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Water resilience and social capital

Comparing informal and formal housing areas in Addis Ababa

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ABSTRACT

Urbanisation, poverty, severe housing need, increasingly frequent flash floods, dysfunctional infrastructure and water shortage serve as a backdrop for this thesis. The everyday management of water is investigated in terms of its water resilience. A water resilient city is defined here as not only a robust city, but also as a city that sustainably turns stresses into opportunities for growth and welfare improvement.

This thesis was written in connection with the Water resilient Green cities for Africa (WGA) research project, and this thesis' empirical findings are from case areas that correspond with the project's case areas, one slum and one newly built condominium site. The comparison of the two is interesting as the slum is unplanned and seemingly ignored, while the condominium area is planned and regulated to a great extent. By focusing on the areas' water-related physical infrastructure and social organisations, an investigation of adaptation measures to water-related problems, such as water shortage and flooding, was undertaken.

The fieldwork findings indicate that the residents and social organisations in both case areas were trying to find solutions to water-related issues, and was in that regard coping with their water-related problems, but only one measure can be deemed as resilient, namely rainwater harvesting in the form of rooftop collection in the slum area and one makeshift stormwater tank in the condominium area. The other measures are not sustainable in the long run, and can therefore not be categorised as resilient.

According to government plans, all slums are meant to be replaced by condominiums in the near future. As the government does not actively regulate and plan the slum area, the slum dwellers have more leeway to actually make changes, like digging culverts and constructing wells in the slum area. Collective action in the condominium area, however, is restrained by the centrally decided rules, and their adaptive measures are limited to buying water from external sources. If the condominium dwellers or their formally elected committees could increase their room for manoeuvre, local and context-appropriate sustainable solutions could be implemented to increase their water resilience.

PREFACE

This thesis concludes my Master of Science education in Geography and geoinformatics, with a specialisation profile in Transformation of Cities and Landscapes. The thesis was written under the supervision of Lise Byskov Herslund, who provided valuable guidance and feedback.

Based on empirical findings collected in Addis Ababa in the summer of 2014, the thesis will hopefully be of use for the Water resilient Green cities for Africa (WGA) research project, which started in 2013 and planned to end in 2017. The project investigates the options for using landscape based stormwater management (LSM) to increase the climate resilience of larger African cities, in cooperation with, among others, the Ethiopian Institute of Architecture, Building construction and City Development (EiABC) at Addis Ababa University, Ethiopia. The EiABC's teaching staff and PhD students were of great help during the field visit.

Thank you for reading.

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LIST OF ABBREVIATIONS

AAWSSA	The Addis Ababa Water Supply and Sewerage Authority
DC	Development Committee
DFID	Department For International Development
EDO	Environmental Development Office
EiABC	The Ethiopian institute of Architecture, Building construction and City development
EPA	Environmental Protection Agency
EPRDF	Ethiopian People's Revolutionary Democratic Front
GTZ	German Technical Corporation
IHDP	Integrated Housing Development Programme
MDG	Millennium Development Goals
MHE	MH Engineering
MWUD	Ministry of works and Urban Development
NGO	Non-Governmental Organisation
SUDS	Sustainable Urban Drainage Systems
WGA	Water resilient Green cities for Africa

1 INTRODUCTION

At the same time as Addis Ababa is undergoing rapid population increase and modernising its image as the diplomatic capital of Africa, the new buildings and paved surfaces means that the city is absorbing less water and generating more runoff water. Being one of Ethiopia's rainiest places, the heavy showers during the summer months thereby cause the city's congested streams and rivers to swell and overflow. Climate projections indicate that the amount of rain will not increase, but that rains will intensify and cause more flash floods (CLUVA 2011). The frequent floods exacerbate the relentless water shortage problem, as the floodwater transport pollutants to waterways.

Slums constitute 80% of the city (UN-Habitat 2007). The poor state of the slums, coupled with their prevalence and need for increased inner city density, has lead the government to replace the slum areas with modern-looking condominium buildings instead of upgrading the areas. The ambitious condominium housing programme aims to remove the presence of slums entirely, but it is questionable whether the programme can keep up with the growing need for affordable housing that results from the rapid urbanisation. Independent of the modernity and durability of buildings, Addis Ababa still suffers under dysfunctional water-related infrastructure, including water delivery, drainage and sewer system, which covers only 3% of the city (UN-Habitat 2010).

The thesis is written in connection with the Water resilient Green cities for Africa (WGA) research project, which looks into the potential for Landscape-based Stormwater Management (LSM) to increase resilience, and water resilience is consequently a central topic. Water resilience is defined as being able to cope with water-related stresses, prevent them in the future and create opportunities for growth and development from them, all while using the ecosystems sustainably (Bernier & Meinzen-Dick 2014, Wong & Brown 2009, Eriksson et al. 2014). These adaptive measures are analysed in connection with social organisations, as social capital is seen as essential in obtaining access to natural capital like water (Adger 2003).

The empirical basis is fieldwork conducted in two case sites in Addis Ababa in close proximity of each other and flood-prone rivers, one slum area and one condominium area. The case sites correspond with the WGA project's case sites. By describing and comparing these two different ways of living with both floods and water shortage my purpose is to investigate how social organisations help mitigate the water-related problems Addis Ababeans are experiencing on an everyday basis.

1.1 RESEARCH QUESTIONS

Under the main topic of water resilience, the research questions are as follows:

> *How is water managed in an everyday context? What can the condominium area, which is planned to be the most prevalent form of housing, learn from the slum?*
>
> *How do social organisations interlink with water resilience?*
>
> *How are the wider structures (authorities and regulations) aiding or hindering water resilience measures?*

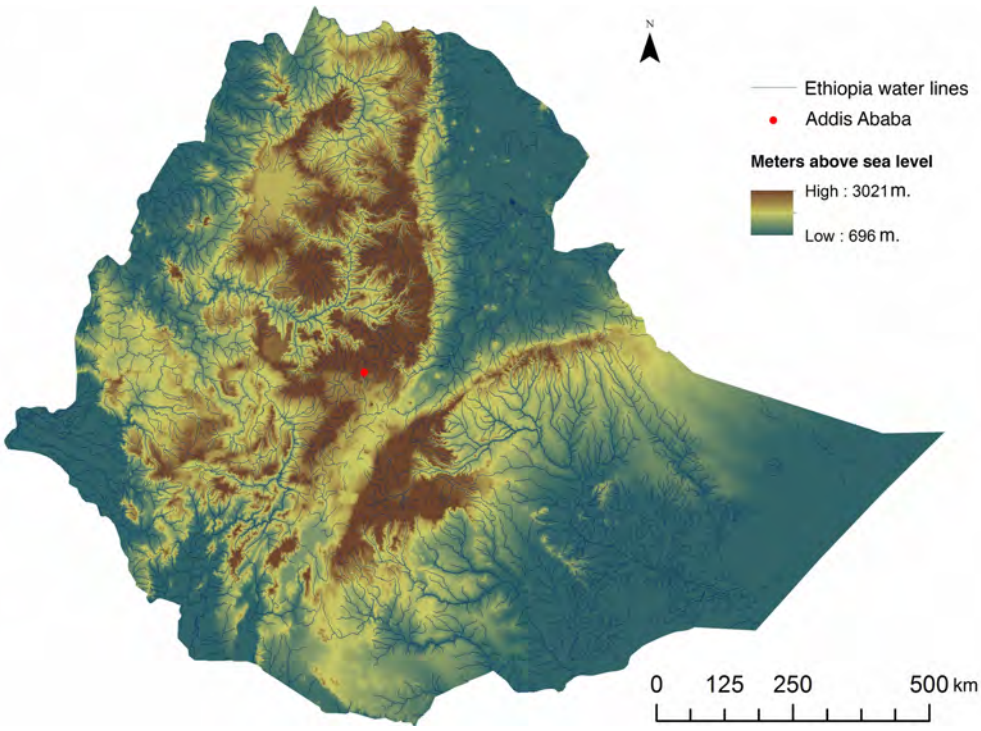
2 BACKGROUND

Ethiopia is the second most populous country in Africa, and is at the same time one of the world's poorest and most indebted countries. The country is ranked 173 out of 187 on the Human Development Index, with 61% of adults being illiterate (UNDP 2014) and 40% live under the poverty line (UN-Habitat 2010). The few wealthy Ethiopians are by far outnumbered by the large proportion living in extreme poverty. Agriculture is the main source of livelihood for approximately 80% of the total population (UN-Habitat 2007), and accounts for almost half of the GDP (UNDP 2014). The agrarian nature of the national economy means that its performance fluctuates significantly with the changes in weather and climate, and food shortages and famine are common even though the country holds large areas of cultivable land (UN-Habitat 2010).

Despite having one of the world's lowest proportions of urban population with only 16.7% living in cities, Ethiopia's rate of urbanisation is rapid, increasing from 6.4 million city dwellers in 1990 to 13.8 million in 2007 (UN-Habitat 2010). The urban population nationwide is projected to grow to 42.4 million in 2037. The proportion of urban dwellers is estimated to double in the 30-year period after 2007, to 31.1% (CSA 2013). The rapidly growing cities combined with the high prevalence of urban poverty have augmented the existing problems of high unemployment, homelessness, environmental degradation, urban decay, lacking infrastructure and basic services (UN-Habitat 2010).

The Ethiopian People's Revolutionary Democratic Front (EPRDF) has governed Ethiopia since 1991, after overthrowing the Soviet-supported Derg military junta that had held power since the revolution of 1974, when the last emperor of the Solomonic dynasty, Haile Selassie, was ousted. Thus, Ethiopia has had a stable governance history compared to most other African countries, which is partly why the country has become a diplomatic center in Africa (Gittleman 2009).

FIGURE 1 MAP OF ETHIOPIA



2.1 Addis Ababa

The capital, Addis Ababa, is a so-called primate city as it is 14 times larger than the country's second largest city, Dire Dawa. Addis Ababa's population increases by between 90,000 and 120,000 inhabitants each year, most of it is due to net in-migration since the city's fertility rate is on average 1.9 children per woman (UN-Habitat 2007). The city had an estimated 2.74 million inhabitants in 2007, and is expected to double to 5.13 million in 2037 (CSA 2013). Addis Ababa is the host of the African Union headquarters, the Economic Commission for Africa and other international organisations. As a result, the city holds the fourth largest collection of diplomatic missions in the world. High-rise hotels and office buildings are popping up all over the city to adjust to its new modern image, which is transforming it rapidly (Keffa 2014).

The inhabitants of Addis Ababa have to deal with social and economic problems such as income disparity, poverty, unemployment and housing shortage, all of which are worsening. In addition, the physical and social infrastructure is poorly developed and the slum and squatter settlements are growing (UN-Habitat 2007). Disparities between Addis Ababeans are increasing as the low- and middle-income are increasingly falling behind the smaller and much wealthier population segment. About half of the city's active labour force is employed in the informal sector. The unemployment rate is estimated to be higher in Addis Ababa than in the rest of the country; with 34.7% compared to 22% nationwide (UN-Habitat 2007).

Addis Ababa is an autonomous administrative area, which after recent restructuring was divided into three tiers: the region, the districts (or sub-cities) and the sub-districts called woreda (UN-Habitat 2007).

Figure 2 Addis Ababa under construction

2.2 CLIMATE

The average altitude of Addis Ababa is 2400 meters above sea level and the city is located within the Akaki river basin. The annual average rainfall is 1161 millimetres (Keffa 2014), which makes it one of the rainiest places in Ethiopia. The rainfall is concentrated to the summer months, when the annual rainy season results in the city experiencing huge downpours. Floods often follow heavy rainfall and the streams and rivers that cross the city from north to south swell considerably after heavy cloudbursts, often resulting in material damage and hazardous for humans (UN-Habitat 2007).

No detailed research has so far been undertaken on Addis Ababa or any other city in Ethiopia showing the impact of climate change (Jørgensen et al. 2014), but observed indicators so far are changes in minimum and maximum temperature and more intense and frequent drought, occurring now every 2-5 years instead of every decade. Regarding rain, the average rainfall amount has reduced, but has at the same time intensified, causing an increase in flooding frequency, which inflict serious damage to human life and property. The results include decreased level of groundwater, decreased water levels during droughts, damage to sewer system and the built environment, and pollution of the drinking water reservoirs. The intensified rains and temperature changes are expected to continue (CLUVA 2011).

2.3 URBAN LAND GOVERNANCE

When the Derg overthrew emperor Haile Selassie in 1974, all land was nationalised with the aim of a fairer distribution of wealth. The government controlled the housing supply in Addis Ababa, which lead to decreased rental prices, low maintenance investment and therefore deteriorating houses. Despite the large housing demand, the effective demand has stayed far lower, meaning people who can actually afford housing at the available prices. When the EPRDF took over in 1991, the country was lead through market-oriented reforms and structural adjustment programs. Hopes were high for the forces of the free(r) market, which was expected to meet the high demand for affordable housing on its own. But the private sector has failed to deliver despite subsidies, and housing prices have increased substantially, making it hard even for employed professionals like doctors and lawyers to find affordable dwellings (UN-Habitat 2010). The EPRDF government has kept the Derg's policy of keeping all urban land nationalised, which allows them to control land use and design (UN-Habitat 2007). The demand for housing remains huge, at least 300,000 housing units are needed in Addis Ababa. But due to the city's large proportion of low-income inhabitants, the need for affordable housing is most pressing (UN-Habitat 2010).

2.4 URBAN UPGRADING

The city has an overall poorly constructed housing stock. 2007 numbers state that only 17% are deemed to be in good condition, 97% of houses were single-story and nearly 60% were attached row houses. Regarding construction materials, half had earthen floors and roofs are almost invariably made from corrugated iron sheets. Almost 25% lacked access to toilets,

either private or shared, and only 38% had kitchens (UN-Habitat 2007). These numbers have undoubtedly changed since, but the durability and quality of housing is still low.

