

**THE ROLE OF GOVERNANCE STRUCTURES AND PRACTICES RELATED TO  
LAND, WATER AND WASTE IN SUPPORTING TRANSFORMATION OF ILULA  
AND MADIZINI EMERGING URBAN CENTRES, TANZANIA**

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**A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE  
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## **EXTENDED ABSTRACT**

Rural-Urban Transformation or Transition (RUT), that is, urbanization processes, have for decades been continuously influenced by globalization, regional contexts and local situations. In Tanzania, many rural villages are being transformed from rural (villages) into urban (townships) entities. The factors driving their transformation are many and varied, but the most important are residential history, geographical location, the rate of population growth from both immigration and natural increase and the announcement of township status. Within formal administrative units like townships and village centres, Emerging Urban Centres (EUCs) have been rapidly growing both demographically and economically. EUCs represent urban centres at the initial stage of centre development, characterized by having experienced a process of change from a 'large village' to a 'small town' with an above-average increase in economic activity and population growth during the last decade. Rapid growth within EUCs has consequently led to land use changes with various implications. There has also been an increase in the demand for land for urban functions like roads, housing, industrial and social institutions, the demand for domestic water from multiple users and the rate of solid waste generation with varied composition. However, despite rapid growth, urban planning and governance mechanisms are not keeping pace with these rapid socio-economic transformations. Therefore, the rapid demographic and economic growth within emerging urban centres has led to major governance challenges related to land, domestic water and solid waste. The broad objective of this study was to identify how governance practices (public and private) in relation to land; domestic water and solid waste management have developed in supporting processes of rural-urban transformation. Specifically, the study analyses the dynamics of the emergence of urban centres with a focus on their densification and spatial expansion, as well as government

decision-making structures at the district, township and village levels, resource availability (land and water) and examining recent past developments in resource governance (land, water and waste), including service provision.

The study was conducted in Ilula and Madizini Emerging Urban Centres (EUCs), two sites that are at different stages in their administrative transition along a rural-urban continuum. This study hypothesized that, the level of administrative transition has impacts on governance structures and practices in respect of accessing resources (land) and service provision (domestic water and solid waste collection) for rapidly growing populations. A combination of research methods was employed to collect data, including 468 household surveys (323 in Ilula and 145 in Madizini), 97 informants' interviews, 39 in-depth household interviews, transect walks and spatial analysis of water points. Households for survey were proportionally selected according to the number of households reported in the national census for 2002 for each individual EUC. Key informants were purposively selected on the basis of their administrative or decision-making role and knowledge about land, domestic water and solid waste management practices within EUC and the township at large. Households for in-depth interviews were purposively selected on the basis of observed variations and commonalities in the household survey data responses.

Descriptive analysis was used to analyse quantitative data from the household surveys, while content analysis was applied to analyse qualitative data from qualitative interviews. Spatial analysis was conducted to document land-use changes from 2007 to 2017 within the two EUCs. Mapping of public domestic water points was also conducted. Binary logistic regression analysis was carried out to assess the factors determining the likelihood of households having access to land within EUCs. A multinomial logit (MNL) model was used to determine the factors influencing households in choosing solid waste disposal practices.

Results indicate that in the last decade EUCs have experienced changes in land use in the form of the conversion of land-use classes, housing densification and spatial expansion. In both sites, the built-up area has increased while agricultural land has declined. For example, in Ilula EUC, the built-up area increased from 149 ha (22.82%) in 2007 to 318 ha (48.7%) in 2017, an increase of 168 ha (113% increase), while agricultural land declined from 425 ha (65.08%) in 2007 to 246 ha (37.67%) in 2017, a decrease of 179 ha (-42% decrease). In Madizini EUC, the built-up area increased from 68 ha (22.2%) in 2007 to 151 ha (49.5%) in 2017, an increase of 83 ha (122% increase), while agricultural land declined from 192 ha (62.9%) in 2007 to 147 ha (48.1%) in 2017, a decrease of 45 ha (-24%). Generally, land-use dynamics within EUCs in the last decade has implications for the planning of service provision and future urban development, especially where there is limited public land. Similarly, governance structures and practices related to township administration, land, domestic water and solid waste management have changed in support of rural-urban transformation. However, the transformation process has occurred differently in the two case studies, with Ilula being in the advanced stage of Madizini where the process is still in its early stage. Changes in the governance structures includes, for example, the dissolution of village government and village land councils following the establishment of new governance institutions like a Township Authority (TA) and the appointment of a Township Executive Officer (TEO) to replace village governance structures in Ilula township. Results revealed that 76% of surveyed households have access to land. Binary logistic regression results indicated that, age, EUC of residence and occupation were significantly associated with household access to land ( $P < 0.05$ ). Households have acquired land through different sources, with social relations (52%) being the main source of land access. Households own about 79% of land, but only 43% of household land and housing has registered title.

Furthermore, village water committees have been changed through the establishment of water utility authorities to correspond to the increased domestic demand for water. Moreover, results of the household survey indicated that 75 % of surveyed households' access domestic water from a tap, 23 % from a well and 2 % from other sources. Only 21% of domestic water sources are located inside household compounds, 74% being located outside. The location of domestic water points has implications for the costs of accessing water and productive labour time. In solid waste management domain, results of the household survey indicated that, 70 % of households' dispose of their solid waste in garbage bins on their compounds, 12 % in burning pits on their compounds, 17 % in public waste dumps and 1 % in both garbage bins and by burning on their compounds. MNL results revealed that, EUC of residence, household size and membership of waste management committees were statistically significant regarding households' choices of solid waste disposal practices ( $P < 0.05$ ).

The study concludes that EUCs are rapidly growing in term of population growth, the concentration of economic activities and the development of social services but that local government authorities are lagging behind in planning service provision (establishment of functional institutions and infrastructures development) for the rapidly growing population within both EUCs. The study recommends that, the respective government authorities facilitate the formal administrative transition to township status to give local government authorities within townships autonomy in decision-making and in planning service provision for the rapidly growing populations of both EUCs. The government should pay special attention to the EUCs in resource allocation for service provision and infrastructural development so as to tap the development potential associated with rapid growth within EUCs. Effective synergies between the government, the private sector and local communities should be initiated with regard to resource mobilization for planning and service provision within EUCs.

**DECLARATION**

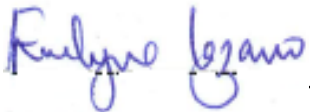
I, Lekumok Kironyi, do hereby declare to the Senate of Sokoine University of Agriculture that, this thesis is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted to any other institution for higher award.



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**DEDICATION**

I dedicate this work to my lovely children, sons Lamayiani and Laanyuni and daughter Namayiani, my age mates Irmeshuki and to the brave men and women herding in the endless Siringet plains. This PhD is equally yours as it is mine.



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## LIST OF ABBREVIATIONS

CA	Collective Action
CBOs	Community Based Organizations
CCRO	Certificate of Customary Rights of Occupancy
CEO	Chief Executive Officer
CI	Critical Institutionalism
CLGF	Commonwealth Local Government Forum
COWSO	Community Water Supply Organization
CSOs	Civil Society or Non-governmental Organizations
DANIDA	Danish International Development Agency
DPs	Domestic Points
DWE	District Water Engineer
EA	Enumeration Area
EMA	Environmental Management Act
EUCs	Emerging Urban Centres
EWURA	Energy and Water Utilities Regulatory Authority
FAO	Food and Agriculture Organisation of the United Nations
FYDPs	Five Years Development Plans
GDP	Gross Domestic Product
GDPRD	Global Donor Platform for Rural Development
GIS	Geographical Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GN	Government Notice
GPS	Global Positioning System
GRO	Granted Right of Occupancy

Ha	Hectare
IAD	Institutional Analysis and Development Framework
ICWE	International Conference on Water and the Environment
IUWASSA	Ilula Urban Water Supply and Sanitation Authority
KIIs	Key Informants' Interviews
KKKT	Kanisa la Kiinjili la Kilutheri Tanzania
LGA	Local Government Authority
LTTPs	Long-Term Prospective Plans
MDGs	Millennium Development Goals
MKUKUTA	<i>Mkakati wa Kukuza Uchumi na Kupunguza Umasikini Tanzania</i>
MLC	Maximum Likelihood Classification
MLHSD	Ministry of Lands, Housing and Human Settlements Development
MSE	Mtibwa Sugar Estate
NBS	National Bureau of Statistics
NGOs	Non-Governmental Organization
NIE	New Institutional Economics
NMB	National Microfinance Bank
NSGRP	National Strategy for Growth and Reduction of Poverty
OECD	Organization for Economic Co-operation and Development
PHA	Public Health Act
PHC	Population and Housing Census
PNBs	Public Notice Boards
PO-RALG	President Office-Regional Administration and Local Government
PRSPs	Poverty Reduction Strategy Papers (PRSPs)
RUCROP	Rural-Urban Complementarities for the Reduction of Poverty
RUT	Rural- Urban Transformation

SACCOs	Savings and Credit Cooperatives Society
SAPs	Structural Adjustment Programme
SID	Society for International Development
SPSS	Statistical Package for Social Sciences
TA	Township Authority
TASAF	Tanzania Social Action Fund
TAWASANET	Tanzania Water and Sanitation Network
TDV	Tanzania Development Vision
TEO	Township Executive Officer
TFDA	Tanzania Food, Drugs and Cosmetics Act
TG	Tanzania Government
TURUWASSA	Turiani Rural and Urban Water Supply and Sanitation Authority
TZS	Tanzania Shilling
US \$	United States dollar
USAID	United State Agency for International Development
VEO	Village Executive Officer
WALAC	Ward Land Council
WCF	Water Governance Facility
WDC	Ward Development Committee
WEF	World Economic Forum
WEO	Ward Executive Officer
WHO	World Health Organization

## CHAPTER ONE

### GENERAL INTRODUCTION

#### 1.1 Background Information

Urbanization is generally conceptualized as a process through which people migrate from rural areas into areas classified as urban in search of opportunities (Tacoli and Agergaard, 2017; Fox *et al.*, 2018). Urbanization is a complex process with multiple dimensions (Guin, 2018). Countries define what is urban on the basis of one or more criteria (Biswas; 2006). Consequently, there are no agreed global definitions or uniform criteria regarding what constitutes an urban context (Biswas, 2006; UN, 2014; Fox *et al.*, 2018). Thus, definition of urban centers is a technical issue and what is mostly important is the relative priority that should be given to 'rural' and 'urban' development (Satterthwaite, 2006). The diversity of definitions of the urban and of urbanization makes' comparison and generalization difficult (Agergaard *et al.*, 2019).

Urbanization can be defined on the basis of demographic growth and the spatial expansion of urban land uses (Fay and Opal, 2000; Satterthwaite *et al.*, 2010; Tacoli and Agergaard, 2017). Demographically, urbanization is defined with reference to the increase in the share of population living in urban centres. Or, if defined with reference to the spatial expansion of urban land uses, urbanization implies a shift in settlement patterns from dispersed to denser settlements. The expansion in urban land uses occurs when there is an opposing shift in settlement patterns from dense to more dispersed settlement (Satterthwaite *et al.*, 2010).

Global trends indicate that the world has crossed the tipping point at which more than half of the global population (54%) can be defined as urban (Beall *et al.*, 2011; UN, 2014;

Christiansen *et al.*, 2016). The continuing urbanization and overall growth in the world's population is projected to add 2.5 billion people (66%) to the urban population by 2050. Urbanization is often more important in the growth of intermediate and small urban centres than big cities (Tacoli, 2015). Consequently, small urban centres account for a growing share of even what is officially defined as urban (Mukhopadhyay *et al.*, 2017). For example, of the projected urban population in 2050, close to half of all urban dwellers will be residing in small settlements of fewer than 500 000 inhabitants. The urbanization rate might be even higher than the statistical data suggest if the rural-urban boundary were moved beyond biased administrative definitions and more sophisticated densification-based measures were used (Muzzini and Lindeboom, 2008).

Urbanization level in different contexts is influenced by different factors. As argued by Satterthwaite (2006), urbanization level is highly influenced by the proportion of population living in small urban centres and large villages that are classified as either urban or rural. Kristensen and Birch-Thomsen (2013) argued that, rural-urban migration has, for several decades, been an important driver of urban growth. Furthermore, livelihoods diversification and increased rural-urban linkages play an important role for urbanization of rural regions or transformation of rural villages into emerging towns (Tacoli, 2017; Steel *et al.*, 2019).

Recently, there has been a renewed interest in urbanization, which is formalized under the New Urban Agenda and Sustainable Development Goal 'Sustainable Cities and Communities' (SDG11), which stresses the need to address rural-urban synergies as an important aspect of urbanization dynamics (Agergaard *et al.*, 2019).

As documented in the existing literature, urbanization dynamics vary in different contexts to represent settlement patterns like small towns, intermediate urban centres and trading centres or market towns, among others (Bryceson, 2011; Christiansen and Todo, 2014; Christiansen *et al.*, 2016; Satterthwaite, 2016; Tacoli and Agergaard, 2017; Agergaard *et al.*, 2019; Lazaro *et al.*, 2019). As argued by Satterthwaite (2006), at least a quarter of the population lives in settlements that could be classified as ‘urban’ or as ‘rural’ or as ‘large villages’ or ‘small urban centres. This study focuses on urbanization processes in emerging urban centres in Tanzania with a specific focus on changes in governance structures and practices related to land, domestic water and solid waste in supporting urbanization or rural-urban transformation.

Within almost all nations, urban centres have considerable economic, social or political importance including service centres for local agricultural producers and local government centres for rural populations (Satterthwaite, 2006). Small and intermediate centres have potential roles in regional development processes (Tacoli and Satterthwaite, 2002) and development of their rural hinterland (Steel *et al.*, 2019). However, the influence of small towns or urban centres in regional and rural hinterlands development processes is influenced by national and regional political contexts (Hinderink and Titus 2002). Moreover, Berdegué *et al.* (2014) argued that, it is only small towns with strong linkages with the rural hinterland that have the potential to reduce rural poverty.

### **1.1.1 Urbanization trends in Tanzania**

Tanzania continues to be the least urbanizing country in Sub-Saharan Africa (SSA) (Wenban-Smith, 2014; IFAD, 2016). The level of urbanization in Tanzania increased slightly from 23% in 2002 to almost 30% in 2012 (Wenban-Smith, 2014; NBS, 2015;

Tacoli and Agergaard, 2017). According to IFAD (2016), Tanzania's annual urbanization growth rate from 2005 to 2012 was 2.49 percent. Given current trends in urbanization, it is estimated that by 2030, 50% of the national population will be urban through natural increase (fertility rate), inward migration and the transformation of rural settlements into urban centres (Wenban-Smith, 2014).

Regarding human settlements classification, there are two broad categories namely rural and urban (NBS, 2013). The common criteria for classification of human settlement as stipulated under Urban Planning Act of 2007 are population size, level of services, economic base and level of sustenance in annual budget (Table 1.1). The empty cells in Table 1.1 imply that, the listed criteria (for example economic base and level of self-sustenance in annual budget) are not considered in the respective human settlement categories classification.

**Table 1.1: Human settlements classification in Tanzania**

<b>Human settlements categories</b>	<b>Criteria for human settlements classification</b>			
	<b>Population size</b>	<b>Level of services</b>	<b>Economic base</b>	<b>Level of self-sustenance in annual budget</b>
<i>Minor settlement or trading centres/villages</i>	Less than 10 000 people	A primary school, a dispensary and a post office and 5 retail shops and a marketplace		
<i>Township</i>	10 000 people	Health centre, 20 licensed retail shops and a marketplace, Secondary school, Primary court; and it should be either a ward or division headquarters		At least 50% of the annual budget
<i>Town</i>	30 000 people	Hospital, secondary school, At least 50 licensed shops, Police station and Divisional headquarters		
<i>Municipality</i>	100 000 people	Centre for higher order of services, cultural, educational and health facilities which serve an area beyond the administrative region including universities, a referral hospitals and international conference facilities and centre of multinational organization(s)	At least 30% of employment should be in the non-agricultural sector and it must have, also, at least one manufacturing industry and several small-scale industries	At least 70% of annual budget
<i>City</i>	500 000	Additional symbolic importance for qualification of a municipality. These includes historical significance, outstanding cultural importance such as a major tourist centre, the seat of regional government, the seat of international activities and any other symbolic value		At least 95% of annual budget
<i>Mega city</i>	4 000 000			In addition, it must surpass all requirements of a city status



Source: Constructed from Urban Planning Act No. 8 of 2007 (p. 55-56)

Furthermore, Tanzania is urbanizing and experiencing urban growth in different types of urban centres, ranging from larger metropolitan cities (regional headquarters) to small urban centres. Urbanization processes in Tanzania has resulted in more rural settlements expanding and being transformed into townships (URT, 1995; Wenban-Smith, 2014). As argued by Christiaensen *et al.* (2016), small towns are forming an ever-increasing proportion of Tanzania's urban population. Empirically, there has been considerable growth in small urban centres over the last decade, whereas the 2012 census identified 600 such centres compared to only 150 in the 2002 census (Lazaro *et al.*, 2017). However, the dynamic change in small urban centres varies considerably in their respective trajectories of demographic and economic growth (Tacoli and Agergaard, 2017). Moreover, according to URT (2016:7), "Urbanization is already putting intense pressure on basic services and urban infrastructure at a time when emerging cities still lack the resources and institutions to provide citizens with access to productive jobs, decent housing, and basic services". Thus, urbanization trends in Tanzania are mostly associated with increases in population and urban administrative classifications, implying an increase in the demand for resources (land) and services (domestic water supply and solid waste collection and disposal) and results into changes in governance structures and practices.

For clear understanding of the central topics of this study, the following sections describe the distinctions that have been made between rural and urban areas, definition and conceptualization of governance, the global and Tanzania contexts of rural-urban transformations, the administrative transition to township status and the development of Emerging Urban Centres (EUCs).

### 1.1.2 The rural–urban dichotomy

As different countries apply different criteria in classifying rural and urban settlements, it is not possible to adopt standard criteria to distinguish urban areas from rural ones (UN, 2002). The different definitions used in different countries make generalization problematic (Tacoli, 1998). As a result, there is no clear and global agreement on the distinction between rural and urban (Champion and Hugo, 2004). In different countries, there might be a clear definition of what is ‘rural’ and ‘urban’ (defined in individual countries), but there are no shared or universal definitions since it often varies from one country to the other making comparisons difficult or even impossible. However, some criteria are combined as standard in different contexts to distinguish between rural and urban areas, including population thresholds and densities, the continuity of built-up areas, political status and economic and service functions (Roberts, 2016). Despite a lack of common agreement regarding the rural–urban dichotomy, it is still important to distinguish between rural and urban settlements for purposes of economic planning, the formulation of social policies and physical planning and analysis (Champion and Hugo, 2004; Schaeffer *et al.*, 2013).

In practice, rural and urban areas are not separate domains since they exist within a broad rural–urban spectrum ranging from megacities to small townships and rural hinterlands (FAO, 2017). The urban is often assumed to mean large cities or more usually medium-sized urban centres (Tacoli, 2017), while the rural is generally classified as a residual category that is not urban (Berdegué *et al.*, 2014). In the past, rural areas were merely suppliers of food, goods, labour and natural resources to urban cities (Roberts, 2016). Recently, the rural has ceased simply to be the opposite of the urban (Schaeffer *et al.*, 2013): rather, rural areas are also urbanizing in terms of their culture and lifestyle, markets

centres and the provision of economic services (Roberts, 2016). The difference between rural and urban places in terms of changes in the bases of rural economies from farming and agriculture to manufacturing and services is declining (Schaeffer *et al.*, 2013). For descriptive purposes, the distinction between rural and urban is unavoidable, but it often implies a dichotomy with both sectoral and spatial dimensions (Tacoli, 1998).

Furthermore, the effects of changing patterns of urbanization in both urban and rural areas have been profound (Roberts, 2016), consequently making the social and economic structures of rural and urban regions more similar (Schaeffer *et al.*, 2013). What is often overlooked is the enormous increase in the number of identifiably urban settlements that have emerged in previously rural landscapes in developing regions (Fox *et al.*, 2018). Therefore, the separation between the rural and the urban has become increasingly blurred (OECD, 2013; Roberts, 2016). Moreover, the notion of a rural–urban dichotomy has so far not acquired any theoretical or empirical significance in the context of regional development (Guin, 2018). The pertinent challenges associated with a simple rural-urban dichotomy include an increasing blurred distinction between rural and urban, questionable unidimensional classifications of forms of settlement and new forms of urbanization (Champion and Hugo, 2004).

In Tanzania and as presented in Table 1.1, there are four commonly accepted perspectives on the urban, politico-administrative, human settlement, statistical, and that of urban population densities (Muzzini and Lindeboom, 2008; World Bank, 2009). The most consistent definition of the urban is that used by the National Bureau of Statistics (NBS), which rests on the classification of census enumeration areas as either ‘urban’ or ‘rural’ based on consultations between the NBS and local authorities (Wenban-Smith, 2014). There is a clear distinction between urban and rural areas regarding non-farm activities,

while population density is an important gradient (generation of agglomeration economies) in defining the urban-rural nexus (Muzzini and Lindeboom, 2008).

However, none of the urban perspectives in Tanzania accounts for population density (World Bank, 2009). In fact, 17% of the population of mainland Tanzania live in high-density settlements that are not legally recognized as urban (Muzzini and Lindeboom, 2008). Differences in urban perspectives have various policy implications, including allowing urbanization to occur (in different regions) off the radar of government agencies, which in turn reduces the government's capacity to effectively respond to the challenges of planning and service provision associated with rapid urbanization, including that in rural landscapes. As a result, there is wide gap between urban and rural areas in the delivery of services and infrastructural development (World Bank, 2009).

### **1.1.3 Governance definitions and conceptualization**

The concept of governance has become a catchword in the social sciences, as well as in the policy world (Kooiman *et al.*, 2008). Governance has been used mostly as an umbrella concept, and no agreed definition of it exists (Tortajada, 2010). Different scholars and institutions such as the World Bank (WB) and the United Nation Development Programme (UNDP) have assigned various definitions to the concept of governance, a concept that is nebulous and multi-vocal, being used differently in many settings between and within academic disciplines and different sectors, including with reference to natural resources (Harmpham and Boaten, 1997; Melo and Baiocchi, 2006; Nunan, 2015). Governance is a rich and complex field (Green, 2011) because it considers multilevel participation beyond the state in the sense that decision-making includes not only public institutions but also the private sector, civil society and society in general (Tortajada, 2010).

A variety of definitions greatly differing in scope, rationale and objectives have been advanced. Thus, this multitude of definitions has generated increasing confusion regarding the international dissemination and boundaries of the concept (governance) (Santiso, 2001; Margues, 2013). Kooiman *et al.* (2008) argued that differences in the meanings accorded to the concept of governance often revolve around the perceived role of the state in both the normative and analytical senses. Melo and Baiocchi (2006) defined governance as a process of coordination (levels) and regulation (rules and norms) in an institutional context. Governance also implies changes in the roles, structures and operations of government, as well as in the way social problems are resolved (Lee, 2003). Moreover, governance entails the informal decision-making processes that have been dominating local policy arenas in many countries for the past two decades (Hambleton and Gross, 2007).

Governance thus comprises complex mechanisms, processes and institutions through which citizens and groups (NGOs and the private sector) articulate their interests, mediate their differences, and exercise their legal rights and obligations (UNDP, 1997). Katsamunskaja (2016) argued that, scientists and practitioners use the word ‘governance’ without there being an agreed definition. Nevertheless, there are some commonalities in the meaning of governance (Grindle, 2007), such as the use of ‘governance’ to refer to institutional processes and outcomes. Stoker (1998) argued that there is a baseline agreement (thesis) that governance refers to the development of styles of governing in which the boundaries both between and within the public and private sectors have become blurred.

This study applies the term “governance” to refer broadly to the policies, rules, processes, by-laws, institutions (local and central government and NGOs or private sector) and local

practices by which land, domestic water and solid waste within emerging urban centres are operated, regulated and controlled. Whereas governance structures are defined as formal and informal actors and institutions at different administrative levels such as village, ward, township and district that are responsible for resources (land) and service (domestic and solid waste collection and disposal) governance. Furthermore, governance practices as applied in this study are defined as day-to-day practices applied by both public and private actors and institutions in facilitating land access, domestic water provision and solid waste management within the rapidly growing EUCs.

#### **1.1.4 Rural-urban transformations and the importance of governance**

There is a considerable literature on rural transformations or Rural-Urban Transformation (RUT) (Tacoli and Satterthwaite, 2003; Bryceson, 2011; Lazaro *et al.*, 2014; Larsen and Birch-Thomsen, 2015; Tacoli and Agergaard, 2017). Rural transformation is a process of comprehensive social changes in which rural societies diversify their production patterns and livelihoods through less dependence on agriculture, move from dispersed villages to towns and small and medium cities, and become culturally like large agglomerations (Berdegúe *et al.*, 2014; IFAD, 2016). In this study, rural-urban transformation or urbanization is conceptualized as a gradual and non-linear transitional process through which an increasing proportion of the rural population moves to and lives in emerging urban centres in rural landscapes. Rural transformation results from the action of global drivers such as the diversification of rural economies away from agriculture, the globalization of the agri-food system and the urbanization of rural villages (Berdegúe *et al.*, 2014). Rural transformation is embedded within structural transformations (urbanization processes) due to changes in rural people's occupations, diversified

livelihoods, changes in social relations within families and changes in communities and social institutions (IFAD, 2016).

Moreover, rural transformation entails better coverage and access to services, expanded decent off-farm employment and entrepreneurial opportunities (IFAD, 2016). Rural transformation is associated with increased rural-urban links through spatial flows, including migration, remittances, services and waste, information and resources, and sectoral flows comprising crops and livestock products for local markets, inputs to markets, high-value agricultural trade and both peri-urban and multi-functional agriculture (Tacoli and Satterthwaite, 2003). Peri-urban development between rural and urban areas is also important for the formation of rural-urban links (World Bank, 2009).

The RUT process influences access to assets (natural resources like land and water), labour and human capital flows (education, skills and health), financial capital (access to credit and markets), social assets (migrants' networks and social relations between producers and traders) and the rate of waste generation (Tacoli, 2002; Lazaro *et al.*, 2014). Strong rural-urban links are also important in reducing poverty (FAO, 2017). It is therefore important to pay attention to rural-urban links in order to observe changes in livelihood strategies and the underlying reasons for these changes for the purposes of formulating policies to reduce poverty and support the role of urban centres in the development of the surrounding regions (Tacoli, 2002). If rural-urban interactions are well managed, they can help improve service provision, growth opportunities and quality of life (OECD, 2013).

Experience indicates that, the transformation process from rural to urban is occurring rapidly and in most cases involves the progressive expansion and transformation of urban fringes that are most linked to existing urban centres (Roberts, 2016). Urbanization rates

have far exceeded the capacities of both national and local governments to plan and manage demographic transitions efficiently, equitably and sustainably (Biswas, 2006). Often, the expansion of urban centres involves competition and conflict over the use of essential natural resources such as land and water (Tacoli, 2002). In small urban centres there are conflicts over the use of resources such as land and water for purposes of agriculture, urban residence and non-farm productive activities (Tacoli and Agergaard, 2017).

Furthermore, new migrants to urban areas create new opportunities and needs by offering new skills and perspectives and generating new requirements for institutional innovation (Beall *et al.*, 2011). In most cases, certain governance arrangements may favour or exclude some resources or service users depending on their influence in decision-making within their areas of jurisdiction (Devas *et al.*, 2004). Governance (UNDP, 1997; Stoker, 1998; Rogers, 2006) plays a critical role in supporting equitable urbanization processes (Tacoli and Agergaard, 2017). Equitable urbanization or inclusive urbanization (McGranahan *et al.*, 2016) literally means different social groups benefitting equally from urbanization or rural-urban transformations. Governance allows us to conceptualize the complex arrangements of relationships (among actors) and rules (institutions) that are needed to manage and distribute resources (Hill, 2013).

In reality, urban governance structures and practices do not operate in isolation but are rather linked with or integrated into other spheres and tiers of governance at the regional and national levels, as well as engaging with community and private-sector actors (Devas *et al.*, 2004). Governance practices help the respective government authorities and stakeholders to address the complex emerging social, political, economic, environmental and institutional challenges associated with urbanization process effectively and



sustainably (Tosics, 2011; Hongbo, 2014). However, many urban centres are continuing to struggle with fragmented decision-making, competing policy objectives, limited coordination with higher tiers of government, a lack of surveying and infrastructure (sewage and garbage collection), inadequate resources and low technical capacities to meet the needs of growing urban populations (Hongbo, 2014; Lazaro *et al.*, 2014). Therefore, increases in competition over resource use and access to services as part of the RUT process calls for a strengthening of governance structures and practices in order to make the RUT process inclusive.

Despite the level of urbanization or rural-urban transformation in different landscapes, there is generally a lack of focus on rural areas and villages becoming urban (Bryceson, 2011; Lazaro and Birch-Thomsen, 2013; Jones *et al.*, 2014; Combaz, 2015; Roberts, 2016). Against this background, therefore, this study aims to explore how challenges related to land; domestic water and solid waste governance are handled both within formal governance systems and through more informal governance practices in support of rural-urban transformation in the context of emerging urban centres in Tanzania.

