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Determinants of resilience in community-led waste management

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Abstract
Self-help by individuals and local community groups in solid waste management is widespread in cities of the developing world as coping strategy to overcome the lack of public services. The study identifies and analyses the driving forces, factors of sustainability as well as internal and external factors which influence failure or success of solid waste community-based initiatives in India. The ability to reflect on the situation, to judge existing risks and to trust in the capability to master the risks of everyday life in interaction with other persons and organizations forms the framework of analysis as core of "social and individual resilience". The concept of resilience is used together with the sustainable livelihood framework for the analysis of eight South Indian community-based solid waste schemes. The results clearly underline the importance of the human and social capital that an individual "instigator" brings into the initiative and highlights the importance of a "champion" in every successful initiative

Keywords: *Developing Countries; Waste Management & Disposal, Sustainability*

Introduction

Rapid growth of cities, increasing urban population density, increasing incidents of poverty, and the limited capacity of municipal authorities have a severe impact on urban environmental services in developing countries. Such lack of basic services, which includes excreta management, drainage and solid waste collection services poses a health hazard for residents and constitutes a major environmental threat. Chronic health hazards by inadequate hygienic conditions not only directly affect the poorest fraction of the population but also severely impact on public goods such as air, water and soil, thus affecting the rich as well as poor. Such a situation is an main obstacle to poverty reduction and the advancement of human dignity (WHO et al., 2000, Beier et al., 1976). As a response to malfunctioning municipal services, self-help initiatives by individuals and local community groups is widespread in cities of the developing world (Anschütz, 1996). In the 90ies community-based management was regarded as the key solution to improve urban environmental sanitation and much international support was given to strengthen such initiatives. Still today this approach shows signs of success, where the poor are no longer the targets of externally designed and directed initiatives but the agents of poverty reduction (Satterthwaite et al., 2011).

Indian municipalities, similar to many others in developing countries, are also finding it difficult to keep up with the pace of the rapid urban growth and are most often incapable of ensuring services let alone planning and dealing with the multitude of challenges of slums and informal settlements (Satterthwaite, 2005). As in many other developing countries however some 75% of

the Indian urban citizens live in the bottom income segments, earning an average of 80 rupees (around 1.80 USD) a day (Sankhe et al., 2010), and most often live in informal settlements where precarious living conditions prevail. Also in India self-organised local solid waste management (SWM) initiatives are a good example of coping mechanisms which grow out of such malfunctioning municipal services (Zurbrügg et al., 2004a). Many initiatives are supported with knowledge and funds by local, national or international NGOs or other international agencies (Pfammatter and Schertenleib, 1996). However experience shows that external financial and technical support alone does not guarantee success (Ali, 2006). Many schemes failed soon after support phased out and even self-organised , bottom-up schemes in solid waste management which are not dependant of external funding tend to stop operation after a few years. The lack of coordination and interaction with the responsible authorities severely endangers the sustainability of many initiatives especially in solid waste activities, where coordination and collaboration with the authorities is most often required for secondary collection and disposal (McGranahan et al., 2001, Zurbrügg et al., 2004b).

This paper aims at identifying and analysing the driving forces for community-based initiatives in solid waste management. Furthermore it analyses internal and external factors which influence failure or success of such coping mechanisms. The analysis is based on results of a survey conducted at eight Indian community-based SWM schemes (Zurbrügg et al., 2004a). Assumption is that initiatives are fuelled by a motivation and capacity to tackle the risks of deficient solid waste management infrastructure and services and that the individuals or groups avail of the capability to initiate and sustain - in interaction with other persons and organizations - coping mechanisms to deal with this risk. Individuals or group of persons may use different means to cope and achieve improvement. Knowledge, interaction and communication, access to social networks as well as financial capital are typical examples. To help describe the access to resources and means to cope, this paper uses the sustainable livelihood framework approach and its structure of “assets” and “transforming structures and processes” (DFID, 1999).

Research Materials and Methods

Urban dwellers in developing countries are exposed to various environmental hazards in their daily life which are particularly enhanced by the urban dimension. Typically improved security and improved environmental sanitation services - particularly solid waste management - are often considered high priority in urban settlements. This retrospective analysis of a survey of Indian community initiatives in solid waste management applies three different conceptual approaches to describe how motivation, social capacity and access to assets influences community initiatives and how these elements affect sustainability and success.