Despite the huge demand for upgrading both housing and infrastructure, only a few Non-Governmental Organisations (NGOs) operating in Ethiopia are concerned with urban issues (UN-Habitat 2010). The government puts NGOs under strict scrutiny (UN-Habitat 2007), which has been exacerbated by the 2010 implementation of the Charities and Societies Proclamation no. 621/2009, which prohibits foreign NGOs from engaging in projects related to human rights in general, including women's rights, children's rights, disabled's rights, citizenship rights, conflict resolution and democratic governance. This could also affect housing or upgrading projects that touch upon these subjects. Moreover, Ethiopian NGOs are considered as foreign under this proclamation if more than 10% of their funding is from foreign sources, limiting NGO work further (CIHR 2009). In Addis Ababa's informal areas, the municipal Environmental Development Office (EDO) has dealt with improving the infrastructure, including installing communal latrines and water taps, and digging drainage lines along roads to avoid flooding in rainy periods. The efforts of the EDO have benefitted several hundred thousand households since its start-up in 1994 (UN-Habitat 2010).

But large-scale upgrading of the city's slums has not been treated as a viable solution because the slum housing units are in an irreparable state, the housing deficit is too massive to be dealt with through small upgrading programmes, and the density of inner city land, where many slum settlements are located, is planned to be increased by building new taller buildings (UN-Habitat 2010). The densification aim has created a distinction between two urban housing typologies: informal, also referred to as slums, and formal in the form of condominiums. These typologies will be the point of departure for the later analysis of this thesis' empirical data.

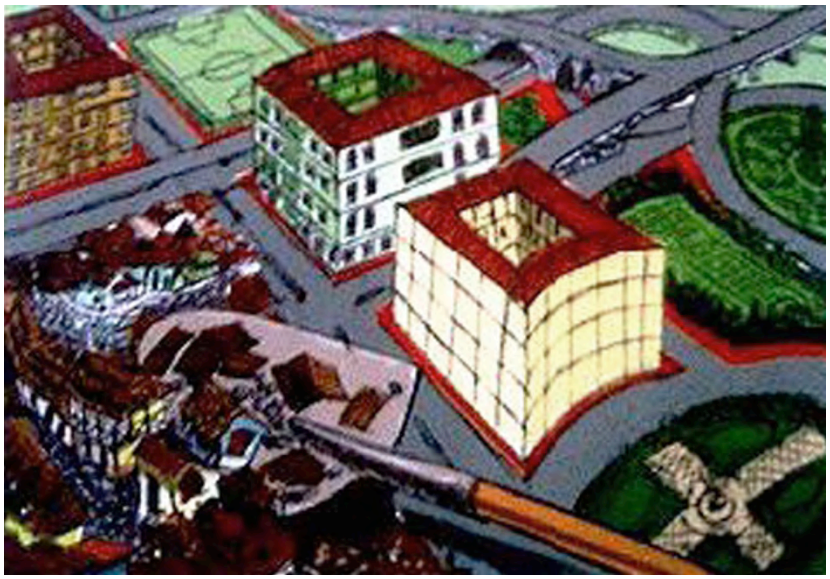


FIGURE 3 IMAGE IN CITY GOVERNMENT PUBLICATION WITH HEADING 'CLEANING ADDIS'. SOURCE: EJIGU 2013

2.5 INFORMAL SETTLEMENT – SLUMS

The large proportion of low-quality housing stock in Addis Ababa has not been maintained since its construction decades ago and is in dire need of replacement or upgrading. The huge demand of affordable houses, exacerbated by rising in-migration, has lead to a increase in informal unplanned housing. Informal housing is the fastest growing kind of housing supply as the informal market has responded more hastily to the shelter needs of the low- and middle-income population than the formal market has (UN-Habitat 2010).

A slum household is according to UN-Habitat's definition a group of individuals who lack at least one of the following five conditions:

- Durable housing of a permanent nature that protects against extreme climate conditions.
- Sufficient living space which means not more than three people sharing the same room.
- Easy access to safe water in sufficient amounts at an affordable price.
- Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people.
- Security of tenure that prevents forced evictions (UN-Habitat 2006:1).

Suffering from more than three shelter deprivations constitutes the term extremely poor condition. Only the first four conditions can contribute to a definition of the slum inhabitants themselves and their shelter conditions (UN-Habitat 2006). The terms informal and slum will be used interchangeably throughout this thesis.

Focusing only at the latter basic shelter need, lack of secure tenure, several substantial segments of Addis Ababa's population can be defined as slum dwellers, including renters, squatters, orphans, tenants with HIV/AIDS (who are often discriminated against) and widowed or divorced women as home ownership does not extend to women (UN-Habitat 2007). According to both a Millennium Development Goals (MDG) needs assessment study (UN-Habitat 2007) and UN-Habitat (2010), 80% of Addis Ababa is considered slum. At the same time, 20% of the city's housing stock consists of illegal squatter units (UN-Habitat 2010). A rare characteristic of Addis Ababa's slums is that all slum dwellers are not of the poorest population segment, they can belong to the middle-income segment, even on illegal squatter settlements. Furthermore, they are not poverty-driven or located in marginal areas, but on prime peripheral urban land (UN-Habitat 2007). Their location is partly why the government plans to clear all slums and replace them with condominiums through an ambitious housing programme (UN-Habitat 2010).

2.6 FORMAL SETTLEMENT – CONDOMINIUMS

In 2005, the government started an ambitious programme that aspires to deal with several of the aforementioned problems, entirely financed by public resources. The Integrated Housing Development Programme (IHDP) aims to build 360,000 condominium units, creating 200,000 jobs, promoting the development of 10,000 small enterprises, enhancing the capacity of the construction sector, regenerate inner-city slums and promoting home-ownership for low-income households. Five years on, 171,000 condominium units countrywide had been built, 80,000 of which in Addis Ababa (UN-Habitat 2010).

FIGURE 4 THIS THESIS' CONDOMINIUM CASE AREA

Condominium housing is a form of tenure where each resident household owns their own apartment or unit, but all land is owned by all the homeowners within the condominium area. Together with their neighbours each resident household equally share the ownership and responsibility of the communal areas and facilities. To obtain a condominium, an applicant has to sign up for one and state preferred unit size, and a computer then allocates units through a lottery system. Being allocated a unit entails being granted the right to buy it, and more importantly, to borrow money from the government-owned Commercial Bank of Ethiopia up to 80% of the purchasing price. The majority of condominium owners enter into a loan agreement with the bank, at the standing interest rate of 8.5%. In the programme's beginning, the interest rate was 0% for studio units and 2% for 1-bedroom units, as low-income households were the target group for the smallest units, but the interest rate has now increased to the same level for all housing sizes (UN-Habitat 2010), consequently shifting their target group away from the poor towards a slightly higher income segment.

Most condominium buildings are not more than five stories tall to avoid the cost of installing elevators. The projected lifespan of each condominium block is 100 years. The design of each condominium site is decided by a jury following competitions that are released by the government, with the aim of avoiding monotony between sites. There are ,however, design guidelines that must be met at each condominium site. 10% of each condominium site is allotted for commercial use, predominantly small shops at ground level. Unlike most dwellings in Addis Ababa, each condominium unit is connected to water, sewerage and electricity, and has a separate kitchen and a bathroom with shower, washbasin and flush toilet (UN-Habitat 2010).

The condominium programme has the potential to bring about great progress in many fields; it can improve the living conditions of the poor by giving them security of tenure and access to basic services, it can reduce the slum prevalence by easing the access to private homeownership, and it can stimulate the national economy and improve the capacity of both the construction and financial sectors (UN-Habitat 2010). In fact, the high demand and support of the programme was unanticipated. The large number of registered applicants can

be explained by the fact that a condominium is an extremely secure private asset. Condominiums have even proven to be an effective poverty reduction strategy as they can easily be rented out for a price that more than covers the mortgage repayments. Up to 70% rent out their condominium, either wholly or partly, according to government estimates (UN-Habitat 2010).

With the absent motivation to and viability in upgrading existing dwellings in slum areas, where the majority of Addis Ababa Ababeans live, it requires an ambitious programme like the IHDP to meet the great demand for durable houses. But the demand for affordable houses is most pressing, and with the increase in mortgage interest rates, this demand might continue to be met by the informal market instead, which has a far lower entrance cost.

2.7 URBAN SOCIAL LIFE

The condominium programme is not only changing the city's physical appearance, but also affecting residents' ways of life. Because the condominium buildings are taller and people live closer together, moving to condominiums requires some adjustment in terms of privacy and noise, manually pounding coffee or grains cannot be done indoors for instance. The non-materialistic needs of condominium residents were taken into consideration in the original master plan. The initial design was made with thought to ease the transition for residents from one-storied houses to high-rise buildings, and had plans for well-developed outdoor green spaces to bring a strong connection to land and to remove the stigma that housing for the poor is mundane and not something to be proud of. But due to lack of financing and demands of higher site density, space for green areas has been significantly reduced. To respond to the social and cultural change that follows with condominium living, freestanding communal buildings in each courtyard are meant to be a meeting place and to provide space for traditional activities that cannot be done in apartments, like slaughtering goats, hand-washing laundry, preparing injera bread or cooking large meals (UN-Habitat 2010). But according to Ejigu (2012), the lifestyles of the poor are not taken into consideration in condominiums and residents have to adapt to the built environment at their own cost, for instance by buying already slaughtered sheep when the communal buildings are not developed for this purpose. The lottery-based composition of condominium residents furthermore results in interpersonal tensions that hinders strong social bonds to be made. Ejigu states that these could be just growing pains, but that the transparent building form common for all condominiums supposedly imposes an openness to which the response is staying inside one's unit and avoiding neighbours (Ejigu 2012).

FIGURE 5 JEMO CONDOMINIUM COURTYARD, COMMUNAL HOUSE TO THE LEFT

2.7.1 ORGANISATIONS

So-called Development Committees (DCs) are meant to deal with the resident's transition or any social issues in condominiums, among other things. The DCs are also meant to enforce the rules and plans set by authorities, including managing communal houses and planting greenery, and also support residents when needed. Condominium owners elect representatives for their DCs, who collect mandatory maintenance fees and deals with internal issues (UN-Habitat 2010). DCs are associations that are established *"with a view to obtaining mutual benefits other than securing or sharing of profits"* (Federal Negarit Gazeta 2003:2397), and their objectives include to ensure peace and security of condominium residents and to perform *"other necessary activities in the interest of unit owners mutual benefit"* (Federal Negarit Gazeta 2003:2397).

In both slum and condominium areas the idir can be found, which is a form of self-help organisation. While burial societies or funeral associations can be found in several societies, idirs are particularly prevalent in Ethiopia. According to three extensive national studies, as many as 90% of respondents were members of at least one idir. There are several kinds of idirs, some are open to all, while other have restrictions based on location, gender, religion etc. Idirs are formally organised, have regular meetings and members pay a fee, which goes to the funerals of member's loved ones. Idirs initially only covered funeral costs for members' loved ones, but some idirs have a wider scope and can provide assistance regarding damaged houses, illnesses and other harmful shocks (Bernier & Meinzen-Dick 2014). In some cases they have also served as agents of local economic development, building consensus and raised funds for neighbourhood upgrading projects (UN-Habitat 2007). In addition, rotating credit organisations, known as iqqubs, are widespread. These can provide members with money for investments, including house construction or starting up a business. The iqqub also serves as a rotating lottery and each member can win once each per round, in practice functioning as a savings organisation (Muir 2004).

Although it is too soon to say what precise effect the condominium programme has had on existing social structures, the transition from informal areas to condominiums is likely to bring about social change in some form. The traditional organisations like the idirs and iqqubs seem to exist also in condominium areas, while the DCs is a new constellation. How the housing changes and social organisations affect the water aspects of people's everyday life will be examined in later chapters.

2.8 WATER BALANCE

In the context of everyday household use, water is often divided into categories labelled green, blue, grey and black. Greenwater is precipitation stored in the soil; bluewater is the freshwater in lakes, rivers and aquifers; greywater is the residue from washing processes; and blackwater contains urine or faecal matter, also known as sewage (Hoekstra et al. 2011). Bluewater can either be potable or non-potable, depending on its level of pollution, while wastewater can be both grey- and blackwater.

Because there are no numbers on water-related infrastructure for slums and condominiums, this section deals with Addis Ababa numbers. The water-related infrastructure relevant for this thesis deals with both the delivery of bluewater, management of grey- and blackwater and to the drainage of precipitation or bluewater runoff. Furthermore, electricity and solid waste are associated infrastructures. Electricity is necessary for water pumps to function and thus for water to be delivered to people's homes. Although 95% of the inhabitants of Addis Ababa have electricity as their main source of light (UN-Habitat 2007), the supply of electricity is weak and power breaks occur almost daily. Solid waste management is relevant because it often blocks the city's drainage lines and rivers. In 2007, municipal solid waste collection covered about 65% of the city, collecting 0.25 kg of the generated 0.4-0.6 kg waste per capita. This is an improvement from earlier conditions, but still leaves noticeable amounts of waste (UN-Habitat 2007).

2.8.1 WATER DELIVERY

The Addis Ababa Water Supply and Sewerage Authority (AAWSSA) supplies water from sources outside the city. Approximately 80% are from three dams reservoirs located 20 to 30 km away, while 20% are from the Akaki well system (Van Rooijen & Taddesse 2009). Water shortage is a widespread problem in Addis Ababa, but the poorest areas are hit hardest. More than one-third of the city's demand for potable water was unmet in 2000, a demand that municipal water production has never been able to keep up with. The problem is exacerbated by the population growth and more water-demanding lifestyles of the wealthier population segment, despite the fact that the municipal authorities increased the water production from 53.8 million m3 in 1998 to 75.8 million in 2004. To make matters worse, during this period, more than a quarter of the produced water has been lost due to leakage on a yearly basis (UN-Habitat 2007).