#### **1.1.5 Rural-urban transformation in Tanzania**

In Tanzania, many rural villages are being transformed into townships as part of a rural-urban transformation process. The forces driving their transformation are multiple, but most important are residential history, geographical location, agricultural value chains, the rate of population growth, announcement of township status and discoveries of, for example, minerals and gas (Nindi, 2016; Lazaro *et al.*, 2017). Thus, the particularities of rural transformations and the growth of emerging urban centres in Tanzania depend on specific location characteristics and overall social change (Tacoli and Agergaard, 2017).

Historically, three periods are central to Tanzania's structural and rural-urban transformation: from independence to economic crisis (1961 to 1985), economic restructuring (1986 to 2000) and the current emphasis on poverty reduction (since 2000) (URT, 2014). African socialism or "*Ujamaa*", inspired by Tanzania's first president, Julius Kambarage Nyerere, was the dominant development ideology in the first phase. The main pillars of *Ujamaa* included an emphasis on agriculture as the backbone of the economy, the nationalization of large private enterprises, education for self-reliance and import substitution to encourage industrialization. The villagization programme was meant to gather scattered inhabitants into administrative villages for easier provision of services and administration. However, in the 1980s rural transformation was only proceeding at a low pace, with substantial disparities of income between rural and urban dwellers. The current EUCs, including Ilula and Madizini, were among the *Ujamaa* villages established in the 1970s.

The second period (1986 to 2000) was dominated by liberalization and macroeconomic stabilization. It was facilitated by a global economic crisis and Nyerere's resignation, and Tanzania was pressured to implement the conditions of international financial institutions, including the implementation of a Structural Adjustment Programme (SAP) (URT, 2014). Due to the removal of subsidies to peasants, the liberalization of agriculture and trade, agricultural outputs decreased since farmers were not able to afford agricultural inputs, including fertilizers imports. This in turn led to stagnation in the speed of rural-urban transformation given their impacts on economic growth and agricultural production.

The third period from the 2000s was one in which a large disparity in poverty levels between rural and urban areas was evident. This phase has been dominated by poverty-

reduction approaches such as those in the Millennium Development Goals (MDGs), Poverty Reduction Strategy Papers (PRSP), including the National Strategy for Growth and Reduction of Poverty (NSGRP) or MKUKUTA in its Swahili acronym (2005 to 2010) and the second generation of MKUKUTA (2010 to 2015). Other strategies include Tanzania Development Vision 2025 (TDV 2025), which outlines the country's aspiration to reach middle-income status by 2025 through structural transformation (Christiansen *et al.*, 2016). To achieve TDV 2025, a range of Long-Term Prospective Plans (LTTPs) and medium-term plans in the form of Five-Year Development Plans (FYDPs) were formulated.

In the first stage of FYDPs, covering a period from 2011 to 2016, the major constraints on Tanzania's progress, particularly infrastructural bottlenecks, skilled labour, science, technology and innovation, the general business environment and agricultural productivity, were all to be addressed (URT, 2012). The second stage of FYDP from 2016 to 2021 focuses primarily on industrial sectors like gas and fuelled-based agro-processing and medium technology industries (URT, 2016). The third FYDP stage from 2021 to 2026 concentrated on improving competitiveness in all sectors with a particular emphasis on manufacturing and services (URT, 2012). Under LTTPs most agro-processing and other value-adding industries are located close to rural producers in small urban centres (Christiaensen *et al.*, 2016). All these phases under the third period influenced the pace of the structural and rural-urban transformations.

Rural-urban transformation in Tanzania, as elsewhere, is experiencing numerous challenges such as unplanned settlement, solid waste management challenges, limited policies to support rural transformation and uncoordinated development efforts (RUT, 2016). This study is therefore envisaged to inform government policies aimed at

addressing the challenges associated with rural-urban transformation by providing the conceptualisation of emerging urban centres being not merely trading centres but areas of rapid change and growth in economic activities, population and urban services centres (RUT, 2016).

#### **1.1.5.1 Administrative transition as part of rural-urban transformation process in Tanzania**

Administratively, in changing from rural (village) into urban (township) areas, rural villages are merged and gradually transformed into townships (Lazaro *et al.*, 2017). However, the transformation process is not linear but depends on the political will locally to support the transition process and local drivers for the development of emerging urban centres. The formal administrative stages of transition to a township as part of rural-urban transformation processes involve changing legal status from ‘village’ to ‘township’, ‘township with township authority’ and eventually to ‘town’ with town council (Figure 1.1).

According to the Local Government (District Authorities) Act 1982, a township is the area of jurisdiction of a township authority. The Urban Planning Act 2007, underlines the requirements for an area to become a township, including a minimum population of 10 000 people and a level of services including a health centre, twenty registered retail shops, a market place and a primary court and should be either be a ward or divisional headquarters. An area can also qualify to be a township if it is a district administrative centre and meets all the above listed requirements. The minister responsible for local government authorities has the power to declare an area a township in the government gazette after consultation with the respective local government authority or district council.

The statutory boundaries of many rural townships in Tanzania cover relatively large planning areas and are determined on the basis of local decisions considering the township's existing size or future growth needs. As argued by URT (1995), the determination of most township boundaries has resulted in uncertainty in relation to the tenure and use of rural land that has been enclosed into township areas, administrative conflicts between township authorities and village governments, and the limited resources available to provide services to rapidly growing township populations.

The structure of local administration and institutional arrangements is important in defining rural-urban relations and relations between local and central government (Tacoli, 2002; Wenban-Smith, 2014). It is therefore of particular interest to link rural-urban transformations with broad governance structures and practices on the ground with regard to land, domestic water and solid waste management, this being the central focus of this study.

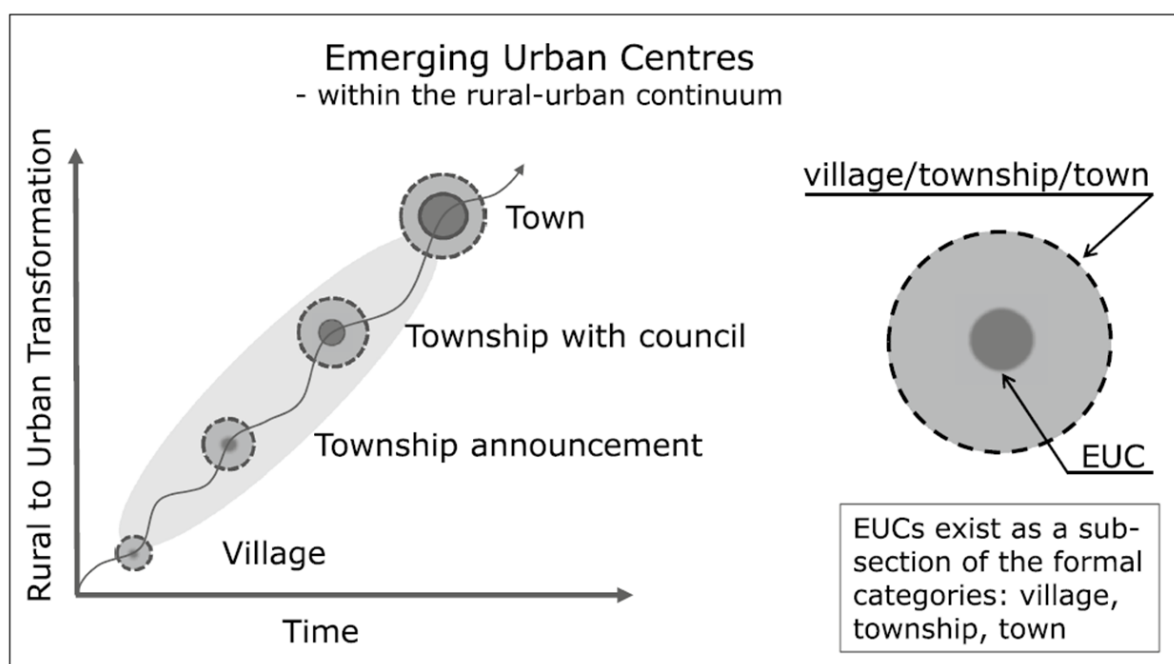
The role and responsibilities of local government have increased considerably, often extending to both urban and rural settlements (Tacoli, 2002). Local government authorities (in districts and townships) are responsible for formulating development plans, regulating land-tenure systems, land-use plans, managing resources (land and water), collecting revenue, acting and enforcing by-laws to safeguard the needs of different resource users, and making provision for the requirements of economic and population growth (Tacoli and Satterthwaite, 2003; USAID, 2011; CLGF, 2018).

However, the capacity of local government authorities in Tanzania to adjudicate competing claims to natural resources appears to be limited by the scale of the emerging pressures (Smucker *et al.*, 2015). Among other greatly emphasized barriers in townships is the

continuous existence of rural governance structures related to land use, water and waste management and taxation (Lazaro *et al.*, 2017).

### 1.1.5.2 Emerging Urban Centres (EUCs) development

Through spatial expansion, densification and the administrative transition of rural settlements into urban areas, the RUT process in Tanzania has led to the development of Emerging Urban Centres (EUCs) (Figure 1.1). Thus, in the last decade, many EUCs have rapidly grown both demographically and economically (Larsen and Birch-Thomsen, 2015; Lazaro *et al.*, 2017). EUCs are differentiated from administrative areas commonly identified as “townships”, “towns”, or “small towns”, which are established by law (Lazaro and Birch-Thomsen, 2013; Lazaro *et al.*, 2014). Administratively, EUCs are not formally registered as urban centres, and therefore they fall outside formal urban classifications and have become centres for providing services not only for their residents but also for their rural hinterlands (Lazaro *et al.*, 2014).



**Figure 1.1: The conceptual presentation of the administrative stages of Rural-Urban Transformation in Tanzania (Lazaro *et al.*, 2019).**

In Tanzanian context, EUCs represent urban centres at the initial stage of centre development, characterized by having experienced a process of change from a 'large village' to a 'small town' with an above-average increase in economic activity and population growth during the last decade (Larsen and Birch-Thomsen, 2015). EUCs are also characterized by in and out migration from the hinterland villages and distant regions. EUCs within townships experience urbanization more intensively than other parts of the township due to their high concentrations of people, economic activities, technological innovation, infrastructural development and service delivery.

Analogically, EUCs have almost the same functional features as the small and intermediate urban centres postulated by Satterthwaite (2016). The emergence of small and intermediate urban centres that are not separated from the 'rural' is often ambiguous, being heterogeneous urban forms not easily distinct from large villages or small urban centres (Satterthwaite, 2016). The factors that influence the development of EUCs in Tanzania include national policies related to both economic and settlement policies or Ujamaa (villagization in 1970s) and national liberalization of the economy during the 1990s, which provided pathways for the location and formation of EUCs (Lazaro *et al.*, 2014; Lazaro *et al.*, 2017; Tacoli and Agergaard, 2017).

Other factors in EUC development include the nature of agricultural production systems such as value chains for dominant crops, such as tomato and sugarcane for Ilula and Madizini respectively (Larsen and Birch-Thomsen, 2015; Tacoli and Agergaard, 2017). Mineral extraction is another important driver for the development of small emerging urban centres in Tanzania (Bryceson, 2011; Christiaensen and Todo, 2014; Christiaensen *et al.*, 2016). Physical location is also important for EUC development, since it provide comparative advantages transport-wise, as well as economic and social infrastructure like

schools, health facilities, bus terminals, electricity, shops, communications, agri-processing facilities and financial institutions (Lazaro *et al.*, 2014). Moreover, emerging urban centres often become urban centres by being reclassified as urban either because of population increases or because the criteria for being urban have changed (Tacoli and Agergaard, 2017).

The populations of EUCs mostly engage in both farm and non-farm livelihood activities (Larsen and Birch-Thomsen, 2015). Therefore, small urban centres or EUCs have a considerable potential role in regional and rural development, as well as in poverty reduction through improved access to farm and non-farm employment, business development, the provision of goods and services and natural resource management (Lazaro *et al.*, 2014; FAO, 2017; Tacoli and Agergaard, 2017). There is an additional effect on poverty reduction when people move into small urban centres or secondary towns and whereby Tanzania embraces the power of urban centres as engines for national development (Muzzini and Lindeboom, 2008). Moreover, at the micro or household level, EUCs play an important role in providing a market for agricultural crops produced by smallholders, in providing services and in creating employment opportunities for their residents and the surrounding populations (Lazaro *et al.*, 2014, 2019). It is important to note that, EUCs development as part of rural-urban transformation process is not unique to Tanzania context or the two case studies under this study since similar process has been documented elsewhere in Africa and beyond (Satterthwaite, 2006; Kristensen and Birch-Thomsen, 2013; IFAD, 2016; Roberts, 2016; Steel *et al.*, 2019).

However, in Tanzania context like elsewhere, the potential role of small urban centres or EUCs in regional and rural development is not intrinsic to them but is largely determined by the wider economic, social and political contexts in which they exist (Tacoli and



Agergaard, 2017). In planning for development, most local government authorities within townships are lagging behind in planning service provisions for the rapidly growing populations of EUCs (Lazaro *et al.*, 2014; Tacoli and Agergaard, 2017). Therefore, there is a need to focus on EUCs, given their development potentials in relation to household economy, rural and national development.

Moreover, EUCs rapid growth has consequently led to an increase in the demand for land for urban functions like built-up areas, increased water demand for domestic use, factories and agriculture, and increases in the generation of solid waste of various compositions. However, despite rapid growth, urban planning, governance structures and practices in EUCs do not match the transition from rural to urban activities and ways of living, which remain a major challenge for their continuing success (Lazaro *et al.*, 2014; Tacoli and Agergaard, 2017). As shown in other parts of the world, managing rapidly growing small urban centres resulting from rural urbanization is proving to be a challenge (Roberts, 2016). There is much concern about the pace of urbanization and the capacity of government authorities at different levels to manage it (Agergaard *et al.*, 2018).

Unfortunately, several EUCs are not generalizable since there is a range of specific and diverse factors that determine their development (Larsen and Birch-Thomsen, 2015). According to Muzzini and Lindeboom (2008), there is as yet no comprehensive study of the urban landscape in Tanzania. To understand EUC development dynamics, it is important to consider how decision-making structures and practices are responding to the needs of the rapidly growing populations that are resulting from rural-urban transformations.

This study hypothesized that; the level of administrative transition has impacts on governance structures and practices in respect of accessing resources (land) and service provision (domestic water and solid waste collection) for the rapidly growing populations. The overarching research question for this study is therefore how governance structures and practices in relation to access to resources and services have changed in supporting rural-urban transformation within Ilula and Madizini EUCs? In responding to the overarching research question, the broad objective of this study is thus to identify how governance practices (public and private) in relation to land, domestic water and solid waste management have developed in supporting rural-urban transformation. Specifically, the study analyses the internal development dynamics of EUCs with a specific focus on their densification and spatial expansion, government decision-making structures at the district, township and village levels, the level of availability of resources (land and water) and the monitoring of recent past developments in resource governance, including service provision.

## **1.2 Problem Statement**

EUCs are socially and economically complex units due to their rapid population growth, which has led to different governance-related, social and environmental challenges. To responds to the evolving complex social, economic and environmental challenges emanating from rural-urban transformation, EUCs need the establishment of functioning institutions to support the transformation process. However, the actual administrative transition from rural village into township is a lengthy process, and so far, the governance responsibilities have not been fully devolved from district government to rural townships (Tacoli and Agergaard, 2017). Moreover, many emerging urban settlements in Tanzania remain within the mandate of District Councils, whose responsibility is rural development,

so that the increasingly urban character of the challenges faced by these areas becomes difficult to address properly (Wenban-Smith, 2014). In the same vein, Muzzini and Lindeboom (2008) argued that although townships operate under the district councils and have semi-autonomous status, with their own elected councils, they do not have an independent budget from the district council.

The lack of implementation of township status challenges the governance structures and practices relating to access to land and domestic water and the limited planning of service provision, including solid waste-handling practices, for the rapidly growing population. This is due to lack of autonomy in decision making in planning and budgeting for service provisions. Furthermore, the existing empirical and theoretical literature reviews have revealed the existence of insufficient knowledge about EUC development dynamics, since most of such studies have a geographical bias in that they focus mostly on larger urban centres or cities (Bryceson, 2011; Lazaro and Birch-Thomsen, 2013; Jones *et al.*, 2014; Combaz, 2015).

This study adopts the concept of governance as an analytical tool in understanding governance within a broad framework of rural-urban transformation, particularly how actors from the public and private sectors are coordinated within institutional settings to meet the challenges associated with rural-urban transformation. The study's empirical analysis revolves around the two selected case studies of Ilula and Madizini EUCs. The focus of the analysis is on changes in resource (land) and service (domestic water and solid waste) governance structures and practices as part of rural-urban transformation.

### **1.3 Justification**

Undertaking this study is justified by the circumstance that emerging urban centres are creating new forms of urbanization in Tanzania mostly in rural villages that are urbanizing as part of rural-urban transformation process. Operationally, the rationale for undertaking this study is four-fold. First, land and water are key resources demanded by rural-urban transformation (contested uses, availability, accessibility and affordability). The level of administrative transition from rural to urban has impacts in respect of access to resources and planning for service provision. Therefore, the increased demand for land and domestic water resulting from rural-urban transformations drives changes in governance structures and access practices by responding to the challenges of rapid population and economic growth. Similarly, solid waste-handling practices become an issue that calls for attention (generation, composition, disposal, composting and recycling) given their various implications for health, businesses, livelihoods and the environment. The study therefore analyses the current governance structures and practices in relation to land, domestic water and solid waste in emerging urban contexts and provides relevant recommendations for necessary planning and policy interventions.

Secondly, through an examination of the existing challenges to resource and service governance resulting from rural-urban transformations, this research contributes by improving understanding of these challenges and the necessary changes in local government authorities' governance structures in order to respond to the needs of the rapidly growing populations in rural townships in a timely and effective manner. Thirdly, through knowledge generated on rural-urban transformation processes, in particular EUC development dynamics, the study contributes to National Poverty Reduction initiatives such as the Tanzania Development Vision (TDV) 2025 goals, the National Strategy for

Growth and Poverty Reduction II (NSGPR/MKUKUTA), periodic government Five Years Development Plans (FYDP) and urban planning strategies and programmes. Fourthly, the study advances knowledge in the academic field of urbanization and the dynamics of rural-urban transformations, mostly on how governance structures and practices in respect of access to resources and services are changing in supporting the transformation process from rural (village) into urban (township).

## **1.4 Research Objectives**

### **1.4.1 Overall objective**

The overall objective of this study is to determine how governance structures and practices (formal and informal) in relation to land, domestic water and solid waste governance have developed in supporting the transformation of Ilula and Madizini emerging urban centres.

### **1.4.2 Specific objectives**

- i.** To determine patterns of land-use change in the last decade (2007 to 2017) within selected emerging urban centres;
- ii.** To examine changes in governance structures and practices for resource and service access in support of rural-urban transformations within selected emerging urban centres;
- iii.** To assess the level of the availability of resources and service provision within selected emerging urban centres; and
- iv.** To determine recent-past development in addressing resources access and service provision related challenges in the selected emerging urban centres.

## 1.5 Research Questions and Hypotheses

### 1.5.1 Research questions

To generate data that answer the above study objectives, the following research questions have guided this study:

- i. What have been the patterns of land-use change within EUCs in the last decade?
  - a. How are changes in land use governed and managed when agricultural land is reclassified as urban land?
  - b. What are the implications of land-use changes on planning for service provision and future urban growth?
- ii. How have land governance structures and practices changed in supporting rural-urban transformation?
  - a. How is land access mediated within EUCs?
  - b. What challenges do EUC residents face in relation to land acquisitions, allocations and tenure?
- iii. How have domestic water governance structures and practices changed in support of rural-urban transformation?
  - a. How is domestic water provision mediated within EUCs?
  - b. How has domestic water access status changed in the last ten years following the increase in domestic water demand?
- iv. How have solid waste governance structures and practices changed in support of rural-urban transformation?
  - a. How is solid waste management handled and planned in light of the increased generation of waste?
  - b. What are the observable social, economic and environmental impacts associated with the current practices of solid waste disposal within EUCs?

- v. What are recent-past developments in addressing resources access and service provision related challenges associated with EUCs rapid growth?
  - a. What initiatives have been implemented to address land governance related challenges within EUCs?
  - b. What initiatives have been implemented to address domestic water provision challenges within EUCs?
  - c. What initiatives have been implemented to address solid waste management challenges within EUCs?

### **1.5.2 Research hypothesis**

This study hypothesized that, the level of administrative transition has impacts on governance structures and practices in respect of accessing resources (land) and service provision (domestic water and solid waste collection) for the rapidly growing populations.

### **1.6 Research Limitations**

Despite the relevance of time in conducting this study precisely when an increasing number of EUCs are forming patterns of urbanization in Tanzania, and in light of the study's contribution to the body of knowledge and policy implications, some limitations must be acknowledged. This study focuses on the role of governance practices in supporting rural-urban transformation in emerging urban centres in Tanzania. Land, domestic water and solid waste were the three thematic areas selected for analysis due to their importance and relevance to rural-urban transformation processes. The analysis is based on empirical findings from two selected emerging urban centres that are at different stages in their administrative transition from rural (village) to urban (township). Limiting the study's analysis to these two case studies and three thematic areas creates challenges in generalizing the dynamics of rural-urban transformation, mostly the extent to which

different local authorities in Tanzania are responding to challenges related to governance and service provision emanating from rural-urban transformations.

Further research is therefore required countrywide to document the different patterns of rural-urban transformation and the associated governance challenges in respect of resource access, planning for service provision and context-based policy interventions. By doing so, development potentials associated with rural-urban transformations can be explored, in particular employment opportunities, revenue collection and service provision, among others. The validity and reliability of the collected data and constraints on time and resources were among other limitations of this study. In minimizing the magnitude of these limitations, the researcher has limited the study to two sites. Furthermore, data collection and methods of analysis have been sequenced so as to produce coherence in inquiry and continuous knowledge development and learning.

## **1.7 Structure of the Thesis**

This thesis consists of eight chapters and made up of publishable manuscripts as described in chapter four to seven. Chapter one presents the general introduction to the study with background information on urbanization trends globally and in Tanzania and an overview of the rural-urban dichotomy and rural-urban transformation/transition both in general and in Tanzania. The chapter also covers the topics of administrative transition to township status and the development of emerging urban centres, a problem statement and justification, and objectives. Chapter two presents the conceptual framework and different theoretical frameworks and theories that have guided the discussion and analysis in chapters four to seven. Chapter three describes the different methods used in the study,



including the sequencing of the inquiry, a justification of the methods used and how the methods used are linked to each other in supporting coherence and continuous learning.

Chapter four documents land-use changes as part of rural-urban transformations within Ilula and Madizini EUCs from 2007 to 2017 to show how rural-urban transformation impacts on land-use changes. Chapter five focuses on how land governance structures and practices (access and tenure) have changed in supporting rural-urban transformations. Chapter six looks at how domestic water governance structures and practices have changed in supporting the transition from rural to urban. The theme of chapter seven is changes in solid waste governance structures and practices in responding to the increasing challenges of solid waste management within emerging urban centres resulting from rural-urban transformations. Chapter eight presents the general conclusions and recommendations based on insights from the two EUCs that can be considered when developing policies, plans and regulations for township governance as an aspect of rural-urban transformations.

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## CHAPTER TWO

### CONCEPTUAL AND THEORETICAL FRAMEWORKS

#### 2.1 Conceptual Framework

Urbanization of rural areas or the process of rural-urban transformation varies between countries and regions due to the heterogeneous nature of the factors driving it (Roberts, 2016; Lazaro *et al.*, 2019). In most cases, rural-urban transformations are complex processes that are taking place in rural areas in all countries, several dimensions of which impact development (Global Donor Platform for Rural Development (GDPRD), 2016; Guin, 2018).

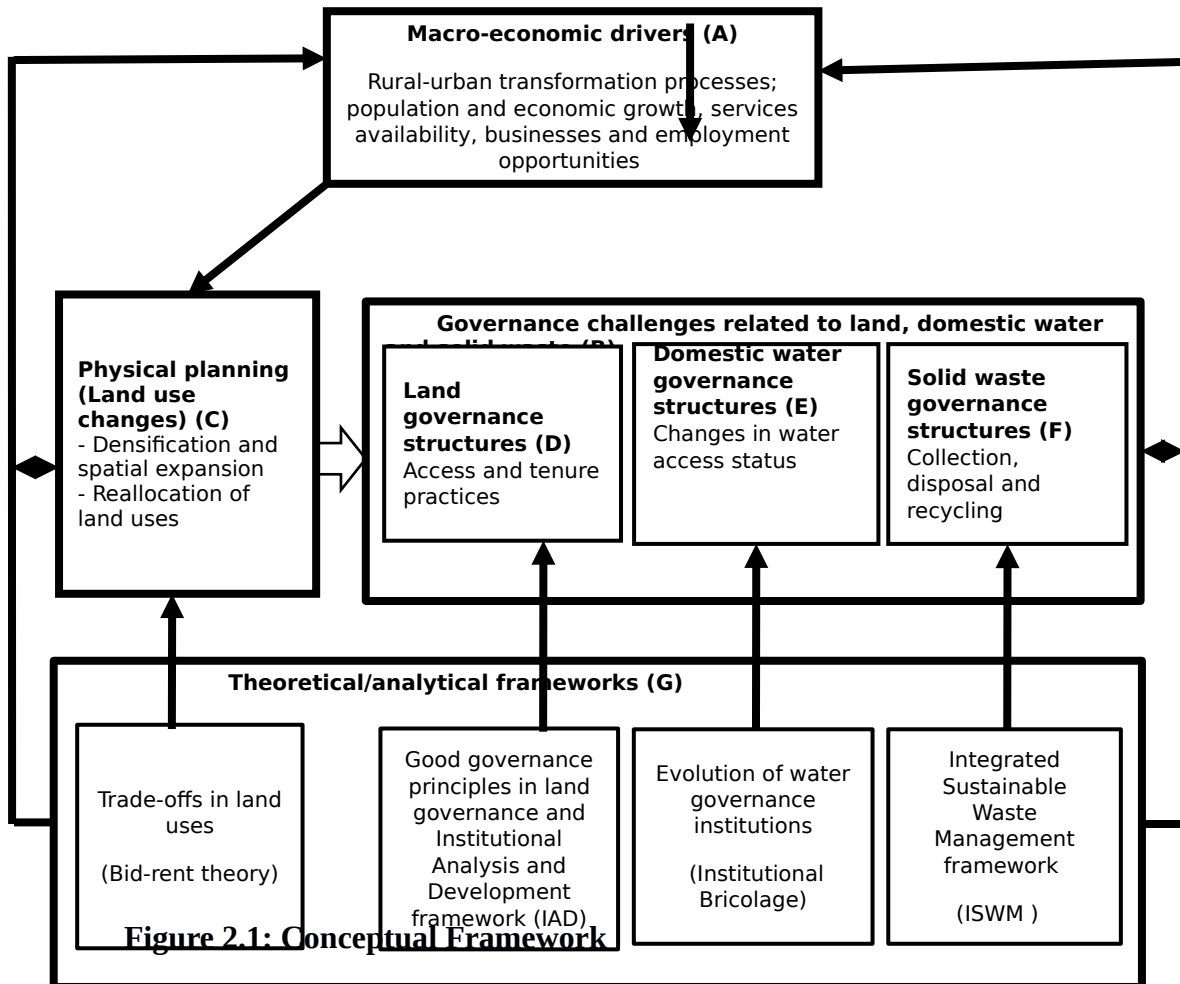
Thus, the impacts of rural-urban transformations can go beyond the positive effects on agricultural and economic transformation to include more negative effects, especially in middle and low-income countries (GDPRD, 2016). Thus, rural-urban transformation needs to be managed to mitigate the negative effects and maximize the opportunities that result. The aim is to facilitate an inclusive process of rural-urban transformation (IFAD, 2016) such that different social groups can benefit equally from the process.

In Tanzania, apart from urbanization processes in large urban centres, urbanization is also occurring in rural areas, particularly in village centres or trading centres connected to large urban centres. In practice, urbanization or rural-urban transformation process within EUCs is associated with macro-economic drivers (A in Figure 2.1) such as natural growth, seasonal migration and permanent settlement, an increasing scale of economic activities and declarations of township status. This process of urbanization or rural-urban transformation, as presented in the conceptual framework (Figure 2.1), results in housing

densification and spatial expansion (C in Figure 2.1) following the increase in built-up areas driven by rapid population growth, economic growth and urban infrastructure development. Similarly, the rapid increase in population and economic growth leads to governance challenges (B in Figure 2.1), such as increased pressure on land, the demand for domestic water and the generation of solid waste. Consequently, governance structures and practices related to land, domestic water and solid waste (B in Figure 2.1) are changing in response to the challenges resulting from rural-urban transformation, including changes in formal administrative status.

Therefore, the rate of population and economic growth influence the degree and extent to which emerging urban centres densify, spatially expand and provide services, as well as their potential for future urban growth. Land-use dynamics (C in Figure 2.1) resulting from the densification and spatial expansion of emerging urban centres have impacts on access to resources and planning for service provision, especially where there is limited public land for future urban growth. Rural-urban transformation influences governance structures that govern access to land and tenure practices (D in Figure 2.1), domestic water supply, infrastructure development (E in Figure 2.1) and solid waste management, including collection and disposal practices (F in Figure 2.1).