Protection Motivation Theory

Understanding the willingness and ability of individual or groups of people to act or not, in order to protect themselves from deficient urban environmental services such as a lack of solid waste and its hazards is complex. Protection Motivation Theory (PMT) (Rogers, 1975) reflects a theory of persuasive communication, emphasizing the cognitive processes that mediate behavioural change. PMT proposes that the intention to protect one-self depends upon four factors: (1) the perceived severity of a threatened event; (2) the perceived probability of the occurrence; (3) the perceived response efficacy; (4) the confidence in one’s ability to undertake the recommended behaviour. Semi-structured interviews conducted with the

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initiators of the community-based initiatives were analysed in in light of these four factors.

The Resilience Concept

Deficient urban environmental services and resulting sanitation or solid waste hazards gives rise to a more or less chronic crisis and therefore a constant threat to the inhabitants. Persistent hazard and chronic threat to health and wellbeing can however also show intensification over time as the environmental system deteriorates further. The World Disaster Report 2004 claims that everyday threats are of greater concern than massive disasters (International Federation of Red Cross and Red Crescent, 2004). The analysis of such hazards and threatening conditions and its effects on people is commonly used to describe the vulnerability of individuals or groups. Moser (1998) defines vulnerability in the urban context as "insecurity in the well-being of individuals, households and communities in the face of a changing environment and their responsiveness and resilience to risks that they face during such negative changes". In contrast to vulnerability, resilience can be described as the means people have to cope with or even influence their environment. This ability of an individual or group of persons to reflect on its situation, to judge existing risks and to trust in the capability to master the risks of everyday life in interaction with other persons and organizations forms the core of "resilience" (Obrist et al., 2010). In the urban context, community resilience can be described by the availability of self-help actions initiated either by individuals of community groups and - more importantly - sustained by the community as a whole with the objective to react to a precarious situation and try to organise themselves and act in order to improve their local situation. Such resilience shows the following attributes: proactive behaviour, social learning, flexibility in actions and social acceptance. These characteristics can be regarded as personal or group assets which are available and can be used. This understanding of assets links to the sustainable livelihood framework approach.

The Sustainable Livelihood Approach

The sustainable livelihoods framework (SLF) is a way to enhance the understanding of livelihoods, main factors that affect livelihoods and the typical relationships between these factors. At the center of the framework, closest to the people, are the livelihood assets or capital which they have access to and can use. These are natural assets, human assets such as skills, education knowledge, capacity, and health, economic assets, physical assets such as technologies or infrastructure and finally social assets such as networks of social support. The extent of access to these assets is strongly influenced by a vulnerability context and by the prevailing social, institutional and political environment also called the "transforming structures and processes", which affects the ways in which people can combine and use their assets to achieve their goals (DFID, 1999, 2001).

Data availability

All data derives from interviews conducted during the research project "Decentralised Composting in Indian Cities" (Zurbrügg et al., 2004a) The goal of this project was to determine the success factors and obstacles of decentralised solid waste collection and composting schemes in order to define new strategies for supporting such schemes in future. India was chosen for this study as it has a very active composting scene comprising commercial enterprises, public organisations and community initiatives. Twenty composting schemes of different size, organisational set-up and scope were interviewed. The semi-structured interviews addressed organisational, technical, financial and

social issues in order to draw a full picture of each scheme. As the survey covered not only questions to assess the current status of the composting scheme, but also the start-up process and future prospects as perceived by the interviewed persons, it was thus possible to retroactively analyse the collected data with a new focus resilience, on the five assets of the SLF, and the four factors of PMT. Out of 20 solid waste management schemes, the analysis of this paper concentrates on eight community-based schemes, three each in the cities of Bangalore and Mumbai and one each in Chennai and Pune.

Results and Discussion

Overview of community schemes

The eight decentralised composting schemes can be distinguished by their aim, their scope of activity and the economic classification of the neighbourhood. Table 1 gives an overview of the eight schemes included in the analysis.

