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Recognising Vulnerability *and* Resilience in Informal Settlements: The Case of Kya Sands, Johannesburg, South Africa

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A dissertation submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree: Master of Science in Town and Regional Planning by research.

October 2013

Declaration

I declare that this dissertation is my own unaided work. It is being submitted for the Degree of Master of Science in Town and Regional Planning, by research, to the Faculty of Engineering and the Built Environment at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.

Dylan Weakley

_____2013

Abstract

For the first time, the world now has a higher urban than rural population, with the urban to rural ratio growing at a steady rate. Much of this urban growth and urbanisation (from rural areas to cities) is happening in low and middle income countries, with city authorities often unable to keep up and 'formally' meet new housing demands. This has led to growth in 'unplanned-for' parts of our cities (from a formal planning perspective), in the form of (among others) informal settlements, often referred to in international literature as 'slums'.

International best practice and contemporary housing policy in South Africa propose 'passive' approaches to informal settlement intervention, such as in-situ upgrading. In Johannesburg planning and housing authorities are generally reluctant to implement such approaches however; opting rather for more 'active' approaches such as relocation to formal housing (Huchzermeyer, 2009; Harrison, Personal Communication, 2013).

This study makes two contributions. The first, and overall objective, is a pragmatic one, the second a theoretical one, both intended to improve engagement between the residents of informal settlements and city authorities.

The overall pragmatic objective aims to contribute to an evolving understanding of informal settlements in South Africa. This is specifically in bringing balance in thinking to often polarised understandings of informal settlements; for example, government's focus on 'vulnerability' and scholarly attention to the positive role played by informal settlements in our cities.

The report argues that we do need to acknowledge the vulnerabilities of residents living within informal settlements but that we must also recognise the positive role played by informal settlements within the broader urban system, and within the lives of mainly poor individuals and households. The report shows that informal settlements do offer the means for individuals and households to build personal, household and community resilience in an urban context.

It is because of this understanding that the report does not propose 'radical' strategies to intervene in informal settlements such as relocation or even high-level formalisation. It argues for incremental – perhaps, seemingly, passive – approaches such as in-situ tenure, infrastructure and housing upgrades. However, these approaches do need to be pursued

systematically and consistently to ensure real and enduring impacts at both settlement and city wide levels.

As part of its pragmatic contribution the report addresses methodology of interventions. It shows that interventions should be case specific and tailored to the circumstances of individual informal settlements. To this end, the first step to any informal settlement intervention should be in depth research into the *specific* context and set of living conditions in the settlement. The study argues, too, that the method of this investigation should build on the knowledge of residents within the settlement, combining traditional technical analysis with recently developed methods in which residents themselves play a leading role in informal data collection and analysis.

The theoretical contribution brings together three streams of theory relating to three key concepts, being 'urban informality', 'vulnerability' and 'resilience'. More specifically, it aims to bring concepts of urban informality into engagement with ideas of urban resilience, as suggested by Miller, et al. (2010). Two general views of informality and informal settlements are outlined, which are termed 'informality as vulnerability' and 'informality as resilience'. The former often leads to a response that seeks to 'eradicate' informal settlements either through relocation or formalisation. The latter recognises the positive, adaptive nature of informal settlements as real and functional parts of our urban landscapes, calling for their integration into rather than exclusion from our cities. It is the adaptive capacity of informal settlements – or, rather of the individuals and households within the informal settlements – that provides the links between notions of informality and notions of resilience. In this sense, the idea of resilience in relation to informal settlements is a short-hand for discussing the extent to which informal settlements are able to: bring residents into a closer relationships with jobs, livelihood opportunities and services; provide poor households with access to land and affordable accommodation; and, provide a form of shelter that can adjust to the changing needs of households through their various life-cycles.

The report recognises that resilience is an elastic concept used in various ways which is both a conceptual strength and limitation. The report outlines, for example, the differences between 'equilibrist' and 'evolutionary' conceptions of resilience. This work is positioned closer to the evolutionary conception as it views resilience as the capacity to adapt on an on-going basis to a continually changing world. However, it acknowledges that the equilibrist notion also has value as there are instances when for example, a

settlement or a household should resist or recover from a shock (fire, flooding, a criminal attack or the loss of a job) and restore what may approximate an original circumstance.

The report also acknowledges that resilience may be used as an analytical or normative term. Analytically, the idea of resilience – and the methodologies linked to it – is a means to test the adaptive capacity of households or other social formations, including human settlement. As a normative concept, resilience is an aspiration (as used, for example, in the City of Johannesburg 2040 Strategy).

Although it is used normatively here, the report acknowledges that resilience is not *intrinsically* positive. Many negative features of a city may also prove to be highly resilient such as, for example, the spatial legacies of Apartheid rule. This 'perverse resilience' does require special attention. Within informal settlements, many of the 'vulnerabilities' may prove to be hugely resilient. This report focuses however on the positive dimension of resilience - on the extent to which the environment provided by informal settlements enhances the adaptive capacity of individuals and households.

Through an investigation into the positive and negative aspects of living in Kya Sands, the study argues that when considering and engaging with informal settlements, planning authorities should not focus only on their undesirable characteristics (from which vulnerability is inferred). Authorities should also consider the benefits that informal settlements provide to their residents and the city at large (to which resilience is compared, but not equated). While interventions in informal settlements should address the clear vulnerability to a number of hazards that many of their residents face, interventions should not 'eradicate' the benefits that residents gain from living there. It is argued that resilience of informal settlements is based on the creativity and adaptive capacity through which their inhabitants have gained access to the city, despite their effective (formal) exclusion from it.

A final contribution of the study is the empirical information is offers on one informal settlement in Johannesburg. Although there have been various investigations into the scale of informal settlement in the city, in-depth study of particular informal settlements are still rare.

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List of Acronyms

ANC – African National Congress

CoJ - City of Johannesburg Metropolitan Municipality

DA – Democratic Alliance

EPWP - Expanded Public Works Programme

GPG - Gauteng Provincial Government

HSRC – Human Sciences Research Council

IDP – Integrated Development Plan

IFRC - International Federation of Red Cross and Red Crescent Societies

ILO - International Labour Organisation

IUCN - International Union for Conservation of Nature

MMC - Member of the Mayoral Committee

NPC – National Planning Commission

NUSP – National Upgrade Support Programme

PMM - Professional Mobile Mapping

RA – Resilience Alliance

RDP – Reconstruction and Development Programme

SES – Social Ecological System

UISP – Upgrading of Informal Settlements Programme

UN – United Nations

UNEP - United Nations Environment Programme

Wits - University of the Witwatersrand, Johannesburg

WWF – World Wildlife Fund

1. Introduction: Research Rationale, Context, Conceptual Framework and Method

In Johannesburg, planning and housing authorities have generally responded to informal settlements through relocation of residents to new 'green fields' housing developments, with in-situ upgrades a relatively new and still partial response (Huchzermeyer, 2009). This is the case in Kya Sands Informal Settlement where all of the 'long term interventions' proposed involve the full relocation of the settlement to purpose built, formal housing. Generally these relocations can take years to implement, if they happen at all. Despite promises and plans being in place to relocate the residents of Kya Sands since 2007 (City of Johannesburg, 2007a; 2007b), there has been no action to date with none in sight (other than some 'short term interventions') (Sabela, 2011; Mendelsohn, 2011).

The dissertation argues that the difficulties city authorities have in responding positively and effectively to the constantly changing landscape of informality in the city has to do with a partial incongruity between the type of resilience inherent within a city bureaucracy, and the type of resilience demonstrated by informal settlement. By virtue of its lack of formal regulation, an informal settlement can adapt and evolve relatively easily (although there are constraints such as the low household income of residents). In this sense, informal settlements do demonstrate a degree of positive evolutionary resilience. City authorities, on the other hand, are highly constrained by regulation, and by the need to retain order with a large and complex urban environment. Although authorities do evolve, and do change policies and approaches, they are often more concerned with containing and regulating change than proactively directing change. In this sense, city authorities exhibit a concern for equilibrist resilience.

In the City of Johannesburg there have been attempts to adapt policy to the realities of informality, but these attempts have been largely frustrated by the inertia in the system, including the interests within the bureaucracy to continue with 'business as usual' and difficulties of adapting the regulative framework (Maina, 2013). It is easier for the bureaucracy to eradicate an informal settlement, moving residents to a new housing scheme, than to engage with the processes of informality, building on aspects that offer positive resilience.

In the case of Kya Sands, there are proposals from government to remove the residents to a new housing development further from job and livelihood opportunities. This ignores the reality that people have chosen to live in Kya Sands, specifically because of its location adjacent to major nodes of work opportunity, and also that the existence of Kya Sands is beneficial to the city at large, removing, for example, the need for additional transport infrastructure

This does not mean, however, that City government has no role in relation to Kya Sands. While Kya Sands represents strong levels of positive resilience, it also contains a degree of negative resilience and environmental and social vulnerability.

This study illustrates the point through an empirical investigation into the advantages and disadvantages that Kya Sands presents for its residents, and (to a lesser extent) to the city at large. It is done to highlight that while the settlement and its inhabitants *are* vulnerable to a number of hazards, they also represent a strong form of positive urban resilience.

1.1. Research Rationale

The rationale for this research is threefold. The first consideration is a material problem of mass unplanned-for urbanisation, resulting in an increase in urban risk and vulnerability around the world. The second is the current inadequacy in the application of policy responses by city authorities to the growth of informal settlements in South Africa (with a special focus on Johannesburg in this study). The third is a theoretical or conceptual opportunity where the notions of urban vulnerability, disaster and resilience provide potential to reframe approaches to informal settlements, however with limitations that need to be addressed.

Material Context

For the first time in human history, the world has a higher urban than rural population (International Federation of Red Cross and Red Crescent Societies, 2010). This is the result of both population growth and rapid urbanisation (rural to urban migration) over the last century. This growth is set to continue, with virtually all of the world's population growth taking place in urban areas over the next 30 years (UN Habitat, 2010). While urbanisation can be seen as a positive phenomenon, with traditionally better living conditions to be found in cities, much of this urban growth, especially in the 'developing world', has not been planned for - resulting in mass informal settlement and the growth of 'slums'.[1] Parsons (2010) argues that rather than urbanisation reducing poverty, the location of global poverty has merely moved, and continues to move, from rural areas to cities.

Having said this, cities provide the *potential* for people to move out of poverty and to build better lives for themselves and their families. Saunders (2010) describes these growing urban areas, absorbing the rural-urban migration and urban growth, as 'arrival cities'. He argues that much attention must be devoted to these areas as they "are not just the sites of potential conflict and violence but also [potentially] the neighbourhoods where the transition from poverty occurs, where the next middle class is forged, [and] where the next generation's dreams, movements and governments are discovered" (Saunders, 2010, p. 3).

[1] The terms 'informal settlement' and 'slum' and their use in this study are defined in Chapter 3.

South Africa has one of the highest urban to rural population ratios in Africa, with 62.2% of the population living in urban areas (although not all in cities, as some of this includes small towns) (South African Institute of Race Relations, 2012). While there has been a decrease in the percentage of households living in informal dwellings[2] in the country, the overall number is still growing. In absolute terms the number of households living in informal dwellings grew from 1 804 430 in 2007 to 1 963 096 in 2011 (Statistics South Africa, 2012). In relative terms the proportion of South Africa's households living in informal dwellings declined from14.9% in 2007 to 13.6% in 2011 (Ibid.) (Statistics South Africa, 2012). Informal settlements have thus persisted in South Africa's spatial landscape despite an ambitious housing programme. Whether this represents a form of perverse or positive resilience depends on the particular perspective taken towards informal settlement. This report argues that informal settlements generally represent a form of positive resilience, although there are perverse elements. This is the case in respect of Kya Sands, which is located immediately adjacent nodes of employment, but may not always be the case, and so contextual analysis is required.

Inadequacy of Implementation of Policy Responses

While informal settlements continue to grow, responses by city planning and housing authorities remain inadequate. This inadequacy is seen internationally, with a few exceptional countries, such as Brazil, innovating and showing progress (Huchzermeyer & Karam, 2006; Huchzermeyer, 2009). The focus in this research however will be on government in South Africa, and specifically Johannesburg-based government responses to informal settlement.

The inadequacy referred to is based primarily on the generally negative or at least ambiguous light in which informal settlements are viewed by authorities (Jenkins, 2006). Here, informal settlement is often seen as a threat to cities (for example in attracting foreign investment) (Huchzermeyer, 2009). An alternative would be to engage with the growth of informal settlements as a reality that exists now and is set to continue to exist for a long time into the future. The continued perception of informal settlements as a threat may, in part, stem from the interpretation of international policy such as the 'Cities

[2] This includes both informal settlements and informal dwellings in the back yards of formal residences.

without Slums' campaign of the Cities Alliance. This interpretation has arguably reinforced policy attempts to 'eradicate slums' and informal settlements, rather than build on the benefits of informality as they are progressively integrated into the city (Huchzermeyer, 2011; Huchzermeyer, 2009). While recent emphasis has been placed on upgrading informal settlements in situ and policy geared towards this type of upgrades (see Tokyo Sexwale in Financial Mail, 2011) there remains a gap between policy and implementation (Maina, 2013).

While some work has been done to improve the lives of those living in existing informal settlements, there is a backlog that continues to grow, compounding the problem for planning authorities. Authorities have historically tended to look for 'all or nothing' approaches to informal settlement intervention[3], with the two options being full formalisation or relocation with the latter favoured (Huchzermeyer, 2009). In South Africa, there have been some exceptions (Charlton, 2006) and, more recently, official support has been given to in situ upgrade approaches, but implementation continues to be frustratingly slow (Huchzermeyer, Karam, & Maina, 2013, Forthcoming). Interventions in informal settlements are also often technocratic, with a focus on delivering infrastructure and housing with relatively little attention to the 'soft dimensions' of community building, which include livelihood opportunities; strengthening local institution; skills development; and, so on. The research that has been conducted on living conditions has also tended to be top-down and technical, conducted entirely by consultants, often missing the nuance of life in informal settlement, and the deep knowledge that residents have of their living environments. Vulnerability and resilience in their various forms are traditionally measured in risk assessments 'from above', or from outside the community, rather than 'from within', through direct contact with the community, or even *by the community*.

[3] This is specifically to 'official' intervention plans. In practice, incremental upgrades are at times implemented (as in Kya Sands), but with no intention for these upgrades to be permanent.

Theoretical opportunity

The concept of urban resilience; along with urban vulnerability and the approach the concept takes to disaster; provides a potentially useful theoretical framework to consider urban informality, specifically informal settlements. Recent literature on ecological, urban and economic resilience (e.g. Walker and Salt, 2006; Obrist, Pfeiffer & Henley, 2010 and Simmie & Martin, 2010) provides welcome contemporary insights to the concept of resilience. This theory, along with the concept of vulnerability from the field of disaster management, provides valuable insights when studied in relation to theory on informality and informal settlements. The three main theoretical opportunities are outlined below.

Firstly (see chapter 2), the equilibrist approach to resilience is limited when applied to social ecological systems such as urban systems. This critique questions whether social ecological systems can ever be considered as being in a state of equilibrium, arguing rather that they are in a constant state of change (Batty, Barros, & Alves Junior, 2006; Goldstein, Lejano, Wessels, & Butler, Forthcoming). More recent theories of evolutionary resilience (Simmie & Martin, 2010) provide a viable response to the critique of equilibrist resilience. These theories also emphasise that evolutionary resilience should not entirely supplant concepts of equilibrist resilience as there are occasions when individuals, households or communities may need to be restored to the equivalent of a pre-existing condition following an extreme shock. The leaning of this report is towards an evolutionary conception of resilience, but the literature on equilibrist resilience is not discounted.

Secondly, (see chapter 4), approaches to vulnerability, risk and resilience research are often top-down technical studies that are conducted from outside of the community. Here, there is an opportunity for a more participatory approach to the appraisal of informal settlements, which may even include the community itself taking responsibility for a survey. Again, balance is always necessary, and there is a place for technical-scientific approaches to assessment particularly in relation to objective environmental conditions (e.g. water pollution, soil toxicity, flood plains).

Lastly (see chapter 3), the concept of disaster is, at times, limited to single catastrophic events. When applied, this limitation ignores the ‘everyday state of disaster’ that many living in informal settlements and ‘slums’ face. Viewing informal settlements in the sense

of everyday states of disaster is intended to give some urgency to planning processes and interventions; however it is also strongly argued in this work, that any research into informal settlements should not ignore the inherent resilience they represent and exhibit.

1.2. Normative and Pragmatic Orientation: Planning Action against Unsustainability and Injustice

This section outlines the normative and formative principles applied in approaching this research. This is important as the work takes a normative view on resilience theory. It is a view which acknowledges that resilience can have both perverse and positive qualities, but argues that positive forms of resilience should be actively promoted. These normative variations of resilience are further elaborated on in chapter two. The two major overarching normative principles are sustainability and justice, including social, environmental and spatial justice (as in Weakley, 2009). To these principles, an emphasis on practical implementation and outcomes is added, through the use of the concept of (philosophical) pragmatism.

1.2.1. Sustainability

Sustainability and sustainable development have become well ingrained in urban and development planning and indeed many other disciplines, having been introduced in the 1970s (Stivers, 1976). Initially, the concept was used to describe the ability to endure or continue to survive, with an early definition being: the ability to meet "the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 16). As the concept has evolved, it has moved on from looking only at promoting continued existence, to also improving the lives of current and future generations. Two such definitions of this are "improving the quality of human life while living within the carrying capacity of supporting eco-systems" (IUCN, UNEP & WWF, 1991) and the ability to "provide a healthy, productive, meaningful life for all community residents, present and future" (Sarkissian, Hofer, Vajda, & Shore, 2009). This shows a sense of social justice that sustainability entails.

Sustainability has been traditionally split into three different categories, namely environmental, economic, and social sustainability. In this work, a view is taken that these three cannot be separated (other than for abstract analytical reasons) and the sustainability of the entire system should be considered. So, if one part of the system were to become less sustainable, so too would the entire system. It must also be noted that society and the economy exist within the environment (or world) that has a finite amount of space and resources, implying thought and action occur within these limitations.

While the concept of sustainability has been criticised for its sometimes ambiguous nature (see for example Van Der Leeuw & Aschan-Leygonie, 2000) as a normative principle, it remains a broadly positive outcome for planning theory and practice. It must be noted too that the goal of planning as a field should not be a static outcome, but rather the promotion of the *processual* nature of sustainability. As with resilience (see Chapter 2) it is not practical to view sustainability as an end state to be reached. Urban landscapes are continually evolving and changing. Thus the process of promoting sustainability should evolve.

1.2.2. Justice

The second broad normative principle adopted in this research is that of justice. This is informed by social and environmental conceptualisations of justice that, as the work relates to urban planning, could possibly be better described as spatial justice (Pirie, 1983).

The notion of justice has been embedded in planning since its formal inception, which was a response to the unhealthy and unjust urban landscapes created by the industrial revolution in Britain (Sherlock, 1991). Over the past 30 years, notions of justice have begun to replace those of equality (mainly economic) in looking at how better to share the positive and negative aspects of living in our cities and societies (Bromberg, Morrow, Pfeiffer, & D, 2007, p. 1). This allowed for both material and non-material concepts (such as happiness, safety and opportunity) to be taken into account (ibid). With this shift, the concept of social justice in urban planning has gained momentum and has become a major goal of the field, as Feinstein (2005) argues it ought to be. This shift included notions of procedural justice which included justice not just in the outcomes of decision

making and resource allocations, but also in the processes of making these decisions (Rawles, 1971). This importantly includes participation of different stakeholders in governance and decision making processes.

A criticism of the traditional notion of justice however is its exclusion of a sense of spatial context (Bromberg, G.D, & Pfeiffer, 2007). The notion of spatial justice recognises that injustice is embedded in space, whether this is between different parts of the world such as the global north and the global south, or between different parts of individual cities, well-illustrated by apartheid cities in South Africa (with this legacy still seen in post-Apartheid cities today) (Pieterse, 2009). Parsons (2010) argues that this spatial injustice and the global divide between rich and poor are best illustrated by the presence of informal settlements and 'slums'. Recently, there has been renewed attention to the idea of social justice in urban planning, for example in Edward Soja's book *Seeking Spatial Justice* (2010).

1.2.3. Pragmatism

Pragmatism has both quotidian and philosophical meanings (Harrison, 2002). While in its basic form, pragmatism refers to putting ideas into practice, the philosophical notions of pragmatism are more dense and complex. Although this is the case, the primary attraction is to the everyday notion of pragmatism where, as a principle, planning theory and research should be geared towards practical interventions and positive outcomes. These interventions should in turn be geared towards promoting and building the two normative principles discussed above, namely those of justice and sustainability.

Harrison (2002) lists some of the key distinguishing features that make up the creative and experimental attitude presented by pragmatism. Some of these are listed below, the ones that directly influence this research, specifically the founding principles of the study, as well as an influence in the process of vulnerability and resilience assessment. They include:

- *an orientation towards a productive social purpose;*
- *an openness to the lessons of experience;*
- *attention to the concreteness of context and particular circumstances;*

- *a respect for the norms of the community (including those of the 'community of planners') but also a readiness to diverge from the norm when required by context;*
- *an appreciation for the place that both rational argumentation and instrumental reasoning have within the planning process;*
- *a bearing that is creative and imaginative rather than scientistic;*
- *[and] an attitude that is intelligently experimental in the way it relates ideas to action.*

(Harrison, 2002, p. 170)

These principles point to an integrated approach to planning, including learning and knowledge creation. For example, it recommends that planners be rational and instrumental (pointing to a degree of scientific thought) however not 'scientistic', an approach that places the natural sciences and scientific process as "the most authoritative... [or even]... the *only* valuable part of human learning" (Sorrell, 1991, p. 1). It shows openness to different and possibly unexpected sources of knowledge as useful, suggesting that not all sources *will*, but rather *may* be beneficial. It must be noted in this light that just as scientism should be avoided, so too should the opposite, where any one approach to knowledge is considered superior to others.

1.3. Conceptual and Theoretical Framework

The concept of vulnerability provides a view on disaster that allows informal settlements to be seen as being in a 'permanent state of disaster'. This highlights the urgency that ought to be taken in addressing the reality of informal settlements in our cities, but is not an assumption that all informal settlements are necessarily in states of disaster. While vulnerability provides the context and history of disaster, the notion of resilience provides it with a forward-moving, pragmatic, and positive thrust. The promotion of sustainable and just urban systems is the desired outcome of such an approach to planning, which is not a static outcome but an on-going and ever-evolving one. This is in accordance with the fact that society and urban systems are ever changing; acknowledgment provided by resilience thinking, which is a theory that recognises and incorporates change and the unanticipated. The process is not linear or circular; but inputs, outcomes, disturbances,

upturns, fluctuations and infinite variations of these occur in all directions, and at all time and spatial scales. Accepting and embracing this is part of resilience systems thinking.

Resilience moves away from planning for a predictable future, to varying preparation in expectation of the unknown. A key to this is adaptability, and hence, building the adaptive capacity of communities and planning authorities is a key to building urban resilience. This capacity can be built by promoting co-adaption or collaboration between different actors in the governance of urban systems.

Resilience must be diverse, and be developed at all levels (from household to international levels) (Obrist, Pheiffer, & Henley, 2010), recognising that if any aspect of a system lacks or loses resilience it causes a lack or loss of resilience in the entire system, and vice versa. This illustrates that parts of a city that lack resilience should not be considered only for their own sake, but for the sake of building resilience of the greater systems (cities, regions, countries) that they constitute.

The use of the idea of resilience in relation to different scales and to different parts of complex systems does pose the risk of conceptual confusion. The idea of resilience can be applied to individuals and households and communities and, in this use of the term, the question in relation to informal settlements is the extent to which the form and functioning of the settlement supports or detracts from the resilience of the humans occupying the settlement. Do the particular characteristics of the informal city enhance the capacity of occupants to adapt to the continually changing world?

However, the idea of resilience has also been applied to geographic categories including the nation, the region, the city, and the neighbourhood (e.g. Bay Localize, 2009). Does an informal settlement enhance the resilience of the city as a whole? Is the informal settlement, as a geographic construct, itself resilient?

The argument in this report is that, on balance, the settlement known as Kya Sands enhances the positive resilience of its residents by providing affordable access to land and accommodation close to work and livelihood opportunities, and is therefore *chosen* by many people as a place of residence. Within the settlement, residents deploy a range of strategies to further enhance resilience, including participation in geographically located social networks.

The settlement itself has shown a high degree of resilience. Despite discomfort from authorities and neighbouring communities at its existence, it has survived over a long period of time and has continued to grow. It may not survive forever as government may, eventually, implement its long-promised plan to relocate the residents to a greenfield site. The question is whether such relocation would enhance or undermine the resilience of individuals and households. Evidence from this study suggests that it may be the latter.

Theories of urban vulnerability and resilience provide the lens through which urban informality is viewed in this work. This provides a useful platform, which allows both the pros and cons related to urban informality and informal settlements to be considered. It avoids the naïve view that informal settlements are ideal living environments, recognising that intervention is required, yet at the same time argues against the eradication of informal settlements, and rather for their integration into the city.

1.4. Main Argument

While the residents of informal settlements are vulnerable to a wide variety of hazards, informal settlements also have characteristics that support the resilience of their residents; dimensions that are often under-rated by planning authorities. The resilience supported by informality may be described as being mainly evolutionary resilience: that is greater capacity to adapt to changing conditions within the household and in the wider world. Residents of informal settlements use informality as a tool for adaption. Through informality they, gain access to the benefits of living in cities - including access to: urban land, shelter, jobs or livelihood opportunities, and basic services. Informal settlements represent informal market-adaption in response to increasing demand for access to cities that is not being adequately met by the various faces of the formal housing market.

1.5. Research Questions

Research Question

To what extent does the informal settlement in Johannesburg known as Kya Sands provide an environment that offers positive benefits for its residents, including the resources needed for greater personal and household resilience, and to what extent does this environment increase vulnerability?

Sub Questions

- What, from the point of view of residents in Kya Sands, are the positive and negative aspects of living in the settlement?
- To what extent are the positive and negative aspects of living in Kya Sands proxies/indicators of vulnerability and resilience?
- What vulnerabilities do the residents of Kya Sands face?
- In what ways does the environment of the informal settlement enhance individual, household and community resilience?
- Are urban resilience and vulnerability useful concepts in considering informal settlements?

1.6. Ethical Considerations and Clearance

In order to undertake research with human subjects (as was done in Kya Sands informal settlement) I needed to obtain ethical clearance from the Wits Human Research Ethics Committee (HREC Non-Medical). This clearance was obtained on 11 July 2011 (see Appendix 1). Further Ethical considerations are outlined in Appendix 2.

1.7. Research Method

As mentioned in the research rationale and indicated by the example given earlier, implementation of policy responses to informal settlements in South Africa are inadequate, and need revision. The planning process is very top down in some respects, and it can take years for relocations or upgrades to materialise, if at all (Huchzermeyer, 2008).

This section outlines the empirical method used for data collection for this work. The method used was a social assessment of the benefits and disadvantages of living in Kya Sands, using semi-structured interviews with residents from the community. While it is not intended that these findings represent resilience and vulnerability directly, it was intended that conclusions around resilience and vulnerability could be inferred from them. .

It must be noted that this section focuses on the *method* used as opposed to the *methodology* behind developing this method. While some methodology is discussed here, much of the thinking and reasoning behind the method used is outlined in the literature review chapters, 2 to 4, most specifically in chapter 4; "Developing the Approach to Method: Vulnerability and Resilience Assessment From Within".

Why a Case Study and Why Kya Sands?

Case studies, as with most research approaches, have both strengths and weaknesses. While, for example, they may provide an in depth view of the case selected, their generalisation across other similar cases is limited. As Flyvbjerg notes (2011, p. 301), a case study is "not so much […] a methodological choice as a choice of what is to be studied". This is based on definitions of the term, of which one example is "the attempt to understand a particular person, institution, society, etc., by assembling information about his [sic.] or its development; the record of such an attempt" (Oxford English Dictionary, 2013). Case studies are hence defined by the unit studied, rather than the research methods used to study them. Case studies are also detailed studies (as opposed to broad, cross cutting ones), are time sensitive and have a focus on their specific context (Flyvbjerg, 2011, p. 301). While it can be argued that a case study is not a methodology,

there is methodology that lies behind the choice to undertake a case study, and the choice of Kya Sands itself.

Chapters 2-4 of this work argue that urban systems, such as informal settlements, are complex adaptive systems that have their own characteristics that require not only individually tailored responses *between* settlements, but also *within* settlements themselves. For this reason, individual, detailed and case specific research is needed in each settlement to guide intervention. This research should be multi-faceted, looking at the settlement in its context, at different scales, and using different approaches, such as social *and* technical ones. This is important to avoid 'blanket approaches' being applied to informal settlements that may be effective in some contexts, but not in others. More detailed and case specific studies would also allow for options such as in-situ upgrades to be considered in detail and for different interventions for different parts of single settlements to be considered. It was upon these arguments that the choice to undertake a case study was based.

This study can only offer conclusions in relation to the case of Kya Sands. However, knowledge and experience of Kya Sands does allow us to speculate more meaningfully about the conditions in other informal settlements, and provides a basis for developing hypotheses and arguments in relation to other settlements.

Kya Sands was chosen as a case study because of its specific history and context, and for practical reasons. As outlined in chapter 5, despite the fact that the settlement has received high level municipal attention, long term interventions in the settlement (proposed as early as 2007) have not materialised. While some short term intervention has taken place, the lack of concrete long term action has led to a number service delivery protests over the last 6 years. This creates an interesting case where it seems that long term strategies proposed by both municipal and provincial government are not feasible and need to be reviewed. Because of its location, and the context mentioned above, Kya Sands was also a practical and logistically viable choice for a case study. Before contact was made with the community, links in the community and in local government were made available through the supervisor of this work. As such, background information was fairly easy to obtain from the city (with thanks to Mr Greg Daniels) and contact with community leadership could easily be made. The settlement was also fairly easy to access

by car both to meet with community leadership and to conduct the three week long fieldwork in the settlement.

Research from without and research from within

Despite having a focus on assessing the community from within this is, to an extent, also done from outside the settlement. The primary difference here is that 'mapping' from within necessarily includes communication with the community whereas doing so from outside does not. There is a focus on investigating the community from within however, as this is the part of the mapping process that has been customarily limited or even ignored in risk assessment.

At first, it was proposed that these methods be named 'mapping from above' and 'mapping from below' borrowed from De Certeau's (1984) notion of viewing urban space from above and from below. As this may suggest certain 'superiority' antithetical to the aims of this research, it was decided instead to term the two approaches 'mapping from within' and 'mapping from without'. Some differences in the approaches are indicated in the table below.

Mapping from Without	**Mapping from Within**
'Measured' (Quantitative)	Inferred (Obrist, Pheiffer, & Henley, 2010) (Qualitative)
Can involve no community participation	Necessarily involves direct communication with the community
Scientific, Technical	Social
Focus on hazards and the prediction of their occurrence	Focus on vulnerability, adaptive-capacity (Obrist, Pheiffer, & Henley, 2010) and resilience to change and perceived hazards
Sees vulnerability as *exposure* to hazards	Sees vulnerability what puts certain people at risk to hazards

Table 1: Mapping vulnerability from within and without

In mapping vulnerability in the community, individual interviews were conducted with residents. The interview method aimed to avoid persuasion, allowing participants the freedom to identify their perceptions on hazards and the positive and negative aspects of living in Kya Sands.

In the individual interviews, it was initially proposed that qualitative questions would be asked first before moving onto quantitative questions on respondents' demographics. It had been suggested by a reader of the research proposal for this study however, that the quantitative 'census-type' questions be asked up front. This was suggested for two reasons. First was to avoid running out of time in the interview and possibly missing out on obtaining this data fully. Second is that doing it up front would allow the researcher (and author) to conduct the interview according to the respondent, including only relevant questions for each individual interviewed. Thus, a very flexible interview approach was used.

It was intended that responses be both 'situated in space' as well as not. In other words, responses were mapped geographically *and* conceptually. In order to specifically map responses geographically, attempts were made to ask questions on issues of particular resonance in different locations in the community. Here, a printed map of Kya Sands was provided, on which residents were asked to write and draw, indicating the areas they feel strongly about (e.g. areas that are safe or unsafe) in the settlement. It was hoped that, in comparing these maps, and respondents' locations within the settlement,[4] it would be possible to compare different perceptions of the positive and negative aspects of living in Kya Sands, and of a range of hazards.

To document the individual interviews three methods were used. The first, as already mentioned, was recorded by respondents themselves by physically drawing on printed maps of Kya Sands. The second method was to record interviews using a voice recorder, for which permission was formally obtained from each respondent. These were then transcribed and analysed as described later in the chapter. The third was to ask residents to give answers to two questions on a scale from one to five (see Appendix 4).

[4] So as to protect their anonymity, respondents' exact locations are not included in the final work.

Appendix 5 is a list showing the information that was sought in the interviews and example questions for obtaining this information. Although the list is split into sections, it was not intended to serve as a list of questions to be asked in any particular order, but rather as a guide to information sought in each interview. It is broken down into two main sections (indicated under 'level 1'), being quantitative (green) and qualitative information (blue). The quantitative or more 'demographic' questions are broken into four sub-sections, with the qualitative section broken into two main sections with further sub-sections thereunder. Questioning was also broken down into different 'levels' of information pursued. Level 1 indicates the broadest set of information sought (with the most broad questions) with level 5 indicating the most specific information sought along with accompanying questions.

The relationship of the questions to the underlying concepts used in the research does require comment. Factors which support positive forms of individual or household resilience, or which expand vulnerability, need to be inferred from responses to questions around the positives and negatives of living in Kya Sands. These questions are not a direct proxy for indications of positive resilience of vulnerability, although they are arguably a partial proxy, and so some degree of interpretation and translation is required.

1.7.1. 'Deliverables' of the Mapping process

The section above begins to indicate the outcome or 'final product' that was intended through this research.[5] The 'map' of vulnerability in Kya Sands informal settlement is presented in the form of both geographic maps, indicating the geographically-related findings, as well as a conceptual map in the form of *this* document detailing findings that cannot be as easily plotted on a map. Having said this, and as detailed in the concluding chapter, useful geographic maps of data collected are limited, and indicate a limitation of the mapping method used (See chapter 7).

[5] While this is the final product in terms of *this* research project, in line with the concept of urban systems, urban resilience and sustainability being on-going ever evolving processes, this type of 'map' would ideally be on-going and ever-evolving too. I hope to hand the map over to the community of Kya Sands informal settlement to utilise and add to in the future.

Map Ownership, Editing and Usage Rights

It is intended that the maps and the dissertation produced through this research be made fully available to the community of Kya Sands informal settlement, and any other person or groups of people interviewed for the research. It will also be made available to city and provincial officials and departments who have an interest in informal settlements and Kya Sands. This will be in hard copy and in electronic form (online) for archival purposes. This is in line with point 8 of the excerpt from Wits University's 'Code of Ethics for Research on Human Subjects (non-medical)' which reads:

> *No reports should be provided to sponsors that are not also available to the general public and, where possible, to the group studied itself, subject to the policy laid down in the document, Policy on Matters Relating to Sensitive and Confidential Research.*
>
> (University of the Witwatersrand, 2012, p. 1)

For the conceptual map, the options were either to publish it on Wikipedia, or through a privately hosted MediaWiki service. The benefits of putting it on Wikipedia are that it would be freely available and editable. This would ensure that the information contained would not necessarily remain static after this research project is completed and that no person or group would have sole ownership or editing rights (a monopoly on the information). A negative aspect of this would be that, as it would be openly editable, the credibility of the information on the site may be put into question. Here, information could be altered by people or organisations with interests that differ from the normative principles of this research or the interests of the community of Kya Sands. The positives of running a private wiki page are that editing access can be limited, and granted to only to certain users by the administrator of the site. This would make contributors accountable for any editing they make on the page; however it would also allow those that have administrative control unequal power over the information published.

If the map were made available to only one group for editing, there is the risk of abuse of privilege. Because of this, for the duration of the research project, the site is to be hosted on a private wiki, editable by the author but viewable by anyone, and made publicly editable (on Wikipedia or by opening editing on the site created) once the project is

complete. This ensures that it remains the authors "own unaided work" as required by Wits (Faculty of Engineering & the Built Environment, 2012, p. 5) at the time of the submission of the dissertation.

Having contacted Wits' legal office, the author has been assured that there will be no problem in making the findings of the work publically available, provided that it is not reproduced by third parties for commercial gain.

1.7.2. Approaching the community and interview process

In the proposal to this work, it was recognised that a considered approach was needed in contacting the community of Kya Sands and in obtaining permission from them to undertake the research. It was proposed that contacts obtained in interviews (Daniels, 2010; Mendelsohn, 2011) would be used to set up a meeting with community leaders of the settlement. Contact was ultimately made with community leaders through an unexpected source. A meeting was set up with Zanele Sabela, a journalist from the Randburg Sun who has reported extensively on Kya Sands. On the morning of meeting with her, Friday 18 November 2011, she indicated that she was going to Kya Sands on a tip off about possible evictions. It was agreed that we would meet at the settlement instead. Zanele Sabela then introduced me to Billy Modikwe, Honey Sakhu and Thabo Motaung, three leaders on the residents' Committee. During the meeting the proposed research was explained, and a meeting set up for the following week to formally propose the research. At the meeting, copies of the research proposal were presented to community leaders as well as the ethical clearance certificate and questionnaires. A recommendation was also requested for a guide to be hired from the community. Permission to undertake the research was granted by the community leaders present and Mr. Modikwe suggested that Thabo Motaung act as research guide.

A separate translator, an honours urban planning student from the University of the Witwatersrand, was hired as research assistant, Mr Marole Mathabatha. Mr Mathabatha acted as both interpreter and research assistant, conducting all of the interviews where respondents did not speak English and transcribing many of these. Interviews that were not in English were conducted in isiZulu, Setswana, IsiXhosa or Tshivenda, all of which Mr Mathabatha could speak. At first, it was proposed that the author conduct all of the interviews (translating as we went) however it was found that this was too time

consuming. Thus the author conducted all interviews where respondents could speak English, and Mr Mathabatha conducted the rest.

Our research guide, Mr Motaung did not sit in on the interviews, and rather just accompanied us in finding respondents to interview. This was to avoid stifling respondents' answers based on the presence of a community leader in the interview. This is especially important with regard to questions asked on the committee and its functions.

1.7.3. Sampling

In choosing a sample group for the individual interviews, it was decided (in consultation with my supervisor) that a number of sixty interviews be conducted. It was agreed that this number would be a sufficiently large sample to produce some meaningful results, but still be realistic within the time and financial constraints associated with an MSc research project. This number was not calculated as being representative of the community, but rather reflects the most interviews that could be realistically done within the limits of the project. It was also decided that interviews should be 'located in space' to allow for those responses that can be mapped to be entered into a Geographic Information System (GIS) to identify spatial trends. Thus, a geographic sampling method was needed.

In order to obtain a good geographical spread of responses across the settlement, the area was divided into sixty 'data zones', with one interview conducted in each zone. The unit of measure determining the size of each zone was number of dwellings, rather than area. In other words, it was intended that each zone have the same number of dwellings, rather than be the same size. Thus the different size of each zone would indicate its density, with smaller zones having higher density than the larger more sparsely populated ones. To do this an aerial photograph of the settlement was considered, and each home was manually counted as best as possible. Homes were demarcated by different roofs in the settlement. This was done in Corel Draw X4, and a small red dot was placed over each dwelling. Once this was complete, all of the dots on the map were selected, giving a number of 3,292 roofs. When divided by 60 (the sample size) this gave 55 roofs per zone.[6]

[6] This method is not intended or considered to be an accurate enumeration of dwellings in Kya Sands. It is likely that the number of roofs is not equal to the number of homes, with more than one home per roof in

Borders were then drawn around groups of 55 dots until the settlement was covered by 60 zones, as indicated in Figure 1. The photograph used was the 2009 aerial photograph obtained from the City of Johannesburg. Although this is not the most recent one obtained, it is the most recent one with sufficiently high resolution.

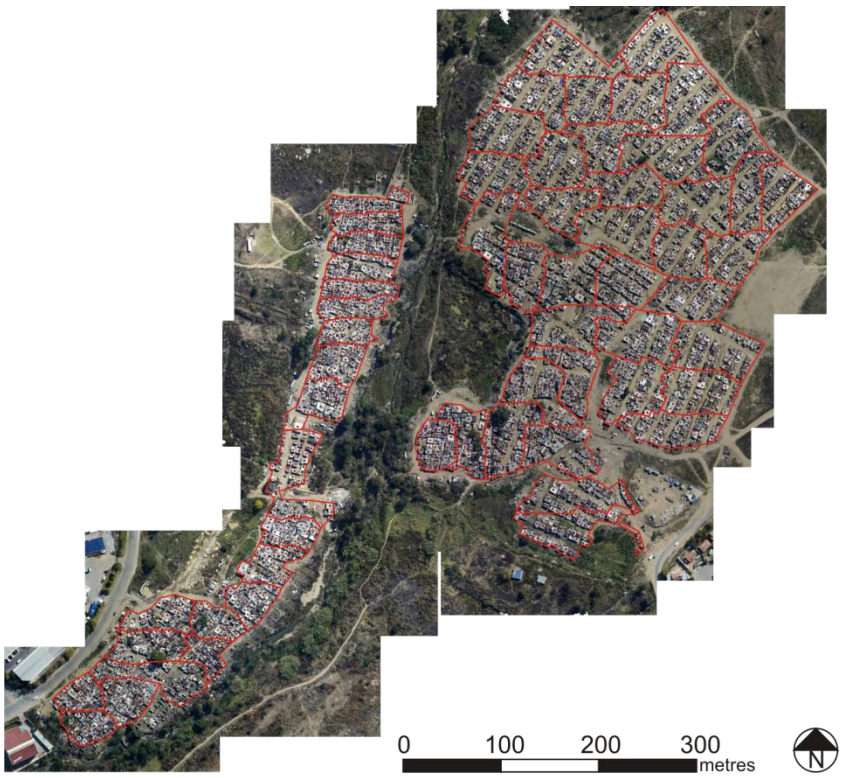

Figure 1: Sampling method for the initial demarcation of data zones.

(Aerial Photograph © City of Johannesburg)

In presenting this sampling method and its results to the School of Architecture and Planning Postgraduate Seminar on 12 May, 2011, a few suggestions were made by the audience on altering the zones. Firstly it was suggested that the data zones making up Section C (see Chapter 5) of the settlement (the section to the west of the river) should be north-south rather than east-west in their orientation. This meant the zones would remain the same (or at least a very similar) size, but allow for comparison between respondents living next to the river, and those living further away from it. It was argued that this was important in comparing opinions of flooding depending on proximity to the

some cases. As the process was done by eye, there is also likely some human error, with it possible that some houses are missed, and some duplicated. It is however a fair rough guide for dividing the settlement into data zones with the limited information available.

river. These changes are illustrated in zones 13 to 20 in Figure 2. The second suggested change was to remove large areas of open space from those data zones that contained it, as this skewed the representation of density by zone size. One zone, zone 12, was thus divided into three different sections, with zone 4 also being changed. The altered zones were then created in a shape file in ArcGIS, with the final data zones used illustrated in Figure 2.

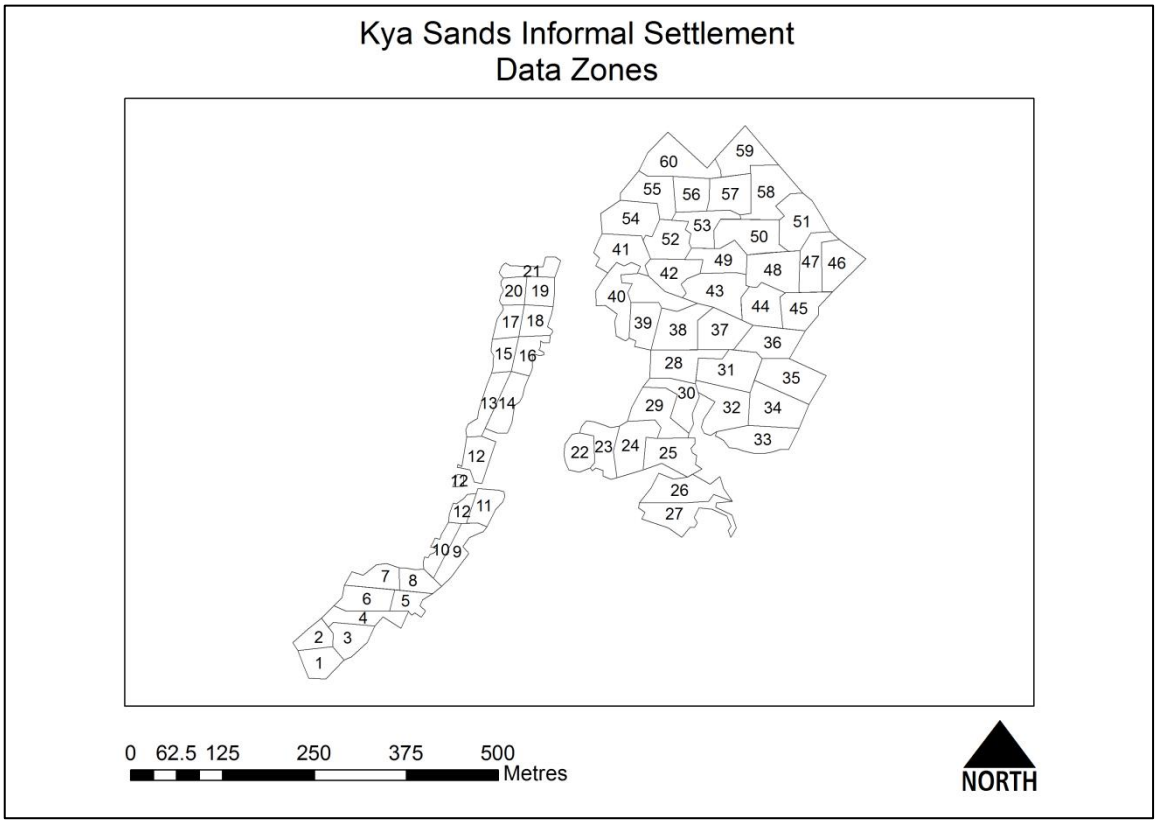

Figure 2: Final Data Zones Used for Conducting Interviews

In the proposal for this work, it was initially planned that the selection of respondents within each data zone would involve a system of random selection, using the lottery method (Sarantakos, 2005). This would involve placing a numbered grid over each zone, and randomly selecting an intersection point on that grid using a random number generator. The nearest home to that point would then be selected. In reality, this was impractical. It was found that the process would be too time-consuming, both in undertaking the random selection process and in finding the exact house selected. In the field, residents were frequently found to be away from their house when we arrived to interview them. It was decided instead to walk as near as possible to the centre of the

zone, and look from there for a willing respondent. Even this was problematic at times, with sometimes large areas of residents being absent from their homes. In other cases, potential respondents were either too busy or unwilling to be interviewed, with some being interested yet unwilling to sign the required consent forms. Generally however, it was not prohibitively difficult to meet a respondent from each zone and there were no cases in which we were left at a loss for respondents. In order to make sure that each interview conducted was indeed in the required zone, a GPS-enabled Android phone was used, with the data zones superimposed[7] over a map of the settlement using the Google Maps Application. The location arrow then indicated where we were, and confirm whether we were in the correct zone or not. Figure 3 below consists of 2 screenshots illustrating an example of this, captured in the field, just outside of zone 3.

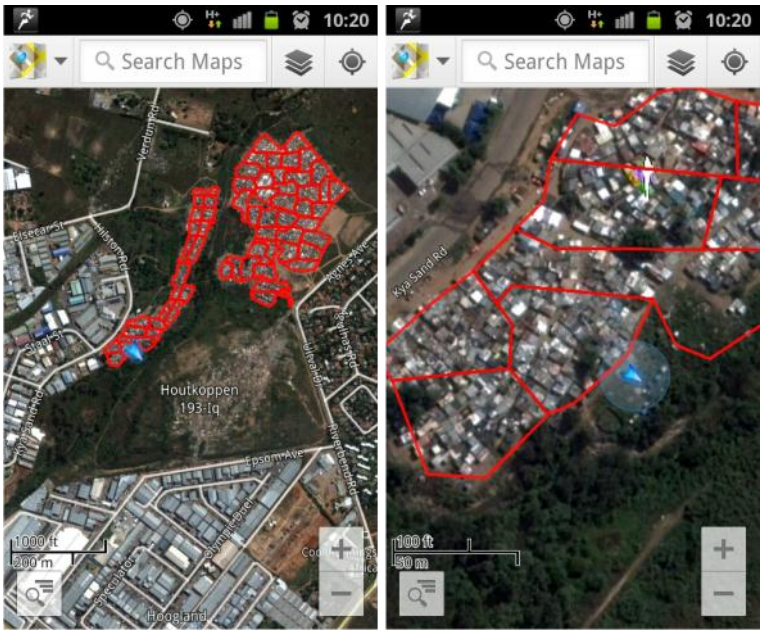

Figure 3: Two GPS-enabled-Android-phone screenshots showing how zones were located in the field with the Google Maps Application. Here located just outside of Zone 3 (blue arrow)

Sample Summary

Of the sixty people interviewed in Kya Sands, 50% of respondents were men and 50% women. This was not done intentionally (unless subconsciously) and is an initial indication

[7] In order to superimpose the red data zones in Google Maps, the 'data zones' shape file was converted to a .kml file using ArcGIS' "To KML" conversion tool. This .kml was then loaded to a public sharing Dropbox folder, and the URL (http://bit.ly/t01LTZ) searched for in the Google Maps App, giving the result seen in Figure 3 above.

of the success of the random sampling method. The average age of respondents was 33 years old, with the youngest respondent being 20 and the oldest 59 years old. 70% of respondents were South African nationals, with 16.6% Zimbabwean, 11.6% Mozambican, with one Malawian respondent making up the final 1.6%. This is detailed further in Chapter 5.

1.7.4. Research Diary

Throughout the fieldwork in Kya Sands, a research diary was kept. This included an entry for each day in which direct contact was made with members of the community of Kya Sands. This contact was made both telephonically and through direct visits, either in preparing for or undertaking the fieldwork. The first entry was made on Friday, 18 November 2011, upon the author's first visit to Kya Sands, and the last on Saturday 16 November, 2012. In total, 24 entries were made. The research diary is included in Appendix 7.

Diary entries were all written on the day the events occurred in order to ensure they were still fresh in the author's mind. The entries attempted to capture all of the events of the day chronologically, and in as much detail as possible. The primary purpose of these diary entries was to keep a record of the fieldwork process. This could then be reflected upon in retrospect, and used to compare findings in interviews to the circumstances under which they were conducted. This helped in the analysis of the interviews, as each one could be looked at in context, when compared to the diary. The diary also helped in providing data such as respondents' gender, which was always observed in interviews, and often not directly reflected in interview transcripts. The diary was also useful in recording the difficulties faced during the interview process. This could possibly contribute to designing future research projects undertaken either by the author or by other researchers working in the same or a similar field.

1.7.5. Data Capture, Processing and Analysis

Once all of the interviews were complete, a long process of capturing and cleaning the data was undertaken. The first step in this process was to transcribe all of the interviews. This was done by the author and two research assistants. Interviews that were not conducted in English, were translated and transcribed by research assistants

simultaneously. The sixty completed transcripts were then ‘cleaned’, including adding the correct date, time and interview length to each, standardising their formatting and giving each a language edit.

Once the transcripts were standardised and cleaned, the process of data capture began. Here, as already mentioned, two types of analysis were done, using a mixed methods approach (Creswell, 2003). This was, firstly, a process of quantifying the large amount of qualitative data, and was then followed by extracting qualitative findings to back up and enrich findings and arguments.

In order to quantify the qualitative data, a table was created. Each respondent was given a row, and each piece of information sought was given a column. These fields were created after the interviews were completed and are largely based on questions asked in the interviews. A code book was created in conjunction with the creation of the table, relating to each field (See Appendix 3). This dataset became quite full, for example five columns were needed just to capture the various hazards mentioned by residents, who gave up to five answers each.

Once the bare table was created with most of the foreseen fields added, all blank spaces were filled with the symbol "-" for text fields, or the value "99" for numeric fields. This is because the default value for these fields was an empty cell or "0", respectively. As blank cells and "0" represented results in most cases (such as no answer/no data or the quantity 0) confusion would be caused in knowing whether data had been captured in cells or not. So "-" or "99" indicated that that cell had not been dealt with and still needed data to be entered. After capturing the data for one respondent, that line could be checked by searching it for "99" or for "-". Once there were no blank cells or "99" values in the table, it was considered full.

Interviews were read through one by one with all of the relevant data extracted and inserted to the table, with constant referral to the codebook. For each one, the interview was read through once, and then combed through in order to find and capture individual responses. If when capturing data for an interview a new response was found, a new code would be entered to the codebook. This was done with the view that at the end of the process, some codes would be merged together. For example, in the responses to the question "what should government do?", the answer "Build RDP houses here" may be

merged with "Build Serviced houses here" into "Build houses here". Both the original codebook and data sets were preserved however, if required for future reference.

Because questions were not always asked in the exact same way, and some questions were left out in interviews where that information was already mentioned by the respondent, answers were not always the in the same form. This caused some difficulty in trying to quantitatively capture people's responses. For this reason, data capture (to a very limited extent) could not always be objective and thus involved some interpretation and a degree of subjectivity. An example of this comes from the interview conducted in zone 15, where the respondent suggests "they can organise the shacks here better like they have done in Pipeline because here it is not organised and there are no streets" (Respondent-15, 2012). While respondent 15 did not specify here who should be doing this, it was recorded under the category entitled: “what government should do in Kya Sands”.

During the early stages of data capture, if it was found that the first 15 interviews captured had fields that all had the code "no data/no response", that field was deleted. Once data entry was complete, fields with 5 or less responses were also deleted. This included mostly fields with multiple answers to the same question. For example, initially 5 fields were created to capture responses to "what do you like about living here?" These were "Like_KS_1", "Like_KS_2" etc. This was finally reduced to only 2 fields.

In some cases, there was more than one respondent answering questions in an interview. While this is acceptable for qualitative analysis, it sometimes caused difficulty in capturing quantitative data for an interview. This was particularly the case when two people answering questions had differing views, most noticeable in zone 19, where the young couple interviewed had almost opposite views on safety and on how much they like living in Kya Sands. In these cases, the main respondent's answers were recorded in the database, in the case of zone 19, the young man who we began the interview with, before being joined by his girlfriend later.

Once all of the qualitative data was captured in the database (or table) some cleaning and reformatting of the data was needed before analysis. Before this was done however, the original dataset and codebook were saved in a separate location and dated. This was also subsequently done between major clean-ups or adaptions of the data, such as

substituting codes with their values. As the database in ArcMap is not conducive to this type of work, the data was first copied and pasted into an excel worksheet. The first cleaning that took place was a spell check and standardisation of data entered. This dealt with much of the typing errors that inevitably occur during the data capture process. The next process was to run the data through Google Refine, a free software package designed to assist with cleaning data (Google, 2011). Here similar fields or the same information worded differently were combined. For example in the "Dngr_Are_1" field, the entries "Bridge", "Bridges" and "River Crossings" were all standardised as "River Crossings". The programme was also used to remove double spaces from the data, as well as leading and trailing blank space that caused inconsistencies in the data.

1.8. Structure of the Dissertation

This chapter has outlined the major aims of the study, and the methods that have been used. The study is made up of two main parts, the first being a theoretical investigation, and the second, an empirical one. The theoretical component of the study makes up Chapters two, three and four. These chapters have then influenced the theoretical framework, the research questions, the main arguments put forward, and the method used.

Chapter 2 focuses on theories of on urban vulnerability and urban resilience. This theory is introduced by looking at the concepts of disaster, risk and hazard. Vulnerability is looked at both practically, as a state of being in relation to hazards, and as an alternative outlook on disaster that shifts focus onto what it is that makes people vulnerable, rather than on hazards themselves. The concept of urban resilience is then discussed. Here two broad notions of resilience are outlined, that lie on two ends of a continuum. These are equilibrist and evolutionary resilience. These are broken down into their basic parts, being the ability to stay the same, and the ability to change respectively. It is argued that these are *both* important constituents of urban resilience, and that a balance between the two needs to be found.

Chapter 3 goes on to examine concepts and theories of urban informality as they relate to theories and concepts of urban resilience and urban vulnerability, asking the question: Urban Informality, Vulnerability or Resilience? Here two broad conceptualisations of

informality are proposed, where informality is viewed as vulnerability or as resilience. Again, it is argued that neither view is correct, and that informal settlements contain both inherent vulnerabilities and forms of positive resilience. What is needed rather is case specific and detailed research into informal settlements to prevent untested assumptions from directing planning interventions. It is argued that planning authorities seem to see informal settlements as inherently vulnerable and often fail to recognise the resilience they present to their inhabitants and to the city at large. Thus interventions aimed at reducing vulnerability (such as relocation to formal housing) can negate the positive aspects of the settlement, such as access to jobs in the city.

The final part of the literature review (chapter 4) is the methodology section of the study. The chapter examines general approaches to risk, vulnerability and resilience assessment. It concludes that there are three axes along which different approaches to these assessments lie, being where they are done from, who is doing them and how they are done. This ranges from within the community to remotely, outside the community, by community members themselves or by outside bodies, and lastly from technical scientific, quantitative methods to social, qualitative ones. It is argued that a balance of all of these is needed. Having said this, it is not always possible to find this balance within a single study, due to the different expertise needed, and time and financial constraints. Here studies should recognise their limitations, and seek to be supplemented by others, to provide a more holistic view overall.

The second part of the study, the empirical investigation into Kya Sands, is then presented in chapters 6 and 7. Chapter 6 provides a background to the settlement, based on both secondary sources and primary data from fieldwork. The chapter looks at the history of the settlement, its demographics and at government interventions there. This is an attempt to create a historical profile for the settlement. Lastly, chapter 7 details findings on vulnerability and resilience in Kya Sands, obtained in the fieldwork. It argues that while Kya Sands is by no means an ideal living environment, with its residents vulnerable to a number of hazards, it has locational and other characteristics that enhance the resilience of its residents and of the city at large. While the vulnerability of Kya Sands' residents does need to be addressed, this should not be done at the expense of the inherent resilience of the community.

2. Urban Vulnerability and Urban Resilience

2.1. Introduction

This chapter is the first of three that make up the literature review of this dissertation. The two main theoretical areas of focus are 'urban vulnerability' and 'urban resilience'. While resilience was the initial point of interest, it is argued consistently throughout this report that resilience cannot be examined in isolation, and that the vulnerability of systems and communities need to be considered at the same time. This is especially true in informal settlements, where it is argued that investigations into the advantages of living in informal settlements need to be considered alongside the disadvantages of living in such an environment. This then relates (although doesn't necessarily equate) to the vulnerability and the resilience displayed by informal settlements and their inhabitants.

The chapter starts by outlining theories on urban vulnerability. This starts with sections on 'disasters', 'hazards' and 'risk', explaining how these terms are considered and used in this work. This is done due to the fact that disaster management is the general field out of which notions of vulnerability have evolved. The sections look at two conceptualisations of vulnerability; firstly as it is used practically to describe a state of being of certain communities, systems, or people; and secondly, as an alternative outlook on disaster and how it has and should become engrained in the wider field of development planning.

The chapter then goes on to look at theory on urban resilience. While many different types of resilience are defined, this work uses Simmie and Martin's (2010) grouping of these into two 'types' of resilience namely equilibrist and evolutionary/transformative resilience. It ought to be acknowledged these are not the *only* two types of resilience, but when conceptualised in this way lie on two ends of a continuum or scale to one another. I argue that newer theories of evolutionary resilience should not necessarily replace older ones, but rather strengthen them, leading to a more holistic approach to urban resilience.

2.2. Disasters, Hazards and Risk

"*We construct our own disasters insofar as disasters occur in the environments we produce.*"

(Oliver Smith, 2004, p. 20)

The terms 'disaster', 'hazard' and 'risk' come largely from the field of disaster management, the field out of which the notion of urban vulnerability has principally grown. Although the terms find their roots in disaster management and risk assessment, they have been since been used as broader concepts of urban vulnerability and resilience. This section starts by looking at disaster, before touching on hazard and risk as a background to urban vulnerability.

The terms 'disaster' and 'natural disaster' have been used extensively (although not exclusively) to describe large scale catastrophic events that lead to human loss and suffering; for example, hurricanes, earthquakes, tsunamis and floods (Bankoff, 2004; Cardona, 2004). This is seen in academic writing and frequently in the media. However, a distinction must be made where the event itself is not the disaster, but rather the outcomes of that event. Some examples of these outcomes are loss of human life, loss of or damage to property, and destruction of livelihoods. The event itself (or series/combination of events) is the hazard.

A good example of this distinction is the 2010 large earthquakes in Haiti (12 January 2010) and Chile (27 February 2010). While the Chilean earthquake measuring 8.8 was far stronger than the Haitian at 7.0 in magnitude (United States Geological Survey, 2010a; 2010b) the *disaster* in Haiti was far more severe. In Haiti more than two hundred thousand people were killed, and an estimated one million left homeless, whereas the death toll in the more powerful Chile earthquake was estimated to be comparatively far less, numbering losses in the hundreds (IFRC, 2010). This comparison points to different levels of vulnerability, exposure and resilience in the two cases; however, the example used here illustrates the error of viewing the catastrophic event, or hazard, as the disaster.

Cardona (2004) and Oliver-Smith (2004) each give different but equally relevant reasons for why the word disaster has been used to describe hazard. While Cardona (2004)

attributes this to a technocratic approach to describing disasters based in the natural sciences, Oliver-Smith (2004) relates it to the trend in western thinking that separates nature and society, failing to perceive them as part of the same overall system.

Cardona (2004) argues that as the natural sciences advanced, and the understanding of natural phenomena such as earthquakes, hurricanes and volcanic eruptions became better understood, focus shifted to the phenomena themselves. While this can be useful in preparing for and responding to disaster, it is only one of the many aspects of disaster that may also be better understood through, for example, studies of people's vulnerability and resilience. Also, because prediction of these large events is very difficult and often inaccurate, disasters have been (and still often are) seen as unavoidable, allowing authorities to dismiss the resulting disasters off as bad luck, fate or even "acts of God" (Cardona, 2004, p. 40). This results in various agencies ranging from government to insurance companies evading responsibility for their response to disaster, placing the responsibility solely on 'nature'.

As mentioned, Oliver-Smith argues that the focus on hazards rather than disasters resulted from the perceived dichotomy in western society "placing [nature and culture]… in opposition to one another" (Oliver Smith, 2004, p. 12). This is a departure from pre-Christian and eastern religions and philosophies that promoted harmony with nature. This departure has resulted in attempts to dominate and control nature, reducing it to a simple resource that humans have the ‘right’ to exploit (Oliver Smith, 2004). When holding the view that humans are in opposition to the natural world, it is easy to lay the blame of disasters on nature rather than on society. Disasters occur by definition at the intersection of society and nature, where; according to Biersack (in Oliver Smith, 2004, p. 18); human life exists, neither "in nature [n]or culture, but precisely both".

This argument leads to the view that will be taken in this research that disasters are, to a large extent, socially constructed (Canon, 2008). A basic example of this (representing exposure which is not necessarily vulnerability), is to imagine a hurricane passing over a town and one passing over uninhabited land. The first has the potential to cause a direct human disaster, whereas in the latter no people are affected. In using the expression 'to a large extent', it is indicated that natural phenomena can and obviously do play a large role in many disasters, such as the Haiti earthquake disaster mentioned earlier. Cutter

explains this saying “Just like geohazards, the earth’s population is also unevenly distributed on the natural landscape […] population size and location coupled with the socio economic and demographic characteristics of that population are the drivers of social impacts, and help explain why the same […] event produces […] different impacts at the local level” (Cutter, 2010, p. 17). Emphasis is however placed on the social construction of disaster in this research, because just as vulnerability and some hazards are socially constructed, so too can they be altered and their effects negated by society.

Lastly, with regards to disasters, emphasis must be placed on the shift in thinking that is taken in this research. The shift moves away from viewing disasters as single events that can be isolated from normal everyday life. This is in light of the fact that so many people around the world living in informal settlements and 'slums' live in conditions that may be described as 'constant states of disaster' (Cardona, 2004). These "permanent white waters" (Folke C. , et al., 2002, p. 4) prompt a shift away from disaster management as such, to a wider developmental approach of resilience thinking. This is not to say that individual events that lead to disasters should be ignored, but rather absorbed into the overall developmental process of resilience building. It must also be noted that it is not assumed in this research that all informal settlements are in constant states of disaster. It is in fact argued that informal settlements should not be viewed as being inherently vulnerable, and research into vulnerability should also include investigation into the resilience that informal communities’ exhibit. The idea of constant states of disaster is used as a concept to move away from only looking at isolated events that lead to disaster (for example fires or floods in informal settlements) and intended to bring a sense of urgency to planning processes that take into consideration the informal settlements in the country.

The next concept to consider is risk, which intrinsically links to hazard and vulnerability. This research looks at the relationship between the three concepts represented as a formula in the following way:

Risk = Hazard x Vulnerability

(Cardona, 2004, p. 38; Wisner, Blaikie, Cannon, & Davis, 2004)

While this is a simplified way of looking at how the concepts link to one another, it is included to conceptually illustrate a couple of points and not intended as a quantifiable method of measuring any of the three variables. Firstly, the equation reveals the distinction that must be made between risk, hazard and vulnerability, and the error of confusing the three. It shows that a hazard does not necessarily pose a risk, it only does so if people are exposed and vulnerable (or even if they perceive themselves to be vulnerable) to it (Wisner, Blaikie, Cannon, & Davis, 2004). Secondly it shows that an individual or a group cannot be merely vulnerable. In looking at the three concepts in this way, it forces us to ask the question: Vulnerable to what? (Cardona, 2004). This is important when investigating vulnerability, as it does more than just label an individual or a group as vulnerable, but also looks at what it is they are vulnerable to, and what it is that makes them vulnerable; giving direction to the process of building resilience. The formula presented above is extended in some cases to include the capacity of people to respond to disaster. This then equates as: *Risk = (Hazard X Vulnerability) / Capacity* (Heijmans & Victoria, 2001). The concept of risk is further elaborated in Chapter 4 of this study under the title “Risk, Vulnerability and Resilience Assessment”.