2.8.2 WASTEWATER MANAGEMENT

In 2007, only 1% of the city's 800,000 m3 of blackwater produced on a daily basis was collected (UN-Habitat 2007). By some estimates, no more than 3% of the city is covered by the sewerage system (UN-Habitat 2010), which means that most blackwater therefore ends up in either dry pits or septic tanks; or in open ditches or streams, *"which have become sewers in all but name"* (UN-Habitat 2007:42). Almost all blackwater and greywater ends up in the Akaki River south of the city, after flowing through the many streams of the city (Van Rooijen et al. 2010). The absence of a sewer system is the major cause of the record level pollution in Addis Ababa's rivers and streams, which used to be sources of potable water. The pollution originates from both industrial sources and so-called nonpoint sources (UN-Habitat 2007), which means coming from several diffuse sources and transported by stormwater runoff both above and through the ground, before depositing them in streams and

rivers. As impervious surfaces generate larger amounts of runoff than woodlands, the transportation of pollutants is intensified in cities (USEPA 2003), but also seeps through the soil and contaminates the ground water. The streams of Addis Ababa are filled with harmful germs and pollutants, for instance is the level of E.coli up to 100,000,000 mpn/100ml, compared to the 1-2 mpn/100ml limit for clean water (UN-Habitat 2007).

2.8.3 Drainage

Despite the prevalence of heavy rains and flooding, the drainage system is underdeveloped. Only 29% of the Addis Ababa's total road mileage had drainage lines in 2007, non-asphalted roads typically have none while about half of the asphalted roads do (UN-Habitat 2007). The limited sewer system suffers from the lack of drainage as it stops functioning during floods. The landscape absorption is limited as only about 36% of the city consists of green areas, according to the EPA (CLUVA 2011), which is not sufficient to absorb the rainy season's heavy downpours.

The infrastructure and service delivery problems can be a vicious cycle, as both liquid and solid waste end up in the already congested waterways, hindering drainage and intensifying flood problems. The city's streams and rivers used to be a source of potable water, but have now become hazardous to drink from, further exacerbating the need for potable water. The large amounts of hazardous floodwater and the lack of water both for drinking and for household use, like washing or sanitary use, immediately appear as paradoxical. If the water-related infrastructure was dealt with in a more holistic way, the mentioned problems could be mitigated, the floodwater could prove useful for several household purposes, for instance.

This chapter has pointed to the forces affecting Addis Ababa today, including rapid urbanisation, intensified rains and pressing housing demand. In addition, an ambitious condominium programme is erecting buildings meant to house hundreds of thousands of people in a city with dysfunctional and limited water-related infrastructure and service delivery, which is causing severe problems for its citizens. If changes are to be made to mitigate these problems, inhabitants and their social organisations must be involved. The connection between the water-related infrastructure and the social arrangements will be examined further in later chapters.

3 THEORETICAL FRAMEWORK

To be able to analyse how the above-mentioned climate, poor physical infrastructure and changing housing conditions affect people's water-related everyday lives, resilience theory will be used. The people-centred livelihood approach will be used as an investigative tool to explain the context in which the case study's inhabitatns live, focusing primarily on the physical and social assets.

3.1 RESILIENCE THEORY

The term resilience was initially used in connection to ecological resilience, which is defined as "*a characteristic of ecosystems to maintain themselves in the face of disturbance*" (Adger 2000:361). Ecological resilience is closely linked to the concept of social resilience, the focus of this thesis, which Adger (2000) describes as "*the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change*" (347). Bernier and Meinzen-Dick (2014) adds a preventive element and defines resilience as

> the capacity of an individual, household, community, or system to respond over time to shocks and to proactively reduce the risk of future shocks; these actions contribute to growth and development rather than merely maintain stability. Resilience requires a diverse set of capacities to meet the reactive and proactive challenges posed by economic, political, environmental, and social shocks (Bernier & Meinzen-Dick 2014:2).

This definition highlights the wider processes that affect how individuals and communities learn and respond to both current and future events, and, importantly, how the responses contributes to future progress. In addition, local-level participation in decision-making, collective action and community cohesion are seen as essential in resilience theory for dealing with uncertainty and change (Bernier & Meinzen-Dick 2014).

Resilience has been described as the flip side of vulnerability, as increased resilience can entail decreased vulnerability, but the two concepts are not direct opposites (Gallopín 2006). Socio-ecological systems that considers human action and social structures as integral to nature and cannot be separated are dealt with by both resilience and vulnerability, which can be defined as *"the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt"* (Adger 2006:268).

3.1.1 WATER RESILIENCE

Building on social resilience, water resilience is essential for this thesis. According to Eriksson et al. (2014), water resilience is *"the water dimensions of how we persist and develop despite changing circumstances, how we adapt to them and how we substantially transform when the situation becomes untenable"* (43), a definition that is closely linked to adaption. Furthermore, to reach increased water resilience, it is essential to utilise ecosystems and their services sustainably, ensure that any resilience intervention is tailor-made and based on local experience. A resilient system is not only strong enough to handle stresses, but also has the ability to turn those stresses into opportunities, like making use of floodwater or re-using greywater (Wong and Brown 2009). There is a promising opportunity

to build water resilient cities while they expand to serve the booming urban population growth. Land and water resources can be overused in improper, unplanned urban areas, but sustainable infrastructure development coupled with safeguarding ecosystem services can contribute to increased resilience (Eriksson et al 2014).

3.1.2 Resilience and adaptation

Adaptation can be considered as "*local or community-based adjustments to deal with changing conditions within the constraints of the broader economic-social-political arrangements. Where those constraints are particularly binding, adaptation may be considered as attempting changing those broad economic-social-political structures themselves*" (Smit & Wandel 2006:289). Resilience is closely linked to adaption as resilience can be seen as a continual process of adjustment and change, and not solely something that can be achieved by building up assets and stocks of capital. In the development field, resilience is essential to obtaining a more general improvement in welfare over time. Resilience does not only entail buffering against shocks, but also deals with recognising the power relationships that reproduce inequalities and thereby contribute to vulnerability. (Bernier & Meinzen-Dick 2014).

3.2 The sustainable livelihoods approach

The approach is intended to provide *"a more rounded picture of the complexities of living and surviving in poor communities than understandings based on measures of income, consumption and employment"* (Brocklesby & Fisher 2003: 187), and is used to investigate how water is handled on an everyday basis. There are several different sustainable livelihoods approaches that have consolidated more or less into one approach, which is developed and/or implemented by intergovernmental organisations, bilateral donors, NGOs and research institutes.

The sustainable livelihoods framework was first developed by the British Department For International Development (DFID) for development practice, and has been in use in their programs since 1997. The livelihoods approach is flexible and adaptable to many circumstances, but as a core principle it is highly people-centred, meaning that it focuses on people rather than on resources, and on their strengths rather than weaknesses. It is also holistic in its aim to link the macro and micro levels together (Glopp 2008).

DFID's definition of sustainable livelihood is:

> A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (DFID cited in Glopp 2008:1).

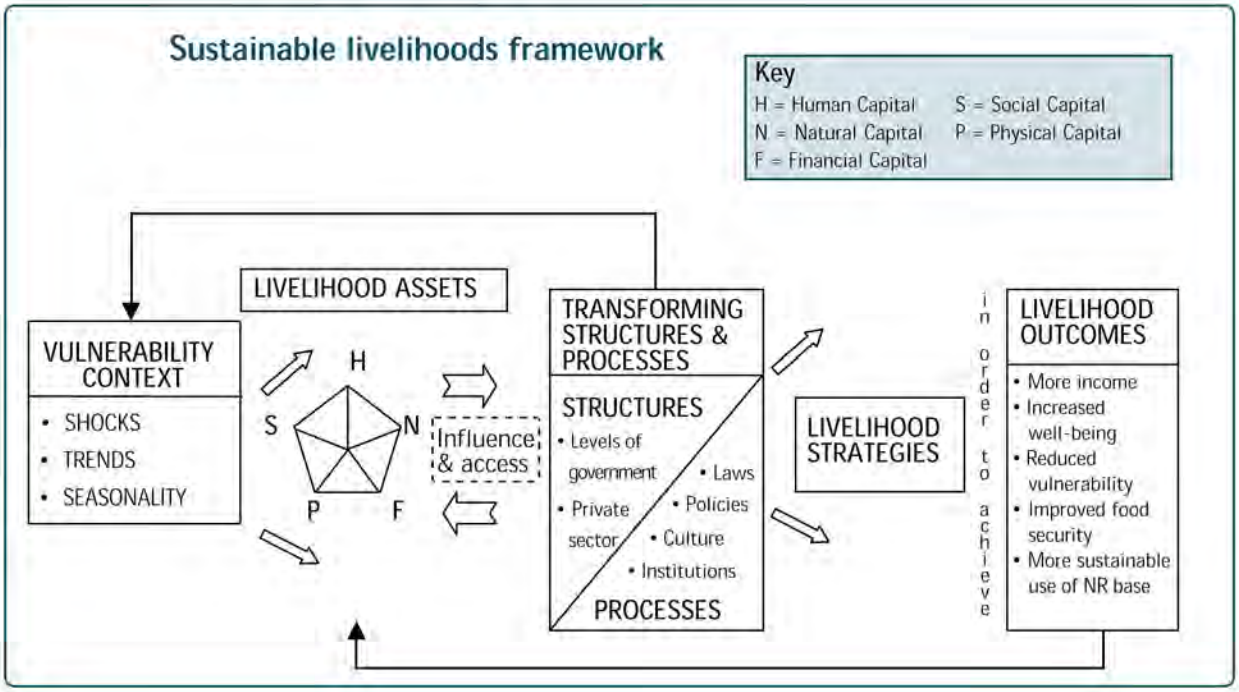


FIGURE 6 THE SUSTAINABLE LIVELIHOODS FRAMEWORK. SOURCE: DFID 1999

The aim of the framework is to conceptualise how people operate within a vulnerability context, which assets they have access to and how they draw on them to increase their resilience. The framework is not supposed to be seen in a linear manner, as it is divided into five components that are complexly interrelated and affect livelihoods in various ways. The five components are the vulnerability context, the livelihood assets, the transforming structures and processes, the livelihood strategies, and the livelihood outcomes (Glopp 2008). How the framework is used in this thesis will be explained in the methodology chapter.

3.2.1 THE VULNERABILITY CONTEXT

Vulnerability is related both to exposure and sensitivity in addition to the particular adaptive capacity of individuals or groups to deal with these exposures. In fact, the broader social, economic and political forces shaping the vulnerability context might constrain local initiatives to enhance livelihoods and hence to adapt (Smit & Wandel 2006), which is closely linked to the aforementioned vulnerability definition. The vulnerability context concerns people's external environment and their exposure to risk and uncertainty, and their capacity to prevent, mitigate or cope (Glopp 2008). These risks can be associated with trends (in population, resources, technology), shocks (health, natural, conflict) or seasonal shifts (in production, food availability). Many of the hardships facing the poor are caused by their vulnerability context, as it affects their asset status and options. At the same time, the vulnerability context lies furthest from people's control, making it hard to change, especially by a few individuals on a short-term scale (DFID 1999).

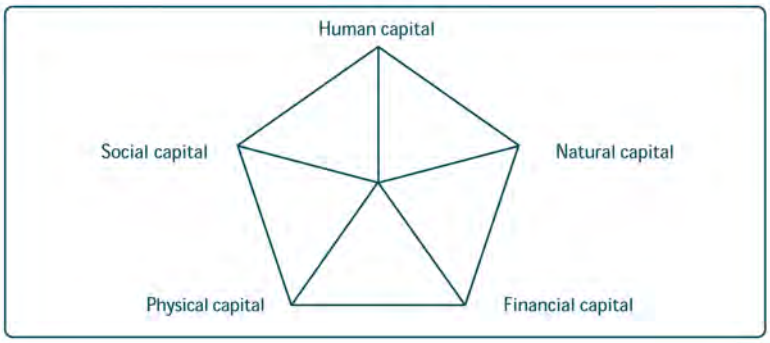


FIGURE 7 THE ASSET PENTAGON. SOURCE: DFID 1999

3.2.2 TRANSFORMING STRUCTURES AND PROCESSES

The transforming structures and processes comprise the institutions, organisations, policies and legislations that shape livelihoods. They also include culture and power relations. While the structures can be considered the hardware, the actual organisations, the processes are the software, they determine how the organisations operate and interact (DFID 1999).

3.2.3 LIVELIHOOD STRATEGIES AND LIVELIHOOD OUTCOMES

The livelihood strategies are the range and combination of activities and choices that people make to achieve their goals. The choice of livelihood strategies depends on what assets they have access to. Lastly, livelihood outcomes are the results of the chosen strategies, and may be unintended. Wanted outcomes include increased wellbeing, reduced vulnerability and more sustainable use of the resource base (DFID 1999).

3.2.4 THE ASSET PENTAGON

The assets are grouped into five categories: human, social, natural, physical and financial capital. No single category is sufficient to achieve a positive livelihood outcome, the livelihood approach is based on the belief that a range of assets are necessary. The more accessible assets, the more strategies one has to choose from.

- Social capital is the social resources that are developed through networks, membership groups, and relationships that can form the basis for informal safety nets. The importance of social capital lies in the lowered costs of working together that results from mutual trust and reciprocity. Social capital is a product of the transforming structures and processes described below.
- Physical capital comprises the infrastructure and consumer goods that are required to meet basic needs and to execute productive activities, like tools and equipment. This includes shelter, water supply and sanitation, and clean and affordable energy.
- Natural capital is all the tangible and intangible natural resources, and is the source of many of the shocks that are part of the vulnerability context. The quality, accessibility and use of natural capital is especially important because poor natural capital will harm human capital, health in particular.
- Human capital is the asset that is required to make use of any of the four other assets, as it encompasses knowledge, skills, good health and the ability to labour.
- Financial capital refers to financial resources, either in the form of savings or income. This is the most versatile asset as it can be converted, but it is also the least available (DFID 1999).