Reasons for taking action to improve the immediate environment

House-to-house waste collection service is generally not available in Indian cities. The household members are requested to bring their waste to the nearest collection point, which can consist of an open area with or without some constructed enclosing barrier, or else a designated container. In principle the municipal collection authorities should ensure that these collection points are regularly emptied and the waste is transported to the disposal site. However, the malfunction of public or even private services leads to unbearable environmental and hygienic conditions in the housing areas. Waste bins overflow regularly as municipal authorities cannot provide regular secondary waste collection service. The more unhygienic the collection points are, the less people tend to use them correctly or use them at all. This enhances indiscriminate dumping and unhygienic situation in the whole neighbourhood. As community members do not trust in the situation to improve in the near future, the detrimental hygienic situation puts much pressure on the residents to become active if they want to see any improvement. With regard to protection motivation theory (PMT) and the four factors that mediate behavioural change, results of interviews show that all respondents highlight the hygienic and environmental crisis in their neighbourhoods and the perceived health threat of this situation (1: the perceived severity of a threat). Quotes: “It was born out of a crisis. The local contractor was not emptying the bins in the neighbourhood properly. The community then decided to take over the waste management themselves” (Bangalore-1); “Out of a desperate need to keep the colony clean we organised waste collection and initiated composting” (Pune-1). In one case (Mumbai-3), it was mentioned that it was one individual that made the others in the neighbourhood aware of the threat which then led to action - “Waste was thrown out in front of the houses before people were made aware of the hygienic problem by a (female) bank officer living nearby”. However no information could be obtained on the perceived probability of hazard occurrence and no specific incidences of health impact were mentioned which might have led to the action. Additional reasons for sparking the initiatives were also identified. Especially the examples of Mumbai grew from environmental awareness and the wish of the residents for a strengthened public responsibility and street beautification within the neighbourhood. Solid waste management was only one among several issues tackled by the initiatives. In the context of PMT this links to the perceived response efficacy and the confidence in one’s ability to make a change: “Solid waste management is part of our street beautification programme in order to maintain the streets clean. We thrive for more environmental awareness and social responsibility among neighbours and

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especially our children" (Mumbai-2). Another similarity of the schemes is the number of households connected to one scheme. With the exception of the inception phase, where they started small and then grew to include residents of the neighbourhood, the initiatives then remained more constant in number of households served , as shown in Table 1. With the exception of two initiatives in Bangalore, all others serve less than 500 households. Size of an initiative is influenced by the perceived or effective feasible outreach into the neighbourhood, or by the expected decreasing response efficacy if too many residents are involved.
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Table 1 Overview of analysed community-based solid waste management schemes

Case	Aim of initiative	Scope of activities	Economic classification
Bangalore-1	Improving cleanliness by solid waste collection in the neighbourhood.	180 households. House-to-house waste collection and composting as a means of waste reduction.	High income area, spacious properties and open public spaces.
Bangalore-2	Improving cleanliness by solid waste collection in the neighbourhood and beautification of public spaces.	3826 households divided in three organisational units. House-to-house waste collection and composting for waste reduction.	middle income area with mixed housing pattern.
Bangalore-3	Improving cleanliness by solid waste collection in the neighbourhood.	1200 households. House-to-house waste collection and composting for waste reduction; regular lectures on environmental issues.	Middle-high income area, partly with spacious gardens.
Chennai-1	Improving cleanliness in neighbourhood, raising environmental awareness and community mobilisation.	476 households. House-to-house collection of segregated solid waste, street sweeping and composting.	Lower-middle income area, dense housing and apartment buildings.
Pune-1	improvement of cleanliness of neighbourhood and waste reduction to avoid overflowing municipal bins.	264 households. House-to-house waste collection, street sweeping.	High income housing communities with spacious garden and public places.
Mumbai-1"	Community mobilisation and increasing social cohesion. Neighbourhood beautification, increase of environmental awareness and well-being of inhabitants.	125 households. Waste segregation at source, house-to-house waste collection, street sweeping, public safety through street lighting, monthly rallies, annual environmental clean-up campaigns.	Middle income area.
Mumbai-2	Community mobilisation and increasing social cohesion. Neighbourhood beautification, increase of environmental awareness and well-being of inhabitants.	120 households. Improved solid waste collection for street beautifications and composting. Compost used for new flower pots in the streets. Painting of walls.	High-middle income area, houses with small gardens.

Mumbai-3	improvement of hygienic condition within the slum	350 households solid waste segregation, composting, households voluntarily deliver waste to the composting site and the municipal public bin	informal settlement lacking infrastructure, community densely populated with simple houses or huts, located in an old stone quarry

The more residents are involved, the larger the complexity of interaction becomes and more difficult it is to achieve social cohesion and consensus within the group. The scheme Bangalore-2 which extends its outreach to over 3800 households is an exception as it is led and supported by a local NGO – with more and more skilled available human resources and supporting funds. Bangalore-3 on the other hand developed a decentralised structure with sharing of key responsibilities among sub-groups in the neighbourhood from the outset of the self-help initiative.