Bankoff states that "while hazards may be natural, disasters generally are not" (2004, p. 29). While in its context Bankoff does this to conceptually place the focus on vulnerability rather than on the hazard itself, the statement is countered in this study. Hazards are not all 'natural' and can be put into many categories, including but not limited to; natural, social, technological, biological, political and economic factors. They can also exist on all scales, from small scale health risks such as a polluted well, to large scale multi-national events such as economic collapse, drought and famine. While creating these categories can be useful in research, in analysis, and in delegating responsibility in preparedness and response; there is the possibility that doing so can give a somewhat blinkered view on hazards. If researchers create categories for hazards, they may look only within the

confines of these categories in mapping vulnerability and assessing resilience, and may possibly miss some detail, nuance or combination of hazards to which people may be vulnerable. As Bromley (1978, p. 1034) puts it: "it is worth remembering that all classificatory schemes can be considered arbitrary, subjective, inflexible and/or narrowly defined for a specific purpose". Essentially, a view needs to be taken that hazards can come from anywhere and as such, being open to the unexpected and even unheard-of is important. With this taken into account, and in light of the view of disaster that is taken in this research, in this study hazards will not be viewed in the traditional disaster management sense of large scale "natural hazards", but can include anything, from the lack of safe drinking water, to crime, political instability, fire, flooding and any other that may present itself. The next section explores the notion of urban vulnerability, followed by sections on resilience.

2.3. Urban Vulnerability

Despite numerous definitions being available, there is no common consensus on a definition of urban vulnerability (Weichselgartner, 2001; Heijmans A. , 2004, p. 115). This is understandable considering how widely the term is used across disciplines and that cases differ from place to place with differing hazards, vulnerabilities and levels of resilience. As such, this report does not attempt to give one definition, but rather discusses it as a wider concept, citing others' definitions along the way. It also shows that vulnerability is not only a practical term or a state of being, but taken as an alternative approach to disaster in this research.

2.3.1. Vulnerability used practically

The term vulnerability is used in many different fields, and to represent many different systems on different scales (Weichselgartner, 2001). While psychology looks at the vulnerability of individuals, disciplines such as anthropology or sociology may look at the vulnerability of groups of people from families to large populations. Other fields of enquiry range from the natural sciences (including ecological vulnerability) to computer/IT systems and economics. This research focuses on the vulnerability of urban populations to hazards of any kind.

Wilches-Chaux, cited in Oliver Smith (2004) categorises vulnerability into 11 different forms namely: - natural, physical, economic, social, political, technical, ideological, cultural, educational, ecological and institutional. This shows the complexity of vulnerability which is influenced by many different factors, and often a combination of many factors.

A basic definition of vulnerability from the field of disaster management is "the lack of capacity of a population to cope with the effects of a certain change in its environment" (Wilches-Chaux in (De Melo Branko, Suassuna, & Adler Vainsencher, 2005, p. 71). This definition, while accurate in certain circumstances, is limited. It focuses on vulnerability to isolated hazards and assumes a stable state of living that is interrupted by these hazards. As such, it does not address situations of sustained states of disaster. The definition also fails to show vulnerability in context, or to illuminate reasons why certain people or populations may be vulnerable, what they may be vulnerable to, and the concepts case specificity in both time and space. A more appropriate definition for vulnerability might be:

> *...an aggregate measure of human welfare that integrates environmental, social, economic and political exposure to a range of potential harmful perturbations. Vulnerability is a multi-layered and multidimensional social space defined by the determinate, political, economic and institutional capabilities of people in specific places at specific times.*
>
> Bohle et al., 1994 cited in Weichselgartner (2001, p. 88)

Oliver-Smith (2004) gives an excellent description of the essence of vulnerability: society has the ability to recognise risk, and in turn, to choose whether or not to take action to diminish that risk. Whether or not society chooses to take action against a certain perceived risk could depend on the probability of certain hazards occurring, the seriousness of the hazard and their vulnerability and exposure to that hazard. If any of these are very low, people are likely to accommodate the risk, and take little or no action. The author sees the essence of vulnerability as when risks are perceived and possibly even frequently experienced, yet people are not in a position to take action against them, and hence are unable to avoid their negative and possibly disastrous effects (Oliver Smith, 2004, p. 20).

2.3.2. Vulnerability as an alternative outlook on disaster

By looking at the dates of the two definitions given a short while earlier, it is clear that the term vulnerability has been around for some time. It has been in use for instance in the field of geography and disaster management for some 20 years (Weichselgartner, 2001). In much of this time however, it has been used in risk assessment largely to describe *exposure* to hazards, and not to describe what it is that makes people vulnerable to hazards. The concept of vulnerability has hence emerged "as a radical critique to the prevailing technocratic paradigm by placing the emphasis, instead [of on hazards], on what renders the community unsafe" (Bankoff, 2004, p. 29). Due to its complexity, ever-changing nature, and dependence on context, disaster and risk "transcend the 'exact' methods associated with traditional 'hard sciences'" creating the need for a "softer" model or approach that is provided by the concept of vulnerability (Weichselgartner, 2001, pp. 86-87). However, in line with the earlier section on pragmatism, this is not to say that technical or scientific approaches to disaster should be rejected altogether, but that they should not be the *only* ones used in its assessment.

2.3.3. The social construction (causes) of vulnerability

While the concept of vulnerability has developed into a positive alternative for approaching the issue of disaster, Canon (2008) warns that it is easy for it to lose its impetus and analytical usefulness if the term is used too vaguely. This ambiguity stems from two places, the first being the notion that people can just be vulnerable without looking at what it is they are vulnerable to (hazard). Second, it is a failure to consider what it is that causes them to be vulnerable to that hazard. The first point has already been discussed in the section on disaster, risk and hazards, so here I focus in particular on what makes people vulnerable.

It is generally accepted that vulnerability is socially constructed (Canon, 2008; Wisner, Blaikie, Cannon, & Davis, 2004; Weichselgartner, 2001; Oliver Smith, 2004). This means that what puts people at risk is the action of either themselves or of others. This action can be undertaken over short or long periods of time, and affect small or large groups of people differently, causing some groups to be more or less vulnerable to certain hazards than others. However, care should be taken in making assumptions about what makes

people vulnerable, as this can lead to a form of 'othering' or at least labelling that can in itself marginalise people, potentially exacerbating their vulnerability (Bankoff, 2004).

A common misconception is that poverty is equal to vulnerability. This is not the case even though there is often a strong degree of correlation. Not all poor people are vulnerable; those who are at risk aren't all vulnerable in the same way; and, people who are not poor can also be vulnerable to hazards (Hilhorst & Bankoff, 2004, p. 2). Blindly linking poverty to vulnerability (as with characteristics such as race, gender, nationality, age, sexual orientation or income group) risks othering various groups, and thereby dulling the concept of vulnerability in its analytical and practical efficacies. Where applicable and founded through case-specific research, these correlations must however be made. Some theorists do link socio-economic status and vulnerability, arguing that the poor may have less material wealth to lose, these theorists note that the ability of the poor to recover from ‘disasters’ is greater (see for example Cutter, 2010). It's not that certain groups *will* but rather *may* be more vulnerable to certain hazards than others and, if it is found that they are, this can direct resilience building action. Cardona (2004) for example correlates levels of underdevelopment and vulnerability, arguing that a community at risk is by definition one that is underdeveloped.

Underdevelopment, poverty and vulnerability are not causes, but rather *symptoms* of underlying causes, such as access to resources, political and economic processes, and different forms of marginalisation (Cardona, 2004). Canon (2008, p. 351) agrees, stating that in looking at the social construction of vulnerability, it is vital to explicitly acknowledge "that the factors that create people’s vulnerability [...] are a product of power relations: the functioning of economic and political systems".

2.3.4. The importance of local knowledge

One of the major shifts in the approach to disasters that vulnerability proposes is in the way information is collected in mapping risk. This shifts focus from technical scientific to social-science methods, with an emphasis on the importance of local knowledge. This is vitally important, as it is often the "only resource controlled by the most vulnerable" (Bankoff, 2004, p. 33). This local knowledge includes communities' perceptions of hazards and vulnerability, the capacity to respond to them (Obrist, Pheiffer, & Henley, 2010) and the methods of such response. The term 'local knowledge' should be used cautiously however, as it can be used in a demeaning way when compared to scientific knowledge, being seen as inferior or even backward (Bankoff, 2004). It should not be seen as a homogenous pool of information specific to one community to be drawn on by planners. Nor should it be seen as the 'opposite' of scientific or western knowledge. Local knowledge is made up of many differing perspectives and derives from many sources, including communication (both within the community and with the world at large), the media, the internet, in fact any source of information available. As such "what local knowledge constitutes can [...] only be gathered in community studies that acknowledge the heterogeneity and power differentials in communities and step away from viewing communities as isolated units" (Hilhorst, 2004, p. 23).

2.3.5. Urban Vulnerability: Conclusion

Vulnerability is constructed through long term political, economic and social processes that place large portions of the population at risk (Weichselgartner, 2001). Bankoff illustrates this by describing disasters as "historical events that occur as part of a sequence or process that determines a particular person or community's vulnerability" (2004, p. 24). This is certainly the case in South Africa, where historical policies and practices in place were not only unequal and unfair, but blatantly exploitative and unjust through the Apartheid regime (lasting some 48 years, 1948 to 1994) and preceding that, colonisation. These long term implications of exploitation, including poverty and inequality, have no quick fix solution, and it is unrealistic to imagine the effects of hundreds of years of injustice being undone in a short period of time. This is evident in South Africa, where some eighteen years of democracy have left the country with persistently high levels of inequality, with the inherited gap between rich and poor having

actually widened during this time. South Africa is now one of the most, if not the most, unequal country in the world in terms of the distribution of wealth (Bhorat & Van Der Westhuizen, 2010; UN Habitat, 2010; UN Habitat, 2008). So while long term interventions should be in place to address vulnerability and build resilience, this is not to say that it is acceptable that people live in unhealthy and dangerous conditions (when this is indeed the case) in the interim. Here, short term resilience-building is needed to improve people's lives that will, with time, contribute to the long term process of sustainable resilience-building in the country. This is particularly important with regard to informal settlements in South Africa where, as will be seen in the context Chapter on Kya Sands Informal Settlement, long term government interventions be they in-situ upgrades or relocations can take years to plan and implement, if they happen at all.

2.4. Urban Resilience

The use of 'urban resilience' as a concept in urban and development planning has grown and continues to grow out of the resilience perspective from ecology in the 1960s and 1970s (Folke C. , 2006, p. 254). From its ecological origins, the concept has been adopted by many fields of study from economics to the natural and social sciences and, more recently, to urban and developmental studies. Significantly, between disciplines, there is little universal consensus on any definitions for the term (Simmie & Martin, 2010) and limited research or literature on social and urban resilience to date (Ernstson, et al., 2010; Obrist, Pheiffer, & Henley, 2010). Having said this, literature on urban resilience is growing rapidly due to international interest in the concept[8].

This work, based on a normative and pragmatic orientation (section 1.2), takes a normative position on resilience. This is similar to the shift in sustainability theory that acknowledged not only the ability of systems to continue existing, but also to allow for increased justice and equality (Sarkissian, Hofer, Vajda, & Shore, 2009), thus taking a normative stance. As such, the work refers to resilience in its positive sense, as opposed to perverse resilience, or the resilience of negative system qualities.

[8] For example, the 2011 UK/Ireland Planning Research Conference was titled: *Planning Resilient Communities in Challenging Times.* The author of the current study attended and presented at this conference held in Birmingham, UK.

In the work, focus is placed on two dominant theories of resilience[9] that have emerged through the use of the concept by different disciplines. Importantly, these two strains are not the only two in the diverse field. Rather they are two major contributions to resilience theory, lying on different ends of a scale to one another, with many variants in between. These are described as an 'equilibrist' approach to resilience and an 'evolutionary' or 'transformative' approach to resilience (Simmie & Martin, 2010). The two approaches are later compared to Brand and Jax's (2007) description of two strains of resilience; resilience as a descriptive concept and resilience as a boundary object. These terms are discussed in more detail below and are important in looking at resilience and informality from different points of view. This is followed by outlining the normative position taken to resilience in the work, and the differences between positive and negative (or perverse) resilience.

The discussion on urban resilience is contextualised immediately below by giving a brief background on urban resilience writing and theory in South Africa.

2.4.1. Urban Resilience Writing and Research in South Africa

Over the past decade, the concept of urban resilience has begun to enter both policy and academic writing on cities and urban planning internationally. While in South Africa the concept could be described as being in its infancy, it continues to gain momentum. This includes recent writing that applies resilience thinking to informal settlements. This section briefly outlines the uptake of urban resilience in South African literature including academic, research and policy spheres in order to place the work in the context of existing urban resilience research in South Africa.

In South African academic writing (as far as the author is aware) the notion of urban resilience was first introduced in 2007/08, through the work of Muller (2007) and Du Plessis (2008). At the same time, the notion of resilience was being introduced to climate change debates, through the work of Vogel, Mosser, Kasperson and Dabelko (2007), although without a specifically urban focus. Du Plessis introduced a number of the principles that are now widely used in resilience related research in South Africa – she emphasised the nature of cities as complex-adaptive, social-ecological systems with non-

[9] As per Simmie and Martin's (2010) grouping of 'types' of resilience theory.

linear dynamics that "acknowledge that uncertainty and unpredictability is a characteristic of cities that requires adaptive management and flexibility in implementation" (Du Plessis, 2008, p. 7).

The first major policy–linked document to adopt the idea of resilience was the South African State of Cities Report, 2011, entitled: "Towards Resilient Cities" (SACN, 2011). The report was released by the South African Cities Network (SACN) which is a not for profit organisation set up by the Minister for Provincial and Local government "that encourages the exchange of information, experience and best practices on urban development and city management" (SACN, 2013, p. 1). The report promotes the concept of urban resilience as "the capacity of a place to anticipate, respond and adapt successfully to challenging conditions, such as global recession, environmental threats or pressures of population growth" (SACN, 2011, p. 12). The report uses the concept as a central thread to tie together the multiple challenges that South African cities face, from social and economic issues, to environmental degradation and dwindling resources.

Contributions from academia and the SACN on urban resilience have since been taken up strongly by various levels of government policy around the country, most notably in the long term plans of a number of municipalities and provincial governments. Municipal and provincial policies that refer to urban resilience include: Johannesburg's Growth and Development Strategy (GDS) 2040, West Rand District Municipality's Regional GDS, the Gauteng Provincial government's Green Strategic Programme, City of Tshwane Metropolitan Spatial Development Framework 2012, eThekwini Municipality's State of the Biodiversity Report 2012, and the City of Cape Town's Environmental Agenda 2009 – 2014. While the National Development Plan (NPC, 2012) does not refer directly to urban resilience, it does discuss resilience in terms of social and economic adaption to climate change, and to "spatial resilience" under the heading Transforming Human Settlement (NPC, 2012, p. 277). Currently, work is underway in national government on a national urban policy, known as the Integrated Urban Development Framework (IUDF), and the indications are that 'resilience' will be used as one of the key framing concepts (Harrison, Personal Communication, 2013).

More recently, some work has been done focussing on the link between informal settlements and resilience, specifically the value of the concept of resilience in

transforming informal settlements into more sustainable and liveable environments. The first is research undertaken on Plastic View Informal Settlement in Tshwane, by researchers at the University of Pretoria (Peres & Du Plessis, 2013). The work, inspired by considering the urban system as a panarchy (e.g. Holling, 2001), considers the resilience of the settlement viewed at different scales; from the wider city region of Tshwane, to the areas surrounding and including the settlement, to the settlement itself. At the level of the settlement itself, the paper proposes a similar argument to this work, that "the internal resilience of the informal community has been strong, showing high degrees of adaptability and capacity for the continual process of change that is one of the often ignored positive characteristics of informal settlements" (Peres & Du Plessis, 2013, p. 9). A second piece of work by researchers at the Human Sciences Research Council (HSRC) (Seeliger & Turok, Forthcoming 2013) considers Enkanini Informal Settlement, in Stellenbosch. Similarly to the work done at UP, the research considers Enkanini in the wider context of Stellenbosch and indeed the country. It notes how the resilience of the settlement affects and is affected by the resilience of the larger scales in which it is situated. Where the paper differs is that it recognises mostly the vulnerability displayed by the informal settlement of Enkanini, using the resilience perspective as an approach towards making informal settlements more sustainable and liveable. It does however note the potential of informal settlements to increase inclusivity in our cities and towns (Seeliger & Turok, Forthcoming 2013).

This work aims to extend research on urban resilience in South Africa, specifically as the concept relates to informality and informal settlements. Where the work differs slightly, is that it focuses on the existing resilience in Kya Sands Informal settlement, focussing on an in-depth analysis of the system at the scale of the settlement, down to scales of individuals and households. This is contextualised in the wider system through creating an historical profile of the settlement, and through interactions between the settlement and government authorities in the region.

2.4.2. An Equilibrist approach to Resilience

Traditionally, the concept of resilience is rooted in equilibrist definitions from ecology[10], where resilience is based on the ability of a system to return to a state of equilibrium following a disruption, or resist being thrown off a state of equilibrium in the face of disturbance. Simmie & Martin (2010) give three examples of equilibrist resilience from Hollings' (1973) original introduction of resilience "as a descriptive ecological term" (Brand & Jax, 2007, p. 1). The first type of resilience is 'engineering resilience', that sees systems as having one state of equilibrium "where resistance to disturbance and the speed of return to the pre-existing equilibrium" define resilience (Holling, 1973; Pimm, 1984, cited in Simmie & Martin, 2010, p. 28). The second is 'ecological resilience' where the size of the disturbance required to change a system's structure and/or function determines its resilience (Simmie & Martin, 2010, p. 29). The third is a notion of 'punctuated equilibrium' or 'multiple equilibriums', where resilience is dependant not on the ability to return to the same state of equilibrium as before, but to one of many possible new states of equilibrium (Holling, 1973 in Simmie & Martin, 2010, p. 30).

As mentioned in the introduction to this section on urban resilience, the two general theories included, lie on different ends of a continuum to one another. This is well depicted by the last type of equilibrist resilience, 'multiple equilibriums', indicated in the previous paragraph. This begins to move towards evolutionary or transformative resilience, yet still maintains the notion of a system being in a state of equilibrium, thus grouping it with equilibrist resilience.

The problem with the use of this equilibrist approach, from an urban planning point of view, presents itself in questioning whether urban systems are or ever can be in a state of equilibrium due to their 'complex-adaptive' nature (Simmie & Martin, 2010, although they ask this question about urban economies). This means that rather than being in a state of equilibrium, urban systems are in a constant state of evolution and change.

[10]Tansey**Invalid source specified.**, in (Du Plessis, 2008) describes this type of ecological thinking as 'old ecological thinking' and refers to what is called evolutionary/transformative resilience in this work as 'new ecological thinking'.

2.4.3. Evolutionary / Transformative Resilience or Resilience Systems Thinking

In response to the limitations of equilibrist approaches to resilience, more recent theories have emerged that describe resilience as a way of thinking and a capacity to learn and adapt, rather than as a well-defined descriptive or analytical term (Brand & Jax, 2007; Carpenter, et al., 2012). These theories come from different fields and are used to make up the body of literature describing an evolutionary or transformative view of resilience. These include, resilience systems thinking (from ecology) (Walker & Salt, 2006), and an evolutionary approach to resilience (from urban economics) (Simmie & Martin, 2010), the panarchy and adaptive cycle models (Gunderson & Holling, 2001), as well as an approach called 'multi-layered social resilience' (from development studies) (Obrist, Pheiffer, & Henley, 2010). Added to this are 'transformative resilience' (Gotham & Campanella, 2010) and, as mentioned earlier in this study, 'resilience as a boundary object' (Brand & Jax, 2007). Aspects of each of these make up the approach to ecological or transformative resilience taken in this research.

Walker & Salt (2006) propose a systems approach to resilience based on the acknowledgement that things change. The authors (2006, p. 31) define three concepts that make up resilience systems thinking. These are a) that humans and nature are not separate, making up one "social-ecological system", b) these social-ecological systems are complex adaptive systems and c) resilience is the key to sustainability in these systems. Added to these three points is an important emphasis on the learning and adaptive capacity of systems in describing their resilience. This includes the importance of the idea of panarchy and the adaptive cycle model in the theory of evolutionary resilience. Transformative/evolutionary resilience is discussed below under four headings relating to the four points above.

Social-Ecological Systems - Urban Systems

Humans, their constructs and actions are not separate from nature or 'the environment'. The term Social-Ecological Systems (SES) (Folke C. , et al., 2002; Gallopin, 2006; Walker & Salt, 2006; Obrist, Pheiffer, & Henley, 2010) has hence emerged to emphasise this connection, that we are all part of one system. It shows that anything can affect anything else, a fact that is becoming more and more apparent with globalisation and global phenomena such as climate change and international economic crises. There is in fact one SES - the world. For practical and analytical reasons in research however, the term social-ecological systems is mostly used in the plural, dividing the world into smaller sub-systems. In the case of this research, which takes an urban planning perspective and where no specific emphasis is put onto the ecology of systems, it is more appropriate to describe the focus of the study as urban systems, (international and regional urban networks, cities, towns and subsections therein) which are SES' (Du Plessis, 2008). This is not to say that parts of the context of urban systems (such as ecology) will be ignored, but it is important to avoid the misleading claim that the research focus is the relationship of society and ecology.

A useful concept in considering the connectedness of systems is that of panarchy (Holling, Gunderson, & Peterson, 2001). The term is an evolution of the notion of hierarchies, which are argued to be "burdened by the rigid, top-down nature of… [their] common meaning" (Resilience Alliance, 2013, p. 1). Instead of considering SES' in terms of rigid, linear top down structures, panarchy allows for the connections of all scales (in temporal, Euclidian and topological senses) of systems to be considered. The concept uses the prefix pan in two senses. Firstly is from the Greek god of nature, which emphasises unpredictable change, the sometimes destabilising role of nature and universality (Resilience Alliance, 2013; Holling, Gunderson, & Peterson, 2001). Second, it relates to the all-encompassing nature of the term (as with universality) where it is "Prefixed to nouns and adjectives with the sense 'in every part of, over the whole of'" (Oxford English Dictionary, 2013a). Considering urban systems as panarchies allows for the full complexity of systems to be considered (and prevents them from being fully understood as in the following section). Importantly, it considers adaptive cycles across different scales of the system that all influence and affect one another to differing degrees and rates. Nested

adaptive cycles in the panarchy of urban systems and SES' are expanded on in the following section.

Complex-adaptive systems

Urban systems are complex-adaptive systems (Batty, 2005 in (Du Plessis, 2009) (Goldstein, Lejano, Wessels, & Butler, Forthcoming)). This means substantially more than being 'complicated' systems as is well described by Walker & Salt (2006, pp. 34-35) in their comparative metaphors of 'bug world' and 'cog world'. Cog world, although made up of many cogs of different sizes all working as a complicated, interconnected system, is still predictable and linear in the way that inputs affect outputs. In bug world however, it is impossible to exactly predict what may happen and often difficult to describe even what has happened. This is because of the autonomy of the bugs in the system and the unpredictability and ever-changing nature of the environment or 'world' in which they find themselves. Unlike in cog world, "complex adaptive systems have emergent behaviour [...] the behaviour of the system cannot be predicted by understanding the individual mechanics of its component parts" (Walker & Salt, 2006, pp. 34-35).

Complex adaptive systems are self-organising, with non-linear dynamics (Folke C. , 2006), made up of independent and interacting components; with selection processes influencing these components (and on the outcomes of their interaction); and with change always being added (Levin, 1998 in Walker & Salt, 2006 p. 35). The concept of complex adaptive systems thus seems quite daunting, and with its endless complexity, impossible to comprehend (Karkkainen, 2005). The point is not to fully comprehend these systems, however. It is to acknowledge that they cannot be fully understood, controlled or predicted, and that they ought to be approached from a more realistic perspective where we "[e]mbrace uncertainty and unpredictability" (Holling C. , 2001). "In an urban context, this means that the traditional paradigm of planning for a predictable future is not only insufficient, but it may, in some ways, also be destructive" (Ernstson, et al., 2010, p. 531). For resilience, this means not predicting single events and putting up protection against them, but rather diversifying preparedness in anticipation and acceptance of the unknown. This means that planners can only be proactive to an extent, and must accept the reality that much of what they do must take place in *response* to unpredicted (and

unpredictable) change in the city. Accepting this may help planners accept unplanned for, unanticipated change in our cities, such as the growth of informal settlements.

An important point in terms of this research is that changes to any part of the system can affect other parts of it, with the possibility that a small change to one aspect can cause a large shift in the entire system (Walker & Salt, 2006). How this concept is valuable, along with that of a whole that encompasses nature and human society, is that it shows linkages in resilience. If parts of the system lose or lack resilience, this will cause a loss or lack of resilience in the larger system, and vice versa. This is useful in thinking about informal settlements and their residents as part of the city, rather than separate from, or in opposition to it. This concept is further elaborated on in the following section below.

Related to the interconnectedness of resilience across different parts of systems at different scales is the notion of adaptive cycles nested in the panarchy of urban systems (Gunderson & Holling, 2001). While the theory of adaptive cycles has not been applied directly to this work, it does warrant some brief attention here. Adaptive cycles are theoretical metaphors used to describe change and adaption in self-organising systems. There are four phases in the adaptive cycle model, including conservation, release, reorganisation and exploitation (Holling C. , 2001). These phases need not necessarily happen in this order, and as such do not necessarily act as a model of how change will happen. Where they are useful is that they acknowledge the continual change, growth, decline – flux - of SES', and of the nonlinear, or unpredictable, nature of this change. In the panarchy model, adaptive cycles happen at all system scales, and interact with one another across *all* of these scales. This reiterates an earlier point that change, disturbance, increases in resilience etc. at one scale will affect adaptive cycles of bigger and smaller system scales. Larger scales are generally slower changing and adapting, while smaller scales are generally faster (Holling C. , 2001; Gunderson & Holling, 2001). This relates to different levels of stability and adaptability across the entire system. This can be related to the argument put forward in this work, that the smaller systems of informal settlements are more adaptive and dynamic than the larger city systems they are part of, and the authorities that govern them.

Resilience and Sustainability

Van der Leeuw and Aschan-Leygonie (2000) argue that resilience should replace the concept of sustainability in the approach to 'environmental problems', citing some of the criticisms of sustainability, including its broad and sometimes ambiguous nature in their reasoning. While this is a good critique to make, it is not the concept of sustainability that they are critiquing, but rather a weak form and use of the concept. Walker & Salt (2006) do not see the concept of sustainability as a redundant one, although they also critique some of the more mainstream takes on it, mainly the notion that the efficient use of resources lies at its heart. Instead of dismissing sustainability, they see resilience as "the key to sustainability" (2006, p. 37). From this viewpoint, sustainability remains the larger overall discourse in which resilience is framed. Instead of seeing resilience as a replacement for sustainability, it should be seen as a practical driving theory for the larger concept.

Adaptive Capacity and Co-Adaption

"Resilience refers to an ability, capability or capacity, of individuals, social groups and even Social-Ecological Systems [not only] to live with disturbances, adversities or disaster" (Obrist, Pheiffer, & Henley, 2010, p. 286) but also to adapt, "innovate and transform into new more desirable configurations" (Folke C. , 2006, p. 260).

The definition above is the definition for evolutionary or transformative resilience that will be used in this research. It avoids equilibrist notions of resilience, defining disasters as isolated events, and provides not only for people and urban systems to persist with adversity, but to progress through and past it. Also, importantly, it shows some insight into how resilience is achieved, and to what it is that makes for resilient systems; the capacity to adapt (van der Leeuw & Aschan-Leygonie, 2000; Folke C. , 2006; Gallopin, 2006; Obrist, Pheiffer, & Henley, 2010; Simmie & Martin, 2010). This however refers not only to the adaptability of communities immediately affected by disturbance. For example, in Johannesburg, it would not only concern the adaptability of the city's growing informal settlements, but it would also pertain to the adaptability of the city; including but not limited to its residents, economy, ecology, government and services; in response to the unplanned for growth of informal settlements.

It is therefore important to find a balance between the need for external assistance and the capacity of a community to respond to change and adversity (Bankoff, 2004). It does not need to be as black and white as this however, and solutions need not be *either* implemented by planning authorities *or* by the communities of informal settlements. Here collaboration between the two should be promoted. Authorities could look to assist in building a community's resilience through creating enabling situations, rather than only striving for full, all-encompassing 'solutions'. In this way, the often limited resources of the authorities would be supplemented by those of the community, and vice versa. This is in line with the proposal of multi-layered social resilience (Obrist, Pheiffer, & Henley, 2010) that suggests, as a method of building resilience, strengthening capacities and enabling factors by facilitating and transforming access to social, economic and cultural capital.

Included in the adaptive capacity of a system is the ability of that system to learn (Wilkinson, Porter, & Colding, 2010; Gotham & Campanella, 2010). This again refers to the learning capability of different parts of the system, including communities and planning authorities at various levels. Adaptability can be driven by the shortfalls of systems, in other words, by learning from mistakes, and adapting constructively in the face of change or crisis (Holling C. , 2001) . Information is vitally important in the ability of urban systems to learn. Here, the two keys are the collection and representation of case-specific and up to date data to inform adaption and development and secondly, access to this information.. Folke et al. (2002) emphasise the need for combining different types of knowledge for learning. This relates directly to this work, which attempts to access knowledge from within Kya Sands Informal Settlement to be used as an alternative, or perhaps rather a supplement to information held by planning authorities, towards building resilience.

Lastly, regarding resilience, it is incorrect to look for one static outcome for urban landscapes, as my grandmother used to assert in saying "Jo'burg will be wonderful once it's finished", remembered by my mother and I when noticing the constant growth, development, degradation, improvement - *change* - in the city. There is no 'complete' or 'end state' to a complex-adaptive system like a city, and there is no way that it will cease to change while it continues to exist. In just this light, neither can the notions of resilience nor sustainability have a set destination (Obrist, Pheiffer, & Henley, 2010). Both are on-

going *processes* with the outcome (say from an urban planning perspective) being the strengthening and promotion of these processes.

2.4.4. A Normative Approach to Resilience: Positive vs. Perverse Resilience

The idea of 'resilience' is not an intrinsically normative. It refers to either the ability to rebound (equilibrist notions) or adapt (evolutionary notions) and does not distinguish between positive or negative system traits. These attributes could be investigated and measured without any reference to normative goals. Even as an analytical tool, the idea of resilience has value.

Having said this, resilience more often than not *is* used normatively when applied to systems, and certainly when applied to social-ecological systems. This is seen throughout many of the key writings on resilience where the overarching narrative considers resilience as a positive system state, or one that maintains or extends its positive system attributes (e.g. Holling, 1973; Holling, 2001; Walker & Salt, 2006). This dissertation takes a normative stance on resilience, and uses resilience to refer to positive system traits. This is done with an acknowledgement that there are negative or perverse forms of resilience.

At the National Colloquium on Urban Resilience 2012[11] a key point of discussion was the idea of perverse resilience. The argument was indeed that a normative view on resilience should be taken, and that "[t]he focus should… be on enhancing the transformative capacity of urban systems, and not the persistence of resilient but perhaps perverse system states" (Task Team on Resilient Urban Systems in Transition, 2012, p. 1). Delineating positive, as opposed to perverse, aspects of resilience, is a subjective task, as clearly illustrated by the case of informal settlements. There is a strong strand of thought in South Africa, and elsewhere, which represents informal settlement as perverse resilience, and looks forward to the eradication of this form of settlement. There is, however, equally a strand of argument which focuses on the role of informal settlement in enhancing the positive dimensions of personal and household resilience. The argument in this report is that evidence from Kya Sands in Johannesburg reinforces the latter argument.

[11] The colloquium was hosted by the University of Pretoria and the Centre for Scientific and Industrial Research (CSIR) on 1-2 August 2012 at the CSIR Knowledge Commons in Pretoria.

In its spatial form, there are many examples across history of perverse and negative resilience. The great cities of the world have shown high levels of resilience, but some cities have proven non-resilient (e.g. post-industrial Detroit). In South Africa, the City of Johannesburg, for example, has proven resilient in the sense of having survived the closure of the mines on which it was founded and having continued to grow strongly in terms of economy and population. However, within the city, perverse spatial arrangements, produced under Apartheid rule have also proven to be resilient but, fortunately, so too have positive dimensions such as the ability of the city to produce creative new socio-spatial arrangements.

Many spatial arrangements in Johannesburg (e.g. the separation of work and residence) undermine the resilience of individuals and households but some spatial arrangements (including the juxta-positioning of the Kya Sands Informal Settlement with the Kya Sand Industrial Park) clearly support resilience.

2.4.5. Urban Resilience Conclusion: The Ability to Change vs. the Ability to Stay the Same

I conclude this section on urban resilience by comparing Brand & Jax's (2007) use of resilience as a descriptive term and as a boundary object to the two conceptualisations of resilience introduced above. The first, an equilibrist approach to resilience, sees systems as being in some state of equilibrium or stability, and the ability of the system to retain or return to either the same or another state of equilibrium when faced with a disturbance. The second, an evolutionary or transformative approach to resilience, avoids considering Social-Ecological Systems as being in a state of equilibrium because of their complex and ever-changing nature. Here, resilience is seen rather as the ability of a system to learn from and adapt to change, recognising the inevitability and unpredictability of this change.

Boiled down into their fundamental forms, equilibrist resilience is the ability of a system to stay the same, and evolutionary/ transformative resilience is the ability of a system to change. This is similar to the balance required in resilience between stability and adaptability, between persistence and change or between predictability and unpredictability (Holling, Gunderson, & Ludwig, 2001).

While some authors such as Simmie & Martin (2010) argue that more recent notions of evolutionary resilience or resilience thinking should replace ideas of equilibrist resilience, I argue that *both* types of resilience have their place. This resonates with Brand and Jax's (2007) argument that on one hand, a scientific notion of resilience needs more clarity and consistency of meaning and use if it is to be used to measure and compare the resilience of different systems. On the other hand, more malleable and varied conceptualisations of resilience are useful in that they can be applied across diciplines (as boundary objects, with the same overall way of thinking but with different case or field specifics), and that these conceptualisations can be geared towards learning and adaption.

Just as Brand and Jax (2007) argue that both resilience as a descriptive term and resilience as a boundary object are important; both resilience as the ability to stay the same (equilibrist resilience) and resilience as the ability to change (evolutionary resilience) are significant. Here it must be noted that both do have their strengths and weaknesses. The positive side of equilibrist resilience is stability, while the negative side is inertia, or a limited ability to adapt to change. Evolutionary or transformative resilience consists of the opposite, with high levels of adaptability, yet limited stability.

When looked at in this way, resilience is a balance between the ability to stay the same and the ability to change. This is observed either in maintaining or moving towards positive system attributes in the face of constant, occasional, gradual or abrupt change.

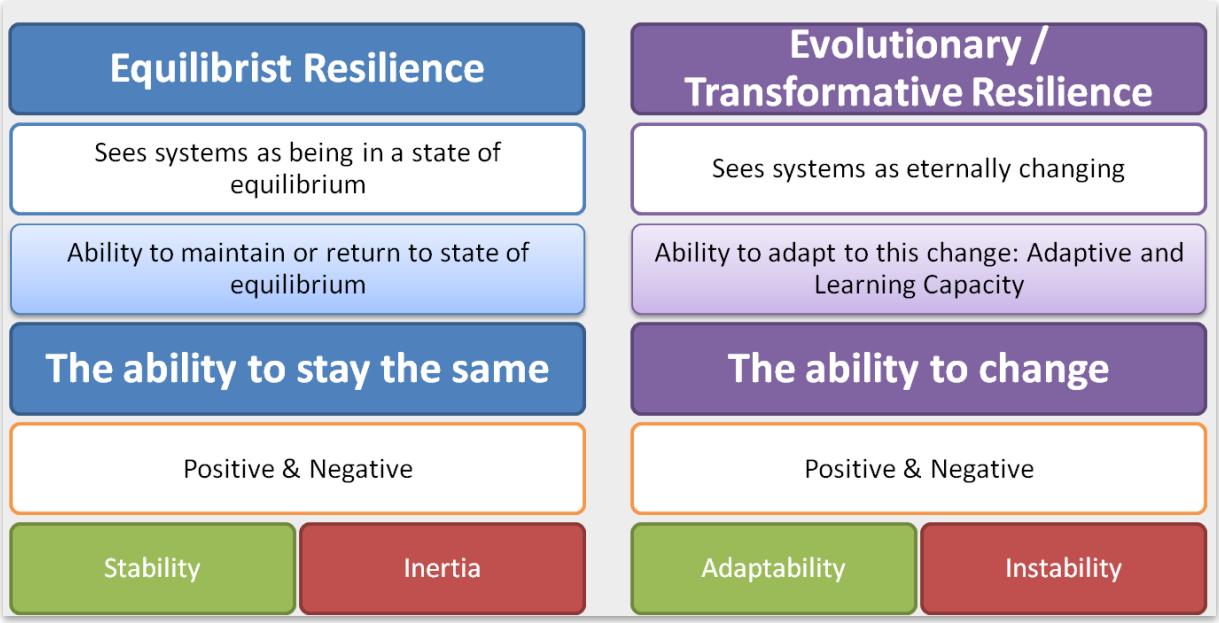

Table 2: Equilibrist vs. Evolutionary Resilience: The Ability to Change vs. the Ability to Stay the Same

2.5. Urban Vulnerability and Urban Resilience: Conclusion

This chapter has outlined and related existing literature on urban vulnerability and resilience. This leads into the next chapter on urban informality, and has begun to raise questions on how notions of vulnerability and resilience link to theory on informality.

The chapter has looked at two conceptions of urban vulnerability, seeing it as a practical term and as an alternative outlook on disaster. Practically, it is used to place emphasis on the underlying causes of what makes people vulnerable to certain hazards, and why some hazards, even of similar magnitudes, may have disastrous effects in certain communities or even households and have no effect in others. This is done to distinguish between exposure and vulnerability to hazards. Being exposed to hazards plays a large part in defining someone's or some community's risk to that hazard, but the focus on vulnerability stems from the idea that disasters are socially constructed. As vulnerability is a state created by social forces (including political and economic ones) so too can it be negated by social action. This is not always the case with hazards, showing the value of research into vulnerability and not only exposure to hazards. In this way, the vulnerability perspective also provides an alternative outlook on disaster. This promotes studies not

only into hazards themselves, but also into communities at risk, and into what it is that makes them vulnerable. This is also backed up by a realisation that hazards cannot always be predicted or avoided. Vulnerability to hazards can however be reduced, and communities' resilience enhanced.

The chapter then outlined some of the theory on urban resilience, and how it would be approached in this work. While many different types of resilience are defined, this work uses Simmie and Martin's (2010) grouping of these into two 'types' of resilience being Equilibrist and Evolutionary Resilience. The first looks at the ability of a system to maintain or return to a previous state of equilibrium during or following a disruption. Critiques of this approach include questioning whether systems are ever in a state of equilibrium, or if they continually change and evolve into new, either more or less desirable states, over time. This has led to the adoption of evolutionary resilience, predicated on the acknowledgement that things change, and based on the capacity of systems to learn and adapt to change.

The addition of evolutionary resilience should not replace equilibrist resilience, and for a system (such as a city) to be truly resilient, it should contain a good balance of the two. Where possible, it should be able to maintain stability in the face of change through pro-active, forward-looking planning. At the same time, urban systems should be able to adapt, learn from and react to unexpected change, for example the unplanned for and unexpected growth of informal settlements in our cities.

3. Urban Informality: Vulnerability or Resilience?

3.1. Introduction

While there is a large amount of literature on many aspects of 'urban informality', this chapter looks at the concept as it relates to the main themes from the previous chapter; urban vulnerability and urban resilience. In the previous chapter, the question posed in this chapter's title is explored mainly through a theoretical lens, as to whether urban informality and informal settlements represent vulnerability or a form of positive resilience. The chapter argues that while informality is often associated with vulnerability, it can also represent a strong form of resilience, as informality is flexible and adaptive to changing urban contexts.

The chapter starts with a short section on the terms 'informal settlement' and 'slum' and explains how these will be used in this research. It includes some local and international statistics on informal settlements and 'slums', in order to give a sense of the scale of the issue being addressed. It then introduces some of the literature and debates around informal settlements and informality as they relate to resilience and vulnerability.

The chapter argues that there are two broad perceptions and depictions of informality that I have termed 'informality as vulnerability' and 'informality as resilience' (see section 3.3 below). The chapter relates these two depictions of urban informality to the two on resilience, detailed in the previous chapter, being equilibrist resilience and evolutionary or transformative resilience. Both sets of theories are extremes at different ends of a continuum, with variations and combinations occurring in-between. It is useful to make this comparison however in order to relate the theories of informality to those on urban vulnerability and resilience.

3.2. Terminology and Statistics: Informal Settlements and 'Slums'

Terminology

Informal settlement can be defined through different characteristics, from building type, to tenure arrangement, to levels of formal service delivery. The South African Housing Code (Department of Human Settlements, 2009) for example gives five characteristics by means of which informal settlements can be identified. These are:

- Illegality and informality;
- Inappropriate locations;
- Restricted public and private sector investment;
- Poverty and vulnerability; and
- Social stress.

(Department of Human Settlements, 2009, p. 16)

While these features may be present in *some* informal settlements, it is insufficient to define informal settlements as those that "demonstrate one or more of the above characteristics" as is done by the Department of Human Settlements (2009, p. 16). After all, it is possible that *formal* housing be inappropriately located, have restricted investment and show signs of vulnerability, poverty or social stress. It is also possible for informal housing to be well located, and to house people with formal jobs. In this work informal settlements are restricted, as Huchzermeyer and Karam (2006, p. 3) do, "to those settlements of the urban poor that have developed through unauthorised occupation of land". This refers to the lack of *legal* authorisation by government (Jenkins, 2006), at least at the time of the settlements formation, and not to the informal tenure arrangements that are present in many informal settlements, including Kya Sands. It also excludes informal housing in the back yards of formal residences. Thus, a more (although not wholly) comprehensive definition, from the housing code, that relates to the first point in the list immediately above is:

> *"The residents of informal settlements live in a permanent state of legal-social insecurity as informal settlements lack legal recognition due to the unlawful*

occupation and/or unauthorized use of land and/or the illegal construction of houses upon land. Informal settlements are typified by the absence of formal planning and incremental, unplanned growth."

(Department of Human Settlements, 2009, p. 26)

Even with this definition and that of the lack of government recognition at the time of a settlement's initial formation, conceptual ambiguity exists when defining informal settlements. There are, for example, settlements that were initially unauthorised, but have now been given a degree of legal recognition. These, in this work, are still regarded as informal settlements, unless formal tenure has been granted to them by government. Similarly many apparently informal settlements (in Johannesburg at least) appear to have been established by authorities as sites for relocation or site and service schemes, evident, for example, in their geometric arrangement.[12] To date however, there is no official recognition of their origins, and the settlements are still regarded as informal although they technically fall outside of Huchzermeyer and Karam's definition above (2006). It is also possible for different parts of a single settlement to have different origins, calling for different definitions. For example, a settlement may have been started officially as a transit camp, or as a site and service scheme, and subsequently grown through the unauthorised occupation of land on the outskirts of the initial scheme. This would partially fit different definitions, but would ultimately be considered as an informal settlement on the whole. In Chapter 5 it is argued that Kya Sands informal settlement is one such case, where older sections of the settlement are unauthorised, and various emergency relocations resulted in an 'authorised' extension of the settlement. Thus, while I have loosely defined what I consider as informal settlements, the research recognises the complexities and ambiguities involved in defining them as fundamental to their nature. This is discussed further in the case study of Kya Sands when looking into its origins and growth, and into government intervention in the area. It is also argued that every settlement must be classified individually based on an in-depth exploration in each case.

[12] An example of this is a transit camp set up in Diepsloot in the northern extents of the City of Johannesburg in 1994 (Bénit, 2002). The site, called the 'Reception Area', was intended to be temporary and to house people removed from informal settlements in Alexandra (another part of the city) until formal accommodation could be provided (ibid.). The Reception Area in Diepsloot is still there today, however, and is listed in the City of Johannesburg's informal settlement data.

The word 'slum' is often used internationally when referring to informal settlements (Huchzermeyer & Karam, 2006, p. x). UN-Habitat (2010) for example defines ‘slums’ at a household level, as:

> *"[households] lacking one or more of the following five amenities: (1) durable housing; (2) sufficient living area; (3) access to improved water; (4) access to improved sanitation facilities; and (5) secure tenure."*
>
> (UN Habitat, 2010, p. 33)

Thus 'slum' can refer to the state of housing, living conditions and their access to services, and not necessarily to the lack of legal tenure or official authorisation, as with informal settlements. For example, in the Johannesburg case, certain localities, such as parts of Bertrams or Hillbrow, may be classified as ‘slums’ but are clearly not informal settlements as defined in this dissertation.

While the terms 'informal settlement' and 'slum' often overlap, they are not synonymous. The term ‘slum’ is used in this study where the source referenced uses the term (e.g. many of the UN-Habitat references), or when referring to international cases where the term informal settlement may not entirely fit. Other than that, the work will focus on informal settlements as described above.

Some Numbers

Just as ambiguity exists in defining informal settlements and ‘slums’, ambiguity–possibly better described as inaccuracy–is often found in the statistics on informal settlements. This inaccuracy relates to the very nature of informal settlements, where just as they are not regulated by any 'formal' processes or structures, accurate formal enumerations are hard to come by, and quickly go out of date (Huchzermeyer, 2011). An example of inaccurate data are shown in Figure 4 below, which overlays the outline of Kya Sands informal settlement, from the City of Johannesburg's records, over a 2011 aerial photograph of the settlement. In this superimposition the disparity between the two becomes clear. Huchzermeyer (ibid.) relates this frequent inaccuracy to the ever-changing nature of informal settlements (due to expansion, densification, migration etc.). The author even suggests that numbers are intentionally skewed at times to suit the agendas of those presenting them (NGOs, development agencies and government) for example, in

securing funding related to population size or number of houses in a certain settlement. So, while statistics and numbers are regularly and confidently presented as hard facts, these should always be read, if not with scepticism, then with caution. This is the case with this section which, through numbers, tries to give a sense of scale to the topic of informal settlements under discussion.

Internationally, figures and statistics are generally provided for ‘slums’ and not for informal settlements. In South Africa the opposite is true, and figures are given for informal settlements specifically. Thus, this section starts by giving international figures for ‘slums’ worldwide, then for Africa, and then focuses on informal settlements in South Africa.

It is estimated that 828 million people worldwide live in ‘slums’, with this number projected to grow to 889 million by the year 2020 (UN Habitat, 2010, p. 42). These ‘slums’ are unevenly distributed across the globe, with higher percentages of urban ‘slum’ dwellers in the so called 'developing world'. Sub-Saharan Africa is the region with the highest percentage of its urban population living in ‘slums’ making up the majority of urban dwellers at 61.7% (UN Habitat, 2010, p. 32). While internationally (as with population growth rates) urban growth rates have declined in recent years, ‘slum’ or informal settlement dwellers in Sub-Saharan Africa increase by around 7 million people a year (UN Habitat, 2010).

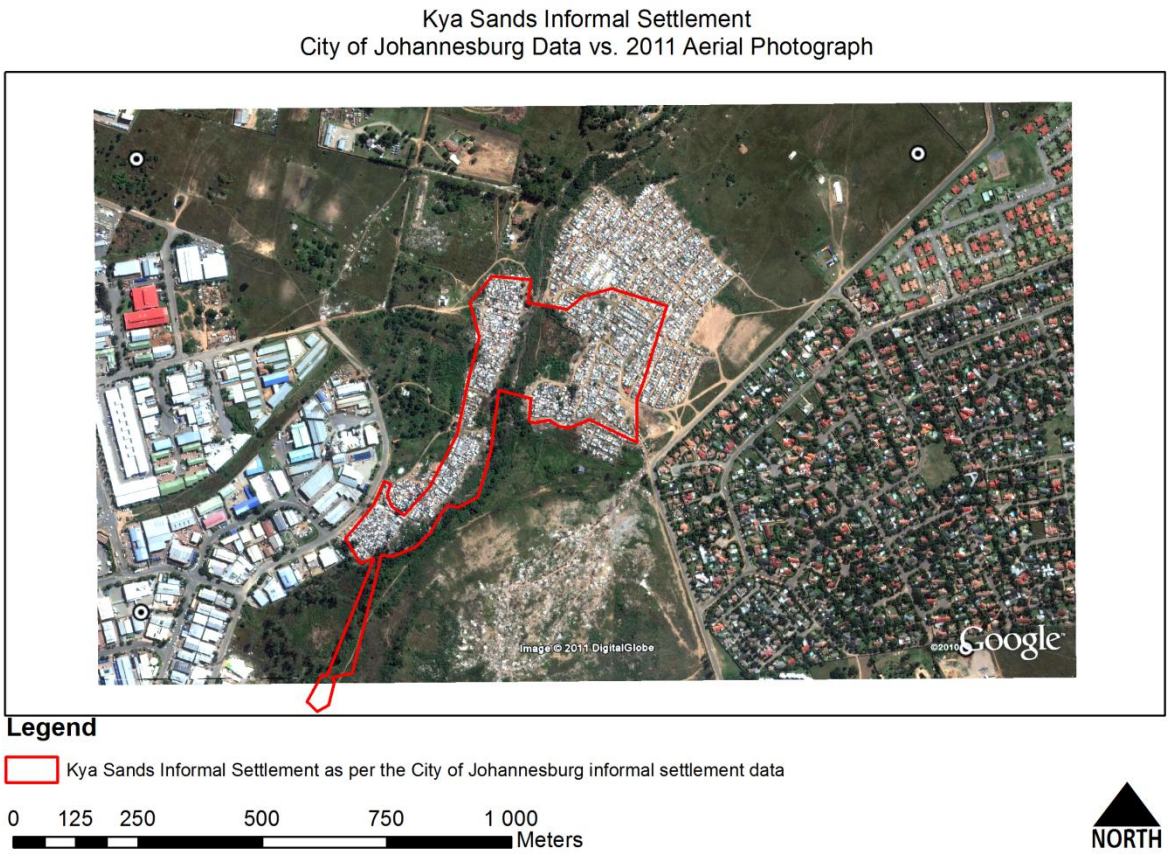

Figure 4: City of Johannesburg Data vs. 2011 Aerial Photograph

(Photograph: © 2011 Google, © 2011 Digital Globe) (Overlay: City of Johannesburg 2011)

In South Africa, some 1.96 million households are reported to live in informal dwellings (including informal dwellings in the back yards of formal residences or 'back yard shacks' [sic.]), with the number of informal settlements in the country having grown from around 300 in 1994 to more than 2600 in 2010 (Sexwale in (Sapa, 2010)). The census of 2011 has shown a decline in the overall percentage of households living in informal dwellings in South Africa, although the overall number has increased with population growth. In 1996, 16.2% of households lived in informal dwellings, in 2001, there was a slight increase to 16.4%, followed by a steady decline to 14.9% in 2007 and 13.6% in 2011 (Statistics South Africa, 2012). According to the 2011 Census of South Africa, in Gauteng Province (where Johannesburg is located) 18.9% of households live in informal dwellings, with 7.8% of these living in 'backyard shacks' and 11.1% in informal settlements (GCRO, 2012). This is second only to North West Province, where 21.2% of households live in informal dwellings (Statistics South Africa, 2012). This means that, in Gauteng, there are some

1,362,221 people living in informal settlements and 957,236 living in 'backyard shacks'[13]. In Johannesburg, there are around 180 informal settlements (City of Johannesburg, 2010, p. 21), including some 125,784 households (Statistics South Africa, 2012b) or 364,773 people[14] excluding 'back-yard shacks' and informally occupied buildings. Including 'back-yard shacks', informal households make up 17.4% of all households in the City of Johannesburg (Statistics South Africa, 2012a).

3.3. Urban Informality

> *"The key issue is not how to 'formalise' the informal, but how to [...] promote social and economic inclusion, rather than exclusion."*
>
> (Jenkins, 2006, p. 99)

While the terms 'informal' and 'formal' have been in use in anthropological writing since the 1960s, they were first applied to development studies in the early 1970s (Bromley, 1978, p. 1035). The concept of informality arose from that of the 'informal sector',[15] which was conceived in the early 1970s to describe the urbanisation of labour in Ghana in the preceding two decades (AlSayyad, 2003). One of the major advocates of the idea of the informal sector in its early days was the International Labour Office (now the International Labour Organisation, or ILO). The ILO initially focused on a particularly dualist notion of the formal and informal, seeing them as distinct and separate sectors, with this view mainly based on representations of the economy (Bromley, 1978). Although this dualist notion has been critiqued regularly since the late 1970s, it is arguably still very prominent in thinking on and policy responses to informality today.

Since its initial introduction to the economy and employment, the concept of informality has been applied to many aspects of human interaction. Informality refers to activities that have no authorisation from government, and that occur outside of official regulations and "as such, the concept is rooted in an approach that is state dominated"

[13] This number was achieved by multiplying the population of Gauteng province, 12,272,263 by the percentage of households in informal settlements and in 'backyard shacks' (GCRO, 2012). It is acknowledged that this may not be accurate, as household size in informal settlements and 'back yard shacks' may differ to the average household size across the province.

[14] Using the average household size in the City of Johannesburg (Statistics South Africa, 2012a).

[15] The term 'informal sector' was coined by Keith Hart (1973) in an influential paper on informal employment in Ghana.

(Jenkins, 2006, p. 85). According to this definition, the concept of informality is dependent on the existence of the formal sector, and can only be defined in comparison to it (Castells & Portes, 1989). So, while the practice of what is today described as informality (e.g. trading, building houses, travelling, working etc.) has been around since the beginning of 'human time' (Revell, 2010), the idea can only be conceptualised from the beginning of formalised human interaction.

Informality is essentially market-driven and caters towards the demand that government or the formal market *does not* or *cannot* accommodate. A common reason why formal sectors *cannot* cater to a particular demand is cost. Here, as informality flies under the radar of rates and tax (along with other reasons), government and the formal market simply cannot compete with prices offered by the informal market. This is often the case with informal housing (Cross, 2010). An example of a sector that government and the formal market *do not* cater towards (in South Africa at least) is free housing for non-South Africans. Here again, the informal sector may fill the gap. Informality is seen in all facets of urban life, including informal trading, employment, public transport, and most importantly to this work, in housing.

The concept of informality in housing, or informal settlements, arose at a similar time to that of the informal sector. This is not to say that informal settlements, as they are defined today, did not exist before then, but rather that they began to be described as such. Before this time, informal settlements in South Africa were referred to as ‘slums’, ‘shanty towns’ and illegal ‘squatter camps’ (Harrison, 1992). The first mention of the term 'informal settlement' that I have managed to find,[16] other than those referring to the informal settlement of disputes, is in a historical account of the Inca Occupation of South Peru in the mid-1400s, published in 1959 (Menzel, 1959, p. 131). While the text does technically refer to informal settlement as we know it today (it refers to informal dwellings on the outskirts of a formal administrative centre) the use of the term relating to modern cities, which were only established in the early 1970s, is a relatively new one. One of the more influential writers in relating informality to housing during this time was John Turner (e.g. (1972). Turner’s work is further discussed below, under the heading 'Informality as Positive Resilience', section 3.3.2.

[16] This was done through a thorough search of Google Scholar and Google Books

While informality is defined in this work by its lack of government authorisation or regulation, informal activities can overlap quite significantly with the formal market, and can indeed change from informal to formal over time as with the case of the South African minibus taxi industry, described by Barrett (2003). It is also possible for formal structures such as governments to act informally themselves[17] (Roy, 2009). This overlap is described by Jenkins (2006, p. 88) in saying that the informal-formal interface "is not a dichotomy but a continuum." This idea was introduced as early as the 1970s, with arguments against a dualist notion of formality and informality. Harris, for example (1978), argues that "as it is not possible to define [...] a precise boundary for the [informal] sector" it is impractical to study it as something that is separate and in opposition to the formal sector. Examples of the continuous nature of the formal and informal are seen in aspects such as informal housing in the backyards of formal residences, and through fruit bought formally at fresh produce markets being sold informally on the streets of the city. One of the clearest indications of this, in terms of the economy, is that money (certainly part of the 'formal economy') changes hands and is used both formally and informally, with both uses fuelling and affecting the formal economy.

AlSayyad (2003) describes two theoretical approaches to informality that have developed since the 1970s. The first considers "informality to be a marginalised sector, a temporary manifestation of underdevelopment characterised by survival activities of the urban poor" (AlSayyad, 2003, p. 11). The second acknowledges what Jenkins (2006) describes above as the continuum between the formal and informal, describing informality as "an essential, permanent component of a modern economy" (AlSayyad, 2003, p. 11). These are similar to Ananya Roy's (2003) two depictions of informality. Roy essentially describes a positive and a negative perception of informality (ibid). In this section, these two notions are broken down into basic terms, describing different views on informality and informal settlements. These are perceptions and representations of ‘informality as

[17] Ananya Roy (2009, p. 80) argues that just as informal settlements are often defined by their 'illegal' nature, building undertaken by government or other formal bodies that may fall outside of planning bylaws can be regarded as informal too. These are often not considered informal because of their modern 'formal' building methods and appearance. Another example is corruption, a manner in which governments and formal corporations may act outside of the ‘rules’ of government, thus acting informally.

vulnerability' and 'informality as resilience'. These are discussed under headings of the same names below.

3.3.1. Informality as Vulnerability

Two representations of informality as vulnerability are discussed in this section, one supported and the other rejected. The view that informality inherently represents vulnerability is rejected when used as a rationale or even as an excuse for its 'eradication'. Perceptions of informality as vulnerability that are based on case specific research undertaken towards reducing this vulnerability and promoting resilience are supported in this study. I argue that it should not automatically be assumed that informality and informal settlements represent vulnerability, but that the opposite should also be avoided, where informal settlement is over-romanticised, with the vulnerability that may be present ignored.

A great tension exists here, however. This is between the use of vulnerability as a *rationale* to intervene, and the use of it as an *excuse* to intervene. How can we distinguish, for example, between justified and unjustified demolitions and relocations of informal settlements? A 2011 example of this tension was seen in Thembelihle Informal Settlement in Lenasia, Johannesburg, where residents protested against relocation (amongst other demands) from what government authorities described as dangerous dolomitic land (SAPA, 2011). Residents, who did not want to be relocated, believed that "dolomite [was] being used as an excuse for removing informal settlements" (SAPA, 2011, p. 1). When are these decisions made genuinely in the interest of the safety and wellbeing of the community, and when are they influenced by external interests such as land development or the desire for formalisation? Conversely, when do the dangers associated with living in a specific informal settlement outweigh the advantages that people gain from living there, legitimately prompting relocation? Although answers to these questions are not necessarily ventured here, this section looks at depictions of informality, specifically informal settlements, as being vulnerable. It argues against views that all informality represents vulnerability, but recognises that vulnerability that may be present (and often is) in specific informal settlements should be acknowledged and acted upon. I start by looking at generally negative perceptions of informal settlements, giving

some examples of this, and then look at some of the hazards and vulnerabilities associated with living in informal settlements.

Informal settlements are often perceived and represented as being vulnerable (Roy, 2003). This view is taken by various parties, from academics to government authorities, when describing informality. Having said this, it seems to be a view more commonly taken by government and development agencies than by academics as is discussed below, where examples of this portrayal are provided, before introducing some critiques of the viewpoint. As suggested above, the view that informality is inherently vulnerable (to a variety of hazards) is often used by planning authorities as a rationale (or excuse) to intervene, frequently through forced removals and relocations (Huchzermeyer, 2009). This rationale may ignore some of the positive aspects that informal settlements present for their inhabitants, such as low housing costs and proximity to work opportunities. Thus, assessments of vulnerability in informal settlements should be done in conjunction with resilience assessments in an attempt to weigh the two up against one another. It is a complex and difficult balancing act, however. This is true firstly in trying to quantify the positives and negatives that informal settlements present to their residents and to the city at large. While indices comparing different variables can be designed and applied, it will never be a perfect science, with definitive answers that everyone agrees upon. This leads on to the second matter of complexity, which arises in comparing findings on vulnerability and resilience in the context of the myriad interests and points of view involved. These can include differences of opinion within the community, in neighbouring communities, between the community and local authorities, and even between different government departments and spheres. There is also the matter of political influence at all the levels mentioned here.

The perception of informality as vulnerability ties in with, and is supported by, the notion of informality as illegality; represented in extreme cases as criminality. An example of this is given by Parsons (2010, p. 4) who states that in 2005, "over 700,000 Zimbabweans lost their homes or source of livelihood or both, with street vendors branded as criminals to excuse tearing down their soapbox stalls". While informality is often technically 'illegal', it is, in most cases, far from criminal. There are obviously exceptions, where some informal activities, for example dealing in narcotics or government officials soliciting bribes are undoubtedly criminal. There are also criminal elements at play in many informal

settlements (Charlton, 2011). However, much informality, including informal trade and settlement, is benign and "human-needs-led" (Huchzermeyer, 2009, p. 62) and preventing people from meeting these basic human needs and rights (defined in the constitution, the highest law in South Africa) may indeed be a crime in itself.

Informality viewed as vulnerability also relates to the description of informal settlements as a 'problem' (Huchzermeyer, 2004b). This is done without adequately defining what this problem may be, and certainly without considering that informal settlements (at least from the point of view of informal residents themselves) can, to a certain degree, be seen as a solution. Depictions of informal settlements as the 'problem' ignore many of the real causal problems that lead to their creation in the first place. Huchzermeyer (2010) describes this approach as 'pounding at the tip of the iceberg'. Here, informal settlements are represented by the iceberg's tip sticking out of the water, with the contributing social, economic and political problems represented by the larger unseen underwater portion. No amount of 'pounding' at this tip will cause any meaningful shift in its underlying mass. Dealing with informality and informal settlements in this way is at best a short term 'symptomatic' approach that will neither improve the lives of the residents of informal settlements, nor meet the long term housing needs of our cities (Jenkins, 2006). While it is not suggested that there are no problems associated with informal settlements, I agree with Huchzermeyer (2004b) that the 'problem' of informal settlements needs to be redefined.

The problem is not the informal settlements themselves, but the often lack of constitutional rights that the residents of informal settlements enjoy (Huchzermeyer, 2004b) and the social, economic and political circumstances that necessitate the creation of informal settlements in the first place. The persistence of these circumstances despite almost 20 years of democracy in South Africa is a good example of perverse resilience, as discussed in the previous chapter. Apartheid and colonial policies and plans have had an extremely powerful lasting legacy on the country, a legacy that is likely to continue for years to come. “South African cities have remained profoundly divided, segregated and unequal despite sixteen [now twenty] years of concerted government efforts to extend development opportunities to the urban poor” (Pieterse, 2009, p. 1; Charlton & Kihato, 2006). The perverse resilience of Apartheid planning and policy will require a concerted effort and a great deal of positive resilience to overcome.

The ‘back-to-front’ way of thinking (of seeing informality rather than the social circumstances leading to it) is still present in government structures in South Africa today. An example of this is an article written in July 2011 by the Member of the Executive Council (MEC) for Human settlements in the Western Cape, South Africa, Bonginkosi Madikizela (2011). While the article starts with some promising sentiments, including the proposition of valid amendments to housing policy, the MEC portrays informal settlements and settlers as an obstacle to state housing delivery. He says "[a] serious problem is land invasion" and that "people are holding government to ransom by invading any land that is earmarked for development because they know that they will be moved to alternative accommodation" (Madikizela, 2011, p. 1). While in isolated cases this could be the case, it ignores human-needs-led 'land invasion' or housing that is not so much an obstacle to housing delivery, as it is an indication of the limitations of housing delivery in the country.

Although a critique is made of provincial and local government's general view on informal settlements, it must be noted that it is not a universal view held by government authorities and officials. While the view does exist in these structures, it is more of a systemic view, or a limiting characteristic of the system in which officials must act. Many people that work for these government bodies are sympathetic to the difficulties faced in informal settlements and in some cases have strong ties with them, possibly living or having lived in them themselves (Charlton, 2011). There are also examples of where progressive ideas on improving the lives of those living in informal settlements have been implemented in South Africa. In eThekwini[18] for example, as early as 1990, in-situ upgrading projects took place in Bester’s Camp informal settlement (Charlton, 2006). Here, despite policies and programmes not being in place to promote such work, the commitment to the work by those involved led to it materialising (Charlton, 2011). Another example is from the City of Johannesburg. Here the Executive Director of Development Planning and Urban Management (November 2006- December 2010) promoted progressive interventions in informal settlements such their regularisation (e.g. (Charlton, 2011; Harrison, 2008). Despite this drive, as has been mentioned, relatively little of this type of intervention ever took place in the city, with a good example being

[18] eThekwini Metropolitan Municipality is located in the province of KwaZulu-Natal with the City of Durban as its major economic and administrative centre.

Kya Sands informal settlement. This shows that even high level governmental support of certain ideas doesn't guarantee that these ideas will come to fruition.

While informality should not immediately be assumed to represent vulnerability, real vulnerabilities to hazards that exist in informal settlements should not be ignored. As mentioned in the previous chapter, speculating on hazards and vulnerability in informal settlements can have a negative effect. This is in that preconceived opinions can affect data as the researcher is looking for what s/he is expecting to find. However, in the media and research on informal settlements, there are clearly some trends that do present themselves. This is included to illustrate some of the vulnerability to certain hazards that often does exist in informal settlements. One of the major reasons for this vulnerability is the location of informal settlements. Informal settlers will choose land where they are least likely to be noticed and evicted (Huchzermeyer, 2009), thus informal settlement often occurs on land that is unused, and not likely to be used in the near future. Along with land reserved for other uses or development, this includes areas that formal planning authorities may deem 'undevelopable' and even dangerous, due to aspects such as flood lines; underlying geology classified as unstable; slope gradient; water table level and proximity to sources of potential toxicity such as landfill sites (Lewis & Mioch, 2005). All of these do pose potential dangers to people living on this land, but I emphasise the word 'potential', as it is not always the case that they come to affect residents. These can possibly be better described, instead of as undevelopable, as "not immediately available for development" (Huchzermeyer, 2009, p. 63) indicating that the dangers posed can be mitigated in certain cases.

Informal settlements are also often densely populated and poorly serviced. Here I refer to municipal services such as water, sanitation, refuse removal, electricity and access roads. When compounded, these factors can create the potential for hazards and vulnerability. For example, the lack of electricity requires residents to burn fires for heating and lighting, and the high density in many informal settlements means that fires, when out of control, spread very quickly through them. This is a regular occurrence in informal settlements in South Africa, with around 800 informal homes having burned down in Gauteng in July 2011 alone (Eye Witness News, 2011). With a lack of access, it is difficult for emergency services to enter the community, again compounding vulnerability to fire. Other potential hazards that the residents of informal settlements may face include

crime, violent crime, eviction, flooding and disease. Added to this is the lack of financial and job security when people are informally employed, described as unprotected by the formal labour market (AlSayyad, 2003).