Even though all five assets will be considered, the main focus of this thesis is on the physical and social capitals to fit with the thesis' people-centred focus on water. By coupling the

water-related infrastructure with social organisation, the thesis gains a socio-technical perspective that has proven promising to address the need for resilience, according to Wong and Brown (2009). Emphasising these two capitals is in line with the sustainable livelihoods frameworks, as it does not suggest that all five assets should be quantified or directly compared using some sort of common currency (DFID 1999).

3.2.5 Physical capital

The emphasis on physical capital is connected to the importance of basic infrastructure to achieve water resilience. As mentioned, physical capital constitutes the basic infrastructure that delivers goods and services required to meet basic needs, and the focus of this thesis is the water-related infrastructure. Cities are more vulnerable than rural areas because they depend on complicated and extensive infrastructure, in addition to their high building- and population density. Adapting cities to make them more resilient includes well-functioning physical infrastructure (Jørgensen et al. 2014), and a water resilient urban system is not only robust, but creates opportunities from disturbances like floods (Wong & Brown 2009).

With urbanisation comes an increase in impervious surfaces in the form of paved roads and buildings. Overall, high-density urban areas absorb less precipitation, less water evapo-transpires and more stormwater is therefore sent to the piped infrastructure or closest waterways. The results are an increase in runoff velocity, volumes, discharge rates and flood peaks (Parkinson & Mark 2005). In high-income countries, conventional water-related infrastructure typically comprises extensive pipe systems for water supply, for sewerage, and for drainage. Furthermore, the water that runs through these systems are centrally sourced and/or treated. In the face of insufficient water supply and flooding, it might seem like an obvious solution to expand the pipe network. But according to Wong and Brown (2009), the conventional urban water system is not suited for the sustainable use of water. The conventional piped infrastructure forces the natural hydrological cycle to change by channelizing or filling waterways. Coupled with increased urbanisation and less impermeable surfaces, the result is altering the patterns of surface and river runoff, and therefore both reducing the natural groundwater recharge (Shannon 2013) and forcing more water into streams and rivers, posing a larger flood threat.

For cities like Addis Ababa, where the limited sewage network covers only a few percent of the city, expansion would be a costly solution. Sub-Saharan cities have limited resources in general, and establishing extensive pipe systems necessitates ongoing commitment and maintenance in addition to the initial investment. Expensive and labour-intensive pipe systems might not always be pertinent for unpredictable flood risks, especially in a city with altering seasons of heavy rain and drought, soft infrastructure can prove to be a more flexible and less costly solution (Mguni et al. 2014). Landscape-based stormwater management (LSM) solutions, including green roofs, rain gardens and wet basins, are increasingly emerging in high-income countries as a response to sewer overflows, urban flooding and poor water quality. The added benefits include improved local climate, urban habitat and recreational opportunities (Backhaus & Fryd 2013). Cities in low-income countries have the opportunity to leapfrog the costly step of installing extensive piped infrastructure systems and focus instead on LSM.

In line with resilience thinking, the water can be made use of instead of being a hazardous burden in a city with great water needs. Water sources like groundwater, stormwater, rainwater runoff and greywater can be found within the city and replace the use of potable water for uses like toilet flushing, laundry, garden watering and open space irrigation (Wong & Brown 2009). Sustainable Urban Drainage Systems (SUDS), a variant of LSM, aims to utilise the urban landscape's green areas and waterways to locally store, infiltrate and evaporate the stormwater, and increase groundwater recharge. Green areas can absorb water and supplement drainage infrastructure, the lack of which can lead to several problems including health hazards related to microbial pathogens, which are prevalent where there is insufficient infrastructure, and damage caused by runoff, which can be reduced by infiltrating or reusing stormwater, which can be done by establishing detention ponds (Parkinson et al. 2007). Even though informal areas might experience less rainwater runoff compared to well-planned areas as there is less paving, there is still a need for drainage for both stormwater and blackwater. Informal areas are often located alongside existing drainage paths like rivers, which can be blocked by waste or overflow, or on steep hillsides that are at risk from landslides (Parkinson et al. 2007). In addition to increasing resilience to intensifying rains and aiding in cities' transition towards sustainability, SUDS can enhance the green infrastructure, improve conditions for urban agriculture and facilitate a more inclusive decision making process by making different sectors and actors collaborate (Mguni et al. 2014).

But merely providing physical infrastructure alone is not sufficient to increase water resilience, the infrastructure needs to resonate with social norms, which are distributed through social capital (Adger 2003).

3.2.6 Social capital

In the livelihoods framework, social capital is regarded as key to creating change and improving the management of natural resources, including water. The main purpose for social capital theory is that it can provide an explanation for how individuals or groups use their relationships to other actors, both for their own good and for the collective good. According to Adger (2003), social capital is a geographic concept because it has a grounded location in place and time, which is created through the interaction of individuals and their relationships are shaping and being shaped by the character of and context in which they live. The social capital concept explains how social practices and collective action manage natural capital and how institutions perform when they are coping with natural uncertainty (Adger 2003). Coupling natural changes with changing urban structures, the framework suggests that social capital might be destroyed through forced interventions that impose new social relations (DFID 1999), which therefore can affect access to water for instance, as social capital plays a fundamental role in obtaining and providing access to natural capital (Adger 2003), an essential topic in this thesis.

But the mere presence of social capital does not automatically entail positive development and sustainable natural resource management, there are downsides that need to be considered. These include social exclusion and narrow-mindedness, and if a social group gains enough power, corruption and mismanagement of resources can be the result (Meagher 2005). It is therefore essential to not focus on social capital exclusively, but also

look at how social networks are linked to the society and the state. To get a better understanding of the social networks in this report's case areas, social capital will not be the only scrutinised asset. Using the livelihoods framework, other factors (than social capital) will also be analysed in my attempt to gain a wider contextual analysis.

In relation to resilience, Bernier and Meinzen-Dick (2014) have identified three central capacities for resilience. Each capacity is connected to a type of social capital; either bonding, bridging or linking:

- Persistence, or coping capacity, deals with the ability of resilient systems to cope with shocks after the event and to restore well-being. This is related to the bonding social capital, which refers to social cohesion through peer groups based on location, shared values etc.
- Adaptation or adaptive capacities are the actions employed to learn from experience or reduce the impact of predicted shocks, which is associated with bridging social capital, referring to the networks that cross social stratifications that may require outside knowledge or resources as it involves coordination or collaboration.
- Transformative capacities refer to the abilities to change the larger structures and systems that they live in, entailing a more radical shift. This requires linking social capital to communicate with external agencies and influencing policy.

Poor communities often have strong bonding capital, weaker bridging capital, and linking social capital is often non-existent. Thus, there might be enough social capital to cope and restore after a shock, but not enough to actually adapt to forthcoming shocks or engage decision-makers in their plight (Bernier & Meinzen-Dick 2014).

Societies have an inherent capacity to adapt to climate change, but any adaption measure is likely to privilege one set of interest over another. To avoid creating losers, it is important to gain social acceptability on adaption decisions and its effects. According to Adger (2003), it is widely recognised that collective action requires networks and flows of information between people to oil the wheels of decision-making that are necessary for adapting or creating change. Informal institutions are needed to provide rules, knowledge and obligations through their social capital, which can enhance security and reduce risk. Even though knowledge is regarded as a human capital, the management of the environment is an expression of social capital.

Defining social capital as *"the norms and networks that enable people to act collectively"* (Adger 2003:391), Adger sees social capital likely to be essential in any climate change adaptation strategy. Relevant for this thesis are the networks in the form of community organisations, of which several forms exist, including informal or formal, founded recently or centuries ago, by locals or outside initiatives. The common denominator for any community group is that they are based on bonds of trust and interpersonal relationships. Community groups can strengthen resilience by building on their existing relationships of trust and interaction, and by increasing their connection to outside actors and resources in addition to encourage the adoption of new technologies (Bernier & Meinzen-Dick 2014).

Diversity of institutional structures is as much a source of resilience as diversity of livelihoods, and these are most beneficial if they compliment each other. Other safety nets

are needed to provide complete coverage for all, as vulnerable people might be excluded from community organisations (Bernier & Meinzen-Dick 2014), social capital is not meant to replace the role of the state. Only if the state is absent, can social capital unwillingly take over as a substitute for the state, but resilience is naturally most obtainable when both the state and the community organisations are strong (Adger 2003).

Due to the general flexibility of the sustainable livelihoods approach, it has been criticised for being too simplistic and not focusing enough on nuances. On the other side, the livelihoods framework allow for wider points of entry, which is taken advantage of in this thesis when focusing predominantly, although not exclusively, on the social and physical assets and their effect on water resilience. Also, the approach offers a common language, framework and a set of principles that can serve as a platform for community-based development actors (Brocklesby & Fisher 2003). How water is handled in an everyday context and the water resilience in in the selected case areas will be analysed through focusing on physical and social capital. The focus integrates natural capital, namely water, and human capital, which in this context is the knowledge and experience that is disseminated through social capital. The remaining elements of the livelihoods framework, namely the vulnerability context; the livelihoods strategies; the livelihoods outcomes are unavoidable, but will not be investigated explicitly on their own in the same manner as physical and social capital. The strengths of the approach, namely its wide range and well-adopted framework, will be utilised to understand the empirical findings of this report in a wider context, while bearing in mind its weaknesses to avoid over-simplistic assumptions.

4 METHODOLOGY

With basis in the livelihood framework, the empirical data of this thesis has been gathered through interviews and observations, and later supplemented with secondary data.

4.1 THE LIVELIHOODS FRAMEWORK AS METHODOLOGICAL TOOL

The livelihoods framework can be used as a methodological tool to identify development priorities, as a means to structure ideas, or to execute a livelihood analysis (Glopp 2008). The latter will be the main use of the approach for the purpose of this report. Using the livelihoods framework entails identifying both the limiting factors and the factors that can reduce vulnerability, in addition to connecting the macro with the micro level, analysing how government programs affects individuals for instance.

There is no fixed order when conducting a people-centred livelihood analysis; people's assets, objectives and strategies can be investigated all at the same time (DFID 1999). As mentioned, the focus in this thesis is on the physical and social capitals. The other elements of the livelihoods framework will be analysed, but not specifically or independently so.

Vulnerability is not easily measured as it reflects both social processes and material aspects, and there is therefore no concrete methodology to identify vulnerability on its own (Adger 2006). As described under vulnerability context, wider changes like population trends or climate-related hazards affect vulnerability and are therefore essential to investigate, especially their impact and how the negative aspects can be minimised. To do this, it is necessary to have an understanding of the local nature, what livelihood strategies the locals employ, and what these strategies' constraints are. It is therefore important to undertake a social analysis, which is done by identifying the social organisations and their relationships with the factors of the vulnerability context (DFID 1999). When analysing vulnerability, it is important to emphasise of what and who resilience is for, and for whose benefit (Friend & Moench 2013).

By examining the management, activities, responsibilities, operation and possible exclusion performed by urban authorities and local organisations, the transforming structures and processes can be identified. The actions of organisations and individuals also represent their livelihood strategies. The livelihood outcomes will not be examined in this thesis, as the empirical data is from one point in time only, and does not describe conditions before and after an interference.

4.1.1 ASSETS

Because poor people have limited access to assets in general, the aim is to identify them and/or innovative ways to nurture them (DFID 1999). As already mentioned, the assets focused on in this report are the physical and social capitals, but as all five are interrelated, they will all be considered.

Analysing the physical capital entails recognising the case sites' basic infrastructure, or the lack of which. Relevant to this report is sewerage, drainage pipes, water taps, other water sources, rainwater harvesting and toilets or latrines. It also requires an understanding of the

quality of the existing physical infrastructure, and who provides and manages it. Natural capital, in this case water, is the essence of the infrastructure described.

Social capital can be researched by identifying the social resources that households rely on, whether someone is excluded from these, and if there are other social assets used in times of crisis. Of particular relevance is to look at community organisation membership. The type of social capital will also be categorised, whether it is bonding, bridging or linking. As social capital is the medium for human capital, it is important to see if there is any existing or new knowledge that can increase water resilience.

4.2 FIELDWORK

In order to gain the aforementioned information, interviews were the main method of obtaining primary data, supplemented by observations.

4.2.1 INTERVIEWS

The qualitative interview was chosen as an appropriate method to learn about the case area's resilience and the effects of floods and water shortage on the two researched communities. With this method I also learnt how events and processes were interpreted by the different actors, which allows me to compare multiple perceptions and perspectives (Weiss 1994).

During the course of my stay in Addis Ababa, the following interviews were conducted:

Interviewees
14 informal dwellers, Repi
15 formal dwellers, Jemo
4 development committees, plus 2 outside the case area, Jemo
Idir chairman, Repi
Water vendor, Repi
Green area administrators, 3rd ward, Woreda
Housing administrator, woreda
Officials at the Water Supply and Sanitation Programme
Deputy and director at the Housing development and Administration Office
Traffic engineer at the Road Authorities' Office
Hydrologist and environmental engineer at the Master Plan Office

Because my fieldwork stay overlapped with a visit from the WGA researchers, I was able to observe and participate in interviews that they had taken initiative to, including the four latter listed interviewees and some of the local respondents in the case areas. The authority

representatives and employees, the four latter, were interviewed to learn more about the workings and plans of the government entities that deal with urban water issues. The woreda administrators offered insight into the local management of the two case sites, and how they work with both the citizens and the upper authorities. At the informal case site, Repi, an idir chairman was interviewed to learn about the idir organisation, and to get an impression of how the community works together with water, supplemented by individual citizens' own experiences. Also, a charity-driven water vendor informed me of their business. In Jemo, the formal case site, six Development Committees (DCs) were interviewed, of which two were located outside the selected case area, to hear about their work as condominium owner representatives. The case area's DCs are named after their block numbers: DC323-337, DC231-242, DC294-303 and DC255-265. Condominium residents were then interviewed to get insight in their everyday dealings with water.