Except for one initiative (Mumbai-3) all initiatives are located in middle- to high-income areas. This might be due to a bias in selection of identified schemes as the local experts only had knowledge about the existence of these initiatives. However, it nevertheless becomes clear that more affluent areas show certain typical asset patterns which suggest that the existence of community-based initiatives is closely linked to available assets.

Livelihood assets as determinants of resilience

The eight initiatives were further analysed based on the five asset categories of the sustainable livelihood framework.

Human Assets – knowledge & skills

Knowledge or a high level education is an asset of almost all persons initiating such activities. The knowledge can be distinguished into the two levels: (a) societal awareness and (b) technical knowledge. The majority of the initiators of composting schemes hold a university degree which is most interestingly a degree in natural science or technology. It can therefore be deduced that the knowledge of natural and technical processes encourages initiators to start a rather technical oriented service such as composting or community-based waste collection. Many initiators are interested in the biological processes of composting and carefully observe and conduct detailed monitoring or optimise their composting heaps as a hobby. They furthermore also show skills in construction or in planning to optimise waste collection vehicles or composting bins. Even the case of the low-income area of Mumbai-3 shows that a teacher was the main driving force to maintain the composting site and the entry point was by starting planting trials with vegetables on compost. Motivation and dedication to the improvement action is thus often fuelled by the knowledge a person has, or the interest in enhancing and gaining more knowledge on this specific aspect. It is thus the resilience of an individual taking action inside the community which is decisive. Community (group) resilience is less relevant in the stage of inception.

The knowledge and experience from other urban areas and their respective living conditions is also a driving force, which can lead to action. Two interviewed initiators of initiatives (Bangalore-1 & 3) mentioned that they have been working abroad in America and Europe and that they had appreciated the cleanliness there. After their return they were motivated to maintain their neighbourhood as clean as they had experienced abroad. They have a clear vision about what a neighbourhood could or should look like. After realising that the municipal authorities could not deliver this envisaged service they decided to become active themselves.

Conflict resolution, communication and management skills of the core members of the initiative are crucial to maintain motivation and participation of households. Inspired by a leadership course, the initiator of Bangalore-3 motivated the neighbours with the following principle: “we are rather celebrating

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achievements than blaming shortcomings". Furthermore, he stated that each person brought in his or her own skills for the management of the community SWM system.

Human Assets – dedication & time

The analysis further revealed that dedication and time are two important assets for the start-up of community-based SWM and composting schemes. All work and commitment of the initiators and supporters of the reviewed initiatives to improve the situation is done on a voluntary basis or by a small payment which is significantly lower than in other fields of work. This clearly shows the dedication of these individuals to the cause rather than interest in the salary. But also time seems to be another important asset. Many residents involved are ladies without formal employment but dedicated to social work and their household and neighbourhood surroundings. Analysis also shows that many retired persons started the initiatives to improve the cleanliness in their neighbourhood.

Social Assets - network within the community, trust and reputation

The social network within a community shows to be crucial for the motivation of residents to cooperate as a community to improve SWM through a collection and composting system. All initiatives have in common that the initiator is a well-respected person in the community. This respect stems from the professional rank, political involvement or social activism and links to reputation and trust. In several cases the interviewees mentioned the importance of trust. The following examples show, that particularly women are trusted when it comes to financial issues: "leading ladies, who enjoy the confidence of the community collect the waste fees" or "one trustworthy lady is collecting the fees monthly".

The initiators also see themselves in a leadership role inside the community which can be drawn from the following quotes: "Leadership is not power but the opportunity to serve" or "The first chairwoman was active in local politics and had a sense for social issues. Social control was working as long as a strong leader was present. Now that she has withdrawn, households fall back to old habits". These leaders are able to establish alliances with friends and neighbours and define a common vision for the local SWM and composting project. Frequently project meetings and encounters are held at the private residence of this leader and initiator.

