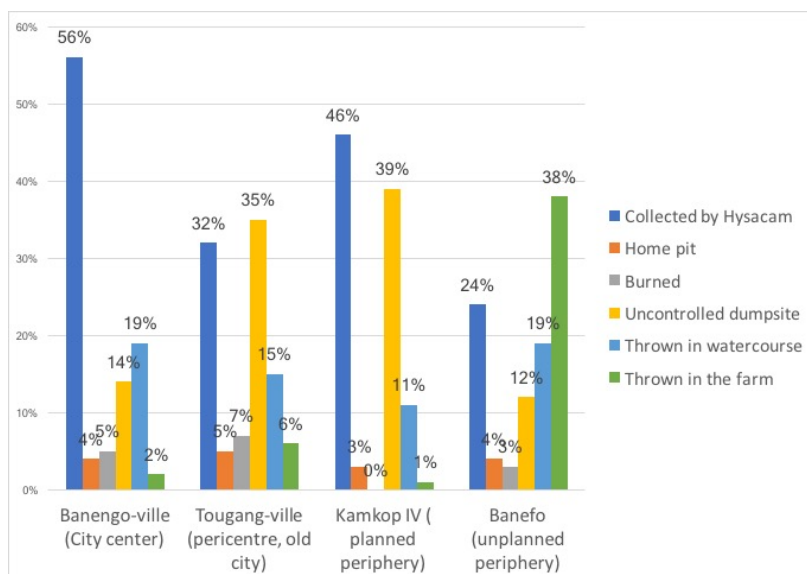
Figure 5: Actual itineraries of Hysacam trucks in Bafoussam



Source: Fieldwork (GPS tracking), 2015

The inequality of waste services is further confirmed by data from our household survey in four selected neighbourhoods (see figure 6). Waste collection is better in planned and more central areas than in unplanned settlements. But even in the centrally located rich neighbourhood of Banengo, a relatively high percentage of garbage is dumped in an uncontrolled way. In the peripheral area of Banefo, only one in four households accesses the formal waste collection services, although Hysacam’s truck pass there regularly because of the nearby landfill.

Figure 6: Types of household waste removal in four neighbourhoods of Bafoussam



Source: Fieldwork (household survey), 2015

5. Discussion

The observed uneven waste collection between planned and unplanned settlements in Bafoussam and the resulting disparities in cleanliness and in the quality of life seem to be the norm rather than the exception in privatised solid waste management systems in sub-Saharan African cities. In contrast to Dar es Salam, however, the spatial inequalities and environmental injustices are not influenced by differences in purchasing power and the willingness to pay for waste removal that led private companies to neglect poorer neighbourhoods (Kassim and Ali 2006). Neither is there a deliberate total exclusion of unplanned neighbourhoods from waste services as reported from Accra (Baabereyir et al. 2012). Rather, the unplanned areas in Bafoussam are neglected because of a complex incentive system working at different levels that is largely based on payments and penalties depending on the weight of garbage collected. Hysacam, in their search for profits ('This is business after all,'²⁰ as a company officer admitted to us), effectively passes the weight incentive down to its workers. This leads to a situation where the individual waste worker teams 'hunt for tonnage' in areas where garbage is more abundant and easier to collect, that is, in planned, well-off neighbourhoods. This hunt for tonnage reinforces an existing bias stemming from political decisions to allocate more teams and routes in these areas in order to keep the city centre clean and beautiful and to preserve the image of the city. As waste collection in Bafoussam is financed entirely through public funds and not through user fees, the public-private partnership implicitly and disproportionately subsidises richer households in planned areas, similarly to what has been observed by Baabereyir et al. (2012) in Accra.

The observed incentive system has other perverse effects: it discourages recycling and composting – particularly the latter would lower the weight of collected garbage as heavy organic wastes would enter a different stream. The pay-per-tonnage system also encourages waste workers to engage in dubious practices, such as collecting soil or construction debris.²¹ However, alternative, non-weight-incentivised solid waste collection systems whereby different private contractors are responsible for their respective zones seem not to fare better,

²⁰ Personal communication, 10.03.2018.

²¹ It has been observed that in similar systems based on pay per tonnage, collected household waste was sprayed with water just before entering the weight bridge to the landfill (personal communication C. Zurbrügg).

particularly when monitoring is weak. In Trivandrum, India, for example, collected waste is often simply dumped in poorer neighbourhoods by private contractors (July 2018; see also Sory and Tallet (2015) for a similar situation in Ouagadougou). Indeed, weight-based monitoring at a centralized landfill site, especially if it were combined with regular inspections of the collected garbage, appear to be relatively uncostly and potentially effective.