To understand how governance structures and practices related to land, domestic water and solid waste have changed in support of the process of rural-urban transformation within emerging urban centres in Tanzania, different theoretical and analytical frameworks (H in Figure 2.1) are applied as presented in section 2.2.



## 2.2 Theoretical and Analytical Frameworks

A range of theoretical and analytical frameworks (G in Figure 2.1) have been devised to enable investigations of governance to be made (Nunan, 2015; Devas, 1999). In relation to this study, this means the governance of urban resources and service delivery. However, there is no single overarching framework that provides a complete and adequate picture of the range of decision-making processes and forms of behaviour that shape resource governance practices and service provision in different contexts (Nunan, 2015). Insights can nonetheless be drawn from a range of theories and frameworks that are helpful in analysing decision-making structures and showing how they may influence resource

governance practices, whether formally or informally, in responding to the challenges emanating from rural-urban transformations.

### **2.2.1 Land-use changes resulting from rural-urban transformations**

This thematic area, which is covered in Chapter 4, documents the dynamics of land-use change resulting from the process of rural-urban transformation in two emerging urban centres (EUCs) in Tanzania from 2007 to 2017. The aim is to illustrate how rural-urban transformation impacts on land-use changes and how these changes, depending on the different contexts, influence patterns of urban development (El-Barmelgy *et al.*, 2014). In most cases, the growth of urban centres results in the conversion of land for urban uses without regulated planning responding to the needs of a growing population, especially investment in infrastructure and service provision (Tali *et al.*, 2013). That is, urban growth is usually rapid, while the planning process that allocates land-uses is slow (El-Barmelgy *et al.*, 2014).

Therefore, a detailed understanding of spatial or temporal processes of land-use change associated with urban dynamics is required (Deininger *et al.*, 2012; Mkalawa, 2016; URT, 2016; Patra *et al.*, 2018). Chapter 4 assesses the dynamics of land-use change within the two EUCs in the last decade in the context of conversions of land-use classes into different uses and with a specific focus on reallocations of agricultural land for urban uses, such as residential areas, institutions and industrial development. Analytically, Chapter 4 applies theoretical insights from bid-rent theory (Alonso, 1964; Mills and Hamilton, 1994; El-Barmelgy *et al.*, 2014).

From an economic perspective, land is a complex object with dual characteristics, being a commodity in the normal economic sense and being immobile by virtue of its varied spatial characteristics (El-Barmelgy *et al.*, 2014). In urban economics, populations and economic activities are concentrated in a geographical space with the advantages of clustering activities in certain locations despite the positive and negative consequences in terms of increased productivity and congestion respectively (Burnell, 2010).

Bid-rent theory explains the relationship between land uses in urban settings and in relation to urban land values. For example, Muto (2006) applied a bid-rent function model in order to establish the mechanisms of a market in urban land. Thus, crops that generate high revenues will be allocated desirable land (Muto, 2006; El-Barmelgy *et al.*, 2014), while households and firms that offer higher bids than agriculture will also be allocated land.

In the context of EUCs, land-users make land-use decisions (for example, between housing and agriculture) in light of the land-use dynamics that result from rural-urban transformations, such as housing densification, the spatial extension of built-up areas and urban land-use regulations. Bid-rent theory is relevant in the context of this study given its theoretical suggestions for how land users in urban settings make trade-offs in land-use decisions based on the bids offered by different land uses. By drawing theoretical insights from bid-rent theory, Chapter 4 examines local factors influencing land-use decisions by EUC residents in light of the degree of rural-urban transformation. More specifically, Chapter 4 assesses the implications of land-use changes (densification and spatial expansion) within EUCs on land-access practices and service provision (domestic water supply, and solid waste collection and disposal practices) and future urban growth.

### **2.2.2 Land-governance structures and practices in support of rural-urban transformation**

This topic, presented in Chapter 5, focuses on how land-governance structures and practices (access and tenure) have changed along with rural-urban transformations. Land is considered to be a crucial resource in rural-urban transformations due to the demand for multiple uses of land and its importance to people's livelihoods (IFAD, 2016). In different contexts, urbanization always goes hand in hand with the transformation of land in rural and urban areas (Ewijk, 2016). Consequently, land problems are critical in both rural and urban centres based on the rate of urbanization (Kironde, 2009), since the limited resources in land create intense competition for different uses, including built-up areas and improvements with respect to land (Sietchiping *et al.*, 2014). Therefore, land governance is important in addressing the pressures on land associated with urbanization in both rural and large urban landscapes (Kironde, 2009).

Theoretically, this topic draws on insights from good governance theory, which deals with various perspectives of governance and how they have evolved over time (Ekundayo, 2017). Good governance theory has a set of principles guiding how a sector of interest should be developed and managed. In the land context, good governance is about how decisions related to land governance are made and implemented (Kironde, 2015). Different institutions (UNDP, 2007), including the IMF (1997), have developed a set of good governance principles that can be applied to different governance contexts, including accountability, transparency, public participation, the rule of law, efficiency and effectiveness. With respect to land governance, good governance is fundamental in protecting property rights and developing efficient and effective property and land markets

(Bell, 2007). Furthermore, secure tenure and access to land is essential for promoting economic growth and social development (Zakout *et al.*, 2006).

Various scholars (Zakout *et al.*, 2006; Kironde, 2015) have contextualized good governance principles in the context of land governance. Thus, good governance theory is relevant in the context of this study since its principles, such as civic engagement, public participation, efficiency, effectiveness, subsidiarity, transparency and equity, are all invoked in assessing the extent to which they are adhered to in relation to access to land and land-tenure practices resulting from rural-urban transformations. The aim is to assess how inclusive is the process of rural-urban transformation within EUCs with respect to land access and tenure, given the heterogeneous nature of social groups with vested interests in land.

Analytically, this topic draws on insights from the Institutional Analysis and Development (IAD) Framework. Being a prominent tool within New Institutional Economics (NIE) (Ostrom, 2005), the IAD framework is applied in a wide range of institutional analyses (Ratner *et al.*, 2013) and by policy-makers (Hall *et al.*, 2014). Various scholars have deployed the IAD framework in studying resource governance, especially with respect to land reform (Clement and Amezaga, 2013), water (Nigussie *et al.*, 2018) and forests (Anderson, 2006).

Analysis of land governance structures (institutions) is essential given the importance of land in rural-urban transformations. The IAD framework is therefore relevant in the context of this study because of its three key variables, which are applied in institutional analysis, namely the action situation, the characteristics of community members and the physical environment (Ostrom, 2005). By drawing theoretical insights from the IAD framework, Chapter 5 explores how land governance structures (actors and institutions)



and practices (land access sources and tenure or ownership) have changed in support of rural-urban transformations.

### **2.2.3 Changes in domestic water governance structures and access practices in support of rural-urban transformation**

This thematic area focuses on how domestic water governance structures and access practices have changed as result of the rural-urban transformation of EUCs, a topic dealt with in Chapter 6. In most cases, urbanization trends introduce new pressures on water resources (Neto, 2016) and increase the areas and numbers of people who are not served by public water supply utilities (UN-Habitat, 2011). Different countries and urban centres respond differently to increased water scarcities resulting from rapid population growth. As various scholars have argued (Franks *et al.*, 2013; Mosha *et al.*, 2016), the availability of water and users' access to water is entirely the function of institutions, organizations and actors at the different scales and levels that are responsible for coordinating and regulating water supply and management. Governance has been identified as the primary cause of failures in urban water provision (Rugemalila and Gibbs, 2015). Within the context of EUCs, domestic water governance structures and access practices are expected to change in response to the increased demand for domestic water from multiple and increasing numbers of users.

This theme draws on the theoretical insights of institutional bricolage (Cleaver, 2002; Cleaver, 2012; Cleaver and De Koning, 2015; Nunan, 2015), which is used in assessing institutional dynamics, complexities and diversities in both formal and informal settings (Nunan, 2015). Various scholars have used institutional bricolage to analyse the evolution of resource governance institutions in different contexts. For example, Merrey and Cook (2012) applied institutional bricolage to assess institutional creativity related to food and

water at multiple levels in river basins, De Koning (2011) assessed bricolage processes in a smallholder forest in the Amazon, while Cleaver (2001) used it to determine the extent to which institutional arrangements can foster conflicts and cooperation among diverse stakeholders in the Usangu Basin in Tanzania.

According to De Koning (2011), constant institutional transformation is important under circumstances of institutional bricolage. The main emphasis with institutional bricolage is the need to take into account the process and nature of institutional formation and adaptation locally (De Koning, 2011; Cleaver, 2002). Normally, institutions are established specifically to perform particular functions (Cleaver, 2001). In the EUC context, domestic water governance structures (institutions and actors) are changing in order to address the increase in domestic water demand resulting from rapid population and economic growth. For example, water utility authorities have been established within small townships to replace older institutions such as water committees and community water organizations. The historical formation and roles of newly established water governance institutions in support of rural-urban transformation differ, but their roles are similar, namely the provision of a clean water supply and sanitation. Therefore, application of institutional bricolage is relevant in the context of this study given its analytical focus on reshaping institutional arrangements in response to rapidly changing situations such as increase in number of resource users (Cleaver and De Koning, 2015).

By drawing theoretical insights from institutional bricolage, the aim is to investigate how domestic water governance structures and access practices within EUCs have evolved to address the increased demand for domestic water resulting from rapid growth associated with rural-urban transformations.

#### **2.2.4 Solid waste management structures and practices resulting from rural-urban transformation**

This topic, presented in Chapter 7, focuses on solid waste management structures and practices within EUCs at different stages along the process of rural-urban transformation. The urbanization process leads to increases in the rate at which solid waste in various compositions is generated due to changes in population growth patterns, foods habits, standards of living and commercial activities in small urban centres (Das and Bhattacharyya, 2014). In the last two decades, solid waste management has become a global environmental priority, given its threats to the environment, human health and socio-economic development (UNDP, 2016; Kaza *et al.*, 2018). Urban solid waste management is a major and worsening problem, since most municipal authorities are unable to keep up with increase in the amount of waste generated (Nthambi *et al.*, 2013; Binyaruka, 2015).

Theoretically, this topic draws on insights from the Integrated Sustainable Waste Management (ISWM) framework (Wilson *et al.*, 2013; Muller and Hoffman, 2001), which focuses on both the technical (collection and disposal) and governance (responsive institutions, inclusivity and financial sustainability) aspects of solid waste management (Wilson *et al.*, 2013). The ISWM framework has been applied in different contexts by different scholars. For example, Muller and Hoffman (2001), used ISWM to assess community partnerships in integrated waste management, while Wilson (2007) used it to analyse the development drivers of waste management. Wilson *et al.* (2013) applied ISWM to assess waste management in developing countries. Other scholars have used it to conceptualize municipal solid waste management in low-income countries (Schübeler *et al.*, 1996) and to assess waste management programmes (Anschütz *et al.*, 2004).

The ISWM framework mostly deployed in developing countries (Wilson *et al.*, 2013), but the principles are applicable universally (Wilson, 2007). The ISWM framework is therefore relevant in the context of this study since it provides theoretical insights into significant aspects of integrated waste management in urban settings that are important to investigate and address in order to mitigate the negative human, economic and environmental impacts of solid waste generation and disposal.

As part of rural-urban transformations, the populations of EUCs are rapidly growing and businesses are flourishing, leading to increases in solid waste generation. Increasing solid waste generation poses challenges for solid waste management and consequently impacts on the environment (inappropriate disposal), human health (insufficient solid waste collection) and the economy (efficient solid waste disposal). Therefore, increasing solid waste management challenges within EUCs calls for an integrated waste management approach, as suggested by the ISWM framework. By drawing theoretical insights from ISWM, Chapter 7 investigates the current situation for solid waste generation within rapidly growing EUCs, as well as solid waste collection and disposal practices (the technical aspect) and how different actors are organized to handle the increasing challenges of solid waste management (the governance aspect).

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## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

This chapter presents a discussion about the criteria for selecting the research sites and their description, the research design, key timelines, and methods of data collection and analysis. The detailed discussion that follows covers the sequencing of the inquiry, justifies the methods used and shows how those methods are linked in order to provide coherence and a continuous learning experience.

#### **3.1 Criteria for Selecting Research Sites**

This study was conducted in Ilula and Madizini Emerging Urban Centres (EUCs). A previous research project, “Rural-Urban Complementarities for the Reduction of Poverty” (RUCROP) (Lazaro *et al.*, 2013; 2014), revealed that Ilula and Madizini EUCs are at different stages of their administrative transitions along a rural-urban continuum.

As part of the administrative transition, Ilula was declared to be a township in 2006 and Madizini in 2002. Ilula Township’s administrative jurisdictions are identified and formed by Ilula, Nyalumbu and Mlafu wards and their administrative boundaries (Figure 3.1). The township administrative transition is more advanced in Ilula Township, which has a Township Executive Officer (TEO) in place and other support officers such as accountant, a trade and human resources officer (all appointed by the District Council), Ward Executive Officers (WEOs), Village Executive Officers (VEOs) and sub-village chairpersons. Ilula Township Authority (TA) was established in 2015 and functions through committees with quarterly statutory meetings.

In the case of Madizini, despite of being declared a township in 2002, it is still administratively a village and governed by village (rural) administrative structures in despite of the significant time that has elapsed since its upgrade to a township. Madizini is therefore still governed by village (rural) administrative structures. The administrative jurisdictions for the gazetted Madizini Township have not yet been determined. Moreover, in key informant interviews, local leaders claim that some villages have been identified as potentials for the proposed administrative jurisdictions of Madizini Township. Thus, apart from differences in the level of the administrative transition achieved so far, there are also other local particularities specific to each EUC that are influencing their respective transformation processes and impacting on access to resources, services and provisions on the part of the rapidly growing population.

Therefore, the two EUCs in this study were selected on the basis of the differences in their levels of administrative transition, as well as local drivers of development. Being at different levels of administrative transition the two EUCs provide the basis for a comparative analysis through a collective case-study investigation into whether the level of administrative transition and its local peculiarities has an impact on governance structures for resources and services and access practices as part of the process of rural-urban transformation.

## **3.2 Description of Research Sites**

### **3.2.1 Ilula EUC**

Ilula EUC is in Ilula and Nyalumbu Wards in Kilolo District and lies along the Tanzania-Zambia highway, approximately 50 km East of Iringa Municipality (Iringa Regional Headquarters). According to the 2012 Population and Housing Census (PHC), Ilula

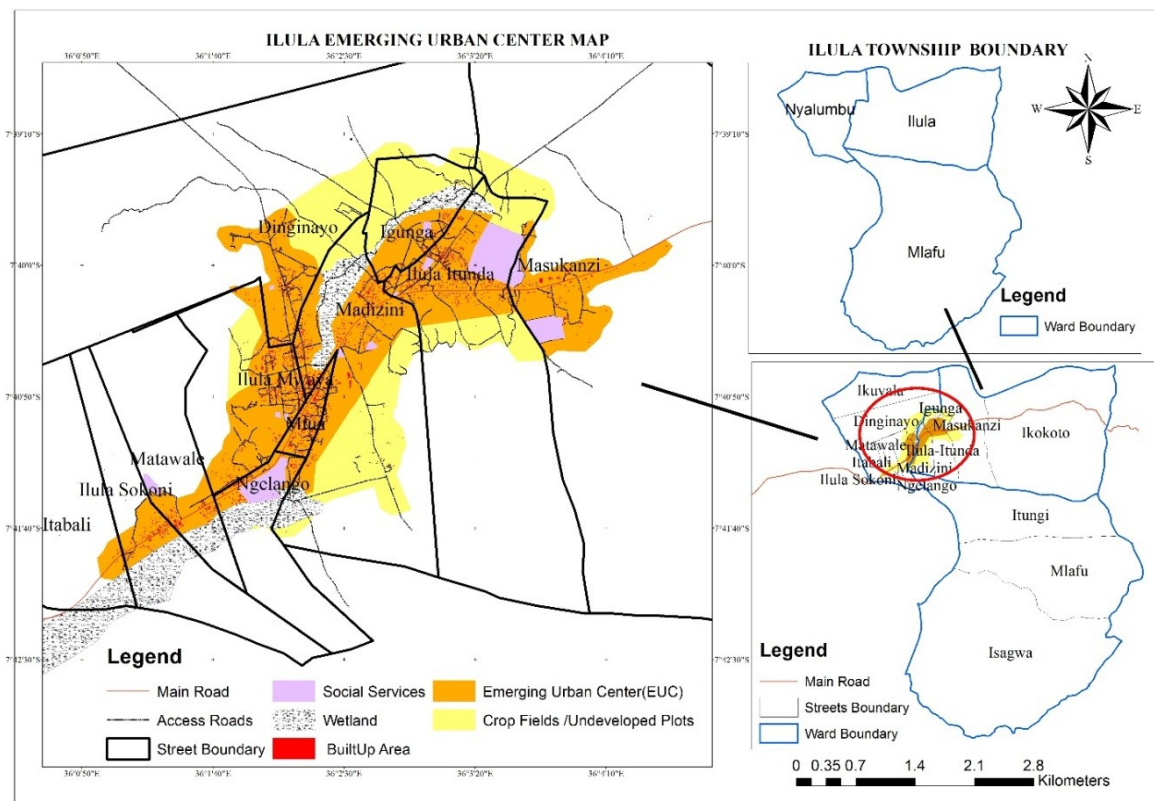
township comprised Nyalumbu, Ilula and Mlafu Wards and has a total population of 32 801. Ilula EUC comprised Itabali, Ilula Sokoni, Matalawe, Ngelango, Mtua, Mwaya, Madizini, Igunga, Itunda and Masukanzi streets (Figure 3.1) and has a population of 22 957. Ilula EUC's population is equivalent to 70% of Ilula Township's population. From 2002 to 2012, the population of Ilula EUC has increased by between 13% (Lazaro *et al.*, 2017) and 17% (Larsen and Birch-Thomsen, 2015).

The dominant agricultural value chain in Ilula EUC and hinterlands is tomato production, including packing, marketing and processing (a tomato factory was established there in 2017). The initial drivers of transformation for Ilula EUC were maize production, tomato cultivation, the transportation highway linking Tanzania and Zambia, and the establishment of social institutions, including schools, hospitals and the Ilula orphanage centres and programme. The current drivers of transformation for Ilula EUC have slightly changed to include factors like the establishment of a Township Authority (TA), service institutions such as the National Microfinance Bank (NMB) and Savings and Credit Cooperatives (SACCO s), crops diversification and businesses.

**Figure 3.1: Ilula Township and EUC topographical map**

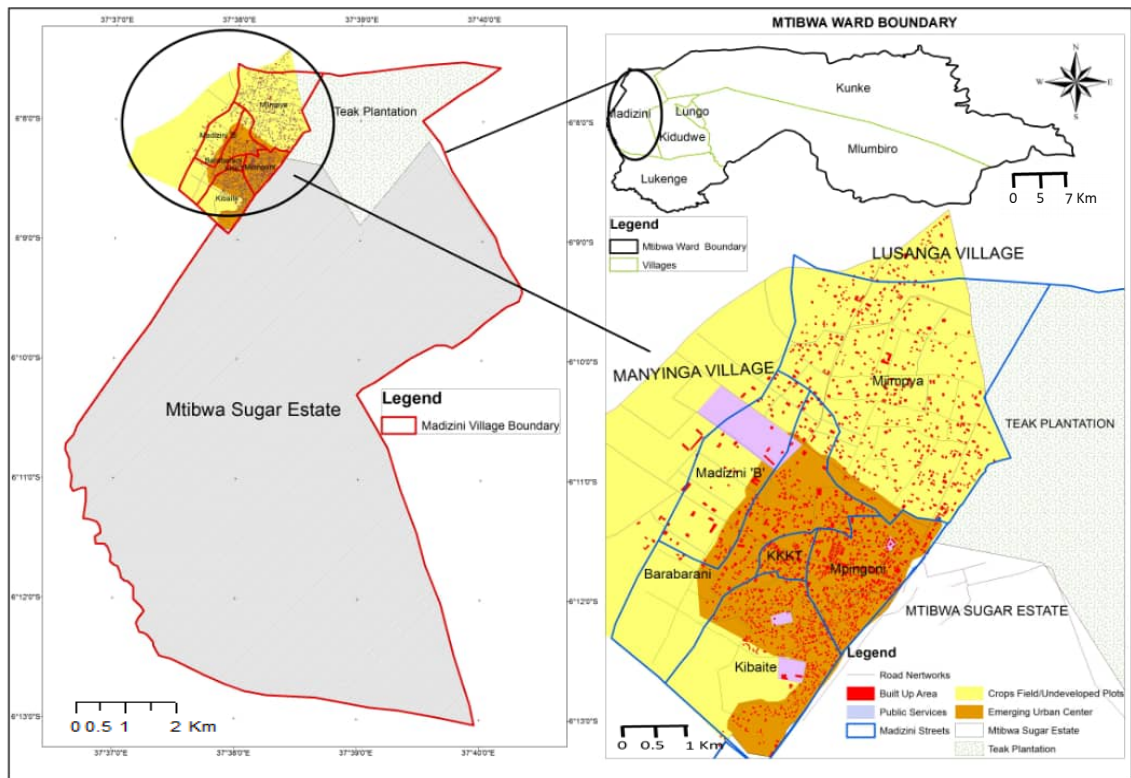
0 1 2 Km

0 5 10 Km



### 3.2.2 Madizini EUC

Madizini EUC is in Mtibwa Ward, Mvomero District (Figure 3.2), approximately 100 km North of Morogoro Municipality (Morogoro Regional Headquarters). According to the 2012 Population and Housing Census, Madizini EUC has a population of 14 168, equivalent to 45% of Mtibwa ward's population. From 2002 to 2012, Madizini's population has increased by 72% (Lazaro *et al.*, 2017). The dominant agricultural value chain in Madizini EUC is sugarcane production and processing by the Mtibwa Sugar Estate (MSE) and small-scale sugar out-growers (farmers). The initial driver of transformation in Madizini EUC was the sugarcane plantation and factory, while the current drivers are crop diversification, service institutions and businesses.



**Figure 3.2: Mtibwa Ward and Madizini EUC topographical map**

### 3.3 Research Design

#### 3.3.1 A case-study approach

This thesis uses a case-study research design. A case study is an approach to research that is used extensively in a wide variety of disciplines in the social sciences to explain or explore in depth complex issues or social phenomena as they occur in everyday or real-life contexts (Yin, 2009; Crowe *et al.*, 2011). Depending on the objectives of the research, a case study can be designed differently in the form of either be a single case study or collective/multiple case studies (Zanal, 2007). This thesis employs the latter. Collective or multiple case studies require the careful selection of a number of examples. In collective or multiple case studies, data are collected from different sources, like surveys and interviews (Stake, 1995), and analysed in different ways (Gerring, 2013). Data collection from collective/multiple case studies needs to be flexible enough to allow a detailed description

of each individual example before considering potential similarities and differences through comparison between examples (Crowe *et al.*, 2011).

Different scholars have used collective/multiple case-study designs in different contexts. For example, Robertson *et al.* (2010) used five national hospitals as case studies in evaluating the introduction of electronic health records in English hospitals. Pearson *et al.* (2010) used eight case studies to investigate the formal and informal ways in which students understand patient safety. Pinnock *et al.* (2008) took the cases of four Primary Care Organizations to examine service planning and implementation in primary care. Andreasen *et al.* (2017) selected three residential areas to study urban transformations in secondary towns in Arusha, Tanzania. Collective/multiple case studies offer the advantage of allowing comparisons to be made across several cases (Crowe *et al.*, 2011).

In this study, a collective/multiple case-study design was employed using Ilula and Madizini EUCs as case studies to investigate how different are in the level of administrative status or stage. In addition, the case study approach also assesses how different these two EUCs are in the process of rural-urban transformation and its impacts on land and domestic water access and solid waste-handling practices within an EUC on a day-to-day basis.

For the purposes of collecting comprehensive, representative, valid and reliable data responding to the research objectives and questions, a combination of research methods were employed for both data collection and analysis, as required by the case-study approach. The research methods and tools/instruments used to collect and analyse the data in this study have been sequenced so as to facilitate coherence and continuous learning,



including building on different levels of understanding, since the chosen research methods inform each other.

### **3.3.2 Research population and unit of analysis**

The research population for this study is all the households in Ilula and Madizini EUCs, and the sampling unit was the individual household. Based on the research question(s) and the level of inquiry (respondents' categories), the units of analysis for this study are i) households for household-level resource governance and service access practices, and ii) EUCs and townships for institutions and decisions-making procedures (actors, administrative rules and procedures) regarding resource and service governance structures and access practices.

## **3.4 Key Timelines: Setting the Scene for Sequencing the Inquiry and Continuous Learning**

### **3.4.1 Literature review of central concepts**

A literature review of the concepts that are central to the study was conducted during two-month study visit to the University of Copenhagen, Denmark, from October to December 2015. The literature review was continued during another six-month study visit from August 2016 to March 2017 to the same university. The central concepts reviewed were urbanization, the rural-urban dichotomy, governance, rural-urban transformation and the importance of governance, as well as the administrative transition to township status and the development of emerging urban centres. Conceptual and theoretical reviews for the study were also carried out at this stage.

### **3.4.2 Household survey questionnaire: development and piloting**

A household survey questionnaire (generic for RUT project) was developed by senior and junior researchers in the project and was tested and piloted alongside the training of enumerators. Relevant improvements in the questionnaire were made before household baseline survey fieldwork was undertaken in February 2016.

### **3.4.3 Households survey data collection, coding, cleaning and analysis**

Household survey data was collected in February 2016. For ease of retrieval and analysis, data collected from the household survey were coded on the basis of the research questions and cleaned according to information provided in the physical questionnaire. The analysis was made using the Statistical Package for Social Sciences (SPSS) version 25 based on the study's three thematic areas. Although being a continuous process, household data cleaning and analysis were mainly conducted during the six-month study visit to the University of Copenhagen in 2017.

### **3.4.4 Developing interview guides for key informants and households for in-depth interviews**

Based on the household survey data, interview guides for key informants and in-depth household interviews were developed and piloted before conducting actual interviews in the field. For example, interview guides for in-depth household interviews were piloted in Madizini EUC in May 2017 with three households, each representing one of the study's thematic areas, namely land, domestic water and solid waste.

### 3.4.5 Fieldwork for qualitative interviews

Fieldwork for key informant interviews and in-depth household interviews was conducted at different times. In Ilula EUC, qualitative interviews were conducted in May and June 2017, while in Madizini EUC, they were conducted in May and October 2017 and in March 2018.

## 3.5 Data Collection Methods

### 3.5.1 Household survey

A household survey was conducted as part of the RUT project and covered the four project sites of Igowole, Ilula, Madizini and Kibaigwa EUCs. A household survey was conducted using a structured questionnaire (Appendix 1) administered by the enumerators, who were trained before data collection began. The purpose of conducting a household survey was to obtain an overview of household-level practices in respect of resource governance (land) and service access (domestic water and solid waste-handling practices).

Since the number of households varies between EUCs, proportionate sampling procedure was employed according to the number of households reported in the Population and Housing Census of 2002 (Appendix 2). The proportion of households as a percentage was calculated based on the number of households in 2002 for Ilula and Madizini EUCs (column 5 in Table 3.1; 7.6% for both EUC). The total number of households interviewed during the baseline survey for Ilula and Madizini EUCs was 468 (N) households (Ilula n=323 and Madizini n=145).