Special cases are the initiatives in Mumbai. As they were all developed with help of a semi-formalised structure provided by the municipal authorities. These initiatives are targeted towards community management as a whole where SWM is only one among several technical and social topics. This semi-formalized setup has been able to established strong social cohesion in some neighbourhoods, which then shows significant benefits for the public space. When little support is available from "structures" (institutions) then the resilience aspects of the individual (particularly of the leadership) plays are critical role as it is this person which pulls the strings and overcomes barriers. If this person then leaves, for whatever reason, survival of the initiatives can be severely endangered unless the leader has been able to find an appropriate replacement with similar assets. When, as in the case of Mumbai, the municipal authorities support the local initiatives in different ways, then it is rather the community resilience, social capital and sense of cohesion that plays an important role. In such cases "individual" resilience is less critical.

Social Assets - link to external agents and organisations

All respondents mentioned their need of support by other stakeholders or institutions that facilitate the community action through an enabling and supporting environment (in the sustainable livelihood framework this is summarized under "transforming structures and processes"). This is also confirmed by an analysis of Colon and Fawcett (2006) in Chennai highlighting the need for local resources, political, technical support and strong local leaders. Several schemes complained about insufficient support or even a jeopardising role of municipal officers. Such statements - particularly from low-income groups - show how motivation is inherently linked to coordination and exchange of the community with official entities. People feel supported and feel their work acknowledged if the local government authorities show signs of recognition. In the cases of Mumbai - where municipal authorities offered a general clean-up of the area with heavy equipment (e.g. front loader and trucks to clean up illegal dumps) in exchange for the communities commitment to care for neighbourhood beautification and payment to street sweepers or local waste collectors - the municipal officer is perceived by the community as very dedicated to the job: "people listen to him as representative of the municipality". Such support can also entail connecting the community to other external actors. Mumbai-1 for instance stated that they were inspired by the achievements of other community initiatives which were highlighted to them by the municipality. The initiative of Mumbai-2 established a link to a waste-picker association for the recruitment of reliable labour for their initiative. Others also take advice from time to time for technical matters from research institutes or private companies in the form of a consultancy service.

In summary the analysis shows that links to municipal authorities, NGOs, research institutes or even private businesses are very supportive in different ways. Firstly, they allow the recruitment of (suitable or qualified) workers for the scheme (waste-picker associations), secondly they can enhance knowledge transfer and networking, thirdly these connections and contacts provide potential opportunities for accessing funding sources for initial investments and finally, fourthly, they can strengthen visibility and acknowledgement by authorities. Particularly this last aspect is considered a key factor for the long-term success of a community SWM schemes as a link to the formal responsible authority is essential.

Natural Assets – access to waste

Major natural asset for SWM and composting schemes is the access to waste, which of course is given in all cases. Access to waste might however change over time. When municipal strategies start to involve private sector for service delivery, they will compete with existing community-based collection initiatives. Given that this "new" service might even be free of charge the community initiatives are bound to stop functioning although service level may not necessarily improve. This perceived threat was reported in the case of Chennai.

In community composting, the quality of waste plays an important role as composting initiatives require segregated biodegradable waste to achieve high quality compost. Hence, the initiative needs to motivate and engage households to segregate their waste at household level in two fractions: wet biodegradable waste and dry recyclable waste. In the interviews motivation and cooperation of households is stated as something which is difficult to achieve and requires the initiator and social mobilizer to have excellent communication skills and be highly respected by the residents. Thus the aspect of social group peer pressure seems critical here where residents do what they perceive is expected from them by their social network. This example shows how closely natural

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assets and human and social assets are linked. Access to waste might however change over time.

Further examples for natural capital are the access to water and access to additives for composting (e.g. cow dung). Water is a crucial input material for composting and difficult access was mentioned as an obstacle in almost all cases. Only two schemes have access to a groundwater source or a tap. The availability of cow dung strongly depends on the financial assets, as in an urban setting cow dung needs to be purchased.

Financial assets – investment capital and recurring costs

Raising and managing financial capital is a major challenge in all assessed initiatives. Firstly, the schemes require money for the initial investment for infrastructure (collection carts, compost boxes, tools), secondly, recurring costs need to be covered continuously by regular revenues.

In high income areas the initial investments were less critical, as often the initiators invested their own money or used their social network to raise money for infrastructure and equipment. In Mumbai-2 for example, after a general clean-up the initiator was able to win a local music store to fund new flower pots as well as the compost bins. None of these initiatives analysed had any access to loans. In the case of Bangalore-2, the NGO involved provided grants for the purchase of land or construction of infrastructure. In a few cases it was specifically mentioned that with the successful initial investment the collaboration of the residents then picked up. Once a first general clean-up was done and the infrastructure was in place, even hesitant households agreed to participate.