The resident respondents were chosen solely based on their availability at the times I visited the case sites. No technique was used to achieve a representative selection because the only criterion for respondents was that they were inhabitants of one of the case areas, which was the first question. I aimed to interview people living throughout both areas, both high- and low-lying in the informal area, and on all floors in the condominium area. Some interviews were conducted inside people's homes, others in the streets, courtyards or walkways. At some instances, groups or entire households were interviewed simultaneously, while other interviews were with just one individual.

The interviews were semi-structured, which is focused on themes, not on standard questions, to allow the respondents to reply more freely, and also allows the interviewer to ask follow-up questions. Specifically for the household interviews, semi-structured life-world interviews were chosen as they aim to understand the respondent's everyday world (Kvale 2007). For the purpose of this thesis, the focus was on the water-related and social aspects of their daily lives, in addition to their personal background information. The interviews with administrators and authority representatives also focused on water and social issues, but with the aim of understanding the wider rules and plans. The qualitative interview does not aim at context-independent or universal knowledge, it emphasises situated knowledge (Kvale 2007), and the following findings are consequently not claimed to be easily transferred to other settings.

The research interview is an interpersonal situation where both the interviewee and the interviewer act in relation to each other and reciprocally influence each other (Kvale 2007). This was highly likely exacerbated by the fact that I as an interviewer was an obvious stranger in both locations I was investigating, which could have made respondents sceptical of me or to misunderstand the purpose or outcome of the interview.

In addition to the interviewee and the interviewer, the translator plays a role in the interview interplay, and might shape words to suit one or the other. Language is the medium of conversation, and the interviewer needs to master the language in order to professionally analyse the interview (Kvale 2007). Unfortunately, I cannot speak Amharic and therefore employed an interpreter to translate between Amharic and English. My interpreter was not a professional translator, but was well acquainted with one of the case areas and fluent in the local language. She was finishing a degree in green space planning and was therefore

familiar with several terms and concepts relevant for this report, especially relating to physical infrastructure. The risk of selecting a non-professional translator is that the interpreter can take over the role of the interviewer or the interviewee (Kvale 2007), which is hard to ascertain when the interview language is unfamiliar, but the time spent translating the respondents answer in English to me was often far shorter than the time spent for the respondents to reply in Amharic. This was especially true for the questions regarding social issues, either because the usefulness of these questions were not clear to the interpreter or because the replies were everyday descriptions that were regarded as common knowledge and therefore lost in translation. On the other hand, the interpreter's familiarity to the places and culture might have helped in formulating questions to avoid touching upon matters that are taboo, which is a risk when interviewing across cultures (Kvale 2007).

4.2.2 Observations

In addition to conducting interviews when visiting the case sites, observations were constantly made with special focus on ditches, solid waste management, water sources, rainwater harvesting, and social life. Many of these observations were photographed and are presented in this thesis. Some situations were not photographed because the photo subjects wanted to be paid for this.

4.3 Secondary data

To supplement the data from my fieldwork, I gathered relevant information from published sources, including reports and research articles. These contribute with background data, historical data and other perspectives to the issues that are presented here.

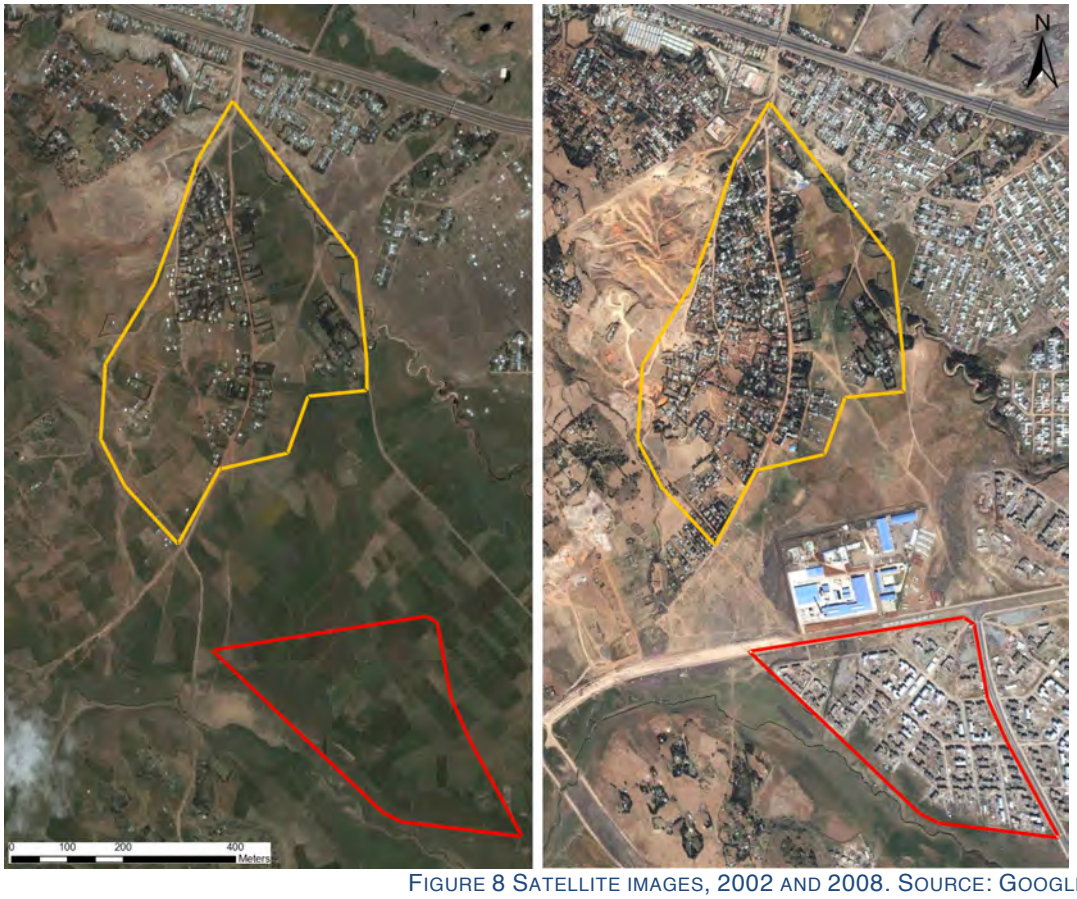


FIGURE 8 SATELLITE IMAGES, 2002 AND 2008. SOURCE: GOOGLE EARTH

4.4 THE CASE SITES

The selection of case sites is based on the WGA project's case areas in Addis Ababa, of which there are three. The Jemo condominium area and the Repi informal site were chosen because they are both residential areas in close proximity to each other, but with quite different infrastructure. The areas are interesting to compare as they represent different eras and ways of living, the slum areas are planned to be cleared by the government, while the condominiums are meant to be the future for the inhabitants of Addis Ababa. It therefore was intriguing to juxtapose the water-related everyday life of the residents in the planned and regulated condominium area to the unplanned and seemingly ignored Repi area.

During the course of the last two decades the areas have changed immensely. As seen in figure 8, Repi was almost uninhabited in the early 2000s, and has gradually expanded since then. Jemo used to be agricultural land, but was rapidly transformed with the construction of the condominium area, which started in 2007. Both case sites are located in the woreda named Nifas Silk Lafto in the southwest outskirts of Addis Ababa. Even though the edges of the two sites are as little as 300 meters apart in linear distance, the journey by the newly constructed car road is approximately 2-3 km.

Both sites are in close proximity to the 36 hectare Repi (aka Koshe) municipal landfill, which is undergoing a sanitary closure process. If everything goes according to plan, the area will become a recreational park with a recycling center. The area has been an open solid waste dumping ground since 1968, causing human diseases for nearby residents and serious environmental hazard in the form of toxic fumes and harmful liquids known as leachates, which may leak into the ground water of its surrounding areas (UNFCCC 2013).

FIGURE 9 SATELLITE IMAGE, 2014. SOURCE: GOOGLE EARTH

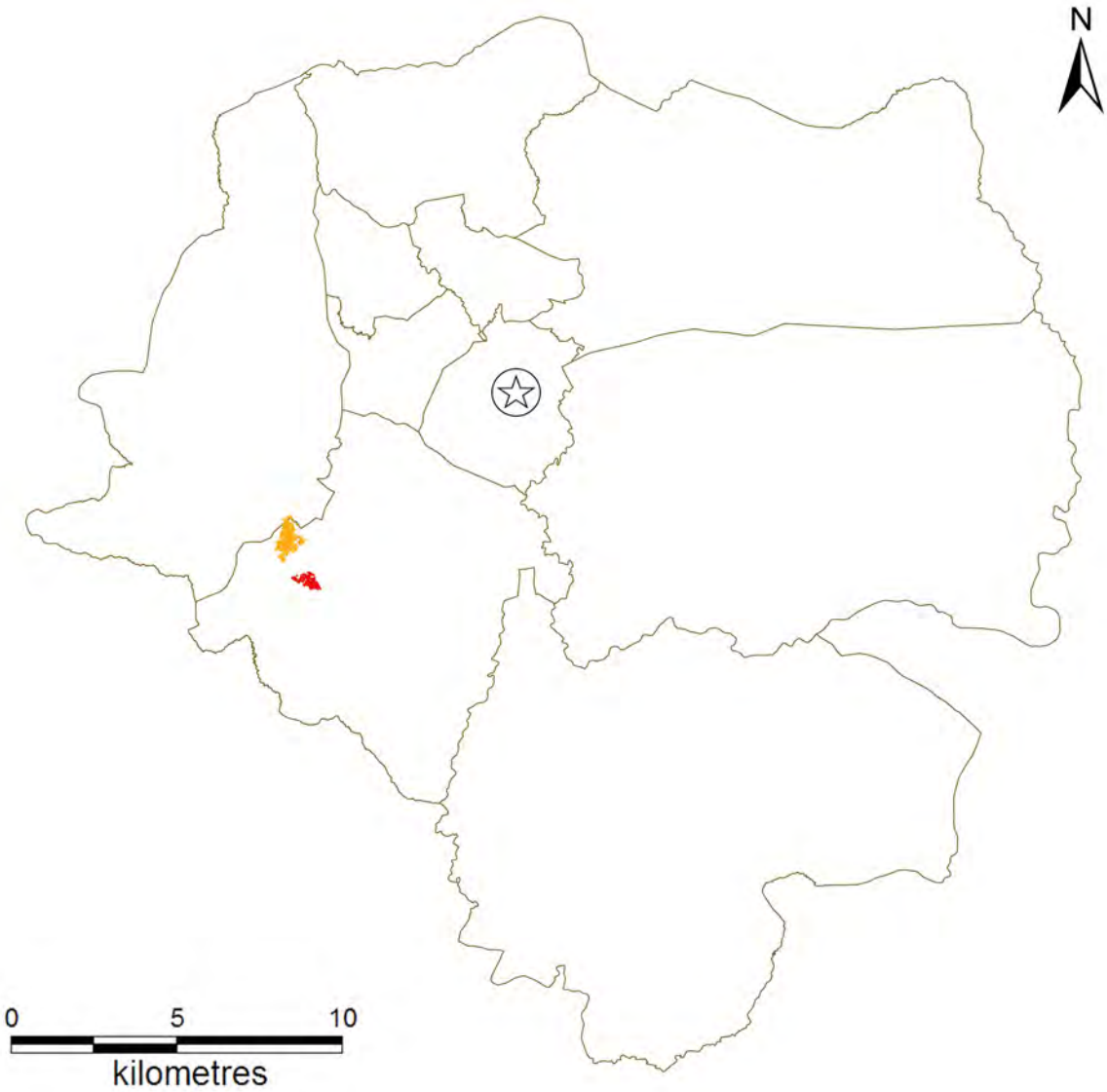
4.4.1 *The slum area, Repi*

Repi, the informal case site, is located on a hill with the same name and covers the densely populated hillside and lower area, but excludes the predominantly agricultural area in the upper part of the hill. The case area borders to a stone quarry on its entire upper, western edge. To the south lies a large glass factory, and the Jemo River covers the slum's eastern side. During the time of fieldwork, construction work had recently started on Chinese-owned factories in an area sandwiched in between the slum and the Jemo River.

In general, the houses in Repi were constructed out of mud or discarded materials, and earthen floors and roofs made of corrugated iron sheets were common. There are not many green areas left, but trees had been planted around the area. There are no registries on inhabitants or houses in Repi, the number of dwellers can therefore not be specified, neither the ratio of renters and owners. The density has clearly increased the last decade, as seen in figure 8, plots have been subdivided and the inhabited area itself has expanded.

Repi is an illegal squatter site and therefore has no public educational or health institutions, but there were for-profit schools and clinics. A recently established community police force guarded the area and erected several watch huts. There were a couple of churches that did not stand out much from the rest of the building stock, except for signs outside. There were also commercial businesses, like bars and kiosks, which most likely were informally run.

Figure 10 Map of Addis Ababa's sub-cities. Star indicates city centre, yellow Repi and red Jemo



4.4.2 *The condominium area, Jemo*

There are currently three condominium sites, named Jemo 1, Jemo 2 and Jemo 3, respectively. The case site comprises the southwest corner of the oldest and largest site, Jemo 1, comprising roughly one-third of it. The case site is separated from the rest of Jemo 1 by two wide roads to the north and to the east, and the Harbu River on the south-western side separates the case area from an agricultural and single-family housing area on the river's other side (figure 14). The area between the case site and the Harbu is a designated 'green buffer zone', which is meant to protect the condominium area from flooding from the river during rainy season. There is a smaller creek running between the case site's condominium buildings, culminating in Harbu and presumably originating from the Repi hill. This creek is not very entrenched and therefore overflows faster than the Harbu, which runs through a deep entrenchment.