While it is incorrect to assume that all informality represents vulnerability or a 'problem', it is naive to ignore the vulnerabilities that informal settlements and their inhabitants can and often do face. As argued earlier in this document, this must not be based on assumptions and preconceived ideas about informal settlements. Reports on vulnerability should be based on case-specific research into the vulnerability of individual communities, with this research undertaken towards building resilience, and not as grounds for eviction and relocation.

3.3.2. Informality as Positive Resilience

While informality is often perceived and represented as vulnerability, there is also a strong tradition, mainly in academic writing, that acknowledges the positive role that informality and informal settlements play. This relates to AlSayyad's (2003) second broad theory on informality (mentioned earlier in this chapter), which first and foremost acknowledges the existence of informality and informal settlement both currently and as a permanent feature of the world's cities. This eliminates the notion of ever being able, or indeed ever attempting, to 'eradicate' informality and informal settlements. Instead of wishing them away, this promotes engagement with urban informality and informal settlements and their integration into the city. It also moves away from dualist notions of the formal and informal that sees the two as being in opposition to one another. Rather, both the formal and informal are seen as part of one urban fabric and system. The section discusses this perception and representation, which I term ‘informality as positive resilience’. The section focuses on the positive roles that informality and informal settlements play, and on their inherent adaptability to changing social and economic contexts.

As mentioned earlier in the chapter, thinking and literature that recognises the value of informality is not new, with it being introduced at a similar time to the notions of informality and the informal sector themselves, in the 1960s and 1970s (e.g. (Turner, 1972; Harris B. , 1978; Turner, 1967). One of the most influential writers regarding informal housing at the time was John Turner. Turner was arguably somewhat ahead of

his time, writing about the positives of informal settlement (although he did not use the term 'informal', he called it self-help housing) as early as 1959 (Harris R. , 2003), some 14 years before the term 'informal sector' was coined by Keith Hart (1973). It must be noted however that Turner was not necessarily the originator of these ideas, but is credited for bringing "Latin American ideas about squatter settlements to the attention of urban scholars around the world" (Harris R. , 2003, p. 245). Turner introduced to the Anglophone world some very influential views on informal housing that sparked recognition of the positives that informal settlement can play. In his work, he advocated the ideas of self-help housing and of informal settlements as a solution rather than as a problem (Harris R. , 2003). He also critiqued the notion of centrally-administered housing provision, seeing housing rather than a product to be delivered, as a process or activity in his work *Housing as a Verb* (Turner, 1972).

More recently, many authors have built on Turner's ideas (and on those of his Latin-American counterparts), resulting in a strong literature that represents informality as resilience. What types of resilience then, do informality and informal settlements present, both in and of themselves and to the people who take part or live in them? Below, I look briefly at a few of the ways in which resilience is represented by informality, with a special focus on informal settlements.

Firstly, and most important to this work, is the *type* of resilience that informality represents. I argue here that it is mainly evolutionary/transformative resilience, as outlined in the previous chapter. One of the biggest strengths of informality is the high levels of adaptability to change that it makes possible. This change can come in any form, and can exist on different scales. For example, it may be the change of a single person or family moving from a farm to the city, or a downturn in the economy resulting in a reduction in formal employment. In fact, the reason that informality exists in the first place is due to people adapting to often adverse conditions in society, where they are excluded from formal markets (Parsons, 2010; Huchzermeyer, 2009). This reiterates the point made earlier, that informality supplies demand that the formal market cannot or does not supply. Thus, instead of seeing informality as desperation, a last resort, poverty or even as a coping strategy, it can be seen as innovation (Roy, 2003), enterprise and positive adaptability.

While some authors argue that the world's urbanisation is simply a movement of poverty from rural to urban areas (e.g. (Parsons, 2010), others recognise that though this seems to be occurring, it is not merely a move from poverty to poverty, but as a sign of ambition and an attempt to move out of poverty (e.g. (Saunders, 2010; Roy, 2003; Neuwirth, 2005; Cross, 2010)). Saunders describes informal settlements[19] as 'arrival cities' which "are not just the sites of potential conflict and violence but also [potentially] the neighbourhoods where the transition from poverty occurs, where the next middle class is forged, where the next generation's dreams, movements and governments are discovered" (2010, p. 3).

In line with this, one of the major benefits that informal settlements present their inhabitants is access to work opportunities. Just as Saunders (2010) argues for arrival cities, Cross (2010) argues that informal settlements provide access to two main factors, namely housing and/or jobs in the city (to which she adds access to schooling and healthcare). More centrally-located informal settlements are geared more towards job opportunities, while informal settlements on the urban periphery cater more towards housing (Cross, 2010). Informality provides access to the city for the poorest of the poor, a function that is not met formally anywhere else in the city. Due to this, Cross goes on to argue that much sensitivity needs to be shown in approaching informal settlements. She argues that even formalisation may have adverse effects for residents of informal settlements. This in that the rental price or price of rates and services in formalised settlements may be too expensive, causing those that are better off to move in, and the original inhabitants to move to another or a new informal settlement. Here too, formal housing may prove to be too rigid a lifestyle for people looking for work in the city. Jobs may be temporary or seasonal, and hence informal settlements may provide the freedom to quickly and easily move or depart from the city altogether.

Similarly to a platform from which to access work, informality can be seen as a driving force towards bridging the gap between the rich and poor, although this has had limited success in South African informal settlements to date (Huchzermeyer, 2009). This is particularly important in the South African context, where inequality has deepened since democracy first came to the country in 1994 (Bhorat & Van Der Westhuizen, 2010). This is

[19] Although (Saunders, 2010) doesn't use the terms informal or informal settlement regularly, referring more commonly to 'slums'.

again based on an exclusionary system, where although the country's economy has grown over this time, the growth has been independent of job creation, one of the reasons that it has resulted in extending, rather than closing the gap between rich and poor (The Economist, 2010). Here, the informal economy and informal settlements can offer openings that the formal cannot.

So what informality offers, when viewed as a form of resilience, is an opportunity to build a better life in spite of exclusionary formal systems. This resilience is more specifically adaptability on the part of those who practice informality, in gaining access to systems that they have no formal access to. Folke et al. (2002, p. 4) see this as a key component of resilience, where "change has the potential to create opportunity for development, novelty and innovation".

While informal settlements may present benefits for their residents, it must be recognised that, due to their adaptive and opportunistic nature, not all informal settlements will serve the same purposes; resilience and adaptive capacity across different settlements is not universal (SACN, 2011). Here, the location of specific informal settlements may give an indication of the reason for their functionality (e.g. access to work or affordability housing), but case-specific research into why people choose to live in certain informal settlements would be required to confirm this (Cross, 2010). This was included in my research in Kya Sands informal settlement.

While the positive roles that informality and informal settlements play should not be ignored, an over-romanticised view of informal settlements should be avoided too (Harrison, 1992). Here, some of the real vulnerabilities and hazards that exist in informal settlements and the difficulties of living in informal settlements should be recognised. Again, neither resilience nor vulnerability in informal settlements should be assumed, but should be based on case-specific research, as undertaken in this research in Kya Sands.

3.4. Equilibrist Resilience and Limited Evolutionary Resilience: Informal settlement intervention in the City of Johannesburg

A major point of departure for this work was the fact that planning authorities in Johannesburg have inadequately or at least ambiguously responded to the growth of informal settlements in the city. While informal settlements show resilience through their high levels of adaptability to changing social and economic geographies in the country (while at the same time showing vulnerability), the adaptability of city authorities to this change is relatively slow (although not non-existent). This section outlines the adaption of the City of Johannesburg to the growth of unplanned informal settlements in the municipality. This is done by looking briefly at informal settlement intervention in and by the City of Johannesburg. The section is based on interviews conducted with a former senior official at the CoJ and on the city's formalisation or regularisation policy. It shows that while intent exists to adapt and implement creative new informal settlement approaches (such as regularisation or in-situ upgrades) the 'city government system', its procedures, structures (both internally and between spheres of government), and bureaucracy limit concrete implementation. Thus it is not that *no* adaptability exists, with the system in fact having adapted and changed significantly over time. Rather, adaptability and creativity are inhibited and decelerated by the administrative and bureaucratic systems and departmentalisation in government. In other words, adaptability is a slow process. This can be related to Holling's (2001) work on adaptive cycles and panarchy. The author argues that each level of a social economic system "is allowed to operate at its own pace, protected from above by slower, larger levels but invigorated from below by faster, smaller cycles of innovation" (2001, p. 402). This refers to the pace at which adaption takes place at different system levels; pace that is fast at the smaller level (informal settlements in this case) and slower at the larger (urban government in this case) level.

Despite recent policy drives, both within the City of Johannesburg and in South Africa at large, to move towards in-situ upgrading and regularisation of informal settlements, relocation to formal 'green field' housing developments remains the dominant approach (Harrison, Personal Communication, 2013; Huchzermeyer, 2009). These drives include the

Department of Human Settlement's "Upgrading of Informal Settlement Programme" (UISP) in the National Housing Code (Department of Human Settlements, 2009), the same department's "National Upgrading Support Programme" (NUSP) (Department of Human Settlements, 2010) and the City of Johannesburg's "Formalisation of Informal Settlements Programme" (City of Johannesburg, 2008). While the details of the UISP and NUSP are not discussed here, some of the detail of the CoJ policy is looked at.

The formalisation (also known as regularisation) policy put forward by the CoJ was initially proposed in 2007. This was informed from three fronts. First was out of a realisation that relocation programmes could not meet the provincial target to 'eradicate informal settlements' [Sic.] by 2014 (Harrison, Personal Communication, 2013; City of Johannesburg, 2008). Second it was informed by international approaches to informal settlements, which inspired a high level city delegation to Brazil in 2007. Third is out of academic work which suggested that in-situ upgrading, in many cases, may be a more appropriate response to informal settlements than relocation (Roy, 2005). (Harrison, Personal Communication, 2013).

The formalisation project was an innovative one looking to fast track the awarding of legal tenure to the residents of informal settlements (that were deemed suitable) as part of the process of their upgrade. The main innovation was that the process need not go via the formal township establishment scheme, requiring, rather, an amendment to the town planning scheme. This could be done through an advert in the paper to inform the public and to call for suggestions and objections. This would be followed by a rezoning procedure to the category "Special for Transitional Residential Settlements" which "applies to land upon which informal settlements are established by the occupation of land and provision of residential accommodation in the form of self-help structures and some ancillary non-residential uses." (City of Johannesburg, 2008, p. 4). The city's infrastructure department would then alloate funding for the provision of infrastructure upgrades, and a layout plan for the settlement. This layout plan may require some reorganisation of the settlement to accommodate infrastructure installation and emergency access to the community (Harrison, Personal Communication, 2013) but would aim to keep "disruption of community networks […] to a minimum" (City of Johannesburg, 2008, p. 3).

At its inception, the project enjoyed good support from high level politicians and civil servants in the CoJ, and was enthusiastically accepted by both the Mayoral Committee and the City Council. The approach was also highly profiled in Mayor Masondo's state of the city addresses (City of Johannesburg, 2008; Harrison, Personal Communication, 2013). A steering committee and a city wide programme[20] were also set up that would coordinate not only upgrades, but all informal settlement interventions. The steering committee and programme had representation from the Planning, Housing and Infrastructure departments in the city, as well as the Gauteng Provincial Government (Harrison, Personal Communication, 2013).

Despite the intent, including policy and high level support, there have been very limited examples of informal settlements being upgraded in-situ in Johannesburg. This is attributed to a number of things. Firstly, while the inter-departmental programme and steering committee was set up, it was not provided with sufficient budget (Harrison, Personal Communication, 2013). This meant that work load would be added to the existing responsibilities of those involved in the programme. The second major issue is to do with departmentalisation and the different interests of the members of the project and steering committee. Housing was incentivised in a different way to planning or infrastructure, fundamentally being mandated to deliver a certain number of formal housing units a year. Thus the provision of tenure to residents of informal settlements would not help the performance scorecards of those working in the Housing Department (ibid.). Provincial government too had its own incentives, informed by their drive to 'eradicate' informal settlements by 2014 (South African Government News Agency, 2009). The regularisation programme was not aligned to these mandates, and aimed to enable the continued existence and upgrade of informal settlements, rather than their 'eradication'. Third were conflicting political interests at different scales. While, as mentioned, there was high level political support for in-situ upgrades in the CoJ, ward councillors in the city were more reluctant to support the approach. This was in that implementing the new approach would require ward councillors to return to their constituencies and change promises on 'give away houses' promoted by national government's Reconstruction and Development Programme (RDP) model of housing

[20] These were chaired by the (then) Executive Director for Planning and Urban Management, Prof Philip Harrison

delivery. All of this ended up with the institutional position of the formalisation programme being shifted from its original position in Planning, to Housing, and limited the implementation of the programme across the city (Harrison, Personal Communication, 2013; Maina, 2013).

While it has been shown that city authorities in Johannesburg generally favour relocation to in-situ upgrades, even the process of relocation is flawed. Here too the process is stifled by bureaucratic process and interdepartmental and inter-governmental blockages. As will be seen in the Kya Sands case, even when relocations have been decided on as the intended long term intervention, these interventions can take long periods of time to come to fruition, if indeed they ever happen. City administration, it makes it difficult to respond flexibly, creatively and quickly. Constraints here include the vast number of regulations, designed to prevent abuse and excess (Harrison, Personal Communication, 2013). These include processes of budgeting which happen at the beginning of the year, and can take time to be compiled and accepted. There are also requirements dictated by Integrated Development Plans (IDPs) that adds time to the process and again limits flexibility. Then there is the issue of different departments working coherently with one another, specifically Planning, Infrastructure and Housing, all needing direct involvement and collaboration. This comes back to the different individual interests of these departments, for example while planning may promote densification and central infill of the city, the housing department may favour cheaper land with less development constraints on the outskirts of the city. In such cases infrastructure may not be available, further slowing and adding cost to the process (ibid.).

So, while government certainly does have good intentions regarding informal settlement intervention and indeed high level support, the structures, bureaucracy, regulations and departmentalisation of government reduce adaptability, and cause a level of inertia. These very regulations, processes, checks and balances are however designed, as argued in this study, to promote equilibrist resilience or stability. They act, in a way, like fire breaks that prevent negative change from flowing through the system, and keeping the vast and complex system running as best it can. These same fire breaks, it is argued, also prevent positive change from flowing quickly through the system, inhibiting creativity, innovation and adaption.

3.5. Conclusion: Urban Informality, Vulnerability or Resilience?

So what then is the answer to the question posed by the title of this chapter? Does informality represent vulnerability or resilience? As seen in the sections on each above, the simple answer is that it represents both. While this may at first glance seem an expedient or simplified view, it is in fact underpinned by theoretical arguments put forward in the previous chapter on different types of resilience. Whether or not an informal settlement displays resilience or vulnerability depends on the *type* of resilience you are defining. I argue that in terms of equilibrist resilience, informal settlements and informality may be defined as vulnerable or lacking resilience, as they generally lack equilibrium or stability, although there certainly are informal settlements that are fairly stable. On the other hand, when approached from the perspective of evolutionary or transformative resilience, informal settlements show strong resilience. This resilience is in that they are adaptive to ever-changing contexts, creating opportunity from change, despite being excluded from formal systems and markets.

While the term 'resilience' has been used in relation to geographical constructs, such as cities and settlements, the fundamental concern is whether individuals or households are resilient (in both the equilibrist and evolutionary sense). The existence of the settlement is to provide the framing conditions of individual or household resilience.

Informal settlements have proven to be a relatively resilient feature of post-Apartheid cities, and this has been regarded variously as perverse and positive resilience. Not all individual settlements have been resilient, with some settlements having been demolished by the state but some settlements (including Kya Sands) have proven to be highly resilient, surviving despite opposition from neighbouring areas and, sometimes, hostility from the state.

More important than the fate of particular informal settlements is whether informality in the living environment supports or erodes the resilience strategies of individuals and households. Are individuals and households better able to cope and adapt because of the option of living in an informal settlement? This dissertation tends towards a positive answer towards this question. Household which do not qualify for the housing subsidy,

for example, are able to access land and shelter, often in better located areas than formal housing schemes.

The dissertation cannot conclude conclusively because it draws on the findings of one case-study but there are good reasons for arguing that the benefits of informal residence extend beyond this one settlement. In the end, however, the particular mix of positive resilience and negative resilience/vulnerability supported by an informal settlement is context dependent, and related to a range of factors including location of the settlement, and existence of environmental hazards.

Informal settlements also support the resilience of the larger system; of the city, city-region, and country. Because of informal settlements, cities in South Africa are able to absorb a greater population, bringing larger numbers of people into an alignment with job and livelihood opportunities.

4. Developing an Approach to Method

4.1. Introduction

This work aims to collect local knowledge on the advantages and disadvantages of living in Kya Sands, and to map and present it in a format that formal planning authorities can relate to. The purpose of the 'maps' is to highlight not only the negative but also the positive aspects of Kya Sands informal settlement, aimed at bringing balance to the generally negative light in which informal settlements are viewed by planning authorities. This is to guide risk mitigation interventions, as well as interventions promoting and extending the existing resilience of Kya Sands and its residents. These 'maps' should be accessible to the community and should ideally be used by them as a planning tool to assist in engaging with planning authorities. While the general approach has already been defined in the conceptual framework (and as described briefly above) this chapter looks at literature on mapping vulnerability and resilience.

The chapter is the third and final in the literature review section of this report. While it is included as part of the literature review, it is not intended to be a comprehensive review of existing approaches to vulnerability, risk and resilience assessment and mapping. It starts by giving a background to the field, looking at general developments and trends. It then focuses on a selection of methods and approaches that have provided specific inspiration to the approach taken in this study. These include community self-survey/grassroots enumeration, resilience assessments in social-ecological systems (Resilience Alliance) and a community resilience approach (Bay Localize, 2009). Following the introduction to risk assessment, I discuss each approach briefly under separate headings including a brief background to each process, what it entails (methods and outputs), and lastly how it will be used in creating the approach taken in Kya Sands informal settlement.

The chapter focuses on three aspects of resilience, vulnerability and risk assessment, namely, how assessments are undertaken, where they are undertaken from; and, who they are undertaken by. The assessments are undertaken by means of methods that range from technical scientific quantitative measures to social science qualitative ones. *Where* they are undertaken ranges from outside the community, more remotely, to

investigations within the area of study. Just *who* is doing the research is important too, and also involves who holds and uses the resulting data. This is also a spectrum ranging from outside, independent (to the community) persons or organisations, to the community undertaking it themselves, with combinations in-between. The chapter does not argue for one approach, but rather holds that a combination of approaches should be used. Research combinations are needed of the scientific and the social; views from within and without; and ought to be undertaken by a combination of community and outside bodies. While this is the case, the chapter also outlines the specific approach taken in this work, and why it has been chosen.

4.2. Risk, Vulnerability and, Resilience Assessment

Risk assessment and research has been carried out for most of human history. Risk assessments began "as early as human beings started to reflect on the possibility of their own death and contemplated actions to avoid dangerous situations" (Renn, 1998, p. 50). Formal risk and disaster research has developed since the turn of the 19th century, tending to gain momentum in response to large stresses and uncertainties such as wars and more recently, climate change and large scale climate events (Peek & Mileti, 2002; Strydom, 2002).

Risk can be viewed from many points of view and measured differently according to different contexts. Determining the risk associated with making an investment, for example, would be different to evaluating the risk faced by a colony of penguins to an oil spill. In this section, I focus on a specific type of risk; the risk that communities of people face in the form of hazards. This type of risk assessment is traditionally called disaster risk assessment or research, however, in the past two decades it has been incorporated into the wider field of development planning, including aspects of vulnerability and resilience assessments (Pelling, 2007). Despite focusing on this aspect, it is still a vast and complex field.

In this section, I introduce the idea of risk assessment or risk research, looking at different general methods in the field both internationally and locally. I show how approaches to risk assessment have evolved from technical studies from without, to more social approaches from within, with an emphasis on local knowledge rather than on expert

scrutiny (Renn, 1998). These two approaches can be likened to participatory and non-participatory risk assessments, which are also discussed in this section. While approaches are not explored in detail, the general aspects of and changes in the field over time are discussed.

In his thorough and well-researched paper, "Three Decades of Risk Research", Ortwin Renn (1998) outlines three approaches to risk research as technical, economic and social (from the social sciences, including psychology and sociology).

Technical approaches to risk look mainly at the likelihood of physical damage being sustained. They are often narrowly defined, looking at a limited number or sometimes only one hazard at a time. Technical systems use methods of modelling risk, using data available, and aggregating it over time to indicate risk profiles. Examples of this are fifty or one hundred year flood lines, which use past data to determine the risk of flooding in a river. Thus, technical risk analysis relies heavily on the availability of data over a long period of time. While this is positive and useful, it does have its limitations in relation to the complexities of any given society. Some of the critiques of the approach include:

- *Perceptions of undesirable affects depend on the values and preferences of those at risk.*
- *Interactions between human activities and consequences are more complex than average probabilities are able to capture.*
- *Risk analysis cannot be regarded as a value free scientific activity.*
- *Technical Risk analysis can provide only aggregate data over large segments of the population and over long periods of time.*

(Renn, 1998, pp. 55-54)

These are indeed similar critiques to those outlined in previous chapters of this study. While technical risk analysis can be useful in informing international, national, city region, or even city wide risk analyses, they are not generally designed for small scale single communities such as the Kya Sands informal settlement. This is not to say however that these types of techniques could not be used in smaller communities. Technical studies on risk would undoubtedly be extremely helpful. This could, for example, include studies into

water and soil quality in the settlement, and possibly health risks associated with these. This is particularly pertinent as Kya Sands lies adjacent to the now closed Randburg landfill site, and is bisected by the Kya Sands Spruit (river), as outlined in the following chapter. It would not be sufficient to assume the risk of this however; a technical study would need to be done. Another example could be to document the fires that the community has suffered over time and the areas in which they took place. This would be a valuable technical study into risk and vulnerability in the area.

The second type of risk analysis, outlined by Renn (1998), is economic risk analysis. This differs from technical risk analysis primarily in that it moves away from looking exclusively at physical harm. Economic risk looks at the likelihood of gains and losses, and not only in a monetary sense. The important aspect here is utility (ibid). Utility cannot be ascribed to economic value alone, and may sometimes seem obscure, even illogical to outside observers. It refers to choices made, and to how the pros and cons of these choices are weighed up differently by different organisations or people. A standard definition is "the intrinsic property of anything that leads an individual to choose it rather than something else" (Oxford English Dictionary, 2012). This definition is borrowed in this study, in looking at the reasons why people have chosen to live in Kya Sands. This is important because, as is seen in the following chapters, living conditions in the settlement are generally seen as undesirable, however people still choose to live there (although some report having no other option). The utility provided by Kya Sands to its residents is weighed up against the negatives of living there, and this–people's choice–is an important aspect of risk, vulnerability and resilience assessment.

The third type of risk assessment mentioned by Renn (1998), that has begun to incorporate aspects of vulnerability and resilience assessment, is social assessment. This is the most influential aspect of community assessment for this work. The general incorporation of social science influences in risk assessment is similar to their effect on planning theory. The origins of modern planning lie in a very technical and scientific approach, described as rational-comprehensive planning. In this approach, planners tried to separate themselves from the city, treating it as an understandable entity that could be objectively considered from the outside, and planned for accordingly (Feinstein, 2005). Feinstein explains how planning then began to incorporate more social approaches, including communicative and advocacy planning (ibid). These considered the individual

contexts and histories of cities, the promotion of social justice as the goal of planning, the need for the process to be more democratic, and the reality that planners cannot separate themselves from political and power considerations at all stakeholder scales (ibid).

In risk, vulnerability and resilience assessment research, one of the major influences the social sciences had, was to make the process more participatory. This refers to where assessments were undertaken from; who they were undertaken by; and, importantly, who holds and uses the resulting data. No longer was it sufficient for studies to be undertaken remotely without the input of those affected and without different stakeholders creating and presenting data of their own (Pelling, 2007). Technical risk assessments should be complemented by studies from within communities that take their preferences and opinions into account. They should also not only be carried out entirely or even largely by outside entities, but undertaken with at least strong input from the community, or even entirely by the community themselves. Pelling (2007) describes this as participatory disaster risk assessment (PDRA) and outlines a fairly stringent set of criteria for assessments to be considered participatory, noting that some approaches claim to be participatory but, in practice, are not. One of the important criteria is that of who holds the data collected. This is described further in the following section on community self-surveys. This is particularly relevant to this work, as participatory approaches are intended "to be empowering […] [and] to be a vehicle for negotiating change" (Pelling, 2007, p. 373). Another aspect that Pelling focuses on is that participatory assessments should be on-going, and should not be only one-off studies (ibid). Due to the nature of this dissertation, which is submitted towards a degree, it is not certain that it will fit this criterion. However, by sharing findings with the community of Kya Sands, it is hoped that it can be used and that it will lead to a manner of on-going process, managed by the community, or used as a starting point for outside researchers for further study into the settlement.

Social, technical and economic approaches all have a place in analysing the risk, resilience and vulnerability of communities at all scales. Although each approach or different sets of approaches draw certain critiques, they also contain certain strengths. Here, the different approaches should complement one another, addressing each other's weaknesses. This is argued by Susan Cutter (2010), who calls this integrated approach "vulnerability science".

Here, as argued in previous chapters on resilience and sustainability theory, vulnerability lies at the intersection of society, nature and the built environment, meaning that investigations into all three is needed at once. The author also argues for a mix of qualitative and quantitative data that would be able to supplement each other's shortfalls (ibid). This requires research at all scales too. It is as important to know which regions are susceptible to large threats such as earthquakes, and flooding, as it is to know which parts of single communities, such as Kya Sands, are more susceptible to hazards than others. Different scales of investigation also give insight into which communities are more vulnerable to large hazards or change; just as Kya Sands and the neighbouring middle-class suburb of Bloubosrand are likely to have different risk and vulnerability profiles, despite being separated by a single suburban road, Agnes Avenue.

4.3. Community Self Surveys/Grassroots Enumeration

One of the more influential approaches to data collection in informal settlements to this work is community self-surveys, also known as grassroots enumerations (Huchzermeyer, 2009b; Watson, 2010). While the methods are not directly replicated in this study, the outcomes, or at least intended outcomes, of the approach are taken as a major source of insight. As the names suggest, these are enumeration tools developed and undertaken (at least in part) by community organisations and residents themselves. These are used for two main reasons, both of which are relevant to this study. The first is to provide up to date data to planning authorities for use in planning interventions in informal settlements. This, importantly, includes local knowledge held by the community that would not usually be considered by planning authorities, due to the informal nature of its presentation, or indeed its lack of presentation at all. Second, it forms a basis against which communities can engage with authorities; negotiate and make demands (Huchzermeyer, 2009b, p. 277).

Community self-enumeration has been in used since the 1980s, having been introduced by an organisation in India named SPARC (Society for the Promotion of Area Resource Centres) (Watson, 2010, p. 6) who still facilitate community enumerations today (SPARC, 2011). The approach is an extension of participatory research methods where, in their purest form, communities will undertake their own enumerations, and not merely participate in a process orchestrated by outside bodies. In South Africa, many of the

enumerations undertaken are facilitated and driven by outside bodies and NGOs in cooperation with the community. An example of this is the enumeration project facilitated by the Community Organisation Resource Centre (CORC) and Shack/Slum Dwellers International (SDI) in Joe Slovo Informal Settlement, Cape Town (CORC, 2009).

Community surveys are an essential aspect of any informal settlement upgrade/ intervention process. They provide the often lacking basic information and mapping of settlements that is used to make decisions and develop plans. This includes basic counting of the people who live there, analysis of the structures in which they live, who owns these structures, levels of tenure security, access to services, and the nature of livelihoods and incomes in the settlement in question (Karanja, 2010). Some of these (other than the counting of people in the settlement) were directly replicated in this work. Three major differences are outlined between enumerations undertaken by outside organisations and grassroots enumerations.

- *Enumerations involve organisations formed by those living in the settlement, and questionnaires are largely determined by these organisations and communities themselves. Most of the data is also gathered by community members*
- *Enumerations cover the whole settlement, and not just a sample*
- *Data is returned to the community for verification*

(Karanja, 2010, pp. 217-218)

The major difference between the approach taken in this work, presented in this dissertation, and that of community self-surveys is that the community was not directly involved in the creation of questionnaires, nor were they involved in the process of collecting information and mapping it (other than through the assistance of a guide from the community, Thabo Motaung). In this work the questionnaire used was drafted by the researcher in consultation with his supervisor. While this is noted in the limitations sections of this dissertation, it was done due to time and financial constraints. Ideally, this work would continue to evolve, with the initial findings being used and critiqued by the community. This critique would highlight perceived weaknesses in the approach and look to rectify them. This process, again in its ideal manifestation, would be indefinitely on-going, evolving and advancing as the community does. As this is a masters project with

funding limited to its two year duration, it cannot be guaranteed that the project will be continued by the community after the project is completed and the study submitted to the university for assessment.

The other main difference between grassroots enumerations and this study is the type of information sought. While enumerations, as their names suggest, look to collect demographic information on communities, this work focuses more on qualitative data; in other words, people's opinions of Kya Sands. While the work does include some quantitative data collection, is not aimed at enumerating Kya Sands or creating a comprehensive demographic profile of the community. The vulnerability and resilience 'maps' created in this work would be well complemented by a community self-survey however, as the most recent demographic survey took place in 2009 (PMM, 2009), with a current enumeration by the Gauteng Provincial Government, started in January 2012 and currently on-going (Modikwe & Motaung, Personal Communication, 2012).

4.4. Resilience Alliance and Bay Localize: Resilience Assessment Workbooks and Toolkits

This section looks at two sets of specific resilience assessment and building toolkits/workbooks. The first set is from the Resilience Alliance (RA), and the second is from an organisation called Bay Localize. While the Resilience Alliance looks at the resilience of social ecological systems (SES), Bay Localize focuses on community resilience. Although neither set of workbooks/toolkits are used in their entirety in this work, both provide some guidance. Thus, this section goes through some of the strengths and weaknesses of the approaches they take as they relate to this work.

The Resilience Alliance: Resilience Assessment Workbooks

The Resilience Alliance is a research organisation made up of members from universities, government and government agencies from around the world[21]. The focal study area of the RA is social ecological systems the category into which urban systems fall (as argued in chapter 2) (Du Plessis, 2009; Goldstein, Lejano, Wessels, & Butler, Forthcoming). While

[21] The RA is made up of, among others: the Stockholm Resilience Centre, the Stockholm Environmental Institute (SEI) and the funders of this work, the South African National Research Foundation. For a full list of member organisations, see http://www.resalliance.org.

the workbooks discussed below do seem to have a slight bias towards the ecological aspects of SESs, the RA does recognise the importance of resilience in urban systems, a field into which they have started to move over the past five years (e.g. (Resilience Alliance, 2006).

The organisation has released two comprehensive workbooks on resilience assessment in social ecological systems. These are the Workbook for Practitioners, with the first version released in 2007 and a revised edition in 2010, and a draft workbook for scientists, released in 2007 (Resilience Alliance, 2007a; 2007b; 2010). As already mentioned, neither is used here in its entirety. This is partly because of the workbooks' focus on resource use, and ecological systems rather than the social aspects of social-ecological systems; and partly due to time and resource limitations. Because of their focus on resource use and ecological systems at the expense of other dimensions, it is questionable as to whether the workbooks can be applied as they are to complex urban systems, such as municipalities and informal settlements. Rather, certain aspects of the approaches can be used in framing urban resilience assessment, with some supplementation required from elsewhere, or through creating new approaches.

The two workbooks differ from one another mainly in their intended target audience, namely, those who are intended to apply them. While the workbook for practitioners assumes no prior scientific knowledge of resilience concepts, the workbook for scientists "is intended as a guide for those familiar with the basic concepts of resilience and systems dynamics" (Resilience Alliance, 2007b, p. 4). The two are intended to be used in parallel if possible, and it can be noted that they do contain many broad similarities.

The primary workbook looked at here is *Assessing Resilience in Social Ecological Systems: Workbook for practitioners* (Resilience Alliance , 2010). The assessment provides a step by step guide to assessing resilience in an SES. The workbook goes through five stages of setting out the assessment, and goes into fine detail, such as providing questions to ask as well as worksheets and diagram templates to be filled out during the process. The process is made up of the five stages summarised in Figure 5 below.

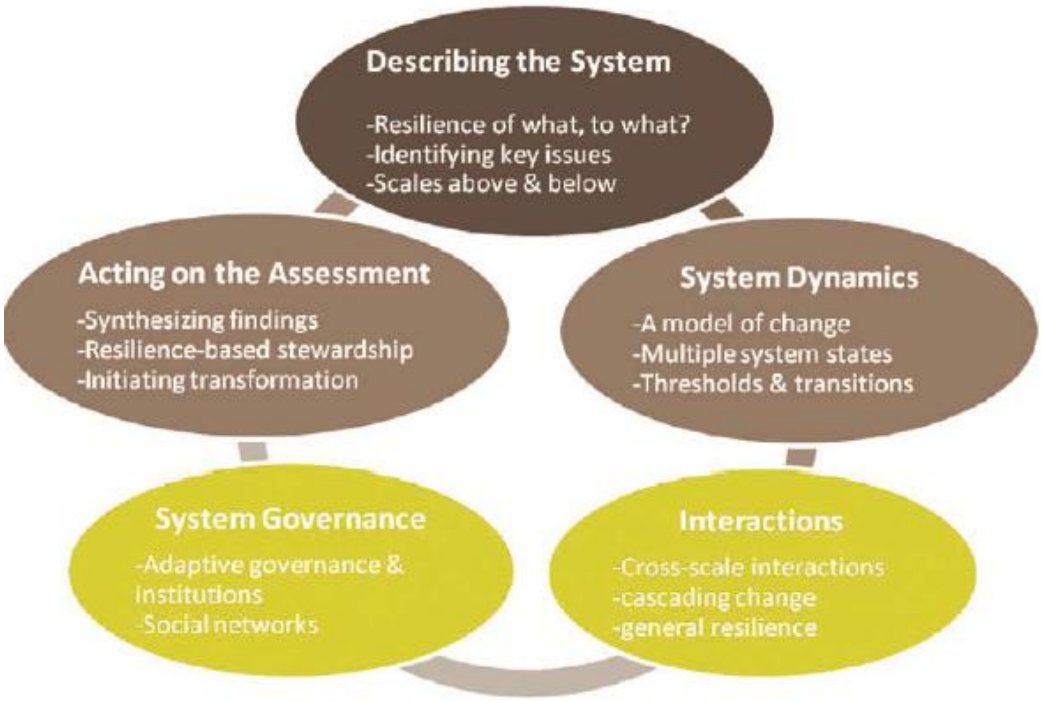

Figure 5: The Five stages of the Resilience Assessment Framework as outlined by the Resilience Alliance

(Resilience Alliance , 2010, p. 5)

The first step of the assessment is a vital one, and is included in both the workbooks for scientists and practitioners. This is "describing the system". Here, the starting point is to define the 'soft boundaries' of the focal system that will be examined. This includes physical boundaries (although this is difficult, due to the fact that an SES transcends physical boundaries); who the major stakeholders are; and the temporal boundaries that will be examined. The workbook for practitioners does this under four main headings:

- Identifying the Main Issues;
- Resilience of What? Key Components of the Social-Ecological System;
- Resilience to What? Disturbances, Disruptions and Uncertainty and
- Expanding the System, Multiple Space and Time Scales.

This is a very useful starting point to guide a resilience assessment, as defining exactly what will be investigated as necessary in any research. The resilience assessments are flexible and adaptable to different contexts, just as with resilience theory. They are also scalable, and can be done within the resource and time limitations of those undertaking them (Jamila Haider, Quinlan, & Peterson, 2012). This is important, as it acknowledges the

complexity of urban systems. An assessment that seeks to be all-encompassing would be unrealistic, in that it would fail to recognise the true (unlimited) complexity of social ecological systems. Resilience assessments should be done by defining the specific parts of a system that will be assessed, as well as the intended depth of the investigation. This is done not to conceptually simplify urban systems, but rather to recognise their complexity and to approach them in a realistic way.

As part of 'describing the system,' both workbooks include the task of creating a historical profile of the system in question. This is important, as it creates a context for what it being investigated. These historical profiles should identify "the times/periods of major events that changed the system" (Resilience Alliance, 2007b, p. 8) that could inform how the system may change, or how similar change or disturbance may affect the system going forward. Examples of the type of change or disturbance given are: environmental, ecological, economic, technological, infrastructural, political and demographic (Resilience Alliance, 2007b, p. 21). It is also recommended to look above and below the focal scale of analysis, and to create historical profiles for these systems, including both temporal and spatial scales. This acknowledges the interdependence of systems, and how change at one scale can cause change at another. For example, change in national government policy can certainly cause change at municipal level. Also, the history of an informal settlement would undoubtedly be influenced by the political and social history of the country within which it is situated. A profile of Kya Sands, including its history, is thus outlined in Chapter 5.

A second important aspect of the resilience assessment method that directly influences the approach taken in this study is the fourth step in the process, looking at governance systems. The section looks specifically at adaptive governance systems, and social networks. It asks questions such as "what key formal and informal institutions have a bearing on decision making within your focal system?" (Resilience Alliance , 2010, p. 38) and whether or not these constrain or enhance flexibility in the system. It argues that "Adaptive governance can enhance resilience by encouraging flexibility, inclusiveness, diversity and innovation" (Resilience Alliance , 2010, p. 37). The section is important in looking at the adaptability of government structures to the growth of informal settlements in the city of Johannesburg. The work argues that this adaptability is slow, although not non-existent. The section is also important in that it acknowledges the

importance of informal governance systems and social systems, another aspect that was investigated in Kya Sands.

Although the workbooks have provided direct inspiration to this study and although in this study urban systems are defined as social ecological systems, it is questionable whether the workbooks can be used as resilience assessments in urban systems without extension and adaption. This is due to three main reasons.

Firstly, despite the focal area of the assessments being described as the SES, it seems the focus of the assessments is actually on ecological systems, with an acknowledgement that they are related to social systems. This is evident in many of the examples given, which include systems such as reefs, rivers, lakes and forests. For instance, the workbook for scientists reads "you may be primarily interested in a marine park that is situated in a fishing zone or perhaps a larger marine reserve system… [or] a broader system (such as the Great Barrier Reef)" (Resilience Alliance, 2007b, p. 17). These systems are specifically defined by their ecological boundaries with interactions with social components, such as urban governance and economic systems, considered second. An urban resilience assessment may rather be defined by the boundaries of social or urban systems, investigating how these interact with ecological ones.

Secondly, leading on from the point immediately above, the workbooks set their focus on 'natural resource management'. The workbook for practitioners, for example, reads: "resilience assessment draws on research insights from complex adaptive systems and integrates a set of key concepts to provide an alternative way of thinking about and practicing *natural resource management* [emphasis added]" (Resilience Alliance , 2010, p. 4). While natural resource management is a vitally important aspect of the resilience and sustainability of urban systems, it does not seem appropriate as the sole or overwhelmingly dominant focus of investigation. While it is not suggested that the workbooks ignore the social aspects of systems, these aspects should arguably play a more central role. An urban resilience assessment may be better focused on building resilience and sustainability in urban systems viewed as social ecological systems.

Third, and most important, is that the general definition for resilience used throughout both workbooks is an equilibrist one, despite both documents being underpinned by

strong threads of evolutionary resilience. One such definition, for example, reads as follows:

> *Resilience… refers to the magnitude of change or disturbance that a system can experience without shifting into an alternate state that has different structural and functional properties and supplies different bundles of the ecosystem services that benefit people.*
>
> (Resilience Alliance , 2010, p. 5)

While this definition may be applicable in some systems, it is an inadequate universal definition for resilience. Both workbooks, at times, seem to assume the system in question is in a desirable or resilient state to start with, just as the definition above refers to supressing the ability of a system to move into an alternate state. It can certainly be argued however, that many urban systems around the world are not in a sustainable, resilient or desirable state. There needs to be recognition of this, and of how the transition to a different state is indeed sometimes desirable. This is where evolutionary notions of resilience become important. Having said this, it must be mentioned that there is some acknowledgement of systems possibly not being in a desirable state to begin with. For example, the workbook for scientists reads "[resilience] is important to either prevent the system from moving into undesirable configurations […] or mov[ing] from a less desirable to a more desirable configuration" (Resilience Alliance, 2007b, p. 15). The notion is however not consistent, mentioned almost as an afterthought, and in places fails to make itself understood.

While the RA's assessments may not be applicable as they stand, they certainly do contain concepts and aspects that can be borrowed from, and applied to urban systems. Step one of both workbooks, which look to define the boundaries of the focal system, as well as its historical profile, is a valuable starting point to urban resilience assessments, and the assessment undertaken in this work. The other valuable part of the assessment that is applicable to urban resilience assessments is the focus on system governance, recognising the importance of adaptive governance and institutions (both formal and informal) and of social networks.

Bay Localize: Community Resilience Toolkit

Bay Localize is a project located in Oakland in the San Francisco Bay area of California, in the United States of America. The project is run by the Earth Island Institute, which is committed to promoting and facilitating "grassroots campaigns dedicated to conserving, preserving, and restoring the ecosystems on which our civilization depends" (Earth Island Institute, 2012). It is a non-profit organisation and while it is based in Berkeley, California, it provides assistance to projects around the globe, of which Bay Localize is one.

In 2009, Bay Localize released their "Community Resilience Toolkit" (Bay Localize, 2009). The toolkit, similarly to the workbooks from the RA, provides a step by step workshop guide for, firstly, assessing the resilience of communities, and secondly, for formulating plans to build resilience. As this chapter is about resilience assessment techniques, I will focus on the assessment part only. Like the Resilience Alliance, Bay Localize has a focus on Social Ecological Systems (although this is not explicitly stated in the document). While, as argued above, the RA places emphasis on natural systems and resources and relates these to society; Bay Localize do the opposite, having a focus on community resilience, viewed through the lens of natural resources and the environment. It is argued that in this way, the two workbooks can complement one another well.

The social and community focus of Bay Localize is illustrated by the definition of community resilience that they use. The toolkit reads "Community resilience is a community's ability to withstand and recover from hard times. Even in the case of a widespread emergency, residents can meet their basic needs including food, water, energy, transportation, housing, and economic and social services" (Bay Localize, 2009, p. 5). This is quite a specific definition, and relates mainly to 'emergency' type situations or large shocks and disturbances. The situations the workbook focuses on are peak oil (with a subsequent need to reduce reliance on fossil fuel), economic downturns and catastrophic events such as flooding (linked to climate change) and earthquakes. An exception, where the approach relates to the idea of 'constant states of disaster' or undesirable circumstances to start with, is where it acknowledges that many "communities struggle to meet their basic needs even in the best of times" (Bay Localize, 2009, p. 4). All of the disturbances mentioned are specifically relevant to communities in California. This is one limitation in applying the workbook across different contexts.

The toolkit is made up of three sections. First, there is an introduction and guide to using and implementing the book. Second there is a chapter on “Evaluating your community” which receives attention here and third, is “Designing your plan”.

The preamble introduces some of the key ideas behind the workbook: who should use it and the purpose it is intended to serve. One key aspect of the workbook is that it is open to use and can be “distributed free of charge by non-profit or community-based organizations for public purposes” (Bay Localize, 2009, p. 2). The guide is also designed to be adaptable to different community needs other than those of communities specifically based in California. It states that it can be used by different sized community groups, from neighbourhood blocks to entire communities or specific groups such as faith groups and clubs (Bay Localize, 2009, p. 7). It also intends to be flexible in its use, stipulating that not all of its contents will be applicable to all communities, and that only those contents that are applicable should be used. This is similar to the workbooks released by the RA. It is not intended to be used as a definitive guide for action, but rather as a tool to empower communities and help them analyse their situations in planning action (Bay Localize, 2009, p. 6). In this light, the toolkit focuses on some key aspects in preparing for its implementation. These include a focus on community assets, that is, members of the community who may have skills that can be shared and drawn upon, and on the importance of local self-reliance; both of which are important in the context of informal settlement communities. The last important aspect of the introductory section is the need to create a historical profile of the community. Again, this is similar to the RA’s approach, and is something that is certainly drawn upon in this work, specifically in the following chapter.

Section two of the workbook details a workshop method of evaluating resilience in communities. It looks at resilience under four headings, as illustrated in Figure 6, extracted directly from the toolkit. These are equity; whether there are differentials in meeting basic needs based on differences such as race, gender, immigration status etc.; quality, relating to basic services such as water and healthcare; sustainability, focusing on the ecological sustainability of services in the community and whether climate change may affect this; and lastly ownership, which considers whether the community has ownership of any services provided, and the resources behind them. This is valid in Kya Sands, and was used, to an extent, in the fieldwork. The last section of questioning looked

at services provided in the community, at who provides them, and at how accessible they are. The residents' perceptions of services in the community were considered, such as sanitation, water, schooling, refuse removal and healthcare, whether provided by government, the community itself, or by outside organisations.

The toolkit then goes on, in some detail, to describe assessing the resilience of specific aspects of communities. These are divided into: 'local food systems', 'local water systems', 'local energy systems', 'local transportation and housing', 'local jobs and economy' and 'social services and civic preparedness'. Worksheets are then provided to rate each of these aspects in terms of the four resilience criteria illustrated in Figure 6; equity, quality, sustainability and ownership. This is done using a scale from zero to four in each case, giving a total scores out of sixteen for each theme, such as 'local water systems'. Included under each section are some suggestions on how to then set about formulating a plan for building community resilience. For example, each section gives examples (under headings) on how to 'learn more' (with suggested resources), 'change what you do', 'do-it-yourself', 'do-it-collectively', 'set local policy' and 'set state or federal policy'. Some of these influenced the method of investigation used in Kya Sands. The three main influential sections were local water systems (although this fell under questioning on services in the community in general), local housing (focusing on ownership, levels of satisfaction and safety), local jobs and the economy (looking at how people make their living) and, as mentioned earlier, social services, specifically where and how residents of Kya Sands access healthcare and education.

As with the RA workbooks and other assessment methods outlined in this chapter, while the community resilience toolkit provided some inspiration for this work, it was not directly borrowed from for a number of reasons. Firstly, as already mentioned, the workbook focused on impoverished Californian communities. While there are similarities, there are certainly some major differences. This is to be expected though, as argued throughout this study, that approaches are necessary that are tailored to the specific context under investigation. The approach has applicability however, and could be adapted for use in informal settlements in South Africa. This would require further research, but could be based on the useful general structure of the workbook.



Figure 6: Bay Localize's "Community Resilience Toolkit's" criteria for assessing community resilience

(Bay Localize, 2009, p. 5)

The Toolkit provides an approach that certainly encourages resilience assessment from within communities, and by communities themselves. This can be done either independently, or with the assistance of outside organisations, such as government agencies or NGOs. Where it differs from this work, in the method used, similar to community self-surveys, is that the work was done by myself, an outside researcher. It also differs in the scale of the community investigated. The Bay Localize toolkit, although it intends to be scalable, has a fairly wide reach. Where it is similar, is that it is undertaken from within the community, informed primarily by local perceptions, opinions and knowledge.

4.5. Conclusion

Just as planning theory has evolved from technical quantitative approaches such as rational comprehensive planning to include more social and qualitative methods such as communicative and advocacy planning, so have approaches to risk assessment evolved over time. This evolution has also generally been from technical to more social approaches, including some change in other areas too. Renn (1998, p. 49) argues that international standardisation of risk assessment techniques, especially technical approaches, can "obscure the conceptual foundations" of risk assessment and that "limitations of this method […] may induce a false degree of certainty when dealing with potential side-effects of human actions and interventions". He argues against the "routinization" of risk assessment with the acknowledgement that both social and technical approaches have their merits, and should both be utilised (ibid).

As with the evolution from notions of sustainability to resilience and vulnerability theory outlined in previous chapters, this should not be seen as a progression, with new theories and approaches replacing older ones. This chapter has shown how, although all approaches do have their limitations, so too do they have their strengths. The strengths of existing approaches should thus be maintained, with new approaches and theories addressing their weaknesses.

No one of the approaches to resilience, vulnerability and risk assessment is correct and, in recognising this, no one approach should be used exclusively. Rather, as argued by a number of authors (Cutter, 2010; Renn, 1998; Vogel, Moser, Kasperson, & Dabelko, 2007; Pelling, 2007), integrated approaches to risk, vulnerability and resilience are needed that complement one another. Using just one approach may reveal only one side of a multi-faceted story. Instead of hoping to implement a method that is all-encompassing, the one used in this work should, ideally be just one part of what Pelling calls a multi-methods approach (Pelling, 2007).

Figure 7 below attempts to conceptually show the spectrum of assessment approaches and techniques to risk, vulnerability and resilience in urban systems. This is done on three axes or spectra, including how assessments are undertaken, who is undertaking them and where they are being undertaken from. *How* assessments are undertaken lies somewhere

on a spectrum with purely technical, quantitative approaches on the one end, and social science-inspired qualitative approaches on the other. *Who* is undertaking them ranges from purely community driven and implemented social assessments, where communities both create and hold the data in question, to studies undertaken by outside organisations that could be government or other research entities. These entities would hold the information themselves, not necessarily sharing it with the community, and in extreme situations, even impose it on them. *Where* information is collected from is represented on the red axis. On one end is 'remotely conducted using desktop' studies, including secondary data on the community, and tools such as remote sensing, maps and aerial photography. On the other end is research conducted within the community that can be qualitative or quantitative. This could be a study such as the current one that utilises questionnaires and residents perceptions of the settlement, or technical observations, that do not involve input from the community, but instead undertake tests and various measurements (looking at aspects such as roads, built form and cadastral data). Approaches that encompass as wide a combination of the approaches as possible are ideal. An approach (or group of approaches) that truly meets this criterion would find itself placed at the intersection of all three axes in the diagram.

Just as different approaches are needed, these approaches need to take place at different scales. When looking at the effects of climate change for example, regional studies are important in order to ascertain how climate is actually changing in those regions. This may involve increased or decreased temperatures, rainfall, or extreme weather events. Although these changes may happen regionally, how it affects different communities will depend on their immediate context. A community settled on a ridge, would be less at risk to flooding than one whose settlement straddles a river, such as Kya Sands informal settlement. Communities' capacities to respond to changing conditions may also differ, where the well-off may be better suited to adapt to climatic change, for example, than the poor (Cutter, 2010). While the focus of this study is one informal settlement, the studies at the different scales above and below the settlement are vital to consider, when assessing the vulnerability and resilience of its residents. The diagram below also indicates this. It shows that assessments should take place at all scales (not necessarily by the same groups or researchers) including international, national, regional, city wide, and at the scale of single communities (Figure 7).

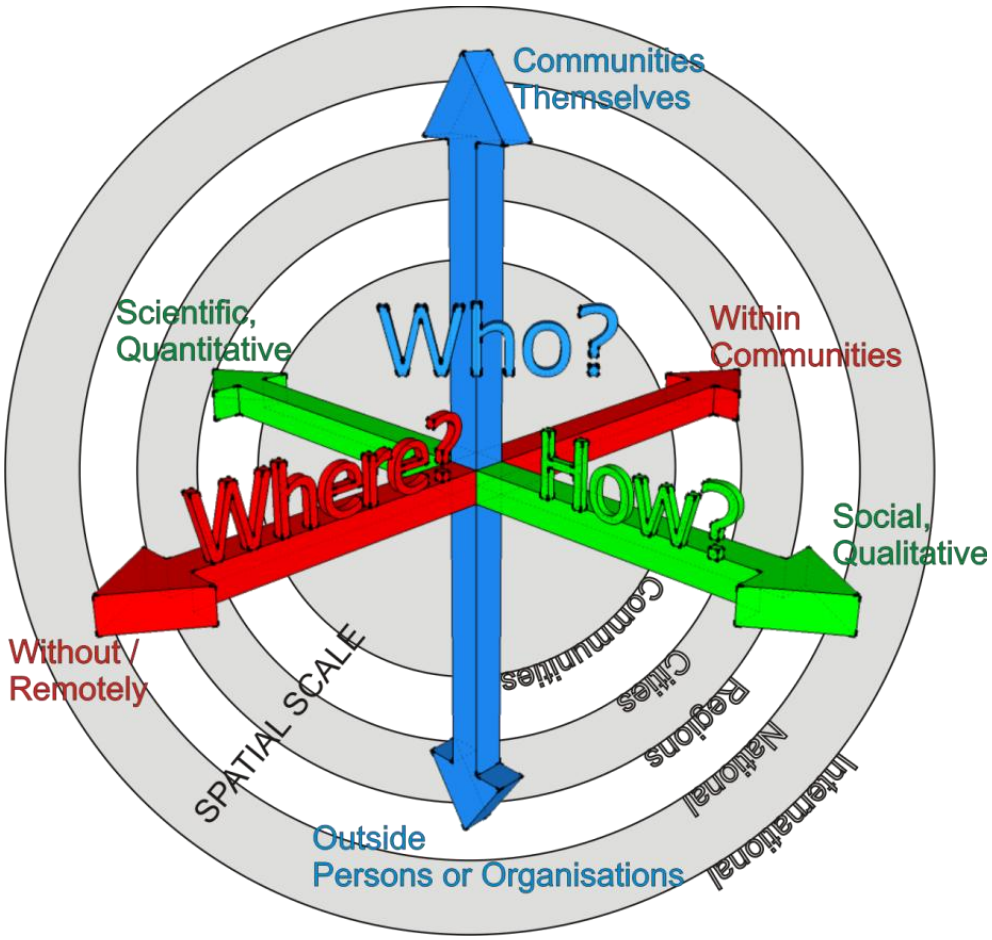

Figure 7: Conceptual Diagram of the Spectrum of Community Assessment Techniques, including who does them, where they are done from, how they are done, and the scale at which they are done.

(Diagram by author)

Having argued for a wide ranging approach for resilience, vulnerability and risk assessment, single studies may, due to various limitations, have to focus on certain aspects of community assessments. This is certainly the case in this study. The approach used in this work is situated mainly within the community, orchestrated by an outside researcher (myself) and using mostly a social and qualitative approach. All three are complemented, to a degree, by other approaches. For example, some remote sensing and secondary sources of data are used to piece together the history of the settlement and to assess how it has changed over time. Although the questionnaire was mostly qualitative, it did contain some quantitative aspects, and most of the qualitative responses were indeed quantified to give statistics and trends, as seen in later chapters. Where it was

indeed quite one sided, is that there was limited participation from the community in designing and conducting the research. The extent of this participation was gaining permission from community leaders to conduct the research, explaining what would be done, and providing them with the questionnaires that would be used. A guide was also used from the community. What has been done however, is that preliminary findings have been presented to community leaders in November 2012, with some suggestions made that have been incorporated into the final work. A website has also been set up, as discussed in Chapter 1. So, while the research does not claim to be purely participatory, it is inspired by participatory approaches, acknowledging the value of local knowledge and its potential role in the developmental process. This could better be described as a Community-Centred approach:

> *Community-centred approaches can allow the coming together of lay and technical expertise; they can open up space for marginalised populations to think through and mobilise responses to local structures of domination; and they can bring policy making closer to the local level, making policy makers more accountable.*
>
> *(Vermeulen, 2005)* Cited in *(Pelling, 2007, p. 379)*

5. Kya Sands Informal Settlement: Demographics, Background, and Authorities Response

5.1. Introduction

The Resilience Alliance (2010) argues that the starting point to any resilience assessment should be to create a historical profile of the system in question. This includes identifying "times/periods of major events that changed the system" with example categories given being: environmental, ecological, economic, technological, infrastructural, political, and demographic (Resilience Alliance , 2010, pp. 20-21). This is done to create context, and to compare current findings to historical ones. While not all of these categories are looked at here, this chapter's primary aim is to compile an initial current and historical profile of Kya Sands informal settlement. This would be initial in the sense that as far as is known, although information on Kya Sands exists, this is the first time that it has been compiled into a single source. It is also 'initial' in that a history and profile cannot be considered as complete, as it is continually changing, and based on a limited amount of information. Thus, as the settlement changes and more information about its history surfaces, so its profile, historic and current, will change. In this light, the chapter also recognises the limitations of the information presented, noting possible inaccuracies and omissions.

The chapter also aims to backup arguments put forward in previous chapters of this work using the case of Kya Sands. Firstly, planning authorities are generally ineffective in engaging informal settlements in Johannesburg, especially when it comes to long term interventions. While the City of Johannesburg has implemented some short term and emergency interventions, no implementation of 'long term interventions' (in the cities words (City of Johannesburg, 2007a) has taken place to date, and none are in sight. Secondly, the chapter looks to back up the argument that individual informal settlements have their own unique characteristics, and generalisation about them, leading to generalised responses, should be avoided. This leads to the argument that in-depth and case-specific research should be done on each settlement, where some sort of interaction and intervention will take place.

As it focuses on content and background, this chapter is not intended to be an analysis chapter, although where appropriate, some analysis is included. Sections such as the one

on demographics in the settlement merely present findings, and these are then discussed in the following chapter when looking at the positive and negative aspects of living in Kya Sands. The chapter contributes heavily to the webpage created for this work as discussed in Chapter 1.

5.2. Location and Geography

Kya Sands Informal Settlement (also known as Kya Sand, Dumping and Kya Centre) is located in South Africa's Gauteng province in Region A of the City of Johannesburg (CoJ), about 15Km north-west of the Sandton CBD (see Figure 8 below).

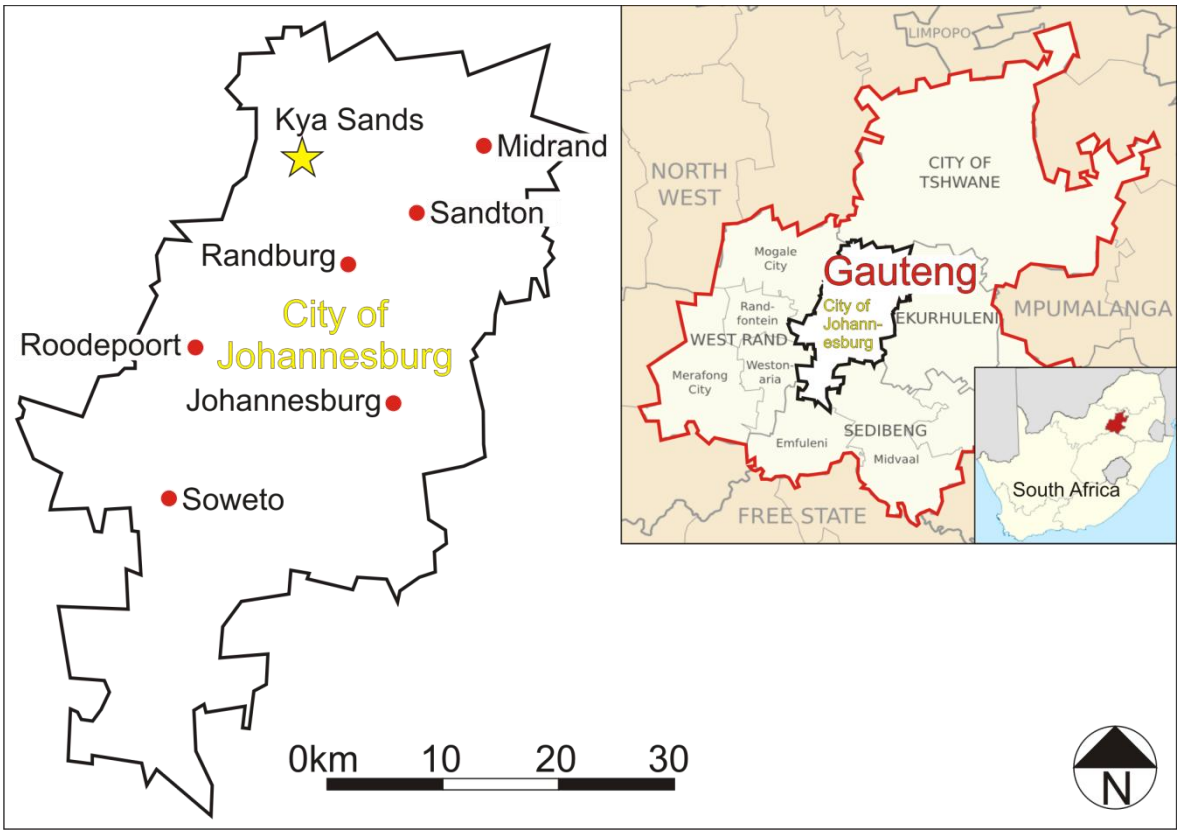

Figure 8: Kya Sands Informal settlement's location. Basemaps © Openstreetmap.org

Immediate Context

The settlement lies on either side of the North Riding Stream (or Kya Sand Spruit according to some sources) and is closely bordered by the Kya Sand industrial area to the west, the Bloubosrand residential suburb to the east, the Hoogland industrial area to the south (separated by the old Randburg landfill site) and mostly small holdings to the north. The settlement occupies both private and government-owned land, lying on 6 different farm and agricultural holdings. The privately owned sections of the settlement lie on the western side of the North Riding stream, with CoJ owned land including sections along the stream and the property containing the old Randburg Landfill site (Houtkoppen 193-IQ ptn. 46). Portion 51 of the adjacent farm Houtkoppen I93-IQ, on which a large portion of the settlement lies, is owned by South African National Government and administered by the Gauteng Provincial Government (GPG) (City of Johannesburg, 2007a) (see Figure 10 below).

Name

Kya Sands Informal Settlement gets its name from the adjacent industrial area, Kya Sand. Other popular names for the settlement include 'Dumping' and 'Kya Centre'. The settlement is also referred to as 'Kya Sand', 'Phomolong' and 'Kya Junction' by some residents.

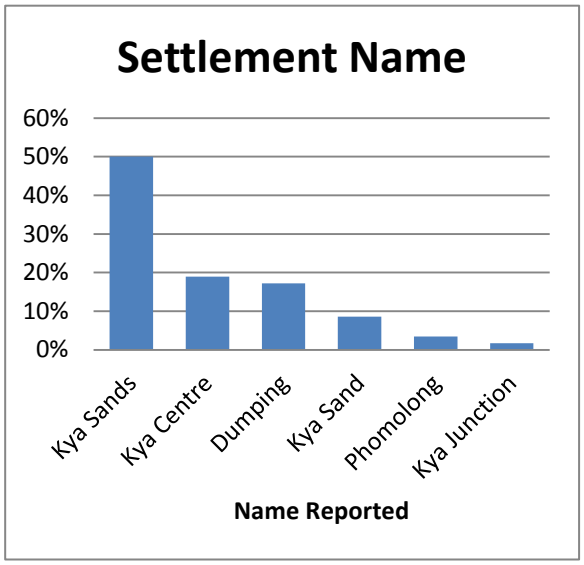

Figure 9: Percentage Ditribution of the Reported name of Kya Sands

Respondent 37 shares some of the history of the names of the area. She relates the name Kya Sand to the fact that sand used to be dug up there for industrial purposes and the name Dumping relates to the adjacent landfill site. She says "Before there was a dumping here there was sand. Kya Sand. It was a place to find sand to build the industry" (Respondent-37, 2012). It is assumed that the name Kya Centre is used due to its similarity to the name Kya Sands.

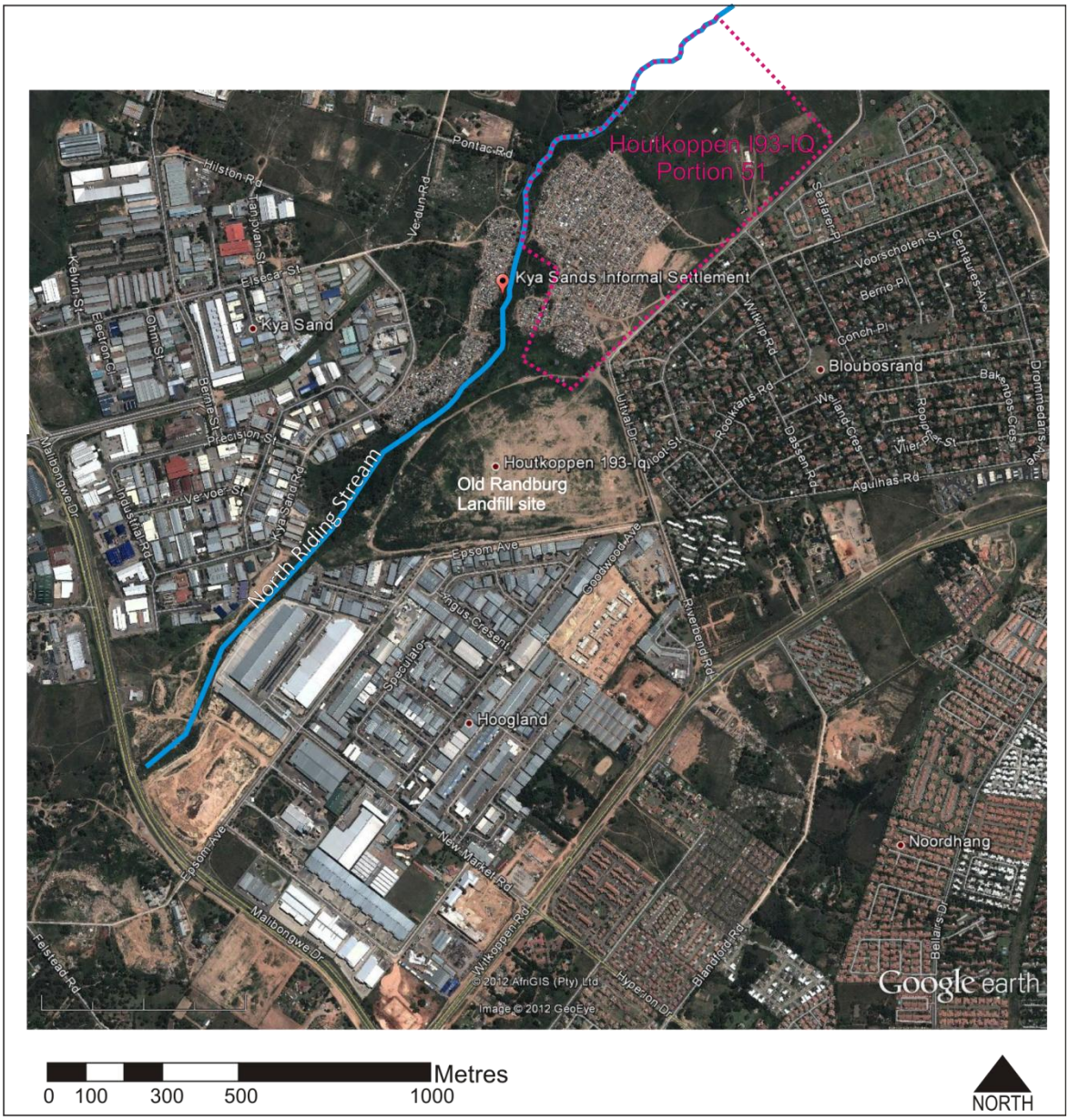

Figure 10: Kya Sands Informal Settlement and its immediate surrounds

(Aerial Photograph, suburb and streetnames: ©Google Earth, ©AfriGIS, ©GeoEye. Stream, and Farm Portion Overlays: Adapted from City of Johannesburg Corporate GIS. Kya Sands Informal Settlement Marker: Author)

Different sections of Kya Sands also have different names. The settlement is broken down firstly into Sections A to D. These are defined by government and are used in counting and numbering houses and toilets in the settlement. While access has not been gained to this data by the author (nor by community leaders according to Modikwe, 2012), a counting and numbering process took place during the latter part of the interview process for this work, in January 2012. Other names for the settlement include 'Pipeline', the whole section of the settlement east of the river, and 'Madala Side', the northern part of Pipeline. While these sections are indicated in Figure 11 below, the exact boundaries are not included, as this level of detail is unclear.