**Table 3.1: Number of households selected for household survey in each EUC**

1. EUC	2. Total population n (2002)	3. Number of households (2002)	4. Number of households selected per site	5. Proportional selected households (%)
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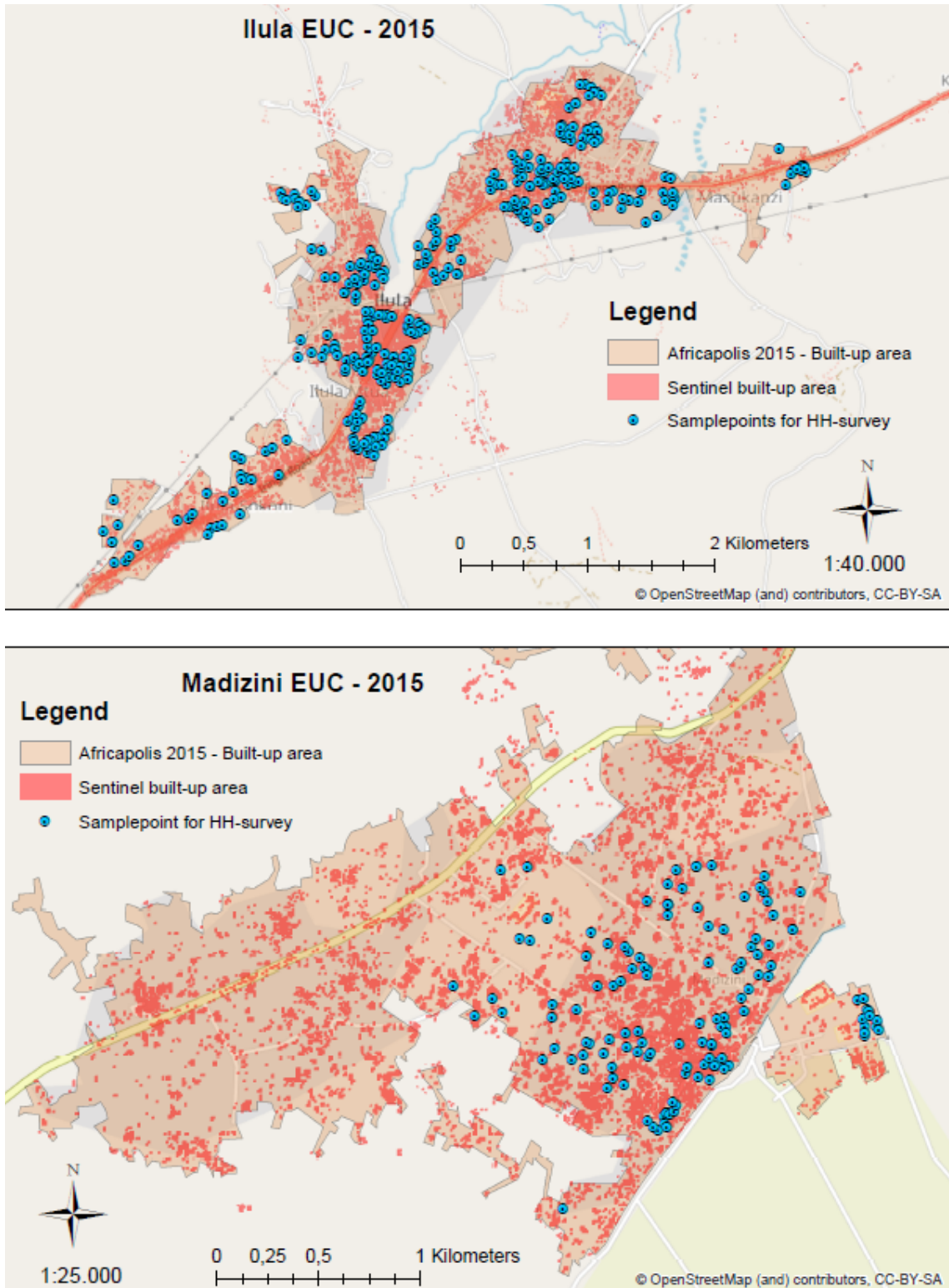
Ilula	20 446	4 238	323	7.6
Madizini	7 811	1 895	145	7.6

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Source: RUT Household Survey, February 2016

In order to obtain a representative geographical distribution of households within each EUC, households sampling was done at “sampling points”. The sampling points were the different neighbourhoods (built-up areas) within EUCs from which households for survey were selected. The sampling points were distributed on the basis of visual assessments of housing densities on each image and distributed proportionately between high and low housing densities (Figure 3.3). At each sampling point, ten households were sampled by selecting every second house. To prevent potential overlap between sampling points, the enumerators worked in teams of two to three, which started sampling in different directions from the sampling point and moved in opposite directions to the ends of each EUC.

A household was defined as those living in a house or compound and eating from the same pot, as well as other dependants of the household living elsewhere. For households with tenants, the number of tenants was also recorded. In a situation where a household had one tenant, a questionnaire was conducted with the tenant and the household was considered a “single person household”. Where there was more than one tenant, one was selected at random. The observations and results of the household survey set the basis for key informant interviews and in-depth household interviews given the variations and commonalities observed in the households’ different responses.



**Figure 3.3: Spatial distribution of households covered during household survey in February 2016.**

### **3.5.2 Key Informant Interviews (KIIs)**

Key Informant Interviews (KIIs) are qualitative in-depth interviews conducted with a wide range of community members who have information about a subject of interest or under investigation (Butler and Howell, 1980; Kumar, 1989; USAID, 1996). In this study, KIIs were conducted with 97 respondents linked to the following thematic areas: township administrative transition, land, domestic water, and solid waste governance practices. The key informants included among others: Township Executive Officers (TEOs), Ward Executive Officers (WEOs), Village Executive Officers (VEOs), village and sub-village chairpersons, the heads of water utility authorities, district resident land officers/urban planners, Wards and Township Health Officers and private-sector representatives such as informal waste-collectors, street-cleaners, public water-well and tap attendants and private/community well-owners. The key informants were purposively selected on the basis of their administrative or decision-making role and knowledge about land, water and waste management practices within each EUC and the township at large. The exact number in each key informant category is provided under each respective publishable chapter based on thematic areas.

The KIIs were conducted using semi-structured interview guides that were specific to each category of key informant (Appendices; 4, 5, 6, 7, 8, 9, 10 and 11). However, some questions were generic across different categories. The purpose of conducting KIIs was to obtain a broad understanding of issues such as current status within the township administrative transition, township administrative structures (actors' roles and relations), land, water and waste governance practices within each EUC, including changes in governance practices following the population increase, economic growth, housing densification and spatial expansion in the EUC. Data collected from KIIs built on

knowledge drawn from the main household survey data and the early field visit in August 2015 and set the basis for in-depth household interviews.

### **3.5.3 In-depth household interviews**

In-depth interviews are qualitative or unstructured interviews that are most appropriate for situations in which a researcher wishes to collect in-depth information in order to achieve a holistic or broader understanding of the situations from the respondents and to explore interesting areas for further investigation (Berry, 1999; Boyce and Neale, 2006). Interviews are often used to provide a context for other data (such as outcome data), offering a more complete picture of what happened and why (Boyce and Neale, 2006). Information from in-depth interviews is collected by using open-ended questions and probing wherever necessary for the purposes of obtaining more useful information (Guion *et al.*, 2012).

In-depth interviews are conducted with relatively few people, unlike surveys in which data are more quantitative and conducted with larger numbers of people (Guion *et al.*, 2011). The sample size used in qualitative research is often smaller, and large number of articles, book chapters and books suggest anywhere from five to fifty participants as adequate (Dworkin, 2012). The concept of saturation is the most important factor to think about when making decisions regarding sample size in qualitative research (Mason, 2010). Saturation is the point at which the data collection process no longer offers any new or relevant data (Fusch and Ness, 2015). When choosing respondents for in-depth interviews, the sample should ideally represent the diverse stakeholders and their various opinions (Boyce and Neale, 2006). The primary advantage of in-depth interviews is that they provide much more detailed information than what can be made available through other data-collection methods such as surveys (Boyce and Neale, 2006).

In this study, 39 in-depth household interviews were conducted, 20 in Ilula and 19 in Madizini. The hypothesis guiding these interviews was that households' varied responses as observed in the household survey data are based on individual household experiences and attitudes regarding land-governance, domestic water-access and solid waste-handling practices within EUCs. Households for in-depth interviews were purposively selected on the basis of observed variations and commonalities in the household survey data. In-depth interviews were conducted using a semi-structured interview guide (Appendix 3) that was customized for each individual household.

The purpose of conducting in-depth household interviews was to obtain in-depth understandings of land, water and waste governance practices at the household level, given the variations and commonalities observed in the household survey responses, and to link household-level data with information generated from KIIs.

#### **3.5.4 Land-use change detection analysis and water-point mapping**

Land-use change detection analysis for the two EUCs for the period 2007 to 2017 was conducted by using the Geographical Information System (GIS). The purpose of conducting this analysis was to establish the conversion of land-use classes from one land-use class to another in relation to population increase, housing densification and spatial expansion in each EUC. The extent of the change detection analysis for the two sites was determined on the basis of housing densification and spatial expansion, knowledge of the physical characteristics of the study sites and the areas covered during the household baseline survey of February 2016. Water-point mapping of public water taps and wells, both private and government, was also conducted.



### 3.5.5 Transect walks and observations

Transect walks and direct observations (Appendix 12) were conducted to orient and familiarize researchers with different neighbourhoods and streets within the two EUCs. Transect walks and observations aimed at assessing the physical characteristics of resources (land) and the service provision situation in relation to domestic water sources, infrastructure, access practices and solid waste collection and disposal practices. Transect walks and observations were also conducted to compare observations based on household locations and household responses in the household survey. The criteria for selecting transect-walk routes and streets were household densification, housing spatial development or changes in land use based on analysis of satellite images and household location (enumeration areas), topics covered by the household survey of February 2016.

The issues that were observed and noted during transect walks were the nature of housing (densification) and spatial coverage (patterns for newly constructed houses), common characteristics and potential differences. Service access practices for public water points (taps and wells) and solid waste-handling practices were observed and mapped for water points. Other issues that were observed included EUC spatial development and changes in land-use patterns. For example, conversion of agricultural fields into housing plots and types of crops cultivated.

The methods used during transect walks included recording and description of Global Positioning System (GPS) point (taking important notes on issues of interest) and photographs. Instant interviews and conversations were held with local people (guiding during transect walks), including those met at points of interest, like domestic water-point

attendants and informal solid waste-collectors and street-cleaners. Transect walk outputs included transect-walk observation reports from the field notes, transect-walk sketch maps and field photographs. Observations from transect walks and direct observation were important in triangulating the validity (realities/practices on the ground) of the information shared by households during the household survey, with the in-depth interviews and data collected from the KIIs.

### **3.5.6 Literature review**

Relevant official documents, reports and research articles were reviewed in accordance with the thematic areas or publishable manuscripts of the study. The purpose of conducting literature reviews of the central concepts was for orientation and to understand the theoretical conceptualization and empirical reviews underpinning them. The literature review helped to identify gaps in research and the contextualization of the study based on existing knowledge gaps (Lazaro *et al.*, 2013, 2014; Larsen and Birch-Thomsen, 2015; Tacoli and Agergaard, 2017; Agergaard *et al.*, 2018; Lazaro *et al.*, 2019). A number of official Tanzanian Government (TG) documents were also reviewed to understand the policy and legal framework governing land, water and waste in both rural and urban settings.

For land, the documents that were reviewed included the National Land Policy (1995), the Village Land Act No.5 and Land Act No.4 of 1999, the Urban Planning Act No. 8. of 2007 and the Local Government (District and Urban Authorities) Act No. 7 of 1982. For water, the documents reviewed included IUWASSA and TURUWASSA annual and quarterly progress reports, the Energy and Water Utilities Regulatory Authorities (EWURA) guidelines and the National Water Policy (2001). For waste, the documents reviewed

included the Local Government Authority (Urban Authorities Act) No. 7 of 1982, the Environmental Management Act of 2004 and the Public Health Act of 2009, among others.

### **3.6 Methods of Data Analysis**

Quantitative data collected from the household survey were analysed by using Statistical Package for Social Science (SPSS) version 25. The initial step involved coding quantitative data based on research questions drawn from the structured questionnaire. Data were then entered into SPSS and cleaning was carried out, including deletion and correction against physical questionnaires. Data analysis was conducted to generate descriptive statistics (frequencies) regarding households' practices in relation to land (access, sources of access, use and tenure), water (sources, providers, payment and changes in water status) and waste (household and productive waste from business disposal practices). The chi-square method was used through cross-tabulation to determine any significance differences in resources and service access practices between the two EUCs. Binary logistic regression analysis was conducted to assess factors that determine the likelihood that a household will have access to land within each EUC. Logistic model specifications and results are presented in Chapter 5. Furthermore, a Multinomial Logit (MNL) model was used to determine factors for household choice in respect of household solid waste-disposal mechanisms. The specifications and results of the MNL model are presented in Chapter 7.

Qualitative data collected from the KIIs and in-depth household interviews were analysed using content analysis based on thematic area topics, research questions and objectives. Content analysis entails objective and systematic summarization of contentious respondents' perspectives and agreements and disagreements among research participants

in the smallest meaningful units or categories in line with the research objectives (Kajembe and Monela, 2000; Mosha *et al.*, 2016).

In this study, the initial step involved organizing data collected from different key informants and households based on formulated research questions in the interview guides that covered the three thematic areas of the study and the stage of administrative transition to township status (recent past development). Thereafter, the inputs or responses from all categories of respondents were organized on the basis of common patterns and potential differences in respect of all thematic areas. Systematic analysis of common patterns and potential differences was finally conducted both within one EUC and comparatively across the two EUCs.

For purposes of spatial analysis, Maximum Likelihood Classification (MLC) was used to classify land-use classes for both Ilula and Madizini EUCs. More details about MLC are provided in Chapter 4, which focuses on land-use change. Land-use classification was conducted by using Landsat 7 image for February 2007 and Landsat 8 image for February 2017 for Ilula EUC, and Landsat 5 image for January 2007 and Landsat 8 image for January 2017 for Madizini EU. Post-classification analysis was conducted by means of pixel by pixel comparison using the combine tool in ArcGIS. Land use-class maps and change-detection maps for 2007 and 2017 were produced for both EUCs. Spatial maps for public water tap (s) and wells (private and government) were also produced.

### **3.7 Limitations of the Methodology**

Some challenges were encountered in the field while conducting KIIs and in-depth household interviews, including the dissolution of the village government in Madizini

EUC, respondents' cell phone numbers being unobtainable or initially not shared, misconceptions about or distrust of researchers, migration out of the area, not willing to be interviewed and deaths (only a few cases). Different approaches were employed to minimize these challenges including engaging local leaders who helped in clearing out the misconceptions about researchers. Furthermore, local field assistants were engaged to accompany while visiting respondents in their residential areas and in making appointments through phone calls.

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## CHAPTER FOUR

### THE INFLUENCE OF RURAL-URBAN TRANSFORMATION ON LAND-USE CHANGES IN ILULA AND MADIZINI, EMERGING URBAN CENTRES, TANZANIA

#### 4.1 Abstract

This chapter documents land-use changes resulting from rural-urban transformations in Ilula and Madizini, emerging urban centres (EUCs) in Tanzania, from 2007 to 2017. Maximum Likelihood Classification generated from Landsat 5 TM, Landsat 7 ETM and Landsat 8 OLI satellite images was used to classify different types of land use. A household survey, key informants' interviews, in-depth household interviews, transects walks and observations were used to complement the results of the land use-change detection analysis and high-resolution image analysis from 2016 Sentinel data and 2018 Africapolis data. Ilula and Madizini have both experienced land-use changes in the form of housing densification and spatial expansion. The household survey results indicate that housing (61%) and agricultural production (38%) in 2016 are the dominant land uses of households within these two emerging urban centres. Land use spatial analysis results revealed that, in Ilula, the built-up area increased from 149 ha (22.82%) in 2007 to 318 ha (48.7%) in 2017, an increase of 168 ha (113% increase), while agricultural land declined from 425 ha (65.08%) in 2007 to 246 ha (37.67%) in 2017, a decrease of 179 ha (-42% decrease). In Madizini, the built-up area increased from 68 ha (22.2%) in 2007 to 151 ha (49.5%) in 2017, an increase of 83 ha (122% increase), while agricultural land declined from 192 ha (62.9%) in 2007 to 147 ha (48.1%) in 2017, a decrease of 45 ha (-24%). Residential history, service availability and local geography are important locational influencing factors in respect of land-use changes and future urban potential growth in the

study sites. The current land-use patterns in emerging urban centres pose challenges related to service provision and future urban growth, especially where there is limited public land. Participatory and proportional land-use planning informed by current land uses is recommended to avoid the development of unplanned settlements and land use-related conflicts, especially with regard to the repurposing of prime agricultural land for urban uses.

**Key words:** urbanization, rural-urban transformation, land-use changes, emerging urban centres

## 4.2 Introduction

The global urban population grew rapidly from 751 million in 1950 to 4.2 billion in 2018, with Asia being home to 54%, followed by Europe and Africa with 13% each (UN, 2018). Urbanization (Fay and Opal, 2000; Tacoli and Agergaard, 2017; Fox *et al.*, 2018; Satterthwaite *et al.*, 2010) has been a continuous process, with heterogeneous drivers and trajectories globally, regionally and locally. Magigi and Drescher (2010) defined urban growth in terms of the better allocation of land for various urban purposes, such as roads, housing, industrial estates and social institutions. Urbanization always goes hand in hand with transformations of land in rural and urban areas (Ewijk, 2016).

Rural trading centres or larger villages that are not even connected to urban centres are being transformed from rural villages into urban townships. In most of the literature, this process of transformation is conceptualized as ‘rural urbanization’ (Christiaensen and Todo, 2014; Ørtenblad *et al.*, 2019). However, rural urbanization varies considerably even within the same country. In most cases, rural-urban transformations are influenced by both local and external factors, especially differences in geographical location, natural resource

endowments and the level of administrative transition, including investment in infrastructure (Guin, 2018; Lazaro *et al.*, 2019). Therefore, these factors are important in determining the economic and spatial transition dynamics of urbanizing rural settlements.

Despite the heterogeneous and complex nature of changes of rural into urban settlements, little has been documented about this process of transformation using information collected in the field (Guin, 2018). Therefore, it is important to study smaller settlements independently as sites of urbanization, economic activities and social transformation, and more importantly their stages in the process of urbanization, as well as rural-urban linkages and their importance to local and global economies (Berdegué *et al.*, 2014; Mukhopadhyay *et al.*, 2017).

In Tanzania, the level of urbanization increased from 23% in 2002 to almost 30% in 2012 (NBS, 2015). Tanzania's urban population as a proportion of the whole is reported to have increased from 5% in 1960 to 30% in 2014 (Wenban-Smith, 2015). Small towns are forming an ever-increasing proportion of the country's urban population (Christiaensen *et al.*, 2016) by 34% at the time of writing, up from 7% in 1967 (Wenban-Smith, 2015). Like elsewhere, the urbanization of rural settlements in Tanzania varies due to differences in factors influencing their growth and consolidation, including the types of agricultural crops grown and their associated value chains, geographical location, resource endowment and formal governance (Bryceson and Mwaipopo, 2010; Bryceson, 2011; Christiaensen *et al.*, 2016; Lazaro *et al.*, 2017; Tacoli and Agergaard, 2017; Ørtenblad *et al.*, 2019).

As a result of the current trends in urbanization, Tanzania is experiencing land-use changes associated with urban dynamics in both large and small urban centres in rural landscapes. However, smaller towns and peri-urban areas are relatively being neglected in

infrastructural development (Sumari *et al.*, 2019). These areas are therefore characterized by a lack of infrastructure, services, public facilities and adequate access roads (Mkalawa, 2016). Furthermore, as a result of rural-urban transformations, uncertainties arise in the use of rural land enclosed within urban boundaries (URT, 1995). Nevertheless, despite changing land uses associated with urban dynamics, most studies of land-use changes in Tanzania have focused on large urban centres (Mkalawa, 2016; Sumari *et al.*, 2019) and protected or conserved areas (Nzunda and Midtgaard, 2017; Mayunga, 2018).

This chapter aims to document land-use changes in two emerging urban centres in Tanzania in the context of rural-urban transformation. The two study sites have different historical factors underlying their development, geographical locations and the stages they have reached in their level of administrative transition along a rural-urban continuum.

#### **4.3 Theoretical Framework on Land-use Changes as Part of a Rural-urban Transition Process**

Different academic and operational theories and models involving the conceptualization of land use and the prediction of future land uses respectively have been advanced to understand the drivers, processes and implications of land-use changes in different contexts (Lambin *et al.*, 2003; Verburg *et al.*, 2004). In relation to urbanization processes, land-use changes are considered to be one of the essential factors that supports patterns of urban development (El-Barmelgy *et al.*, 2014). At the initial stage of urban centre development, people tend to buy land or settle at the heart of urban centres where there are social services, businesses and employment opportunities. Given a degree of housing densification and land shortages, people move to buy land in peri-urban areas despite the inadequacy of important services such as water, electricity and access roads. However, as

in most cases, land in peri-urban areas is prime agricultural land; conflicts may result with the requirements for agricultural production.

Urban economists and proponents of so-called 'bid-rent theory' (Mills and Hamilton, 1994; Alonso, 1964; El-Barmelgy *et al.*, 2014) contend that users of land and residents in urban settings usually change their land uses by making trade-offs between land price, transportation and the area of land they use. Bid-rent theory states that crops that produce the highest revenues in a given location make the highest bid to be cultivated in that location. Therefore, landowners in urban settings sell land to households or firms if their bid is higher compared to the bid offered by agriculture, which in turn defines urban boundaries (El-Barmelgy *et al.*, 2014).

In most cases, the growth of urban centres has resulted in the conversion of land to urban uses without regulated planning responding to the needs of the growing population, especially investments in infrastructure and service provision (Tali *et al.*, 2013). This occurs in a situation in which urban growth is rapid, while the planning process that allocates land uses is slow (El-Barmelgy *et al.*, 2014).

In Tanzania, urban planning has long lagged behind urban growth. Now, indeed, hundreds of rural trading centres are growing rapidly without any form of planning for dedicated uses (URT, 2016; Deininger *et al.*, 2012). Most urban public authorities in Tanzania have failed to provide their rapidly urbanizing populations with the necessary services, including earmarking land for orderly urban development (Kironde, 2006). The rapidly growing populations of unplanned urban settlements are placing additional stress on land resources (Kironde, 2009) and planning for service provision.

Thus, the land-use changes associated with trends in urbanization have a number of implications. A detailed understanding of accurate and up to-date spatial and temporal land-use changes associated with urban dynamics is therefore required to assess trends in urban growth (Mundhe and Jaybhaye, 2014; Mkalawa, 2016; Patra *et al.*, 2018). More importantly is the understanding of how people make land-use decisions and how various factors interact to influence decision-making on land use in a specific context (Lambin *et al.*, 2003).

Nonetheless, building an empirical base to inform urban policies is a key challenge faced by government agencies (Muzzini and Lindeboom, 2008). In developing countries, for example, there are often insufficient data to monitor land uses (Musakwa and Niekerk, 2013). As a result, adapting public policies to dynamic local contexts in addressing land-use changes remains a major challenge for decision-makers (Schielein and Börner, 2018). Using the example of land-use change in Dar es Salaam, Tanzania, Mkalawa (2016) argued that, the spatial-temporal aspects of the relationship between land-use changes and the spatial patterns of urban centres is lacking. This chapter, therefore, illustrates processes of land-use change in rapidly growing urban centres in rural Tanzania as part of rural-urban transformation with a specific focus on the reallocation of agricultural land for urban purposes.

#### **4.4 Emerging Urban Centre (EUC) Development and Land-use Changes**

The concept of Emerging Urban Centres (EUC) has recently been documented in the literature (Lazaro *et al.*, 2019; Larsen and Birch-Thomsen, 2015; Lazaro *et al.*, 2014). Literally, EUCs are core urban centres within formal administrative units like formally declared townships that are at different stages of development along a rural-urban

transition continuum. EUC development trajectories in Tanzania vary, though they have some drivers of development in common, such as the Villagization Policy of the 1970s, economic liberalization and changes in administrative status. Due to their greater availability of services, businesses and employment opportunities, EUCs act as ‘centres of attraction’ for people from rural hinterlands and distant regions (Tacoli and Agergaard, 2017). The concentration of people, services and infrastructural development within EUCs has resulted in land-use changes in the form of housing densification and spatial expansion. However, despite rapid population and economic growth, as well as associated land-use changes with their various implications, there is little empirical evidence regarding the dynamics and patterns of land-use change in small urban centres, EUCs included.

This chapter documents land-use changes within Ilula and Madizini EUCs from 2007 to 2017. The aim is to illuminate how rural-urban transformation processes impact on land-use changes. Thus, by drawing empirical evidence from the contexts of EUCs, this chapter contributes to the current literature on land-use changes associated with urbanization dynamics. Moreover, the chapter will inform the implementation of different urban and land-use planning strategies and programmes in Tanzania, particularly those targeting rural townships, which are growing rapidly but flying off the radar screens of government agencies (Muzzini and Lindeboom, 2008). These include, for example, the detailed plan for rural trade centres (2015-2021) with nine settlement and agglomeration zones, and the National Land Use Planning Framework (2013-2033), which aims to address the challenges related to the spatial organization of settlements and land-use conflicts and disputes.

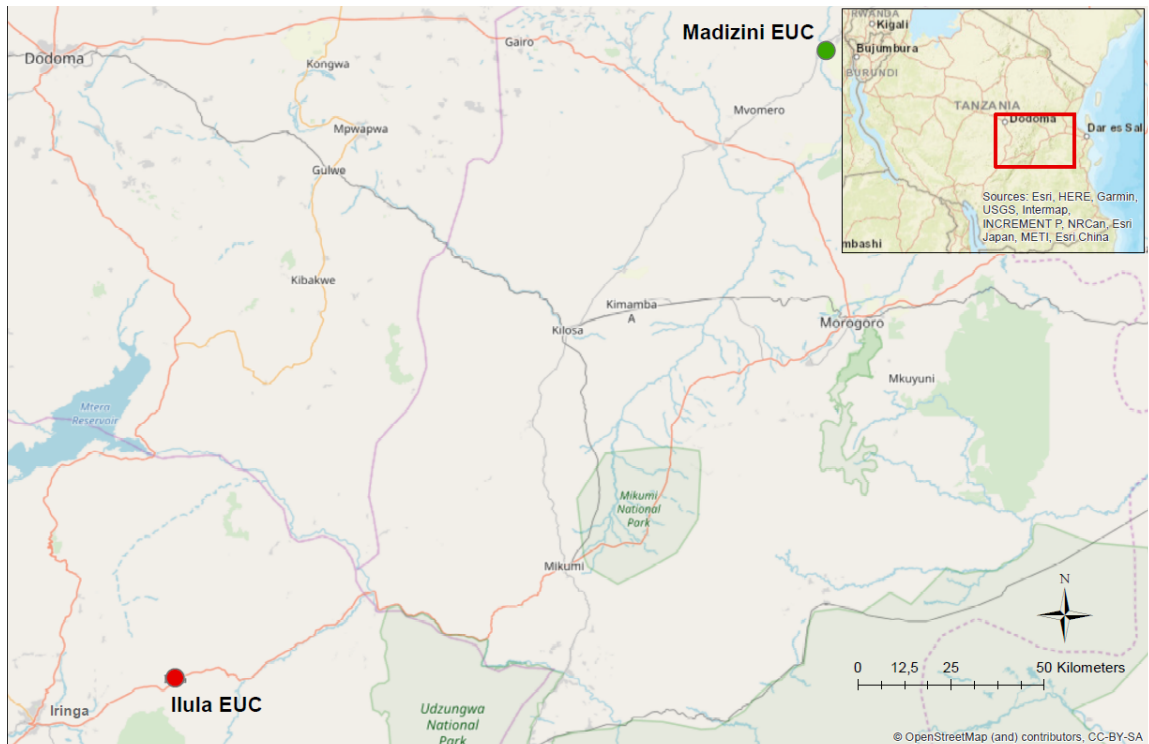
## **4.5 Research Methodology**

### **4.5.1 Research sites**

Ilula EUC is in Ilula and Nyalumbu wards of Kilolo District, and Madizini EUC in Mtibwa ward, Mvomero District (Figure 4.1). According to the 2012 Population and Housing Census (PHC), the population of Ilula EUC was 22 957 and of Madizini EUC 14 168 (NBS and TCGS, 2013). The initial drivers of transformation in Ilula EUC were tomato cultivation, a transportation highway linking Tanzania and Zambia and the establishment of social institutions, including schools, hospitals and the Ilula orphanage centre and programme. Currently, the drivers of transformation have changed slightly to include factors like the establishment of township authorities, service institutions such as banks and Savings and Credit Cooperatives (SACCOs), crop diversification and businesses. In Madizini EUC, the initial drivers of transformation were a sugarcane plantation and factory, while the current drivers are crop diversification, service institutions and businesses.

Given their rate of population increase from 2002 to 2012 (13% in Ilula and 72% in Madizini) (Lazaro *et al.*, 2019) and these drivers of transformation, Ilula and Madizini EUCs are experiencing land-use changes. This indicates a need to undertake land use-change detection analysis so as to understand the patterns of land-use change within the two sites and thus inform policy-makers about the land-use dynamics in these EUCs. The study sites have been selected primarily as RUT project sites and because of the different historical factors in their development, their geographical locations and the stages they have reached in their levels of administrative transition along a rural-urban continuum.





**Figure 4.1: Location of study sites**

#### 4.5.2 Data acquisition and image classification

Field-ground truthing, Google Earth and Topo Sheet were used to generate land-use classes for Ilula and Madizini EUCs for 2007 and 2017. Given the Landsat program's relatively long history of space-based data collection on a global scale, Landsat images may be the most common data source for land-use and land-cover classification even in the study of urban landscapes (Moran, 2010). However, due to the relatively rough spatial resolutions of their satellite images (Jensen and Cowen, 1999; Lu and Weng, 2007), high-resolution images from the 2015-16 Sentinel (Sentinel, 2016) and Africapolis data (Africapolis, 2018) and Google Earth's image analysis were used to determine the densification and spatial expansion of both EUCs. Sentinel data provide continuous and operational high-resolution imagery (10m, 20m and 60m) for the global and sustained monitoring of the earth's land (including built-up areas) and coastal areas with revisit frequencies by each satellite of ten days and combined constellation revisits every five days. Africapolis combines a spatial

approach with physical criteria (a continuously built-up area) and demographic criteria (more than 10 000 inhabitants) to define 7 500 urban agglomerations in fifty African countries (Africapolis, 2018).

In this chapter, land-uses are grouped into four classes: built-up area, crop land, green vegetation and open area. Built-up area includes all man-made structures such as houses, and roads and cropland consist of agricultural land. Green vegetation consists of tree vegetation, wetland and scrubland, while open area represents areas that have not been used or rather used as playgrounds, open spaces and grassland. The reason for classifying land uses into the above four classes was the dominant land uses in Ilula and Madizini EUCs. The extent of change detection analysis in the two sites was determined on the basis of housing densification, spatial expansion and the areas that were covered during the household survey of February 2016.