There are 10,064 condominium units in the Jemo 1 area, and with the average household size in Addis Ababa being roughly 4 individuals (CSA 2012), one can assume that there are 40,000 inhabitants in the entire area, of which approximately one-third live in this thesis' case site. The condominium buildings are all five stories tall. According to government numbers, approximately 70% are renters in condominium areas (UN-Habitat 2007), which coincides with the number given by the four interviewed DCs.

There were several empty lots in the case area which are meant to hold health clinics, kindergartens and schools, but only one lot was developed by the time of fieldwork. This lot holds a for-profit school called Dream International Academy. There are kindergartens or day-care arrangements in the condominium buildings that may have been informal. There were plenty of bars, restaurants and kiosks in the ground floors of condominium buildings. There were no visible religious buildings in the area.

Figure 11 The Harbu river

5 RESULTS

In this section, the results from the interviews and observations in Repi and Jemo, respectively, will be presented and compared. Starting with describing the water-related physical infrastructure, its use and function will be made clear before describing the social ties within each area

The financial status of residents in the two area differed both in their income and in their type of income: informal or formal. According to several interviewees, Repi residents belong to the lower income group, and the most common source of income was informal day labouring, which earned 2 respondents between 450 and 1500 ETB monthly. In Jemo, household incomes ranged from 500 to 5000 ETB monthly, but most commonly around 2000 ETB, and the largest households had the highest incomes. At the time of writing, 100 ETB corresponds to roughly 5 USD or 30 DKK. The higher incomes among the Jemo respondents fit with the outcome of the mentioned increase in mortgage interest rate for condominiums, namely the exclusion of the population with the lowest incomes.

Monthly housing costs in Repi were noticeably cheaper than in Jemo. The average monthly rent for a house in Repi was said to be 500 ETB, and no houses were rented for more than 1000 ETB. This corresponds with the information gathered from 4 Repi renters, who paid 500-515 ETB monthly for their houses. Because there are no public schools in Repi, enrolling children to the area's private schools cost 800-1000 ETB per month. In Jemo, the lowest rental price stated was 1500 ETB, but 3 respondents paid between 2000 to 4000 ETB. The updated price of Jemo condominium units and monthly mortgage expenses were not discovered, but is likely to be less that the rental prices as to generate some profit for the beneficiaries renting out their unit.

5.1 WATER-RELATED PHYSICAL INFRASTRUCTURE

The general poor state of Addis Ababa's physical infrastructure is reflected in both areas, especially related to water delivery and drainage. There were however differences in the two areas' roads, solid waste collection, electricity, and especially liquid waste management. The infrastructure that accompanies water supply and management includes electricity and solid waste, as mentioned earlier.

5.1.1 ELECTRICITY AND SOLID WASTE

Electricity was unreliable in Repi, serving as a large problem for a water vendor's borehole water pump. In Jemo, electricity shortage was a problem for several residents as it powers water pumps and therefore the supply of water. The upper floors were especially dependent on electricity to get water in their taps. Residents in both areas used gas and charcoal as alternative energy sources, but these could not replace the use of electricity for the water pumps.

In Repi, waste is picked up by the authorities twice weekly from pick-up spots, brought there by locals who are employed by the woreda who collect waste from the ground or from waste bins attached to fences along most roads. Solid waste in Jemo was also picked up twice weekly by the authorities, either curbside or from waste containers placed on the outskirts of the condominium area. Solid waste was seen scattered around both sites, but there was most in Repi, both in the form of solid waste piles in the edges of the area and blocking the culverts along roads.

FIGURE 12 LIGES WATER SOURCE, REPI

5.1.2 WATER ACCESS

In Repi, access to water was a problem for many respondents. There were different water sources to choose from, but all with limited supply:

- The local woreda had set up two water tanks, also called ‘roto tanks’, one in the lower area, by the only incoming car road that is connected to the Ring Road, and another on the upper end of the car road, which seemed less used and was closed during the fieldwork days. According to a woreda tank employee, the tanks were filled up every two days by the water authorities, but several respondents said that the tanks only had water in them a few times per month. The woreda tank water was potable and cost 0.25 ETB per jerry can (20 litres) plus 5 ETB for the labour.
- In the lower area, the charity organisation Liges, who works with lepers in the area and is owned by an association that invests in small enterprises, sells water from their four-year-old groundwater well, which is pumped up from 55 meters below the ground. The well depended on electricity for their water pumps, and because they had no alternative energy source, they were frequently forced to close down during power shortages. They also had a shower house. Their water was treated with clarification chemicals and therefore supposedly safe to consume, at the price of 1 ETB per jerry can.

- An Idir operating in the lower area had recently dug a 7-meter deep well even closer to the Jemo river, which was manually driven and therefore more available than the Liges well. According to the head of this idir, wells/boreholes were a traditional way of obtaining water, but it was new to the Repi area. The idir well water was non-potable and sold for 0.50 ETB per jerry can.
- In-house water taps were most common in the houses along the slum's lower main street. The source of the tap water is unclear, but one resident stated that there were fewer in-house taps in the upper area due to low water pressure and electricity problems. The three respondents with their own water taps said that they only had water in them 1-4 times per month. When accessible, the tap water would be filled in jerry cans and stored for later, and some sold water to their neighbours. In-house water taps had to be requested from local authorities, according to one resident who had recently been denied one.
- Rainwater harvesting from the rooftops for washing was common in Repi, but none of the 6 respondents who did this had any organised or planned system to do so, they just made use of the rainwater that had gathered in indents on their roof. One respondent said that they stored rainwater for future use. Another resident chose not to use rainwater from her roof because her roof was not clean enough.

The taps are far cheaper than buying per jerry can, as the taps only involve a smaller monthly fee to the authorities. But due to the unstable supply of tap water, tap owners also had to purchase water in addition. Buying water from tanks or wells could be expensive, 5 of the respondents spent between 300-500 ETB monthly, while two others spent 100 ETB and 200 ETB, respectively.

FIGURE 13 THE IDIR-MANAGED WELL IN REPI

In Jemo, 12 of 15 condominium respondents stated that water in general was a problem, and 6 said that they had not experienced water shortage in their previous dwelling. There were fewer water sources to choose from than in Repi:

- In-house water taps was found in every condominium unit, but they only had water in them every 3-7 days, according to the respondents. Water access in the upper floors was rarer due to the low water pressure provided by the pump, which is also dependent on the frequently failing electricity system, exacerbating the problem. The residents in the lower floors had better access to water and often gave away or sold water to their upstairs neighbours. According to the woreda housing manager, selling water from the taps is technically not allowed because only the government can sell its water, but the woreda would not interfere with this practice because of the large water shortage problem.
- Water could be bought from private vendors outside the condominium area. A brick factory was the only identified external water source for the Jemo residents.
- Rainwater harvesting in the condominiums is on paper not allowed. Neither residents nor the DCs harvested any rainwater due to the limits in the regulations, design and construction of the buildings and downpipes. It was simply not possible without interfering with the construction and that is not allowed. Modifying a condominium unit or common areas is not allowed and will have to be reversed at either the DC or the resident's cost according to the condominium proclamation (Federal Negarit Gazeta 2003). However, DC323-337 has access to a underground tank on the fringe of their area that fills up with storm- and rainwater, which can be hoisted up using a bucket to water the green areas during the dry season (Fig x). The tank is not easily spotted and only in use by one DC. According to the woreda housing administrator, who is responsible for managing prohibited modifications made to buildings, the woreda can be willing to give assistance to condominium residents with a good idea on how to harvest rainwater, but it needs to be in cooperation with the authorities.

The main difference between the water supply infrastructure in Repi and Jemo is that the condominiums have all the pipes and fittings that are needed, the problems lies with the government-run water supply system. In Repi, the authorities have actually provided water tanks, albeit with limited supply, but most houses lack the pipes and taps needed in case the centralised pipe-based water delivery is improved. The lack of this might be why there are more water sources to choose from in Repi than in Jemo, but the condominium regulations highly likely also prohibits private water vendors to set up shop in the area. Inhabitants in both areas reused their greywater.

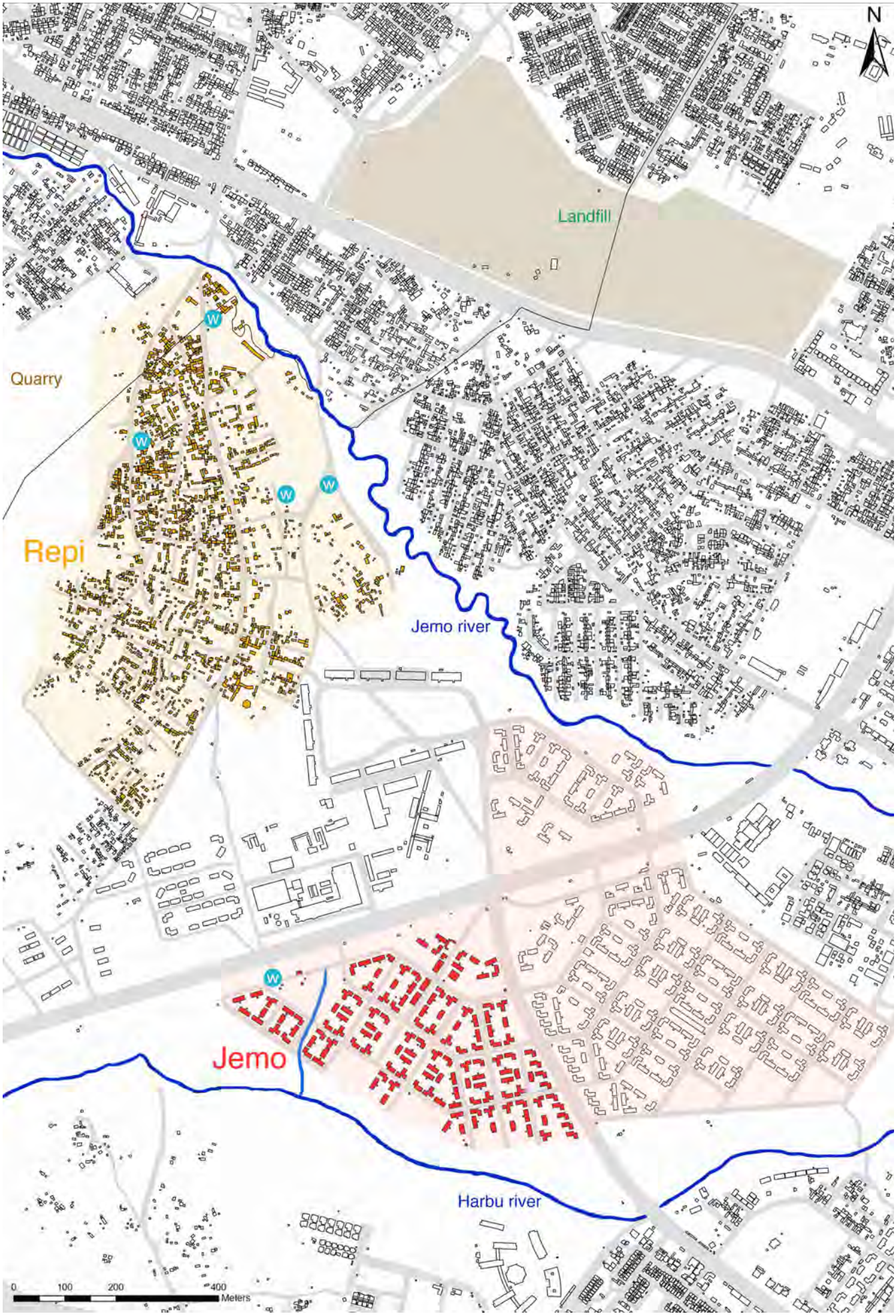


FIGURE 14 CASE AREA MAP. W INDICATES WATER SOURCES

5.1.3 WATER SAFETY

The safety of the water from the groundwater wells was questioned by several Repi respondents, who claimed it was ridden with water-borne diseases like typhoid. The water from the Idir well was being tested and could not currently be used as potable water, while the Liges well was supposedly safe and had a certificate from the government proving this. 2 respondents said that they drink water from the groundwater sources because they do not know of any other alternative, while 3 respondents bought water for drinking from either the Jemo area or the Ring Road. The groundwater might be contaminated by the nearby landfill. The tap water was not seen as completely safe to drink either, one respondent added clarification chemicals to it. Furthermore, a resident said that the lack of water made it harder to maintain a good personal hygiene.

The most pressing concern arising from the water shortage in Jemo was the inability to flush the toilets. One ground floor respondent stated that they only used the toilet when they really had to, otherwise the try to use the toilets at their work. Her household saved the wastewater from the clothes washing to use for flushing. Another resident said that the toilet in her top floor condominium unit could get so stinky in water-scarce periods that she would pay extra to have water transported up to her apartment to be able to flush the toilet. She checked her water taps several times every single day to see if there was water in them, even in the middle of the night, and always had laundry ready in case there was. She often retrieved water from her ground floor neighbours, and chose to pay them even if they did not demand money for it. According to another respondent, the un-flushed toilets were the cause of the Jemo children constantly suffering from common cold.

FIGURE 15 RAINWATER HARVESTING IN REPI

5.1.4 FLOODING

Flooding affects the entire Repi case area due to its position, which is partially on a steep hillside (figure 17) and partially in a low-lying area in close proximity to the Jemo river. The lower area was most affected, as this was where the rainwater gathered and posed a larger risk to both houses and residents. According to one resident, everything below the lower main street was flooded during heavy rains. In the upper hillside, the steep slope meant that the rainwater gathered enough velocity to cause material harm on its way down, and had even caused a fence to fall over.