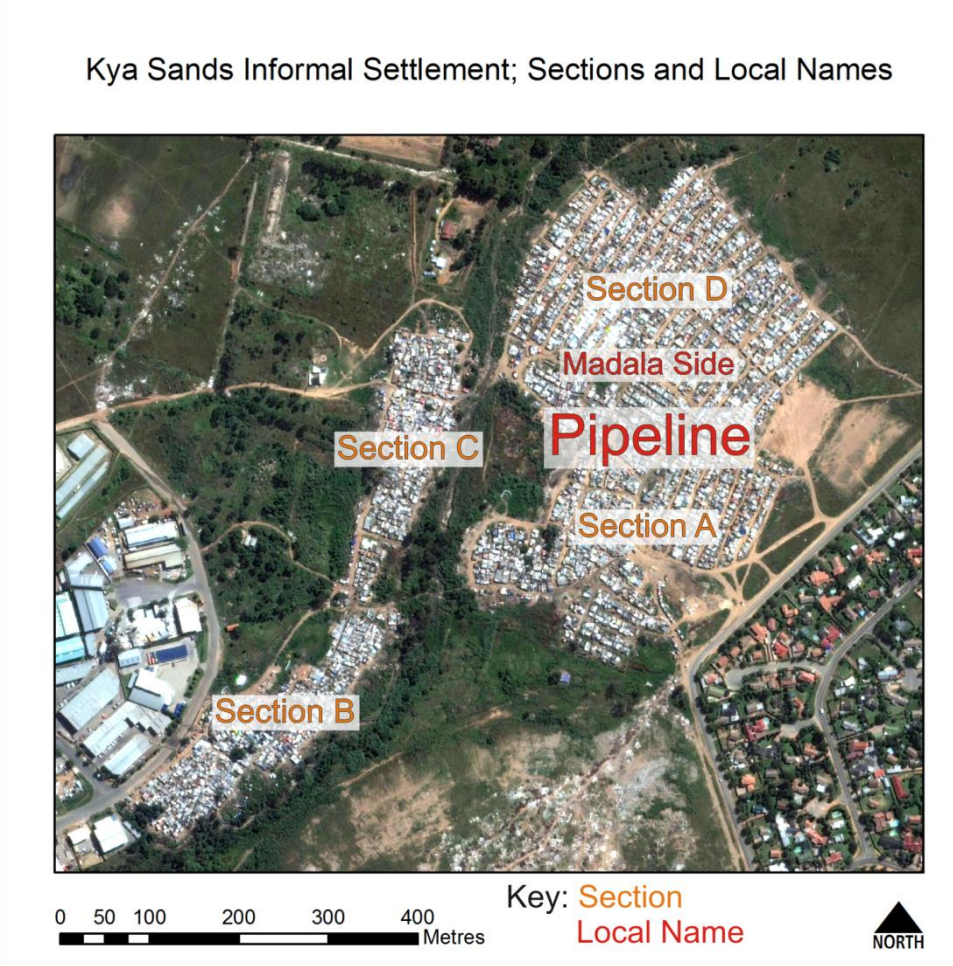

Figure 11: Kya Sands Informal Settlement, Sections and Local Names

(Aerial Photograph, 2011: Google Earth; © AfriGIS; © Digital Globe. Data source: Fieldwork Interviews)

Again, according to Respondent 37, Pipeline got its name as a piping company once used the area for storing its pipes (2012). It is thought that the name Madala Side, meaning old

side in isiZulu, is the same name as a section of the settlement that was relocated between 2006 and 2007. Residents were relocated from a secluded section of the settlement south of section B, to Pipeline, and the name Madala Side relocated with them (see Figure 24).

Services

Until 2007, the settlement had no formal servicing whatsoever, including water, sanitation, refuse removal or electricity. The settlement now has some basic services provided by the City of Johannesburg. These include a refuse removal service, potable water delivered through communal standpipes, basic lighting through scattered Apollo lights and chemical toilets (both private and communal) that are periodically emptied by the city. These services are discussed in further detail in section 5.5.1 below.

5.3. Demographics

As Huchzermeyer (2011) argues, because of their informal and ever changing nature, enumerations of informal settlements are not easy to conduct accurately, and quickly go out of date. This seems to be the case in Kya Sands, with differing reports on the number of people and households in the settlement emanating from different sources. Sources known to the author include the City of Johannesburg (2007a), Professional Mobile Mapping (PMM) (2009), a survey company commissioned by the CoJ, Growth Indicator Data from Geo TerraImage (GTI) (2010). Added to this is fieldwork and desktop research conducted by the author for this project. These are all referred to here as best as possible to give an indication of the demographics of Kya Sands, and to highlight and note possible limitations or inaccuracies in the data. This shows that while there is some idea as to what the makeup of the settlement is, it can certainly be debated.

Population Size

Regarding the population of the settlement, there are two figures available; the first from 2007 and the second from 2009. In 2007, the CoJ estimated that the population was made up of 7,500 people living in 1,200 'units' (2007a). In 2009 a survey was done by PMM that reported a population of 16,238 people living in 5,325 dwellings (PMM, 2009). Although these numbers vary quite substantially over the two years that separate them, the population of the settlement could have increased to that degree over that time

period. This is primarily indicated by the large increase in size (area) of the settlement in the period, resulting mainly from the relocation of people from the west bank of the Northriding Stream to portion 52 of the farm Houtkoppen (see section 5.5.1). With this (and with some natural growth) the physical area of the settlement grew by some 36% in the two year period. If this were directly proportional to population growth (which it almost certainly is not) and the 2007 number of 7,500 was correct, the projected 2009 figure would be 10,200 people. This indicates a few possibilities. First, is that the initial estimated number of 7,500 was somewhat low. Second is that the population grew disproportionately to the growth in area, in other words, densifying the settlement. This is backed up by survey findings from this work, where 12 respondents indicated that they moved to Kya Sands to live with family already located there, indicating the possibility of growth in population, without physical growth of the settlement. Third is that the number given by PMM may indeed be rather high. It is difficult to say with much certainty however, and a combination of the three seems likely.

The figure of 16,238 given by PMM (2009), can be compared to other data from the same year to question whether it is realistic or not. Firstly, from aerial photographs taken in 2009, the area of the settlement is measured at 0.156 km^2 (15.6 ha) giving a population density[22] of 104,089.7/km^2 (1,040.9/ha). At first glance, this seems extremely high, especially when compared to somewhere like the very densely populated area of Kowloon in Hong Kong, with a population density of 44,500/km^2 (445/ha) (Hong Kong Government, 2010). The Kowloon region, like many other cities and regions with high densities, does include open space and land with non-residential uses however, diluting the massive density. When looking at some foreign informal settlements, the number looks a bit more believable. Dharavi in Mumbai for example is reported to have a population density of more than 296,520/km^2 (2,965.2/ha) (Nijman, 2010, p. 8), almost three times the calculated density for Kya Sands. Dharavi is an extreme example however, and contains a fair amount of high rise buildings, increasing the density. When compared to Kibera, a large informal settlement in Nairobi, Kenya, the density is fairly similar, estimated at between 95,120/km^2 (951.2/ha) (Map Kibera Project, 2011) and Marras' highest estimate of 117,391.3/km^2 (1,174/ha) (2009). This indicates that although it is

[22] All population densities here are given in "people per km^2" followed by "people per hectare" in brackets.

surprisingly high, it is possible that Kya Sands has this very high density. The number is probably slightly exaggerated however. This is due to the way area of the settlement was measured by drawing a polygon tightly around dwellings and not incorporating any surrounding open space and little open space between houses (see Figure 24 p. 125). A smaller area would result in higher density figures.

Next we can compare PMM's figure to GTI Growth Indicator Data and data collected in this research. "Growth Indicator© is a spatial dataset that describes residential settlement patterns" (Geo TerraImage, 2010, p. 2). This is done by placing dots over dwellings, using a GIS and aerial photography, and repeating the process periodically to compare results, indicating change. One set of data includes informal settlements in Johannesburg, with dwellings counted in 2001 and 2009. This is similar to what was done for the sampling process in this research (described in Chapter 1). The Growth indicator data indicates 2,546 dwellings in 2009, while the sampling process from *this* work counted 3,292. When multiplied by the average people per structure (not to be confused with people per household) from surveys conducted in this work of 3.03 we arrive at 7,714 people and 9,974 people, respectively. While these numbers are lower than the PMM number, neither method of counting houses is not considered very accurate, as mentioned in chapter 1, and it is anticipated that if anything, they were undercounted rather than over-counted, recognising single roofs as single houses, that may indeed be more than one home. When comparing the GTI data to aerial photographs from the same year, it also seems that quite a number of homes were not counted, and that 'stands' were generally counted, rather than individual homes.

So while it is possible that Kya Sands has over 16,000 people, it is unclear and cannot be claimed with certainty. The survey conducted by PMM is the most recent and most thorough to date however, and population numbers from this survey should be used (while acknowledging possible inaccuracies) until another enumeration is conducted and released.

Population and Household Dynamics

Of the 60 interviews conducted it so happened that 30 were done with men and 30 with women through a process of random sampling (i.e. there was no specific attempt at achieving a gender balance). While this does not indicate with certainty that the

settlement comprises an equal number of men and women, it does indicate that there seems to be a natural balance of men and women in the settlement, and no clear majority of one gender as may be found in a settlement, for example made up of mainly mineworkers.

From the interviews conducted, 70% of households are South African, with the remaining 30% coming from Zimbabwe (17%), Mozambique (11%) and Malawi (2%) (see Figure 12 below). These findings differ substantially from PMM's findings (2009), which indicate that 95% of households in Kya Sands are South African. There is also a disparity in the makeup of foreign nationals in the settlement between datasets, with the PMM reporting that Mozambicans make up the majority of foreigners in the settlement, followed by Zimbabweans and Malawians with the (very small) balance made up of Batswana (Botswana), Basotho (Lesotho), Zambian and Swazi nationals (ibid). This disparity cannot be explained, yet again points to inconsistencies, possible errors (relating to sample size) or changes in population dynamics.

Of the 42 South Africans interviewed, the majority are originally from Limpopo province, at 55%. Next represented were the Free State and Mpumalanga, with 12% each. The remaining 21% came from Natal and the Eastern Cape (7% each), North West (5%) and only one respondent (2%) originally from Gauteng. None of the respondents were from the Western or Northern Cape, see Figure 13 below. As PMM (2009) did not report on South Africans living in Kya Sands' province of origin, these are (as far as is known to the author) the only statistics available in this regard.

When looking at respondents' province *or* country of origin, results were also of interest, as summarised in Figure 14. If countries and provinces are considered equally, most respondents are from Limpopo, followed by Zimbabwe, Mozambique, Free State, Mpumalanga, Eastern Cape, KwaZulu-Natal, North West, Gauteng and Malawi. This shows a high percentage of Zimbabwean and Mozambican respondents, when compared to different South African provinces of origin.

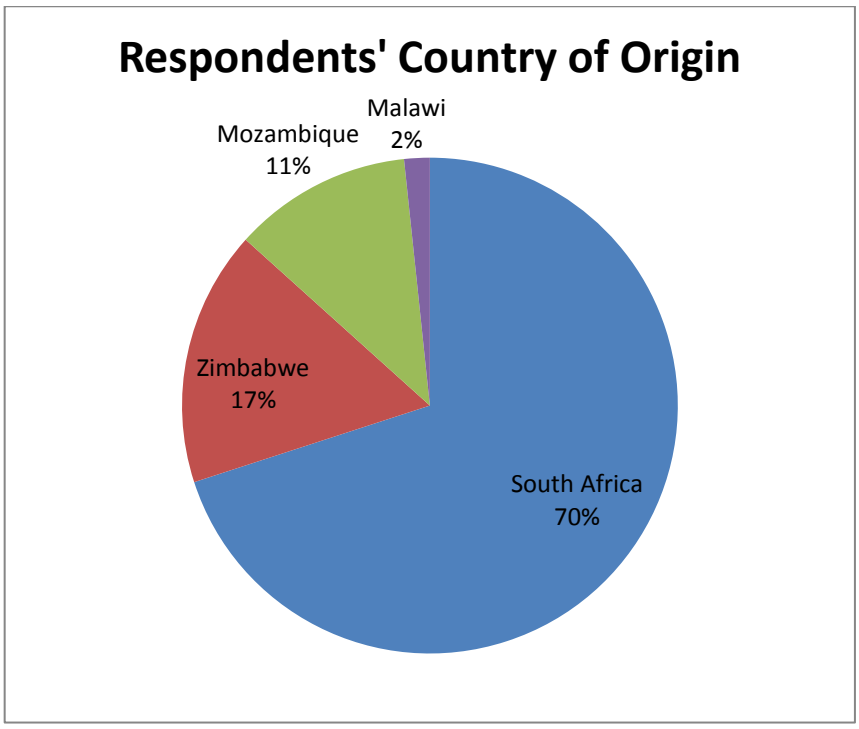

Figure 12: Respondents' Country of Origin (Source: Fieldwork for this Research)

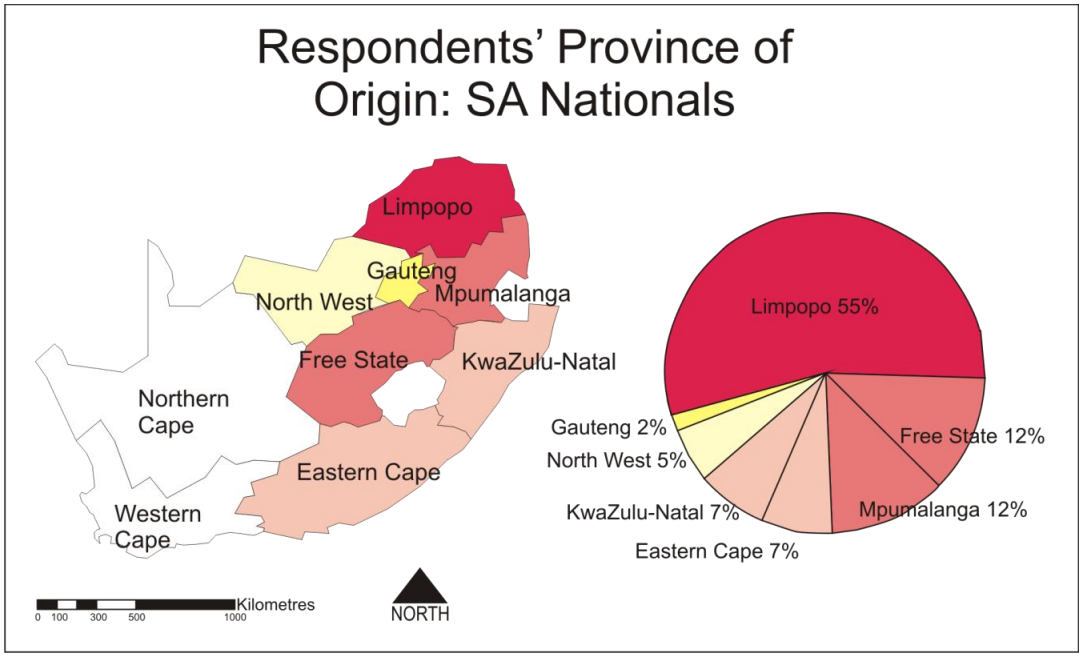

Figure 13: Respondents' Province of Origin: South African Nationals

(Source: Fieldwork for this Research)

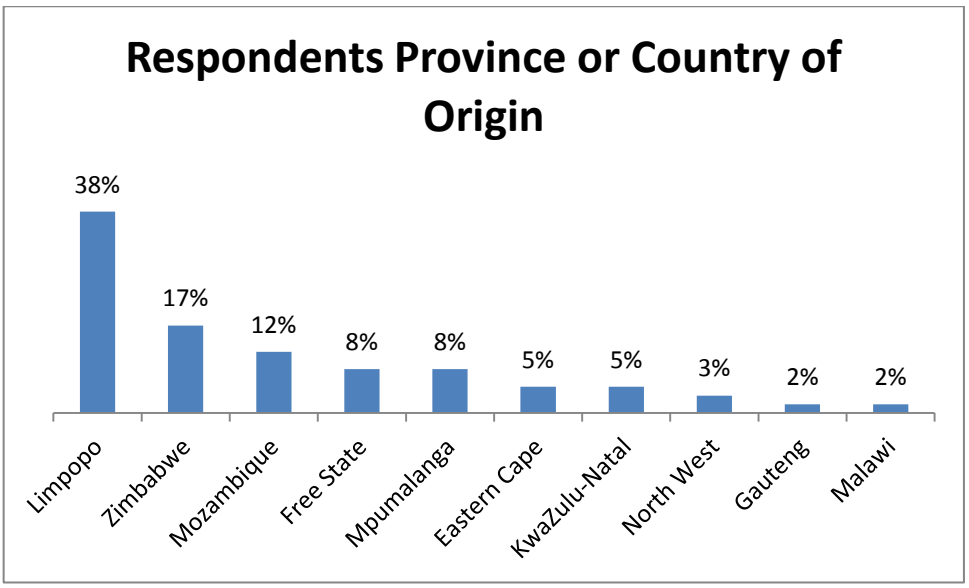

Figure 14: Percentage Distribution of Respondents' Province or Country of Origin

The dominance of residents from the Limpopo Province accords with another study conducted by researchers at the University of Johannesburg which shows that the settlements in the north of Johannesburg have a disproportionate number of migrants from Limpopo (de Wet, Patel, Korth, & Forrester, 2008). This is further illustrated by the South African Census of 2011 (Statistics South Africa, 2012).

Survey data from this work shows household sizes range from one to ten people per household, with the average number of people per household being 2.77 (see Figure 15 below). This is slightly lower than the figure given by PMM, which indicates the average household size as being 3.04 (2009). The average composition of each household is 2.07 adults and 0.7 children. The vast majority of households interviewed have no children living in them, however, with 36 respondents (60%) reporting as much (see Figure 16 below). Fifty nine of the 60 households interviewed reported having from 0 to 3 children residing there, and one outlier reported having nine. Excluding this outlier drops the average number of children per household to 0.56. Either way, this indicates a low ratio of children to adults (approximately 1:3). One reason for this is that some people choose to live and work in the city, and leave their children at 'home' (their other, often rural, home) with grandparents, siblings or other adults. Of the 45 respondents for whom data

are available[23], 37.7% report having children living at another home in South Africa or abroad. Respondent 6 for example, reports “Once my child reaches five years I take them home [Limpopo] as there is someone that can look after them [mother in law]. I have three children, the third one being this little baby” (Respondent-06, 2012).

Five respondents out of the sixty interviewed (8.3%) reported that there were two households living in the same dwelling. This was always in another room and included secondary households made up of between one and eight people. This number was not included when more than one household occupied a single stand in the municipality-demarcated-stands in Pipeline (see section 5.5.1). It was only included when respondents specifically stated sharing their building with another household. Because of this, the number is thought to reflect as less than the real number.

Lastly regarding population dynamics is the makeup of households. The majority of households interviewed described themselves as either couples (married or unmarried) or couples with children, making up half of those interviewed, at 25% each. Single adult households made up 20%, with single parents and children making up the next biggest group at 8.3%. The remaining households fell into one of eight further household categories, illustrated in Figure 17 below.

[23] These include people who report having a home outside of Kya Sands *and* for whom data is available for who lives at that home.

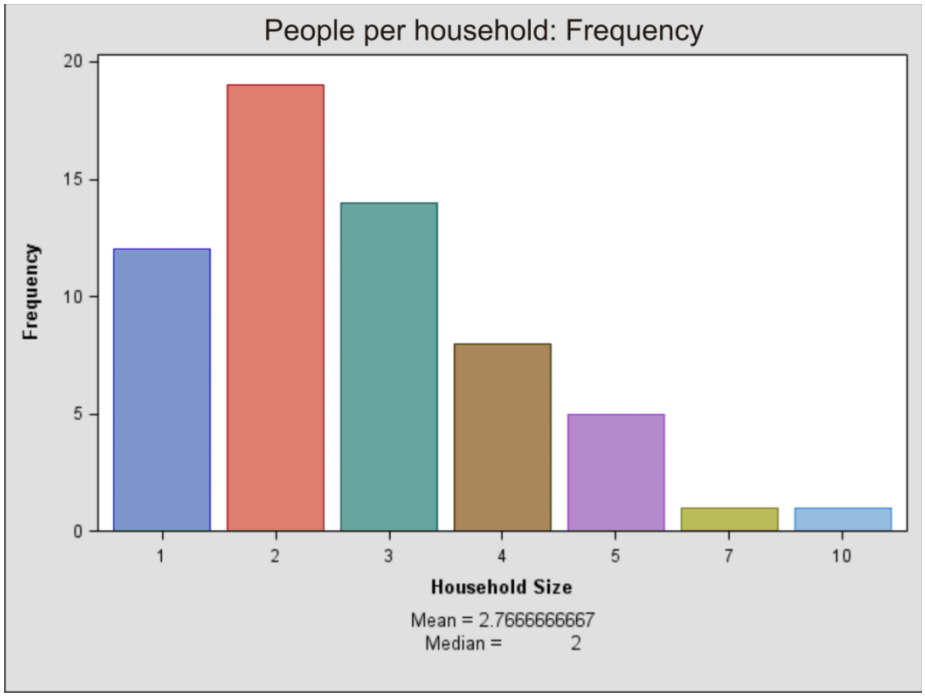

Figure 15: Frequency Distribution of Household Sizes in Kya Sands Informal Settlement

(Source: Fieldwork for this Research)

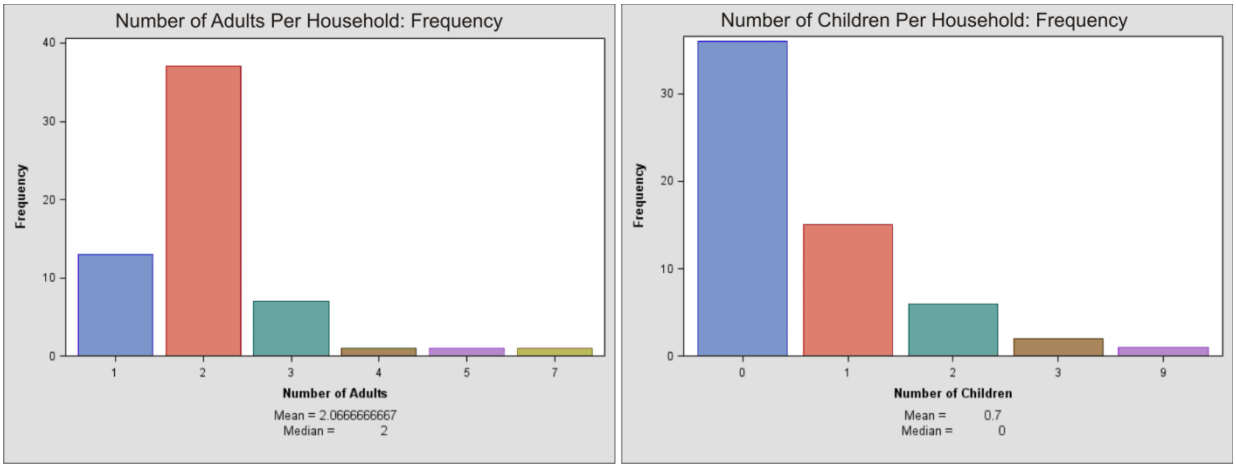

Figure 16: Frequency Distribution of Adults and Children per Household in Kya Sands Informal Settlement

(Source: Fieldwork for this Research)

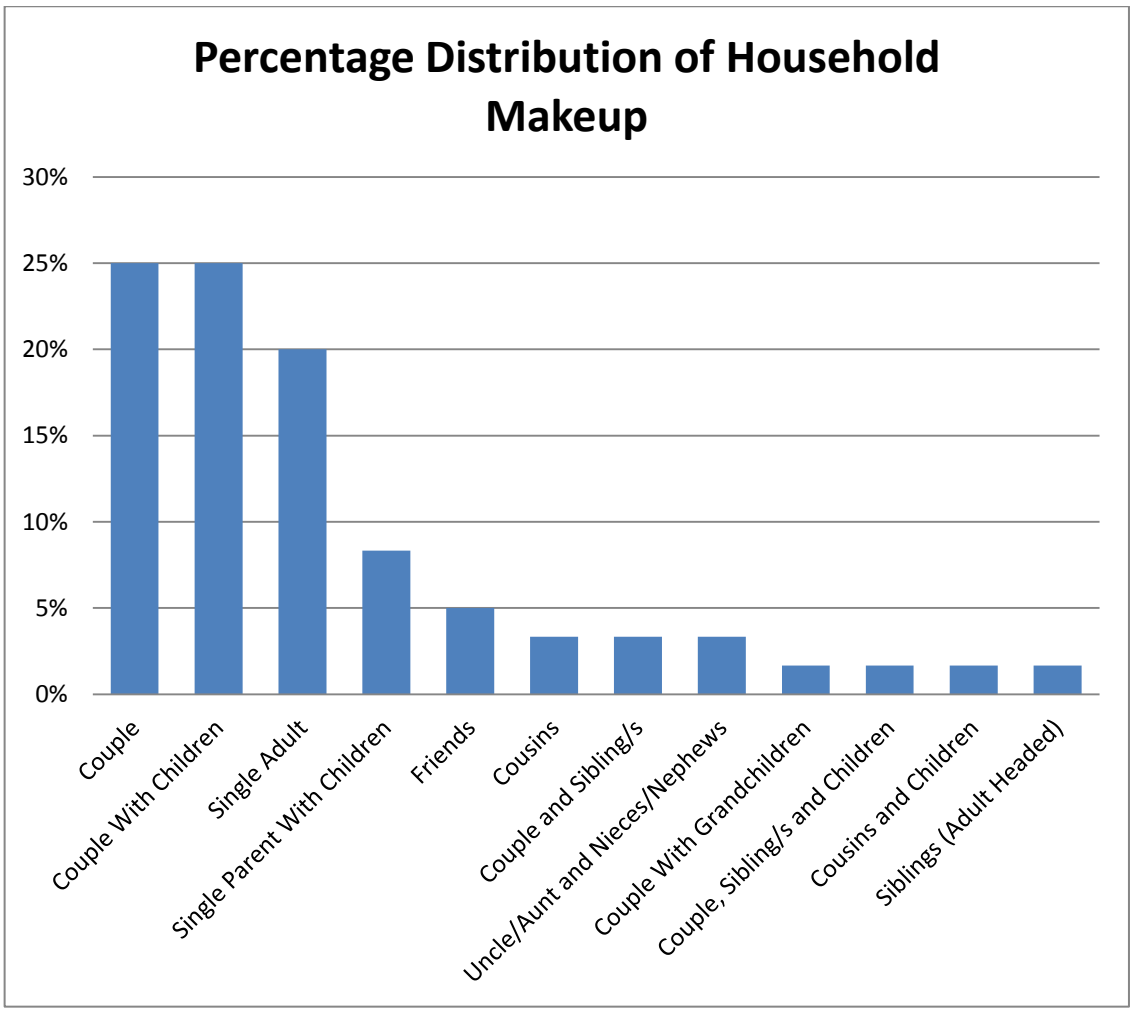

Figure 17: Percentage Distribution of Household Makeup in Kya Sands Informal Settlement

(Source: Fieldwork for this Research)

Of the households living in the settlement, PMM reports that 25% of households in the settlement are not eligible for a housing subsidy, which means that they would not receive money to upgrade and a new house from government, with a possible alternative of rental accommodation (PMM, 2009). The reasons that residents/households may not qualify for a housing subsidy can be:

a) they have previously received a subsidy and sold the property,
b) they are not South African citizens,
c) they are child headed households,
d) they earn more than R 3,500 a month or

e) they are single with no dependants.

(City of Johannesburg, 2007a; PMM, 2009)

While points a, c and d cannot be confirmed, as has been discussed earlier in the section, there are significant numbers of foreign households (30%) and a high number of households made up of single parents (20% although this may not equate to not having dependants). From this, an accurate number cannot be given for households that do not qualify for a subsidy, however it is easily conceivable that this is at least 25% as indicated by PMM, and is likely to be more.

5.4. History and Background

Similarly to the demographics of Kya Sands, the settlements history has not been recorded in detail and some aspects about it are unclear, its age included. Data on the age of the settlement is inconsistent, with the City of Johannesburg citing different dates of formation in different documents and with little consistency in reports from community residents and organisations. The CoJ's informal settlement data[24] (City of Johannesburg Corporate Geo-Informatics, 2011) indicates that the settlement was first established in 1998, however other documentation from the city reports that it was established in the "early 1990s" (City of Johannesburg, 2007a, p. 4). A sign erected by an Expanded Public Works Programme project (made up of residents and community leaders from Kya Sands) in January 2012 reads: "From 1988 to 2012" (see Figure 18 below). In the interviews conducted, three respondents reported that they had moved to Kya Sands in 1995, or before. These included one man, who reportedly moved there in 1984 (Respondent-41, 2012), and two women who moved there in 1993 (Respondent-11, 2012) and 1995 (Respondent-37, 2012), respectively.

[24] Obtained from the City of Johannesburg in July 2011.



Figure 18: Sign at the Entrance to Kya Sands Informal Settlement on Agnes Avenue, Bloubosrand.

(Photograph by Author)

From this, all that can be said with certainty is that Kya Sands was first inhabited between 1984 and 1998; which does not serve as a very useful statement. If a year of establishment were to be estimated however, it would be 1993. This is primarily based on the CoJ report that the settlement was established in the early 1990s, and on the interview conducted with Respondent 11 (2012). Before conducting the interview, Thabo Motaung (my research guide and a community leader) told me that the interviewee was widely regarded as the first person to have settled in Kya Sands. In the interview she told me she had lived there for 19 years; since 1993. The estimate reached here is also based on an assumption that the years 1984 and 1988 are erroneous. The estimate from the information at hand is that Kya Sands was established in 1993, although this stands to be corrected.

Kya Sands was initially set up and inhabited by subcontracted and informal workers doing various jobs at the adjacent Randburg Landfill site (City of Johannesburg, 2007a). This is confirmed by some early residents of the area. Respondent 17, who moved to Kya Sands in 1997, reports that "This area near here [pointing towards the landfill] used to be a municipal dumping area, then next to the dumping people began to build their own informal settlements and then slowly the placed filled up" (Respondent-17, 2012). Respondent 11, who moved to Kya Sands in 1993, worked at the landfill as an informal

recycler, collecting material there and selling it to scrap dealers in Kya Sand industrial area. She says "Before moving here, I came here to work, to collect rubbish to take to the scrap yard for money to support my children. I then decided to move closer to the landfill and moved here so I could go there every morning and collect rubbish to take to the scrap yards... when I moved here it was just bushes" (Respondent-11, 2012). Lastly, Respondent 37, who moved to Kya Sands in 1995, also did so in order to work at the landfill. She says "[after losing my previous job] my colleagues advised me to come and look for a job here in the dumping. I found a man who was working in typing, recording the weight of the dumping trucks. I then got that job and worked for three months" (Respondent-37, 2012). Although the landfill site has subsequently closed down, there is still evidence of many people in the settlement working as informal recyclers. It is also a common source of income to fall back on when people lose their jobs, or when work is scarce. The influence of the landfill (and associated illegal dumping in the area) on Kya Sands is evident in the settlement's nickname, ‘Dumping’.

From its establishment in the early 1990s, Kya Sands has grown steadily year on year and continues to grow. This is based on available aerial photographs of the settlement (which, unfortunately, only begin in the year 2000). The subsequent growth in the area of Kya Sands over time is depicted in Figure 19 below. The settlement can be observed to have gone through three distinct periods of growth since 2000. Firstly from 2000 to 2006 the settlement grew steadily in area, year on year. Next, there are two spikes in growth, a small one between 2005 and 2006, and a more pronounced and sudden growth from 2007 to 2008, both resulting from relocations by the CoJ (described in section 5.5.1 below). The settlement has since returned to a steady rate of growth, seen in the years 2008 to 2011, despite calls by the CoJ to limit this growth. With a new set of relocations to the settlement by government in the second half of 2012 (Modikwe & Motaung, Personal Communication, 2012), there is likely to be a third spike in growth once 2012 or 2013 aerial photographs become available. The reasons that the area has remained attractive to new residents are discussed in the following chapter.

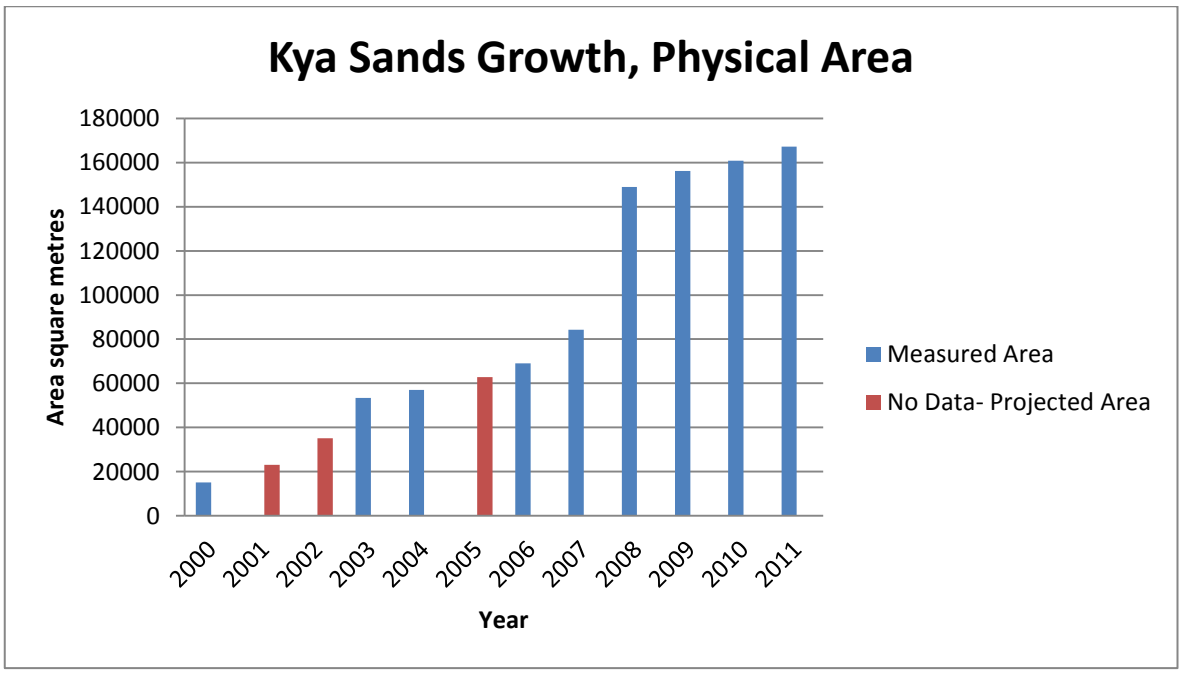

Figure 19: Physical growth in area occupied by Kya Sands Informal Settlement, 2000-2011[25]

5.5. How Authorities Have Responded

On 15 November 2006, a mayoral road show visited Kya Sands informal settlement. These road shows are a form of public participation that allow residents to communicate directly with the top management of the CoJ and to which "all members of the Mayoral Committee and many senior officials of the administration [are] expected to accompany the Executive Mayor" (City of Johannesburg, 2006). From this visit, and due to the "appalling conditions that were found on site" the mayor set up a task team made up of the city's Development Planning, Urban Management and Housing departments to come up with long and short term strategies to address the "health and safety risks confronting the community" (City of Johannesburg, 2007a, p. 1).

[25] These figures were measured by the author using aerial photographs of Kya Sands Informal settlement for each of the years plotted in blue on the graph. Images were obtained from the City of Johannesburg GIS department (2000, 2003, 2006, and 2009) and from Google Earth (2004, 2007, 2008, 2010, and 2011). All of these were then inserted into the ArcGIS application. While the CoJ images were already geo-referenced, the Google Earth images were geo-referenced using the method described by Kawano (Undated). An individual shape file was then created for each year and polygons outlining the settlement were manually traced by the author (e.g. Figure 24 below). Then, using ArcGIS' 'Calculate Geometry' function, the area of the settlement for each year was determined. For years where aerial photographs were not available (2001, 2002, 2005), figures were estimated by calculating the Constant Annual Growth Rate (CAGR) using the formula CAGR: =((End Value/Start Value)^(1/(Periods - 1)) -1 (I Get It, Undated) using the nearest measured years on either side of those missing as start and end values.

While short term interventions have been fairly successful in delivering basic services, no long term interventions have been implemented to date, and there is currently no action in sight. This has resulted in numerous service delivery protests in Kya Sands, with the most recent coinciding with Human Rights Day, 21 March, 2012 (Eyewitness News, 2012). A major obstacle and source of confusion is the lack of clarity on who is responsible for long term interventions in Kya Sands. This confusion lies both within the community, and between the two entities concerned, which are the City of Johannesburg and the Gauteng Provincial Government. Responsibility seems to sway from one to the other periodically, with seemingly little collaboration between the two at least more recently, as also noted by Tissington in the Slovo Park informal settlement (2012).

5.5.1. Short term interventions

Approximately one month after the mayoral visit of November 2006, emergency and short term interventions were put forward to and accepted by the CoJ Mayoral Committee, with intervention work already having started at the time of the report (City of Johannesburg, 2007a). Some 9 months later, on 4 October 2007, fair progress was reported to the committee (City of Johannesburg, 2007b). This progress, along with confirmation of service delivery and emergency interventions from fieldwork, is outlined as follows.

Basic service delivery

According to the City of Johannesburg (2007a) basic water and sanitation delivered by 2007 included the installation of 120 chemical toilets, as well as 48 standpipes and 12 stationary water tanks providing portable water. This seems fairly accurate when assessed. If water tanks were initially delivered, they are no longer in place and it is assumed that these were used while installing standpipes. While working standpipes are in place, the number of 48 is much higher than those actually installed. On the last day of fieldwork in Kya Sands, 22 standpipes were counted.[26] The higher number that was indicated by the CoJ may be due to each tap per standpipe-unit being counted. As can be seen in Figure 20 below, each 'standpipe unit' has 6 taps. The CoJ may be referring to 8

[26] It is possible that some standpipes were not counted as we relied on our guide, Thabo Motaung to find them. If any were missed however, it will be a small number, thought to be less than 5.

such systems, making up 48 taps in total (2007a). If this is the case, then the initial delivery of taps has been substantially supplemented. While working taps have been installed, no drainage system is in place. Because of this, many of the roads downhill from taps have been eroded (Figure 20). The small gulleys cut into the roads by standpipe runoff also channel storm water, further exacerbating the problem.



Figure 20: A Typical Standpipe and eroded roads due to lack of drainage systems in Kya Sands Informal Settlement

(Photographs by the author)

Regarding toilets, it is easily conceivable that 120 were installed, and probably more. There are two types of toilets, plastic bucket toilets (commonly known as 'portaloos') and concrete Ventilated Improved Pit Latrines (VIPs) made by the South African Company Amalooloo[27] (See Figure 21 below). These are spread across the settlement in different configurations, from communal, to semi-communal, to private toilets. While Sections B and C only have communal plastic chemical toilets, Pipeline has a mixture of communal chemical toilets and private and semi-private VIPs (see Figure 22 below). Communal toilets are used by many people and families, semi-private ones are used by a group of families whose houses are near to a single VIP, and private VIPs are when each stand has its own VIP (although there is sometimes more than one household per stand). The last category only exists on stands demarcated by the CoJ, to which people were relocated in 2007 (detailed below). The City of Johannesburg's water agency, Johannesburg Water,

[27] http://www.amalooloo.com/

also runs at least two vacuum trucks (also known as 'honey suckers') that periodically empty the toilets in the settlement (Figure 21). This was reported, for example, by Respondent 7 (2012) who said: "...with these toilets, they come maybe every month, like yesterday, they were here cleaning."



Figure 21: Toilet Types and Vacuum Trucks in Kya Sands

(Left: Ventilated Improved Pit Latrine, Middle: Plastic Chemical Toilet (Portaloo), Right: Vacuum Trucks. Photographs by the author)

In the CoJ document (2007a), it was further reported that Pikitup, the city's refuse removal and waste management company, removed some 65 tons of dumped refuse and rubble from the settlement. It was also reported that the company hired 10 full time and 10 casual workers from the community to collect refuse in the community and deliver it in refuse bags to central points for daily collection by Pikitup (City of Johannesburg, 2007a; City of Johannesburg, 2007b). While the removal of rubble cannot be confirmed, Pikitup certainly continues to collect refuse from Kya Sands. Black plastic bags are provided to residents, and trucks conduct regular rounds collecting rubbish. It is also confirmed that residents of Kya Sands are hired by Pikitup to help collect rubbish bags and litter during these rounds, and to assist with loading them into trucks (see Figure 23).

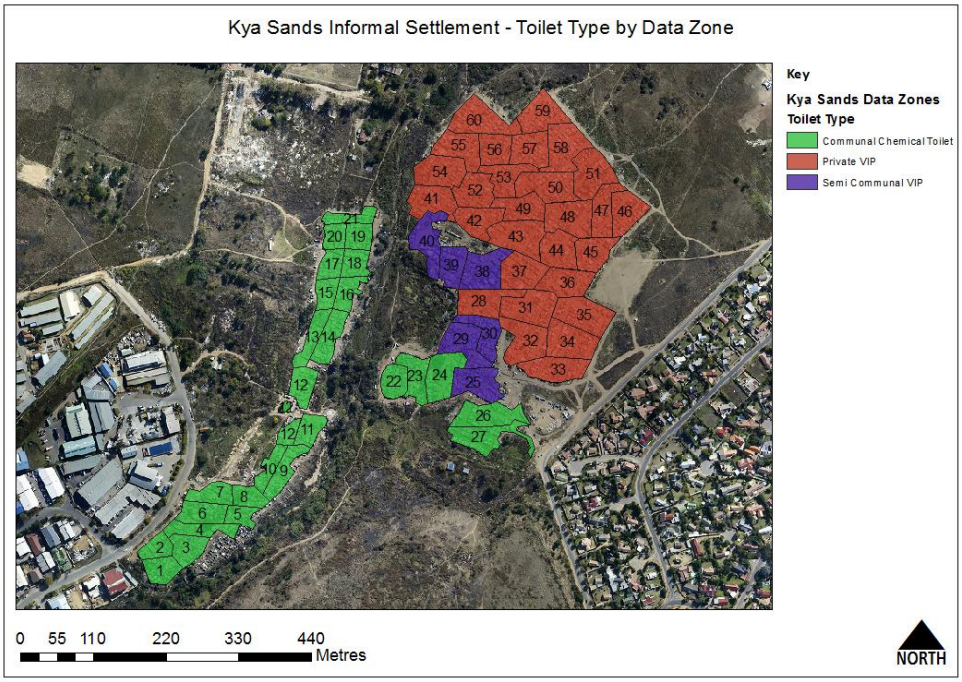

Figure 22: Kya Sands Informal Settlement, Toilet Type By Data Zone

(Source: Fieldwork Surveys. Aerial Photograph: © City of Johannesburg, 2009)



Figure 23: Refuse Removal Trucks and Workers in Kya Sands

(Photographs by the author)

The final basic service delivered is a network of Apollo lights scattered around the settlement. Two such lights are seen in the background of the left hand photo of Figure 23 above. On the last day of fieldwork in Kya Sands, 11 such lights were counted. Besides these lights and the odd privately owned generator, car battery and solar panel system, there is no other electricity supply in the settlement. The lights are also reported by some

residents to be poorly maintained. Respondent 7 for example reports that it is dangerous walking at night in the dark; he says “These lights, they have been working, but right now they are not” (Respondent-07, 2012).

Emergency Relocations

As mentioned in the introduction to this section, the second short term intervention laid out by the CoJ (2007a) were emergency relocations. Initial relocations were done in two parts, both from sections along the Northriding stream to Pipeline (on the east of the river). These relocations were within Kya Sands or from Kya Sands to immediately adjoining land and so were not necessarily disruptive to the livelihoods of those relocated. More recently, relocations have also taken place from an informal settlement nearby to Kya Sands (Modikwe & Motaung, Personal Communication, 2012).

Between 2006 and 2007, it is reported that 150 families in the worst locations for fire and flood were relocated to Portion 51 of the adjacent farm, Houtkoppen I93-IQ (see Figure 10 above) (ibid).

This move is confirmed in aerial photographs from the same years, indicated in Figure 24 below, and by residents of Kya Sands. As can be seen in the 2006 image, at that time there was a small outlying section of the settlement, south of where Section B is today. By 2007, the section was removed, and growth can be seen in the northern part of Pipeline, indicating the section residents were relocated to. The small section to the south of the settlement is thought to have been called Madala Side and, as mentioned earlier in the chapter, the name moved with the residents to its new location in Pipeline. Respondent 45 also confirms the move, saying “There used to be an area called Madala side. We were removed there because they said it was in a flood plain” (2012). Interestingly, he goes on to say that the move was far from a peaceful one. He says “Someone came and burnt all our places then we were told we have to move” (ibid). This has not been confirmed by any other sources however.

The CoJ document of October 2007 then outlines the proposal to relocate more families in ‘dangerous areas’ to the same farm portion. While this was not confirmed in subsequent documentation on the settlement, it is confirmed by aerial photographs and by residents. Between 2007 and 2008, a much larger scale relocation took place, from the

western banks of the river (including parts of sections B and C) to Portion 51, Houtkoppen. The relocated-to area now makes up the northern section of Pipeline. This can be clearly seen when comparing the 2007 and 2008 photographs in Figure 24 below. Note how, between the two years, a large area is cleared along the western bank of the river, and how the settlement grows substantially on the northern side of Pipeline. The move is also confirmed by a number of residents. For example, Respondent 47 reported "Since 2004 I was living in C section and we were moved from there in 2008 and we were taken here [Pipeline]" (Respondent-47, 2012).

No one has moved back to the original location of Madala Side, up until 2012 there had been little encroachment into the cleared section of the west bank. What little encroachment there has been was people expanding their homes, rather than building new ones. Respondent 16, who lived just outside of the area of relocated homes, benefited from the cleared space. He says "…when they moved everyone from next to the river here to the other side, that is when I extended my home into the newly vacant land" (Respondent-16, 2012). More recently, this trend seems to be changing, with more dwellings built in the cleared area.

Both areas relocated *to* are interesting in that they are clearly 'planned', as shown by their ordered stand and street layout, which is done in straight rows with clearly demarcated blocks. There is also an indication that these areas are better serviced, with more standpipes than the older sections of the settlement, and they are the only sections that contain private VIP toilets. Lastly, according to some residents, along with relocation came permission from the municipality to occupy the land. Those relocated received relocation slips, one notifying them of the move and one confirming that it had been done. Respondent 53 has retained his slip, and showed it to Marole and myself during the interview process. When asked who had given him permission to occupy the land, he confirmed that the municipality had. Interestingly, he had also built a full brick structure on the site, possibly an indication of his perceived security of tenure.

Since the fieldwork for this study was undertaken in January 2012, there has been another round of relocations to Kya Sands. In this instance, people were moved from the informal settlement on Inanda small holdings, to just north of Kya Sands (Modikwe & Motaung, Personal Communication, 2012) (relocations have taken place to the open area

between Agnes Avenue, Bloubosrand, and the soccer field in Kya Sands, just east of Pipeline). This is different to relocations of residents from Kya Sands to areas adjacent to the settlement, in that they include relocations to the settlement from another informal settlement nearby.

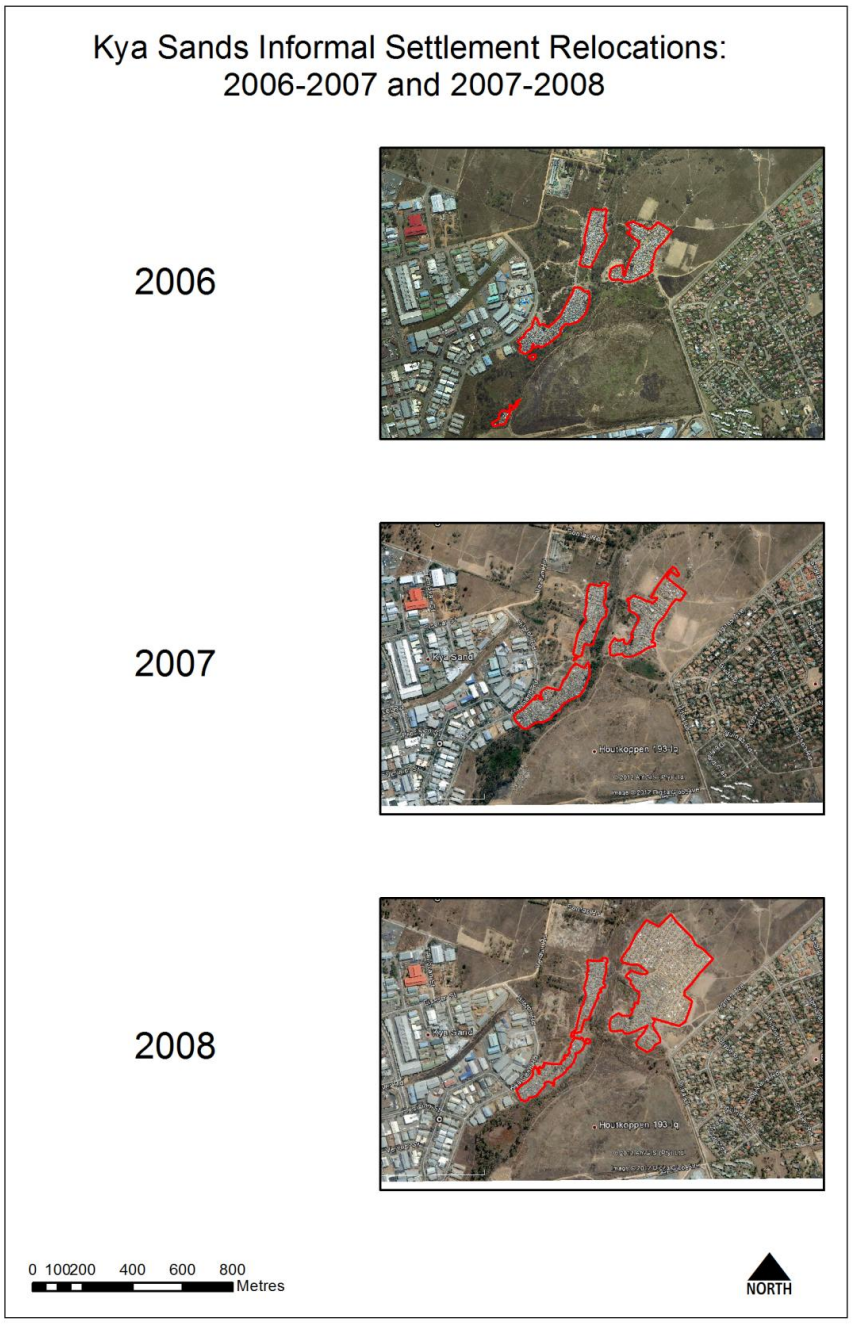

Figure 24: Kya Sands Informal Settlement Relocations: 2006-2007 and 2007-2008

(Aerial Photographs: 2006 - © City of Johannesburg. 2007 and 2008 - © 2012 Google Earth; © 2012 AfriGIS; © 2012 Digital Globe)

Over the past 6 years there have been two major proposals for long term interventions in Kya Sands. Both have entailed the full relocation of the community to new formal housing developments nearby. So far, no construction or relocations to formal housing have taken place, with the whole process having stalled, and no due date proposed or in sight (Daniels, 2010; Mendelsohn, 2011; Sabela, 2011; Mantshontsho, 2012).

Initial Proposal January 2007

Initially, it was proposed that the entire community be relocated to Portion 51 of the adjacent farm, Houtkoppen I93-IQ (the same farm where emergency relocations had recently taken place, Figure 10). The farm is directly adjacent to the settlement, which means that residents would not have to move away from work opportunities or other benefits they enjoy as a result of the settlements location. The land is owned by the South African National Government and administered by the Gauteng Provincial Government (GPG) (City of Johannesburg, 2007a). A feasibility study on low income housing on the farm portion taken in 2004, showed the land to be adequate for development, with capacity for bulk water, sewage and electricity (ibid). The study identified that there was space for 860 plots of 250 square metres each. This was predicted to be adequate to house the entire settlement (at the time), with a possible need for some spill over onto adjacent pieces of open land (ibid). This proposal was accepted by the mayoral committee, and steps were proposed, including meeting with the GPG to discuss obtaining the land for development. In 2008, it was reported that the development potential of the Portion 51 of the farm Houtkoppen I93-IQ could yield enough housing for the entire relocation of Kya Sands in three housing types, namely row housing, 3 storey and 4 storey walk ups (City of Johannesburg, 2008). This, in total, would include 5,159 units, similar to the high estimate of units in the settlement of 5,325 dwellings (PMM, 2009).

Revised Proposal October 2007

At a task team meeting in August 2007, the GPG Department of housing (who were in attendance) put forward a revised long term proposal for the residents of Kya Sands informal settlement (City of Johannesburg, 2007b). This proposal looked at a larger scale solution for not only Kya Sands informal settlement, but also other informal settlements in northern Johannesburg. This made apparent sense, as it was a more comprehensive

solution for the city region, rather than a piecemeal approach targeting only one settlement. It was proposed that a mixed use and mixed income settlement be built in a similar vein to that of Cosmo City[28]. The development would take place just to the north of Cosmo City on portions 19 and 20 of the farm Nietgedacht 535 JQ (see Figure 25 below) and accommodate some 10,000 households from 9 informal settlements, including Kya Sands. The development would include the in-situ upgrade of Itsoseng and Lion Park informal settlements and new development around this. These informal settlements lie within the proposed development area. The development of Portion 51 of the farm Houtkoppen I93-IQ (from the initial proposal) would also proceed in order to accommodate any spill over from the larger development. It was thus agreed that the GPG department of housing would go ahead with feasibility studies for the area (City of Johannesburg, 2007b) and with acquiring the land for donation to the CoJ (City of Johannesburg, 2008). The proposal was approved by the Gauteng executive council housing department on 12 February, 2008 (ibid).

On 9 October, 2009 a letter was written by the then executive director of Development Planning and Urban Management at the CoJ, Prof. Philip Harrison, to the acting head of the Local Government and Housing department at the GPG (see appendix 6). The letter outlined the city's concern regarding the delay in the project, with no progress having been made up to that time. It noted that the CoJ and the GPG had met with the residents of Kya Sands informal settlement on 22 March 2007, informing them of the planned relocation. It also noted that on 24 September 2009, the residents of Kya Sands staged a march the lack of progress.

It has since been reported that there is no allocated budget at the provincial or municipal levels for bulk services to be installed at portions 19 and 20 of the farm Nietgedacht (Mendelsohn, 2011; Sabela, 2011), and that to provide bulk water to the area would be prohibitively expensive in the short term (Daniels, 2010). Thus, as mentioned in the introduction to this section, the project has stalled, with no foreseeable plan of action in place. In a cruel coincidence, the words 'niet gedacht' translate directly from Dutch to the English words, 'not thought'.

[28] For more details on Cosmo City, see (Onatu, 2010)

Current Status of Development Plans

While there is some information available to the author on the current status of long term development in Kya Sands, it is limited and includes no 'official' documents. Newspaper articles are available reporting on meetings between the community of Kya Sands and the CoJ. Currently, it seems that the CoJ has reassumed responsibility, with indications that intervention will be follow the initial proposal of January 2007, with overflow accommodated by the larger development in Lion Park (the opposite to the revised proposal of October 2007). The numbers of households that will be accommodated and where and when these will be accommodated is not however clear.

In late 2011 for example, Nomsa Mlotshwa, head of housing for Region A in the CoJ, reportedly told the community that "4500 walk-up units will be built right here" (Sabela, 2011). She also reported that the major obstacle to the development was the lack of bulk services (water and sewage, despite earlier reports to the contrary) and a lack of money for these to be upgraded, but that a R50 million project was in place to do so (ibid). This project would serve both the development at Kya Sands, and the larger one at Lion Park.

More recently, following the service delivery protests of March 2012, another meeting was held between the residents of Kya Sands and officials from the city of Johannesburg. Here, the Member of the Mayoral Committee (MMC) for Housing at the CoJ, Bonakele Dan Bovu put forward a slightly different plan, reportedly telling the community that "2000 walk-up houses will be built... because we do not have enough land to cater for everyone. The rest of the families will be moved to Thabo Mbeki where there is enough space to build houses for 7000 families" (Mantshontsho, 2012, p. 1). He related the delay to both to the lack of bulk infrastructure and lack of funding for the project. He also reported that the project "...will take a minimum of five years" (Essop, 2012, p. 1). MMC Bovu ended the meeting promising that further short term service delivery including "proper toilets, a bridge..; proper spacing between the houses and extensions, a clinic and the possibility of installing electricity..." (Mantshontsho, 2012, p. 1). He told the community that he would report back to them in 60 days, following consultation with the leadership of the community and the CoJ (Essop, 2012, p. 1).

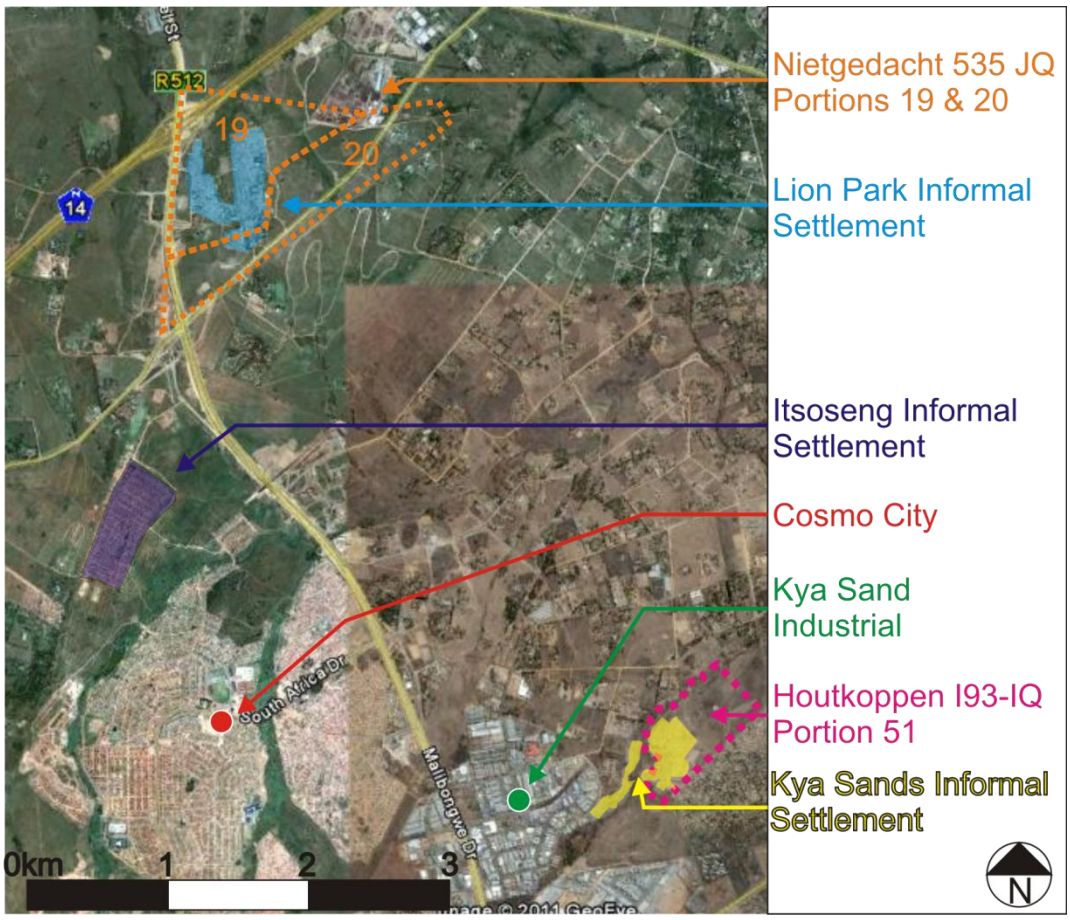

Figure 25: Revised larger scale relocation proposal of Kya Sands and other informal settlements to Nietgedacht, ptn. 19 & 20

(adapted from Google Earth, CoJ GIS and CoJ, 2007b)

One possible source of apprehension for planning authorities (and a possible reason for the second proposal) is indicated in Figure 26. The image (Google Maps, 2012) shows what seems to be a proposed future township development, possibly and extension of Bloubosrand. As is seen in the image, the township layout lies on portion 51 of the farm Houtkoppen, and significantly overlaps with Kya Sands (indicated by the red outline). While the source of the data cannot be confirmed, it is not on the CoJ future townships layer of their corporate GIS, and has obviously been designed and laid out by urban designers, with a similar layout and similar stand sizes to that of Bloubosrand. While the township layout is not indicated on the CoJ GIS, the green piece of 'open land' on the north western edge of the plan is the same exact shape as the open land indicated on the CoJ GIS. As the green space follows the contours of the layout closely, it is assumed that the township layout does exist in CoJ plans not yet reflected in this data layer. It is of

course also possible that the plan is now redundant. The data are thought to be from AfriGIS, as indicated in the image and caption below. While the source of the data is not clear, AfriGIS' data includes integrated data from many sources including "National coverage of surveyed property boundaries, as captured by the Surveyor General's Offices around the country" (AfriGIS, 2012, p. 1). While the status of the layout is not known, it is a possibly a point of conflict, and something that also requires more investigation.



Figure 26: Unaccounted for Township Layout Overlapping the current Layout of Kya Sands

(©Google Maps 2012, Map Data AfriGIS (Pty) Ltd 2012 (Google Maps, 2012). Red overlay: 2011 outline of Kya Sands Informal Settlement traced; from 2011 ©Google-Aerial-Photograph; by Author)

The lack of meaningful engagement between government authorities and Kya Sands refers primarily to the lack of long term intervention in the settlement. It also stems from the fact that the possibility of an in-situ upgrade, in the authors opinion, has not been adequately considered, although the types of intervention implemented to date seem to be preliminary (although limited) incremental steps in implementing such an approach (Roy, 2005). Here the rationale for relocation by the CoJ can be questioned. This includes a list of hazards outlined by the city, including:

a) Flooding - Parts of the settlement were located within the 50 year flood line.

b) Water Pollution - The North Riding stream was reportedly unsafe for drinking, bathing and swimming with unsafe PH levels, e-coli and ammonia. [This considering that there was only one standpipe providing potable water in the community at the time that the report was published]

c) Possible toxic leaching from the adjacent former Randburg landfill site.

d) Fire - This is due to the high density, lack of fire breaks and use of paraffin lamps and stoves as well as open fires for cooking, lighting and heating.

e) Lack of immunisation among children "given the relatively high proportion of illegal immigrants living there"

(City of Johannesburg, 2007a, p. 2)

While these all do have some merit, the prospect of an in-situ upgrade of the settlement has not, in the authors view, been adequately considered by the CoJ, who state:

> *"Since almost all of the land containing the current informal settlement is hazardous and inappropriate for human settlement, and the land proposed for temporary settlement cannot provide a long-term solution, it is recommended that the Kya Sands Community be relocated to another site" (City of Johannesburg, 2007a, p. 3)*.

While the current proposal to move to settlement to formal housing on the adjacent open piece of land will maintain the proximity to employment opportunities for residents, and improve access to basic city services (including electricity), it is questionable as to whether the affordability of living there will compete those currently enjoyed by the residents of Kya Sands. It is unclear what the additional costs of living in formal housing may be, and if this may lead to a gentrification of the area. Insufficient consideration has been given to an in-situ upgrade of the settlement. This may be a partial in-situ upgrade, and a partial relocation. This could include relocating all of the residents in sections B and C to portion 51, Houtkoppen, where Pipeline is located. It is, in the authors view, then feasible to upgrade the whole of Pipeline.

Further investigation is needed into the possibility of an in-situ, or partially in-situ upgrade of the settlement, possibly relocating people currently living on privately owned land to the government owned Portion 51, Houtkoppen. This would include an investigation into the effects of toxic leaching from the adjacent landfill site. This may affect not only the residents of Kya Sands, but also those of Bloubosrand, which also lies directly adjacent to the landfill.

5.6. Conclusion

This chapter has attempted to piece together some of the history and dynamics of Kya Sands Informal Settlement. This is done by painting a rough, although fairly in depth, picture of Kya Sands and bringing together different sources of information on the settlement. Rather than crisply defining the history and characteristics of the settlement, conclusions that can be drawn from the chapter are somewhat different.

Firstly, the settlement is dynamic, complex and ever-changing, and thus difficult to concretely define. Instead of a conclusion, it can maybe rather be called a confirmation of both writing from previous chapters and indeed of the same idea put forward by Huchzermeyer (2011). Even when information is found it can quickly go out of date, and it is almost always up for debate. Different methods of enquiry or indeed different enquirers may present different findings, indicated in something as simple as the settlements' date of formation. The fact that information is imperfect should not however stop engagement or development by planning authorities; it should just be recognised as the reality, the circumstances under which engagement and development must take place. This fact, that Kya Sands and other settlements in the city are ever changing, may indeed be one reason for limited engagement by planning authorities.

An example of this is that the CoJ's initial plan for relocation in 2007 was based on a feasibility study done in 2004. This study indicated enough space for relocation to Houtkoppen Portion 55, as well as capacity for bulk services. This was based on the 2007 estimate for the population of the settlement, which was 7,500 people. Just two years later, the settlements population was measured at more than twice this, clearly making the feasibility study null and void.