Land uses were classified using Landsat 7 images for February 2007 and Landsat 8 images for February 2017 for Ilula EUC and Landsat 5 images for January 2007 and Landsat 8 images for January 2017 for Madizini EUC (Table 4.1). The Landsat images thus obtained were processed to the top of atmosphere reflectance using the radiometric correction tool in ENVI software 5.3.1, followed by supervised classification using Maximum Likelihood Classifier in ArcGIS software 10.3.1. Satellite image processing or correction is a very important step because it removes the atmospheric dust and other unwanted particles that are also captured by the satellite. To enhance the accuracy of classification, class probability classification and band combination were used to detect each land-cover class accurately. By band combination, crop land detection used bands 6,5,2 and 6,5,4, and green vegetation detection used bands 5,4,3, 5,6,2 and 6,5,4. For built-up area detection, bands 7, 6, 4 were used, while open area detection was enhanced by combining bands 7, 4, 2.

**Table 4.1: Satellite images used for change detection analysis in Ilula and Madizini EUCs**

Area	Path	Row	Image type	Sensor	Spatial Resolution	Date
Ilula	168	065	Landsat 7	ETM	30m	24/02/2007
Ilula	168	065	Landsat 8	OLI	30m	11/02/2017
Madizini	167	064	Landsat 5	TM	30m	24/01/2007
Madizini	167	064	Landsat 8	OLI	30m	03/01/2017

#### 4.5.3 Land-use change detection analysis

Remote sensing and Geographical Information Systems (GIS) are recognized as powerful tools in generating accurate and timely information on the spatial distribution of land-use changes (Tali *et al.*, 2013; Reis, 2008). Because of their synoptic view, repetitive coverage and real-time data acquisition, remote-sensing data are very useful in quantifying and mapping patterns of land-use change (El-Kawy *et al.*, 2011). Change detection analysis using GIS has emerged as a significant tool in managing and monitoring natural resources and urban development by generating quantitative analyses of the spatial distributions of populations of interest (Hassan *et al.*, 2016). Change detection involves analysis of both bi-temporal images acquired over the same geographical area at two different dates and multi-temporal images acquired at multiple dates such as time series (Hedjam *et al.*, 2016; Belal and Moghanm, 2011). The purpose of undertaking change detection is to identify changes that have occurred over the period under consideration. Therefore, monitoring land-use conversion can be performed through a simple comparison of successive land-use maps (Lambin *et al.*, 2003).

In urban settings, detecting land-use changes by using multi-temporal remotely sensed data is a challenge due to the complexity of urban landscapes. Normally, urban change accounts for a small proportion of the study area, scattered in different locations, and often confounded with other land-use changes (Lu *et al.*, 2010). To address these complexities, as housing and population densities are related to urban land-use distribution patterns, these data can be used to correct some of the classificatory confusion between commercial and high-intensity residential areas (Lu and Weng, 2007).

In principle, a suitable classification scheme is required before land use can be classified. The process involves two steps: recognition of land-cover objects and labelling of the pixels to be classified using a certain classification algorithm. Unsupervised and supervised approaches are used in the labelling of different pixels as land-cover classes (Janssen and Huurneman, 2001; Lillesand *et al.*, 2004). In supervised classifications, the process of pixel labelling is controlled by the image analyst. Supervised classification usually requires knowledge of the physical characteristics of the area of interest. The unsupervised approach can be used when there is not enough knowledge about the area to be classified. In many applications, supervised performs better than unsupervised classification (Franklin, 2001). For this reason, this study used the Maximum Likelihood Classifier (MCL) tool together with a supervised classification approach to classify dominant land-use classes in two emerging urban centres. The data were generated from Landsat 5 TM, Landsat 7 ETM and Landsat 8 OLI satellites respectively.

Furthermore, post-classification change detection was conducted in relation to the two independently classified images of 2007 and 2017. The purpose of undertaking post-classification analysis was to compare pixel by pixel land-cover classes for the 2007 and

2017 images to detect land-cover changes in the past ten years. Pixel by pixel comparison was done using a combined tool in ArcGIS.

#### **4.5.4 Accuracy assessment**

Accuracy assessment involves comparing a classification with ground-truth data to evaluate how well the classification represents the real world. Confusion matrices can be used to search intermediate prior probabilities that give the desired number of pixels in each class, possibly using an iterative algorithm (Gallego, 2004). Pixels for training samples were selected randomly in order to identify different land-cover classes. The selection of training points was combined with knowledge about the physical characteristics of the study area. In Ilula EUC, an overall figure of 89% was obtained from the accuracy assessments for 2007 and 2017 land-cover classes. In Madizini, overall accuracy assessments of 91.3% in 2007 and 87% in 2017 were obtained.

#### **4.5.5 Household survey, key informant interviews, in-depth household interviews and transect walks**

A questionnaire survey of 468 household was conducted to determine household-level land uses within each EUC. Twenty-four key informant interviews and 39 household in-depth interviews were conducted to obtain more detailed information about the local factors that determine land-use changes within both EUCs in respect of the rural-urban transition process. Data collected from the household survey were analysed using Statistical Package for Social Sciences (SPSS) version 25, while qualitative data from key informants and household in-depth interviews were analysed using content analysis. Transect walks and observations were conducted to familiarize ourselves with different neighbourhoods in both EUCs, mostly with reference to settlement patterns and service provision.



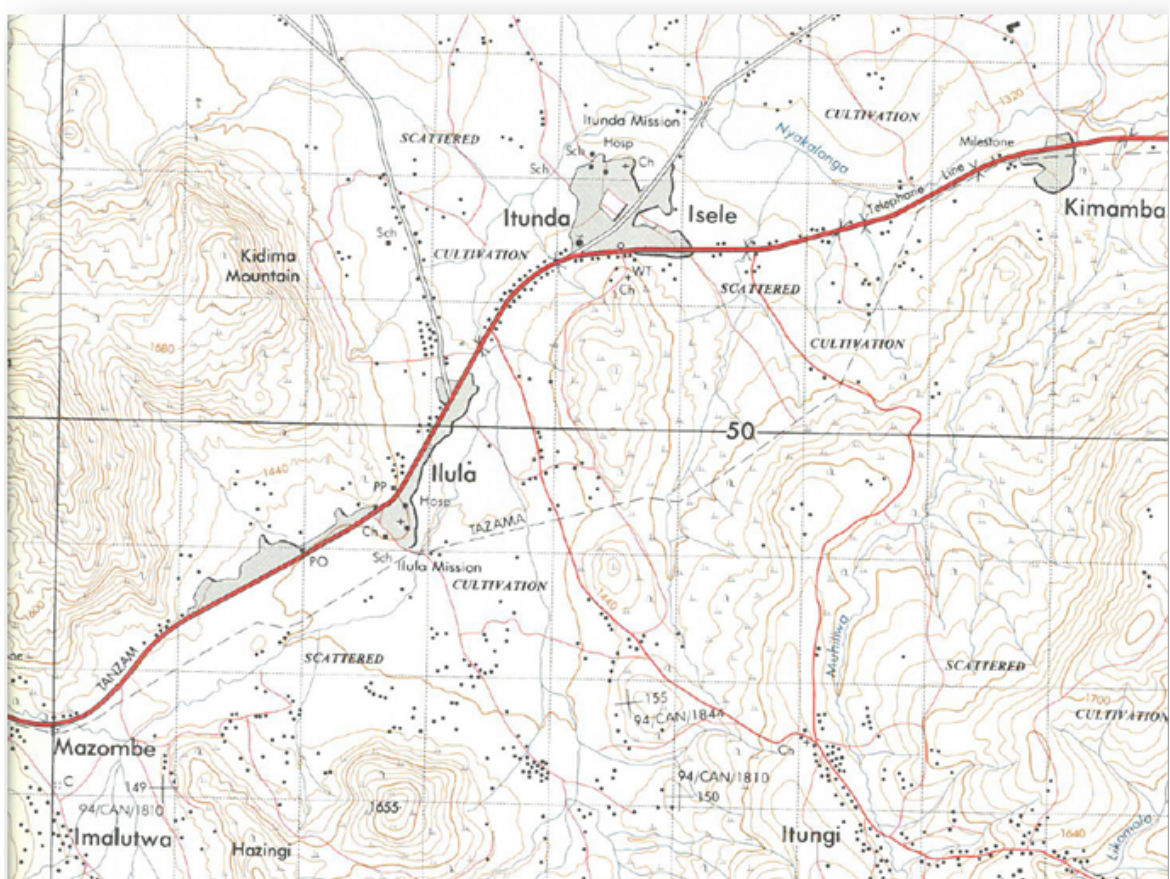
## **4.6 Results and Discussion**

### **4.6.1 Ilula and Madizini EUCs historical development**

Ilula and Madizini EUCs have different development drivers that have influenced the present state of land-use dynamics and predict their future development trajectories. Lazaro *et al.* (2019, 2017) have documented important factors in the development of Ilula and Madizini EUCs in the pre-1990s and early 2000s, including agricultural potential, land availability, geographical location and the Villagization Policy of the 1970s. The availability of land for the cultivation of different agricultural crops, such as tomatoes, maize and tobacco in Ilula EUC and sugarcane in Madizini EUC, as the most important agricultural crops, encouraged the earlier establishment of settlements. People were attracted to settle within the present-day EUCs to undertake farming, work as labourers in agri-processing factories (for example, the Mtibwa sugar factory in Madizini) or to establish businesses.

Being located along the main tarmac road (Ilula EUC) and in an area with an agricultural processing factory (Madizini EUC), both EUCs encouraged the early establishment of settlements since it was easier for smallholders to transport their agricultural products to both regional and national markets. The government's Villagization Policy of the 1970s (*Ujamaa*) also influenced the establishment of settlements in present-day Ilula and Madizini EUCs since this resettlement programme was meant to make administration and service provision easier. The establishment of services like primary schools and health dispensaries and establishment of both Lutheran and Catholic missions as indicated in Figure 4.2 in the *Ujamaa* villages under the villagization programme also attracted more people to settle in the present EUCs.

For example, as indicated in Figure 4.2, in the 1970s the present-day Ilula EUC had three residential villages, namely Ilula, Itunda and Kimamba. Ilula village comprises the current Ilula Sokoni, Itabali, Matalawe, Ngelango, Mwaya and Mtua streets, Itunda village comprises the current Madizini, Itunda and Igunga streets, while Kimamba village is part of the present Masukanzi street (Figure 3.1). The present-day Madizini EUC (Figure 3.2) is a former Ujamaa village, and it established more settlements for people coming to work in the Mtibwa Sugar Factory or to set up businesses (Lazaro *et al.*, 2019).



**Figure 4.2:** Ilula topographical map, based on aerial photographs from 1977.

**Source:** 1:50 000 map of Tanzania. United Republic of Tanzania (1982).

More recently, the diversification of crop economies, the concentration of services and businesses and the announcement of township status in the government *Gazette* (Madizini in 2002 and Ilula in 2006) have attracted more people to settle in both EUCs due to the



availability of services, employment and business opportunities. Natural population growth alongside the influx of immigrants has generated population increases in both EUCs. In both sites, earlier or older residential villages constitute the present-day EUCs, which are characterized by high degrees of housing densification and concentrations of businesses and services. Consequently, both EUCs have experienced spatial expansion and land-use changes. The following section presents an overview of land-use change detection analysis within both EUCs from 2007 to 2017.

#### **4.6.2 Land-use change detection analysis**

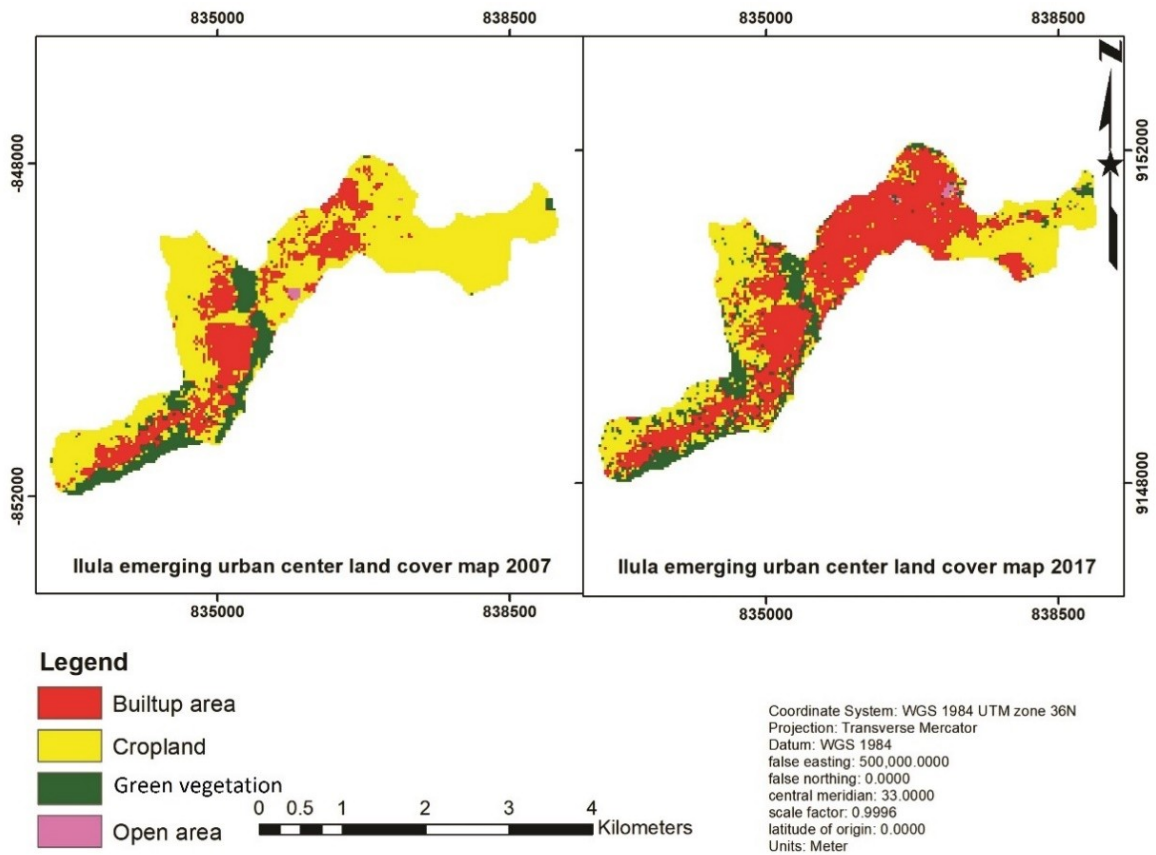
Ilula and Madizini EUCs underwent land-use changes from 2007 to 2017, as indicated in Figure 4.3 for land-cover classes and Figure 4.4 for the change detection map in Ilula EUC and Figure 4.5 for land cover classes map in Madizini EUC. For Ilula EUC, the total built-up area in 2007 was 149 ha (23%), increasing to 318 ha (49%) in 2017 (Table 4.2). The increase in built-up area by 169 ha (113% increase) is associated with urban development, which resulted in increases in the demand for land for residential purposes, following population increases of 13% (Lazaro *et al.*, 2017), hence more tenants and business spaces. There has also been an increase in the demand for land for urban functions like infrastructural development and the establishment of social institutions such as schools and hospitals.

Agricultural land, which had an area of 425 ha (65%) in 2007, had declined to 246 ha (38%) by 2017 (Table 4.2), a reduction of 179 ha (-42%). This reduction is mostly associated with increases in population and the consequent increased demand for housing. For example, 98% of the reduction in agricultural land is due to it being covered with built-up areas (Table 4.3) for housing and infrastructural development like roads, marketplaces

and secondary schools. There is a significant perfect negative correlation ( $r=-.983$ ) between the increase in the built-up area and the decline in agricultural land and green vegetation. Open areas are very small, though they have increased in the last decade (Table 4.2). Furthermore, the total area covered by green vegetation of 77 ha (12%) in 2007 had increased to 85 ha (13%) in 2017 (Table 4.2), which can be linked to people planting shade trees in their compounds.

**Table 4.2: Pixel computation into area for 2007 and 2017 land-use classes for Ilula EUC**

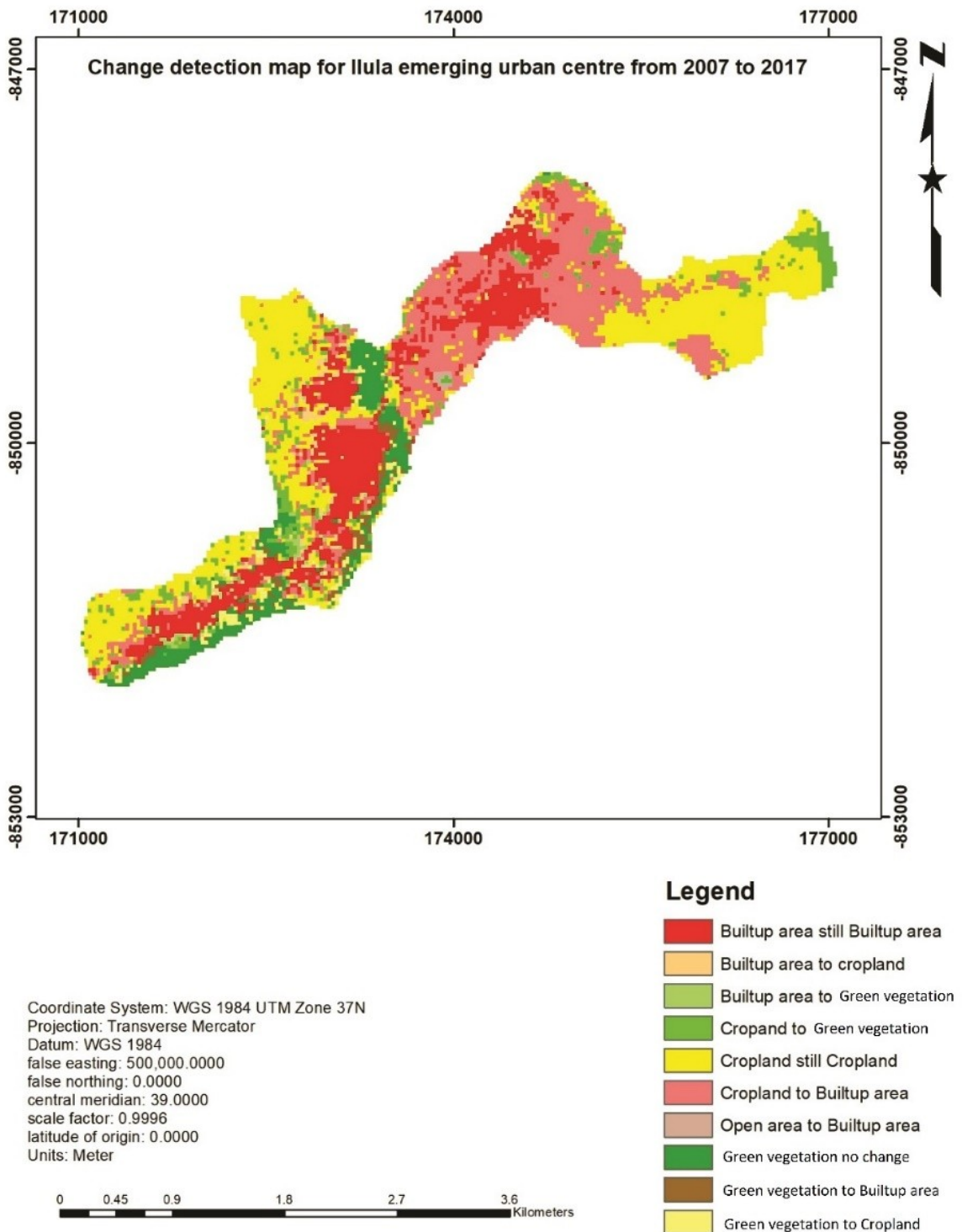
Land-cover classes	Pixel count	Area (ha) 2007	% 2007	Pixel count	Area (ha) 2017	% 2017	% of change
Built-up area	1 660	149	23	3 534	318	49	113
Crop land	4 717	425	65	2 734	246	38	-42
Open area	24	2	0.31	45	4	1	100
Green vegetation	857	77	12	945	85	13	10
Total	7 258	653	100	7 258	653	100	



**Figure 4.3: Ilula EUC land-use classes in 2007 and 2017**

**Table 4.3: Change detection matrix for Ilula land-use change from 2007 to 2017**

Land-cover classes (hectares)	Built-up area	Cropland	Green vegetation	Open area	Total 2007	2007 %
Built-up area	124	20	5	0	149	23
Cropland	176	210	36	4	426	65
Green vegetation	15	16	45	0	76	12
Open area	2	0	0	0	2	0.31
Total 2017	317	246	86	4	653	100.0
2017%	48.7	37.67	13.02	0.61	100.0	



**Figure 4.4: Change detection analysis map for Ilula EUC from 2007 to 2017**

In Madizini EUC, the total built-up area in 2007 was 68 ha (22%), increasing to 151 ha (50%) in 2017 (Table 4.4). The increase in built-up area of 83 ha (27% of total area), which is an actual increase of 122% (Table 4.4), is associated with a rising demand for land for

residential purposes following population increases generating more tenants. Similarly, the demand for land for social institutions and business spaces has also increased. The results have shown a fall in the available agricultural land within Madizini EUC, since agricultural land, which covered an area of 192 ha (63%) in 2007, had declined to 147 ha (48%) in 2017 (Table 4.4). Agricultural land has declined by 45 ha (15% of total area), implying a reduction of -23% in the agricultural land class. The decline in agricultural land in Madizini EUC has been attributed to the increase in the built-up area as a result of the conversion of agricultural fields into residential plots because of the increase in population. There is a significant perfect negative correlation ( $r=-.899$ ) between the increase in built-up areas and the decline in agricultural land.

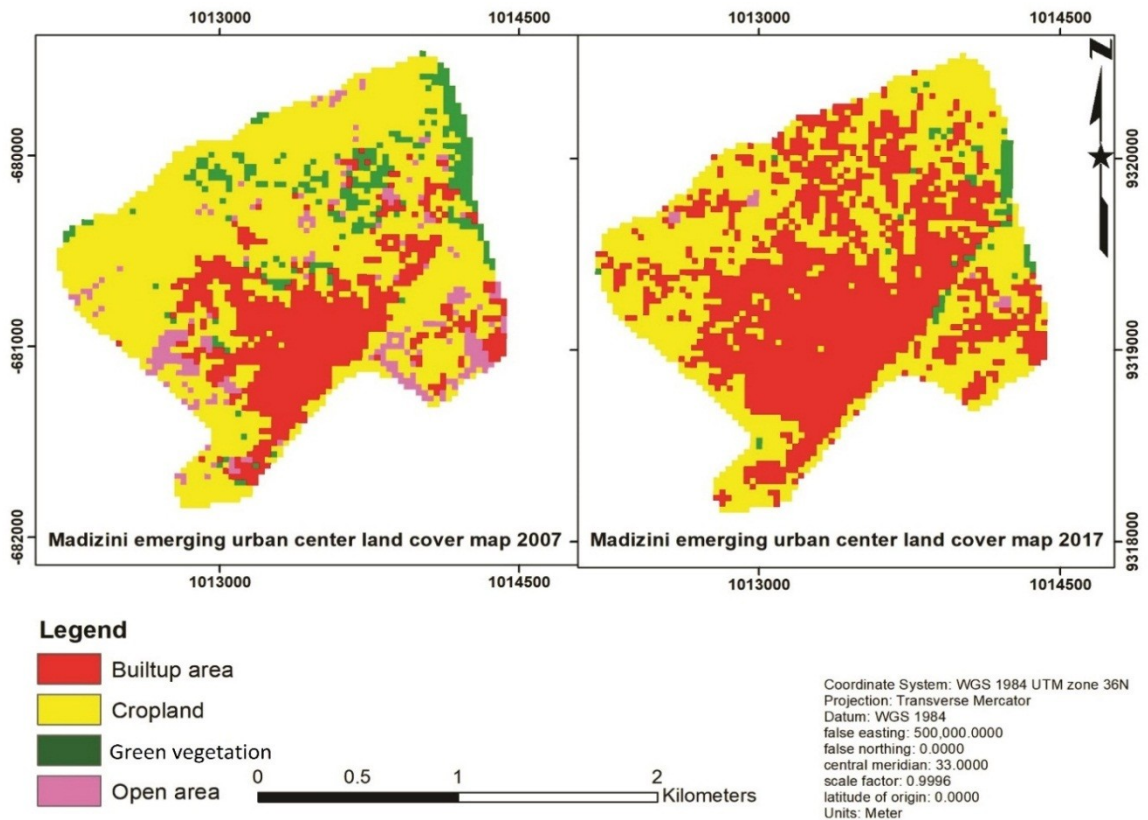
**Table 4.4: Pixel computation into area for 2007 and 2017 land-use classes for Madizini EUC**

<b>Land-cover classes</b>	<b>Pixel count (2007)</b>	<b>Area (ha) 2007</b>	<b>% 2007</b>	<b>Pixel count (2017)</b>	<b>Area (ha) 2017</b>	<b>% 2017</b>	<b>% of change</b>
Built-up area	755	68	22	1680	151	50	122
Crop land	2136	192	63	1633	147	48	-23
Open area	242	22	7	15	1	0.4	-95
Green vegetation	264	24	8	69	6	2	-75
Total	3397	306	100	3397	306	100	

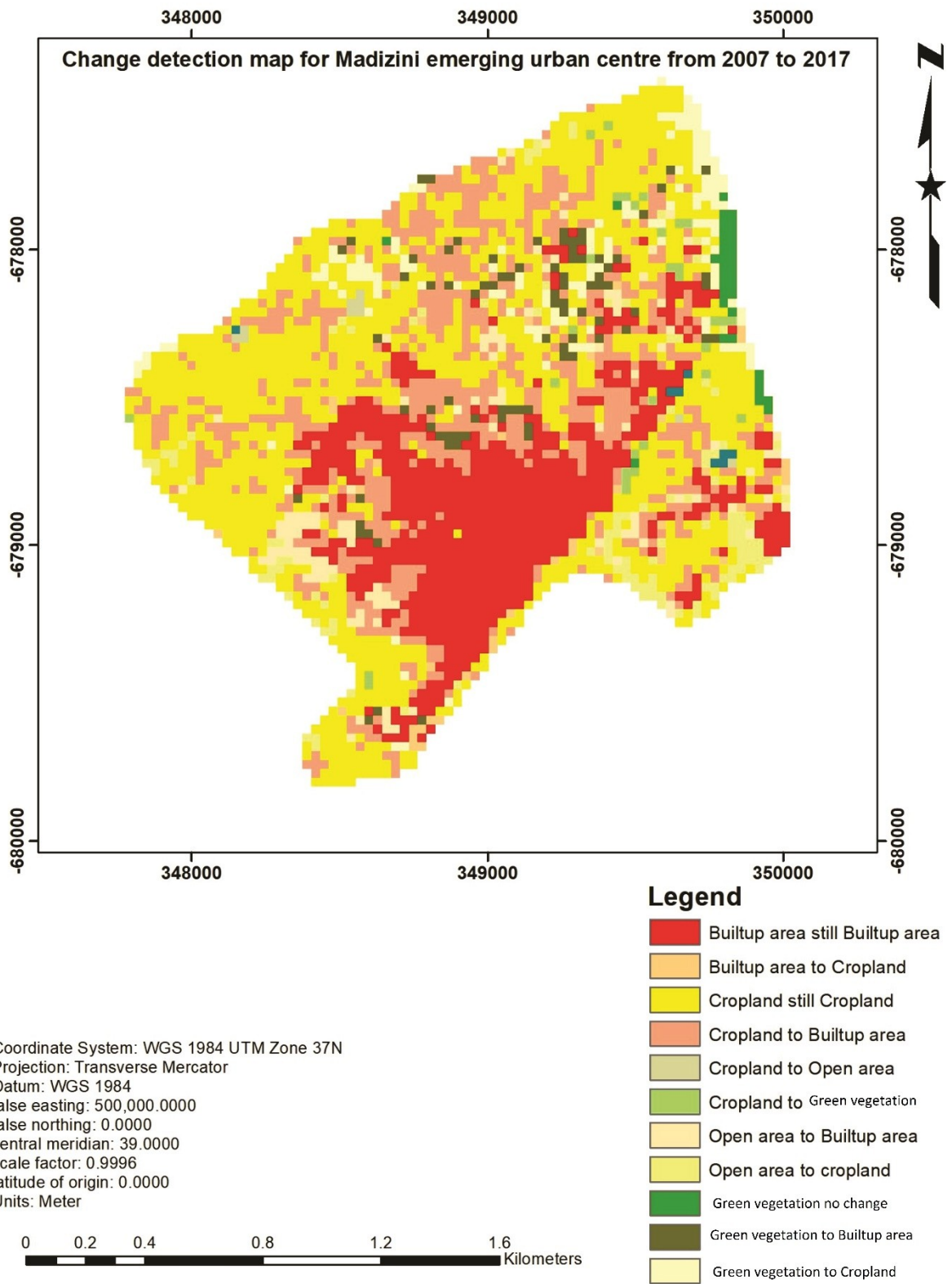
In addition, the open area in Madizini EUC has witnessed a decline from 22 ha (7%) in 2007 to 1 ha (0.4%) in 2017, a net decrease of -95% that is associated with urban development and spatial expansion. The total area covered by green vegetation declined to 6 ha (2%) in 2017 from 24 ha in 2007 (Table 4.4). This decline in the area covered by green vegetation of -75% is associated with settlement densification and spatial expansion.