Culverts had been dug along most Repi roads (figure 17), some shallower than others, but their purpose was not clear. Some claimed they were only for floodwater, while others said they were for blackwater too. Both types were seen in the culverts during the fieldwork. Although some houses had septic tanks, most had makeshift toilets made out of plastic and wood, which were emptied out on the edges of the built area or in the street ditches, inevitably blocking the culverts from leading floodwater. Right above the highest-lying houses a ditch was dug to direct floodwater away from the built area, this ditch was partly filled with solid waste. The quarry located above the western fringe of the slum area had dug out the area above the upper car road so that water could gather there. The houses along this road had also been slightly elevated. The locals worked together on digging culverts along the streets, while 1 respondent had dug a ditch around her house by herself. A local community police man was worried about the effect of the hillside culverts on the lower-lying residents as it would direct more water down to them and exacerbate their flood problem. During the time of fieldwork, in the beginning of the heavy rain season, the locals were cooperating on digging culverts in the lower area, with the likely aim of directing the water into the Jemo river.

The entire Jemo area was not equally affected by flooding, but it was a severe problem for the low-lying areas closest to the Harbu river. There were culverts around most condominium areas, some had solid waste in them, but not blackwater, as the area is connected to the sewer system. A ground floor resident in this area had experienced floodwater in her apartment, covering the floor due to the flat front doorstep. The two interviewed DCs in this area had experienced damages to their buildings due to flooding and were cooperating to find solutions together. The main cause for the damage was the small creek running down to the Harbu river, crossing both areas of these two DCs, which overflowed during the rainy season. DC255-265 stated that the flood problem was larger than the water shortage problem. They had tried to plant trees and other plants around the creek, but it had not stopped the flooding. DC323-337 was planning to let the residents farm the land, both for flood prevention and for aesthetical reasons, in addition to the measures they had already undertaken, including using soil to make drainage lines, planting trees and building makeshift dams.

5.1.5 USE OF OPEN GREEN AREAS

Repi is surrounded by open space on several sides, but due to the quarry and the newly built industrial and condominium buildings, there were not many trees or other greenery. The trees around the idir well were going to be cut down to avoid them absorbing too much of the groundwater. As seen on figures 8 and 9, many of the former green areas have been

covered by dwellings. The lack of green areas meant that little rainwater was absorbed, and instead was allowed to run down the steep hills, posing a risk for humans and houses. There were no specified green plans for the area at the time of fieldwork, and the woreda green area administrators therefore did no work there.

In Jemo, a large strip of land running through the south-western area is formally dedicated to be a so-called green corridor. This area had no greeneries in it, it did however hold three large government-owned warehouses, which according to the woreda's green area administrators was a problem they were trying to solve. According to the director at the office for Housing Development and Administration, the allocated space for green areas on condominium sites had increased from 10% in the oldest sites to 40% on newer projects. Each condominium courtyard has a design plan dictating the planting of greeneries. If a DC does not follow this plan, the woreda will step in and add or remove elements. In the case of one DC's area, the woreda had provided trees to be planted because their courtyard had no greeneries except some patches of grass. To fulfil the design plan for a greener courtyard, the DC had decided that children could no longer play in the courtyard, forcing them to spend their days either inside the condominium unit or in the stairs and walkways so they could be looked after.

Urban farming is technically not allowed in condominium areas, but still occurred in Jemo. One respondent had seized a 3x4 meter area outside her ground floor unit without asking permission to do so, where she grew different types of vegetables (figure 16). The rules prohibit urban farming mainly because there is not enough land for every resident to eat off, which will only create conflict. Another problem with urban farming in the condominium areas occurs when residents cultivate the communal land and sell the produce for profit, which can only benefit a handful of households. This was an issue amongst the residents in DC255-265's area, which had lead them to halt their plan to let the residents farm the land in order to prevent flood damage.

FIGURE 16 URBAN FARMING IN JEMO

The availability and quality of physical capital in both sites are lacking, but the shelters and sewer solutions in Repi are by far least durable and therefore more vulnerable to flooding. Jemo, on the other hand, has sturdier buildings with modern indoor piping and sanitary equipment, which are connected to the city's limited sewerage network. But both sites lack the actual delivery of services such as water and electricity. There is poor drainage in both sites, but Repi is again least resilient to floods due to its location on a steep hill and closeness to the Jemo River, which overflows more easily than the deeper-lying Harbu River close to the condominium area.

The result of the lacking service delivery is that dwellers in both sites are forced to spend non-productive time to collect water themselves. The informal market in Repi has responded to the demand for water, as there are at least two water sources in addition to the water sources provided by the woreda. The slum dwellers do not have to travel far to buy water, which is easily obtainable. Also, rainwater is commonly harvested on people's roofs. The supply of water in the condominium units, however, is so rare and unpredictable that it requires more time for the Jemo residents to obtain water from other sources, as they need to constantly check their own taps first, then with downstairs neighbours, then with private vendors outside the condominium area, which may charge for transportation both to the condominium and extra for upper floors. Furthermore, harvesting rainwater by for example accessing the downpipes on the side of the buildings was not allowed. The toilets in Jemo are reliant on water to flush, unlike the makeshift toilets in Repi, and the need for non-potable water in the condominium units can therefore be immediate. The modern equipment is in this regard making the condominium residents more vulnerable in the face of water shortage.

5.2 Social arrangements

Overall, both areas' residents were satisfied with where they lived. The general attitude towards living in Repi was that it was not perfect, but it was the cheapest place to live in Addis Ababa. Some respondents said that with all the necessary infrastructure in place, like schools, clinics and water, Repi would be a great place to live. Awareness of their lack of rights in this informal area was clear, but some respondents had hopes that the politicians would prioritise the area higher soon. In contrast, 2 respondents mentioned a strong feeling of insecurity because they might have to move the next day. The Jemo respondents were also generally pleased, except for 2 who disliked it but felt they had no choice. The close proximity to markets and kindergartens was a plus. Also, the condominiums were said to facilitate a 'modern way of life' and a higher quality of living.

5.2.1 Social cohesion

Some Repi respondents had lived there more than a decade, including one respondent, a 44-year old woman, who had lived in Repi almost all her life and was bringing up her kids there. She would like to live in a condominium, despite it being more expensive than her current monthly rent of 515 ETB, but had not signed up for one. Based on the satellite images (figures 8 and 9), Repi was scarcely inhabited up to about 10 years ago, and there is therefore no reason to believe that every resident has longstanding relationships with all their neighbours, although some have lived there for longer periods.

FIGURE 17 REPI CULVERTS AND ROADS

Because the Jemo condominium area was first inhabited in 2008, every resident is new to the place and used to live elsewhere. Several residents used to live in informal areas that had been cleared to build condominiums, and had been granted a unit in Jemo as compensation. One interviewed condominium dweller stated that she knew her neighbours from where she used to live, and a few other respondents said that they felt a 'strong connection' to their neighbours and that they knew them well, even if they used to live in different places. So-called coffee ceremonies are a common way of socialising in Ethiopia, and one resident met with 3 neighbouring ladies 2-3 times every day to drink coffee and eat popcorn, and she even knew some neighbours from her previous location. In contrast, one respondent, a renter, said that her household did not interact with their neighbours because they were supposed to stay inside their units now that they lived in condominiums. She did not use the communal open spaces to socialise, but for personal recreational purposes and so-called 'spiritual moments'.

In Jemo, there are freestanding communal houses in every courtyard, but not all were ready for use or utilised for their purpose. One communal house was seemingly rented out as a housing unit, even though one room was visibly equipped for slaughtering, with hooks in the ceiling and trenches in the floor where blood could gather, and another room for laundry, with washbasins and clothes' lines. Another intended use of the communal houses was for larger gatherings that could not be held inside condominium units due to their small size. Several respondents said that ceremonies like weddings were often held in the communal areas, either in the designated house or in the outdoor spaces that were most often open for all the neighbours. In one area where the communal house were in proper use, several ladies had gathered to prepare injera bread in the kitchen part, and in another corner of the courtyard another group of women were manually pounding coffee beans because the communal house was occupied that day.

The Jemo outdoor spaces were often used for children to play in, which enabled more social contact amongst the parents. One DC member said that many residents had complained about the lack of playground equipment, but installing this is not allowed because each courtyard is supposed to only hold decorative greeneries. The DC member further stated that the idea of preserving an open green space was new to most people, its use was not clear to them, so there was an awareness issue. Some of the open areas that were assigned for schools and clinics had not been developed yet, and were therefore used as playgrounds, albeit without equipment.

5.2.2 Organisations

The identified organisations in Repi were:

- The idir seemed to be the most prevalent social organisation, as it was highly unusual to not be a member of one, whether one was a renter or an owner. The interviewed idir chairman had had his position for 12 years, and his idir had 150 household head members, technically comprising 5 times as many members as each household comprised 5 individuals on average. The idirs held meetings in terms of crisis, and their well was a result of a meeting about the water crisis. The idirs in Repi seemed to have a wide scope, and according to 1 respondent, the idirs were in charge of paving the roads with stones and digging ditches to deal with the floodwater. As mentioned,

an idir had also taken initiative to dig a well to provide the area with water, and the same idir hoped to be able to dig another well because water was the community's main problem. There might be a separation between the work that the idir does on physical infrastructure and the work that they do in connection with funerals, but their work extends financial support for funerals for their member's loved ones.

- Iqqubs were common. These could also in some cases provide support in times of crisis, when the game can be 'rigged' for the benefit of struggling members.
- The sambat, a religious organisation, gathered on Sundays to solve disputes between members.

In Jemo, the following organisations were found:

- The most widespread organisation in Jemo was inevitably the DC because no condominium area can be without one, according to law (Federal Negarit Gazeta 2003). There are 26 DCs in the entire Jemo area, of which a third is this thesis' case area. DC members worked voluntarily and held weekly meetings. They collected money for car parking, renting of the communal buildings, maintenance and for development, which included fencing, gardening and security guards, according to a DC member. Monthly development fees amounts to 30-50 ETB. There were rumours of mismanaged DCs, the woreda housing manager feared that some DC members were only preoccupied with being popular and re-elected than actually following the rules for the greater benefit of all, or even just looking for a way to earn some extra money.
    - Some DCs facilitated social gatherings that were not related to their managerial main function, including coffee ceremonies that were open for everyone who lived there, because "formerly, no one drank coffee alone", as stated by a DC member and idir vice chairman.
    - Each interviewed DC had separate committees consisting of elders, which dealt with interpersonal conflicts in the condominiums.
- There were several idirs in Jemo, within the area of one DC there were 5 idirs, each with 80-200 members. Only 5 of the 15 interviewed Jemo residents were members of an idir. Even though some renters were idir members, several respondents stated that it was unusual for renters to be members because they were not staying permanently. According to a DC member, who was also an idir vice chairman, the idirs in Jemo only dealt with funerals, nothing else. The same member said that weak social ties were common in condominiums, just not in his area.

Although iqqub or sambat groups were not mentioned in interviews with the Jemo respondents, similar groups could operate there too. But the DC is a type of organisation that only exists in condominium areas, as their initial function is to ensure that the rules are being followed. Their mandate could have been widened to include social issues either by the authorities or through own initiative. There was a clear discrepancy in engagement between the interviewed DCs, giving the impression that different DCs took on different responsibilities. Furthermore, the Repi idirs seemed to have a wider scope as their work included digging culverts and constructing wells, while the Jemo idirs were concerned only

with funeral support. This could be explained by the condominium rules, which do not allow for interventions like digging in the ground, and where the DCs mandate covered similar efforts.

5.2.3 Connections to authorities

The Repi area was not officially connected to any formal governing entity and was at the first glance seemingly ignored by the authorities. But the woreda had set in place a local solid waste pick-up scheme, and transported the waste away from the area. They also supported the community police, provided water tanks and installed water taps in some houses, so the area was in some respects serviced by the authorities, but it is unknown if this was at their initiative or a result of community complaints and pressure.

Jemo was technically fully serviced by the authorities' services, including solid waste pick-up, sewerage and water delivery, which were limited, as mentioned. But in contrast to Repi, the area is not only connected to the authorities, but also under their responsibility. That entails that the condominium residents can contact their DC if they have any complaints or feedback, which is then brought to the woreda, and from there to higher levels. Not all respondents were pleased with the actions taken after contacting their DC about problems. Several respondents had complained about water shortage and low water pressure to their DC, but the continuing water problems had left one interviewee feeling that their DC was weak. One DC had cooperated with other DCs in the area to contact the higher authorities regarding water problems, but failed, partly due to the complexity of the water problem, including general water shortage, equipment failure and electricity shortage. Some DC members also expressed the suspicion that the authorities were just prioritising other areas higher. They had also tried to get more water taps and additional water supply systems, like tanks, but the water authorities had not been convinced it was necessary.

At the woreda level, there were also problems with collaborating with higher levels. The most used form of communication upwards from the woreda was written letters. The woreda green area administrators had tried to get the government-owned warehouses removed from Jemo's green corridors, but got no reply. And even if the warehouses were removed, the woreda cannot deal with flood prevention from the nearby Harbu River or the creek crossing the condominium case area, because only the Environmental Protection Agency (EPA) has the authority to work with flood prevention, and the woreda does not cooperate with the EPA on flood issues. A similar lack of cooperation was seen in water management, stormwater is supposed to be managed by the woreda, while wastewater is a ministry issue, according to the Water Supply and Sanitation programme.

But once an issue gets attention above the woreda level, it is not certain it can be dealt with, as government authorities do not often collaborate, as stated by the traffic engineer at the Roads Authorities. The lack of coordination between government entities can be seen in the many empty lots in the Jemo area, which are allocated for clinics, kindergartens and schools. The development of these lots is currently under the responsibility of the Health Bureau and the Educational Bureau, respectively, and not the Housing Administration and Development office.

The two case sites exist under quite different transforming structures and processes. While Repi is an informal area and thus without plans or regulations, meaning that the residents can do more or less what they wish, but the authorities in turn have no responsibility for them. The woreda does however deliver some services, which implies that the Repi residents might have some influence. Jemo on the other hand, is tightly connected to governing structures that control the area down to the type and location of each plant. The hierarchy is obvious, but the actual ability to make change upwards is not yet proven.