This trend is exacerbated when making observations at a larger scale, including all of the settlements in Region A for example. Here feasibility studies regarding provision of bulk services will quickly go out of date, as populations change at this larger scale. It is also unlikely that this problem will change going forward. MMC Bovu has indicated that it will take at least 5 years for the implementation of long term plans in Kya Sands. Will the planned installation of bulk services in the area be sufficient by this time? One would most likely answer “no”. This is a challenge that is very difficult to deal with, with no easy solution. What it does indicate is that the more development and implementation are delayed, the less is solved and the bigger the task becomes.

The second conclusion leads on from this and is that planning authorities (specifically the CoJ and GPG) seem generally ineffective in engaging with Kya Sands informal settlement, at least regarding long term interventions. As has been seen, despite plans being formulated for the past 6 years, there has been no implementation and there is no progress in sight. Even if intervention takes place in 5 years, the process will have taken 11 years. Regarding short term interventions, there has been significant improvement in basic service delivery. If looking at water delivery alone, there has been a great improvement, considering that there was no water delivery in 2007, and now there are at least 22 standpipes scattered around the settlement providing portable water. Others include refuse removal, the delivery (although varied across the settlement) of toilets, cleaning services for these toilets, scattered lights and a refuse removal service. While this may not be enough, and a lot less than promised, it is certainly an improvement and an initial sign of service delivery and engagement with Kya Sands Informal Settlement by the planning authorities.

6. Findings: Residents Perceptions of Living in Kya Sands Informal Settlement

6.1. Introduction

This chapter details the results of this study. It presents findings on residents' perceptions of the positive and negative aspects of living in Kya Sands from fieldwork conducted between 16 and 31 January 2012 as described in the first chapter. While it focuses on findings, the chapter also contains some analysis and discussion as findings are presented. This is done with the concluding chapter in mind, which looks to summarise living conditions in Kya Sands informal Settlement and relate them to notions of vulnerability and resilience. This includes comparing findings to the two types of resilience outlined in the literature review chapters, which are equilibrist and evolutionary resilience.

Findings are presented under the two broad categories being the positive and negative perceptions of Kya Sands. Many findings from the fieldwork have already been incorporated in the previous chapter, including demographic, historical, and other details of the settlement. These are once again drawn on here where in certain cases correlations are made between these variables and residents' responses on the pros and cons of living in the settlement. Other findings that will be discussed include livelihoods and informal tenure arrangements in the settlement, which speak directly to the reasons people choose to live in Kya Sands.

The two sections follow the interview structure closely, which was broken down into the same sections in the interview structure (see appendix 5). The intention was to ask about the positives and negative aspects of living in Kya Sands, and to infer information on resilience and vulnerability from these responses. However, a more nuanced view of resilience and vulnerability is taken than merely the positive and negative aspects of living in Kya Sands in this and the subsequent chapter. Instead of creating an index type investigation, where variables representing vulnerability and resilience are predefined and tested; this study concerns itself more directly with investigating what these variables may be.

The chapter presents findings in two general formats, being qualitative and quantitative. Each section and subsection starts with qualitative reporting (in the form of graphs, maps, percentages etc.) and then includes qualitative findings, intended to contain more nuance and texture, using quotes to compliment qualitative findings and to reflect views not necessarily presented by the quantitative analysis.

It is important to note that not all findings represent the full sample of the sixty people interviewed. This is because not all of the questions were compulsory to answer, not every question was asked of each respondent (due to the semi-structured nature of the interview process) and some questions were not applicable to certain respondents. The statistics are thus presented with the specific number of people for whom data are available, for each variable or set of variables.

The first point argued in the chapter reiterates what has been argued throughout this research report; that because all settlements are unique, they require unique responses that should be based on case-specific research. It is intended that this and the previous chapter show some of this detail and uniqueness of Kya Sands. It is also intended to show the complexity and variation across the settlement itself.

The second argument is that the positive and negative aspects of living in Kya Sands relate strongly to access to the city. The settlement provides an access point to the city to those who have been effectively excluded from it. In this way, it is argues that the settlement and its residents display evolutionary resilience providing and gaining access to employment and accommodation in the city, in a self-sufficient, adaptive and innovative way. However, on the other hand, due to its informal nature, Kya Sands and its residents are excluded from many of the amenities that make city living safe and attractive.

6.1.1. Introductory Questions on the Pros and Cons of Living in Kya Sands

During the interview process, after asking some demographic questions of each respondent, questions moved onto the pros and cons of living in Kya Sands. The opening question, in order to allow residents to dictate whether positives or negatives were spoken about first, was "Do you like living in Kya Sands?" Here, as described in Chapter One, a scale was used where residents were asked to represent how much they like living in the settlement, with 1 representing the sentiment 'very much' and 5 representing 'not at all'. If residents indicated that they mostly liked living in Kya Sands, questions on what it is they like about living there, were asked first, and vice versa.

Here the results were quite clear. The average answer was 3.55, indicating that mostly people dislike living in Kya Sands. More notable was that 24 respondents (40%) indicated 5 on the scale, or that they don't like living in Kya Sands at all. In fact, the majority of respondents (58.3%) indicated that they mostly dislike living in Kya Sands indicating either 4 or 5. Fifteen percent of respondents were indifferent, indicating 3, and only 26.6% reported mostly liking the settlement, indicating 1 or 2 (see Figure 27 below). This challenges romanticised views of informal settlements. While, as we shall see, the settlement does present many benefits to its residents, we cannot conclude, overall, that it is a desirable environment in which to live.

This is included not to suggest that how much people like or dislike living in Kya Sands represents positive resilience or vulnerability respectively. It is done to show two things. Firstly, that the perception of living conditions in Kya Sands is not very good, prompting the recognition that living there is far from ideal and that forms of vulnerability, to a variety of hazards, certainly exist. Secondly, it highlights that despite the poor perception of living conditions, people *have chosen* to live in Kya Sands, and continue to do so. This indicates that living in Kya Sands does present some benefits to its inhabitants, even suggesting that the benefits of living there outweigh the negatives.[29] These benefits, the reasons that people have chosen to live in Kya Sands, is an *indicator*

[29] An exception to this may be when people report having no other option but to live in Kya Sands.

of the positive resilience that the settlement presents for its inhabitants, as well as the resilience of the inhabitants themselves[30].

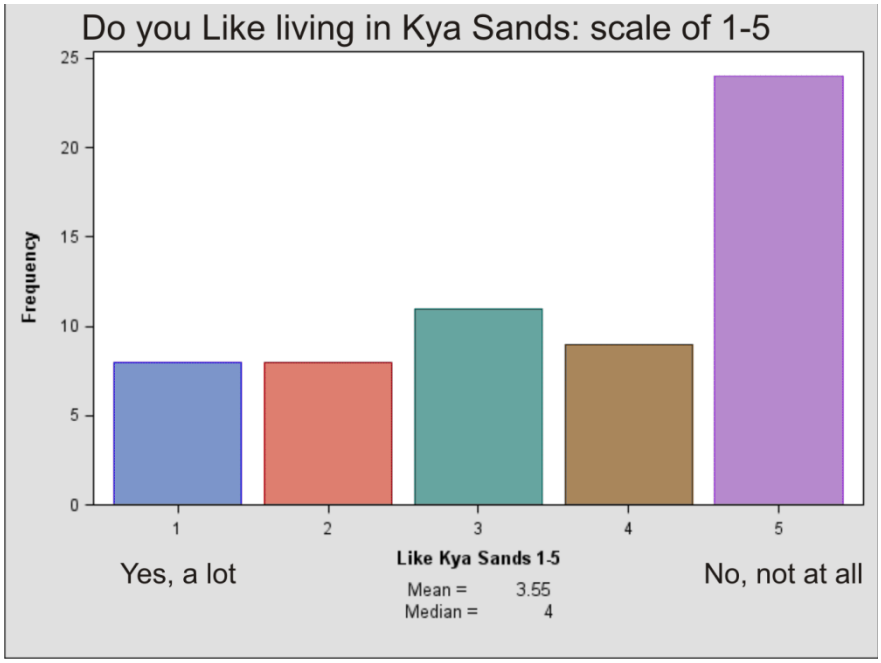

Figure 27: Frequency distribution of how much residents like living in Kya Sands on a scale of 1 to 5 (1: A lot, 5: Not at all)

6.2. Residents Perceptions of the Negative Aspects of Living in Kya Sands

In attempting to investigate the negative aspects and vulnerability faced by the residents of Kya Sands, two main introductory questions were asked. These were, firstly, concerned with what people dislike (if anything) about living in the settlement, and secondly, with what the dangers were to be associated with living there. These sometimes overlapped, for example 'crime' and 'fire' were given in both sets of answers. This section is broken down into two parts, relating to the two introductory questions.

[30] This is specifically with reference to the normative position taken to resilience in this work (see section 2.4.4. p. 51)

6.2.1. What Residents Dislike About Living in Kya Sands

To the question "Is there anything/what is it that you dislike about living here?" the 58 respondents for whom data are available, gave up to 5 answers each. With all of these added together in one long list, a total of 22 unique responses were given, relating to living conditions, hazards and social issues in the settlement. These answers are indicated in Figure 28 below. This section goes through the major responses, looking firstly at the lack of electricity, and then at living conditions. It examines responses relating to living conditions and social issues, and ignores hazards as these are explored in the following section.

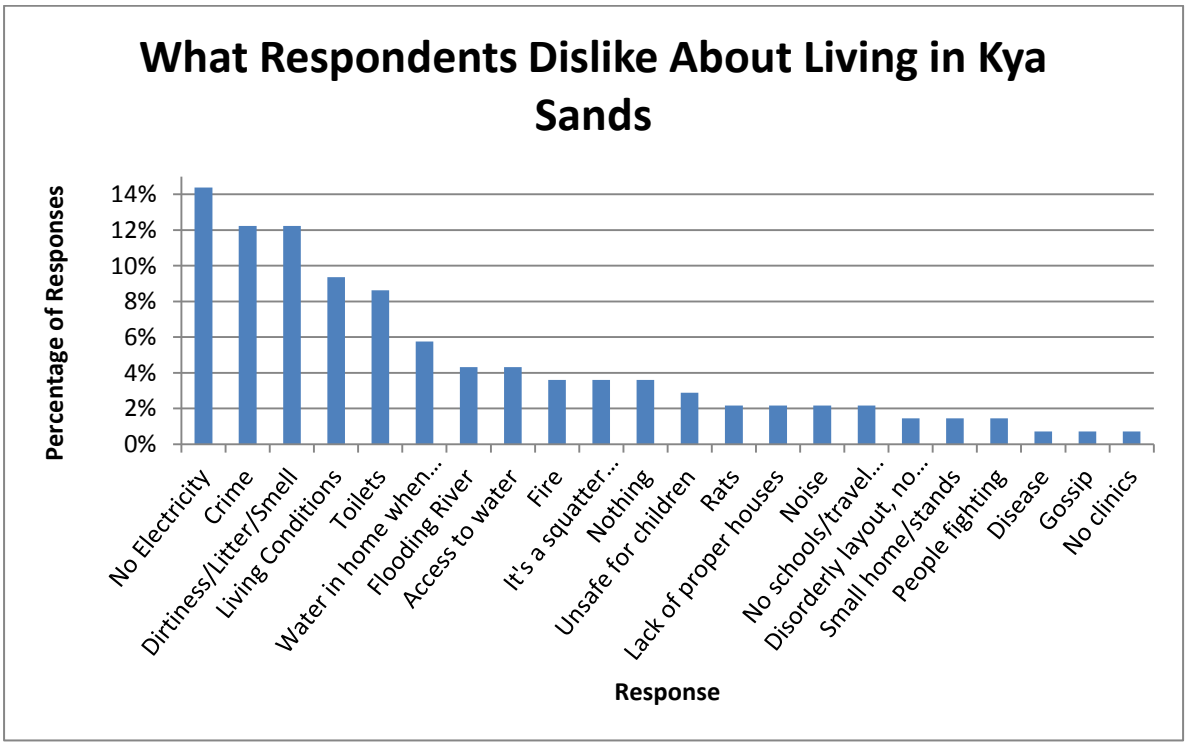

Figure 28: Percentage Distribution of Answers to the Question: Is There Anything That You Dislike About Living in Kya Sands?

(Source: fieldwork)

Lack of Electricity

The most common response regarding what residents dislike about living in Kya Sands was the lack of electricity. This was reported twenty times, making up 14.3% of all answers to this question. When only including residents' first response to the question,

the complaint of no electricity was even more prominent, making up 18.3% of responses.

The concern of having no electricity has a few facets that relate both to living conditions and safety in the settlement. It arguably represents a form of vulnerability too, in that it is one of the services that people cannot practically provide for themselves. This is in that although many residents recognise the dangers posed by having no electrical connections, and see electricity as a solution for making the settlement safer, they are not in a position to do much about it. As mentioned in the previous chapter, the only electricity in the settlement is in the form of scattered Apollo lights (installed and maintained by the CoJ) and the odd car battery, generator or small solar power system.

The first danger reported that relates to the lack of electricity in the settlement is crime, due to poor visibility at night. Residents reported that "it is not safe when there is no electricity… especially at night" (Respondent-22, 2012) and "if they only provide us with electricity this place would be safe. It's not safe now because it is dark when walking outside at night" (Respondent-58, 2012). There are some reports however that the Apollo lights installed by the CoJ do help to reduce crime. Respondent 34 for example said: "I am very glad with the Apollo lights ok; they did help a lot because at night the crime is not like before, because everybody was doing everything in the dark" (Respondent-34, 2012). While the appollo lights have helped somewhat, there is a general feeling that they are not enough. The feeling, as indicated above, is that a full electricity supply and more comprehensive lighting would reduce crime in the settlement.

The second reported danger of having no electricity is fire. This is due to the fact that lighting, cooking and heating are achieved using mainly open flames, in the forms of candles, paraffin lamps and stoves, gas stoves and fires. Respondent 16, for example, when asked about where in the settlement the danger of fire is most prominent, responded "ja, all over the settlement... because we are using a paraffin stove, we don't have electricity… it's not alright" (Respondent-16, 2012). He went on to say that he had been in a fire in 2003, saying "You see me here, [indicating scars covering his arms] I was burned here". At least four other respondents report similar opinions with respondent

56, for example, reporting “With no electricity, we are forced to cook using paraffin which is not safe, and causes fire” (Respondent-56, 2012).

Lastly, the lack of electricity in Kya Sands has an effect on living conditions. Firstly this relates to amenities that people would like and cannot practically access. Respondent 7 complains that “[w]e cannot have a fridge here. You cannot iron your clothes here, there is no electricity” (Respondent-07, 2012). This also relates to cost, as perishable food cannot be stored and people need to pay for fuel with which to cook, heat and light their homes. Probably the most common example of how the lack of electricity costs residents money is that they have to pay to charge their cell phones. This is a major issue, and indeed a big industry (relatively speaking) in the settlement, as my guide Thabo assured me that almost everyone has a cell phone.[31] Residents generally charge their phones in stalls providing the service, using either car batteries (that are charged elsewhere and brought in), fuel powered generators or small solar panels. Charging your phone costs R5-R6, and comes with the added inconvenience that you have to leave it at the stall while it is being charged.

Despite the fact that there is no electricity provided in the settlement, and that there are power lines running overhead to installed Apollo lights, there is no evidence of ‘illegal’ connections. Thabo assured me that no one had made any such connections that he or the committee were aware of, and that the committee strongly discourages it.

While it is thought that residents cannot practically electrify the settlement themselves through conventional high voltage grid connections, other sources of electricity may be viable. Renewable energy is possible, in the form of solar power and a small number of these systems were observed in the settlement. With relatively low upfront investments, residents could light their homes and provide enough electricity to charge a cell phone. This is currently undergoing trials in two projects (known to the author) in the country. The first is in Zamani informal settlement in Duduza on Gauteng’s East Rand, where one solar panel and a car battery provide power to three LED lights and a cell phone charger in eight dwellings (Ntuthuka, 2012). The second is through a project

[31] 89% of households that live in an ‘Informal dwelling/shack not in [a] backyard’ in Gauteng, have at least one cell phone (GCRO, 2011) .

initiated by the Sustainability Institute in Stellenbosch, called iShack (improved shack). The project is being piloted at Enkanini informal settlement in Stellenbosch. The project looks at redesigning informal settlement dwellings, to be correctly oriented (north facing) and insulated, to make temperatures inside more stable and comfortable. Similarly to the Zamani project, they also include a solar power installation, with three inside lights and a cell phone charger. In addition, in the iShack model, each dwelling has its own solar panel, and the addition of a floodlight (activated by a motion sensor), over the front door (Mthembu, 2012). While these interventions would help reduce the risk of fire as lighting would be done using solar energy, cooking and heating would still be done with open flames, thus only partially counteracting the risk.

Living Conditions

As mentioned in the introduction to this section, while hazards and dangers such as crime, fire and disease, were reported as characteristics that reduce the attractiveness of Kya Sands as a place to live, they are discussed in the following section (6.2.2). With these ignored in Figure 27, we see that poor living conditions are a major complaint. If a single general category is introduced, including all responses relating to living conditions, it makes up 65.4% of responses on what people dislike about living in Kya Sands.[32] This makes sense as it relates directly to the question asked. The more important question to address here is whether poor living conditions represent vulnerability or a lack of resilience. On the surface it seems that these poor conditions don't and, if given the least weight possible, it may be argued that poor living conditions are merely about comfort or even cosmetics. However, I believe that these are important in looking at vulnerability.

The argument, that living conditions do not relate merely to cosmetics or discomfort, is firstly in relating back to the section on sustainability in Chapter One of this study. The section noted not only the 'traditional' goals of sustainability, such as continued survival and existence, but also those of continually striving to improve the lives and living

[32] Categories relating to living conditions include: No Electricity; Dirtiness/Litter/Smell; Living Conditions; Toilets; Water in home when raining; Access to water; It's a squatter camp/informal settlement; Lack of proper houses; Noise; Disorderly layout; no streets and Small home/stands.

conditions of people. In this way, poor living conditions in the settlement point to an unsustainable state that can be interpreted as one of vulnerability, especially if residents are not in a position to improve these conditions themselves. Here I believe that residents are not necessarily in this position, and so while poor living conditions may not directly equate to vulnerability, they act as indicators that certain forms of vulnerability are present in the settlement.

Secondly, some of the poor living conditions reported by residents relate to hazards or dangers, although in this case, not necessarily in a quantifiable or concrete way. Some of these may even be underlying *causes* of dangers and hazards. Inadequate toilets, leaking roofs, limited access to water, and the category 'dirtiness/litter/smell' may increase the chances of contracting diseases, for example. Disorderly layouts and the lack of streets may allow for fires to spread more quickly (detailed in the following section). So, indirectly, poor living conditions represent problems in the settlement that lead to a vulnerable situation. They indicate problems that people perceive yet may not have the capacity to respond to and mitigate. In this way, again, they are good indicators if not direct measures of vulnerability.

6.2.2. Hazards/Dangers

After enquiring about what respondents dislike about living in Kya Sands, questions moved onto the hazards and dangers associated with living there. Again, to introduce the topic, a response scale was used. In response to the question "Is it safe living in Kya Sands?" interviewees were asked to mark from 1 to 5, with 1 indicating that the settlement is "Very Safe" and 5 being "Not safe at all". Here, no specific danger was alluded to, and the safety or lack of safety could relate to anything.

These results are even more clear-cut than how much residents like or dislike living in Kya Sands. As can be seen in Figure 29, more than two thirds (64.4%) of the 59 respondents for whom data are available, indicated that Kya Sands is not safe, responding either 4 or 5. While 20.3% of respondents were neither here nor there, indicating 3, only 15.3% indicated either 1 or 2, or that Kya Sands is mostly a safe place to live.

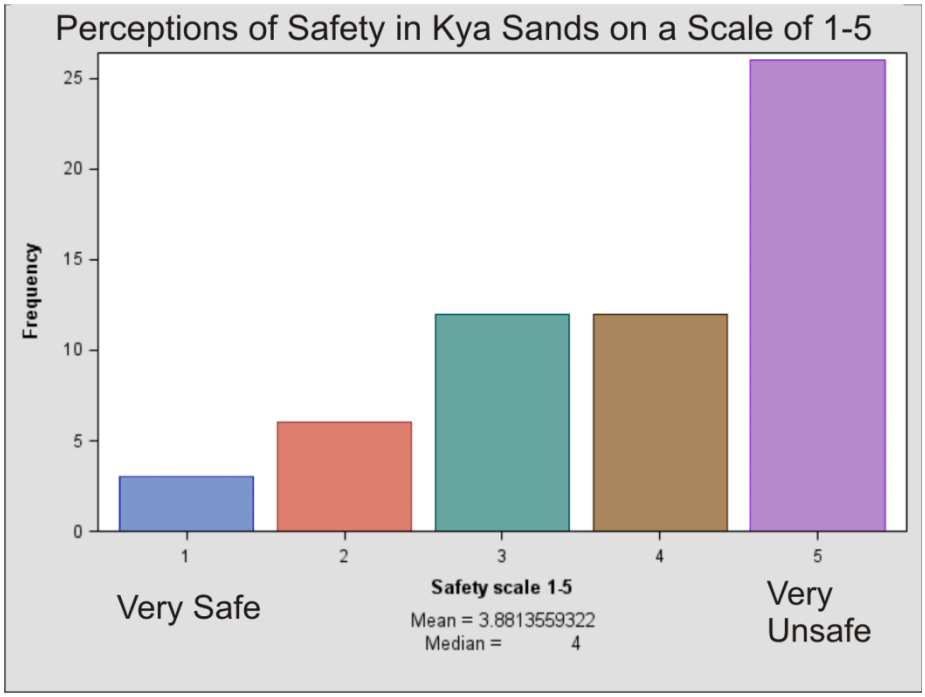

Figure 29: Frequency Distribution of Perceptions of how safe it is to live in Kya Sands (regarding any hazards/dangers) on a scale of 1 to 5 (1: Very Safe, 5: Not at all)

The percentage distribution of dangers or hazards reported by residents is shown in Figure 30. Here again, results closely mirror responses on hazards as reasons why people dislike living in Kya Sands. With 54 respondents giving up to four answers each to the question "What are the/are there any dangers associated with living in Kya Sands?" the most common responses again were crime and fire. If all of the categories reported relating to crime are added together,[33] they account for half of the responses, at exactly 50%.[34] Fire makes up just over a quarter of responses at 27.6%, and is followed by disease (7.1%) and a lack of safety for children at 6.1% (although other dangers relate to children as well).

[33] Including the categories: 'Violent Crime (including fighting)' and 'Houses not Secure'.

[34] The possibility cannot be discounted that the high frequency of 'crime' being reported relates to the nature of the question asked, and that respondents assumed safety and danger relate to crime. Even this assumption, however, speaks to the prevalence of crime in the settlement, and the result does repeat sentiments from Figure 28.

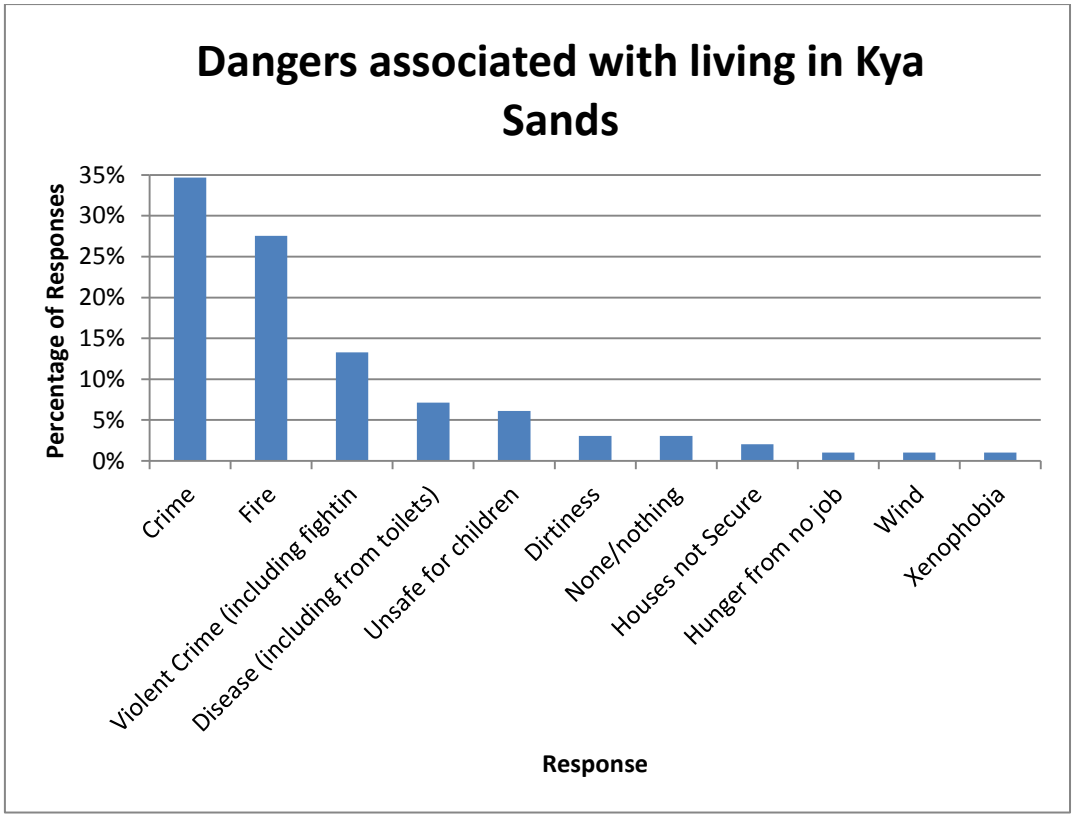

Figure 30: Percentage Distribution of Answers to the Question: Are There Any/What Are the Dangers Associated With Living in Kya Sands?

(Source: fieldwork)

Crime

While crime is the most commonly reported danger in Kya Sands, reports on the situation are varied. On the one hand, there are extreme reports of violent crime, yet on the other, some residents report that the crime situation is not bad at all.

Those reporting violent crime are further divided into two groups, those who refer to serious but isolated incidents and those who refer to crime as an everyday occurrence. Isolated incidents include rape and attacks as described, for example, by Respondent 29, who said "the ambulance doesn't enter [Kya Sands] anymore; one time it was called while there was a pregnant lady and the boys stopped it with bottles and then raped the assistant" (Respondent-29, 2012). Violent crime as an everyday occurrence is described by other residents who report "[the dangers here include] criminal activities like robbing people's belongings in their homes, raping, muggings and killing" (Respondent-20, 2012)

and “we hear the guns at night... people killing each other. Ja, we are not safe at all. People are killing each other every day” (Respondent-34, 2012).

At the other end of the spectrum, there is a perception of low crime in the settlement by some residents. Some even claim that they moved to the settlement due to the relatively low crime levels when compared to other parts of the city, specifically larger formerly black-only townships. One man reported “Ja, in Kya Sands crime is not too bad. The main crime is in the big locations, not here at the squatter camps… I don't say there is no crime, there is crime, but it is just little bits” (Respondent-21, 2012). Another lady reported that she moved to Kya Sands to get away from crime; “we were bored by the high crime in Diepsloot. When going to work you had to be intentionally late because you’re scared of being attacked if you leave home early” (Respondent-41, 2012).

Ultimately, it was a small minority who said that crime in the settlement is not significant. The quantitative findings presented in Figure 29 and Figure 30 quite clearly show a strong concern about safety and crime in Kya Sands. This shows that the residents interviewed generally perceive themselves to be vulnerable to crime. As discussed earlier in the chapter, it does not clearly show the nature of this vulnerability, only that it is present.

Fire

Fire is regularly mentioned as a danger in Kya sands, second most frequently after crime. Fires also reportedly occur on a fairly regular basis and, due to the compact layout of the settlement, single fires are not well contained often spreading to more than one home. Six respondents, 10% of the total number interviewed, reported that they had been direct victims of fire in their homes. Three others reported that houses very near to theirs had burned down and fortunately did not spread to theirs. It seems that the danger of fire is certainly one to which the residents of Kya Sands are vulnerable. This is due to the fact that while the danger of fire is both perceived and periodically experienced, methods of reducing the risk of fire are also well established. While these methods of mitigation are known, they seem to be beyond the capacity of the community to implement.

The first solution reported by community members, which has already been mentioned earlier in the chapter, is that the availability of electricity would reduce the chance of fires starting in the first place. The use of open flames for cooking, lighting and heating would be reduced. This sort of large infrastructure would have to be installed by an outside entity, though a clear limitation in the community's ability to act.

The second is the acknowledgement that as houses are so close to one another, fires spread more easily and that carving out space between them would help reduce this. Examples of such responses include: "shacks are too close to each other which makes fire risk higher" (Respondent-11, 2012) and "the houses are too close to each other so there is a risk of fire" (Respondent-22, 2012). Respondent 11 suggested "There should be space between houses to prevent the spread of fires" (Respondent-11, 2012) and respondent 6: "They should make streets so that it's open, these shacks shouldn't be this close. If this shack burns, the whole of Kya Sands is going to burn up" (Respondent-06, 2012). Again, the capacity of the community to implement such a measure seems limited. In order to undertake a project to create more space between houses, the density of the settlement would need to be reduced; especially in the older, more densely occupied sections (sections B and C). This would include the relocation of those residents moved, and some sort of arrangement to ensure that new homes are not built on the newly vacated land. There would also be a complex and most likely contested process in deciding who needs to move and who gets to stay.

6.2.3. More and Less Desirable Parts of the Settlement

One of the goals of this work (and of the spatial sampling method used) was to look at how perceptions of Kya Sands differ across the settlement and how its different parts are perceived differently by its residents. This is important in arguing against 'one size fits all' approaches to informal settlement intervention. Here, not only do different settlements require tailored responses from planning authorities, but different sections of single settlements may need unique responses too. This section looks at which parts of the settlement are more or less desirable to live in, as well as which areas of the settlement are perceived to be more dangerous than others.

Better or worse areas within Kya Sands

After asking whether residents like living in Kya Sands or not, attempts were made to find out if it was the whole settlement they like/dislike, or just certain parts of it. This was done in three ways. Firstly, if residents responded that they mostly did not like living in Kya Sands, we asked if it was the whole settlement, or certain portions of it that they disliked. The second was to ask (later on in the interview) if certain parts of the settlement were better to live in than others. And third, after asking people about the dangers of living in Kya Sands, we asked whether certain areas were more dangerous than others.

In response to the first question as to whether respondents disliked the settlement as a whole, or certain parts of it, data are available for 39 respondents. Of these, the vast majority, that is 79%, indicated that it was the *whole* settlement they disliked and not specifically their own area of residence within it. Next, 10% of respondents reported that they specifically dislike Sections B and C (the portion of the settlement to the west of the river) and only one person reported disliking Pipeline specifically. This correlates with responses to the question on whether certain parts of the settlement are better to live in than others. Here, the most frequent response was that Pipeline was the best part of the settlement to live in, making up 45.3% of the 53 responses (Figure 32). If "A Section" and "Sections with stands" (which are both part of pipeline) are added to the number, it makes up the majority of responses, at 50.9%.[35] It must be noted however, that a close second was the response that the whole settlement is viewed the same way, with 23 responses or 43.4%. So while the majority of respondents report that they dislike the *entire* settlement, there is a leaning towards Sections B and C (West of the river) being the less preferred sections of the settlement to live in, and Pipeline (to the east of the river) being favoured.

[35] When comparing responses from those who live in Pipeline (east of the river) to those who live in Sections B or C (west of the river) no significant difference is found in this regard. For respondents living in Sections B or C, 36.8% of those for whom we have data indicate that Pipeline is better to live in, while for those living in Pipeline, 50% of those for whom we have data indicate that they prefer Pipeline. So there is a slight bias based on where people live, however, it is not hugely significant.

Reasons for the eastern side of the river being favoured are quite clear. From those who reported that Pipeline was the best part of the settlement to live in (giving up to two answers each), responses included the organised layout (28.6%) and size (21.6%) of stands and the toilets (28.6%), which are mostly private VIP toilets as described in the previous chapter. These all result direct to intervention from the CoJ indicating, as discussed further on in the chapter, some improved living conditions in the settlement emanating from municipal intervention. Respondent 10 reports Pipeline as being better than sections B and C. He relates this to an important safety issue, saying that "It's not like here [west of the river], the houses are not like these ones. The streets are properly laid and if one needs an ambulance they can be fetched from their street, unlike here" (Respondent-10, 2012).

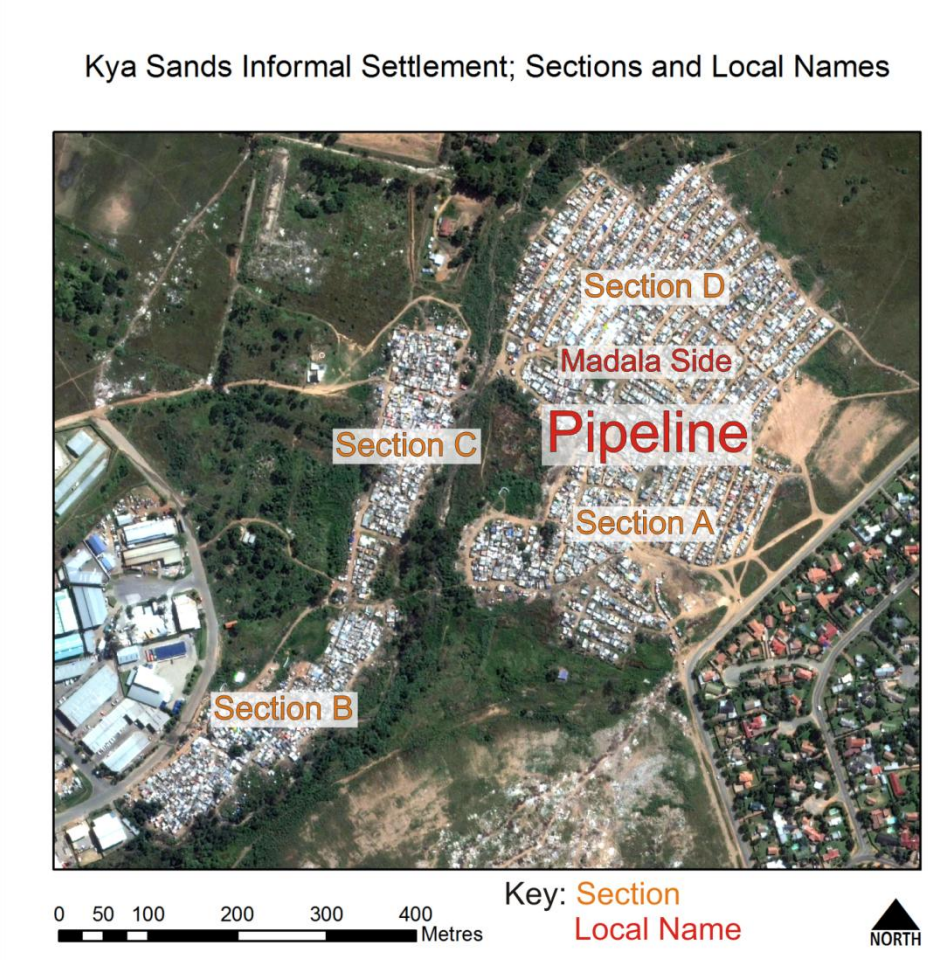

Figure 31: Kya Sands Informal Settlement, Sections and Local Names

(Aerial Photograph, 2011: Google Earth; © AfriGIS; © Digital Globe. Data source: fieldwork Interviews)

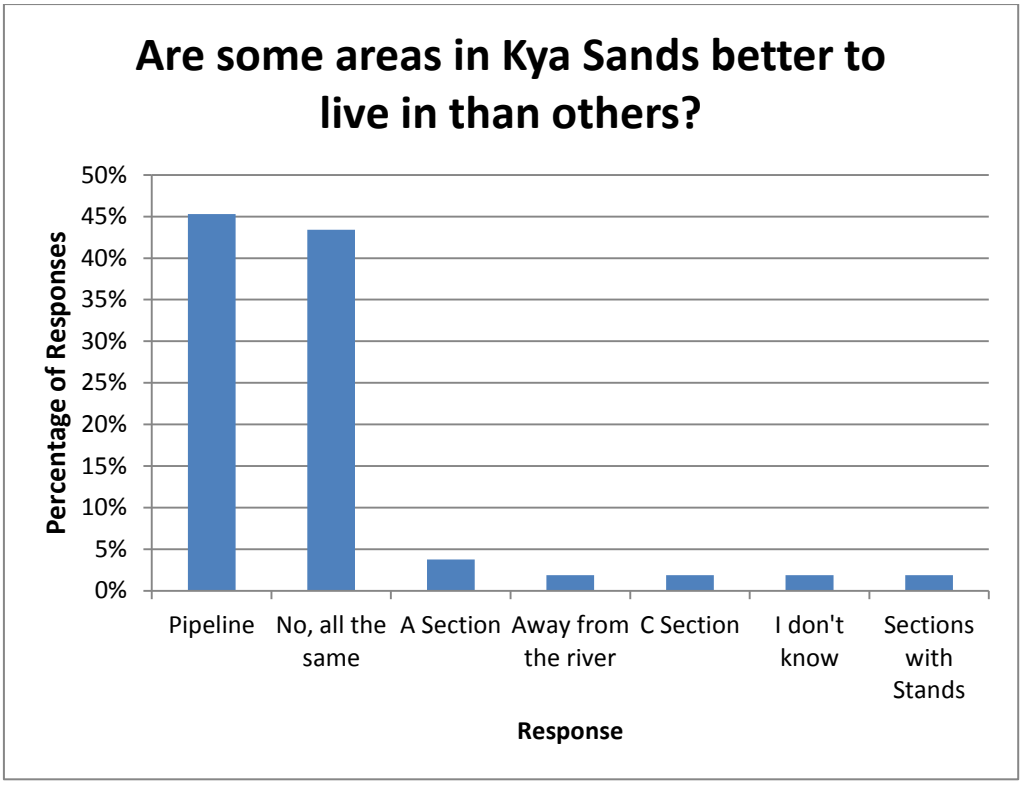

Figure 32: Percentage Distribution of Resedents' Response to the Question: "Are Some Areas in Kya Sands Better to Live in Than Others?"

Dangerous Areas

When looking at residents' perceptions of more dangerous areas[36] in Kya Sands, results are similar to areas of the settlement that are less preferred for living. Again, the most frequent response from the 49 respondents for whom we have data (each giving up to three answers each) was that there is no difference across the settlement. Here, 30.8% of responses showed that the whole of the settlement was equally dangerous (Figure 33). The next most frequent response was 'Sections B and C', at 23% of responses. One reason given for this was the lack of space between houses, as it is the most densely populated part of the settlement. Respondent 41, when asked the question if some areas in the settlement are more dangerous than others, responded "I think it is this one [indicating Section B on the map], because the houses are closely situated to one another, therefore if fire emerges, they all burn" (Respondent-41, 2012). Respondent 6 reported a similar sentiment, saying "Here we live in an informal settlement. If one

[36] This is not specific to any one hazard.

house was to burn we all burn unlike in pipeline" (Respondent-06, 2012). Again, it seems that while many residents perceive the whole settlement to be equally dangerous, there is a perception that the west bank of the river is more dangerous than the east.

The sections of the settlement next most frequently reported as dangerous were river crossings, constituting 12% of responses. This relates both to dangers of crime, and of getting washed away by the river, and possibly drowning. There are two river crossings used by the community. The southern one is merely a shallow part of the river, with a few bricks laid in the water as stepping stones. This can only be used when it has not been raining at all. The second more 'formal' crossing (at the time of the interviews) was a bridge constructed by members of the community, using a metal frame and wooden planks. While it had a higher clearance over the water than the other crossing, it was still dangerous to cross during or after rain, and prohibitively so during and after heavy summer showers. Examples of the dangers of crossing the river were given by respondents including "Ja, if this river floods guys, you can't cross it" (Respondent-07, 2012) and "Sometimes when it has rained, you can think the river is not full and try to [get] across and then drown" (Respondent-18, 2012). One respondent reported a recent death saying "I don't know whether you know, but one other guy passed away last year. He was drunk, then he tried to cross that tree, and he fell. The river was strong and he passed away" (Respondent-13, 2012). The two river crossings are shown in Figure 34. The second more formal bridge is spoken about in the past tense, as it has subsequently washed away and at the time of writing this (November 2012) there was no new bridge in place (Modikwe & Motaung, Personal Communication, 2012).

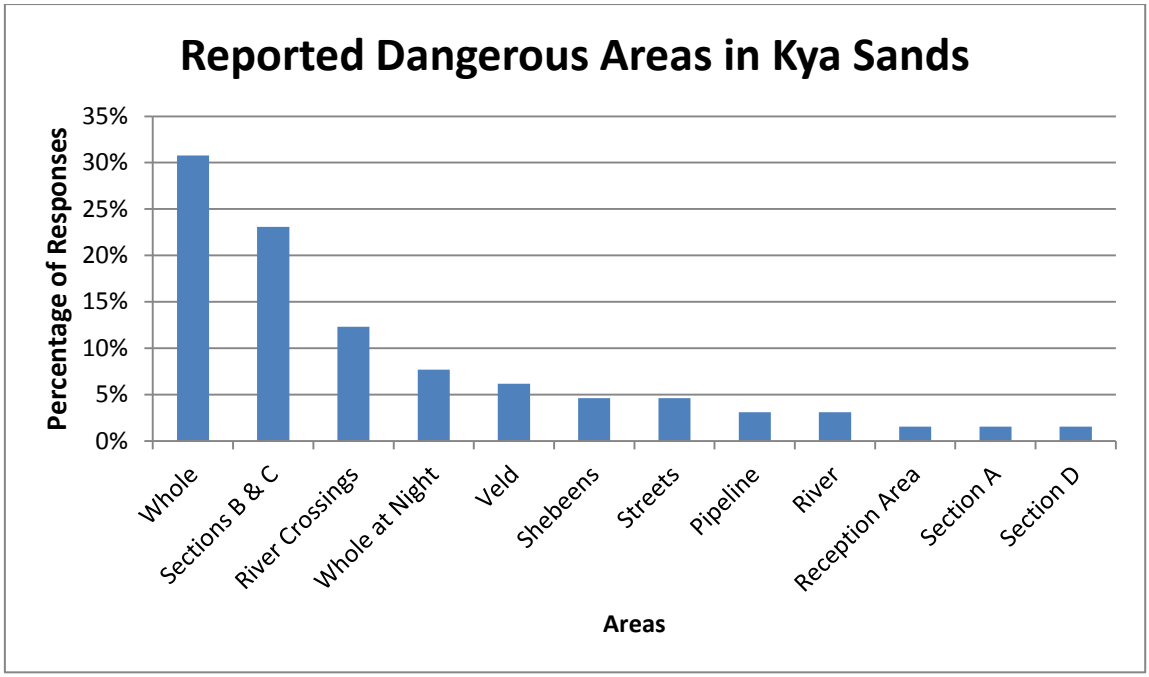

Figure 33: Percentage Distribution of Responses to the Question "Are some places in Kya Sands more dangerous than others?"



Figure 34: River crossings in Kya Sands Informal Settlement. Left: Southern Crossing point with Thabo Motaung looking on, Right: Northern more 'formal' bridge

(Photographs by the author)

6.2.4. Conclusion: Hazards as a Proxy for Vulnerability?

There is no doubt that, in Kya Sands, vulnerability exists in relation to a number of hazards. This is inferred through residents' perceptions of the negative aspects of living in the settlement. In fact, the perception of the safety and living conditions in Kya Sands is more negative than positive, shown through the two response scales used (see Figure 27, p.137 & Figure 29, p.143). Generally people report that they do not like living in the settlement, and that it is an unsafe place to live. What these perceptions *directly* represent is not vulnerability. It can more adequately be described as poor living conditions and exposure to hazards. The fact that people perceive these conditions shows underlying vulnerability to the hazards spoken about however, and thus the vulnerability shown is inferred rather than directly represented.

The three major hazards reported by residents are crime, fire and the risk of disease; in that order. Crime and fire are usually directly reported, while disease, although directly mentioned by a small number of residents, is more often indirectly described. This is done through complaints such as dirtiness, limited access to water, inadequate toilets and rats. This, importantly, starts to describe not just the danger of disease, but also its sources which in turn allude to solutions to the problem. This is similar to the dangers of fire and crime, where it is widely described that having electricity in the settlement would reduce the danger of both. Here residents not only perceive the dangers, but also the solutions to them. Many of these however are solutions that residents cannot implement themselves, which shows their vulnerability in the situation.

6.1. Residents Perceptions of the Positive Aspects of Living in Kya Sands

6.1.1. Introduction

In looking at the positive aspects that Kya Sands presents to its residents, a similar approach was taken in looking at the negatives (in the previous section). Questions here started very broadly, allowing interviewees to dictate what benefit they gain from living in Kya Sands. For those who answered that they mostly liked living in the settlement

(see Figure 27), positives were spoken about first, however for the majority of respondents, the negative aspects of living in Kya Sands were spoken about first. The two main sets of data from which the benefits of living in Kya Sands are derived are responses to two main introductory questions. These questions are based on the awareness that even though living conditions are far from ideal, people *have* chosen to live in Kya Sands. In this light, the questions explore what the settlement provides for its residents, and why they have chosen to live there. This then begins to illustrate the function of Kya Sands, the reasons it exists, and importantly the aspects of the settlement that should be maintained and enhanced through any type of intervention.

6.1.2. Positive Dimensions and the Link to Resilience

The first of the introductory questions on the positive aspects of life was: "Is there anything/what is it that you like about living in Kya Sands?" The results of the 58 respondents giving up to two answers each are summarised in Figure 35. There are two clearly dominant answers. The first is the availability of and proximity to jobs which makes up 34.3% of responses. Second is the affordability of living in Kya Sands, making up 22.8% of all responses. The third most frequent answer, making up 11.4% of responses, was that there is nothing respondents like about living in the settlement. There are also a range of less frequently reported answers, some of which, along with the findings mentioned immediately above, are discussed later in the chapter.

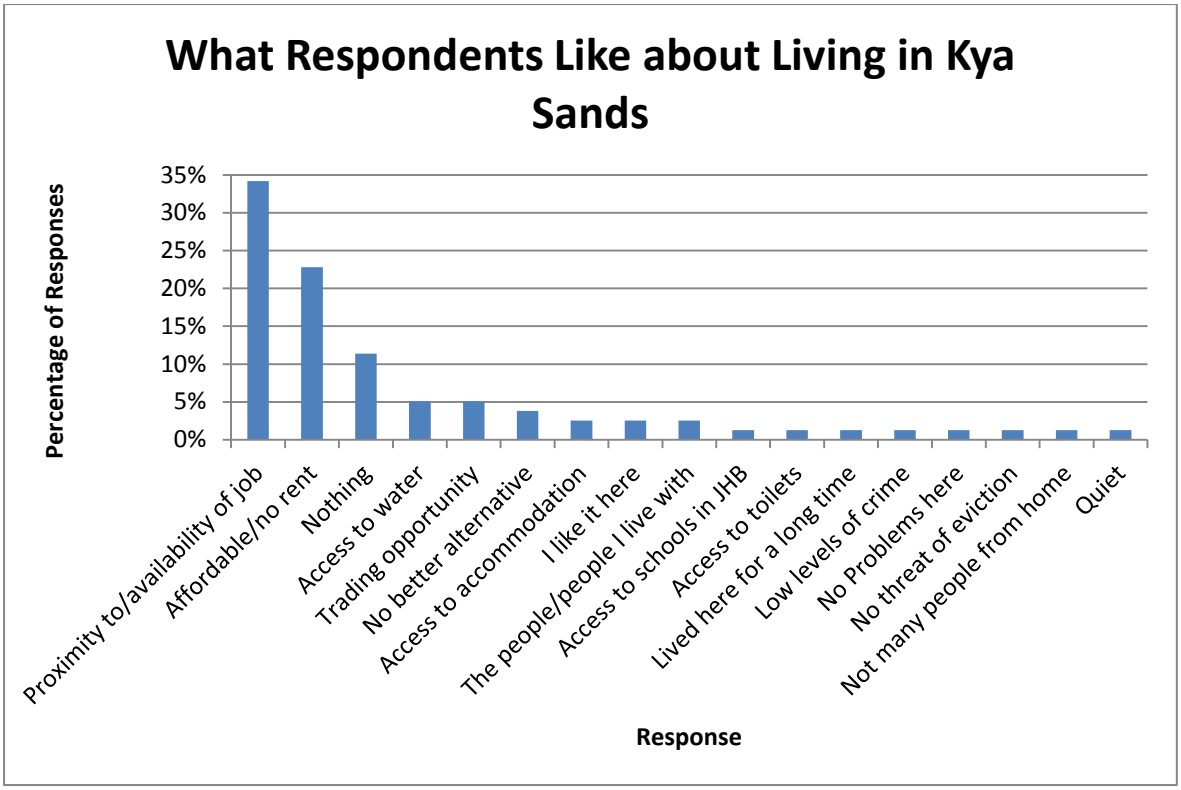

Figure 35: Percentage Distribution of Responses to the question "Is there anything/what is it that you like about living in Kya Sands?"

The second of the major introductory questions regarding positive aspects was the question: "Why did you move to Kya Sands?" Responses and results (summarised in Figure 36) are similar to those from the previous question, on the positive aspects of living in the settlement. In fact, the two most prominent responses in both cases are the same. The most common reason reported for moving to Kya Sands was the proximity to and availability of jobs, making up 31.5% of responses (from 57 respondents giving up to three answers each). If this is added to the fourth most reported response, that of 'proximity to my/my households job'[37] and 'trading opportunities', proximity to jobs makes up 45.7% of responses. Respondent 42 summarises this, saying "I am staying here because of work. I don't have to take taxis and buses to go to work and I can look for a

[37] The distinction between the categories "Proximity to/Availability of Job" and "Proximity to my/household's job" it that in the first case, people moved to Kya Sands without a job to find one, and in the second, already had a job in the area and moved to Kya Sands to be close to their or their households place of work.

job without wasting money" (Respondent-42, 2012). The second most common response was the affordability of living in Kya Sands, under the category 'rent', making up 20.7% of responses. If added to the fifth most frequent response, 'access to accommodation' access to affordable accommodation as a reason for moving to Kya Sands makes up 30.4% of responses. An interesting addition that was not as prominent in data on the positives of living in Kya Sands, was the idea of moving there to enhance social networks, in the category 'to be with family', at 13% of responses. Results on what people like about living in Kya Sands and the reasons they moved there in the first place are discussed below under the title: Access to the city.

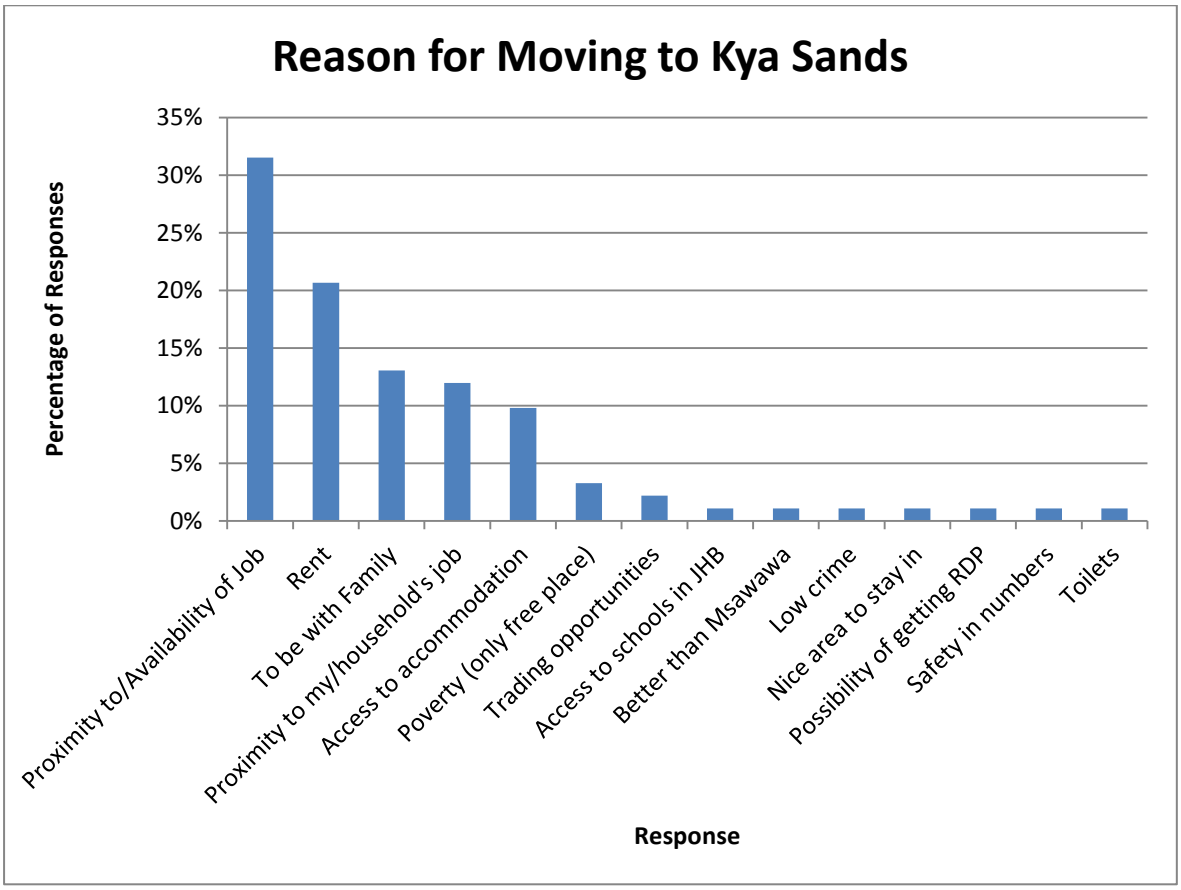

Figure 36: Percentage Distribution of Responses to the question "Why did you move to Kya Sands?"

It is not necessarily the case that a perceived positive feature of living in an informal settlements indicates greater support for individual or household resilience. However, in the case of Kya Sands there does appear to be a strong correspondence. The most important positive feature, the proximity to jobs, is hugely important for individual and

household resilience in South Africa's work-constrained environment. Low levels of rent are also important in a context of deep poverty. Most other dimensions support the resilience of residents in one way or another. This will become more apparent below.

6.1.3. Access to the City

It is clear that the most common reasons and biggest attractions to living in Kya Sands are the fact that it is well located in relation to jobs and that it provides affordable accommodation in the city. Kya Sands provides a viable access point to the city to those who would most likely be excluded from it if the only avenues of entry were formal ones. This section looks at the access to the city that Kya Sands provides for its residents, or, looked at in another way, that residents have created for themselves. This is done under four headings being: Livelihoods, Access to affordable housing, Social networks, and Access to city services.

<u>Livelihoods</u>

Although many of the residents of Kya Sands are formally unemployed, only one household reported having no form of income whatsoever. The rest had at least one source of income (of different varieties) with a fairly high proportion of respondents reporting being formally employed, and a fair number reporting more than one source of livelihood per household. People also generally work close to their homes in Kya Sands, reducing or even eliminating travel expenses altogether.

As is seen in Figure 37, most of Kya Sands' households (98% of those interviewed) have at least one source of income or livelihood. While the majority of households have only one livelihood (58%), a high proportion of households (42%) have either two or three, with the average

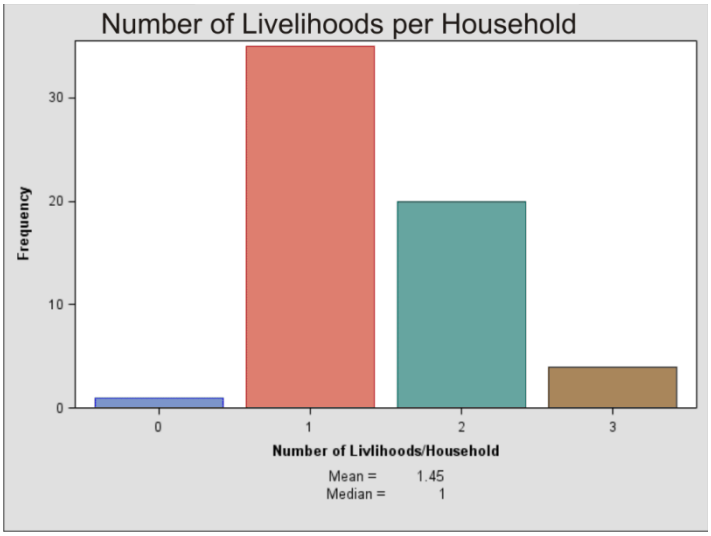

Figure 37: Frequency Distribution of the Number of Livelihoods per Household in Kya Sands Informal Settlement

being 1.45 livelihoods per household. This is a substantial number, and indicates that 67.7% of adults in the households surveyed provide some source of income,[38] although with varying levels of formality and regularity.

The broad nature of income, livelihood or employment types is illustrated in Figure 38. Most notable here is the high proportion of people employed who fit into the category 'formal employment'.[39] Here 57.9% of the 88 people[40] represented (in Figure 38) are formally employed. This is significant in that people who are informally housed contribute directly to the formal economy in the city. It can be argued here that Kya Sands is beneficial to the wider city and its economy as a pool of labour. The settlement, in providing cheap accommodation and low or non-existent transport costs, provides affordable and viable labour for the city's economy. The other two substantial forms of income reported, are 'informal/self-employment'[41] and 'piece jobs', making up 19.3% and 17% of responses, respectively. Here too, the informal nature of housing in Kya Sands allows for this type of work to take place. This is, again that accommodation and transport costs are so low. It is also viable in that accommodation is very flexible, especially for those renting in Kya Sands. It is possible to rent with any formal paperwork, and for short periods of time. This creates a viable entry point to the city, as there is no great risk or commitment associated with renting in Kya Sands. Thus if people do not find work and need to move back home losses are not too great, especially in relation to formal housing options.

Sources of income also vary in the frequency of work. 'Piece jobs' are less frequent and less stable, while formal jobs are generally more frequent and more stable. Results relating to the regularity of work then correlate fairly closely to job types, with the

[38] This excludes reports of the income categories 'family assistance' and 'grants' which made up five responses in total. The remaining livelihoods were then divided by the amount of adults captured in interviews.

[39] Formal employment here refers to jobs that can be formally *recognised*. Examples of this are domestic workers, security guards, factory workers and builders, to name a few. This is not to say that all of the jobs that fit into this category are necessarily legally formal. For example, I am sure that not all of the domestic workers in the settlement have formal contracts with their employers. The category shows jobs that are generally considered to be formal, and is used in contrast to overtly informal jobs.

[40] This is higher than the number of people interviewed as it includes all the adults in households who provide some sort of income.

[41] This category includes people who own and run informal businesses within Kya Sands, mostly spaza shops and taverns, and people who do informal work, mainly within the settlement.

majority of the 69 people (for whom data are available in this regard) reportedly being employed full time, at 52.2%. Second, most frequently reported is the category 'when available' at 36.2%, while 11.6% report being employed part-time.

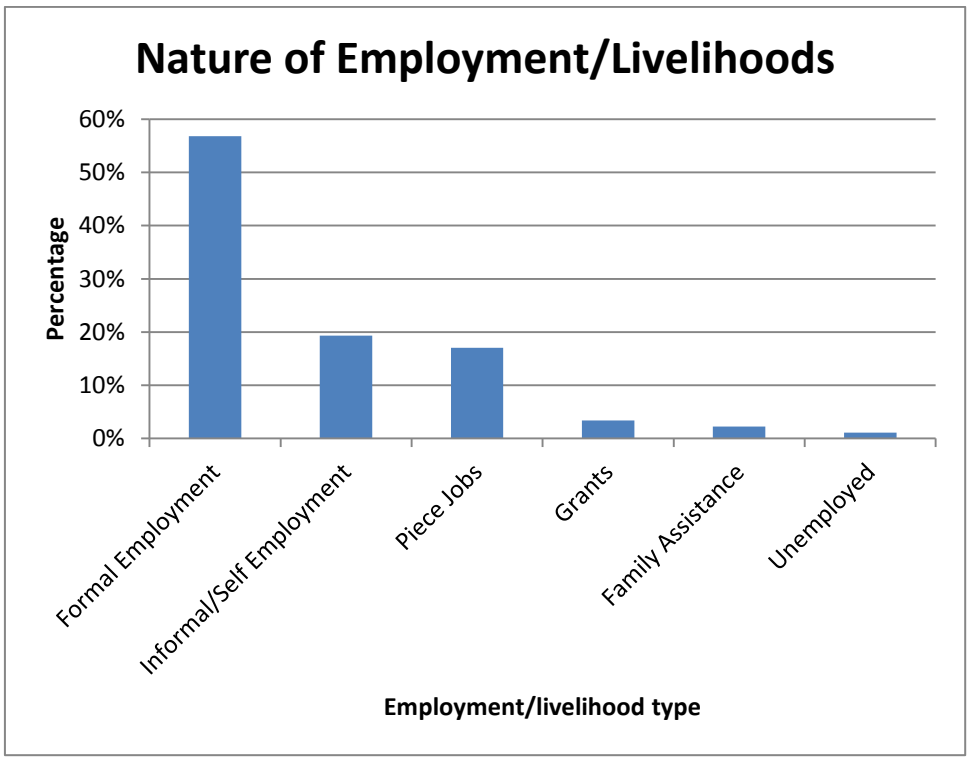

Figure 38: Percentage Distribution of Employment/Income/Livelihood Type

The employment results presented here differ significantly to results from across informal settlements in Gauteng. The Gauteng City-Region Observatory's 2011 Quality of Life Survey (QoL) (GCRO, 2011), reports that, of the 1022 respondents who live in informal settlements,[42] the majority are unemployed. It reports that 50.3% are 'unemployed and looking for work'. Only 24.9% of people living in informal settlements across the province, according to the survey, are employed, including the full range, from formal, informal, self-employed, part-time and full-time (ibid.).

[42] This includes the category "Informal dwelling/shack not in backyard" under Dwelling Type (GCRO, 2011).

It is clear that Kya Sands is well located regarding access to jobs. This is emphasised in the results displayed in Figure 39, which compares the number of people working in certain locations (in blue) to the distance of these locations from Kya Sands[43] (in red). The two trend lines on the graph show that the number of people working at each location, and its distance from Kya Sands, are indirectly proportional.[44] In other words, people are more likely to work near to the settlement than far from it. It shows that most people work either within Kya Sands Informal Settlement or in a nearby area. In fact, 72.6% of breadwinners work within 3.5km, 80.6% within 6km and 87% work within 10km walking distance of the settlement. The most common work location is Kya Sand Industrial area (29% of workers), which directly borders the settlement to the west. Work here takes place mainly in the many factories that the area houses. Next, many people work within the settlement itself (27.4%). Here people work in shops, engage in informal work such as informal recycling, or have formal jobs in the settlement. Formal work in the settlement includes working at one of the outside organisations or city services such as Pikitup, Vuk'uzenzele, or Judah Africa Ministries (see section 6.1.4). Other large sources of work are formal residential suburbs nearby, including, most prominently, Northriding and Bloubosrand, both of which are within a 3.5km walk of Kya Sands.

[43] These figures were obtained using the 'Directions' tool in Google Maps (Google Maps, 2012) and choosing the 'Walking directions' option to get the most direct route possible. Thus, distances are not 'as the crow flies'. Although at their closest, Bloubosrand and Kya Sands Industrial Area practically intersect with Kya Sands, they were each shown at a distance of 1km so that the value would reflect on the graph. The same was done for Kya Sands informal settlement itself.

[44] The data excludes the two outlying results of Brakpan and Booysens, respectively 60km and 38.2km from Kya Sands informal settlement. It must be noted that this graph is used to show the *general* trend of the inverse relationship between how many people work in certain locations, and how far these locations are from Kya Sands. The angle of the trend lines will change if the labels are sorted differently. The graph is currently sorted first by percentage of respondents working in each location (largest to smallest, left to right), and then alphabetically (left to right), where percentage values are equal. If the second sorting method was at a distance from Kya Sands (largest to smallest, left to right) the angle of the red trend line would be shallower, yet would still show the general inverse relationship.

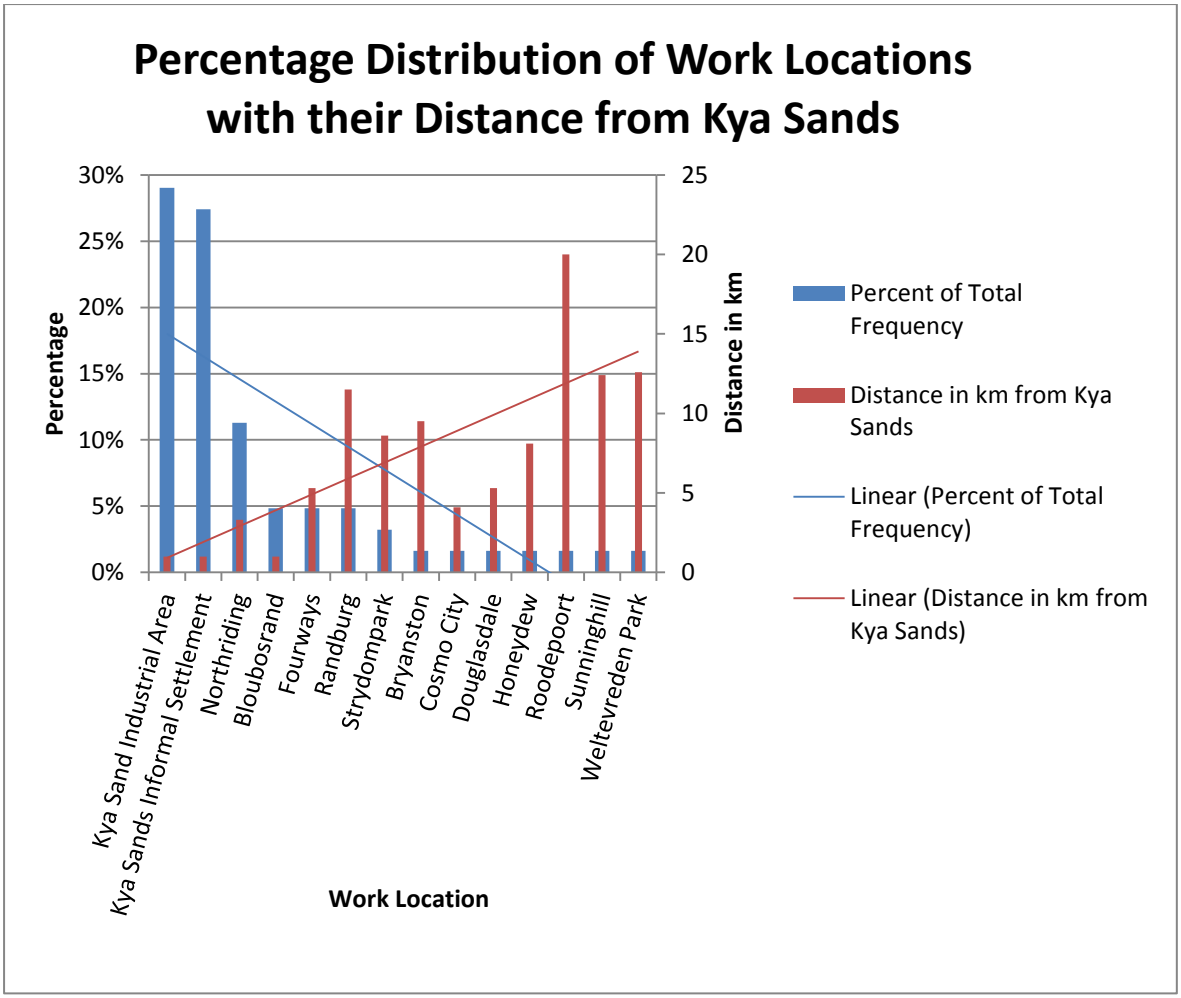

Figure 39: Percentage distribution of work locations with their distance from Kya Sands Informal Settlement

An interesting aspect of livelihoods in Kya Sands, represented in Figure 35 and Figure 36, is the attractiveness of trading opportunities in the settlement, both as reasons for moving there and as positive aspects of living there. While it is not a hugely significant number of people, with 2.17% reporting it as a reason for moving to the settlement and 5% reporting it as a positive aspect of living there, it shows the attractiveness of the settlement itself, that not only relates to its location. Instead of being attracted to jobs in the surrounding area, these people are attracted to the market created by the settlement itself. Respondent 41 (2012) reports, "The only thing I like is that my business is prospering. There is money to be made in the squatter camp even though it's not safe." This shows some (although still very limited) growth of a market and possibly of

some economic independence of the settlement. This is further displayed by the developing property market in the settlement, outlined in the following section.