**Table 4.5: Change detection matrix for Madizini EUC from 2007 to 2017**

Land-cover classes (hectares)	Built-up area	Cropland	Green vegetation	Open area	Total 2007	2007%
Built-up area	63.9	3.8	0.3	0	68.0	22.2
Cropland	69.1	119.4	2.8	0.9	192.2	63
Green vegetation	7.7	12.8	3.2	0.1	23.8	8
Open area	10.4	11.0	0.0	0.4	21.8	7
Total 2017	151.2	147.0	6.2	1.4	305.8	100.0
2017 %	49.5	48.1	2.0	0.4	100.0	



**Figure 4.5: Madizini EUC land use/cover classes for 2007 and 2017**



**Figure 4.6: Change detection analysis map for Madizini EUC from 2007 to 2017**



The above results from the land use-change detection analysis indicate some commonalities and potential differences between the two EUCs. The observed commonalities between the two sites are that, they have both registered significant increases in built-up area and a decrease in agricultural land, though to varying degrees. As observed during transect-walks, housing densification and spatial expansion in both sites is occurring without proper regulated urban planning. For example, in most neighbourhoods within the two EUCs, there are remnants of village planning mixed with new urban planning, particularly in new residential areas, where households have divided their croplands into residential plots.

Regarding the potential differences in land uses between the two case areas, the results of the household survey indicate that 61% of surveyed households use their land for housing, while 38% are using their land for agricultural production (Table 4.6). There are, however, significant differences in household land uses within the two EUCs. While 47% of households in Ilula EUC use their land for agricultural production and 51% for housing, only 10% of households in Madizini EUC use their land for agricultural production and 90% for housing (Table 4.6).

**Table 4.6: Use of land within EUCs by households**

Use of land within EUC by households (%)	EUC			Chi-square statistics
	Ilula (n = 266)	Madizini (n = 89)	Total (n = 355)	
Housing	135 (51)	80 (90)	215 (61)	42.878(.000) *
Agricultural production	126 (47)	9 (10)	135 (38)	
Others	5 (2)		5 (1)	

\* Significant at 1%, Source: RUT Project Household Survey, 2016



Furthermore, in line with theoretical insights from the Bid-rent theory, key informant interviews and in-depth household interviews revealed that current land uses in both EUCs are mostly influenced by local geography (topography; mountains and rivers). For example, in Ilula EUC, farmers are still using wetlands in the form of *vinyungu* (Plate 4.1) to cultivate tomatoes and other horticultural crops and sugar cane plantation by Mtibwa Sugar Estate and Teak tree plantation in Madizini EUC a situation which is relatively particular influenced by the favourable local topography.



**Plate 4.1:** *Vinyungu* or small gardens irrigated using water from boreholes in Ilula EUC

The rate of population growth is another important factor influencing land-use change within EUCs due to its influence on demand for housing and social services development such as schools and health facilities. In a study conducted in Morogoro Municipality, Sumari *et al.* (2019) observed that increases in urban populations and built-up areas are highly correlated. The rate of immigration is another factor influencing current land uses in both EUCs. For example, in Madizini EUC, 79% of respondents are immigrants, 90% of

households are using their land within the EUC for housing, while 86% of their agricultural land is located outside the EUC.

Other local factors influencing housing densification and spatial development within the two EUCs include economic development, mostly construction of bus terminals, agro-processing factories, financial institutions (offering land as collateral), increases in land prices and agricultural crop markets. Masanja (2003) argued that, economic factors are the prime motivators of land-use change in urban centres.

Furthermore, based on theoretical insights from bid-rent theory and as revealed in qualitative interviews, EUC residents make trade-offs in land-use decisions based on changing land values (plot prices), and the increase in demand for rental houses and service provision (such as bars, guest houses and business/shops spaces). For example, in Madizini EUC a small number of sugar out-growers are dividing their crop fields into small residential plots due to increases in land prices in the last decade following increases in population and economic development and the fear of land dispossession by the government for future urban planning purposes at low rates of compensation (Box 5.1). A similar conversion has been reported in peri-urban parts of Dar es Salaam (Masanja, 2003) as an outcome of urbanization resulting from macro-economic factors.

Thus, residents of EUCs perceive that, the use of land for housing pays more compared to its use for agriculture for two main reasons. First, houses can be used as collateral in accessing loans, while housing rents are increasing following rapid increases in population. The second reason is seasonal fluctuations in agricultural productivity and crop prices. However, it was revealed during key informants' interviews that, the conversion of agricultural land into urban uses has both negative implications (food insecurity, crop

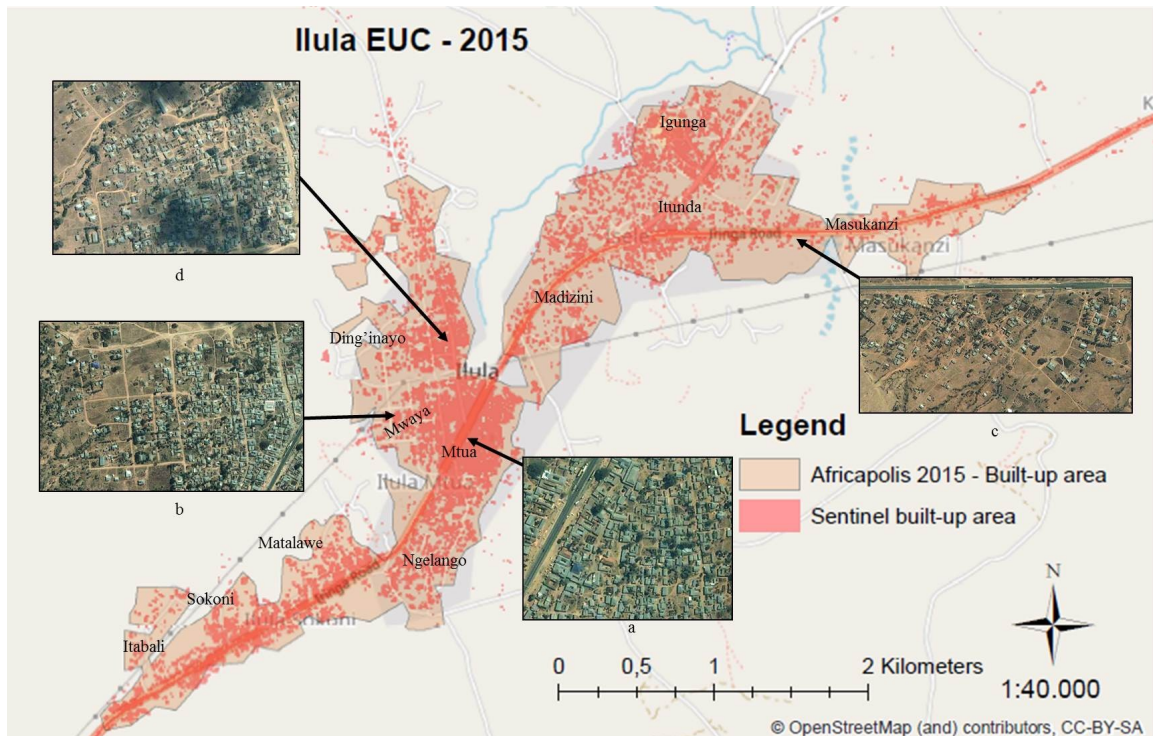
safety in distant locations, family incomes being generated from agriculture) and positive implications (more economic returns when land is developed and rented out).

#### **4.6.3 The implications of land use changes within EUCs on service provisions and future urban growth**

Results of land use-change detection analysis provide a general overview of land use change dynamics in both EUCs in the last decade (2007 to 2017). These results are supported by household survey results and qualitative interviews with key informants and household in-depth interviews. Hence, building on the historical drivers for EUC development and the results of the land use-change detection analysis, combined with knowledge of the physical characteristics of the two EUCs, it was learned that, changes in land uses in both EUCs take the form of housing densification and spatial expansion. However, patterns of land-use change within different streets and sub-villages of the two EUCs differ based on the streets' residential histories, business and service concentrations and geographical locations. These factors are important in influencing the degree of housing densification and street planning and future urban growth.

For the case of Ilula EUC, high levels of housing densification in the older residential areas is illustrated using the 2015-2016 Sentinel and Africapolis data classifying 'built-up' areas (see Figure 4.7). Through transect walks it was observed that, Ilula Mwaya and Mtua now have concentrations of businesses, including financial institutions like banks, administrative institutions, police posts, the Ilula Urban Water Supply and Sanitation Authority's (IUWASSA) office and the Mazombe Division and Ilula Township Authority Headquarters. Some parts of Ilula Mwaya toward the mountains in the north-west have been partially planned, and new residential houses are being constructed. As indicated in

Plate (b) in Figure 4.7, houses in the new residential houses in Mwaya are modern and large in size, a situation linked to the availability of land and levels of household wealth implying the ability to buy large plots.



**Figure 4.7: Ilula EUC built-up area based on 2015-16 Sentinel (Sentinel, 2016) and Africapolis (Africapolis, 2018) data.**

Settlement accessibility along the main road in the old residential area, as indicated in Plate (a) in Figure 4.7, is a challenge due to the high housing densification and predominance of unplanned settlements. The spatial growth potential of these streets will be constrained by the presence of wetland to the southeast and mountains to the northwest. However, in Ngelango there are new houses across the wetland in Mlolo sub-street (eastern side) along the road towards Mlafu ward to Kilolo District headquarters. Spatial growth in this area is influenced by the district road, which it is planned to be tarmacked.

Itunda is characterized by its high housing densification, with new modern houses, less dense settlements and streets partially planned, particularly around Itunda Lutheran

Hospital. To the east of Igunga, towards Masukanzi, houses are old, there are few modern houses, housing density is high, and the streets have not been planned. The future growth potential of Itunda and Igunga will be constrained by the surrounding wetland. The future growth potential in Itunda and Igunga may occur in the current crop fields across the wetland to the northeast. Housing densification in the old residential areas of Ilula EUC is linked to the availability of services, which motivated the earlier establishment of settlements and attracted both earlier and recent immigrants.

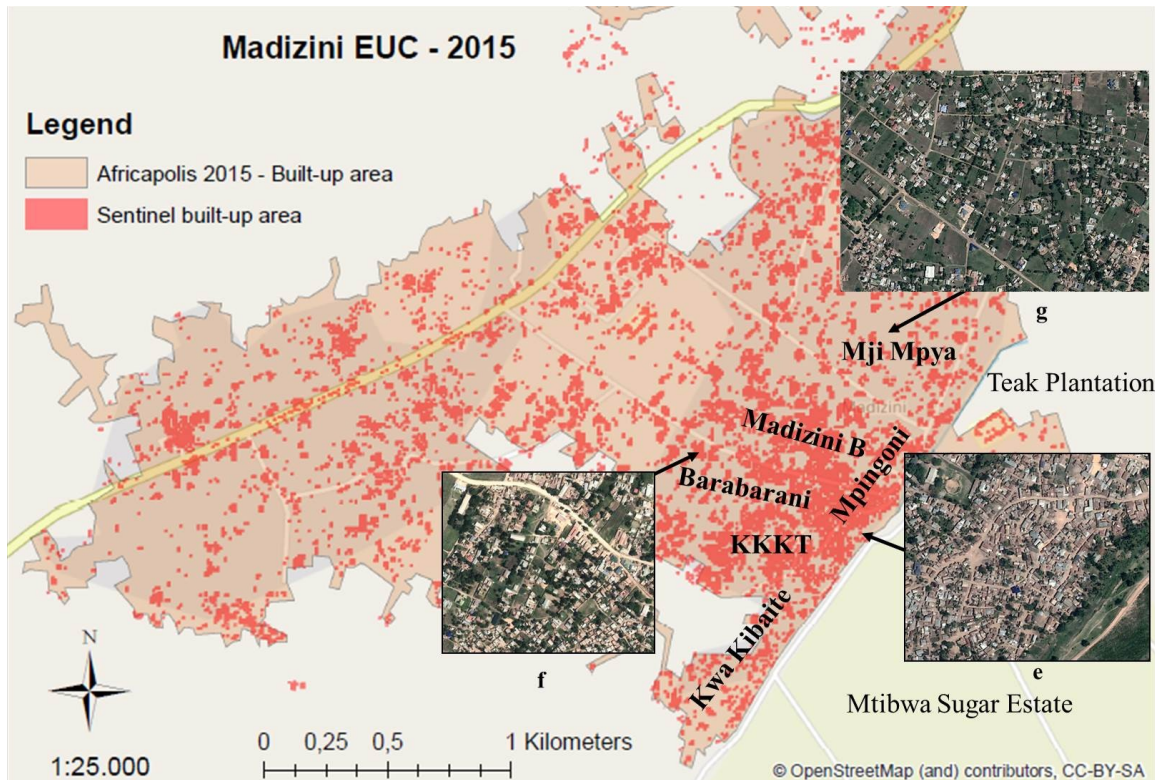
Itabali and Matalawe are relatively new residential areas, despite being in the former Ilula village, with its lower housing densification. There are also crop fields, new residential houses and Nyalumbu Secondary School in Itabali Street, towards the north. Future potential spatial expansion in Itabali and Matalawe will be constrained by mountains and gullies, wetland and surrounding villages like Imalutwa to the south-west, which is not part of Ilula Township. Ding'inayo is a new residential area with less dense settlements but gradually densifying, as indicated in plate d in Figure 4.7. There is possible spatial growth in Ding'inayo towards Ikuvala to the north, the rural part of Ilula Township. Ilula's Township headquarters is planned to be constructed in Ding'inayo, and 903 plots have been identified.

Madizini Street in Ilula EUC has less dense settlements, but with new houses around the TASAF tomato market and along the highway. There is limited potential spatial growth in Madizini Street, since it is constrained by mountains to the east and wetland to the west. As indicated in plate (c) in Figure 4.7, Masukanzi is a newly constructed residential area with less dense settlements but one that is growing without regulated planning. Ilula EUC's spatial growth will potentially take place in Masukanzi, given land availability there. The

current Dabaga tomato-processing factory in Kimamba sub-street to the northeast and a new bus terminal are being constructed in Masukanzi.

In the case of Madizini EUC (see Figure 4.8), the sub-villages of Barabarani, Mpingoni, Kwa Kibaite and KKKT are the older settlement areas. As observed during transect walks and by Google Earth image analysis, these areas have rural characteristics; plots are not surveyed and streets are not planned, resulting in high levels of housing densification (see Plate e, Figure 4.8) - a mixture of both modern and old houses (mud houses but iron-roofed) and crop fields (Kwa Kibaite). Some settlements in the old parts of Madizini EUC have been partly planned, as indicated in Plate f, and this densification is linked to both former and recent immigrants who have settled in these sub-villages. The household survey shows that of the 145 respondents interviewed, 79% are immigrants, of whom more than half (52 %) are living in these old residential areas.





**Figure 4.8: Madizini EUC built-up area according to 2015-16 Sentinel (Sentinel, 2016) and Africapolis (Africapolis, 2018) data.**

Madizini B and Mji Mpya have some distinct patterns compared to the older sub-villages, with less housing densification (Plate g in Figure 4.8), surveyed plots (former sugar fields) and streets having been relatively planned. Apart from modern houses this area also include institutions (for example, banks, schools, offices and churches), and business spaces and service facilities such as hotels, lodges and guesthouses. The reasons for Madizini B and Mji Mpya being partly planned is associated with plots being surveyed by sugar out-growers who have converted their sugar plantations into residential plots. Undeveloped plots in Mji Mpya and Madizini B are currently used to cultivate crops. Being surrounded by the Mtibwa Sugar Estate to the south East), a teak plantation to the northeast and other villages like Manyinga to the northwest and Lusanga to the north, Madizini EUC has limited scope for future spatial development except in the current undeveloped plots in Madizini B, Mji Mpya and the crop fields in Kwa Kibaite.

#### 4.7 Conclusions and Recommendations

Ilula and Madizini EUCs have experienced land-use changes in the last decade resulting from rural-urban transformation. The common patterns of land-use changes between the two EUCs are housing densification, spatial expansion and the reallocation of agricultural land as residential and other built-up areas. The prior establishment of settlements during the *Ujamaa* villagization period in the 1970s is key to both EUC's transformation process and current changes in land use. As revealed by the household survey, the main land uses at the household level are housing (built-up areas) and agricultural production. In both sites, spatial analysis showed an increase in built-up area and a decline in agricultural land from 2007 to 2017 a result of the economic potential of parcelling land, increase in the demand for housing following the rise in the urban population and increased infrastructural development.

The patterns of land-use change within EUCs differ across different neighbourhoods based on residential history, housing densification and geographical location. The nature of EUC development, associated land-use dynamics and the limited availability of public land pose different challenges for service provision, mostly in terms of land access and tenure (Chapter 5), domestic water supply (Chapter 6), solid waste collection and disposal (Chapter 7) and future urban planning. The repurposing of agricultural land as built-up areas has implications for household incomes and food security since households are engaging in agricultural production for both selling and household consumption.

Many small urban centres are emerging in Tanzania and they are experiencing land-use changes in the same way as Ilula and Madizini EUCs. The study therefore recommends



that, responsible actors from government, the private sector and communities undertake orderly planning both within EUCs and in townships in general, particularly in areas where EUCs have the potential for future growth. Among the initiatives that should be undertaken are plot surveys and infrastructure placements, such as access roads, electricity, sewerage and water systems and public spaces. In the old and already dense parts of EUCs, plans should be drawn up for access roads and sewerage and water systems. However, any upgrading intervention in the currently dense and unplanned streets within EUCs has compensation cost implications and may encounter community resistance if not enough consultation is carried out before implementation. Unless immediate steps are taken to address the prevailing dynamics of land-use change, EUCs are likely to experience the same planning and service provision challenges that larger urban centres are currently facing. Furthermore, efforts should be made by the government, the private sector actors and households to protect the conversion of prime agricultural land into urban functions (residential and industrial development) in order to prevent negative impacts on household incomes and food security.

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## CHAPTER FIVE

### LAND GOVERNANCE STRUCTURES AND PRACTICES RESULTING FROM RURAL-URBAN TRANSITIONS: EXPERIENCES FROM ILULA AND MADIZINI EMERGING URBAN CENTRES IN TANZANIA

#### 5.1 Abstract

The level of administrative transition as part of rural-urban transformation processes in Ilula and Madizini has led to changes in land governance structures and practices. This chapter aims to determine how such structures and practices have changed in their support of rural-urban transformations. The study employs a combination of research methods, including 468 household surveys, 24 key informant interviews and 39 in-depth household interviews. Descriptive statistics and binary logit models were used for data analysis. Institutions and actors in respect of land governance in the two study sites have changed based on the level of administrative transition reached by individual EUC. Changes in land governance institutions and actors are for example dissolution of village land governance structures such as village councils and village land councils as part of administrative transition from village to township. Household survey results revealed that, 76% of surveyed households have access to land that they either own as household, individuals or rented. Age, EUC of residence and occupation were significantly associated with household access to land ( $P < 0.05$ ). Households have acquired land through different sources, with social relations (52%) being the main source for land access. Households own about 79% of land, but only 43% of household land and housing has registered title. The local government authorities and households in the study sites are facing land governance challenges emanating from rural-urban transformations, including limited

availability of public land for social services development, institutional challenges and insufficient human and fiscal resources. The study recommends improving land governance structures and practices by introducing full township authority status to give local government authorities autonomy in decision-making related to land governance issues. For timely and efficient responses to land governance challenges emanating from rural-urban transformations, sufficient allocation of fiscal and human resources and facilities provision should be guaranteed. Government and other actors should mobilize resources to address the prevailing land governance challenges through land and housing surveys, and by formalizing and strengthening the capacity of land governance institutions at the village, ward and township levels.

**Key words:** urbanization, rural-urban transformation, emerging urban centres, land governance

## 5.2 Introduction

Rural urbanization, or the transformation of rural villages into urban areas in different contexts, has been widely documented in the literature (Christiaensen and Todo, 2014; Mukhopadhyay *et al.*, 2017; Tacoli and Agergaard, 2017; Guin, 2018; Lazaro *et al.*, 2019; Ørtenblad *et al.*, 2019). Rural-urban transformations are mostly associated with changes in the administrative statuses of rural villages that go hand in hand with changes in the resources of governance structures, including those related to land. The administrative transition from rural village to urban township drives changes in land governance structures and practices due to increased pressures on land and changes in legal administrative status. Examples of such pressures due to rural-urban transformations include the increased demand for land, capital investments in land, land use and conflicts over tenure.

Land is a crucial resource in rural-urban transformations due to the demand for multiple uses of land and its importance for people's livelihoods (IFAD, 2016). In many societies there are multiple competing demands on land, such as for development, agriculture, urbanization and infrastructure, among others (Bell, 2007; Sietchiping *et al.*, 2014). Kironde (2009) argues that Africa has the highest rates of urbanization in the world and therefore, rapidly growing population is creating land use and governance problems in urban and peri-urban areas. Furthermore, the expansion of urban centres often involves competition over the use of essential natural resources such as land (Tacoli, 2002).

Land governance can be understood as a process in which decisions related to land access and use are made and implemented and land use-related conflicts mediated (Kironde, 2009; Palmer *et al.*, 2009). Land governance issues have attracted global interest as

demand for land has increased rapidly, while land transfer systems have failed to live up to expectations (Deininger *et al.*, 2014). While urbanization can drive growth and development (Locke and Henley, 2016), land governance ideally plays an important role in providing favourable conditions for maximizing urbanization potential and minimizing the negative impacts of urbanization. Land governance is therefore important in addressing the pressures on land associated with rural-urban transformations. However, there is little discussion in the literature on how land governance issues challenge or facilitate urbanization and development (Locke and Henley, 2016).

What is most needed with processes of rural-urban transformation as far as land governance is concerned are political and economic institutional principles that address constraints in the rural economy, guarantee property rights and promote the participation of rural people as active actors in the transformation process (IFAD, 2016). FAO (2016) argues that, if land rights are properly defined, rural dwellers can benefit from increased land prices as a result of urbanization. Along the same lines, Deininger *et al.* (2014) emphasized that, without a public record of ownership and the ability to transfer land, its use as collateral by financial systems becomes difficult. However, legal recognition or formal papers proving land rights may not be enough to provide security of tenure. What is equally important is the ability to defend such rights effectively and at a low cost against competing claims from the state or other individuals (Deininger *et al.*, 2014). The aim of this chapter is therefore to determine how land governance structures and practices have changed in support of rural-urban transformations in Ilula and Madizini EUCs.

### **5.3 Land Governance in Tanzania in Respect of Rural-urban Transformation**

In Tanzania, all land is vested in the President on behalf of all citizens. Legally, there are policies and laws governing land access, transfer and tenure, including the Tanzania

National Land Policy of 1995 (URT, 1995), Village Land Act No.5 (URT, 1999a) and Land Act No.4 of 1999 (URT, 1999b), Land Acquisition Act 1967 (URT, 1967) and the Courts (Land Dispute Settlement) Act of 2002 (URT, 2002). The Local Government (District and Urban Authorities) Act No.7 of 1982 is crucial in respect of land governance issues (URT, 1982; Kironde, 2009).

Land in Tanzania is divided into three categories: general, village land and reserved land. General land includes all urban land that is not reserved or village land. The Land Act governs general land, meaning that it comes under the Commissioner for Lands in the Ministry of Lands, Housing and Human Settlements Development (MLHHS). Ownership of general land is based on a Granted Right of Occupancy (GRO) issued to Tanzanian citizens or groups of citizens for a specified lease period of 33, 66 or 99 years. Reserved land includes all protected areas such as national parks, forests and wildlife reserves, spatial planning and future infrastructural development. The Land Act also governs reserved land and other laws and regulations based on reservation category. A Granted Right of Occupancy and a Certificate of Customary Rights of Occupancy (CCRO) can both be issued in connection with the ownership of reserved land based on the character and purpose of the reservation (Kironde, 2009). However, institutional arrangements for the management of reserved land differ based on sector-specific policies, laws and regulations.

Village land includes all land under the jurisdiction of a registered village. As stipulated in Section 7 of the Village Land Act No. 5 of 1999, a village is registered after reaching a consensus with neighbouring villages that there are no existing boundary disputes, that all boundaries have been demarcated, that a formal certificate has been issued as a result, and that the village is registered in the National Register of Village Land. Furthermore, Section

12 of the Village Land Act 1999 requires each village to define three land-use categories within its borders: communal village land, individual and family land, and reserved land (Kironde, 2009). The management of village land is vested in the village council, which is composed of 25 members elected by the village assembly. For land management-related decisions, the village council is accountable to the village assembly. Therefore, in accordance with the requirements of the Village Land Act, the village council has the responsibility and authority to manage village land, including the allocation of land, the issuing of CCROs and establishing and administering local registers of CCROs. Village residents are given a priority in respect of allocations of village land. To safeguard village land from being transferred into the hands of foreigners, non-village residents, companies and organizations must meet certain conditions stipulated in Section 22 (f) of the Village Land Act 1999. Land officials at district level provide technical advice to village councils on issues related to land management.

As part of the process of rural-urban transformation in Tanzania, rural villages are changing their administrative statuses into ‘township’ and ultimately into ‘town’, as stipulated in the Local Government (District Authorities) Act of 1982 (Lazaro *et al.*, 2019) and the Urban Planning Act of 2007 (URT, 2007). Therefore, as part of the process of rural-urban transformation, village land, which is largely held under customary law, is usually converted into general land and subjected to urban land regulations and therefore changing practices relating to land access, tenure and ownership. No legal procedures have been introduced to recognize customary land rights formally before land is reallocated for urban development (Magigi and Drescher, 2010). As a result, land tenure disputes arise between statutory tenure and the continuing use of customary land rights (Magigi and Drescher, 2010). Locke and Henley (2016) argues that, re-designating rural villages as

expanding municipalities or towns has impacts on land tenure, uses and administrative structures.

Furthermore, most urban authorities in Tanzania tend to expand the areas under their jurisdiction in order to enclose large populations and thus justify their classification in higher categories such as the township (Magigi and Drescher, 2010). According to URT (1995), the determination of most township boundaries has resulted in uncertainties over tenure and the use of rural land that has been incorporated into township areas. Moreover, Ørtenblad *et al.* (2019) argues that the dramatic increase in people living in towns and small urban centres in Tanzania has created pressure on land. As a result, access to land for urban housing and security of tenure have long been contentious in Tanzania, exacerbated by rapid increases in urban population (URT, 2016). Drawing on experiences in the major city of Dar es Salaam, Deininger *et al.* (2012) found that 80% of housing (400 000 out of 500 000 houses) have only informal title. Referring to mainland Tanzania, Kironde (2009) claimed that only 2percent of rural land is registered and that 90% of Tanzanians are not in the property registration system and this implies insecurity of land tenure.

#### **5.4 Emerging Urban Centres (EUC) Development as Part of Rural-Urban Transformation Process**

According to Lazaro *et al.* (2017:7) “the EUCs could be viewed as “urbanized” centres inside formal categories of “urban” settlements (townships) that have reached different stages or levels/degrees of transformation within a rural-urban continuum”. EUCs are urban centres at the initial stage of centre development, characterized by having experienced a process of change from a ‘large village’ to a ‘small town’ with an above-average increase in economic activity and population growth mostly associated with complex in- and out-migration during the last decade (Larsen and Birch-Thomsen, 2015). The factors that influence the development of EUCs in Tanzania include national policies

related to settlement (1970s) and economic liberalization (1990s), the nature of the agricultural production system and physical location (Lazaro *et al.*, 2014; Larsen and Birch-Thomsen, 2015; Nindi, 2016; Lazaro *et al.*, 2017; Tacoli and Agergaard, 2017).

Conceptually, as presented in Figure 1.1, many rural villages in Tanzania are gradually being transformed into urban townships in line with transformations in formal administrative governance structures. However, the transformation process is not linear and has no definite timeframe. Tacoli and Agergaard (2017) argue that, the actual administrative transition from rural village to township is a lengthy process and that so far there has been no full devolution of governance responsibilities from district governments to the township authorities.

Several studies (Kironde, 2009; Lupala, 2015; Namwata *et al.*, 2015; Locke and Henley, 2016; Wolff *et al.*, 2018) of land governance in urban settings have focused on large cities, but research on land governance practices in emerging urban centres remains limited. Given the increase in the pressure on land resulting from rural-urban transformations, an understanding of forms of land governance is imperative.

Results from this chapter will inform policy- and decision-makers about the nature and magnitude of the land governance challenges associated with rural-urban transformations so that they can provide effective and timely responses. The lessons of this study can also be replicated in other parts of the country, as well as contributing to existing knowledge on the dynamics of rural-urban transformations, mostly changes in land governance structures and practices in their support.