The urban community and Hysacam concentrate their monitoring efforts in the city centre, the latter to please the politicians and bureaucrats from whose decisions the continuation of its monopolistic contract is dependent. Neither Hysacam nor the urban community have an obvious incentive to bring better waste collection to the populous unplanned settlements; Hysacam is led by a profit motive, and the urban community is appointed by the central government and therefore has no votes to gain through good service delivery in the periphery. At the same time, there are hardly any complaints from the underserved neighbourhoods; the current collection system is probably better than the former municipal one, and certainly not worse. The urban community has no direct interest in checking on dubious waste hunting practices either, as their monthly financial contribution is fixed. But they benefit from the underestimated garbage collection target fixed during the week-long weighing campaign each year. The relatively low targets also allow Hysacam to increase their profits. It is less clear why the central ministry, which is represented during annual week-long weighing campaigns and which pays extra for each unit of garbage collected above the fixed targets, allows these malpractices to happen and a monopolistic situation to exist. It appears that there were close relations in the past between Hysacam's executives and the central government.²² In any case, the principal-agent problem that Awortwi (2004) describes in the case of public-private partnerships in Ghana's waste sector is further complicated in Cameroon through the existence of two public partners. In Bafoussam, the public partner that should theoretically be interested in keeping the cost of garbage collection low (i.e., the central ministry) does not directly monitor and supervise the private party.

6. Conclusions

This paper described and analysed waste collection in Bafoussam, Cameroon, with the aim to better understand (and thus avoid) the production of spatial inequalities and injustices under public-private partnerships. The partnership between the urban ministry (central government), the urban community (local government) and Hysacam (private company) is based on a minimum monthly weight target and the remuneration of the private partner by weight of collected garbage. Our participant observation has revealed that Hysacam's waste workers fear sanctions if they fail to collect the daily target of 10 tonnes and that they are encouraged to engage in a 'hunt for tonnage'. In this endeavour, they sometimes also collect (heavy) non-household wastes. Further, they deviate from their official routes to collect waste in planned, central parts of the city where the tonnage can be more easily attained than in unplanned settlements. This practice contributes to uneven service delivery (confirmed by our household surveys and GPS tracking), socio-spatial inequality and environmental injustice borne in peripheral unplanned settlements.

Our study suggests that, apart from better monitoring by the urban community, the incentive system leading to the hunt for garbage and the role of the urban ministry as a remote public

²² However, tensions between the central government and Hysacam have come to the fore since early 2018, when the former failed to pay the arrears for delivered waste services in Doula and introduced competitive bidding for waste collection in peripheral parts of that city. In September 2018, the contracts went to three small and medium enterprises (Agence Ecofin, 2018).

partner would need to be rethought to reduce the disparities in Bafoussam's waste removal. Effective decentralization of solid waste management (beyond the current deconcentration to the urban community, which is nominated by the central government) and the inclusion of an elected body in the public-private partnership would strengthen downward accountability, including to people living in peripheral and unplanned settlements, which is necessary to change the incentive structures currently favouring the hunt for tonnage in central parts of the city. An elected and decentralized body is more likely to have an interest to monitor waste collection in peripheral parts of the city and to foster good relations between residents and waste workers with a potential to move the workers' incentives structure away from company-instilled fear to reach a fixed tonnage towards providing an adequate service adjusted to the needs of local residents.

However, the socio-spatial inequalities in Bafoussam's waste collection are not the consequence of an increased neglect of unplanned settlements compared to the municipal household waste collection system prior to 2008. Comparing the city's situation today to the description by Grelle et al. (2006), one can state that the city has made significant improvements in the urban cleanliness since Hysacam's arrival. The public-private partnership has brought daily waste collection. At least the city centre and the main roads are cleaned regularly today while even these areas were filled with heaps of rubbish in the mid-2000s (Grelle et al. 2006). The challenge now is to extend these improvements to more peripheral and unplanned parts of the city. For this, Hysacam's imported equipment and approach are inappropriate. As recommended for Cameroon's capital cities of Yaoundé and Douala (McKay et al. 2015; Ngambi 2016; Parrot et al. 2009), we suggest potential solutions for Bafoussam to be based on the inclusion of additional stakeholders, such as CBOs, NGOs and small businesses, and on the development of pre-collection systems in interior, less accessible areas and transfer stations. Such pre-collection systems would need to be planned and accompanied by participatory processes as to reduce current household malpractices caused by unsuitable equipment, inappropriate timing of collection and lack of awareness. This would break Hysacam's monopoly but the company might have an opportunity to expand its operations due to the availability of increased amount of garbage to be collected.

More generally, our research points to the importance of considering the practices and motivations of all stakeholders, including the waste workers, for the design of public-private partnerships in solid waste management. It further indicates the need to involve institutions that are accountable to residents, particularly those of peripheral and unplanned settlements, so that inequalities in service provision and environmental injustices can be reduced.

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