Kya Sands then provides its residents with viable access to jobs in the city. At the same time, it can be argued that Kya Sands benefits the city at large. This is in that residents are active participants in the city's economy, both formal and informal. As many people live close to their place of work, and accommodation costs are so low, the settlement provides an economically viable and affordable source of labour for the city.

Access to Affordable Housing

As has already been outlined, the second most reported reason for people choosing to live in Kya Sands or for moving there in the first place, was access to accommodation in the city. Here, accommodation is *actually* affordable for people in the city's lower income brackets (although respondents' incomes were not explored).

One set of questions in the fieldwork was around the informal tenure arrangements adopted in Kya Sands. Questions related to who gave people permission to live where they do, and whether or not they ever paid or currently pay to live there.

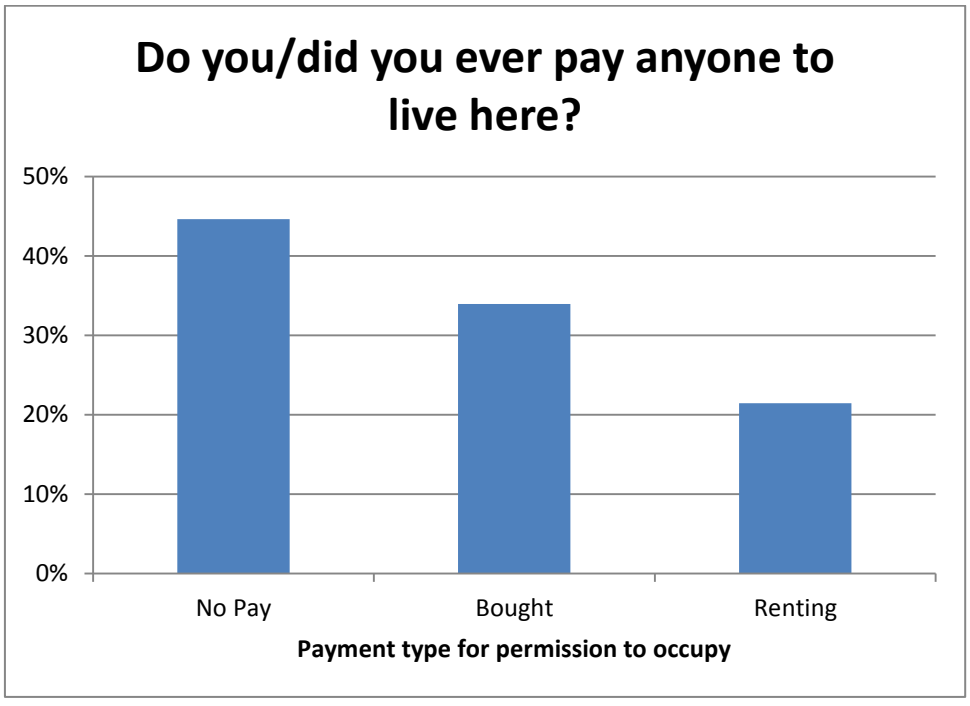

Figure 40: Percentage Distribution of Payment type for permission to occupy land in Kya Sands Informal Settlement

(source: fieldwork)

Regarding payment, there were three categories reported, summarised in Figure 40. Of the 56 households for which data are available the largest category was “no pay” at 45%. Next was “bought” at 34%, indicating that either the land alone or land and structure were purchased, and third “renting” at 21%. Although ‘no pay’ was the largest single category, the majority (55%) of those interviewed either bought or are renting the home they live in.

While this shows a fairly well balanced mix of informal tenure arrangements, it is notable that an informal property market has grown in Kya Sands over time (Figure 41). This was observed by comparing when people moved to Kya Sands and the area that they lived in, to the method of payment (if any) to live there. Initially, respondents only moved to the settlement for free (indicated in orange), with all those who moved to the settlement between 1993 and 1999 not paying anything to do so, and with people still consistently moving to the settlement for no fee up until 2012. The upward angling trend line in orange indicates that, of the people that have moved to the settlement for free, more people have moved to Pipeline over time. This makes sense in that Pipeline is the newer part of the settlement, the area where the settlement has grown and expanded meaning that in general more people have moved into Pipeline over time. In 2000, the first indication of the informal real estate market under development begins to appear, with residents reporting that they had paid for the land they live on (indicated in purple). This also continues steadily to 2012, with an even spread of property purchases across the settlement indicated by the almost level trend line. Finally, the year 2008 sees the introduction of the rental market in Kya Sands (green), with the majority of these rentals (83.3% of the 12 residents who report being tenants) located in Pipeline. We can thus see the development of this (still young) property market and the trend of moving away from free accommodation in Kya Sands, to bought and more recently rented accommodation.

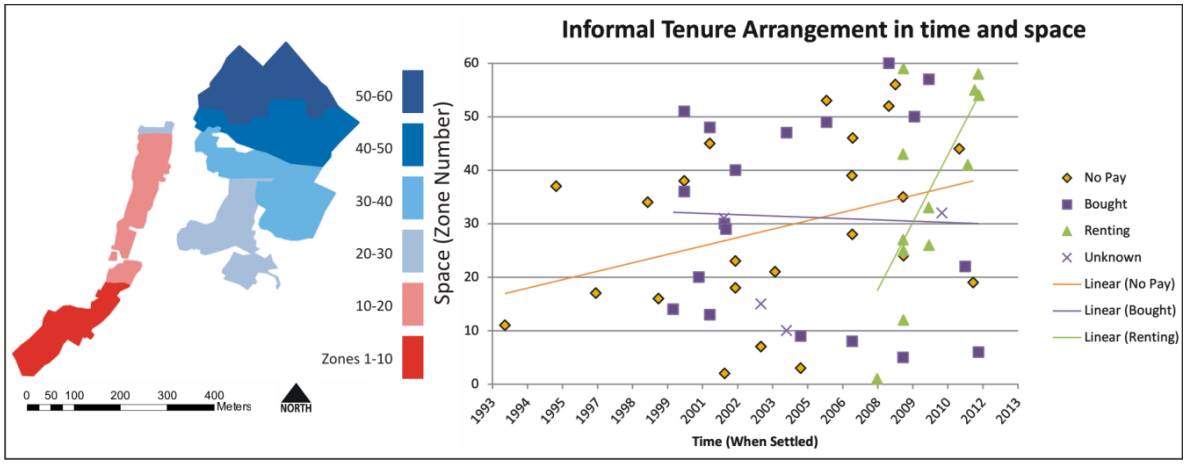

Figure 41: Informal Tenure Arrangement in Time and Space in Kya Sands Informal Settlement

(Source: fieldwork)

Rent prices per month are fairly consistent. From the 12 tenants for whom data are available, three rental prices are paid. The lowest is R180 per month, with only one person paying this amount. Five and six people then reported paying R200 and R250, respectively. The average rental is R223.33 per month. As the introduction of rentals in Kya Sands only emerge around 2008 (in these findings at least), there is not too much variation in rental price according to when people moved to the settlement. There is also little variation according to where people are renting in the settlement, although rental prices are slightly higher in Pipeline, where the majority of rentals are located. The average rental price in Pipeline is R228 per month, and the average in Sections B and C is R200.

Purchase prices vary more considerably, with the cheapest being a mere R35, and the most expensive being R3000 (from data available for 18 residents).[45] The average selling price from the sample is R1224. Here, there are a few variables that determine property prices. The first, like most property markets, is *when* it was bought. As is seen in Figure 42, there is a general trend of properties selling for higher prices over time. While this is the general trend, there is some disparity, with a stand selling for R2000, higher than the

[45] Some of these are unfortunately not visible in Figure 42 due to their low values (e.g. R35) and the scale of the graph.

average over the 12 year period, in 2002. The second is *where* the property is located. Surprisingly, when compared to findings presented in section 6.2.3 above, property selling prices are generally higher (although only slightly) in the more densely populated, supposedly less desirable, older parts of the settlement. This is indicated by the downward sloping trend line in Figure 43. Again, there are exceptions. The highest price paid for a property, for example, was in Pipeline, Zone 50, at R3000.

The final two variables influencing price were who was selling the property, and whether the property included a structure at the time of purchase or not. The two seller categories reported were 'the committee' and 'the previous owner'. The average buying price from the committee is R367, while the average price from previous owners is R1734 (from the 15 respondents for whom these data are available). When vacant land was sold, the average price was R723.50, and when land was sold with a dwelling already built, the average price was R1850[46] (for the 18 respondents for whom these data are available).

The emergence of a property market, although informal, speaks to the resilience of the community, and the resilience the settlement provides. This property market is highly adaptive, and has evolved over time, where people have adapted and responded positively to increased demand for accommodation in the area. 'Owning' land in the settlement can lead to economic gain through renting it out or buying at a certain price (or getting it free) and selling higher. While some people rent out parts of their homes, some move out of the settlement and rent the property to others. These gains, although very modest when compared to formal property markets in the city, provide the opportunity for economic advancement, going beyond mere subsistence. There is a possibility of moving to Kya Sands, getting cheap or even free land, and using it as a stepping stone towards a better life. This begins to question the argument that people need legal tenure for property to be able to buy and sell it, and to use it for monetary gain or for access to capital and finance, as proposed, for example, by de Soto (2001). While legal tenure does come with benefits, such as reducing the threat of eviction, and

[46] To determine this, the field 'self-built' was used. If respondents reported building the dwelling themselves, it was assumed that they purchased a vacant piece of land. If they answered that it wasn't self-built, it was assumed that the land was purchased with the dwelling already built.

the possibility of raising capital in the *formal* market, Gilbert argues that this is not always the case. He maintains that in some cases formalisation and regularisation of title may indeed inhibit the informal property market, or move gains to the rich instead of those already inhabiting the land. In some cases "sales are… more frequent when people lack legal title" (Gilbert, 2002, p. 1). The developing informal property market in Kya Sands shows that people can make money from their land, without formal title

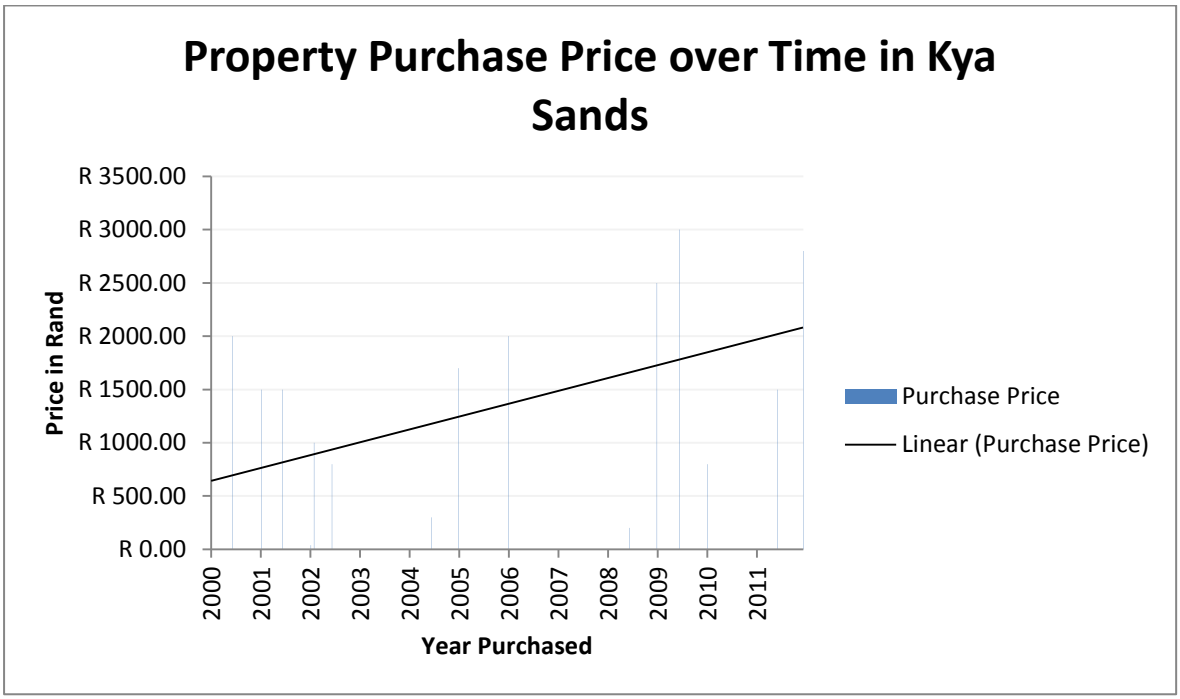

Figure 42: Variation in Property purchase prices in Kya Sands Informal Settlement over time

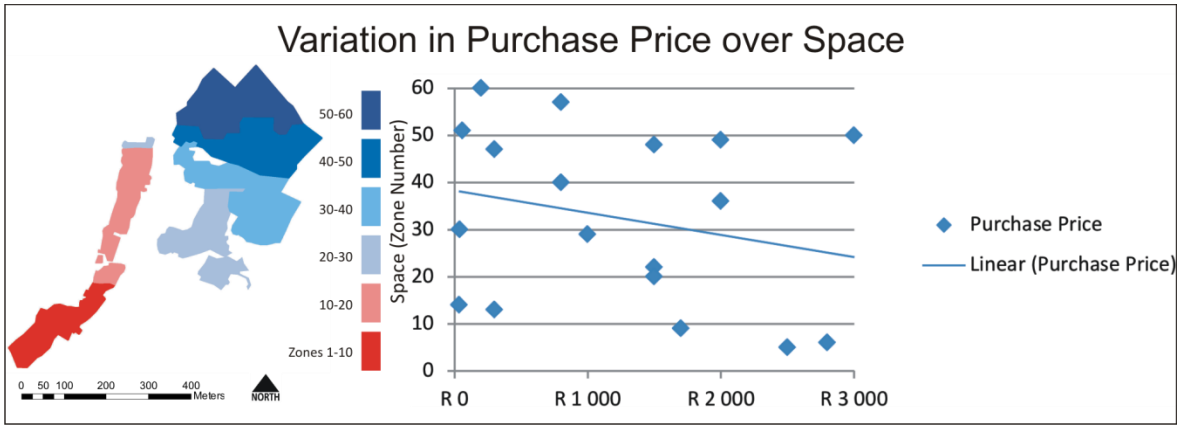

Figure 43: Variation in property purchase price over space in Kya Sands informal settlement

Social Networks

As seen in Figure 36, the third most reported reason for moving to Kya Sands is the category 'to be with family', making up 16% of responses. Here, people generally had family living in Kya Sands before moving there to be and live with them. This starts to indicate the importance of social networks in Kya Sands as an attraction to stay in the area.

The first indicator of the importance of social networks in Kya Sands is who residents heard about the settlement from as a possible place to stay. Results here are summarised in Figure 44. The two most common categories are family and friends living in Kya Sands, making up 30.8% and 25% of responses respectively (from the 52 respondents for whom data are available). When including the category "colleague living in Kya Sands" which makes up 5.8% of responses, the majority of residents, 62%, moved to Kya Sands already knowing someone (friend/s, family or colleague/s) who live there. This is significant in that people don't just initiate social connections once they've moved to Kya Sands, but they often arrive with these already in place.

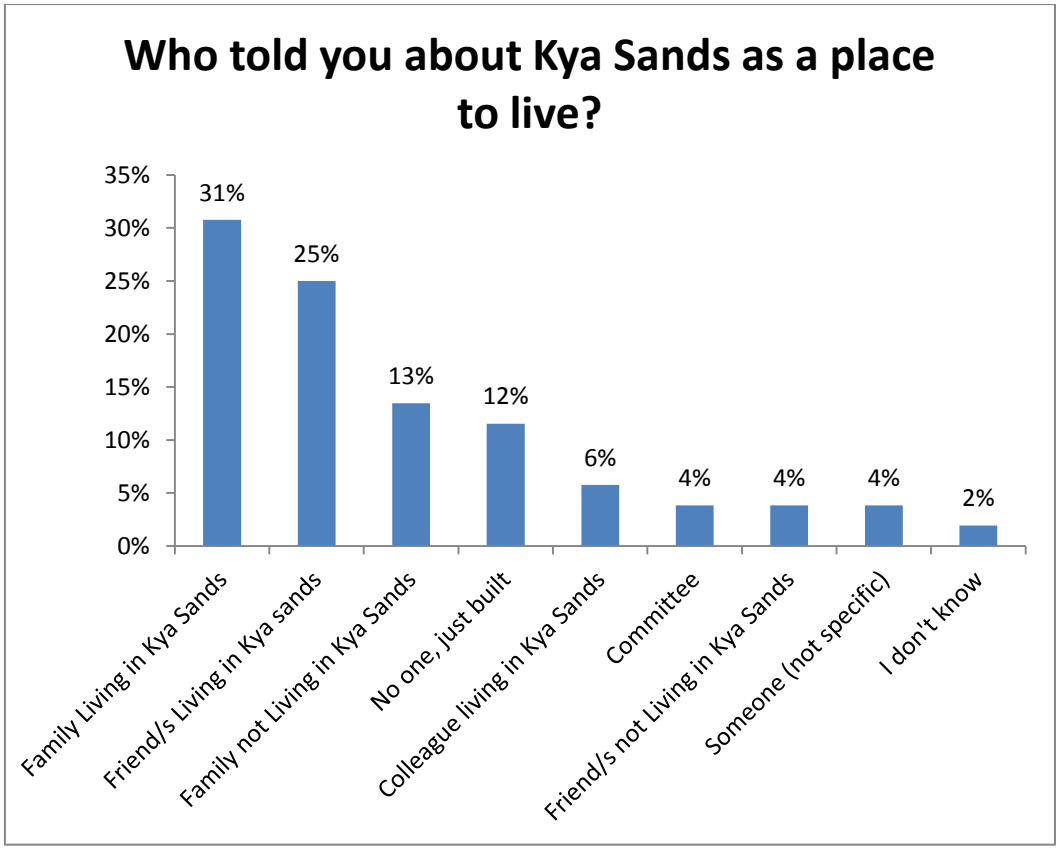

Figure 44: Percentage Distribution of who residents heard about Kya Sands from as a place to live

The strength of social and family networks in the settlement is further and even more profoundly indicated by how many respondents report having family (other than those they live with) living in Kya Sands. Of the 58 respondents for whom data are available, 63.8% of respondents have relatives living in other homes in the settlement. Most of these families have only one other related family living in the area, however seven respondents report having either two or three. Respondent 34 for example, who already shares a home with some of her cousins, says "we have got [other family living in the settlement]. She is also our cousin; there are two of our cousins that stay down there at C section, and the one is also around here on the other street that side" (Respondent-34, 2012).

Residents in Kya Sands also report having social networks in the city at large, represented by responses to the question "Do you have any family living in Johannesburg?" Of the 46 people for whom data are available here, the large majority,

89.1%, report having family living in Johannesburg. When asked if they see this family, 87.1% report that they do; for various reasons, and with varying frequency (including only the 31 respondents who report having family in the city).

Along with the statistics presented above on family connections in Kya Sands and the city, there are qualitative reports of social networks playing an important role in the resilience of Kya Sands and its residents. This is represented by a tangible sense of community. For example, when asked what, if anything, she likes about living in Kya Sands, Respondent 6 answered “Ja, I like the people here, some of them are kind and they help us”. Later on, when asked about what the community does to make Kya Sands safer, she responded “Ja, if this guy who lives here [points at a neighbour's house] opens the door, then I must always check that no one enters and steals anything. So if he is cooking and wants to go somewhere then I must be the one to check that nothing goes wrong... they will do the same for me” (Respondent-06, 2012). Another man says “Ja, because I still remember when there was fire in this area, you see these shacks [pointing]. That was 2005, during the festive season, some of these shacks caught fire, and then we were helping each other before the fire brigade came. So ja, almost everybody is like a friend when there's danger” (Respondent-07, 2012).

While it is not closely related to social networks *within* Kya Sands, another set of questions arose around social networks in the country, and abroad (for respondents not from South Africa). Notable here is the high percentage of people who have homes other than the one they live in in Kya Sands. When asked if he has another home, one man responded, “No, it's not my only home. This one is my home just to get jobs in Jo’burg; because we are next to the jobs… my homeland is in Venda” (Respondent-21, 2012)

Of the 59 respondents for whom data are available, only 4 respondents (6.8%) report having no home other than Kya Sands. While 3.4% report not having another home elsewhere, they still report having family in their home province or country. So, if added together, 10.2% of respondents report not having a home outside of Kya Sands, while they may have other family in their home province or country. The majority of respondents (89.8%) report having another home in their home province or country.

Second homes are mostly inhabited by family. As mentioned in the previous chapter, over two thirds of respondents (of the 45 who have another home and for whom data on who lives there is available) have children living at their second home, either alone if they are adults, or with grandparents or siblings. In most cases included in this study, second homes are respondents' parents' homes, making up 51.1% of responses.[47]

The connection to these homes is indicative of the importance of social networks that extend beyond the limits of the city. 40.4% of respondents visit their other home either once or twice a year, 25.5% visit three to four times a year and 21.3% visit more than 4 times a year (from the 47 respondents for whom data are available). This means that 87.2% of residents interviewed visit their second home at least once a year, showing, despite a choice to live in the city, a strongly-maintained link with homes in other provinces or countries.

Access to City Services

While many of the positive aspects of living in Kya Sands derive from informal action outside of government control and sanction, some of the attraction and positive living conditions are directly from government intervention and other formal services. Here some of the advantage of living in Kya Sands is access to city services. This includes both household services such as water provision, toilets, settlement lighting and refuse removal (although all to limited degrees), and wider services such as healthcare and education. The latter are provided by both government and non-government institutions. As household services have already been discussed in the previous chapter, this section focuses on wider services provided by the city, specifically healthcare and education.

While it was not explicitly reported by any respondents that they moved to Kya Sands or like living there because of access to healthcare, it is clear that residents of the community can access healthcare when needed. This is important as in some remote and rural parts of the country, access to hospitals and clinics is limited and often

[47] This includes the categories 'Parent/s' (31%), 'Parent/s and Children' (15.6%) and 'Parent/s and Sibling/s' (4.5%).

expensive, due to transport costs (Stassen, 2012). While access to healthcare for the residents of Kya Sands is by no means perfect, it does seem that in general, people can realistically access it when needed.

There are 51 respondents for whom data are available in response to the question "Where do you/your family go if you are sick?" Of the nine for whom data are unavailable, only two say there is no clinic or hospital available. For the rest, the question is not valid or was not answered. Three say they have not been sick since moving to Kya Sands, and four report that there either is or was a small clinic in the area, yet they don't report using it. One man, for example, reports "I can go anywhere; I've never been sick since I got here. I don't know where my brother goes when he is sick" (Respondent-20, 2012). This shows a high level of engagement with the question and, more importantly, a low number of people who report that there are no clinics or health facilities available to them.

The 51 respondents, who report the hospital or clinic that they use, give up to four answers each. These responses, with the distance of each Clinic/Hospital (or the suburb it is in) from Kya Sands, are summarised in Figure 45.[48] Here, while people still generally choose clinics/hospitals that are closer to Kya Sands, the settlement is not as well located when it comes to access to healthcare as it is to jobs. The three most utilised clinics, making up 67.1% of responses, are an average of 9.2 km walking distance from the settlement, with the closest and most utilised being 7.1km away (Witkoppen Health and Welfare Centre Non-Profit Organisation). These are not easy walking distances, especially when people are ill. There are other options than walking however, and ambulances are used in emergencies (as indicated in Figure 45, but also when accessing other hospitals mentioned on the list). If illnesses aren't serious enough to warrant dispatching an ambulance, residents do need to pay for transport to clinics however.

> *"We usually call an ambulance but it only comes for pregnant ladies, if you are ill you have to hire transport to go to" (Respondent-28, 2012)*

[48] See footnotes 43 and 44 for method and limitations of the graph and trend lines. "Pipeline", "Mobile Clinic", "Ambulance" and "Judah" were each given a distance value of 1km, so that they show on the graph, despite being effectively within the settlement.

We call an ambulance but it takes time to come. Sometimes we hire private cars to Coronation for those who are giving birth or Helen Joseph hospital for those who are sick" (Respondent-56, 2012)

While ambulances are available in emergencies, as mentioned earlier in the chapter, there are issues regarding ambulance access to the settlement, namely danger posed to ambulance workers and poor roads. Because of this, there seems to be an arrangement that ambulances do not enter the settlement, but collect people at petrol stations nearby. This may also be done for practical reasons, as Kya Sands has no formal addresses. For those living in sections B and C (west of the river), the BP garage in Kya Sand Industrial Area is used (750m walking distance), while in Pipeline, the Total Garage on Witkoppen Road (1km away) is used.

"We wait for the ambulance, there up the road by the BP garage. If I'm sick I have to walk from here to the BP Garage". (Respondent-05, 2012)

So if a pregnant woman is about to give birth, then you have to go to the BP garage and wait for an ambulance there because it can't go down these streets. (Respondent-07, 2012).

If you are very sick, then the ambulance will come but you have to go to the garage. You must take the patient to the Total Garage. (Respondent-34, 2012)

Interestingly to note, with regard to clinics, is that the closest clinic is not always the most popular. Randburg, for example, is mentioned more than twice as frequently as Honeydew, despite being almost 4 km further away. The Judah Ministries Clinic on the other hand only makes up 3.5% of responses, despite being practically within the settlement.[49] Reasons for this are unknown, but it is assumed that the cost of certain clinics and the facilities they offer are strong influencing factors.

[49] A reason for this may be that the clinic run by Judah Ministries was very new at the time these interviews were conducted. Respondent 30 reports "It has been there only for around three weeks or so" (Respondent-30, 2012).

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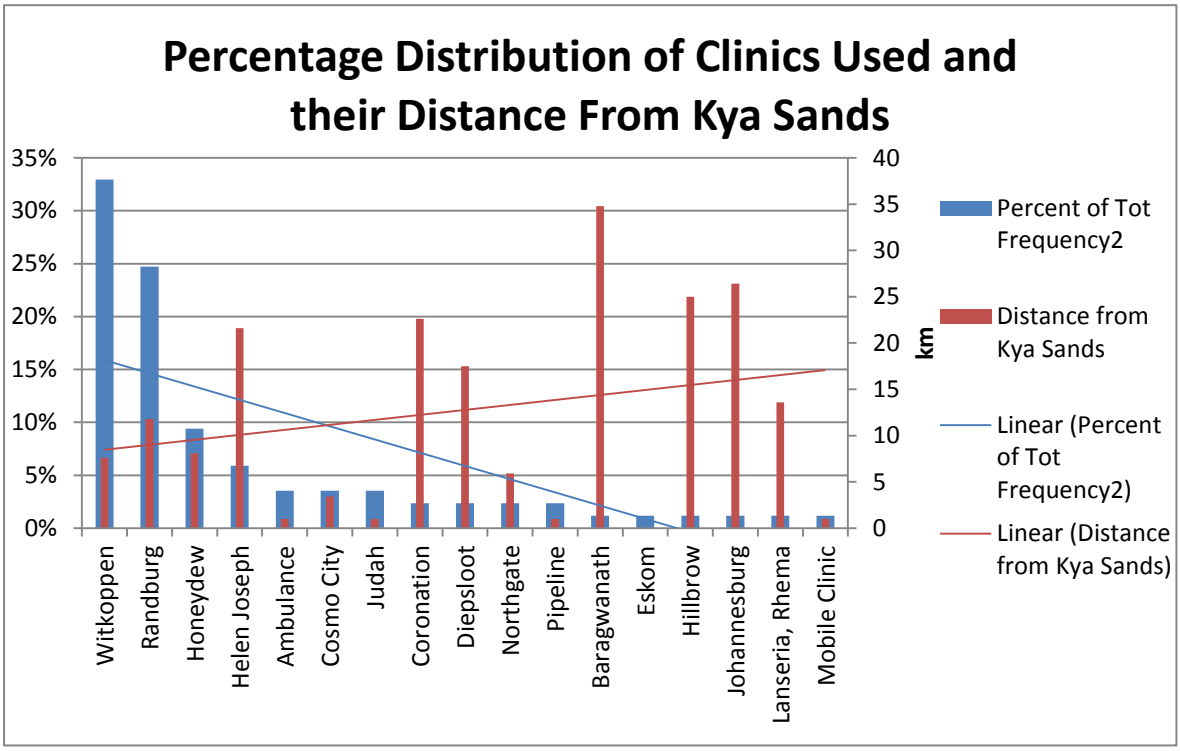


Figure 45: Percentage Distribution of Clinics Used and Their Distance From Kya Sands

When looking at access to schools in the area, the situation seems slightly worse than access to healthcare. There are only 17 people who report schools being available. It is thought that the low number of responses relates to the relatively low number of children living in the settlement, as outlined in the previous chapter, and it seems possible that the low number of children is related to poor access to schools. The 17 respondents gave up to two answers each regarding schools, and did not always relate to where their own children go to school. In fact, only 11 of the 24 households who report having children living with them give information or are aware of schools available in the area. A reason for this may be that some children are not yet of school going age, however it shows that the availability and/or awareness of schools in the area are limited. Figure 46 summarises the responses here, showing the percentage distribution of reported school locations and their distance from Kya Sands. Again,

[50] See footnotes 11 and 12 for method and limitations of the graph and trend lines. "Judah" was given a distance value of 1km so that it shows on the graph, despite being effectively within the settlement.

similarly to healthcare facilities, there are not many schools in close proximity to the settlement. The closest schools reported are in Cosmo City, 3.4 km walking distance from the settlement. While this is not prohibitively far to walk, the distance does pose problems. One respondent for example reports “my children have to go all the way to Cosmo City to go to school. It's dangerous for them to cross Malibongwe Road, which is very busy, and I can't afford to send them there as I don't have money for transport” (Respondent-11, 2012). Thus it seems there is not a problem of convenience, but of the danger posed to children as they travel to and from school. Witkoppen is the second most reported school site, and this too is reported as being too far at 5.9 km away. One resident says “There are no schools, people take a taxi to Witkoppen, that’s why I don’t have my kids here, they are at home [Limpopo] where they can just easily walk to school… even when I have piece jobs there will be a problem with transport” (Respondent-17, 2012).

While reports on access to schooling are generally negative, there are some reports of school access being good, although these are limited. Respondent 30 for example reports: “Ja, government do provide the schools. My two children are at school, one is in Grade 4… he goes to Fourways primary school, the bus comes and we don't pay anything, we don't even pay school fees” (Respondent-30, 2012). This shows again that while access to wider city services is far from perfect, it does exist.

There are also three nursery schools in the settlement, run by outside organisations, and at least one ‘informal’ crèche run by a resident of Kya Sands. When asked about how many children attend the crèche and if she charges for the service, she responded:

> *“Yes, 12 come but 2 are absent today. I don't charge for now, I look after them while their parents look for jobs. Once they have found jobs they will pay me a little bit” (Respondent-11, 2012)*

While schools can be accessed, they are generally reported as being too far from the settlement resulting in high transport costs and, if these cannot be afforded, dangers posed to children in crossing busy roads.

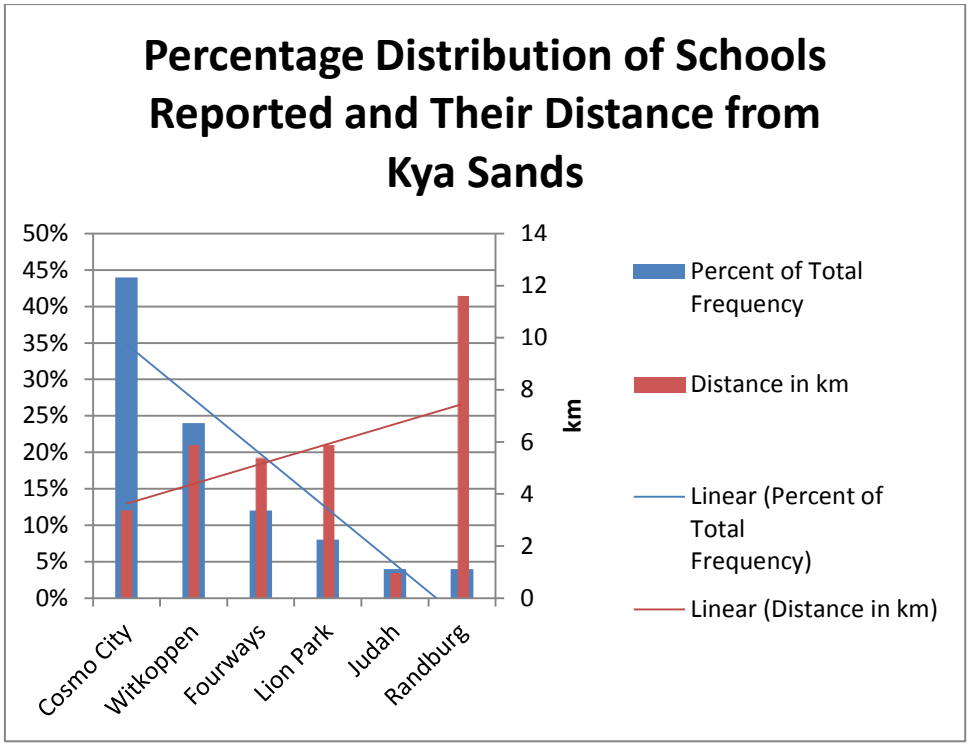


Figure 46: Percentage Distribution of Schools Reported and Their Distance From Kya Sands

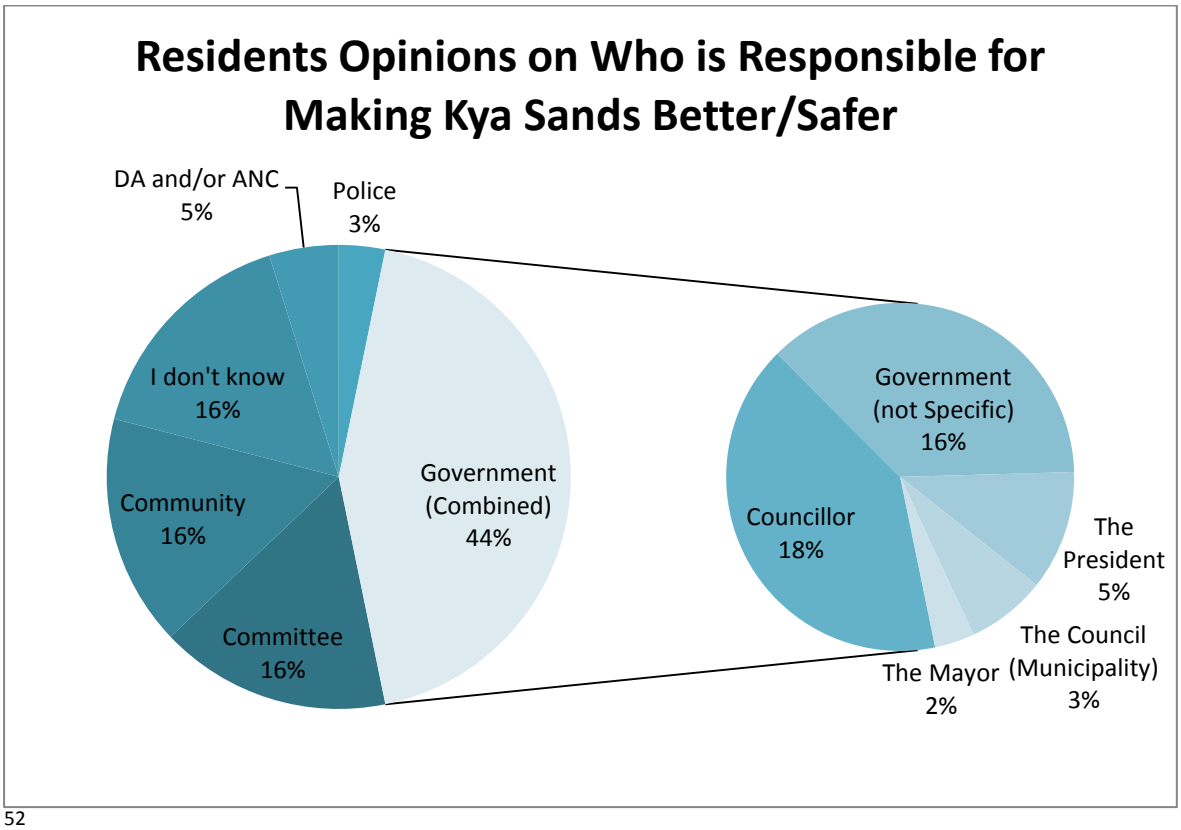
6.1.4. Improving Living Conditions in Kya Sands: Community, Government and Other Organisations' Roles

The third and final section of each interview centred on the roles of community, government and outside organisations in improving living conditions in Kya Sands. While the section did not form the core of the interviews, it does give some insight into residents' perceptions of these different organisations and what they do.

The question "Who is responsible for making Kya Sands better/safer?" had a very good response, with 57 respondents giving up to 3 answers each. These responses are summarised in Figure 47. At first glance, the results looked quite even and well spread, with the most frequently reported answer being the Ward Councillor (17.7%), followed by the committee, the community themselves, government and the category 'I don't know' at 16.1% each. When all of the categories relating to government[51] are added up

[51] This includes the categories 'Councillor', 'Government (not Specific)', 'The President', 'The Council (Municipality)' and 'The Mayor'.

however, government makes up 43.5% of responses. The major categories then are government, the committee and the community themselves. Other minor categories include political parties, the ANC and the DA, and the police, both of which may arguably be included in the category of governance. Interestingly, this shows that while the community expects government to play a large role in the future of the settlement, they still very strongly recognise their own role in this regard.



[52]

Figure 47: Percentage Distribution of Responses to the Question "Who is Responsible for Making Kya Sands Better and/or Safer?"

This section looks at the three major categories mentioned above, as well as the role of outside organisations in the settlement. It briefly examines how the community responds to perceived dangers and poor living conditions in the settlement (although this was also asked in the previous interview section on the positive and negative

[52] The ANC and the DA are the African National Congress and the Democratic Alliance, and are South Africa's ruling party and main opposition, respectively. The DA is 'in power' in Kya Sands' ward, however (ward 96). All values are rounded to no decimal places.

aspects of living in Kya Sands), before looking at the 'committee' (a local residents association), perceptions of government intervention and lastly, the role of various independent organisations.

Community

When compiling the interview structure, the central question relating to resilience was perceived to be "How do you/the community make Kya Sands better/safer?" This sought to determine the ways in which the community responds to disturbances and change. However, much of the conclusions on resilience centred upon other matters, outlined in this chapter. In fact, there was quite a limited response to this question, which could mean that it was perceived as ambiguous by participants. Data are only available for 42 respondents here, who each gave up to 2 answers each.

The first notable finding from this question is that almost half of the answers here relate to the committee, at 48.9%. This includes fighting crime and liaising with police (32%), cleaning the community through the Expanded Public Works Programme initiative (11%), raising issues with government (4%) and educating people about safe fire use (2%). The role of the committee is discussed in the following section.

The second notable finding is the high proportion of respondents at 27.7% who report that the community does nothing to make Kya Sands better or safer. It is unclear whether this disengagement with the question was due to the fact that it was too general, or that there is indeed limited action by the community in this regard. The question is raised as there is a contrast with the results displayed in Figure 47, where the role of the community in bettering Kya Sands seems quite prominent. This role often comes through in response to the perception that government is not doing enough, and that they will not deliver on their promises. As one young woman put it:

> *"No one can help us, we should do these things by ourselves, because we keep asking the government, the municipality for help and they don't come. So we should do it ourselves. The community should do this. We won't wait for someone out there with a nice house, safe place to come and help us here, they won't. They are safe, so we should do it ourselves" (Respondent-05, 2012)*

Committee

> *"One thing which I saw here is that there is this committee. This normally overlooks this area. If there are disorders, they are available for people to go to them to try and make things calm. And if it is a serious case, they normally refer to the police, but via the committee" (Respondent-49, 2012)*

As already touched on, the committee plays a prominent role in the community. The committee is made up of fifteen members, all of whom live in Kya Sands. Of the fifteen members, there is a hierarchy with a group of five members who oversee its activities, namely the Organiser (Billy Modikwe), Treasurer, Chairperson, Secretary and one other member. The committee is voted in at community meetings, and new elections are held every five years, where members can be re-elected, or replaced (Modikwe, Personal Communication, 2012).

While the committee was mostly not explicitly mentioned in questions, they were often brought up in response to the question "Are there any community organisations working in Kya Sands?" and, as mentioned earlier, "How do you/the community make Kya Sands better/safer?" with their functions mostly discussed thereafter. There are 45 respondents for whom data are available regarding the functions of the committee, with respondents giving up to three answers each. These are summarised in Figure 48. The biggest response here relates to crime, one of the major dangers associated with living in Kya Sands. 25.9% of responses showed that the committee helps in fighting crime, including liaising with the police. This was noticed in the field too, with a police presence in the settlement (e.g. Figure 49), and through witnessed meetings between police and community leaders. In some cases the committee deals with petty crime and fighting within itself, however when required, calls the police. One man for example states that:

> *"the committee, if there are some guys that are fighting, they are going to the committee to speak with them. And sometimes, if someone is robbed, we go to the committee and they call the police" (Respondent-16, 2012)*.

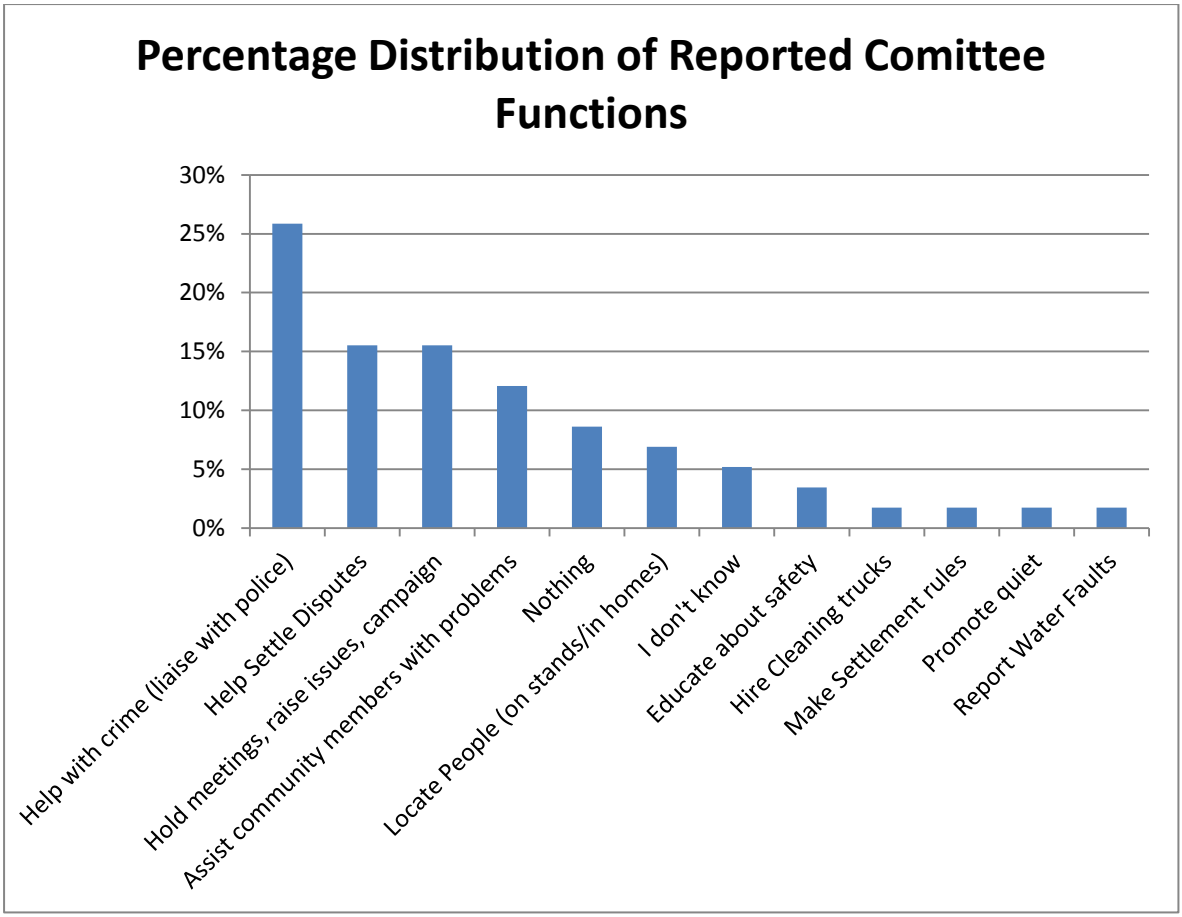


Figure 48: Percentage Distribution of Reported Committee Functions



Figure 49: A Police Car Patrolling the Streets of Kya Sands Informal Settlement

(Photograph by the author)

This quote is in line with the second most commonly perceived function of the committee, namely that of helping to settle disputes in the settlement (15.5%), which is similar and linked to the fourth most frequent description of their role as assisting community members with problems (12.1%). This was often witnessed in the settlement. The two 'top five' committee members that I met, were often in discussions (sometimes heated) with community members regarding some form of conflict. In fact, as outlined in the research diary (p. 247), my first encounter with community leaders of Kya Sands was delayed due to their involvement in settling a dispute. One example that Thabo Motaung shared, involved a stand in the settlement. According to him, the stand was sold by its previous owner to 4 separate buyers. On the day they were all expected to move in, they discovered they had all bought the same piece of land, with the seller making off with all of their money. They took this problem to the committee, who decided that the only fair thing would be to leave the stand empty, which it still was at the time of the interviews conducted for this study (Figure 50). The role of the committee in resolving disputes is explained by respondent 7 as follows:

> *"The committee they are just there maybe to locate people and to solve these small issues, maybe that people have before the police need to get involved. Because where can they get money? Because the problem is that inside here they need money, where can they get it? Some of them they can't even get work. So they can't do as much as we think they can. They are like small courts in villages, solving minor disputes." (Respondent-07, 2012)*

The third most significant role of the committee as reported by interview respondents is to campaign for change in the settlement (15.5% of responses). This is done, as already mentioned, through holding weekly meetings and raising issues with government authorities. Another way this is done is through protest action, as touched upon in the previous chapter.



Figure 50: Stand left vacant due to disputed ownership; the previous owner had sold the stand to more than one buyer

(Photograph by author)

Government

While government services provided and government's long and short term plans for Kya Sands have been discussed in the previous chapter, this section focuses on residents' perceptions of government intervention. This is done in four parts, relating to four specific questions that were asked of respondents. These relate to what government has done, what they have said they will do, whether or not residents believe it will happen, and lastly, what residents believe government should do. The questionnaire section did not focus on any specific level of government, and thus responses relate to individual views on what constitutes government; with quite a diverse range, as illustrated in Figure 47.

In response to the question, "Has government done anything in Kya Sands?" 59 respondents gave up to three answers each, with responses summarised in Figure 51. The results show a strong recognition of the basic services provided by government, with the top four answers (excluding the categories 'nothing' and 'I don't know') all

referring to services provided by the municipality. When added together, these make up 62.4% of responses, including the categories 'provided water' (24.7%), 'provided toilets' (20.4%), 'apollo lights' (8.6%) and 'refuse removal' (8.6%). This is all expected, as these services are all provided (to limited degrees). Interesting is the order in which they are listed, possibly in order of importance regarding services. Water is the most prominent, as it is the most essential of all services.

The other interesting result is the response found amongst the study's participants that government has done 'nothing' in Kya Sands, which made up 16.1% of responses. This despite the fact that some clear progress has been made. The reasons for this manner of response were thus not entirely clear. One reason may be that people are responding to the *full scope* of what government has *said* they will do, which the government can by no means be said to have achieved. This is discussed in the next few paragraphs. When assessed in relation to the grand promises of government, it may seem that the progress made is insignificant. Another factor may be the period in which respondents first moved to the settlement. I anticipated that people moving more recently to the settlement were less likely to recognise the services that government has introduced (as they may have moved there with services already in place, hence seeing no improvement over time). This assumption proved however to be invalid. Those reporting that government has done nothing in Kya Sands moved there, on average, in 2002. For those that cited one of the four services that government provides,[53] the average year they moved to Kya Sands was found to be 2005. This seems to indicate that people get more disillusioned with government the longer they live in the settlement. Lastly, these responses also relate to *where* people live in the settlement. In Pipeline (the newer section of the settlement, east of the river) only 18% of respondents report that government had done nothing, while in Sections B and C the percentage is 40%. In Section B alone, the oldest part of the settlement, 50% of respondents report that government has done nothing. This possibly relates to Pipeline being better serviced, as discussed earlier in the chapter.

[53] This includes residents' first response, out of a possible four answers.

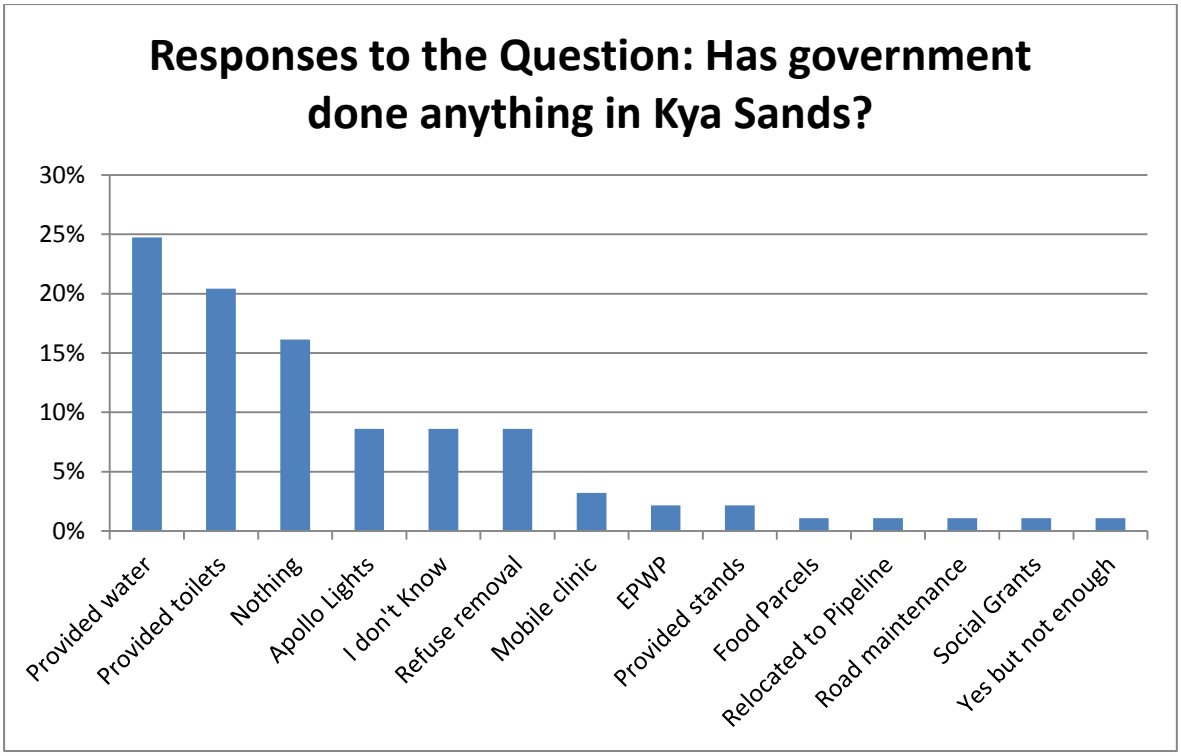


Figure 51: Percentage Distribution of Perceptions of Government Action up Until the Time of Interviews in Kya Sands

As mentioned earlier, there seems to be a link between residents' perceptions of government intervention and the promises made by government. While the previous chapter discussed these promises based on CoJ documents and media reports, residents' perceptions on promises are discussed here. The results are summarised in Figure 52, with one response from each of the 60 participants. The first notable result is that most respondents (76.7%) answered yes to the question "Has government promised anything?" The remaining responses consisted of 8.3% who said no, and 10% who reported that they did not know. This shows that people are well aware of promises made by government. The second notable result is the high percentage of people who report that government has promised them housing, at 58.3% of responses. This is broken down into two categories. The majority at 46.7%, say government has promised them houses where they are, with 11.7% reporting government having promised that they will be relocated to housing elsewhere. This is in line with the two proposals put forward by government, as seen in the previous chapter. Other reported promises by

government are that they will build a bridge, where 6.7% of respondents indicated that they were under this impression, while 1.7% reported that government had promised to provide electricity.

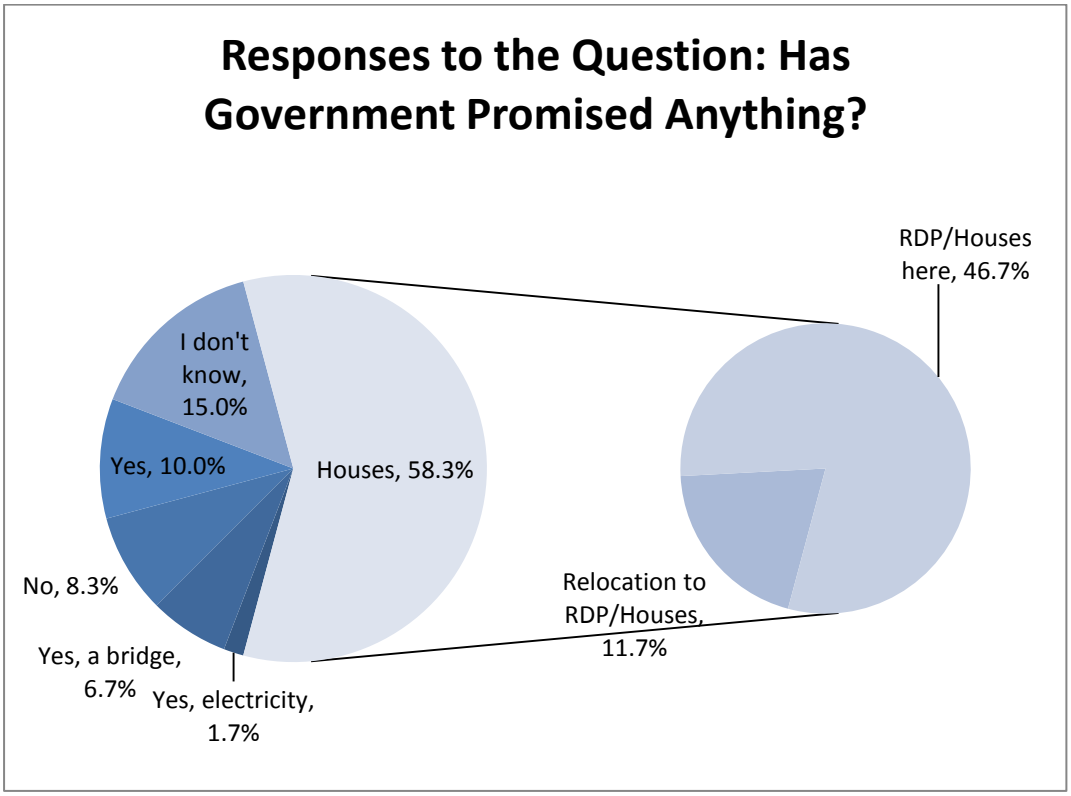


Figure 52: Percentage Distribution of Responses to the Question: "Has Government Promised Anything?"

In most cases, immediately after asking what government has promised, we asked whether or not people think that government will deliver on these promises. There is only data available for 34 respondents here, with these responses summarised in Figure 52. As can be seen, the most frequently reported answer is that government would not deliver, which was expressed by 41.2% of respondents. Interestingly however a similarly large number of 35.3% residents interviewed believed that government would fulfil their promises. This is significant as it shows the mixed feelings the community has about government intervention and whether they will deliver on their promises or not. An interesting point that emerged was the reliance on the government for housing, based on perceived promises. Though not a common response in the survey, it was in certain

instances motivation for some of the respondents to move to the settlement, and to continue to live there. As Respondent-21 reports:

> *"…my plan is to get an RDP house. So I just want to live here until they say that they have got a place for RDP housing and then we are to move… When we moved here we agreed that we would move to RDP houses eventually" (Respondent-21, 2012)*

Respondent 30 goes on to say that despite being able to afford moving out of Kya Sands, he decided to stay so as not to lose the chance of getting an RDP house:

> *"I was staying in Bloubosrand before and renting there… earning very little at that time… the money which I was earning, I don't even see income on it. So I decided rather to go and stay in the squatter camp… So then when I got paid, I found that the only thing I had to pay for was food, and I could save a little money on top of that… But when I found a nice job I wanted to leave, but I decided not to because maybe I can get an RDP house just like that and until now, I am still living here" (Respondent-30, 2012)*

The final section on government intervention examined what residents believe government should do in the settlement. Here, all 60 interviewees responded, giving up to four answers each, summarised in Figure 54. The most reported answer, at 34.5%, is that government should provide houses, with RDP houses often specifically mentioned. This figure is broken into two very distinct parts, relating to perceptions on government promises above. The first of this number, at 29.1% of total responses, is that government should provide housing in Kya Sands.[54] The second quite different response revealed the expectation that the government would relocate people to houses elsewhere, held by a much lower proportion of respondents at 5.5%. This is interpreted here as significant, due to the fact that it reinforces that the location of the settlement is attractive even though the living conditions aren't.

[54] These results include when people specifically report wanting houses in Kya Sands, or when they report wanting houses, but are not specific about where. For example, Respondent 1's answer "They should build us proper houses with water toilets and electricity" (Respondent-01, 2012) was assumed to mean in Kya Sands.

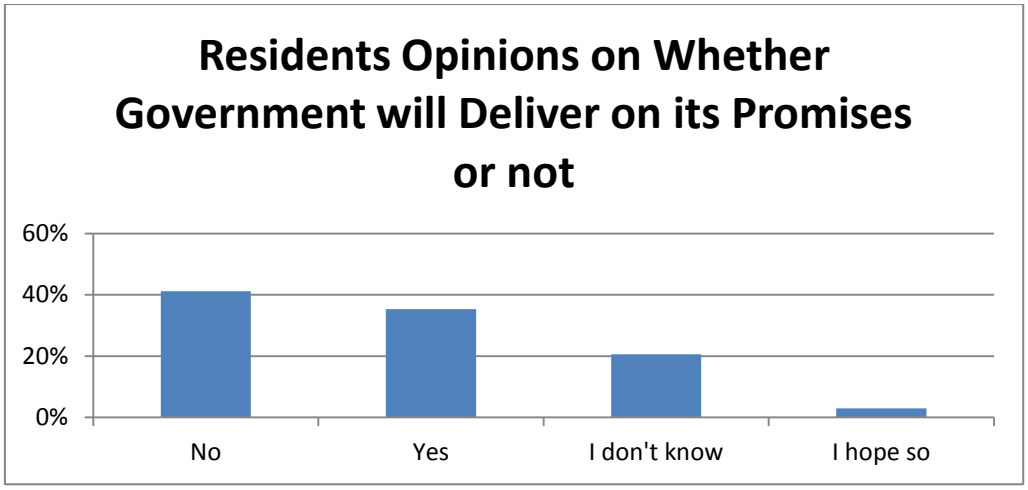


Figure 53: Percentage Distribution of Answers to The Question: "Do You Think Government will Deliver on its Promises?"

The second most frequently reported answer aligns with the major dislikes of living in the settlement, namely having no electricity. Here 17.3% of responses argue that government should provide electricity, relating, as mentioned earlier, to both promoting safety and improving quality of life. The remaining responses, almost half of the total at 48.2%, concern a wide range of issues in the settlement. These include hard services, such as building a bridge and laying roads, and social service needs such as the building of a school, clinic, police station and post office. There are also a number of practical, small-scale recommendations, which would seem quite a lot more manageable for government to implement. These include communicating properly with residents, starting police patrols and closing taverns.

It is notable that alternatives to the RDP model of housing delivery are proposed by some residents. These include site and service schemes and ideas of incremental and in-situ type upgrading. Respondent 13 for example stated, "I want to move from here to a better place but not by myself, at least if they [government] can accommodate me. Just give me a stand that at least I can know is my place and I can carry on from there... [This should be] in the area, not here but not too far away" (Respondent-13, 2012). Another respondent recognises the limited capacity of government, proposing an incremental approach. She stated, "Because they will not move us we can renew our houses into iron sheet houses" (Respondent-06, 2012). It should be noted that one of the more

disturbing responses recorded was that government should evict Zimbabweans from the settlement.

Outside Organisations

The final section of questioning in the field work examined external organisations working in Kya Sands, and how they help to improve living conditions and safety. It also included interviews with Billy Modikwe, a community leader, and Nonhlanhla Mosebi, manager of Vuk'uzenzele. This section gives a brief overview of some of the organisations and what they do. These include two NGO's; Vuk'uzenzele and Build the Future; and two faith based organisations; Judah Ministries Africa (also called Impact Africa) and Heritage of Faith Ministries. Vuk'uzenzele is funded by the Department of Social Development (Mosebi, 2012), while funding sources for the others are unknown.

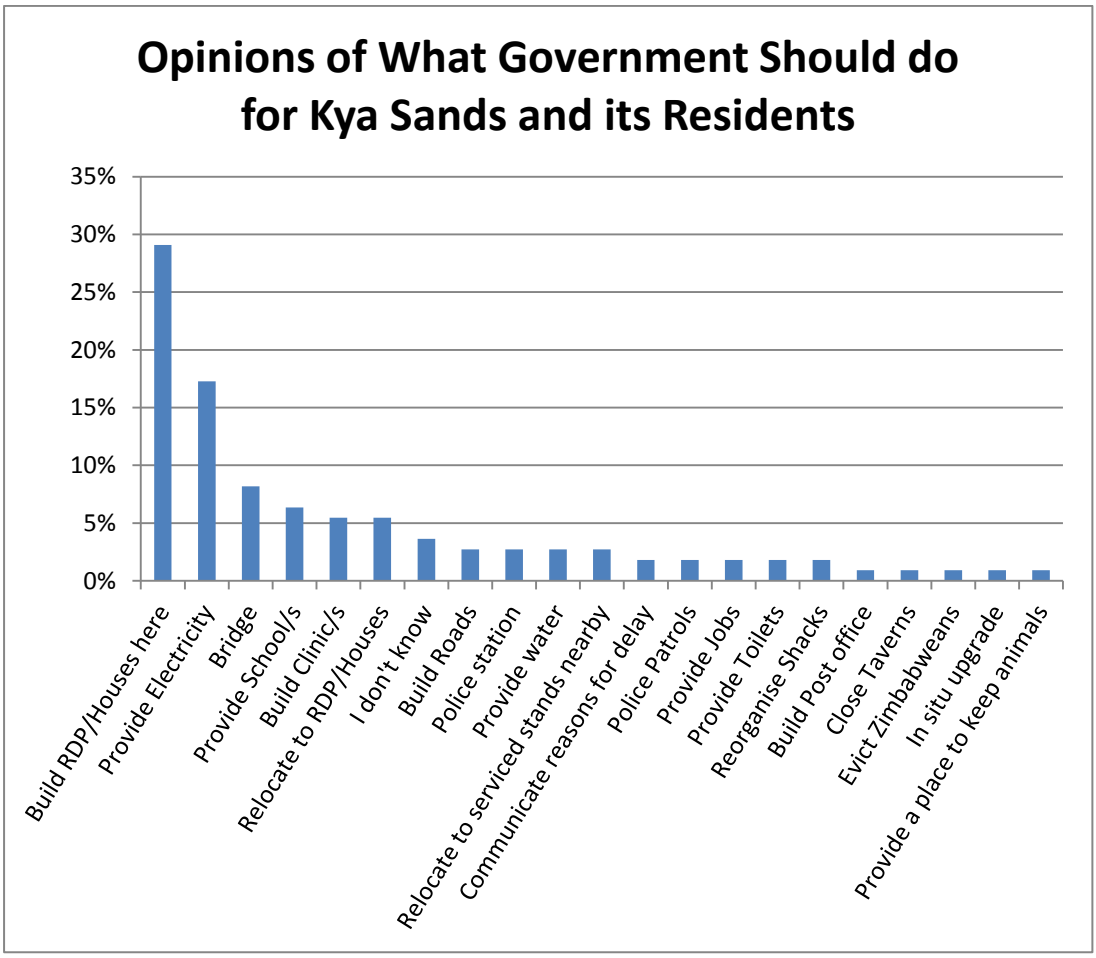


Figure 54: Percentage Frequency of Residents Opinions of What Government Should do for Kya Sands and its Residents

Between the organisations, there are three crèches that serve the community. These are located at Heritage of Faith on the western outskirts of the settlement, Vuk'uzenzele, in the centre of Pipeline, and Judah Ministries to the north east of Pipeline on portion 51 of the farm Houtkoppen. While it is unknown whether parents pay for their children to attend the Heritage of Faith or Vuk'uzenzele schools, Judah Ministries were found to charge a fee. Respondent 30 stated that "[one of our children is] at the crèche and we are paying for him… at Judah ministries" (Respondent-30, 2012). As mentioned earlier, there is also at least one informally run crèche in the settlement. Along with running their crèche, Vuk'uzenzele also does rounds in the settlement, attempting to capture a database of all of the children living there. An obstacle to this is that many of the children in the settlement (especially foreigners) do not have identification documentation, or it is incomplete. The organisation does have around three hundred children on their database however, to whom they distribute monthly food parcels (Mosebi, 2012).