## **5.5 Theoretical and Analytical Frameworks**

Theoretically, the study draws insights from good governance theory, which deals with various perspectives on governance and how they have evolved over time (Ekundayo,



2017). Good governance theory has a set of principles guiding how a sector of interest should be developed and managed. According to Kironde (2015), in the context of land governance, ‘good governance is about processes of making and implementing decisions’ (p. 350). Different institutions (UNDP, 2007), including the IMF (1997), have developed a set of good governance principles that can be applied in different governance contexts, including accountability, transparency, public participation, the rule of law, efficiency and effectiveness. In respect of land governance, good governance is fundamental in protecting property rights and developing efficient and effective property and land markets (Bell, 2007). Furthermore, based on good governance principles, secure tenure and access to land is essential for promoting economic growth and social development (Zakout *et al.*, 2006).

Different scholars (Zakout *et al.*, 2006; Kironde, 2015) have contextualized good governance principles in the context of land governance and administration, including efficiency, effectiveness, transparency, accountability, subsidiarity, participation or civic engagement, equity and the rule of law. Good governance theory is relevant in the context of this study since its principles are applied in assessing land governance structures and practices in support of rural-urban transformations. Examples of good governance principles that are relevant to the context of this study include civic engagement or public participation, efficiency, effectiveness, subsidiarity, transparency and equity. The aim is to provide suggestions for improvements, including the extent to which good governance principles related to land access and land tenure are adhered to in respect of inclusive rural-urban transformations.

Analytically, the study draws insights from the so-called Institutional Analysis and Development Framework (IAD). The IAD framework is a multi-tier conceptual map that examines how individuals or groups behave in a context of collective action and the

institutional foundations that inform social interactions and decision-making processes (Ostrom, 2005). IAD is a prominent tool within New Institutional Economics (NIE) for researching community resource management and governance mechanisms and informing both development partners and policy-makers in developing countries (Hall *et al.* 2014). The IAD framework is highly adaptable and has been applied to a wide range of institutional analyses across different systems of resource governance (Ratner *et al.*, 2013). It also highlights the fact that some practices can be adopted at only one level of resource system, while others can be applied across different levels.

IAD provides a framework for analysing institutions that govern actions and outcomes as part of arrangements for collective action. Ostrom (2005) argued that the IAD framework helps both policy-makers and scholars interested in studying how governance arrangements enable individuals to solve problems democratically to acquire diagnostic, analytical and prescriptive capacities. There are three key variables for analysis under the IAD framework: action situation, the characteristics of community or other collective units of interests, and the attributes of the physical environment through which the community acts (Ostrom, 2005).

The action situation refers to a social space in which diverse participants interact, exchange goods and services, solve problems, and dominate or fight one another. These include, for example, sub-village, village, ward and township platforms for land governance decision-making. Community characteristics include representing the homogeneity of the community's members and their shared values, while the physical environment through which communities act represent mobility and flows of resources, including human labour, capital and resource availability in, for example, land in the context of EUCs. By applying insights from the IAD framework, the chapter analyses institutional arrangements for land

governance within EUCs and shows how they have changed in support of rural-urban transformations. The chapter also assesses the availability of land and land access practices by different heterogeneous households within EUCs, including different sources of land access and forms of land ownership.

## **5.6 Research Methodology**

### **5.6.1 Research sites**

The study was conducted in Ilula and Madizini EUCs. Research sites were selected because they were both Rural-Urban Transformation (RUT) project sites, located in different geographical locations and had reached different stages of administrative transition along a rural-urban transition continuum. Geographically, Ilula EUC is in Ilula and Nyalumbu wards in Kilolo District, while Madizini EUC is in Mtibwa ward, Mvomero District (Figure 4.1). According to the 2012 Population and Housing census, Ilula EUC has a population of 22 957 and Madizini EUC a population of 14 168. Ilula was declared to be a township in 2006 and Madizini in 2002. Ilula EUC is at an advanced stage in its administrative transition to a township, with a Township Executive Officer (TEO) in place and other support officers such as an accountant and a trade and human resources officer present, all appointed by the district council. The Ilula Township Authority (TA) was established in 2015 and is now functioning, with committees and quarterly statutory meetings. Madizini, conversely, is still under a rural administrative structure in which the Ward Executive Officer (WEO) is in overall charge in collaboration with the Village Executive Officer (VEO) and the village and sub-village chairmen. Being at different stages in the administrative transition after being announced as townships, the two study sites provide an opportunity to investigate differences in the land governance structures

and practices that result from different administrative statuses along the transition from rural village to urban township.

### **5.6.2 Data collection methods**

The study employed a mixed-methods approach to data collection. Before actual data collection, in August 2015 preliminary field visits were made to all project sites to obtain an overview of land governance issues from local leaders at the district and EUC/township levels. Household surveys were conducted with 468 households (323 in Ilula and 145 in Madizini) to collect household-level data on access to land, sources of access to land and land tenure or ownership. Using the 2002 census, the number of households for the survey was proportionally estimated based on number of households in each EUC. Due to changes in enumeration areas, streets, sub-villages and wards, an estimated figure for households in the 2012/2002 national census for each EUC has been used to represent the ‘urban’ part of the ‘township’, whether formally announced or not. Households for survey were selected using a systematic random-sampling strategy, ten households being selected at each sampling point by selecting after every second household. Household survey data were collected using a structured questionnaire.

In-depth household interviews were conducted with 39 households (20 in Ilula and 19 in Madizini). Households for in-depth interviews were selected on the basis of variations in or the dynamics of responses that required further inquiry from the household survey. The variations in household responses related to land access, sources of access and land tenure. The selected households were interviewed using semi-structured interview guides developed on the basis of variations in or the dynamics of households’ responses in the main household survey. During interviews, the interview guide was customized or adapted

to specific individual households based on household responses in the household survey. Key informant interviews were also conducted with 24 informants consisting of sub-village and village chairpersons, Village Executive Officers (VEOs), ward land council secretaries and district land officials. Key informant interviews were conducted to obtain a broad understanding of issues such as the current township administrative structures (roles and power relations) and changes to land governance administrative institutions and practices in accordance with the transition from rural village to urban township. A review of relevant documents setting out government policies, laws and regulations related to land governance in Tanzania was also undertaken to determine what is prescribed in land governance policies and day-to-day practices within EUCs.

### **5.6.3 Data analysis**

Data collected from in-depth interviews and key informant interviews were analysed using content analysis. Content analysis entails objective and systematic summaries of contentions or respondents' perspectives and agreements and disagreements among research participants in the form of the smallest meaningful units or categories in line with the research objectives (Moshia *et al.*, 2016; Kajembe and Monela, 2000). A chi-square test was used to cross-tabulate comparisons of households' responses to issues of land access, sources and tenure within the two EUCs. Binary logit model regression analysis was used to determine factors associated with household access to land in both EUCs. In this study, access to land is defined as a situation where a household have a piece of land within EUCs that is used either for agricultural production, housing or business regardless of land tenure such as household land, rented land or communal land.

Since the dependent variable in this case is binary, a cumulative distribution function of a standard logistic random variable derived from the underlying latent variable model (Wooldridge, 2012) was adopted. To estimate the latent variable model, an observed binary outcome where  $y=1$  if land is accessed and  $y=0$  otherwise is employed to determine the likelihood of households accessing land within EUCs. As presented by Gujarati (1995) and Aldrich and Nelson (1984), the mathematical formulation of the logit model is specified as follows:

$$P_i = \frac{e^{z_i}}{1 + e^{-z_i}} \quad (1)$$

Where,  $P_i$  is the probability that a household has access to land within the EUC and  $e = 2.71828$ ,  $i = 1, 2, 3 \dots n$

The probability that a household has no access to land within EUC is:

$$1 - p_i = \frac{1}{1 + e^{z_i}} \quad (2)$$

Therefore,

$$\frac{p_i}{1 - p_i} = \frac{1 + e^{z_i}}{1 + e^{-z_i}} \quad (3)$$

Now equation (2) is simply the odds ratio in favour of treatment, that is, the ratio of the probability that a household has access to land (being in the reference category) to the probability that it would be in the non-reference group (no access to land).

By taking the natural log of equation (2), we obtain:

$$L_i = \ln \left( \frac{p_i}{1 - p_i} \right) = Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \quad (4)$$

where  $P_i$  as the probability of being in the treatment group ranges from 0 to 1, and

$Z_i$  is a function of  $n$  explanatory variables ( $x$ ), which is also expressed under equation 5 as:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \quad (5)$$

where,  $\beta_0$  is an intercept and  $\beta_1, \beta_2 \dots \beta_n$  are slopes of the equation in the model

$Li$  = is log of the odds ratio, which is linear in  $X_i$  and in the parameters, and  $X_i$  = is the vector of household characteristics. If the disturbance term ( $U$ ) is introduced, the logit model becomes:

$$Z_i = \beta_0 + \sum_{i=1}^n \beta_i X_i + U \quad (6)$$

For the purposes of this study equation 5 above can be specified as follows:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + U \quad (7)$$

where;  $\beta_1, \beta_2 \dots \beta_7$  = parameters to be estimated

**Table 5.1: Determinants of likelihood that household will have access to land within EUC**

Cod	Variable	Description of variables	Expected signs
$e$			
$X_1$	Sex	Sex of household head (1 if male; 0 otherwise)	+/-
$X_2$	Age	Age of household age	+
$X_3$	Formal	Formal education of household head (1 if completed at	+/-
	education	least primary education; 0 otherwise)	
$X_4$	At least	Education of household head (1 if at least attained	+
	secondary	secondary education; 0 otherwise)	
	education		
$X_5$	Location	EUC of household head residence (1 if Ilula; 0 if	+/-
		Madizini)	
$X_6$	Place of	Place of birth of household head (1 if born within EUC; 0	+
	birth	otherwise)	
$X_7$	Occupation	Main occupation of household head (1 if agriculture; 0	+/-
		otherwise)	
$\beta_1$	Coefficient		
	estimates		
$\beta_0$	Constant		
$\epsilon$	Error term		

## 5.7 Results and Discussion

### 5.7.1 Land governance structures within EUC: institutions and actors

As noted earlier, the two EUCs are at different stages in their respective transitions from rural village to urban township. As a result, land governance structures differ, with

Madizini EUC still having a rural or village structure for land governance purposes, while Ilula EUC has an urban or township structure. In the context of EUCs, and based on theoretical insights from IAD framework, there are different action situations in which decisions related to access to land and land tenure are made by different actors. Examples of action situations or social spaces in which decisions are made regarding land include the household, village or street, ward, the township and the district. However, in many EUCs in Tanzanian context, these social spaces are changing in line with the arrival of township administrative status along the rural-urban continuum as presented in sections 5.7.1.1 and 5.7.1.2.

Similarly, as noted earlier on, community groups with vested interests over land within EUCs are also heterogeneous and include farmers, pastoralists, investors, indigenous peoples, young people and immigrants, among others. Heterogeneous community groups are likely to be affected differently by rural-urban transformations in terms of land access and land tenure system. As suggested under IAD framework, land governance decisions (access and tenure) at different social spaces within EUCs should therefore consider the heterogeneous nature of community members and their varied interests over land.

#### **5.7.1.1 The village land governance structure of Madizini EUC**

As shown in Figure 5.1, different actors are responsible for making decisions related to land access, tenure and conflict resolution practices in Madizini EUC. Land governance at the village level is largely administered by the village chairperson, who is the custodian of village land and is aided as such by the Village Executive Officer (VEO), village land council, village land-use planning committee and village social and environmental committee. The practice is not unique to Madizini EUC but is common to all villages in mainland Tanzania in accordance with the Village Land Act No. 5 of 1999. These village-



level land-governance institutions are responsible for facilitating land access, land-use planning and resolving disputes over land.

Issues related to transfers of land ownership through means such as purchases are handled administratively by VEO on behalf of the village government. Newcomers or immigrants to the EUC can potentially obtain access to land either to buy or rent through land-brokers who link those wanting to buy or rent land with those who are willing to sell land or rent it out. Therefore, the land-brokers facilitate intermediation processes through which they can link newcomers and land buyers with various owners of land and facilitate the transfer of ownership through either formal or informal procedures. Nevertheless, land buying or renting can also occur through direct contact with landowners without facilitation of land brokers. Furthermore, traditional/customary systems play potential roles in land transfer and land conflicts resolution.

Moreover, disputes over land access and use that cannot be solved at the village level are normally forwarded to the Ward Land Council (WALAC) for subsequent mediation or resolution in accordance with the guidelines underlying the function of Ward Development Committees (WDC), the supreme organ of WALAC. Normally, land disputes are settled at the village and ward levels, but disputes that cannot be resolved at these two levels are referred to the district land department for further action. The district land officer is also responsible for providing technical support to village land-use planning and issuing certificates of granted rights of occupancy (GRO). Land and housing division of the High Court of Tanzania also facilitate land conflicts resolution through judicial procedures for landowners in both rural and urban settings.

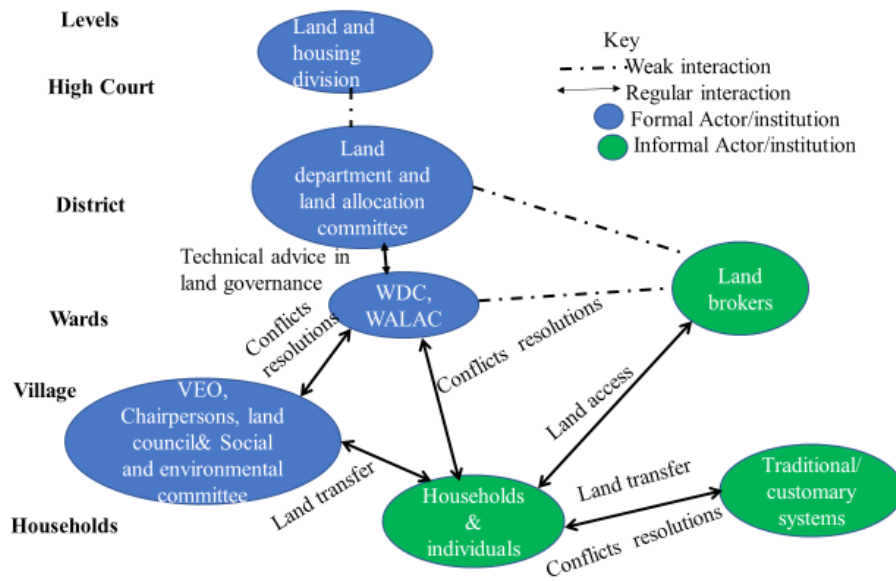


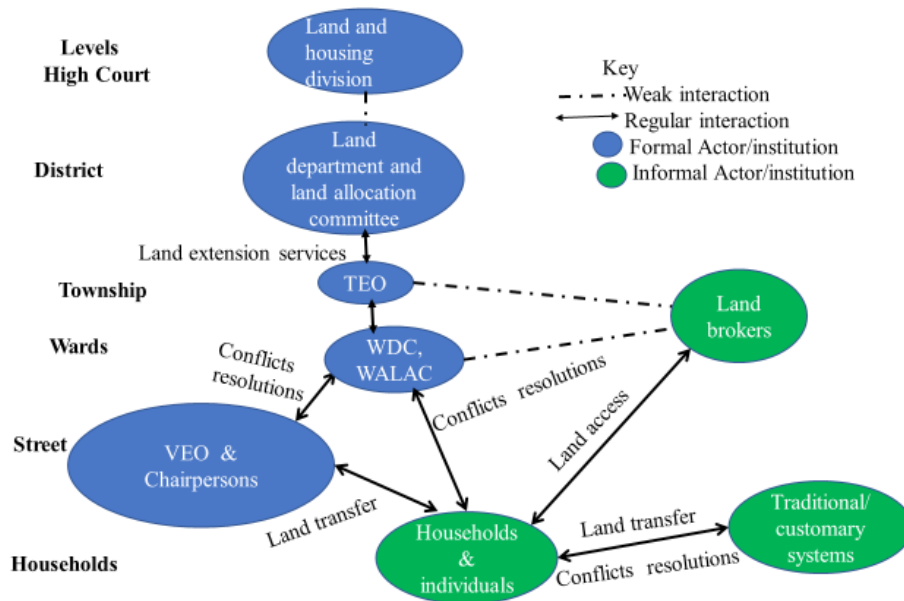
Figure 5.1: Land governance actors and institutions in Madizini EUC

### **5.7.1.2 The township land governance structure in Ilula EUC**

Following the establishment of the Ilula township authority in 2015, village councils and village land councils have been incorporated into township administrative structure for land governance (Figure 5.2). Streets have been established to replace villages in accordance with the Local Government Act No. 7 of 1982 (Urban Authorities) and the Urban Planning Act of 2007. Therefore, village land-governance institutions do not exist anymore and have no influence on land-governance decisions in Ilula township. Following the dissolution of village land councils in Ilula EUC, the township authority became an intermediate organ between the township residents and the district land department, particularly in endorsing district land plans. A recent example is the construction of Dabaga's tomato-processing factory in which the Kilolo District Council assisted (by negotiating with respective street government leaders) the investor in obtaining the land from Masukanzi street.

The WALAC's remain in place as part of the current township administrative structure and occupy roles similar to WALAC's in Madizini EUC. Under the current township structure, sub-village leaders have no prescribed legal mandate over issues of land governance. However, as a transitory strategy or 'steppingstone' to bridge the 'governance gap' from village to township, sub-village leaders are helping the district land department in respect of land governance or land access issues by providing evidence papers during formal land transfers. Sub-village leaders also provide any supporting documents that can help resolve land conflicts or disputes in collaboration with ward land councils. Furthermore, the Ilula township authority has asked Kilolo District Council's land department to pay weekly visits (regularly every Thursday) to provide a land governance-related service for Ilula EUC. The most common land governance services provided include land-conflict

resolution in relation to the surveyed plots, the approval of construction permits in accordance with urban standards and a plots survey (land extension services).



**Figure 5.2: Land governance actors and institutions in Ilula EUC**

As learned from key informants interviews, delays in the administrative transition to township status have impacts on land governance structures and practices, such as the delayed establishment of institutions for land administration at the township level, including township land committee, designated township land officer, urban planner, valuer and surveyor in Ilula township. Functional township authorities imply services, including land-related services being brought closer to the people. Therefore, it is of great importance PO-RALG and respective district councils to facilitate township administrative transitions (subsidiarity principle under good governance theory) in order to address land governance challenges in emerging urban centres where the pressure on land is higher. As Tacoli and Agergaard argue (2017), the delay in achieving township administrative status has impacts on continued development (land governance included) in both EUCs. Similarly, despite changes in land governance structures following the transition from village to township (the case of Ilula EUC), there are still some common practices in terms

of land access between the two EUCs, such as the role of VEOs in facilitating land access and of ward land councils in resolving land disputes.

### 5.7.2 Land access within the two EUCs

There is a significant statistical difference in the level of households with access to land between the two EUCs (Table 5.2). Overall, 76% of surveyed households have access to land within their EUC, while 24% of surveyed households reported not having access to land (Table 5.2). Of households without access to land within the EUC, 37% of surveyed households are in Madizini EUC and 18% of surveyed households in Ilula EUC (Table 5.2). As argued by proponents of ‘good governance’ theory principles in land governance (Zakout *et al.*, 2006), access to land for different societal groups is important for both social and economic development.

**Table 5.2: Household access to land in EUCs**

	Ilula	EUC Madizini	Total	Chi-square statistics
<b>Household access to land within EUCs</b>	<b>(n = 323)</b>	<b>(n = 145)</b>	<b>(n = 468)</b>	
Access to land (%)	266(82)	91(63)	357 (76)	21.24(.000) *
No access to land (%)	57(18)	54(37)	111 (24)	

\* Significant at 1% level, Source: RUT Household Survey, 2016

From in-depth household interviews and key informant interviews, factors that were reported as constraining households in accessing land within the EUC include increases in land prices, income levels, period of stay and place of origin. For example, in Ilula EUC it was revealed that in 2005 a hectare of land had been sold on average for 100 000 TZS, a price that had increased to a million TZS in 2015. Whenever the government acquires land from private landowners in exchange for monetary compensation, the township official in Ilula reported that a hectare of land currently sells for 2 million TZS. A sub-village official in Ilula reported that in high-density settlement areas on average half a hectare goes for

between 2 and 3 million TZS, the same plot being rented out for between TZS 150 000 and 200 000 per cultivation season. In more rural parts (for example, in Ikuvala, north and south), the same area of half a hectare is sold for between 800 000 and a million TZS. Therefore, land is relatively cheaper in the more rural parts of the township.

In Madizini EUC, it was revealed during in-depth household interviews that currently a 25 by 20 metre plot would be sold for between 2 and 3million TZS and 0.4 ha plot for between 1 million and 3 million TZS depending on the plot's location within the EUC. The difference in land prices within the EUC is mostly determined by the land's location. For example, land prices are mostly high in planned settlements (Chapter 4, Section 4.8), like Mwaya in Ilula and Mji Mpya and Madizini B in Madizini, as well as in areas with infrastructures like main roads, water, businesses and bus terminals.

Drawing on the theoretical insights of the IAD framework, households in both EUCs are very heterogeneous in terms of their demographic characteristics and migration statuses. Given the heterogeneous nature of community members within EUC, access to land is constrained by multiple factors, mostly price and location within EUCs. Namwata *et al.* (2015) observed similar constraints facing urban farmers and households in Dodoma in accessing land for agricultural purposes namely a lack of money to buy land (18.8%) and high land prices (16.8%).

From binary logit analysis (Table 5.3), it was observed that the likelihood of a household having access to land within EUCs increases with age by 4.3%, a situation which can be linked to the greater availability of land previously, as well as to strong social relations and the influence of the elderly. One's EUC of residence was statistically significant and positively influenced the likelihood of a household accessing land within EUCs. Households in Ilula EUC have a 157% higher chance of accessing land compared to

households in Madizini EUC, possibly because of local geography and place of origin. For example, Madizini EUC is surrounded by many villages, a teak plantation and the Mtibwa Sugar Estate (MSE), implying limited land availability. In Ilula EUC 47% of sampled households are immigrants, while in Madizini the proportion of immigrants is 79% of sampled households, which has implications for the likelihood of households being able to access land within the EUC, since the established population has better chances to access land compared to immigrants.

Households whose main occupation is agriculture have a 62% higher chance of accessing land compared to households engaging in other occupations, since households are engaging in agricultural production for both their own consumption (85% in Ilula and 80% in Madizini) and selling (48% for both Ilula and Madizini EUCs).

**Table 5.3: Determinants for the likelihood of households accessing land within the EUC**

Determinants for land access	B	Wald	Sig.	OR
Sex	.028	.010	.920	1.029
Age	.042	17.526	.000***	1.043
At least secondary education	-.269	1.090	.296	.764
At least completed primary education	.118	.080	.778	1.125
EUC of residence	.944	13.498	.000***	2.570
Place of birth	.309	1.321	.250	1.362
Main occupation	.485	3.996	.046**	1.624
Constant	-1.684	6.059	.014	.186

\*\*\* Significant at 1%, \*\* Significant at 5%

Furthermore, given the current pressures on land (the physical characteristics of land as a resource as postulated under IAD framework) within EUCs, households, enterprises and government are all forced to buy land from private landowners within or outside the EUCs. For example, Madizini village government has bought 22 ha of land from the neighbouring

Manyinga village for future township development, including sites for an agricultural market, offices and institutional development.

In Ilula EUC, there is no general land for the government to distribute to people in need of land or for future development. It is only Masukanzi street within Ilula EUC that has 20 ha at Igingilani, farm number 10. The twenty hectares belong to former Greek-owned tobacco farms that were used for research and agricultural demonstrations are now set aside for future development. Furthermore, in Ilula EUC, fourteen people gave 14 ha to the government for the construction of Nyalumbu ward Secondary School and were given alternative land by the government in Luhanzi. Kilolo District Council also planned to obtain land from private landowners in Ding'inayo street to survey 903 plots to construct a headquarters for Ilula Township.

### **5.7.3 Sources of land access within EUC**

There are significant differences in the sources of access to land within the two EUCs, with 52% (Table 5.4) of sampled households acquiring land through social relations. From in-depth household interviews, it emerged that social relations take different forms, based on religion, ethnicity, occupation or neighbourhood (direct contact) among others. For example, one respondent reported that:

*“My friend asked me to give her ten sacks of paddy so that she can give me a land plot. I gave her the ten sacks of paddy, and she gave me this plot [on which] I constructed my house”* (In-depth household interview in Madizini, September 3, 2017).

Examples of practices for sources of land access and transfer procedures are presented in Box 5.1.



**Box 5.1: Access to land through social relations**

*“I am originally from Kilimanjaro region, Mwanga district. I relocated to Madizini village in 1971 from Bwage, Mvomero district. I have been engaging in sugar production as an out-grower since 1973 to date. Within Madizini, I own around 8 ha in Kwa Kibaite sub-village and 0.2 ha in Mpingoni sub-village. I bought the 8 ha through social relations (knowing the natives) way back in the 1970s. However, of recent, due to fear of township formalization status (announcement of township status), I have decided to divide my land into small residential plots of 20m<sup>2</sup> by 30m<sup>2</sup> and sold it to individuals. Plot price differs based on plot size, but the average price is 2 million TZS. Practices for land selling is that I and the buyer agree on the land size, price and mode of payment, and we go to the Village Executive Officer for formalization (act as witness) by filling in the special form or evidence paper legalizing the land transfer between the parties involved”. (In-depth household interview in Madizini, May 7, 2017).*

Inheritance from relatives was reported by 26% of sampled households in Ilula EUC compared with 7% of sampled households in Madizini EUC (Table 5.4) reflecting the respective rates of immigration. Inheritance as a source of land has also been reported in other studies (Tsiko, 2016; Magigi and Drescher, 2010).

In key informant interviews, land-brokers were mentioned as a less popular source of land acquisition due to recent increases in the double selling of land by land-brokers. Apart from the government (village/district) as a source of access to land, other sources include informal land-transfer practices based on source of access. Furthermore, with the exception of inheritance from relatives, land acquired from other sources involves some payment (monetary or an exchange of properties). One respondent from Ilula reported that:

*“The land [on which] I constructed my current house was distributed to my parents by the government during operation Vijiji in 1974. I then inherited this land from my parents” (In-depth household interview in Ilula, June 12, 2017).*

**Table 5.4: Sources of access to land within the EUC**

Sources of land to access within EUC	EUC			Chi-square statistics
	Ilula (n = 265)	Madizini (n = 91)	Total (n = 356)	
Social relations (%)	130 (49)	53 (59)	182 (52)	17.02(.002) *
Land-brokers (%)	9 (3)	3(3)	12 (3)	
Directly from landowners (%)	52 (20)	27 (30)	79 (22)	
Inherited from relatives (%)	70 (26)	6(7)	76 (21)	
Government (village/district) (%)	4(2)	1(1)	5(1)	

\* Significant at 1% level, Source: RUT Household Survey, 2016

Land accessed through the different sources presented in Table 5.4 is transferred through both formal and informal procedures. Despite the administrative status, the formal land-transfer procedures under the Village Land Act No. 5 of 1999 include a visit to the land being transferred, the boundaries being identified, the price mutually negotiated and a visit by the Village Executive Officer (VEO) office for the evidence paper and payment of the land-transfer facilitation fee. On average, six people are involved in land transfers, namely the landowner, the buyer, two witnesses representing the two sides, the sub-village leader (to confirm ownership and the absence of any dispute) and the VEO. In a situation where disputes have developed between a rightful owner and family members or a third party, the village or sub-village leaders are consulted to solve the dispute. Village government is paid 10% of the total price of the land being transferred as a service charge in facilitating land transfers. Thus, drawing theoretical insights from IAD framework, in EUCs context decision about formal land transfer is made at different levels (action situations), first household or individual level and later on formalized through village government leaders or VEOs.

Traditionally, however, land is transferred through informal customary procedures. In practice, this means for free for family members once one is considered mature enough to get married, for example, in the case of men. Customary procedures for land transfers are

similar in the two EUCs but differ with ethnic group. However, some informal procedures are common, including counting plots or physically surveying land area, land being distributed proportionally to all eligible household members. The land-transfer process at the household level is mostly supervised by the elderly within the household. For example, in the Hehe tradition (the dominant ethnic group in Ilula EUC) it is the oldest child (usually the son) who is responsible for ensuring fair land distribution among household members, land they will henceforward own as individuals in the form of small plots or farmland. Magigi and Drescher (2010) in Himo town among the Chagga tribe and by Kironde (2009), regarding general practices regarding customary land tenure system in Tanzania, have documented similar customary practices for land transfer or acquisition. In Madizini EUC, it was difficult to capture the dominant customary procedures for land transfer due to a mixture of different ethnic groups who are mostly immigrants.

#### **5.7.4 Land tenure or ownership within EUC**

Results indicate that 79% of sampled households reported that their housing and farmland is owned by the household (Table 5.5). In most traditional communities, the household head is the owner of household land. In the case of household land, the implication is that the household members have use, control and ownership rights to the land referred to. Renting is another common form of land tenure within EUCs, with 22% of sampled households in Ilula EUC renting land as compared to 7% of households in Madizini (Table 5.5). Given the expected announcement of township status, more people are attracted to migrate into the EUC and are therefore likely to rent land. For example, in Ilula EUC, of the 82% (Table 5.2) of sampled households with access to land, 22% (Table 5.5) are renting the land they have access to.