For the financial viability of a scheme, most respondents mentioned that acceptance and participation of all households is crucial. In all cases income from sales of compost or recyclables was low and does not cover the recurrent cost. Rather it is the regular waste collection fees paid voluntarily by the participating households which enables financial viability. Problems with fee collection and delays in payment however seems to be the norm. The following two statements illustrate these obstacles: “The richest are least willing to pay the waste management fee” (Bangalore-1) or “50 % are willing to pay, 40 % are reluctant and 10 % do not pay (Bangalore-2)”.

The larger an initiative is, the more professional it must act and the more dependent it becomes on the financial contributions of the households. All analysed initiatives depend on voluntarily paid fees and enforcement of payment is not feasible as these initiatives are informal organisational structures without a legal backing. The willingness of residents to pay is closely linked to the status of the person that is collecting the money. It shows that waste collectors, usually unskilled and uneducated labour and not well integrated into the social network, face difficulties if they need to ask for payments. They are not taken seriously, not trusted, and often also do not have the necessary self-confidence to put pressure on the residents to pay. On the other hand, “ladies” of the neighbourhood are usually welcomed into the house by residents and residents then find it embarrassing to haggle or refuse to pay such a small monthly fee. Finances must be managed transparently to maintain the trust and satisfaction of the participating households.

Physical assets – infrastructure and access to land

Particularly, infrastructure and land are key physical assets for community-based SWM and composting schemes. Although in the urban area there is usually not much open and unused land available, the analysis of these existing initiatives however shows that even smallest strips of land are made available and used for composting. In Mumbai and Bangalore for example compost bins

were constructed on top of drains or under high voltage power poles. In two cases, space was made available for composting by clearing an illegal neighbourhood dump site. In these cases, the composting site was even more appreciated by the neighbouring households, as the nuisances of the dump was removed. The initiatives of Chennai and Pune own the land they use and Bangalore-2 obtained an official approval by the municipality to use open plots for composting. The other initiatives are set up on unused public land without a clear and formal permission by the municipal authorities. Such an informal status constitutes a high risk to sustainability as the initiatives have to continuously fear sudden eviction by municipal authorities. These risk are somewhat averted by a strong social assets, i.e. good connections and relations to key people in municipal authorities or local politicians. It thus becomes evident how social assets are connected to availability and access to physical assets.

Conclusions

Assessments of strengths and weaknesses in solid waste projects often focus only on a physical, technical and financial description without taking into account the "human" factor (Ali, 2006). This analysis of community-based initiatives in solid waste management uses asset categories as defined in the SLF and provides useful insights on the necessary preconditions and strengthening factors for community resilience in the urban sanitation context. It can in fact be concluded that human and social assets are key to the success of all community initiatives. All interviewed initiators revealed that the task of starting such a community activity is not easy and takes a lot of effort. By taking action they expose themselves to the public and become a subject of discussion in the community. It is only thanks to special human and social assets that such a task is feasible. Strong leadership, communication and networking skills and high social recognition are key attributes of all initiators.

As long as all members of the community participate and cooperate, such systems can sustain themselves. Nevertheless, given that neighbourhood primary collection systems always depends on a secondary collection - which entails regular emptying of a municipal collection point and transport to the disposal site – there is a need to coordinate and collaborate with the next higher level: the municipality. This interaction is also crucial when considering the informal status of such initiatives, always at risk of being contested or dismissed. It is again the strong social assets of core members such as good connections and relations to influential people or key people in municipal authorities which can avert these risks. These findings are confirmed by Colon and Fawcett (2006) which also highlight the need in community-based schemes for significant local resources and political and technical support which are hard to find and sustain without strong local leaders. This pre-condition of strong leadership influences the potential of replication of similar schemes. In Mumbai however, given the support and commitment of the municipality, replication of such initiatives is more obvious.

Understanding the drivers of such community-based actions and the assets required to maintain them, finally allows a better planning and development of more targeted support to such initiatives - either through direct support such as training or by indirect support in facilitating a better enabling environment at municipal or national level.

Community-based schemes in solid waste management exist and this indicates a certain level of resilience of communities and their ability to reflect on their situation, to judge existing risks and to trust in their own capability to master the risks of everyday life in interaction with other persons and organizations. Each individual resident has only a limited impact on cleanliness other than in the private sphere. The

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neighbourhood and public space can only be improved through collective and coordinated action by all stakeholders.

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