Figure 55: Heritage of Faith Crèche (Top Left) and Vuk'uzenzele (Top Right and Bottom)

(Photographs by the author)

Secondly, two of the organisations, Vuk'uzenzele and Judah Ministries, provide medical care to the residents of Kya Sands. Judah Ministries has recently built a small clinic that we visited on the last day of our fieldwork. It is fairly simple clinic with a waiting room, a consultation room and an office, however there were around ten people waiting to receive treatment when we were there. Respondent 30 reports, "they brought another clinic there. Next to Judah... It has been there only for around three weeks or so. It is for free and it is for anyone. It is a very small place though with very little medication" (Respondent-30, 2012). Vuk'uzenzele runs two programmes to promote health in the settlement. The first caters to children in the crèche and others in the settlement who receive medical check-ups and immunisation. The second provides homecare to people living in the settlement. Here a team of 10 caregivers and a qualified nurse do house calls for those who need medical care. When needed, people are referred to clinics in the area, including Witkoppen and Diepsloot, and transport fares are provided (Mosebi, 2012).

The organisations also provide employment for people living in the settlement. There were a few examples of people working at either Judah or Vuk'uzenzele. One young woman interviewed for this study said: "My mother and father are working. My mother works at Impact Africa; it is a preschool at Judah ministries, and my father is a driver for Judah Africa" (Respondent-32, 2012). Vuk'uzenzele reportedly hires 38 people who live in Kya Sands (Mosebi, 2012). There is also an Expanded Public Works Programme (EPWP) cleaning scheme that is funded by the Department of Health that was organised by Nonhlanhla Mosebi of Vuk'uzenzele and is managed by Billy Modikwe (Modikwe, Personal Communication, 2012; Mosebi, 2012). The project hires 52 people from the community, and undertakes cleaning projects within and around the settlement, including at Msawawa Informal Settlement, about 2km up the road.

Finally, outside organisations in the settlement provide assistance to the community, both generally and in response to emergencies. This includes the NGO Build the Future, who comes to the settlement to provide food, clothes and blankets to children. Respondent 13 reports "They used to come every Wednesday last year and give children sweets whatever… They used to cook for them, give them food. Any children from here… I can say people were trying to help, even blankets" (Respondent-13, 2012).

Respondent 11 reported that “Judah Africa Ministries usually help people when their shacks have burned down, with zink sheets and blankets but they didn’t help me when mine burned down” (Respondent-11, 2012).



Figure 56: Workers on the Expanded Public Works Programme cleaning initiative cleaning and preparing a park at the entrance to the settlement on Agnes Ave

(Photographs by the author)

6.1.5. The benefits of Living in Kya Sands: Viable Access to the City

Although there are substantial hazards present in Kya Sands to which its residents remain vulnerable, the settlement does provide positive aspects both for its residents, as well as for the city at large. This section has outlined the advantages of living in Kya Sands, the most prevalent of which is access to the city. Another is access to the services provided in and by the settlement itself, and by the city at large. This access is,

importantly, economically and practically viable (in other words flexible enough to meet the flexible needs of residents), and provides residents an option that the formal market cannot compete with. Economically, it is *actually* affordable for people with very low incomes, and, as it is not officially regulated, anyone can live there with no paperwork or administrative requirements.

Residents are able to access jobs, housing and some basic services such as water, sanitation and refuse removal, which are all provided by local government, with the stark omission being electricity. The benefits of living in the settlement also relate to wider city services, such as access to healthcare and education (although this far from perfect). Social networks also play a strong role in the wellbeing of the community, with most people moving there with some sort of social network already in place. Lastly, there are a number of organisations that work within the settlement, aiming to better the lives of its inhabitants. This is further discussed in the conclusion to the chapter.

It is this combination of factors – location, jobs, affordable land and accommodation, basic services *and* the existence of social networks and institutions – that, arguably, makes Kya Sands an environment that supports the resilience strategies of its residents.

6.2. Conclusion: Possible Trade-offs between the advantages and disadvantages of living in informal settlements?

While Kya Sands is by no means an ideal living environment, it does provide some benefits for those who live there. It may be argued that, as people have chosen to live there and continue to do so, the positives (affordability and access to jobs) outweigh the negatives. The choice to live in the settlement could also be the result of no better alternatives however, as directly reported by 3.2% of respondents, who said that they moved there due to poverty and that it was the only option available to them.

The starkest disadvantage of living in Kya Sands is the danger posed by certain hazards. Fire and crime are the most widely reported of these, with the danger of disease also

reported as a major hazard. Linked to this are complaints about the lack of electricity in the settlement which, some residents argue, contributes to the high risk of crime and fire. In response to the danger of fire, some residents suggest that more space is needed between dwellings to prevent fires spreading. This circumstance then fits in with Oliver-Smith's definition of vulnerability (2004), where dangers posed by hazards are perceived and even frequently experienced, yet people are not in a position to reduce their risk. Here not only are the dangers perceived but so are solutions; however these are largely often beyond residents' capacity to implement, and so may be considered a form of vulnerability.

As argued in previous chapters, resilience is a concept and tool that is part of the larger overall process of building sustainability. A more recent and important conceptualisation of sustainability is that it not only allows the continual existence of human life (while preserving resources and the environment for future generations), but that it also ensures the continual progression and advancement of humanity. This progression is towards better lives, which are healthier, more productive, more meaningful, happier and more socially and environmentally just. This also relates to the normative position taken in this work, which considers positive resilience, while acknowledging perverse resilience (see section 2.4.4). One of the more pronounced features of the resilience provided by Kya Sands Informal Settlement is the *opportunity* for a better life. It is argued that the resilience of the settlement (and its residents) is mainly evolutionary resilience. This is in that the settlement is highly flexible and adaptive, and it provides a platform for flexibility and adaptability for its residents. There is no guarantee however that moving to the city and to Kya Sands will in fact provide a better life. The *possibility* for an improved standard of living remains the driving force of people moving to the area. This pursuit is one of seeking out access to the city and its benefits, including, most commonly, access to employment. Most of what residents attested to liking about living in Kya Sands, and their reason for moving there, was job opportunities in the area, whether in nearby industrial areas, neighbouring residential suburbs or within the settlement itself. Almost all households interviewed had at least one source of income, with more than half of households including someone who is formally employed. The

second most reported benefit of living in Kya Sands was access to *actually* affordable housing in the city.

This suggests that the greatest strength of Kya Sands is the combination of its location, and the affordability of living there. This combination is important. If it were affordable, but there were no jobs, or if there were many jobs but the housing more expensive, it would not be as attractive a place to live. While the dangers and poor living conditions associated with living in Kya Sands certainly need to be addressed, it is important not to overlook its strengths. Moving the settlement to formally built housing may address its current weaknesses, but it would also eradicate its major strengths, those of true affordability and location in relation to potential employment. With relocation, a new settlement without a reason for existing may emerge, with a potentially different set of benefits.

Any intervention in informal settlements should focus on reducing the vulnerability of residents, and ensure that the resulting settlement (whether in the same place or nearby) competes directly with the strengths of the current settlement. In Kya Sands, this is with regard to access to the same jobs, with little or no travel costs and, very importantly, to housing prices. While the settlement's location could be maintained through an in-situ upgrade or relocation to portion 51 of the farm Houtkoppen (on which much of the settlement currently lies), any 'formalisation' would struggle to compete with the property prices (for rental, purchase or rates, tax and services) of Kya Sands informal settlement, especially for the 45% of respondents who pay nothing to live there.

What is needed here is close consideration of the trade-offs between the benefits and disadvantages that different interventions may have. In response to fire and crime, for example, many members of the community suggest the installation of an electrical network that would most likely address both issues. Doing so, however, would come with additional charges for residents. Users would most likely be charged directly for their electricity consumption, through pre-paid meters. This would affect one of the settlement's major attractive qualities, its affordability. Reducing vulnerability in terms of one aspect may result in the reduction of benefits in another. This would need to be

weighed up, to see if the benefits would outweigh the disadvantages. Could the installation of electricity make the cost of living in the settlement prohibitively expensive? Could it result in a different section of the housing market moving in? Such would never be a simple analysis, as more complexities would enter the equation. For example, in some cases, where people may not be able to afford electricity, they would continue with current lighting and cooking methods, and thus the risk of fire would be maintained. The use of electricity may save people money on the cost of charging phones from generators however, and they could refrigerate their food, allowing bulk buying, and possibly reducing food costs. Consideration of these different trade-offs is important through any intervention, and an analysis of the current positive and negative aspects of living in the settlement is a valuable starting point in directing intervention.

7. Conclusion: Differing Types of Resilience, Differing Speeds of Adaption - a Barrier to Engagement?

7.1. Introduction

The aim of this chapter is twofold. The first goal is to summarise the key findings of the study. This is done through theoretical and empirical lenses. The theoretical and empirical findings are then compared to one another to pose a speculative hypothesis that one of the reasons for the lack of meaningful engagement between planning authorities and the residents of informal settlements in Johannesburg (Huchzermeyer, 2009), is as a result of the constrained ability of state authorities to accommodate the adaptive capabilities of informal settlements and their residents. City authorities and informal settlements exist at different scales of the urban panarchy meaning that their adaptability and adaptive cycles transpire at different speeds. Furthermore, city authorities tend to sponsor 'equilibrist resilience' which may provide stability and reduce system risk, but which may also be regarded as bureaucratic inertia. Residents of informal settlements, however, are continually forced to respond, and adapt to, a volatile envelope of survival options, and use the fact of informality as a key instrument of adaptive flexibility.

Lastly, the chapter reflects on the method of vulnerability and resilience assessment 'from within' (the area of study), looking at the strengths and limitations of the approach used. I argue that while the approach of this study has provided some valuable case-specific insights on Kya Sands and its residents, the method does have its limitations. The approach is useful in assessing informal settlements towards building resilience through assessing and documenting their inherent positive characteristics; however it is discussed how the approach ought to be supplemented by other approaches. The chapter also discusses to what extent the advantages and disadvantages of living in Kya Sands can be used as indicators of positive resilience and vulnerability respectively. Lastly, the chapter outlines some information gaps, and suggests areas for possible further research into Kya Sands.

7.2. Key Findings

The key findings in this work stem from two broad sources, and from the two broad types of research done. The first was a literature review on urban vulnerability and resilience (Chapter 2), reflecting upon how this theory links to literature on urban informality (Chapter 3). This was followed by a review of literature on broad approaches to risk, vulnerability and resilience assessment (Chapter 4). The literature review also extended into the second (empirical) part of the study which began by looking at existing literature and data on Kya Sands Informal settlement, the case chosen for this research. This was to give a background to the settlement in an attempt to create as thorough as possible an historical profile for the settlement (Chapter 5). This theoretical and empirical survey then informed the method used in the second part of the study where empirical research was undertaken, in the form of fieldwork in Kya Sands. Here the benefits and disadvantages of living in Kya Sands were investigated using a semi-structured interview process, with 60 residents, evenly spread across the settlement using a geographic sampling method (see Chapter 1).

7.2.1. Theoretical Findings

Although urban resilience was the primary starting point in the theoretical investigation, it was decided that this could not be looked at without considering urban vulnerability with particular reference to the broader field of study. It would be naive to look only at the benefits provided by informal settlements, ignoring the obvious negative aspects of living there; an outlook described by Harrison (1992) as a romanticised view of informal settlements.

The section on vulnerability began with an overview of literature on disasters, hazards and risk. This was done to emphasise their differences and to critique their periodic use as synonyms. It was also done due to the fact that disaster management is the main field out of which the concept of urban vulnerability has grown. Vulnerability is just one aspect of 'disaster' and 'risk' and should not be conflated with other concepts. Worth noting is that people cannot merely be described as vulnerable; this description must consider the relation to specific hazards, or sets of hazards which stems from the question "vulnerable to what?" (Cardona, 2004). Also important to an understanding of vulnerability is the

notion of ‘constant states of disaster’ that refer not only to specific events, but to a state of continual poor living conditions, and levels of underdevelopment.

As it is used by many disciplines and by scholars in many different contexts, there is no concrete agreement on a definition for vulnerability (Weichselgartner, 2001; Heijmans A. , 2004, p. 115). As such, no great attempt has been made to give one here. It has been used conceptually rather to narrow down what the goals and methodology of this study based in Kya Sands. Here, vulnerability was examined in its practical sense, as a state of being, and as an alternative approach or outlook to the concept of disaster.

In its everyday form, urban vulnerability describes what it is that makes certain people vulnerable to hazards. Oliver-Smith (2004, p. 20) argues that vulnerability in its essence can be understood as when risks are perceived and possibly even frequently experienced, yet people are not in a position to mitigate their negative and possibly disastrous effects. Here vulnerability is socially constructed (Canon, 2008; Wisner, Blaikie, Cannon, & Davis, 2004; Weichselgartner, 2001; Oliver Smith, 2004) meaning that it can be altered and its effects negated by society. For this reason, vulnerability was chosen as a conceptual point of investigation.

Importantly, vulnerability is different to *exposure* to hazards. One can be exposed to a hazard, but not be vulnerable to it. A critique of the term vulnerability in risk assessment is that it has been used largely to describe *exposure* to hazards (Weichselgartner, 2001). The concept of vulnerability as an alternative outlook disaster was developed "as a radical critique to the prevailing technocratic paradigm by placing the emphasis, instead [of on hazards], on what renders the community unsafe" (Bankoff, 2004, p. 29).

The concept of vulnerability also greatly influenced the approach used in this study. This is due to its similarities to resilience, as outlined below. This includes its emphasis on complexity, focus on context and the fact that it is dynamic and ever-changing. This calls for a more social, case-specific approach and evolution from purely technical and scientific studies. It must be emphasised again, however, that these more social qualitative approaches do not replace technical ones, but are a vital aspects of a wider interpretation of disasters, vulnerability, resilience and risk that Cutter calls “vulnerability science” (2010). The main influence for this work was just this, and it influenced the social, qualitative approach conducted from within, rather than exclusively from without.

As mentioned, urban resilience theory was the main theoretical basis for this work. The use of urban resilience has emerged from ecological uses of the term, (Folke C. , 2006, p. 254) most notably through the work of C.S. Holling (1973). While many different types of resilience are defined, this study utilises Simmie and Martin's (2010) grouping of these into two types of resilience, being equilibrist and evolutionary resilience. This is useful in that it can be related to planning authorities' and informal settlements' differing resilience.

The equilibrist approach sees systems as being in state of equilibrium to begin with, and their ability to maintain this, or move to another equilibrium path. Chapter 2 outlined the three main types of equilibrist resilience, being 'engineering resilience', 'ecological resilience' and the notion of 'multiple equilibriums' (Simmie & Martin, 2010). These are defined by different system capacities in retaining or returning to their state of equilibrium, or in moving to a new state of equilibrium in the face of disturbance or change. Importantly here, the concept that equilibrist and evolutionary resilience lie on different ends of a continuum to one another is illustrated by the idea of multiple equilibriums. In considering this, it is acknowledged that the grouping of equilibrist resilience shows an inherent tendency of adaptability and change, already moving towards evolutionary resilience. It is grouped with equilibrist resilience as it still considers systems as being in some sort of equilibrium state, rather than just in an ever evolving moment in time.

More recently, concepts of *evolutionary* resilience have emerged that question whether urban systems are or ever can be in a state of equilibrium due to their complex-adaptive and eternally changing nature. Evolutionary resilience is based on the notion that things change (Walker & Salt, 2006). Due to the complexity of social ecological systems (into which category 'urban systems' fit (Du Plessis, 2009; Goldstein, Lejano, Wessels, & Butler, Forthcoming); change is inevitable, and very difficult (often impossible) to predict. In fact, it is often difficult to describe what *has* happened or even what *is* happening. Here adaptability, adaptive and learning capacity are key facets of equilibrist resilience (Wilkinson, Porter, & Colding, 2010). This means reacting efficiently to change rather than planning for a 'predictable' future; an idea that Ernstson et al. (2010, p. 531) describe as not only insufficient, but possibly even destructive.

Lastly, regarding resilience, it is important to note that it does not replace the concepts of sustainability or sustainable development. Sustainability remains the broad goal of resilience or the key aspect in the on-going process of resilience building (Walker & Salt, 2006).

The two concepts of resilience, equilibrist and evolutionary, were then distilled in this study; understood as the ability to stay the same, and the ability to change, respectively. This simplification is not new to this work, and is indeed recognised by authors such as Holling (2001, p. 396) who calls it "the interplay between change and persistence". This simplification is made to highlight the complexity and importance of resilience as a concept. Resilience is a powerful term, in that it encompasses two opposite traits (the ability to change and the ability to stay the same) to describe one concept. This is indeed engrained in the definition of the word, described in the Oxford English Dictionary as:

> *"The quality or fact of being able to recover quickly or easily from, or resist being affected by, a misfortune, shock, illness, etc.;* ***robustness; adaptability*** *[emphasis added]."*
>
> (Oxford English Dictionary, 2012)

While retaining or maintaining system qualities (robustness, stability) is similar to the dictionary definition of sustainability, resilience adds the ability of a system to morph or adapt into a more desirable state in the face of change. While sustainability and its indicators describe the state of a system, resilience looks at the ability of the system to either maintain *or* move towards a more desirable state (Millman & Short, 2008). Both of these interpretations of resilience are important, and it is held here that a balance between the two should be promoted in our understanding of resilience, since each presents benefits and weaknesses. Equilibrist resilience promotes stability yet can lead to inertia, while evolutionary resilience promotes adaptability, yet can exhibit instability. In building resilience we must thus seek to find a balance between equilibrist and evolutionary conceptions of the term.

The report also acknowledges analytical and normative uses of the term 'resilience', arguing that both uses of the term are valid. Given the elasticity of the concept, it is however important to define its usage. The report has deployed resilience as an analytical

concept but has done so within a broader normative framework. Positive forms of resilience, at least, are present within informal settlements and expanded forms of positive resilience are something to aspire to, and work towards.

The last theoretical part of the literature review was to look at methods of vulnerability and resilience assessment, including a general review of risk assessment techniques. This was then used, with literature on vulnerability, resilience and informality, to build a methodology to be used in Kya Sands. As with theory on sustainability, resilience and vulnerability, and indeed planning, the review looked at the broad move from technical scientific, sometimes called 'scientistic' (Sorrell, 1991; Harrison, 2002) or 'technocratic' (Cardona, 2004) approaches, to more social-scientific ones; a body of theory that greatly influenced the approach taken in Kya Sands. The chapter then attempted to map out the spectrum of approaches to vulnerability, resilience and risk assessment that can lie anywhere on a graph, plotted on three axes. These axes represent *how* assessments are done, *who* is doing them and *where* they are done from. *How* they are undertaken ranges from technical scientific quantitative methods to social qualitative ones. *Where* they are conducted ranges from remote studies from outside the community to studies that take place in-situ. Lastly, *who* is undertaking the studies ranges from research undertaken fully by bodies independent of the community in question, to studies designed, run, and owned purely by the communities themselves.

The chapter then argued that there is no correct or incorrect place in which to situate a study on this three dimensional graph (Figure 7). There must be an acknowledgement by researchers, however, that wherever their study lies on the graph, it should be supplemented by other studies that bring balance to the set of approaches used. Ideally, the collective set of methods used would contain a good balance of all three axes, placing itself at, or at least close, to the intersection of all three.

This goes on to highlight a general theme in the theoretical approach taken in this work, and a critique of a common trend in writing, especially academic writing. As academics are humans working in a complex and ever-changing world, theories are inevitably fallible and partial. Academia plays an important role in the on-going process of critique and reformulation of theory. However, with the drive to constantly produce original work and new knowledge, there is a danger that new theories are sought to replace old ones

altogether. In the field addressed by this dissertation, there is an argument that sustainability theory should be replaced by resilience theory (van der Leeuw & Aschan-Leygonie, 2000) and that equilibrist concepts of resilience should be replaced by newer notions of evolutionary resilience (Simmie & Martin, 2010). Here, as argued throughout the work, instead of replacing old theory altogether, new theory should build on the useful aspects of the old, looking to address their limitations. Thus resilience should be an extension of sustainability theory, with sustainability its overarching goal, and with concurrent emphasis placed on equilibrist and evolutionary resilience. Into the future, our vocabulary will further evolve, and ideas of resilience may well be replaced by concepts better able to capture our aspiration but, for the present, the concept of resilience is valuable in describing urban systems, and ways to make them more sustainable, equitable and liveable.

7.2.2. Empirical Findings

The empirical findings of this work derived from two places. First was a desktop study of existing literature on Kya Sands, mainly through City of Johannesburg documentation and data, and through other GIS data from various sources. The second was through the field work carried out in Kya Sands. In this section, I outline some of the key empirical findings of the work under four different headings.

Demographics and Geography

As with much of the data on informal settlements (Huchzermeyer, 2011), the data uncovered and collected on the demographics of Kya Sands is not consistent or conclusive. Estimates on the population of the settlement vary greatly, with the City of Johannesburg (2007a) giving a figure of 7,500 in 2007 and a survey of the settlement conducted by Professional Mobile Mapping (2009), giving a figure of 16,238. This growth does appear to correlate with the growth of the physical area of the settlement within this time however, meaning that the high estimate is a plausible one. If this figure is accurate, the settlement has a notably high population density of 104,089.7/km^2 (1,040.9/ha) (using the 2009 area from aerial photographs), comparable to that of Kibera informal settlement in Nairobi, Kenya (Marras, 2009).

The survey conducted in the fieldwork showed an almost entirely migrant population, who came either from other provinces in South Africa or other African states. Interesting too, is that the vast majority of people interviewed report having another home, other than their home in Kya Sands, in their province or country of origin, with most returning to it at least once a year. There is also a low ratio of children to adults in the settlement, with some residents reporting that their children live at their second home, with grandparents or older siblings. According to some of the respondents in this study, many of the residents of Kya Sands come to the city to work and send money to their children and families at home, which seems to be corroborated by the high ratio of adults to children in the settlement at approximately 3:1.

Kya Sands has grown in size year on year (in physical area) at a fairly steady rate. This steady 'natural' growth is due to ever more people building homes on the outskirts of the settlement. An important finding in this work showed that there have been two spikes in the growth of the settlement's physical size, between 2005 and 2006, and a more pronounced one between 2007 and 2008. These spikes both relate to emergency relocations of people from within the flood line of the Kya Sands Spruit to the farm Houtkoppen (to the east of the river). Once 2012 and 2013 aerial photographs become available, there is also likely to be a third spike in growth due to recent government relocations to the settlement from the informal settlement on Inanda Small holdings just north of Kya Sands (Modikwe & Motaung, Personal Communication, 2012).[55] This shows that much of the growth (in physical area at least) in Kya Sands is directly due to government intervention, rather than due to the natural growth of the settlement. This supports an argument put forward by Roy (2009), presented in Chapter 3, that even government sometimes acts informally. This is important because despite government's episodic calls to 'eradicate' informal settlements (Huchzermeyer, 2011), in certain cases they are using informality as an 'official' tool for planning.

[55] It is unclear whether these relocations were planned and orchestrated by the Gauteng Provincial Government, or the City of Johannesburg Metropolitan Municipality.

Residents Perceptions of the Disadvantages of Living in Kya Sands

In examining the negative aspects in Kya Sands, to avoid influencing the way in which residents report them, and likewise to avoid predefining the hazards towards which people are vulnerable, broad questions were asked on the aspects that make Kya Sands a less desirable place to live. This started with questions such as “do you like living in Kya Sands?”, “how safe is it living here?” and “are there any dangers associated with living here?” The resounding response was that perceptions of living conditions and safety in the settlement are decidedly poor. On a scale of one to five, with one being ‘very much’ and five being ‘not at all’, the average response on whether people like living in the settlement or not was 3.55, with the majority of respondents marking either four or five on the scale. Regarding safety in the settlement, responses were even starker, with the average response being 3.88, with one being ‘very safe’ and five being ‘not at all’. More than two thirds of respondents marked either four or five on this scale.

Dislikes of the settlement included the lack of electricity, crime, and poor living conditions. The lack of electricity related not only to living conditions, but was also frequently reported as a source of vulnerability, as it leads to higher threats of fires and crime in the settlement. The dangers associated with living in Kya Sands were predominantly reported as being crime and fire.

While it is believed that these results do not depict the vulnerability of the residents directly (describing more hazards and exposure to them), the fact that people perceive these risks, show a certain underlying vulnerability that exists in the settlement. The perception that the provision of electricity would reduce the risk of fire and crime does represent vulnerability, where people perceive and experience these hazards, as well as possible solutions, yet are not necessarily in a position to take action to mitigate their effects (Oliver Smith, 2004).

Residents Perceptions of the Advantages of Living in Kya Sands

In exploring the positive aspects of living in Kya Sands, similar introductory questions were asked to those on the disadvantages of living there. These included “what do you like about living in Kya Sands?” and “what was the reason that you moved to the settlement in the first place?” Here, results were fairly consistent as well. In both cases,

people primarily moved to the settlement and enjoyed living there because of access to jobs, as well as access to affordable housing. The major benefit of living in Kya Sands was deduced to be access to the city, including access to housing, jobs and municipal and city services. Kya Sands provides a viable entry point to the city to those that would likely be excluded from it if they hoped to enter it through 'formal avenues'. A further advantage of living in Kya Sands comes in the form of social networks in the settlement, in the city at large and indeed stretching to people's home provinces or country, and from organisations working in the settlement. Here many people have extensive social networks at all three of these scales.

In the questionnaire, livelihoods were explored in some detail. The most surprising results were the (relatively) high levels of employment in the settlement, both in the formal and informal sectors. Instead of asking people directly whether or not they were employed, Marole (my research assistant) and I asked how people make their living. The first result was that most households (98%) have at least one source of income, with 42% of households having either two or three. Extrapolating this and comparing it to the average number of adults per households (from interview data), it was calculated that 67.7% of adults in households surveyed provide some source of income. The other surprising result was the high proportion of people in formal employment (or in employment that can generally be regarded as formal). Of the 67.7% adults with some form of livelihood, 57.9% were categorised as being formally employed. This shows how well Kya Sands is situated in relation to employment, with most people working in nearby middle class suburbs, or in the Kya Sand industrial area directly bordering the settlement. Lastly, there were a relatively high percentage of people who reported working within the settlement, in shops, taverns or doing other informal work. This shows that the settlement itself has created a market and job opportunities for its residents.

Regarding access to housing, it was found, as may be expected, that the affordability of housing was a major attraction for the people to live there. Informal tenure arrangements fall into three categories, namely; people who do not and have never paid to live there; those that have purchased the property in which they live; and those that are renting. While the biggest single category was people who did not pay to live there at 45%, most people either purchased (34%) or are renting (21%) making up the majority at 55 percent. The development of an informal property market over time was also revealed, where

people only moved there for free initially, with people starting to purchase houses and plots of land around the year 2000, and people starting to rent in 2008. This market is significant in terms of resilience, with people who 'own' homes in Kya Sands able to use them for financial gain, either in selling them at a profit, or renting them out to supplement their income. This resilience derives from the adaptability and ingenuity of residents, allowed by the flexible informality of the settlement. The growth of an informal housing market also demonstrates the attractiveness of the area and its location.

Next, there was a strong sense of people moving to Kya Sands to access city services (or naming these as a positive aspect of living there). These include (to varying degrees) basic municipal services such as access to water, refuse removal and sanitation. Wider city services such as healthcare and education are also available to residents, yet results show that the settlement is not as well located in this regard as it is regarding access to jobs.

Important too were social connections in the settlement with 62% of residents (for whom data are available) moving to Kya Sands already knowing someone who lives there. More pronounced is that 63.8% of respondents (for whom data are available) have at least one other household of relatives living in the settlement. This, in a way, shows quite an exclusive community, where people generally already know someone living there before moving in.

Lastly, the attractiveness of living in the settlement is supplemented by outside organisations working there, who provide social services (including healthcare and education), in the form of faith based groups and NGOs.

Government Responses in Kya Sands

There have been two general government responses in Kya Sands, initially proposed in 2007, in the form of short term, and proposed long term interventions (City of Johannesburg, 2007a). While short term interventions have been fairly successful in providing basic services and implementing emergency relocations, none of the long term plans for the settlement have yet seen any implementation, and there is no indication of any in sight (Sabela, 2011; Mendelsohn, 2011; Modikwe & Motaung, Personal Communication, 2012).

Short term interventions included emergency relocations of residents from within the flood line of the Kya Sands Spruit to the area east of the river, locally known as Pipeline. Services delivered include the implementation of a regular refuse removal service from Pikitup, the installation of at least 22 standpipe units, and the provision of communal and private VIP toilets, and 'portaloo' type chemical toilets. This includes a service by the city's water utility, Johannesburg Water, to periodically clean and empty the toilets using vacuum trucks. Short term promises also include the construction of a safe bridge for crossing the river (Modikwe & Motaung, Personal Communication, 2012), another source of danger for the residents of the settlement. While the bridge has been promised, at the time of writing this (August 2013) construction has not started.

Since 2007, there have been two general proposals put forward by the City of Johannesburg regarding long term interventions in the settlement with both involving the full relocation of the settlement to formal green-field housing developments. The first was to build formal housing on portion 52 of the farm Houtkoppen, on which much of Pipeline is situated, including ownership and rental options. In 2007, in consultation with the Gauteng Provincial Government, a new proposal was tabled for a larger scale relocation of many of the informal settlements in the area to an area near Lion Park informal settlement, some 10km north of Kya Sands. Having since fallen through due to a lack of bulk infrastructure in the area (Sabela, 2011; Mendelsohn, 2011), the plan has apparently reverted to the initial one of building and relocating people to formal housing on portion 52 of the farm Houtkoppen (Mantshontsho, 2012; Modikwe & Motaung, Personal Communication, 2012). This will reportedly take a minimum of 5 years however (Essop, 2012), and whether it will materialize or not is yet to be seen.

7.2.3. Resilience vs. Vulnerability in Kya Sands

Despite the fact that living conditions in Kya Sands are generally considered to be dangerous and undesirable by its residents, people still choose to live there. Here, residents have weighed up the positives (viable access to jobs, houses and city services) with the dangers and poor living conditions that come with living in the settlement. This choice is an interesting one, and two explanations are ventured. The first is that the positives of living in the settlement actually outweigh the negatives, prompting people to move and stay there. The second is that people have no other option but to live there,

and choose it as a last resort (although this is not frequently reported by residents). When analysing these explanations, it is worth noting that urbanization in South Africa, and in many other countries in Africa and around the world, is happening at a very high rate, a rate so high that urban planning, housing and infrastructure authorities cannot keep up with formal housing demand. Here, informal settlements supplement this shortfall, providing an affordable and viable point from which to access the benefits of urban life. It is important to note that Kya Sands and other informal settlements provide the *potential* for a better life, but do not guarantee it. The opportunities offered in the city seem to be the central attraction for residents. The resilience of Kya Sands and its residents is based on adaption to changing urban rural contexts in the country, adaption that is quicker and in some ways more efficient than that of city authorities. The adaptions of the smaller systems of informal settlements are quicker than those of planning authorities in the same way Holling (2001) describes adaptive cycles in a panarchy. Here smaller systems adapt quickly, inciting processes of slower adaption in larger systems. This is important in that planning authorities in Johannesburg have not merely ignored the emergence of informal settlements. Indeed they have taken some significant steps in engaging with informal settlements. The argument is that the adaption of planning authorities to the growth of informal settlements is too slow however, relating to Holling's theory (2001).

The negatives of living in Kya Sands are likened to a lack of equilibrist resilience. This is through its lack of stability (relating to poor living conditions, lack of tenure security, and vulnerability to a number of hazards).

Kya Sands is not a settlement that was randomly located on the only piece of open land available. On the contrary, its establishment related initially to livelihood opportunities in the area and its growth has been market driven by the demand for viable (administratively flexible) and affordable housing near to these opportunities. This is best indicated by higher than expected employment (better described as livelihood) figures resulting from this work. Kya Sands and other informal settlements are some of the more prominent faces of change in the city, of dynamism, creativity and adaption (Huchzermeyer, 2011). While the vulnerability of residents needs to be acknowledged and addressed, this should be done in conjunction with promoting the adaptive resilience of the settlements and its residents, and the positive aspects of living there.

7.3. Reflecting on the Approach

While the approach used has provided some results that can be used for future planning, both by the community and by planning authorities, as with all research, it does have its limitations. This section looks at the strengths and weaknesses of the approach used. The section also explores to what extent the advantages and disadvantages of living in Kya Sands can be used as proxies for resilience and vulnerability respectively, both of the settlement and its residents.

The major strength of the approach of social vulnerability and resilience assessment from within Kya Sands is that for the first time (as far as the author is aware) an assessment has been done (in Kya Sands) that takes the opinions and perceptions of community members into consideration. This revealed some expected results relating directly to questions asked, but also revealed some unexpected details on the history on the settlement, and aspects such as the emergence of a vibrant and growing informal property market. This shows that despite having no legal tenure (in the common sense of the term), people do use their properties for monetary gain, and in certain cases, as a stepping stone to enter the property market. It has also shown how well the settlement is located with regard to jobs, both formal and informal, revealing one of the major benefits that the settlement provides for its residents. As the method avoided a romanticised view of informal settlements, the study has also managed to concurrently look at both the positive and negative aspects of living in the settlement, which it is argued here, is something planning authorities have failed to do, focusing more on the settlement's shortfalls.

Another strength of the approach, and one that I believe can be replicated in similar future studies, was the geographic random sampling method used. This ensured a geographic spread of results across the settlement in an attempt to gauge how the settlement, and resident's opinions of it, differs within its own boundaries. This was done in response to notions of informal settlements being considered as uniform and homogenous entities. This extends the argument that not only do different settlements require bespoke responses; but so too do different sections of single informal settlements.

Data in the work were presented in two forms. Qualitative data was put forward in statistical form, linked to more nuanced insights gained from respondents. This qualitative approach was also, to an extent, complemented by quantitative data from various external sources. This mixed methods approach is important in finding a balance between scientific and social science-inspired approaches to vulnerability, risk and resilience assessments.

The method used in this work provides a good indicator of the positives and negatives of living in Kya Sands. Can these be related to resilience and vulnerability however? The correlation may not be direct and absolute but it is clear that benefits of living in Kya Sands such as location and cost do allow individuals and households greater flexibility in adapting to the changing environment. With reduced housing and transport costs, for example, households have greater disposable income and more options in responding to change. Most important, perhaps, is the likelihood that living in Kya Sands strengthens prospects for jobs and livelihoods is enormously important in enhancing adaptive capabilities.

Similarly, many of the negatives revealed in the survey relate to the vulnerabilities experienced by residents. It is questionable however whether the method used by this study fully exposes the vulnerability of those living in Kya Sands, or the vulnerability of the settlement itself. Results in this regard can more adequately be described as hazards and exposure to hazards, despite intentions to the contrary. Although hazards are indeed good indicators of the presence of vulnerability in Kya Sands, they do not explicitly show what it is that makes people vulnerable. For example, the possible objective reality of toxic leaching from the waste dump and water pollution may have been under-represented by the community who focussed more on visible vulnerabilities such as fire, crime and flooding.

While this is a limitation, the community-based survey is able to elicit responses to vulnerability that other assessment approaches often do not. Residents propose solutions to mitigate the risk of the dangers they face. The installation of an electricity network for example is proposed both to light the settlement, making it safer to walk at night, and to reduce the use of open flames in homes, lowering the risk of starting fires. It is also proposed by residents that space be carved out between dwellings to prevent fires

from spreading. The circumstance of these residents demonstrates Oliver-Smith's definition of vulnerability (2004), where the dangers posed by hazards are perceived and even frequently experienced, yet people are not in a position to reduce this risk.

The first limitation of the method used was the community self-mapping technique, as described in Chapter 1. Here, residents were asked to physically draw on a transparent film overlaid on a printed map of the settlement. The main flaw is that no pre-set key was used, so for each respondent, colour is used differently. While clarity could be found in the interview transcripts, the inconsistency made the data difficult to work with. It was also difficult to clean the scanned maps to be able to overlay them into ArcMap, the GIS software used. I do feel that the data are useful however, and with a fairly considerable amount of further work, sorting and cleaning, the data could be valuable in extending the study in Kya Sands.

Secondly, recognition that the type of research done in this work cannot stand alone, must also be made. While the generally social (as opposed to technical) method used does fill an information gap on the settlement, it should ideally be complemented by other more technical studies. This ought to include an updated full enumeration (possibly self-enumeration) of the settlement, and technical investigations on the hazards and risks faced by the community. Thus, while the method used in this work is useful, it should not stand alone, and should be supplemented by other methods and sources of information too.

A further possible limitation is the level of input from the community in defining and undertaking the research, which could and ideally should be greater. This would include more consultation in designing the research, seeking to determine the information the community is interested in obtaining, as well as more participation in undertaking the research itself. The ability to do this is limited in this type of academic research however, which is required to be the author's "own unaided work" (Faculty of Engineering & the Built Environment, 2012, p. 17).

The final limitation is that the work should ideally be on-going, and should not end with the completion of this dissertation. As this is a master's dissertation however, funding is only available for the duration of the degree. While it is hoped that the research will be

continued in some form by the community or other researchers, the author's direct future involvement is not guaranteed.

7.3.1. Points for further study, how the research can be expanded

Various points for further study have been mentioned throughout this chapter and the preceding chapters of the work. These are briefly summarised here before concluding the chapter:

This work would be well complemented by some more 'technical' studies into the settlement. This could include investigating the possibility of a different long term government intervention approach in the settlement, such as an in situ-upgrade. This would be particularly valuable as there seems to be no long term intervention that will take place in at least the next five years. This type of investigation would include:

- A complete enumeration of the settlement, conducted ideally by the community itself, with data held by them. This would ideally be done on an on-going basis.
- Testing water (of the river) and soil quality to determine the possible effects of toxic leaching from the adjacent landfill site.
- Conducting a study into the history and location of fires in the settlement to build a fire response strategy, even if this is a short term one.

Further study is needed into the status of the unaccounted for township layout discussed in this chapter and illustrated in Figure 26, as this may be a point of future contention. It could also prove to be a now void plan, and may not affect the settlement at all.

There are also some points where this study could be extended. This could include:

- Reworking of the data from individual data zones into bigger zones, possibly made up of five to ten of the current zones.

This may give more valuable maps showing different opinions across the settlement.

- Clean, sort and categorise all of the community mapping data, and insert it onto different layers in a GIS application in order to compare results and ascertain trends.

The final point of extension for the study could relate to a hypothesis developed through the research; that a possible reason for the lack of meaningful and effective engagement between planning authorities and informal settlements is due to the different types of resilience they represent, linked to the different scales at which they find themselves in the urban panarchy. The hypothesis poses that informal settlements adapt and change quickly, displaying mainly evolutionary resilience, and that planning authorities adapt more slowly, displaying mainly equilibrist resilience. This would require specific research into the adaptability and barriers to adaptability of government authorities regarding informal settlement intervention. The proposed extended research would be done with the goal of improving engagement between the two in mind, towards improving living conditions in informal settlements, and better integrating them into our cities. This hypothesis is argued in the following, concluding, section.

7.4. Finding a Balance between Equilibrist and Evolutionary Resilience between Informal Settlements and City Authorities

> *"Over the past several decades, as societies have struggled with [… communication failures between various stakeholders], an alternative communication model has emerged from a range of fields to replace the traditional, linear, one-way notions that previously have underlain the science–practice interaction. It is a more democratic model of communication in which different experts, risk-bearers, and local communities all have something to bring to the table. But we have much to learn as to how to do this effectively."*
>
> (Vogel, Moser, Kasperson, & Dabelko, 2007, p. 360)

While Kya Sands shows clear forms of resilience, living conditions in the settlement certainly cannot be described as desirable. However, the fact that people have chosen to live there, and continue to do so, suggests that the positives outweigh the negatives, at

least in relation to alternative settlement options for the residents. An exception to this may be when people report moving to Kya Sands as a last resort. This indicates that informal settlements play an important although imperfect role in our cities. For their residents, they provide access to the city that they would likely be formally excluded from. For our cities they supplement authorities' limited ability to house growing urban populations, providing housing for the growing workforce. It is important for city authorities to recognise and weigh up both the positive and negative aspects that informal settlements pose, both to their residents and our cities at large. Responses should look to address the vulnerability exhibited by informal settlements and their residents, while looking to promote their inherent resilience.

Two types of urban planning may be broadly defined that relate to the two types of resilience outlined in this study. These include formal top down proactive planning, and organic, informal, piecemeal, bottom up, and reactive planning. These coincide with equilibrist and evolutionary resilience, respectively. Organic informal urban design is driven, by definition, by adaptability as described by Mumford in (Mills, 2012, p. 1); "Organic planning does not begin with a preconceived goal: it moves from need to need, from opportunity to opportunity, in a series of adaptations that themselves become increasingly coherent and purposeful, so that they generate a complex, final design, hardly less unified than a preformed geometric pattern." Thus, by the definition (possibly more accurately; description) of transformative or evolutionary resilience, informal settlement planning and urban design represents a strong form of urban resilience.

It is thought that the type of resilience shown in Kya Sands is primarily evolutionary resilience. Here the settlement has adapted to changing urban contexts at a faster rate than planning authorities in the city. This relates to the different speeds at which various scales of the panarchy adapt and change. Residents of Kya Sands have gained access to some of the benefits of the city, most prominently access to jobs and *actually* affordable housing, despite being effectively excluded from viable formal access to it. Conversely, planning authorities show limited evolutionary resilience in responding to the growth of informal settlements. This work argues that in order for planning authorities to more effectively engage informal settlements, they need to become more resilient to unexpected change in the city, embodied in this case by the growth of informal settlements.

Planning authorities can learn from the evolutionary resilience shown in informal settlements, while using equilibrist approaches to improve the resilience of the settlements. This balance between evolutionary and equilibrist resilience is vital for urban systems to become more resilient and sustainable overall. This is closely linked to the view of urban systems as complex adaptive social-ecological systems (SES). Due to their unlimited complexity, they require more diverse approaches, and an acknowledgement of the importance of adaptability in the face of unexpected change.

It goes without saying that informal settlements are no less a real part of the city landscape than formally planned parts of it. They are a stark face of change in the city, of the changing rural/urban geography in South Africa and elsewhere. These settlements cannot and should not be wished away or excluded, but embraced as a fundamental part of the city. Here planners and planning authorities need firstly to accept this reality; that informal settlements exist at a large and growing scale (Eighty20, 2011a; 2011b) and are likely to continue to exist indefinitely. Another recognition that is promoted strongly by this report, is to not only recognise the vulnerability of informal settlements, but also the resilience they exhibit, both internally and in terms of the wider city panarchy. Planners and planning authorities need to become more adaptive to the changing urban context and more resilient in an evolutionary sense.

This study proposes that more creativity and participation in the creation and sharing of knowledge is a first step to better engagement between informal settlements and government authorities. The creation of knowledge cannot be top down only, and 'imposed' on the residents of informal settlements. Rather, knowledge and information need to be created using different methods, at different scales, by different stakeholders and from different locations. In choosing a social study at the community scale from within the settlement, this study has looked to address some of the more traditionally neglected approaches to information collection, and fill some of the information gaps on Kya Sands. It looks to create a source of information that can be used by planning authorities and the community of Kya Sands alike, which can hopefully act as a tool for more meaningful engagement and understanding going forward.

It is hoped that the findings on Kya Sands presented in this work, along with findings on the settlements history and unique dynamics, can be used to complement existing

information held by the City of Johannesburg and the Gauteng Provincial Government. This can hopefully lead to further engagement and investigation towards developing and implementing long term interventions in the settlement that look to improve living conditions, lower the risks of living there and maintain its inherent resilience.

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Appendices

Appendix 1: Ethical Clearance Certificate

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON MEDICAL)
R14/49 Weakley

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER H110603**
PROJECT TITLE	Mapping vulnerability for building resilience: The case of Kya Sands informal settlement, Jhb
INVESTIGATOR(S)	Mr D Weakley
SCHOOL/DEPARTMENT	Architecture and Planning/Town Planning
DATE CONSIDERED	10/06/2011
DECISION OF THE COMMITTEE	Approved unconditionally
EXPIRY DATE	10/07/2013
DATE 11/07/2011	**CHAIRPERSON** pp (Professor R Thornton)

cc: Supervisor : Prof P Harrison

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Signature _____ **Date** 20 / July / 2011

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

Appendix 2: Ethical Considerations

As per the rules of the University of the Witwatersrand (Wits) and my responsibility to the community of Kya Sands and the community of planners, there are certain ethical guidelines that have been followed in this research. Ethical clearance has also been obtained from the university to undertake the study.

The first set of guidelines comes from the 'Rules and Syllabuses for Degrees and Diplomas' in the Faculty of Engineering and the Built Environment (EBE) for the degree for which this study is being submitted. It reads:

> *Exit Level Outcome 1*
>
> *The qualifying learner is competent to identify, evaluate and solve problems within the ambit of the research area, and* ***demonstrates a high level of responsibility and ethics both within the immediate context of the problem, and with regard to society as a whole*** *[bold added]. In addition, s/he is familiar with relevant theoretical material for his/her area of specialisation.*
>
> (Faculty of Engineering & the Built Environment, 2012, p. 150)

The second is from the university's Code of Ethics for Research on Human Subjects (non-medical) which reads:

- *A researcher's paramount responsibility is to those studied. Where there is conflict of interest, they must come first. Researchers must do everything within their power to protect their informants' physical, social and psychological welfare and to honour their dignity and privacy.*
- *The aims of the investigation should be communicated as well as possible to informants.*
- *Informants should have the right to remain anonymous.*
- *Questions asked should not be insulting or embarrassing.*
- *The use of monitoring devices such as tape recorders and cameras should be open, and fully understood by the people concerned. They should be free to reject them if they wish. Results should be consonant with the informant's right to welfare, dignity and privacy.*

- *There should be no exploitation of informants for personal gain. Fair returns should be given them for all services. There is an obligation to reflect on the foreseeable repercussions of research and publication on those studied.*
- *The privacy and wishes of informants should at all times be respected.*
- *No reports should be provided to sponsors that are not also available to the general public and, where possible, to the group studied itself, subject to the policy laid down in the document, Policy on Matters Relating to Sensitive and Confidential Research.*

(University of the Witwatersrand, 2010)

A major focus was put onto the anonymity of respondents. This was explained to respondents before any interviews were conducted, and it was also noted that respondents need not answer any questions or divulge any information that they did not wish to. This is specifically to avoid this study being used as a justification for eviction. In line with this, permission was granted from all residents before conducting interviews. Please see these permission forms in Appendix 2, p. 235.

As Jenkins (Jenkins, 2006, p. 98) states, "researchers... need to be clear what their motivation is, and make this clear for ethical reasons." As such, when conducting interviews I have made it clear that it is for academic research, to broaden research into informal settlements and Kya Sands while at the same time acknowledging that it is part of my attaining a university degree. I have avoided promising anything in return for respondents taking part in the research as this cannot be backed up. I did however affirm that the findings will be made available to the community and that the work is intended to be used as a planning tool by the community.

Appendix 3: Participant Information sheet, Consent form and Voice Recording Consent form

D. Weakley MSc Research - Wits University
Information Sheet

Research Information Sheet

Mapping Vulnerability for Building Resilience: The Case of Kya Sands Informal Settlement, Johannesburg, South Africa

To whom it may concern,

I would like to invite you to take part in research I am undertaking on Kya Sands Informal Settlement. The research forms part of my studies at the University of the Witwatersrand (Wits).

I estimate that I will need about an hour of your time, and will ask you to answer some questions about yourself and Kya Sands, and to draw on a map of the settlement (provided) indicating areas that you feel strongly about in the community.

If you chose to participate, you will remain anonymous, in other words your name or location will not be shared with anyone or included in any reports that result from the research.

The research looks to gain a better understanding of some of the vulnerability and hazards facing the residents of Kya Sands, as well as measures taken by members of the community to build resilience against these.

I intend to create a map and a document of my findings that will be made publically available to the community that can hopefully be used as a planning tool in building resilience in Kya Sands.

Participation is voluntary, and will not include any remuneration.

Please see the following page for a summary of the research and contact details of the researcher.

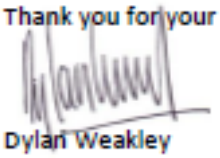
Page | 1

D. Weakley MSc Research - Wits University
Information Sheet

Name of researcher:	Dylan Weakley	dylanweakley@gmail.com	011 7177619
Supervisor:	Prof. Philip Harrison	For contact details, please contact researcher above	
Institution:	University of the Witwatersrand		
Degree:	MSc Town and Regional Planning		
Research Title:	Mapping Vulnerability for Building Resilience: The case of Kya Sands Informal Settlement, Johannesburg, South Africa		
Aims:	Improve understanding of residents' perceptions of Kya Sands informal settlement, specifically including vulnerability to hazards and resilience.		
Outcomes made available publically and to the community:	1. Thesis 2. GIS (Geographic Information System) Map of Demographics, Hazards, Vulnerability, Resilience and any other information gathered in Kya Sands 3. Conceptual map in the form of a MediaWiki page including similar (but not necessarily geographically located) information to the map above. These maps are not limited to any specific information.		
Funding Provider	National research Foundation		

I hope that you will consider taking part in this research, towards a better understanding of Kya Sands and Informal settlements.

Thank you for your time,



Dylan Weakley

D. Weakley MSc Research - Wits University
Participation Consent Form

Participation Consent form:

Please read, or ask the researcher to read to you the following before signing below.

1. Participants will remain anonymous, and their names will not be used in any research findings. Here coded names for example 'Participant A' will be used.
2. Participants' exact locations will be kept secret, with only the 'zone' in which they are located (see map attached) indicated in research findings.
3. Participants need not answer any questions they do not wish to.
4. Maps drawn on by participants (with any information that could identify informants deleted) may be included in the final work.
5. There will be no remuneration for participating in this research.
6. Any further questions respondents have may be asked of the researcher before signing below.

I, the participant, agree to take part in this research through an interview have read the information sheet provided, and have had any further questions answered by the researcher.

Name (Optional):_____

Signature: _____

D. Weakley MSc Research - Wits University
Voice Recording Consent Form

Voice Recording Consent form:

Please read, or ask the researcher to read to you the following before signing below.

1. This recording will be used by the researcher when referring back to the interview.
2. Voice recordings will not be made available publically.
3. Transcripts of these recordings may be used in reports; however any information that can be used to identify respondents (e.g. names and house location) will be omitted.

I, the participant, agree that a voice recording device may be used to record this interview.

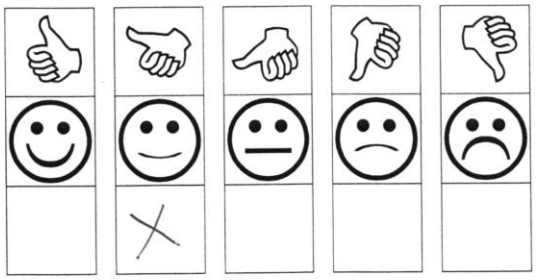
Name (Optional):_____

Signature: _____

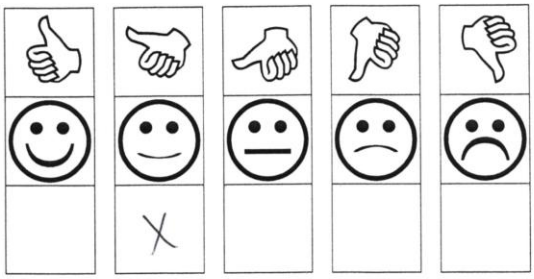
Appendix 4: Example Response Sheet

Zone Number: 12 Date: 25 Jan '11

Do you like living here?



Do you feel safe living here?



Appendix 5: Information sought in the interview process

Question Guideline

(not a chronological question list, order will be dictated by answers to previous questions)

Information Sought							How Documented		
First Level (Most Broad)	Second Level	Third Level	Fourth Level	Fifth Level (Most specific)	-	Example Question	Voice Recording	Marked on Map	Indicate on scale
Quantitative Information					-	How long have you lived in this settlement?	x		
	Geography / settlement name				-	What name do you know the settlement by?	x		
		Local Names			-	Do different parts of the settlement have different names?	x	x	
	Demographics				-		x		
		Age			-	Do you mind telling us how old you are?	x		
		Gender			-	Observation	x		
		Household / Family Dynamics			-	How many households / people live here?	x		
			Head of Household		-	Who is the head of the household? What is your relationship to them?	x		
			Family			Do you have family in Kya sands?			
					-	Do you Have Family in Johannesburg?	x		
		Foreign / South African			-	Are you from South Africa?	x		
			Nationality		-	If not: Which country are you from?	x		
			Origin in South Africa		-	Or: Where in South Africa are you from?	x		
	Livelihood				-	How do you/your household earn a living?	x		
		Employed / Unemployed			-	Does anyone in your household have a job?	x		
		Formal / Informal			-	Where do you / household members work?	x		
	Tenure Arrangement				-	How did you / your household hear about Kya Sands as a place to live?	x		
		Structure			-	Did you / your household members build this house?	x		
		Usage Rights			-	Who provided you with this land?	x		
		Bought / Renting			-	Do you or did you ever pay anyone to live here?	x		
		Other			-	If neither, what is the arrangement?	x		

Question Guideline

(not a chronological question list, order will be dictated by answers to previous questions)

Information Sought							How Documented		
First Level (Most Broad)	Second Level	Third Level	Fourth Level	Fifth Level (Most specific)	-	Example Question	Voice Recording	Marked on Map	Indicate on scale
Qualitative Information: Perceptions on Vulnerability and Resilience					-	**Do you like living in Kya Sands?**	x		x
	Positives of living in Kya Sands				-	**What do you like about living in Kya Sands?**	x		
		Area Specific			-	Are some places in Kya Sands better than others?	x	x	
		Resilience			-	Why have you/your household chosen to live here?	x		
			Why Kya Sands?		-	When did you/your household move here?	x		
				Reason for moving here	-	What was the reason for moving here?	x		
				Previous home/s	-	Where did you live before Kya Sands? 3 most recent	x		
				Alternate Residence	-	Is Kya Sands your main home? Do you have another home/homes? How often do go there?	x		
			Existing forms of resilience		-	How do you and others in the community make Kya Sands Safer/better?	x		
			How Risk could be further negated		-	What do you think needs to be done to make it safer/better here?	x		
	Negatives of Living in Kya Sands				-	**What do you dislike about living here?**	x		
		Area Specific			-	Is it specifically this part of Kya Sands you dislike?	x		
		Risks			-	What are the risks or dangers of living here?	x		
			Hazards		-	How safe do you feel living here?	x		x
				Locations of hazards	-	Where are the hazards you have mentioned located?	x	x	
				Perceived vs. Experienced	-	Have any of these affected you or your family?	x	x	
			Vulnerability		-	Inferred from above	x		
		Dangerous Areas			-	Are any places in Kya Sands not safe? Please mark these out on the map.	x	x	

Question Guideline

(not a chronological question list, order will be dictated by answers to previous questions)

Information Sought							How Documented		
First Level (Most Broad)	Second Level	Third Level	Fourth Level	Fifth Level (Most specific)	-	Example Question	Voice Recording	Marked on Map	Indicate on scale
Qualitative Information: Perceptions on Vulnerability and Resilience	Perceptions of community, government and other bodies' intervention				-	Who is responsible for the betterment of Kya Sands and the lives of its inhabitants?	x		
		Government Intervention			-	Has Government Done anything in Kya Sands?	x		
			Positives of Government Intervention		-	Has government done anything that you approve of?	x		
				Refuse Collection	-	Does the city collect your rubbish? Where from?	x	x	
				Water and Sanitation	-	Where do you get water? Which toilets do you use?	x	x	
				Lighting	-	Do you have electricity?	x		
				Health and Education		Does Government provide any schools or healthcare? If you/anyone in your household is sick, where do you go?	x	x	
			Negatives of Government Intervention		-	Has government done anything that you disapprove of?	x		
			Future Government Plans		-	What has government said they would do? Will they do it?	x		
			Way forward		-	What do you think Government should do?	x		
		Community organisations' Interven			-	Are there any community organisations in Kya Sands? Stokvels, buerial society? What	x		
		Other Organisations' Interventions			-	Are there any other organisations working in Kya Sands? What do they do for the	x		

Appendix 6: Letter from the City of Johannesburg Executive Director of Development Planning and Urban Management to the Acting Head of Department, Local Government and Housing, Gauteng Provincial Government

City of Johannesburg

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MONGEZI MNYANI
ACTING HEAD OF DEPARTMENT
LOCAL GOVERNMENT & HOUSING DEPARTMENT

Cc. ACTING CHIEF OPERATING OFFICER – BONGANI MORE
REGIONAL HEAD JOHANNESBURG – LINDA NGCOBO
ED: HOUSING, COJ – UHURU NENE

Dear Sir

SERIOUS CONCERN REGARDING THE DELAYED KYA SANDS RELOCATION PROJECT

The Executive Mayor of the City of Johannesburg in November 2006, during a Mayoral Road Show, identified the Kya Sands Informal Settlement as a priority project for the City of Johannesburg and has subsequently identified this community for relocation due to its location on the banks of the spruit traversing the settlement and also to redress the appalling conditions of the settlement. The Development Planning & Urban Management and Housing Departments of the City of Johannesburg were therefore mandated to jointly work together in addressing this problem area.

Since November 2006, the City through its administration has coordinated a Kya Sands Steering Committee with all internal City of Johannesburg Stakeholders to assist in the delivery of services to this community with a further mandate to address the plight of this community accordingly. This committee resolved to relocate the Kya Sands Informal Settlement to Plot 51 of the farm Houtkoppen in order to address the appalling conditions that this community was living in.

The City of Johannesburg was approached by the Provincial Department of Housing to consider amending its short term approach to a holistic approach in addressing informal settlements in view of the fact that this area presents itself with a number of informal settlements in pockets throughout the northern fringes of the City of Johannesburg including Lanseria.

These communities are continuously subjected to evictions from private land and this necessitated a more integrated solution which resulted in a provincial approach to utilize Portions 19 and 20 of the farm Nietgedacht and Portion 51 of the farm Houtkoppen as a solution to deal with the informal settlements. This proposal required an amendment to the City's approach which in turn resulted in a policy report submitted to and approved by the Mayoral Committee on 12 October 2007 (Annexure A) outlining the new approach and solution.

This Steering Committee was then tasked with the responsibility to start the technical township establishment process for the eventual relocation of this settlement to the identified sites.

To achieve this objective Provincial Housing proceeded to appoint consultants (LTE Consulting Engineers) to manage the project towards implementation. In support of the project and the City's endeavour to fast track the project based on the Mayor's commitment to the community involved all Departments in the City to participate and assist where possible. Despite the City creating this enabling environment for the Consultants and whereas the Steering Committee has met on several occasions since 2007, progress regarding this project has been delayed.

Early in 2009, the Steering Committee recognized that meetings agreements were not honored and that timeframes were not met. It became apparent the project manager Mr. Thando Miti (The project manager from the Consultants), was not delivering on his mandate. Steering Committee members raised concern regarding the non delivery and slow pace of this project and this resulted in Mr. Miti being replaced by Mr. Sham Maharaj from the same company. During the last Steering Committee meeting held on 18 September 2009, it became very clear that even under the management of Mr. Maharaj still no progress is visible and milestones are not met.

It should be noted that this community on 24 September 2009, through a service delivery protest march, complained about the fact that since the Mayoral visit in November 2006; no progress had been made towards long term solution for them.

The last Steering Committee meeting was adjourned on the request of Provincial Housing (Mr. Andre Van Der Walt) as the consultant could again not report on progress and had missed the deadline for submission again. The consultants presented a number of arguments as to why the project is delayed which included payment to the consultants by the Department, the consulting team's emphasis on other provincial projects but moreover the Project Manager indicated his efforts to rectify and consolidate all previous work.

The City is under constant pressure from this community and its neighbours which also results in political pressures. It should be noted that the City and Provincial Housing, during a public participation meeting held on 22 March 2007, informed this community of the intended relocation.

The City is therefore gravely concerned about the fact that this project, since 2007 is not progressing, even though consultants have been appointed and paid for during this period. It is kindly requested that you consider an investigation into the delay of the implementation of this project and provide the City with a formal response on the measures to be taken to remedy this situation.

You urgent attention and feedback in this regard will be appreciated

DR. P HARRISON
EXECUTIVE DIRECTOR
DEVELOPMENT PLANNING AND URBAN MANAGEMENT
9 October 2009

Appendix 7: Research Diary

Friday, 18 November 2011

Today I had an appointment to go and see Zanele Sabela, a journalist from the Randburg Sun who has been working on Kya Sands Informal Settlement for about a year. While I was scheduled to meet her at her office, she contacted me yesterday asking if I can meet her at Kya Sands instead. She was going there on a tip off that the CoJ housing department would be evicting some illegal residents of the community. This eviction ended up not taking place. I met her however and drove a short way into the settlement where we both parked our cars. She called it the 'reception area' and it did seem to act as a 'gateway' into the settlement. It is a more open area than the rest of the settlement and is surrounded by small shops selling fruit, cigarettes and chickens among other things.

Zanele then phoned a contact of hers and community leader, Honey and told her why she was there. She also mentioned that there was someone (me) that she would like to introduce to her. Zanele then got a phone call from another community leader or 'committee member' saying that she shouldn't be there as she was not invited. Zanele was not stressed by this and just laughed it off. Zanele then walked me over to a house about 10m from where we were standing and introduced me to two ladies who are community leaders. They were talking to a member of the community who, from what I could gather, had a grievance about possibly being evicted from the settlement.

Another community leader then arrived, Billy Modikwe, who assisted in settling the grievance. I was then introduced to Billy and exchanged numbers with both him and one of the 2 community member women, named Johanna. I told Billy about the research I intend to do in the community, explaining the maps and website that would be created as a source of information for the community. He said that there would be no problem conducting interviews and seemed quite excited about the project. I asked him if he could put it past the rest of the committee, and if I could come and meet all of them to propose the research project. He said he would speak to them on Sunday and get back to me about when I can meet them. I also explained to Billy that I would have a research assistant/interpreter who I will bring along, and will require a guide from the community whom I will pay a small daily stipend. He agreed to speak to the committee about this too.

Although I didn't venture very deep into the settlement, my initial impression of it was good. At no stage did I feel uncomfortable or threatened. In fact, it was quite the opposite with all of my greetings being returned and being welcomed by the leaders. In all, I left Kya Sands feeling very positive about the project.

Friday, 2 December 2011

Having not heard from Billy Modikwe since our meeting on 18 November, I phoned him today. I think I should have phoned earlier, however did not want to seem pushy. In retrospect I realise he would not want to spend money contacting me and I should call him and all other residents of the community that need to be contacted from now on.

In my phone conversation with Billy, he said that I can come and meet him and other community leaders next Wednesday (7 December). These will be the ones that are available and not at work. I told Billy that I will bring Marole, my research assistant/interpreter along so that I can introduce him too.

Having had three responses from Wits students to my advert for a research assistant, I got three applications. Although all three were well qualified for the task, I ended up choosing Marole as he seems both capable and 'streetwise'. He lives in Katlehong in the East Rand and claims to have friends in informal settlements who he visits regularly. I feel that he will be comfortable in Kya Sands, and will be able to look out for me if needed. Garth Klein (a lecturer of Marole's at Wits

and a former lecturer of mine) has also assured me (via e-mail) that he is trustworthy and indeed a good choice. Marole also has a staff number at Wits already, so there should be no payment/HR type issues.

Wednesday, 7 December 2011

Today I went to Kya Sands with Marole having planned to meet Billy and other community members to present my proposed research to them. We arrived at the settlement and drove in to the reception area. There was a formally dressed lady standing at the house where I had met Billy and Johanna before, and I asked her if she knew where Billy was. She said I should give him a call, so I did and he said would come meet me.

While waiting for Billy, Marole and I noticed a group of people in Pikitup overalls and a rubbish truck. The truck was not branded by Pikitup, but by a hire company. It was obvious however that it hired by Pikitup to remove refuse from the community. It arrived while we were waiting there looking as if it had been doing rounds in the community. This answered a question that I have posed in my work so far, whether or not the city had continued refuse removals from the area after their first emergency interventions in 2007. It also looks as if members of the community are hired to assist Pikitup with removals. I intend to find out the regularity of refuse collection and the routes around the settlement it does. I would also like to find out how people are hired and what they are expected to do. It is a heartening and positive sign however that refuse removals are continuing. Related to this (before I go on to my meeting with Billy) I did notice that the settlement is very clean with very little litter lying around. This must be related to the refuse removal service. I also noticed signs painted on flat rocks saying 'no dumping' and something about keeping the community clean. These were obviously made by members of the community, another heartening sign. On the other side of the settlement, just off Kya Sand road, Marole and I also noticed a more official looking no dumping sign that had been raised up on someone's roof, showing support of the notion by some community members.

After a minute or so, Billy arrived wearing shorts and a t-shirt and I greeted him and introduced him to Marole. He then approached the smartly dressed lady and spoke to her for a minute or so. The house she was at (the same one I met Billy and Johanna at) seems to house a business too, with a cage full of live chickens and a section behind this where ladies slaughter and pluck the chickens as needed by customers. Billy motioned for us to come over and Marole and I obliged. Billy introduced the lady as Honey, a name John Mendelsohn had mentioned to me in our meeting in February 2011 and who Zanele had phoned during my previous visit to Kya Sands. He said I should explain my research to her giving the impression that she is a fairly prominent community leader. I was a bit disappointed however, in that I was expecting an audience with a few more leaders, but I began to explain.

I had brought a couple of documents with me. These included a print out of the interview dates, photocopies of Marole and my student cards, copies of the question guideline, a copy of my research proposal and a copy of the ethics clearance certificate from Wits. I had also included screen shots of the website that I have set up and copies of all the documents I have from the CoJ for the community's records. Lastly I had printed out some maps, showing the growth of the settlement in aerial photographs from the last 10 years, and a map showing the 'data zones' in which I would be conducting interviews. After about a minute of explaining everything to Honey, she said she would have to go to get back to work. I was a bit taken aback, thinking a meeting had been planned, but didn't mind too much as Billy then said "the community leaders give you permission" for the research. I then quickly rushed through all of the documents with Honey, and she instructed me to explain it all to Billy who would report to the community leaders at their next meeting. I thanked her and she drove off, soon to return to carry on with what she was busy with. I think that she was interested, but just busy and needed to carry on with work. I then went through everything with Billy and he assured me that there would be no problem undertaking the research and that he and the other community leaders would support it. He said that he would

discuss our hiring of a guide with the community leaders. After Marole asked, he also pointed out on the map where the bridge across the river is and said that he lives on the western side of it.