As with the rest of Addis Ababa, both case sites lack sufficient water-related infrastructure, both when it comes to the access and delivery of water, the handling of blackwater and floodwater. The consequences include extra water expenses, health issues and material damage. The green areas were generally limited in Repi, while heavily regulated in Jemo. Regarding social relations, both areas' inhabitants have access to and make use of membership groups, through which social capital is developed. The most obvious difference was the two areas' idirs, who seemed to have a much narrower scope in Jemo than in Repi, as mentioned. How these organisations affect water resilience will be discussed in the following chapter.

6 DISCUSSION

6.1 RESILIENCE

The two areas' water resilience and vulnerability can be partly assessed based on the aforementioned findings, keeping in mind that the fieldwork did not uncover everything related to the water-related infrastructure and social organisations. Resilience in terms of communities coping with water-related stresses and disturbances is seen in both areas, with the construction of wells and culverts in Repi and the patience of waiting for water to appear in the Jemo taps or buying from outside sources. But activities that explicitly proactively reduce the risk of future shocks and contribute to growth and development (Bernier & Meinzen-Dick 2014) were only observed in the form of greywater re-use rainwater harvesting, from rooftops in Repi and the single hidden stormwater tank in Jemo. Also, the Repi wells could to some extent be categorised preventive as they are likely to provide water for some time still and make life easier for Repi residents, but they are not sustainable as the groundwater in Addis Ababa is not recharged, and is polluted, leading to health problems. Water resilience requires the sustainable use of ecosystems (Wong & Brown 2009) and therefore disqualifies the wells from being a measure towards water resilience. So even though they are coping, in the form of more active measures in Repi, or the buying of water elsewhere while waiting for authorities to take action in Jemo, they can both be seen as vulnerable as both areas are susceptible to harm from exposure to stresses (Adger 2006). Following Adger's vulnerability definition further, Jemo can be seen as more vulnerable as the residents lack the *"capacity to adapt",* as they are locked within a regulative system, which will be discussed further in coming sections. But the promise from the in Jemo woreda housing manager that assistance would be provided for rainwater harvesting can open a vital opportunity to decrease that vulnerability.

6.2 SOCIAL TRANSITION TO CONDOMINIUMS

During the course of the next decade or so, condominiums will be the most prevalent form of housing in Addis Ababa, and the informal areas will be a thing of the past, at least according to the government's ambitious plans. According to the livelihoods framework (DFID 1999), social capital can be destroyed when forced interventions impose new social relations without taking into account the strengths of the old. The IHDP can be seen as forced as it does not let condominium beneficiaries choose where to live, nor does it give slum dwellers a choice when slum areas are cleared to become condominium sites (UN-Habitat 2010). Consequently, social bonds between former neighbours will be disturbed and new bonds will have to be made with new neighbours. In that sense, the intervention of the IHDP is uprooting people and imposing new social relations. But whether or not the programme is taking the old social relations into consideration is a more complex issue. The condominium areas are planned with some consideration to ease the process of moving to a new form of housing, equipped with communal houses and plans for decorative green areas to make residents feel connected to their new homes. But because of financial constraints and in some cases lacking DC engagement, not all Jemo communal houses are being used for their purpose and not all green areas are developed according to plan. The condominium

residents therefore might lack a meeting place and lose some sense of connection that would otherwise be shared with neighbours.

As already mentioned, according to Ejigu (2012), the condominium's transparent building form and shared courtyards impose an openness that lead residents to stay behind closed doors and avoid their neighbours more than in informal housing areas. Ejigu furthermore claims that important social connections are lost due to the lack of neighbourly contact coupled with tensions between residents. Even though Ejigu does not rule out that social connections could be established over time, the way of living in condominiums is claimed to obstruct strong relationships. This was echoed by one Jemo respondent, a renter, who said that living in condominiums entailed that people should stay inside their own unit. Similarly, the were few observations made of people looking after children in the courtyards or walkways, but this could have been done indoors as the fieldwork was undertaken during the colder season. Other respondents stated that they felt a strong social connection to their neighbours, and although this was a repeated phrase that could have lost some meaning in translation, conflict or tension was not mentioned. The composition of one's social capital, meaning networks and organisations, is undeniably changed when moving to a new area with thousands of new neighbours, but there is potential for establishing new valuable relations and joining new organisations.

6.3 Social cohesion

Because the Jemo condominiums had only been inhabited for 5-6 years during the time of fieldwork, and the respondents who had lived there longest had been there for 4 years, residents could be still in the phase of settling in and getting to know their neighbours. Housing in Repi, on the other hand, was established more than 12 years ago. But the area has expanded and densified considerably during the six years prior to the fieldwork, as seen on satellite photos (figures 8 and 9), and all of its inhabitants can therefore not be said to have longer relationships with their neighbours than the Jemo residents have. But the Repi residents seem to cooperate more and take action to mitigate the problems relating to water shortage and flooding. This could be explained by the fact that they have more leeway to make changes, like digging culverts and constructing wells, which makes it possible to intervene once the problems are felt. Floods in particular have affected Repi more than Jemo, due to its geographical location and less durable buildings, which could also play a role in the hasty response. Jemo residents are, however, restricted by the condominium regulations and can therefore not physically intervene in the buildings or in the ground. Even though their need for water is pressing, there is not much else to do than to have water brought in from outside, they cannot for example harvest rainwater from the downpipes. But they do have a clear chain of command above them, with the DC being the closest, whose mandate is to support residents. The Repi social bonds or organisations cannot be defined as stronger than in Jemo, but they do get together and take action quicker. As mentioned, the lack of capacity to adapt can therefore define the Jemo residents as more vulnerable.

6.4 SOCIAL ORGANISATIONS

There are several social organisations in both case sites, but the idirs in Repi and the Jemo DCs seem to handle most of the water-related issues in their respective area. According to Bernier & Meinzen-Dick (2014), poorer communities have different forms of social capital and therefore different resilience capacities. Low-income areas supposedly have less linking social capital, but more bonding social capital, and the connected coping capacity. Based on the gathered income information and the fact that around 70% of Jemo residents are renters, and condominiums are rented for a higher price than the mortgage costs, the residents in Repi can be defined as less wealthy than Jemo residents. Following Bernier & Meinzen-Dick (2014), Repi would therefore have stronger bonding and weaker linking social capital, and consequently less ability to change the wider structures they live in because they cannot influence decision-makers.

Repi's idirs are in many ways a form of bonding social capital as they are organisations, based on location and presumably shared values, that cope with shocks after they happen. But their measures are also based on experience and meant to be preventive, exemplified by culvert digging and plans to construct another well. Even though they are not sustainable and therefore not contributing to water resilience, as mentioned, these pre-emptive actions are a form of adaptive capacity, which is typically connected to bridging social capital, but no outside assistance was provided. Linking social capital in the form of social organisations influencing authorities was not explicitly seen or reported, but implied in the services that Repi receives from the woreda, including solid waste collection, water tank provision, installing in-house water taps and emptying septic tanks. The Repi residents had also taken initiative to a community police, which was later connected to the city police. This service provision by the local authorities to an illegal squatter site is what Fein and Kryck (2011) call the informalisation of governance structures, meaning the opposite of enforcing formal institutions. This challenges the immediate image of Repi as being an ignored area. The same authors found that idirs in an Addis Ababa slum area actively tried to influence the public authorities, by filing petitions for example, in addition to building social and physical infrastructure. This further calls into question the definition and common perception of slums and its inhabitants. Although Repi is illegally occupied by mainly low-income people, it does not necessarily entail that they are living in isolation from the rest of the city and its authorities. But the future of the Repi residents does however seem bleak, as the city's master plan supposedly has categorised the area as a green area that is not to be inhabited, while the woreda's housing manager claimed that the entire area was sold to a Chinese shoe factory and the inhabitants would be evacuated shortly. The hillside has supposedly been a concern for the national security agency for some time as it is possible to shoot down airplanes that are taking off or landing at the city's commercial airport. None of the Repi respondents were aware of any future plans for the area, which is an expression of a weaker connection to the urban authorities, who at the end of the day do not have any accountability for the squatters, even if they do provide some services.

In Jemo, on the other hand, the DCs are a form of linking social capital as they work under the woreda, but are elected by the residents. Their mandate is clearly expressed, and any action must be pre-approved by the woreda, which is where the opportunity for change dwindles. The DCs might be set up as a link between condominium residents and urban

authorities, but due to overall governmental capacity constraints, the actual influence is weak. Condominium residents' opportunity to create change mimics their physical surroundings; the structure is there, but lacking action, in the form of water delivery or support from the authorities. But there is some hope that the authorities and residents could work together on solutions for their water-related problems as the woreda housing manager did state that the woreda would provide assistance to condominium residents who wanted to gather rainwater to use for toilet flushing, for instance. With well-functioning urban authorities, professional design could serve as solutions to many water-related problems in Jemo. But instead the rigid rule system just seems to hinder local solutions, and thereby forcing the condominium dwellers to live with water shortage.

6.5 THE FUTURE OF CONDOMINIUMS AND SLUMS

Although the condominium programme, the IHDP, deserves praise for its high ambitions to provide housing for the poor, the fact is that the low-income segment cannot access condominium housing as it requires a sizeable down payment and is therefore out of reach for most poor Addis Ababa inhabitants. The lack of support schemes to help poor with the down payment has been a hindrance since the programme's start, but the rise in interest rates has excluded an even larger population segment. As mentioned, in the beginning, loans for the smallest condominium units had 0% interest, but now stand at 8,5% (UN-Habitat 2010). The high rent rate requires a steady income to avoid losing the unit, which is rare in a city where half of the active labour force has informal jobs (UN-Habitat 2007). However, if a condominium beneficiary manages to collect enough money for the down payment, the condominium can prove to be an effective poverty reduction strategy by renting it out. The huge housing demand entails that condominiums can be rented out for far more than the monthly mortgage costs. According to both government numbers (UN-Habitat 2010) and fieldwork results, 70% of condominiums are rented out. But the condominium owner would then have to live somewhere else while renting out their unit. The result is that wealthier people than the ones who were initially allocated the condominium unit inhabit the condominium areas, while the beneficiary might be living in an informal area and have an informal job, albeit with extra rent income. There is a chance that the poorest condominium beneficiaries can move into their units once the mortgage is paid through rent incomes, and only pay smaller monthly fees for services, but the repayment period is scheduled to be 20 years (UN-Habitat 2010).

The programme might lower the housing demand for the middle-income segment, but the poorest will still need affordable housing, which is the main driver behind slums in Addis Ababa. Consequently, the programme will not remove the reasons for slums, even if they are replaced with condominium areas. Slums will most likely be established in more peripheral areas instead, at least slums in the form of self-built houses on un-serviced squatter land. As the abovementioned UN-Habitat slum definition reflects, there are several types of slum. Lacking *"easy access to safe water in sufficient amounts at an affordable price"* (UN-Habitat 2006:1) is enough to define an area as slum, which makes it possible to define Jemo condominium area and most other condominium sites as slum, as water delivery is a widespread problem across the city. In addition, Jemo lacks *"access to adequate sanitation"* (ibid) as the toilets often cannot flush. By following this definition literally, the condominiums

are not only replacing slums, but becoming slums themselves due to the poor water-related infrastructure and delivery. The government's plan to focus on building condominium sites in the city center where piped infrastructure is more available, and thereby avoiding the huge costs of establishing new infrastructure in peripheral areas, might make inner city condominiums better serviced and therefore not definable as slums. But less central sites like Jemo need either large-scale upgrading of water supply and delivery, or alternative local ways of accessing water to avoid being labelled slum.

7 CONCLUDING REMARKS

Both areas have social organisations that deal with water, albeit following different rules and performing different activities. As rainwater harvesting can be seen as the only true water resilient activity performed in the case areas, there is both a long way to go and a great potential for increasing water resilience. The inhabitants are currently quite robust and managing to survive, but their actions are not preventive in the long term, nor are they turning the external stresses into opportunities, other than the occasional use of rainwater and some greywater re-use. Landscape-based stormwater management (LSM) solutions like these are viable and resilient, both in terms of absorbing floodwater and storing stormwater that can replace the use of potable water for washing or flushing. Sustainable LSM solutions can also to a large extent replace the establishment extensive and costly piped systems.

What can Jemo learn from Repi? As the social organisations' collective action in Repi is undeniably more influential in Repi than in Jemo, there must be something that can be transferred to the condominium area. The first presumption was that the social cohesion must be stronger in Repi, because it is an older settlement and people have decided the location themselves, in contrast to Jemo residents. But even though there might longer-standing relations between the Repi dwellers, the difference in collective action seems to be more related to the regulative environment in the two case areas. The social cohesion in Jemo did not appear as very strong, but this is likely related to the novelty of the area and its dwellers. After all, the majority of condominium inhabitants are previous slum dwellers and bring with them their experiences and habits of organising socially, which might be adapted to their new setting, but not completely lost.

Jemo, and perhaps condominium areas in general, has the capability and need to implement some local solutions to their water problems. The residents' capacity is an untapped resource at the moment due to the authorities' rules. Although the Jemo idirs have a narrower scope than the Repi idirs, they are social organisations that can be classified as bonding or bridging social capitals, as they are based on location. But while the idirs only deal with funerals, other forms of bonding social capital in Jemo seem to only be manifested as interpersonal relationships in the daily coffee ceremonies. The scope of these social organisations could be widened to include knowledge sharing and actions that mitigate flood risk and water shortage, of course with the approval of the woreda. In fact, the DCs could widen their scope as their mandate includes *"other necessary activities in the interest of unit owners mutual benefit"* (Federal Negarit Gazeta 2003:2397). The neighbourhood groupings could get together to learn more about the possibilities of rainwater harvesting or other LSM solutions from local experts, like the staff at the Ethiopian institute for Architecture, Building construction and City development (EiABC), a vital partner in the WGA project. The possibility of this happening was increased when the housing manager's stated that the woreda would assist in establishing rainwater harvesting solutions in Jemo. This would of course also be possible in Repi, but is more challenging as it is likely to be replaced with either a green area or a Chinese shoe factory in the near future.

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