We then returned all of the documentation to its plastic file and handed it over to Billy. He said he would try and get all of the documentation that the community leaders have together so that I can make photocopies of what I don't have. He said that He could organise a tour for Marole and myself soon and that we should stay in contact. We then bid him farewell and returned to Wits, driving around the settlement and through Kya Sand Industrial area on the way home.

Thursday, 12 January 2012

I have been back at university for 2 weeks now from my holiday break and have spent most of the time back either registering and dealing with other administrative issues around campus, or organising for my fieldwork which starts on Monday (12 January).

I called Marole today but could not get hold of him, I know he is doing some training however, so will try to call him this evening, hopefully he will be free.

Mostly, these past two weeks, I have been working on my questionnaire, but have also organised 'branding' for Marole and myself, as well as for my car. The branding consists of black t-shirts with the Wits logo on them (I got four, so that Marole and I have 2 each that can be worn and washed on alternating days) a blue cap each that read "Wits University" on the front, and a blue and white Wits raincoat each, as it is the rainy season. In fact it is raining while I type this. For the car I have ordered a set (one for each door) of 500mm by 200mm printed magnets that have the Wits logo on them, as well as the writing "University of the Witwatersrand" and "School of Architecture and Planning". Lastly, I bought a Wits lanyard and a card holder so that I can wear my student card around my neck. Marole already has a lanyard and holder.

I have decided to 'brand' ourselves so as to limit confusion as to why we will be in Kya Sands. I do not want to be mistaken for someone else such as city officials, or researchers working for another organisation (maybe the press, police or even land developers). It will also distinguish us as the outside researchers from our guide. I think this is important to show that it is indeed an independent study, and not commissioned by anyone, not even community leaders. I will be parking in the same place as on my first visit to Kya Sands, and the branding on the car will hopefully make it clear that we are there for research purposes. Also, having the car there will let people know (including Honey, Johanna Billy and general members of the community) that we are there and walking around the community somewhere.

On to the questionnaire; I have been working on the question guideline all week, and met my supervisor, Philip Harrison, about it yesterday. While he had good additions to make, I am worried that interviews may take a bit long. In total, there are now some 61 questions on the list, some of which can have one word answers, but some of which could take 5 minutes to answer. As I am hoping to do interviews in an hour each, it looks like time may be an issue. I have decided to do around 5 interviews as an 'in-situ pilot' so if I find that interviews are taking too long, I may have to cut out some questions, or some of the fine detail in the interviews. This may include the sections added to "Perceptions of Government Intervention" being perceptions of community and outside organisations.

Another method that Marole and I will pilot is to 'translate as we go'. Here, I will be the interviewer (in English) and will ask respondents all of the questions myself. Marole will then translate when needed between myself and the respondent. While this may take longer than Marole just asking the questions in Zulu for example, it will ensure that I can engage with the person and the conversation. It will also make transcribing quicker, as we will have answers recorded in English, and both Marole and I will be able to transcribe. If they were all in Zulu, Marole would have to translate and transcribe simultaneously for all of the interviews.

It is intended that we transcribe interviews on the same day that they are conducted. This will save time in the whole process of analysis. It would also be preferred to capture any qualitative data from the interviews in this process, and plug it directly into the shape file in ArcMap, or at

least into a spread sheet for now. This will include zone number, household size, formal/informal employment, gender, etc. If the workload is too much, I will try to capture this qualitative data on the weekends, and just conduct and transcribe interviews in the week. It must not be forgotten after all that it is about a 45 minute drive each way to Kya sands.

Lastly for today's diary entry (and indeed the reason I'm doing an entry at all) is that I have just come off the phone to Billy. I called him around 3pm to make sure that we are still on for Monday. After wishing him a happy new year, he confirmed that he is expecting us on Monday and that he has organised for a guide to accompany us around the settlement. I asked him if he thinks R50 a day is a fair rate, and he said yes. I also checked online for some minimum wages and found out in the security and hospitality sectors (the closest sectors I could find) is between R9 and R10.70 an hour (http://www.mywage.co.za/main/minimum-wages). For this reason, I think that R10 an hour is fair (we hope to be there from 10:00 to 15:00 each day). I will get a receipt book to keep a record of each payment. Also, I will make sure to only take enough money for each day with me.

I am looking forward to the four weeks ahead very much.

Monday, 16 January 2012

I have just returned back to Wits from my first day conducting interviews in Kya Sands. I can't say the day was a resounding success, but turned out to be a bit more productive than I had at one stage anticipated.

I arrived at Wits at 08:00 to meet Marole as previously arranged. He arrived and we discussed the day ahead while I did some last minute printing, including some spare questionnaires and some response scales. Having planned to pick up the car magnets from Kya Sand industrial area at 09:30, and meet Billy at 10:00 I had planned to leave Wits at 8:45. Marole needed to change his raincoat size at the Wits shop, and headed there at 08:30, when it was scheduled to open. I then waited for him until 09:00 before I phoned him asking him where he was. He had gone to check up on his bursary at the fees office, and was told that one of his documents was incorrect, and that he would need to correct this by 12:00. He said he would have to go home and get the original, and have it certified at a police station. He would not be coming on our first day of interviews.

Although irritated by the whole situation, I decided to go by myself, meet the guide that Billy had organised for me, and at least try to get a good tour of the settlement, and hopefully an interview or two if possible. As I was a bit late, I skipped picking up the car magnets (I got them rather on the way home) and went directly to the reception area of the settlement, just off Agnes rd.

When I arrived, things were fairly quiet. There were a few people around, but no more than usual. I called Billy and told him I was there, he said that my guide (Thabo, a young man who I had actually met on my first visit to Kya Sands) would missed call me. I called him, and he said he would meet me. While waiting for him, I spoke to a man standing nearby. He was wearing the orange overalls that I had earlier described as Pikitup overalls. He asked what I was doing there, and I briefly explained my research, and that I was waiting for someone to come and meet me. I then took the opportunity to ask about the refuse removal in Kya Sands. He explained that it was not in fact Pikitup, but a subcontracted company for whom he worked. The city of Johannesburg logo is on the overall, along with others, so it seems that they are the ones who foot the bill. He explained that all of the workers (like himself) live in Kya Sands, and are employed to fill the trucks. These trucks do routes through the community, with workers walking behind and filling them. Community members are given black plastic bags, and these are piled at strategic points for collection by the rubbish truck. The man told me (without me asking) that he earns R2700 a month for this job. While walking around later, I saw a few trucks collecting rubbish. Because of this, the settlement is in fact fairly clean (in terms of litter) with a few exceptions here and there. A major exception is a large embankment leading west down to the river from the eastern part of the settlement. Here rubbish has been strewn down the hill and polluting the river (which is also fairly polluted).

After about 5 minutes, Thabo arrived. He apologised for taking a while to arrive, which I didn't mind, and said as much. He is a well-spoken young man, and told me that he had gone to school in Soweto, where he had also (to a large extent) grown up. As he looks quite young, I wanted to make sure that I was not keeping him away from school so I asked him his age. He said he is 22, and I believe him. He also told me later that he is a member of the 'committee' making me certain that is older than 18 and finished with school. I explained that Marole could not make it that day and suggested that he gives me a tour of the settlement instead, and that we try and conduct an interview or 2 if possible. I went through the procedure with him (information and consent forms) and showed him the data zones, explaining that one interview in each would need to be done. He is a good map reader and was orientated straight away. He said it would be no problem and we started on the tour.

He started by explaining to me that the settlement is divided into 4 sections, named A, B, C and D. He said that he is unaware who created these sections, but explained them to me none the less. I will be sure to ask a few respondents to indicate the sections on the map to get a good view of where they each are. Basically, A and D are the southern and northern halves of the portion to east of the river respectively and sections B and C are the southern and northern halves of the portion of the settlement that west of the river respectively. He also said that the section on the east bank is known locally as "Dumpy", a reference to the landfill and to the illegal dumping that was rife in the area before Pikitup removed a lot of refuse and rubble in 2007 and began regular refuse removal.

We started by walking through "Dumpy" through the mostly straight and more "planned" streets that typify this part of the settlement (due to relocations to there by the city). Each house had its own installed concrete toilet that had been fairly recently installed as explained by Thabo. I asked when these were pumped, and he said they were done fairly regularly by a company sub-contracted, assumedly by the city. This section was fairly busy, with many houses having people in them. When I asked Thabo if it would be a problem finding people to interview (as many would be at work) he assured me that unemployment rates are high enough to always have someone around; indeed a sad consolation. However in Dumpy, this certainly seemed the case with people probably in every second or third house. The quality, or maybe better described as qualities of houses vary greatly too. Some built of brick and mortar, but mostly materials one would associate with an informal settlement. I also saw at least three houses that were two storeys high. Every street has more than one local spaza shop, selling all sorts of food and day to day supplies. It seems that there are two or three main stores however, that sell bigger bulk items such as maize meal and oil. One is in the reception area, and the other I saw on the western side of the river.

During our walk through Dumpy, we passed a crèche. I went in and set up a meeting with the lady who works there for Wednesday morning. While it will not be an official interview for a data zone, I hope to get some insight on organisations working in the community. There are two other big crèches too that I hope to visit sometime during the next few weeks.

Once we had gone through and around the east bank section of the settlement, we headed across the river to sections B and C. The crossing Thabo took me on was not the bridge, but rather just a shallow part of the river. Even though it is the rainy season, the river is not a raging torrent, and can easily be crossed here. It does become un-cross able during storms however, which are frequent at this time of the year. During storms it can be impossible to cross, even at the makeshift bridge a bit further downstream (to the north). However, during these storms, some young men can charge a fee of R1 a crossing in exchange for maintaining the bridge.

As seen in the aerial photographs, sections B and C are far more densely populated (by buildings at least) than the other side of the river. It also seemed quieter, with seemingly less people at home. It may also be that the houses all face inwards (we were walking mostly around the outside of them) and that people merely could not be seen. Small walkways lead into these sections. While walking south along the western side of the river, Thabo told me about Kya Sands' oldest resident, a lady named Phumi (name changed). We continued walking, and actually came across

her by chance. She was sitting talking to a group of people. Thabo introduced us and explained my research. She requested to be the first person interviewed, and so I had my first respondent. She lives in Data Zone 11.

Phumi (name changed) is a very interesting character and has lived in Kya Sands for 19 years. She was an informal worker on the landfill who used to collect items from there to sell to recyclers in Kya Sand industrial area. She also runs a crèche next door to her house, where she looks after children of adults who are either out working or looking for jobs. While the interview was very useful, I am not sure that I will be able to use it. It was Thabo who did the interpreting (where Marole should have). Even if it is not used as a data zone however, it does provide some good insights into the history of the settlement.

One mistake that I think I made in conducting the interview was, to start with the qualitative rather than quantitative questions as planned. Starting with the quantitative ones allows a good introduction of the respondent and their history before going into their opinions on the settlement. Other than that the interview went smoothly, with a minor hiccough possibly being Thabo's lack of familiarity with the questionnaire (although he did really well and I can't have asked for a better guide).

After the interview, Phumi (name changed) took us to see her crèche and livestock. Thabo and I then headed back across to the car and decided to call it a day, waiting rather for Marole so that interviews could be conducted as planned. I paid Thabo the agreed R50 for the day, filled in the "payslip" and got him to sign that he had received it. I then forgot to give him his copy, but will do so tomorrow.

I then collected the magnets for the car, and came back to Wits.

Tuesday, 17 January 2012

Today was a far more productive day than yesterday; I would say the fieldwork is well and truly underway. Marole was able to make it today, and we managed to do 4 full interviews. If we can manage to keep that rate up, we will finish all 60 with a week to spare (out of the 4 planned). We will then be able to spend the last week transcribing before Marole needs to start classes the following week (Mon 13 Feb). Having spent a huge amount of time transcribing the first interview last night, I think that this extra week will be needed as it certainly takes longer than I had anticipated. Marole is busy transcribing an interview now however and indeed going over the one yesterday to see if Thabo left out anything described by the respondent. I will try and transcribe the rest this afternoon and evening, but may have to leave one for the weekend or for the redundancy week that we may have available to us.

Marole and I arrived promptly at 9 in Kya Sands to find Thabo waiting there for us. I quickly introduced them to one another and, not wanting to waste any time, headed straight for data zone 1 where our first interview for the day was planned. To make sure that we were in the correct zone before finding someone to interview, I used Google maps on m phone, a Samsung Galaxy Sii. I had previously loaded an overlay of my data zones as a KML file onto the internet. Then by searching for the link to this KML, the dada zones loaded on the map of Kya Sands, and if our location marker (obtained using the phone's GPS) was in the correct zone, it meant we were in the right place. So using this method, we went to zone 1 and once in, started asking people if they were willing to be interviewed. This did not start off well.

The homes in this area of the settlement (as mentioned in my previous diary entry) seem to be less busy, with more looking locked up. We entered the small passageways that run between them however, and found a few people going about their business, like washing clothes, sweeping or preparing food. The first three people we asked (Thabo approached them to start with) were all either too busy or not prepared to take the interview. We carried on through the narrow passageways and after a few minutes came across two ladies talking outside their house, one with a baby strapped to her back and with two small toddlers with them. Thabo approached and, In Zulu, asked if Marole and I could interview them. They seemed interested, but asked if Thabo

could speak English, as they didn't understand Zulu. Without a language difference, I took over and explained the interview and the research. The lady with the baby on her back accepted, and she set out 3 25l buckets for us to sit on, in the passage outside her home. I conducted the interview in English and it went mostly smoothly. The only down side I can think of, was that as the lady was quite softly spoken, and sometimes seemingly not to say anything out of place, or that may upset anyone. I think a major reason for this is that she was Zimbabwean, and had mentioned that one of her biggest fears is Xenophobia in the settlement. Despite this, the interview went well and only took about 35 minutes. Marole and I thanked her, and went off to find Thabo, and a second respondent.

The second zone we went to was zone 3. I had decided to do all of the odd numbers first. This was a precautionary measure, in case the interviews took too long and we could only do half of them in the time allocated. This would mean that we would still have a good spread of respondents across the settlement. We got to zone 3, using Google maps again. Here we were luckier, getting a positive response from the first person we approached. Again we headed down a (very in this case) narrow passageway leading to the inward facing home entrances. Thabo approached a young couple (about 25 years of age each) who were eating in their room. He asked if we could interview them, and the man agreed. As he was eating, I suggested that we wait outside and wait for him to let us know when he was ready. After about 5 minutes he called us in, Thabo went off, and Marole and I went in for the interview. He said he only had about 30 minutes, so we made an effort to get it done in this time. I conducted the interview in English (which he agreed to, and which helped in making it quicker) and we got through the interview. We thanked him and left.

After meeting up with Thabo again, and on a bit of a roll, we walked to zone 5. The main road running through this zone was quite busy, and Thabo approached a lady who was washing her clothes with some children around her. She agreed to be interviewed, and carried on washing. When we handed her the information sheet and consent form to sign however, she took a seat and put her washing aside for the interview. She was a young mother (22 years old) and well-spoken and opinionated about the settlement. Again, the interview was done in English and was probably the best to date. This is as the respondent engaged and gave insights not expected and not heard before. This was very heartening, and I thanked her and left feeling very positive about the research.

As it was 12:00 and we had planned to work only until 14:00, we headed back to the car for a short lunch break. I had brought 3 curries from Kara Nichas (at Wits), one for each of us. They are great value (R6 each) and quite filling, definitely enough for each of us for lunch. I plan to do this daily for lunch.

At lunch I saw Honey, busy in what looked like a business meeting (with refuse removal workers and contractors) so I approached and briefly greeted her telling her the work was going well, before having lunch. We ate for about 20 minutes, and then went off for our last interview in zone 7.

In zone 7 again, the first person we approached accepted our invitation to participate. We sat outside his house while a friend of his plucked a chicken in a bowl of hot water. He was a nice jovial man and joked, when he read on the consent form that there would be no remuneration to take part in the research, that he would need at least R200 for his information. He did sign however, and we carried on with the interview, again in English. Although he said he was a South African from Limpopo, both Marole and I got the impression that he was indeed from Zimbabwe. Not that this matters, it is just an interesting observation that he may lie about this for whatever reason. Either way, it was also a very good interview, and he was willing to share a lot of his opinions, information and history of the settlement. It was also valuable in that he had been in the settlement for a long time, 9 years.

As mentioned earlier, it was a good day and although it was tiring, I am feeling more positive about the research going forward.

P.S. Having now done 5 interviews in Kya Sands, this represents a "Pilot" phase of the project, although the interviews will most likely be used in the final work. Some of the sticking points are as follows.

I changed have changed the question on the local names in Kya Sands from two to one. Before, it was: does this part of the settlement have a specific name? Do other parts of the settlement have specific names? To do different parts of the settlement have different names?

I have also taken out a question on vulnerability, and changed it to an inferred one.

I removed the question mentioning fire, disease and the landfill, rather leaving it with what people respond with.

Took out do you have electricity - inferred.

Lastly, I will stop pushing ideas. An example is when I ask people, "Are some places in Kya Sands Better to live in than others" and people say no, I will not go on to ask which areas are the best to live in. I have also reduced the number of questions here.

Wednesday, 18 January 2012

Today was another successful day of interviews. The changes I made to then questionnaire, mentioned at the end of my last entry, made a difference in keeping the interviews smooth and still getting the required information. I found that there was less time explaining and more time talking about what is important. They have also become shorter, while still providing good content. Because Marole and I are getting into it now, we are also able to get through more. Today we had our most productive day to date, having done five interviews. I have no doubt we can get it up to 6 or more though as we progress. It may seem silly to add, but it feels as if our "stamina" is getting better too. We are less tired per interview already, and by next week will hopefully to conduct 6 good interviews a day. We have also reduced interview time by making sure all of the documents needed for each interview are ready before we even start looking for a respondent. This way we can sit down and start. It involves making a pile of the papers needed, putting a new transparency over the map, and beginning to look. It is probably a good idea to make packs before we arrive at Kya Sands, this will save time in the field.

We arrived as usual at 9:00 and again Thabo was waiting for us. I remembered that I had an appointment with the lady at the crèche "pipeline" so we went to meet her. We went there, however her and another lady were busy with financial reports. I said it was no problem, and made an appointment for next Wednesday, at 9. No matter, we knew where we wanted to start, so went directly there, to zone 9. We arrived there and entered into the passages leading to people's houses. After a minute or so, we found a young man working in his small yard, just next to his house. Thabo introduced us, and he agreed to take part in our interview. As he had nowhere to sit, we conducted the interview in his small yard, all standing. I asked if he minded if we did it in English, and he said that was fine. So far, I think he was the lease responsive respondent to date. I think this was due to a combination of things. Firstly, he was busy working on his home and seemed anxious to get the interview done, and continue working. Secondly, as he was initially reluctant to let us record the interview (he agreed once we explained that we would not share the recording with anyone); I don't think he fully trusted us, and was not fully open. Third, although he said that he wanted to do the interview in English, Marole and I felt that he would have actually been more comfortable in another language. Despite all of this, we still managed to complete a usable interview.

After the interview, we met up with Thabo and continued immediately to the next one in zone 13. Again, we entered zone 13 and found someone to interview. Zone 13 is the first interview we

have done in section c of the settlement. This specific area is a lot less dense than the ones we have done so far, and the pathways between houses a lot wider. We found a man who had just finished preparing food for himself in his house (chicken stew and pap) and Thabo and Marole introduced us. The man was very friendly indeed, and as I mentioned it was windy outside, and this would affect the recording, he invited us inside, and we conducted the interview there. The man was very open with us and the interview went well. As he was eating when we started the interview, he said that he wanted to sign the consent forms after it was complete. He joked that he wanted to hear what we would ask him before he would sign. This turned out quite well, and once the interview was done he had no issue with signing. In fact, we used this method for the fifth interview of the day with the same result. We completed the interview in good time and having gained some good insights. We thanked him, and he us and left. This was one of my favourite interviews to date, and I enjoyed speaking to the respondent thoroughly.

Again, we headed off to the next zone to do the next one. It was scheduled to be zone 15, but Marole suggested that we do zone 16 instead as it is on the river (east) side of section c and as all the others were on the western side, this would give us a better spread. We went to zone 16 and not many people were around at all. The one man we saw said that he was too busy (cleaning, washing clothes etc.) so we went on. We walked north along zone 16, weaving in and out of its passages, but found no one at home. Marole and Thabo suggested that we move onto another zone, but we had not yet looked at the southern half of the zone. We went there and I am glad we did. We met an interviewed another very kind, knowledgeable and welcoming gentleman inside his house. He was a Malawian man which I was also pleased about, as we have not interviewed a Malawian person as yet. Went through the interview, with the only hiccough coming in explaining the response charts. He asked, "So I fill in I don't like living here, and then what" thinking we may move him or something. We assured him that this is University research, and none of our results would mean eviction or relocation. Once the interview was finished we thanked him and waited outside for Thabo. He brought us chairs, and we sat and chatted some more. Again, I very much enjoyed talking to such a kind and friendly man.

After this interview, Marole said that he was starving, so he headed back to the car for lunch. After a quick lunch, we set off back to try and do two more interviews before calling it a day.

Next on the schedule was zone 17, but as zone 19 was closer, we started there. As we arrived to zone 19 we met a young man working outside his house. Again we were introduced, and he agreed to conduct the interview. He invited us into his house, and we sat down. It was fairly big and very neat and tidy with pictures hanging on the walls. In fact, one of the nicest houses (in my opinion) that we have seen so far. This was an interesting interview. We started talking just to him, and then his girlfriend arrived. As he had only lived in Kya Sands for three months, we ended up asking her a lot of questions too, and ended up doing a dual interview. He is the first respondent to say that he likes living in Kya Sands. He was a softly spoken young man who told us he had been in a car accident the previous year and had moved in with his girlfriend who had been helping him recover. He was full of praise for his girlfriend and her mother (who lives nearby) saying they had taken him in when no one else would. He said he loved living there because of the kindness of the people he lived with. It was an extremely sweet sentiment, and his sincerity and gratitude, even in front of his girlfriend, touched me. Due to his circumstances, he loved living in Kya Sands. The rest of the interview went well, and involved both him and his girlfriend. We also finished in good time, and went to do the last interview of the day.

The last one was in zone 17, and went off without a problem. We found a man leaning out of his big window (which I thought was a shop) and we invited him to take part. He invited Marole and Myself in, and we sat down and began. His house was also quite large (2 rooms) and had a TV and speakers with electrical connections. He later said he had a generator to run this equipment. We sat down and I asked if it was ok to do the interview in English. He said that it was ok, and that he would ask Marole to translate if needed. I got the feeling that he was not very comfortable speaking English, so I asked Marole to explain the information sheets and consent forms in Zulu. As they were talking so freely, I decided to ask Marole to conduct the whole interview in Zulu (or

what ended up being a big mix of South African languages, including Venda, Zulu and Tswana) as Marole explained to me later. While I could not follow word for word, Marole conducted the interview well and we finished, again, in good time. As mentioned earlier, the respondent signed the consent forms after the interview was complete, and knowing the content of the interview, didn't hesitate to sign.

Having done five interviews in the day, we headed home. Again a successful day, and despite a not too positive start, we met and interviewed some very interesting, welcoming and kind people.

Thursday, 19 January 2012

We have just arrived back at the office after another day in the field. It was yet another productive day, and again we have beaten our previous record. Today we managed six interviews, and for the first time, conducted interviews on the "Pipeline" (east bank) part of the settlement. Today was also probably the least involved I have been in the interview process, in that 4 of the six conducted were done by Marole as those respondents were not that comfortable in English. We have decided to go for this option (rather than interpreting as we go) as we have found people are a lot more open, and a lot less impatient when conversing in a language they are comfortable with.

We arrived about 15 minutes late, partially because we were running late to start, and partially because of traffic. We parked in the normal place and were met by Thabo. He said that Billy wanted to see me, so we went and met him up on Agnes Rd. He was busy coordinating a clean-up project, with about 30 Kya Sands Residents in working outfits with EPWP (expanded public works programme) high visibility bibs on. Billy explained to me that he was coordinating a project funded (I think he said) by the health department and the EPWP. His project is to take sites around the settlement where rubble has been illegally dumped, and level these out and turn them into parks. These parks include signs reading "Keep Kya Sand Clean" and the like. It is also now clear that it is this project that installed the signs reading "Keep Kya Sands tidy" etc. that I noticed on my first visit to the settlement. The project gives people work and some income, promotes beautification and improvement in the community, and seems to build a bit of a sense of community. Although I have been looking for forms of resilience through my interviews, this is great, as I have come across one inadvertently.

While meting Billy, he gave me a pile of documents and newspaper clippings that he and the community have collected over the years (as I had requested on earlier visits). I have brought them to Wits with me to make copies for myself, and I also told Billy that I would make electronic copies for him (and probably upload them to the website) in case he ever loses the hard copies.

After speaking to Billy and taking photos of the workers and their work, we headed to zone 21 to start the day's interviews. We reached the zone, the northern most portion of section c (in fact described in our interview as section e) and found two ladies sitting outside their house, and approached them. While speaking to them, a man appeared from the house and seemed quite reluctant to allow us to interview any of them. He asked a lot of questions, and Thabo and Marole explained the research. It was a funny situation, in that he seemed almost aggressive (and a little drunk) but once he was satisfied that all his questions were answered, he changed to become polite and eloquent. I conducted the interview in English, and got some good insights. He was another rare respondent to say that he likes living in Kya Sand and also feels fairly safe living there. Another good interview.

Next we crossed the river and headed for zone 23. We found a young man to interview and gain conducted the interview in English. He lived alone in his home, and like the only other respondent we have spoken to who lives alone, was not very forthcoming. I also forgot to ask him one section of questions so had to return later to complete the interview. However, again we conducted a usable and useful interview.

For the next 4 interviews we conducted, I cannot comment too much on the content (before they have been translated and transcribed by Marole) so I will rather comment on the context.

Interestingly, as Marole pointed out, it seems so far that most respondents in Pipeline are not too comfortable with English. We have only done 5 interviews so far though, so it is possibly just the luck of the draw.

The next interview we did was in zone 27. We had gone to 25 (the next scheduled zone) and found a willing respondent who said we should come back in a bit. We went to zone 27 in the interim, and met a young lady waiting outside her house. Because of her young appearance, I started by asking her age (as I do not intend to interview people younger than 18 as per my ethical clearance application). She said she was 20 so we continued. I asked if she was comfortable with English, but after explaining the invitation letter, Marole and I both felt that she would be more comfortable speaking Zulu. Thus, he conducted the interview. The interview went smoothly, and we moved back to zone 25.

We returned to zone 25 to meet the lady we had met earlier. We set up inside her house, however she said she was just visiting from the Eastern Cape so we politely said we would have to find someone else. We thanked her for her time and left.

Instead we came across a home full of women, and children, 5 ladies and five children all sitting and chatting together. We asked if the lady whose house it was would be willing to be interviewed, and she accepted. Again, she was not comfortable with English so Marole conducted the interview. It went well and we thanked her and left.

We then had a quick lunch, yet again of veggie curry, and a coke each that I bought at a shop near the car. It was 12:30 when we finished and I told Marole and Thabo that I thought we should do 2 more interviews. We returned the coke bottles for a deposit of R1 each, and made our way towards zone 29.

There again we came across a home full of ladies and children, this time less however with two women and four children. They were cooking and chatting. The older of the two ladies agreed to be interviewed, and we began. Again Marole conducted the interview and I was somewhat of a deaf and dumb bystander. However the women spoke in depth and with conviction, and Marole confirmed my thoughts that it was a useful and rich interview. Happy with the result, and now both quite tired (it was a very hot day) we headed to zone 31 for our final interview of the day.

We approached a couple working in a shop (with their home in the same building, directly behind). The lady of the house accepted, and set up some chairs outside for us to sit on. Yet again, the interview was conducted by Marole and again the lady was very responsive and spoke in detail. Her and her husband was also both very friendly and joked with Marole and I a lot. Although I could not understand the conversation word for word, I followed loosely and felt positive about the outcome.

It was 14:00 by the time we left, and certainly the most tiring day so far. We are making good time though having completed 16 interviews in 4 days. At today's rate we should finish in less than 2 more weeks. I look forward to another 6 interviews tomorrow and a good rest on the weekend.

Friday, 20 January 2012

We have just arrived back from our fifth day in the field. We conducted 6 interviews (one of which may not be usable) and none in English. So while it was a successful day in collecting data, it was unfortunately quite a boring day for me. I am pleased about the interviews we did though, and Marole has assured me that we have got some good responses. All of the interviews we did today were in Pipeline and all in homes located on stands that have been set up by government (baring zone 39 which is an older part of the settlement). Thus this part of the settlement is more spacious (both within and in-between stands) and, from my suburban frame of reference, more pleasant. All but one of the homes we conducted interviews at had small yards and their own toilets, and all faced onto a road.

We started at zone 33 which is the first you drive past when entering the settlement from Agnes Rd in Bloubosrand. This is certainly a section where stands were set up by the city, and has neat rows of houses. The man we interviewed lived by himself and rented for R200 a month. While I started the interview in English, we soon found that he didn't answer many of the questions and so I handed over to Marole to conduct it.

Next we headed towards the heart of Pipeline, well not quite yet, but nearer at least: zone 35. There again we found a similarly laid out home as zone 33 (same stand size with a toilet) and a friendly and helpful young man living there. Again, he preferred to speak Sepedi, so I was a bystander. We sat outside his home, and had to ask the person inside to turn down the music so that we could record the interview. I noticed that he had a small flower bed outside and a little yard with an entrance pathway. There were however two houses on the stand, both of which shared the toilet. The next door house was fully made of brick and mortar, something that seems to be more common on the government demarcated sites. I assume that residents feel more of a sense of government recognition that justifies the extra investment. Anyway, the interview went well, and we thanked the man and went on.

Next was zone 37. We walked to the area, and for a short while were intercepted by two very drunk men. I was as polite as possible, and we moved away from them. The first lady we approached bluntly said no, so bluntly in fact that none of us even bothered trying to persuade her. We moved on a few metres, and were approached by a lady asking what we were doing there. She said that she would like to be interviewed and, as her home was in zone 37, we happily obliged. She invited us into her yard which was covered by a tarpaulin, a welcome break from the hot sun. Her house consisted of a small yard with a concrete toilet in it and a small patio type area leading into the house. She had two small girls (twins) sitting in a shell shaped plastic sandpit (although with no sand in it) in the porch area. Surprisingly, the yard was very dirty, with quite a lot of litter in it. It is the worst kept private area I have seen so far. Then again, it could just have been a bad day, and would only have taken a few minutes to clean up. As we entered, she swept aside the some rubbish with a rake, and set out some chairs for us. Again we started the interview in English, and then Marole took over. From what I understood of the interview, the lady was very knowledgeable about the settlement, talking about its history, and even the history of the names Kya Sand, Dumping and Pipeline. She also spoke in great detail and I look forward very much to reading the interview once it has been translated and transcribed.

The next interview we did in zone 39 was possibly the worst we have done so far, and I anticipate that we may need to conduct another interview in this zone. The man we found was very quietly spoken and I think quite sceptical of us. He was a Mozambique national, and was also intimidated by having to sign the permission sheets (being illiterate). He was very softly spoken, and often responded merely with ‘angazi’ isiZulu for or ‘I don’t know’. The main reason that it may not be usable however is that there was a baby crying very loudly near us for the entire interview, and I think it may not be audible. I will see how it goes through, and conduct another interview if needed.

We then went to zone 41. Here we conducted our first interview in a brick and mortar house. The respondent was a young lady who was renting from a landlord who occupied the other room of the house. The house was made up of two rooms that lead off a central stoep, as mentioned all built in brick with solid wood doors with the floor fully tiled. Again, Marole conducted the interview. The interview seemed to go well, and we thanked the lady and left.

After lunch, we went to zone 43 for our last interview. Here we found a group of three women sitting outside in the shade of a tree and preparing some fish for a meal. This surprised me, I didn't expect to see people eating fish in Kya Sands (I'm not sure why) and we asked if they would like to be interviewed. They declined and pointed us in the direction of a man who was in the house opposite them. We approached him and he agreed to take the interview. He started bringing some chairs out, but Marole asked if we could do the interview inside, away from the midday sun. Again, the interview was done in Sepedi so I struggled to follow. The man spoke fairly

confidently however, and it seems the interview went well. From my perspective, the two most striking parts of the interview were firstly when a drunken man came in and generally bothered us for a while, and secondly when a very brave mouse ran near my foot. I saw it out of the corner of my eye and was pleased with the composure I showed in not jumping around or anything.

We finished at 13:00, headed to the car, paid Thabo for the last 4 days, and left.

Monday, 23 January 2012

I apologise upfront if this diary entry is a bit brief. I am not feeling too well and need to go home and get some rest. We have almost completed half of the 60 interviews required, sitting at 28 after completing 6 today. It was another sweltering day which ended up being physically and mentally draining. One of the biggest things I have taken from today, is a comment made by a man while we were leaving. I greeted him as we passed his house outside which he was sitting, and he greeted me back. He then asked "Where are you from, America, Europe?" and I replied "No, Jozi". He then said "Oh, you have just come to learn how the blacks are suffering". I am not sure what to make of it really, but I thought it should be added here.

We have gotten into a good routine not wasting much time in getting into interviews. Having said this, we did arrive a bit late today, at 09:30. Although I arrived at Wits early today, there was a lot to do in preparing for the days interviews. But we got there at 09:30 and began interviews at 10.

The first interview was in zone 45, just next to the soccer field. The respondent was tall handsome and kind faced man, and we spoke outside his shop and home, with his wife sitting and listening in (also responding at times). Although he was not South African (he was from Mozambique) Marole conducted the interview in Zulu as he was not comfortable speaking English. The interview went well and he seemed to give some good insights.

Next was zone 47. Here we met a youngish man, also from Mozambique, who we interviewed outside his house sitting on some upturned buckets. Again, Marole conducted the interview in Zulu. It seemed to go well, and I assisted with the map etc. as well as possible. The man's wife waited inside, and his two small children (one dressed as spider man) moved in and out of the house in between the three of us conducting interviews. Again the interview went well.

In zone 49 we came across a group of men sitting outside a house. We approached and they greeted us jovially, joking and smiling. The man we interviewed did not live there, but we ascertained that he lived within the data zone so we could interview him. He was a Zimbabwean man, and helpful and responsive. He could also speak good English, so I conducted the interview. Besides his friends proving to be quite irritating during the interview, it went well and we got a good usable interview. I am also glad that we are getting a good mix between local and foreign respondents and men and women.

Fourth in the day was zone 51. This was a strange interview, conducted in a tavern, again with a Mozambique woman, with two pool tables in it. When we arrived there were three people in the room, an older man playing pool with a younger man and an older woman doing some washing in a bucket. We asked if we could conduct an interview, and as the woman (who lives there) could only speak Shangaan (a language that Marole cannot speak) it was decided that the younger man would translate for her. While the interview started well, our interpreter began responding rather than translating and the whole thing got a bit confused. We will translate and transcribe the interview, but it may be one that we need to do again.

Second last for the day, we interviewed a South African Security guard (man) in English in zone 53. He had a full brick house that he had built himself that was comfortable and one of the nicer houses in the settlement. When we arrived, he was sitting on his stoep going through bills and magazines. We invited him to be interviewed and he agreed. We conducted a good usable interview. During the interview, he mentioned that when he was relocated from section B to his current location (by the municipality) he had gotten a relocation slip. One notifying him of the move, and one confirming that it had been done (from the City of Johannesburg). I asked to see it, and he showed me. It is interesting in that this already defies the definition of informal settlement

used in my work, in that the occupation of the land has been authorised by government. I assume that this paperwork has given him the confidence to invest in a full brick structure.

The last interview of the day was in zone 55. Here we first approached a man who said he was busy. We then mat a lady sitting outside her home on the stoep. She said that she had only moved in 2 months ago, but as she was a resident, we interviewed her. The interview was conducted in Zulu, and was valuable in that it provided a perspective of someone who had just recently moved in. It was a solid, usable interview.

As mentioned earlier, I am not feeling too well so apologies for the short entry. Off for a sleep so as to be fresh for tomorrow.

Tuesday, 24 January 2012

Today I woke up making a concerted decision to be more positive about the fieldwork process. As mentioned in my previous entry, I was feeling a bit under the weather and a bit down yesterday, but I realised I am only half way and that I should make the most of it. I arrived early at Wits again to print and put together the 6 research packs needed for the day. Marole arrived at 8:30 and we left and arrived at Kya Sands on time. Unfortunately Thabo was a bit late (the clock on his phone was wrong due to it running out of battery) but he came soon after I missed called him. We had 2 interviews to do in Pipeline before starting at 2 and making our way across the settlement again.

Once again, all of the interviews conducted today were done by Marole. I have gotten used to this role however, and feel I can still engage despite not understanding the language fully. As there are now so many interviews that need to be both translated and transcribed, I'm sure I will need to hire some extra help. I will put this past Phil, my supervisor, soon. The two other applicants for the research job are the obvious choices and I hope they'll be interested.

The first interview we conducted today was in zone 57, one of the 6 northern most zones of the settlement. While this is part of Pipeline, it is also known as Madala Side (or Madala *Site* as written on the man from zone 53's relocation note from the city council). Marole said that this means Old Side, which is counter intuitive as it is indeed the newest part of the settlement. Thabo said that it is named after the section of the informal settlement that was moved there. This section no longer exists, and lay south of the current settlement, along the river. In section 57 we found a home that looked as if it had 3 rooms leading onto a common porch type area. There were 2 men in this common area doing some washing and other chores. We approached, and one man agreed to conduct an interview. We sat in this common area, and Marole did the interview. The man was a young Zimbabwean, and was a good respondent. After the interview, we thanked him and left.

Next was zone 59, the last in Pipeline for a while and the northern most zone in the study. Strangely enough, the man we found to interview here was also a 28 year old Zimbabwean male, the same as the previous interview (this had me quite confused in remembering who was who in writing this entry). We met him standing outside his home with a friend, and he accepted the invitation to be interviewed. The man had short dreadlocks, and he borrowed a bench from the shop across the road which I shared with him, while Marole sat on an upturned bucket. Again the interview went well, and we moved onto the next.

By this stage it was seriously threatening to rain. As we were crossing the river, I didn't want the rain to prevent us from being able to cross again to get back to the car. We also figured that it was a waste of time having to walk all the way back to the car (from section b) for lunch, so we drove to section B and parked there on Kya Sand Rd. We quickly found zone 2 on the map and in reality, and found a middle aged couple sitting and chatting in their home. The lady (who we interviewed) wore a Royal Challengers Bangalore cricket shirt. The interview was conducted by Marole, and went well, although quite quickly. The lady did seem to answer with quite a few "I don't knows" but this does not matter, it was a solid usable interview.

We then moved onto zone 4, right adjacent to zone 2. We met a group of people, most of whom were reluctant to take part. An elderly woman agreed however, and led us to her home. She

produced a crate each for Marole and myself, and moved to sit on the floor. I offered her my crate instead, and sat on an angled slab of concrete next to Marole. The interview was conducted by Marole in (according to him very proper and old school) Sotho. Interestingly, the lady didn't answer how long she had lived there, rather just saying "very long". When Marole later asked when she had moved there she replied something like "Didn't I already tell you I don't know?" Marole reported to me later. Again, although I did not follow word for word, it was a good interview.

After this, we went for a lunch of veggie curry at the car for about half an hour. At lunch (on Kya Sand Rd) Marole and Thabo pointed out about 20 men (throughout the duration of our lunch) returning home to Kya Sands informal settlement for their own lunch. These were obviously all men working in the Kya Sand Industrial area.

In zone 6, next on the list, we interviewed a very pleasant lady in her home which was neat and fully tiled. She was busy sweeping when we arrived, and after a minute or so, we realised her baby was asleep on the bed when s/he coughed. The lady was in her late 20s and was welcoming, and answered questions seemingly openly. The conversation went well, and I left happy that we had conducted a good interview.

Having just reviewed the lengths of interviews, it seems as if they are getting shorter and maybe we should spend more time on each one.

Last we moved on to zone 8, to one of the less comfortable interviews we have conducted so far. It was done with a lady in a group of 4 other ladies, obviously friends, all joking and laughing. For this reason, I think the interview was taken a little less seriously than we would have liked. In fact the whole situation was a bit awkward from the beginning as Marole explained to me afterwards. In looking for someone to interview in the zone, we were summoned over by the group of ladies. They wanted to talk, and not about the research. After the interview for example, I received a (joking) marriage proposal from the respondent. Another lady had asked Marole about himself (where he is from etc.) and when her friend asked why she was asking, she replied something like "you never know, maybe I can meet a husband". Despite this, the interview was completed (in very good time) and we thanked them and departed. This is the third interview that I think may need to be conducted again. I will review it when the transcription has been done however.

In all it was a successful day made easier by the overcast and cool conditions. We have now completer 34 interviews, so have 26 to go.

Today was the first day that I had arrived in the settlement after a night of rain. It is really noticeable due to the sand roads and poor drainage. Everything is wet, and walking through mud is the norm. The lack of drainage has really struck me during these two weeks in Kya Sands; this despite the water points dotted around the settlement. Water from these merely runs down streets, carving channels into them, down towards the river. There is also often water pooled around and running away from toilets, especially groups of communal toilets. Today we also noticed a burst pipe in section B of the settlement. This was gushing clean water out of it, and running down the road. This is not only a waste; it also reduces water pressure for the taps downstream, erodes the road and begs the question: "how does one report it to the council?" I pointed it out to Thabo however, and asked that he report it in the next committee meeting.

Wednesday, 25 January 2012

Today was certainly the worst start to any of the research days so far, even including the first where Marole could not make it. Firstly the traffic was terrible so we were late, and arrived at about 09:30. As we would be working in sections B and C the whole day, I parked on that side of the settlement, on Kya Sand Rd. I opened my door to get out of the car (stupidly not looking behind me for oncoming cars) and heard bicycle tyres skidding before a loud thud into my door. A cyclist had hit the door and was now on the road. I leapt out of the car and asked them man if he was ok, he was in shock, jumping onto his feet, and I lead him to have a seat on the pavement behind the car. I got his bike and brought it over to him. I apologised profusely and he said not to

worry. I said that I would replace/fix his wheel. After a short while he had recovered, and thankfully he had only received a few bruises and grazes, he could stand up fine and bend his knees etc. After a few minutes he was ready to go and asked for a lift to his house. I obliged and it was only a 5 minute drive. I dropped him and his bike off, taking his front wheel with me. He also asked me for R100 to go to the clinic for a check-up, but I declined, saying if he went he should bring a receipt (in retrospect this was a bad move as I probably cannot afford this). Haven spoken to him subsequently, he seems fine and just got some Paracetamols to kill the pain. While getting my bearings before driving back, him and his brother returned, saying I should take the whole bike as the back wheel and left peddle were also bent. I did not argue, and took it with. After our interviews I took the bike for a quote for repair, and it came to R520. While I am prepared to pay this, it can only be done in some 2 weeks. I have asked Marole to ask him whether he would like the bike fixed in this time, or the money tomorrow. I will wait and see.

Despite all of this, we still managed to get 5 interviews done.

I returned to Kya Sands and found Marole and Thabo waiting for me. I was still a bit worked up about the whole thing, and decided to go and get a quote for my car door from the panel beater on the same road. I asked Marole to go and do an interview in the meantime, and he obliged. This is the only interview I have not sat in so far, and if everything goes to plan, it should be the last. I went to get the quote, and came back and waited about 5 minutes for Marole and Thabo to return. I have asked him to write the following short passage about the interview in zone 10, for referral:

"The first challenge on this day becomes the psychological stage we find ourselves in. Due to not having a GPS enabled phone an accurate finding of the actual zone becomes a challenge. It was an easy interview to find because the first person we approached agreed to do the interview. There was a challenge with him not being able to speak Sotho properly but could speak Zulu although not fluently. The interview took place near his trading stall although we found him at his house. The respondent is 24 years old but seemed not to know much about household issues like when his brother began to live there. The interview took place in a noisy area as it was in the street near a trading stall. At some point we had to pause because people nearby were too noisy. After 15 minutes of the interview the respondent wanted to leave because we found him washing a pot so he wanted to go and cook. Overall it was a type of interview with a lot of 'I don't knows' because the respondent is not informed about a lot of Kya Sand issues although he has been living there since 2004"

The second interview 'we' did on the day was in zone 12. We met a Zimbabwean lady there in her home, and we sat outside on two installed green benches to conduct the interview. After I had asked a few questions, Marole noticed that I had not started recording, so I pushed start and merely read out the answers she had already given (just 3 or 4 of them). I then recorded the interview normally. Although the interview is usable, I feel that the lady did not always elaborate as much as she could have. A lot of the questions she merely answered with "I don't know". Anyway, we thanked her and moved onto the next one.

In zone 14, very near to the river, we found two men sitting and chatting in their home. They welcomed us in, and I asked who lived there and if he minded being interviewed. He was happy to be, and provided a very good interview indeed in English. The man had lived in the settlement for 12 years, and he spoke at length about it while we sat on two couches in his lounge. He had a large home with separate sleeping and living areas. He complained that his bedroom was wet, and took me there to show me at one stage. Again this was a very heartening interview, and one that I'm sure will produce a good few quotes for the final work.

Next we went to zone 15. You will remember that we mixed up the odd and even numbers earlier in the interview process to get a better geographical spread. Marole conducted this interview with a young man who, to be honest, was quite sceptical of us from the outset. The interview was not great quality, although usable. If we have time this is one interview that may need to be redone. For now, we will keep it however.

Lastly for the day (due to the bicycle fiasco in the morning) was an interview in zone 18. The interview was conducted with a lady who had been helping Billy a few days earlier with the clean-up and construction of the park. She was wearing a high visibility EPWP vest and an ANC youth league t-shirt. The interview went well, and was conducted by Marole. During the interview, Billy approached me and I returned his documents to him (that I had scanned). I also gave him some pictures that I had printed out of the EPWP project he had been working on. I then went back to Marole and finished the interview.

We then left, to try sort out the bicycle and return to Wits. Oh, upon leaving, we also saw the lady from the crèche in pipeline. Because of the bicycle accident, I completely forgot about going to see her. I apologised to her, and made an appointment for 12 tomorrow instead.

Thursday, 26 January 2012

We have just returned from our 9th day in the field. Again it was a successful day with 6 interviews completed. We now only have 15 to go, and should be done by Thursday. I will ask Marole to go through the three interviews that I have previously mentioned possibly need to be redone, and if they do, we will. Once we are satisfied that we have 60 usable interviews, we will spend a day mapping the taps in the settlement, and possibly the roads by walking up and down all of them with the GPS on. I have stopped doing this every day, as the battery has been running out before the GPX file is saved and uploaded. I would also like to map the light poles in the settlement.

We started the morning by visiting the man who rode his bike into my car door. He seems to be ok, just some bumps and bruises. I tried to call him, but his English is not too good, go I got Marole to call him instead. As I was quoted R500 to fix the bike, I decided to offer the man the money or a repair which would take 2 weeks. He chose the former, a sound decision as he could probably get a second hand bike for this price, and certainly buy the parts for less and do the repair himself. I gave him a receipt for the R500, and went off to collect Thabo. He was at Msawawa informal settlement helping with the EPWP work that had moved up there for the day. This was convenient, as the bicycle man lived nearby.

We returned to Kya Sands to do our last interview on the section B and c side of the river. We parked at the crèche just to the west of zone 20. In the densely housed zone 20, we came across two women and a small boy working and chatting outside their home. The corridor felt like that of a maze winding through the houses. We asked the ladies if they would mind being interviewed, and one of them agreed. She brought out a bench from inside her home, and she and I shared it while Marole sat on an upturned bucket. The lady was very friendly and responsive and a good interview was conducted by Marole. We thanked her and headed off to the next one.

As all of the remaining interviews would be in Pipeline, we decided to drive around and park in the reception area there. The next interview, zone 22, was done with a lady (and later with her husband who joined us). We sat outside their home under some shade cloth with her neighbour and child in attendance. The lady was Zimbabwean and the interview was conducted by me in English. Again, it was a good usable interview.

Next on the list was zone 24. Here we found a woman cooking who was willing to do the interview. She signed consent, but declined to sign the voice recording consent form. We thanked her, and moved on. A few houses away and down a side path, we found a woman washing clothes outside of her home. We asked her if she would participate in our research, and she agreed. We sat on some upturned buckets under a tree, which was very pleasant on a day that was now becoming quite hot. Marole conducted the interview and she spoke freely and quite confidently. The interview was a good one, and we thanked her and moved on.

By now it was already 11:45 and I had an appointment to meet the lady at the crèche in pipeline. As we were already running a bit behind schedule, I asked Marole to go and do another interview while I met with the lady at the crèche. Because the crèche was right next to zone 28 (the last zone scheduled for the day) we decided that Marole would go there while I was in my meeting. I

went with him to find a participant, and then went to the interview. The interview was conducted in a home full of women. It also had a well-kept garden and a beautiful creeper draping over the door.

After I left Marole to conduct the interview, I crossed the road to the crèche. The lady I spoke to was inspirational and explained the work that the organisation does. Besides helping children, ill people and the elderly in Kya Sands, the organisation also hires a significant number of people from the community. I recorded my conversation with her on my phone, and promised to add her organisation, the work it does and contact details, into my final report and website. After the interview I waited outside for Marole and Thabo, and we headed for lunch at the car.

As we had jumped ahead to zone 28, we just had zones 26 and 30 to go, and we did them in that order. In zone 26 we quickly found a young man from Zimbabwe to interview. His was the best setup for our purposes to date. He stayed in a brick house with a 2m by 2m yard, covered with corrugated plastic sheets. He had a round table in the centre with three chairs around it, which we sat around to do the interview. It was cool and comfortable and easy to refer to the map. The interview was done in Zulu and the young man engaged enthusiastically with us. Afterwards, he went inside and we took our time packing our things away in the shade before moving onto the last interview of the day.

The last interview of the day was another one of those very good ones. In zone 30 we found a well-spoken courteous man who engaged fully with the interview process. The interview was conducted in English, and with him by himself at first. After a while his girlfriend joined us and contributed to the conversation. He was also a very together man. Although he was between jobs, both of his children attended school (one in Fourways and the other up the road ad Judah ministries) and his girlfriend worked at the crèche I had visited earlier. It was a very enjoyable interview, and one I look forward to reading again.

After this we called Thabo and told him we could make our own way out. We drove past him while leaving, and thanked him and confirmed the time and place to meet tomorrow.

Friday, 27 January 2012

We have come to the end of a busy, sweaty, tiring and productive week. We completed another 6 good interviews today, and managed a grand total of 29 in the week. At this rate we will certainly finish by Tuesday, after which I hope to do some mapping on Wednesday and some concluding interviews (with community leaders and organisations) on Thursday.

The day was off to a good start; we arrived and got straight onto the work for the day. Thabo was waiting for us as we arrived, and the first zone of the day, zone 32 was directly adjacent to the reception area where we parked. We walked down one of the roads leading into the zone, and soon found someone to interview. We knocked on an open door and found a youngish lady who said she would take part. She said she hoped it would not take too long as she had an exam to study for and we assured her it would only take around 20 minutes. The interview was conducted in English, and the lady was well spoken although she did speak a bit softly. We completed the interview, thanked her and wished her luck for her exam, and moved on.

In the next zone (zone 34) we interviewed a lovely lady who worked as a domestic worker in Northriding. We arrived as her and two other women were having breakfast and she welcomed us in. I put my pencil case on the table and she commented that I have no table manners. I was suitably embarrassed and apologised. The lady was a bit sceptical of us, and said that she would only sign the consent form after the interview was complete. She was a very good respondent and I think it will be a useful interview. At the end she asked if we would be able to make a difference in the community. I told her about the website and the report I would put together, and while I could not promise anything to her, I told her that I hoped it would at least be a start. We thanked her and moved on.

Next was zone 36. Thabo had to leave to ambush an illegal dumping in the settlement on a tip off, so Marole and I went on alone. We knocked on a door that we could hear music behind. A middle

aged lady came out who I had indeed met before in Kya Sands. I, again embarrassingly, did not recognise her and introduced myself. She told me her name and later reminded me that we had already met. Marole conducted the interview which went well and we moved along.

Thabo phoned me to find out where we were and we soon met up with him again. The fourth interview of the day was in zone 38. Here we interviewed a man in his home, sitting on some benches. It was a large brick structure and his wife was outside washing clothes. The home had a shop window in the front with a telephone on the ledge. I assume this was to make pay calls on. The home was made of brick and was much larger than the average Kya Sands home. It was made up of one big room, divided by curtains hanging from the corrugated iron roof. Marole conducted the interview, and it went well.

We then headed for lunch before the last two interviews of the day.

In zone 40 we interviewed a young man in yet another big house that had three bedrooms leading off a communal area. While (without meaning to seem rude) he seemed a bit dazed, we did manage to conduct a good usable interview. Marole again conducted it, and it went well. We were interrupted a bit by another man who came and went speaking loudly each time. There was also a small boy who came and went, and occasionally sat on the interviewees lap and listened to the proceedings.

The last interview of the day was conducted with an elderly man in zone 42. It was conducted by Marole in Zulu, who afterwards said that the interview went well. The man sat on the porch in the chair he was in when we arrived, and Marole and I sat on a bench that a lady who also lives there brought out for us. His was also a fairly big house, with two bedrooms and a porch.

After the interview I agreed to give Thabo and a friend of his a lift to Braamfontein, and we left.

Monday, 30 January 2012

After a much needed restful weekend, Marole and I headed to Kya Sands this morning for the beginning of our last week of field work. We had only 9 interviews to go, and managed to do five of them today. Although it was a very hot day, we got through the interviews in good time and managed to have 5 done by lunch time. Despite the fact that we worked quickly, the interviews themselves were not short, and I feel we got some quality interviews in today. All of the interviews were conducted by Marole today.

Thabo had a busy day today too. He was helping both us and some people from the Gauteng housing department who were re-numbering the houses in Kya Sands again (although I am not sure how many times this has been done before). He told us that they are also taking down the names and ID numbers of the inhabitants of the houses, indicating that it is a step towards some type of intervention. I hope to speak to someone involved in this project to see the progress and the proposed outcomes.

The first interview of the day was in zone 44. The interviewee was a young Zimbabwean woman who was pregnant. We found her sitting outside her home on the porch, and we conducted the interview sitting there. Marole conducted the interview, and while at times she spoke freely, the lady often answered with "I don't know". Her neighbours and family members were also quite loud, so I hope the interview recording is audible. Despite this, a good usable interview was conducted. Marole told me afterwards that her neighbours were saying that interviewers often come, yet nothing ever gets done.

We then quickly moved on to zone 46, the eastern most zone in the settlement. Here we found a man who was on his own at home. He was middle aged and happy to be interviewed; although he said he needed to be somewhere in half an hour from starting the interview. This was no problem as the interview was done in 20 minutes, and although the man was soft spoken and his radio quite loud, he engaged with Marole who conducted a successful interview.

Next was Zone 48. Here we met a lady who we interviewed outside, across the road from her house. Marole sat on a log, the respondent on a bread crate, and I sat on a plastic stool (provided

by the lady's husband) next to a large wooden box. The interview seemed to go well, although I struggled to follow. Afterwards we thanked the lady and moved on. We then called Thabo who said the people from province had arrived. He came soon enough though, and walked with us to the next zone.

In zone 50, we interviewed a youngish lady in her house that was well built, neat, and had a solid floor of both smooth concrete screed and neatly laid tiles. Marole and I sat on the couch, while the respondent, along with another lady about her age, sat and lounged on the bed. The interview went well and regrettably again I struggled to follow. All the same, it was a successful interview.

The last interview for the day, zone 52, was in a Tavern with two pool tables in it, with a door that lead through to the respondent's living quarters. It was a seemingly professionally built structure, with brick walls and a tin roof. We interviewed a youngish mother from Mozambique who engaged well with the questions. She held her son throughout the interview, who was balling his eyes out when we arrived (apparently because he was scared of me). Marole assures me that it was a good interview, and commented on the ladies excellent sePedi, and thus we finished the day on a good note.

We met Thabo at the car for a lunch of a pie and a coke, and decided to return for the final four interviews tomorrow. I am very happy with our progress, having done 56 interviews in less than three weeks. If we finish early tomorrow (which we should) I hope to start some mapping of the roads and services in Kya Sands. Lastly, I hope to visit the crèches to set up appointments for Wednesday and Thursday of possible.

Tuesday, 31 January 2012

We have now officially finished out interviews, completing four today. It is a good feeling, and has been hard but exciting and extremely interesting and eye opening work. Having never visited an informal settlement, to spending three weeks on one talking to its residents has been a bit of a culture shock, but a great experience.

We arrived at 9 and met Thabo in the reception area. Honey was there too, and we greeted her. Our first interview of the day was conducted in English by myself in Zone 54. The man we spoke to had only been living in Kya Sands for 2 weeks, and had moved there from Msawasa up the road. Because he was a new arrival to the area, he answered a lot with "I don't know" however it was certainly a usable interview, and a good comparison to residents who have been living there for a long time. I now think I have the full spectrum, from more than 10 years, to less than a month. Because the man didn't know how to respond to a lot of the questions, the interview went quickly and was done in about 15 minutes.

We quickly moved on to Zone 56 where we found a group of three ladies and two children (one tiny and very cute baby) sitting on their porch chatting. The home was brightly painted and very attractive. We sat with them, Marole and I sharing a small bench, and I asked if I could conduct the interview in English. At first the lady of the house said that that would be ok, but after explaining the information sheet and consent forms, she said that she would be more comfortable speaking in Pedi. Hence Marole took over and conducted what seemed like a good interview.

Due to reasons of practicality, we decided to do zone 60 next and leave zone 58 for last. This saved us a good amount of walking. In zone 60 we interviewed a lady outside her home, made up of one room of three on the small stand. We sat on benches and crates outside, and Marole conducted the interview. It started with her sitting by herself, and after a while she got her crying baby from inside to sit with her. The interview went well, and we thanked her and left.

Last we walked over to Zone 58 where we first asked a lady doing hanging up her washing if she would take part in our research. She could only speak Portuguese and Tsonga however (being from Mozambique) so we had to move on. A few houses down we found a young man sitting on the porch with his wife and young child. We asked him if he was willing to participate, and he quite enthusiastically agreed. He had also only been living in the settlement for a few weeks, yet

engaged with Marole (who was conducting the interview) and a good solid interview was conducted.

We then called Thabo who met us at the car, and as we were finished, I took Marole and Thabo for a burger at Northgate to celebrate. At lunch we spoke about the house numbering that Thabo had been assisting with. Apparently the database is being renewed by the GPG. This is good, in that these databases obviously go quite quickly out of date. In fact, I would put money on the fact that it will already be at least slightly out of date by the time it is complete. This is probably unavoidable however, and merely a reality and limitation of the process. I asked Thabo if he knew what they were planning, and he said he didn't know. He did say that he overheard the data capturers speaking, and they mentioned something about houses that are not marked being demolished by the red ants. I asked what happens if the process just misses a house by mistake, and Thabo said they are quite thorough. He said that they had missed a few homes with hidden pathways leading to them, and in some cases those that look like one home but are actually two, but he tried to point them out. I asked if they pay him for the work, and he said they do sometimes. An interesting point he brought up was that if people were renting, and the landlord does not stay in Kya Sands, the tenant goes onto the list rather than the landlord. This seems to be quite a subjective process though, and far from perfect. I don't have any suggestions for improving it though, so it is more an observation than criticism. I must get in touch with the GPG to find out their plans.

Tomorrow I will go to Kya Sands without Marole and map the water points and lights in the settlement. A friend of mine, Christiaan, is going to tag along to help, and also out of personal interest.

Wednesday, 01 February 2012

I have finally completed my fieldwork, well provisionally at least. I say provisionally in case I need to go back and do another interview or something. I hope it is finished though.

Today I was accompanied by my friend Christiaan, who was interested in walking around the settlement. We arrived at 9, and pulled over near Witkoppen Rd where Billy and Thabo were talking to the EPWP workers from Kya Sands. Billy and Thabo approached my car and told me they were sorting out some issues, and that they would meet me at the reception area in half an hour. My friend and I went to park there and I decided that we should walk to Judah Ministries in the meantime to try and arrange an appointment. We arrived there and walked into the only open building, a small brick structure with 3 rooms, a waiting room and reception, and two consultation rooms, one leading off from the other. It was the clinic I had heard about in a few of the interviews so far. A lady that I had previously met was working there, and I remembered her name and greeted her. She led us in and I spoke to who I assume is a nurse or doctor working there. I asked if I could set up an appointment, and she gave me the phone number of a Dr. Tshabalala who I should contact. I intend to contact her/him in the next week.

We then went back to the reception area, and on the way met Thabo, near the soccer pitch. I introduced Chris and Thabo to one another and began walking around to map the water points and lights. We started in pipeline, and walked all around the area and through the streets. Thabo led us to all of the points, which I took pictures of with my phone from as close to them as possible. I had the GPS tagging feature turned on so that I would capture the coordinates of each light or tap. Walking around was a good time to chat about the settlement, explaining what I knew to Chris, and asking Thabo to fill in the gaps. It was fun work to do.

Once we had done pipeline, we moved across the river to sections B and C. Here again we were led by Thabo and recorded the locations using the same method. Come to think of it, we may have missed one or two standpipes in zones 22 and 23. An area we meant to go back to but never did. Already a probable reason to return; oh well, I will have to arrange this with Thabo.

Once we were done, I arranged to speak to Billy and record our conversation. It was not a great interview as I had not prepared properly. I did learn about the committee structure however and

its responsibilities. Once I was done, Billy provided me with two more newspaper articles to copy (which I did with my phone) and I thanked him. I then took Thabo to the garage to get him and Billy a Cold Drink each and to draw money to pay Thabo for the week. I thanked them both and bid them farewell, saying that I would stay in touch and that I would bring them copies of my final work.

Lastly I bid farewell to Honey (where I had interviewed Billy) asking if I should put her details on the site (which she said I should) and thanking her. I then left and drove home. I think I may have to go back to the area, and if I do I will contact Thabo to take me to the last standpipe that I may have missed.

Saturday, 16 November 2012

After working on my results and findings and context chapters for around 9 months, I started a job too in this time which has slowed my progress, I finally finished the two chapters. Not having seen Thabo or Billy for all of this time too, I felt I should reconnect with them and go and present them with the two chapters that are most pertinent to them from my research. I called Billy and arranged to meet him on Saturday morning at the reception area in Kya Sands. I invited my friend, Christiaan, too, as he has grown a keen interest in informal settlements in general, being a member of the Democratic Left Front. He, and his girlfriend Theresa, came along with me, both to have a short look around the settlement, to meet Billy and Thabo, and to find out a bit more about my work.

We arrived a few minutes late in Kya Sands, at around 9:10 (we had said we'd be there at 9), parked in the reception area, and called Billy. He said that he would meet us there in a few minutes. While we were waiting, I started showing Chris and Theresa the documents that I had brought with me to present to Billy and Thabo. While we were looking at them, we were approached by two young men who asked what we were there for and who we were. They were interested in the documents we had. I explained that I had conducted research in the settlement earlier in the year, and that I was here to hand the preliminary results over to community leaders. They asked what the work was about, and I replied that it has to do with the vulnerability and resilience of the settlement and its residents, or the positive and negative aspects of living there. To this they laughed slightly, saying that there is nothing good about living in Kya Sands. They both complained about the poor living conditions, especially the heat (it was a particularly hot November morning) and that they were both unemployed. I tried to explain that, in my results, I found that people generally dislike living in Kya Sands, however people still choose to, with the main reasons being access to affordable housing and jobs in the city. We then asked how long they had lived there, and they both replied about 5 years. I asked where they were from, and the one man was from the Eastern Cape, and the other from Mpumalanga. I asked why they had moved to the settlement, and they both replied that there was nothing for them at home, and they came to the city to find jobs. Chris then asked if their homes (in their provinces of origin) were better than living in Kya Sands. They both replied that they were, with comfortable beds, tv and a quiet relaxing lifestyle. Chris then asked why they don't move back, and the one man asked what he would do there, and what the community would think of him, just sitting around doing nothing all day. This was interesting, in that it indicates the aspirational reasons for moving to the city, the ambition for a better life.

By this time, Billy and Thabo arrived, so we bid the two men farewell, and greeted Thabo and Billy. It was good to see them, and I apologised for not coming to see them for so long. I asked Thabo if he had got any calls for the tour advert I set up on Google Maps, and he said his number had changed, and asked that I put up his new one. I asked if there was a place where we could sit where I could go through the documents with them. Billy led us to some benches outside Honey's house, the place where I had first met and spoken to him. I went through both documents with Billy, Thabo, Chris and Theresa looking on. I focussed mainly on the graphics (graphs, maps and pictures) as they are the easiest to talk to, however went into some of the writing when possible. I recommended that they both read through it later, which they said they would do. One aspect I

discussed at length was the section on government interventions in the settlement, and relocations. Much of what I know about the settlement since my last visit in February, I have got from news sources. This included the protest staged in March, and the resulting meetings with the CoJ. I asked whether the city had continued their engagement with Kya Sands since then, and Billy assured me that they had. He also confirmed that the original plan to move residents to the adjacent piece of land is back in play, however he couldn't give me any timescales. Billy said that the next step was the building of the bridge. He also informed me that currently there is no bridge in place, with the makeshift one having washed away.

When talking about the relocations in the settlement, Billy and Thabo both informed me that a new set of government relocations had taken place from the Inanda informal Settlement, just north of Kya Sands. People have been relocated to plots of land between the soccer field and Agnes Avenue. This shows that government is using Kya Sands as a relocation area, and that the government is indeed growing the informal settlement. I failed to ask if it was the GPG or the CoJ who are doing the relocations. It is also interesting, in that it shows government actually acting informally, using informal settlements as part of their city planning.

I went through the rest of the document with them, and it was well received. Billy and Thabo then took us to see the newly relocated area, with newly built informal dwellings. He informed me that the move did not go down well with the Bloubosrand Residents, and that they opposed it strongly. The new dwellings face the houses of Bloubosrand directly, and are right across the road. Billy also informed me that new taps were installed for the new section, and that VIP toilets were on their way. For the meantime, only sets of chemical bucket toilets are in place. I took some photos of the new part of the settlement, and as I was in a rush to be at another engagement, I thanked them and left. I assured them that I would add the new findings to my research report.