**Table 5.5: Land ownership and tenure within the EUC**

Land ownership/tenure within EUC	Ilula	EUC Madizini	Total
	(n = 266)	(n = 91)	(n = 357)
Owned by household	76	87	79
Rented	22.	7	18
Borrowed	0.0	1	0.3
Community land	0.4	0.0	0.3
Owned by cooperative	0.0	1	0.3
Owned by clan	1	4	2

Source: RUT Household Survey, 2016

Regarding housing tenure, a relatively high proportion of households own their current houses without a registered title. For example, in Madizini EUC only 8% of surveyed households have a registered title for their property as compared to 32% of households in Ilula EUC (Table 5.6). Households which have had their plots surveyed but have not had a formal title deed issued or have not had their land surveyed at all remain in a high degree of uncertainty regarding their security of tenure.

**Table 5.6: Tenure status of current housing within the EUC**

Tenure status of current housing within the EUC	Ilula	EUC Madizini	Total
	(n = 323)	(n = 144)	(n= 467)
Owned with registered title	32	8	25
Owned without registered title	38	54	43
Rented	28	29	28
Rent-free use	2	9	4
Others	0.0	1	0.2

Source: RUT Household Survey, 2016

Different reasons limiting the processing of formal titles to land and housing were given during in-depth and key informant interviews. A lack of awareness or understanding of the positive and negative impacts of owning the land without formal title was reported as the most common reason, but the high rate of survey costs was another impediment to registering land and housing. For example, in Madizini EUC households reported that on average the issuing costs for survey and plot title deeds range between 300 000 and

400 000 TZS, without follow-up costs. In Ilula EUC, households reported that on average surveying one hectare can cost approximately 2 million TZS which is difficult to afford for most households.

As theorized under the good governance theory, formal title to land or housing in EUC context is important in ensuring security of tenure for future generations, increasing land values and enabling access to financial services. Securing land rights is especially important for vulnerable groups such as the poor, ethnic minorities, women and orphans (Bell, 2007). As elsewhere, key informants interviews revealed that, owning land or housing in EUCs without registered title carries multiple socio-economic risks, including lacking true ownership of land, land conflicts that are difficult to resolve, denial of access to financial services, low compensation rates and the risk of dispossession. Despite negative threats associated with owning land or housing without having formal title deeds, some households felt that there are no threats at all. This was argued due to trust in the customary tenure system, sellers and evidence papers provided by village leaders, being known to other villagers and still feeling more rural.

In minimizing the risks of owning the land and housing without formal title deeds, EUC residents in both sites are formally surveying and formalizing their land and housing to enhance their security of tenure and use their formalized land or housing as collateral in accessing financial services. For example, in both sites, district land officers have been undertaking individual plot surveys at the request of individuals provided the latter meet all the costs of surveying and formalization. In unplanned settlements (Chapter 4, section 4.8), as in the case of Madizini EUC, people are issued with residential licenses, a form of land registration for unplanned settlements. According to the Mvomero District land office records, by March 2018, 23 residential licences had been issued for Madizini EUC.

The processes of formalizing land and housing ownership was reported to be lengthy, bureaucratic and costly and a situation which is contrary to the principles of good governance theory in land governance context. Long bureaucratic procedures were also reported as a constraint in formalizing land possession in Tanzania by Ewijk (2016), who argued that in Tanzania it takes from seven to eleven years to complete the procedures required to develop plots of land. In accordance with the principles of good governance theory, procedures to register land and property are supposed to be brief, clear and cost-effective (Kironde, 2015; Zakout *et al.*, 2006). The government has been making efforts to reduce both the lengthy bureaucratic procedures and the costs of formalizing land and property ownership. For example, the initial official or government costs for surveying and formalization were TZS 500 000 but were reduced to TZS 250 000 in 2016. Recently, in April 17, 2019 through the Minister of Land, Housing and Human Settlement, the government has reduced the costs of plots, housing surveys and formalization from TZS 250 000 to TZS 150 000.

#### **5.7.5 Land governance challenges within EUCs**

Institutions responsible for land governance within EUCs are facing numerous challenges. For example, key informants' interviews revealed that, ward land councils are facing challenges such as members dropping out and a low level of understanding among members regarding both their own and the council's roles and positions. Other challenges include insufficient facilities and human and fiscal resources for ward land councils to perform their duties. Furthermore, the local government authorities at district level lacks the funds to undertake zoning or plot surveys or to compensate private landowners in a situation where their land is used for infrastructure development such as roads and water

pipes placement. Land governance challenges over access and tenure within EUCs are linked to the stage in the administrative transition that has been reached along a rural-urban continuum and to local geography. Both EUCs rely on designated district land officers to help them address land-related issues. As reported in other studies (Locke and Henley, 2016; Magigi and Drescher, 2010), in the EUCs context, the inclusion of more rural villages in the townships' jurisdiction has implications for land tenure and ownership issues under the current customary system in the rural villages.

The nature of land governance challenges within EUCs, though related to rural-urban transformations, are independent of the level of administrative transition. However, the extent to which land governance challenges are addressed can partly be linked to the level of administrative transition that has been reached. For example, the absence of resident land officers in both sites limits the local township government's ability to enforce land policies and regulations or the rule of law principle under good governance theory.

The inadequate capacity of land governance institutions, coupled with limited human facilities and fiscal resources, limits the attainment of good governance principles such as efficiency, sustainability and the rule of law. Similar observations have been made by Kironde (2015) in a study conducted in Dar es Salaam to assess plot survey projects. Given the economic and social benefits of good governance in land administration (Bell, 2007; Zakout *et al.*, 2006), addressing land governance challenges within the EUC is important in order to be able to tap into the potential of rural-urban transformations, such as employment creation, access to services and technological innovation.

## **5.8 Conclusions and Recommendations**

This chapter aimed to assess changes in land governance structures and practices in support of RUT. Results revealed that, land governance structures and practices have changed following the administrative transition from rural village into urban township. These are for example dissolution of village level land governance structures such as village councils and village land councils following establishment of Township Authority administrative structures. A significant number of households surveyed (76%) have access to land within the EUC through multiple sources, with social relations being the most common such source. Due to increased double selling of land, however, land-brokers are least preferred (3%) as a source of land acquisition. Land is transferred through both formal (village government) and informal procedures (varies from one ethnic group to another). A large proportion of land (79%) is owned privately by households.

Rural-urban transformations have created challenges to issues of land access and tenure, including institutional vacuum for land governance, increases in land prices as well as disputes over plots and boundaries. To address the prevailing land governance challenges emanating from rural-urban transformations, the study recommends improving land governance structures and practices by facilitating the attainment of full township status to give township authorities planning, implementation and decision-making independence on matters related to land governance pressures emanating from rural-urban transformations. Sufficient allocations of fiscal and human resources and facilities should be ensured to facilitate the timely and efficient resolution of land governance challenges. The government and other actors should mobilize funds to address the major land governance challenges through plot and housing surveys and formalization and strengthening the capacity of land-governance institutions at the village, ward and township levels.



Improving land governance within EUCs will enable households to benefit from rural-urban transformations by having their security of land tenure guaranteed and other land governance challenges resolved effectively and in timely fashion.

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## CHAPTER SIX

### CHANGES IN DOMESTIC WATER GOVERNANCE STRUCTURES AND ACCESS PRACTICES IN SUPPORT OF RURAL-URBAN TRANSFORMATION WITHIN ILULA AND MADIZINI EMERGING URBAN CENTRES IN TANZANIA

#### 6.1 Abstract

Pressures on domestic water access in Emerging Urban Centres (EUCs) in Tanzania have increased following rapid population growth. However, infrastructural development in connection with domestic water supplies is not keeping pace with this rapid growth. The aim of this chapter is to determine how domestic water governance structures and practices have changed in support of processes of rural-urban transformation. In the two case areas, the study employed a combination of research methods, including 468 household surveys, 39 household in-depth interviews, 45 key informant interviews, transect walks and direct observation. Descriptive and content analyses were conducted to analyse quantitative household survey data and those from qualitative interviews respectively. A spatial analysis of domestic water points was also carried out. The study results showed that, water governance institutions, actors and practices have changed through the establishment of water utility authorities in support of rural-urban transformation. The results of the household survey indicate that 75% of surveyed households access domestic water from a tap, 23% from a well and 2% from other sources. Only 21% of domestic water sources are located inside household compounds, 74% being located outside. The location of domestic water points has implications for the costs of accessing water and productive labour time. The study concludes that, despite numerous efforts to address domestic water scarcities in EUCs, such as the rehabilitation of water infrastructure and the establishment of domestic water points, access to domestic water is still a critical challenge in the two case areas,

especially in terms of volumetric capacity and spatial distribution. Planning for spatial water supply systems is not keeping pace with the increasing demand for water. The study recommends that government, private and community actors secure more water sources with sufficient volumetric capacities, built more water supply infrastructure and ensure that the financial and human resources and capacities of water supply institutions are strengthened.

**Key words:** rural-urban transformation, water governance, domestic water access, emerging urban centres, Tanzania

## 6.2 Introduction

The literature on water governance from a variety of perspectives has increased in the last two decades in response to growing concerns over the water crisis (Woodhouse and Muller, 2017). Economic developments, population growth, deteriorating water quality and climate change are increasing the pressures on water supplies in different contexts (Akhmouch *et al.*, 2018). Rapid urbanization associated with the increasing demand for water is causing conflicts in water service delivery (SID, 2008), drawing increasing attention to water and its governance as a policy concern (Woodhouse and Muller, 2017). The 1992 Dublin Statement on water and sustainable development, Principle No. 4, emphasized the economic value of water given competing water uses and pointed out that the scarcity and misuse of fresh water calls for affordability and equity criteria to be considered in allocating water (ICWE, 1992). Therefore, it is important to manage water as an economic good (involving market and integrated decision-making to determine allocation of scarce water resources) to achieve efficient and equitable water use and conserve water resources (Savenije and Van Der Zaag, 2002; Van Der Zaag and Savenije, 2006). The failure to govern water as an economic issue poses serious challenges to human health, food security, industrial development and ecosystems, all of which critically depend on water (ICWE, 1992).

Furthermore, the main focus of Sustainable Development Goal (SDG) 6, 'Ensure availability and sustainable management of water and sanitation for all', is to ensure access to safe water sources and sanitation for all. Specific targets under SDG 6 include 6.4 (water use efficiency), 6.5 (integrated water resource management) and 6B (participation of local communities in improving water and sanitation management). Also important is the OECD water governance initiative launched in 2009, which is tasked with advising governments



at all levels in designing and implementing better water policies to improve lives (OECD, 2015a). Nationally and locally, water governance is changing in response to local water-scarcity problems, as well as its increasing demand.

Urban water provision and governance have become subjects of extensive scholarly attention in cities in the Global South (Rugemalila and Gibbs, 2015). Urban water crises are often primarily governance crises (Rugemalila and Gibbs, 2015; OECD, 2011). Furthermore, urban water management is increasingly combining measures on many different scales, from urban-rural co-operation to small-scale water services (OECD, 2015b). However, very few assessments of water governance address more local settings or explicitly consider the urban dimension of governance, which involves making distinctions between urban, rural and peri-urban contexts (Moretto, 2015). Consequently, there is still scant knowledge of how authorities and residents in, for example, emerging urban centres (EUCs) at different stages in their transition from rural villages into urban townships are coping with water scarcities through different water governance arrangements. Woodhouse and Muller (2017) raise three critical questions that are important in studying how water is governed in any given context: who should participate in decision-making regarding water access? At what geographical and political scales should water governance institutions operate? And what is the appropriate role of market (demand-driven) versus non-market criteria (government equity policies) in allocating water?

By drawing on the experiences of EUCs in Tanzania, this chapter is guided by Woodhouse and Muller's (2017) questions and theoretical insights drawn from the notion of 'institutional bricolage'. Specifically, the chapter aims to determine how domestic water governance structures and access practices in EUCs in Tanzania have changed in

supporting the transition from rural village to urban township. Hypothetically, the level of administrative transition reached on the path to becoming a township has a significant influence on access to domestic water within EUCs. The results of this chapter aim to contribute to current debates on rural-urban transformations in the Global South, focusing especially on how water governance is evolving in support of the process of rural-urban transformation.

### **6.3 Water Governance Structures and Practices in Tanzania**

The concept of governance is defined differently by different scholars and in different contexts. According to Rhodes (2007: 1246), “governance is a matter of ‘governing with and through networks’”. Ostrom (2009) conceptualized governance as a series of ‘nested’ institutions governing the use of a ‘common pool’ of a natural resource such as water. Bakker (2010: 44) defined governance as ‘a process of decision-making that is structured by institutions (laws, rules, norms and customs) and shaped by ideological preferences. As is the case with governance in general, the concept of water governance is still evolving and still has no universally agreed definition (Tortajada, 2010). It is often not clear what water governance entails or even what its goal should be (Woodhouse and Muller, 2017). The OECD (2015a) has defined water governance as a set of formal and informal rules, practices and processes through which decisions over the management of water resources and services are taken and implemented, stakeholders articulate their interest, and decision-makers are held accountable. Other scholars (Tortajada, 2010; Rogers and Hall, 2003) have conceptualized water governance as a range of political, social, economic and administrative processes and institutions through which governments, the private sector and civil society make decisions about the use, allocation, development and management of water resources and deliver water services at different social levels.

In practice, water governance is about what determines who gets what water, when and how. More importantly it is about human relations determining how water systems work (WGF, 2015). Different countries regulate water services provision in different ways (OECD, 2015b). Woodhouse and Muller (2017: 236) argue that ‘the large diversity of situations requires context-related responses adapted to local specifications in governing water’. According to WEF (2016), improved water governance is necessary to accommodate growing populations and promote economic development. Therefore, due to the increasing demand for water in different uses around the world, water governance is becoming critical (Kabote and John, 2017).

Water management is distinguished from water governance through its focus on the operational activities or practices of monitoring and regulating water resources and their use, as well as planning, building and operating water infrastructure (Woodhouse and Muller, 2017). Water management is a development challenge that requires cooperation, collaboration and coordination from both within and outside the water sector by multiple interested parties (Tortajada, 2010). Water governance and water management are interdependent in the sense that effective governance systems are the means that enable practical management tools to be applied properly as situations require (Tortajada, 2010). In this chapter, both water governance (formal and informal institutions/actors) and management conceptions or practices are taken into account in assessing the effectiveness of institutional arrangements for water governance, water access situations and water infrastructural development in coping with rapid increases in population and economic growth in EUCs.

According to the World Bank Group (2017), Tanzania is already suffering water stresses because of growing demand. At the end of 2015 it was estimated that, 23.7 million people in Tanzania did not have access to improved water sources for drinking (Word Bank, 2018). With a projected population of 65.2 million by 2025, it has been estimated that the 2012 annual average available water per capita of 2000 cubic metres will be reduced by 30% to about 1400 cubic metres per capita per year by 2025 (URT, 2013). In 2019, national water demand in Tanzania reached 150% of the accessible water supply during the dry season (TAWASANET, 2019). Therefore, the growing demand for water in urban centres and industries needs to be better understood and planned for (World Bank Group, 2017).

Water governance structures in Tanzania are characterized by a mixture of formal (established by formal laws) and informal (not legally registered) institutions (Kabote and John, 2017). As a result of this dual system of water governance, institutional arrangements for accessing and using water in Tanzania are both diverse and complex (Franks *et al.*, 2013). The complexity and diversity of water governance institutions stem from a range of existing and newly established governance structures that are intended to facilitate water allocation, distribution and use (Mosha *et al.*, 2016). Currently, the National Water Policy of 2002, the Water Management Act No.11 of 2009 and the Water Supply and Sanitation Act No. 12 of 2009 are the main formal legal frameworks governing water management and use in Tanzania (Kabote and John 2017; Mosha *et al.*, 2016; Franks *et al.*, 2013). Other legal and administrative frameworks for water governance in the country include the National Water Sector Development Strategy of 2008, Districts Water Supply and Sanitation Plans, Business Plans for utilities in district and regional capitals and plans for water delivery and management in small towns (USAID, 2011). The government of Tanzania is also implementing the Water Sector Development Programme (2006-2025) in

line with the Tanzania Development Vision 2025 and other poverty-reduction policies and strategies.

Operationally, water governance institutions in Tanzania are established on different administrative and geographical scales and levels, including the national, basin, district and community levels. Nationally there is a National Water Board responsible for policy and the coordination of related issues regarding water management. At the basin level, Basin Boards are responsible for monitoring water use, identifying water users, issuing water rights and bills, collecting water extraction taxes and mediating conflict over water in villages (Mosha *et al.*, 2016). There are also catchment and sub-catchment water committees. At the district level (for rural districts) water management comes under the District Water Departments.

At the level of the township and of emerging urban centres that are yet to become township authorities, there is a mixture of rural and urban water governance systems, mostly influenced by the available water sources and providers and increases in the demand for water. According to National Water Policy of 2002, urban water provision is governed by formally established water utility authorities within townships or urban centres that are responsible for facilitating spatial water distribution, sanitation, quality control, billing, tariff collection and regular maintenance within defined jurisdictions. Rural water governance consists of informal water systems like committees or Community Owned Water Supply Organization (COWSOs) (informal) at the street or village and community levels that are responsible for water governance (operation and maintenance) (Water and Sanitation Program, 2011). Other informal actors responsible for domestic water governance include households, water vendors, community and private-sector actors. Whether rural or urban, informal rules are implicit in everyday practices for water access (Kabote and John, 2017; Mosha *et al.*, 2016), and in the Global South they often differ

from the official governance prescriptions and mechanisms for service delivery within the institutional sphere (Moretto, 2015).

#### **6.4 Emerging Urban Centres Development and Domestic Water Services**

##### **Requirements**

In Tanzania, many rural villages are being transformed administratively into townships as part of a process of rural-urban transformation. Emerging Urban Centres (EUCs) (Lazaro *et al.*, 2019; Larsen and Birch-Thomsen, 2015) are defined as rapidly growing small urban centres in terms of population increase and economic growth that have reached various points in the administrative transition from rural village to urban township. Rapid population and economic growth within EUCs increase the domestic demand for water. However, access to improved domestic water supplies in urban areas is not keeping pace with population growth (Water and Sanitation Program, 2011). Hence, in supporting the transformation process, domestic water providers and residents within EUCs are changing water governance structures and practices. Most research on water governance and access in Tanzania has focused on large urban centres and irrigation schemes at the basin and water catchment levels (Rugemalila and Gibbs, 2015; Mosha *et al.*, 2016; Kabote and John, 2017).

The extent to which residents of EUCs are coping with the increased domestic demand for water resulting from rural-urban transformation is less well documented. This chapter addresses the existing knowledge gap by drawing on the experiences of Ilula and Madizini EUCs (Figure 6.1) on how government authorities, private actors and residents have changed domestic water governance structures and access practices to cope with increased domestic water demand resulting from rural-urban transformations.

## **6.5 Theoretical Framework**

As mentioned above, water governance in Tanzania is composed of formal and informal arrangements and is therefore diverse and complex. Similarly, as EUCs are at different levels of administrative transition, they employ both formal and informal water governance practices to cope with the increasing demand for water. Theoretically, Critical Institutionalism (CI) explores how institutional dynamics mediate relations between people, natural resources and society (Cleaver and De Koning, 2015). From a CI perspective it is argued that rules, boundaries and processes are unclear and that people's complex social identities and unequal power relations shape resource management arrangements and outcomes (Cleaver, 2012). Furthermore, CI gives recognition to institutions associated with social life and interactions, power relations, kinship and gender that mediate access to and control of natural resources (Nunan, 2015). Under CI, the term 'institutional bricolage' is used to describe how the interplay of institutions impacts on how people draw on formal bureaucratic and informal, socially embedded practices and institutions to find a way to make things happen (Cleaver, 2002).

Institutional bricolage is a process through which people consciously or unconsciously assemble or reshape institutional arrangements to form new institutions (Cleaver and De Koning, 2015). Bricolage is a useful term reflecting the dynamism, complexity and diversity of institutional arrangements and the emphasis on the importance of both bureaucratic and socially embedded institutions (Nunan, 2015). Although former institutional arrangements are modified and new ones established under institutional bricolage, some components of the old arrangements may persist and enter into the new arrangements. In their reworking of existing institutional arrangements actors innovate but do so within the limits of their resources, social circumstances and what they perceive to be legitimate (De Koning, 2011; Cleaver and De Koning, 2015). By drawing insights from

institutional bricolage, this chapter investigates how water governance structures and access practices within small EUCs have evolved in supporting rural-urban transitions.



## **6.6 Research Methodology**

### **6.6.1 Research sites**

The study was conducted in Ilula and Madizini EUCs. Ilula and Madizini are emerging urban centres in Tanzania that have been transforming themselves rapidly in the last decade in terms of population growth, settlement densification and spatial expansion, businesses and the setting up of social services. This has resulted in an increased demand for water and changes in governance structures for access to domestic water and access practices in support of rural-urban transformation. Ilula EUC is in Ilula and Nyalumbu Wards in Kilolo District and Madizini EUC is in Mtibwa Ward, Mvomero District (Figure 4.1). According to the 2012 Population and Housing census, Ilula EUC has a population of 22 957 living in Itabali, Ilula Sokoni, Ngelango, Mtua, Ilula-Mwaya, Ding'inayo, Madizini, Igunga, Ilula-Itunda and Masukanzi streets. Madizini EUC has a population of 14 168.

### **6.6.2 Data collection and analysis methods**

A combination of research methods was employed in this study. A preliminary field visit was conducted in August 2015 to obtain an overview of water governance practices within the two EUCs. In February 2016 a household survey was conducted among 468 (323 in Ilula and 145 in Madizini) households to collect quantitative data on household-level practices for domestic water access, including on sources, providers, location, payment and changes in domestic water status from 2007 to 2017. The sample size of the two surveyed EUCs was proportionally estimated based on population figures and average household size from the 2002 PHC census. The selection of households for the survey was based on a systematic random sampling strategy, whereby ten households were selected at each sampling point by selecting every second house. Household survey data were collected using a structured questionnaire.

In-depth household interviews were conducted with 39 households (20 in Ilula and 19 in Madizini). Households for in-depth interviews were purposively selected based on variations in or the dynamics of responses that required further inquiry from the household survey. The variations in household responses were related to water sources, location, providers, payment for water services and water access status. The selected households were interviewed using semi-structured interview guides developed on the basis of variations in or the dynamics of households' responses drawn from the survey. The interview guide was customized or domesticated for specific individual households based their responses in the household survey.

Furthermore, 45 key informant interviews were also held with heads and representatives of the Turiani Rural and Urban Water Supply and Sanitation Authority (TURUWASSA) in Madizini and the Ilula Urban Water Supply and Sanitation Authority (IUWASSA) in Ilula. Other key informants were attendants of public standpoints or domestic water points, street or sub-village leaders, township, ward and village leaders and district water officials. Representatives of private wells (in Madizini) whom local leaders and residents identified as supplying water to a wider public within the neighbourhood were also interviewed. Key informant interviews were conducted using a semi-structured interview guide to understand domestic water governance practices at the EUC level.

Public tap- and well-attendants and water vendors were also randomly selected during transect walks to assess day-to-day practices in acquiring domestic water, including queuing arrangements, the number of people drawing water from a specific water source based on seasonality, and water fee payment modalities. During transect walks, all public water sources (wells and taps) were surveyed and mapped for the purposes of assessing the spatial distribution of water sources in different neighbourhoods within Ilula and Madizini

EUCs. Mapping water points using a handheld GPS offers great potential in terms of analysis and planning (Jiménez and Pérez-Foguet, 2010). A literature review of relevant by-laws and laws relative to water governance in Tanzania was also undertaken.

A chi-square test was used to cross-tabulate comparisons and determines whether there were any significant differences in the distribution of household responses from the household survey in respect of accessing domestic water supply, including sources, location and changes in water access status in the past ten years. Data collected from in-depth interviews and key informant interviews were subjected to a content analysis (Mosha *et al.*, 2016; Kajembe and Monela, 2000). Physical observations at water points were also undertaken.

## **6.7 Results and Discussion**

### **6.7.1 Evolution of water governance within EUCs**

The analysis of the evolution of water governance institutions in this section is guided by the theoretical insights of institutional bricolage already presented in section 6.5. Water governance institutions and actors in Ilula and Madizini EUCs have evolved as part of their respective rural-urban transformations (population increase and announcement of township status) and broader national water policies, as well as social, political and economic structural transformations. Water utility authorities like IUWASSA in Ilula Township and TURUWASSA in Madizini EUC are newly established formal government institutions that are responsible for domestic water provision in small townships and nearby villages. The main drivers of the establishment of water utility authorities are the reclassification of villages as townships and the increase in the demand for water following population increases, which have gone beyond the capacity of water committees to meet the

increasing water demand. Therefore, as suggested under institutional bricolage, IUWASSA and TURIWASSA have replaced the water committees and are currently performing similar roles, though with wider geographical coverage beyond the announced township authority's administrative boundaries and urban centres. However, as presented under section 6.7.2, not all households within the two EUCs are supplied water by the formal water utility authorities.

In Ilula EUC, given the increased demand for domestic water within Ilula EUC, IUWASSA was established and replaced the water committee that had been composed of ten members endorsed by the village assembly. The water committee was responsible for ensuring domestic water access arrangements within the present Ilula EUC. The water committee was headed by the manager, who was also the committee chairman, and below the manager were technical staff and, at water points, water sellers (agents). IUWASSA was gazetted on June 21, 2002 in Government Notice (GN) No. 258, and the first board of directors was appointed on August 30, 2007 under the Water Utilization Miscellaneous Amendments of 1997 section 8: 282(38).

IUWASSA falls under category C of the water utility authority, meaning that it is responsible for water provision and sanitation in small townships. IUWASSA's spatial geographical coverage covers three wards, namely Lugalo, Nyalumbu and Ilula. Within Ilula EUC, IUWASSA supplies domestic water in all streets within the urbanized part of Ilula Township, namely Itabali, Ilula Sokoni, Ngelango, Mtua, Ilula-Mwaya, Ding'inayo, Madizini, Igunga, Ilula-Itunda and Masukanzi. In rural areas, IUWASSA supplies water in Ikuvala (Nyalumbu ward) and Ikokoto (Ilula ward). In Lugalo ward (administratively not part of Ilula township), IUWASSA supplies domestic water in Mazombe and Imalutwa villages. In Mlafu ward which is administratively part of Ilula Township is not supplied

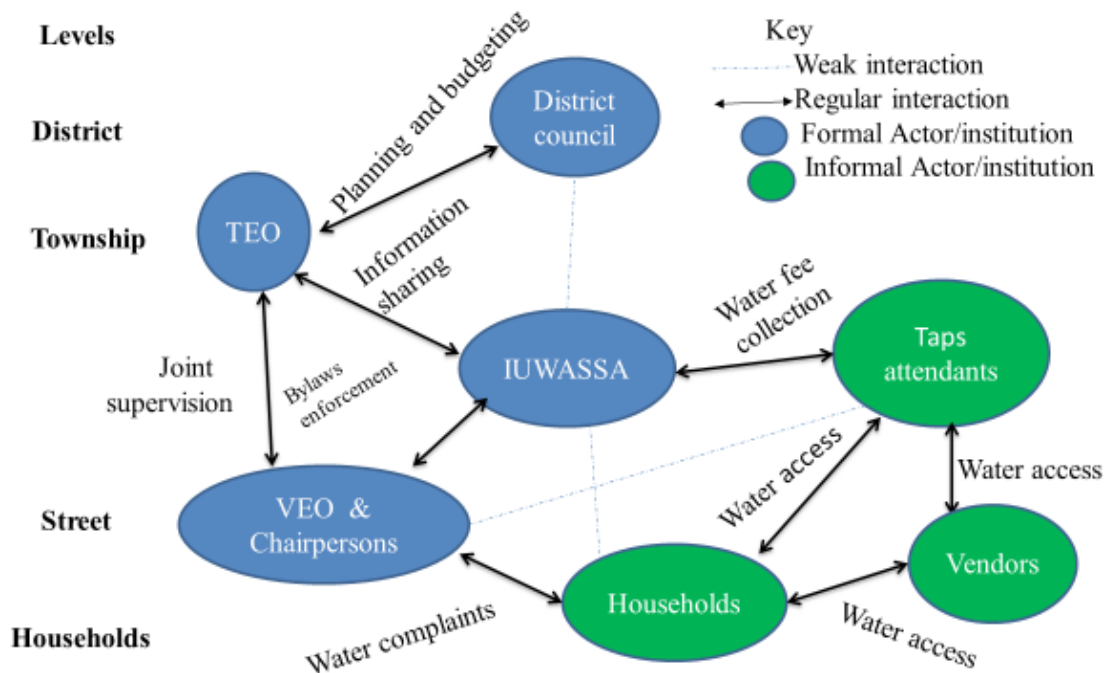
water by IUWASSA and therefore households in Mlafu are accessing domestic water from open wells owned by private individuals and public.

In Madizini EUC, TURUWASSA started to operate officially on 16<sup>th</sup> November 2015 following an announcement regarding its Board of Directors (composed of seven members) made by the Prime Minister on February 1, 2015. TURUWASSA was announced in the Government Notice no. 336 on December 30, 2016. It comes under category C, meaning that its service delivery mandate falls under the jurisdiction of small townships. Geographically, TURUWASSA is responsible for supplying clean water and sewer water management in six villages, namely Mhonda, Kichangani, Kilimanjaro, Manyinga, Madizini and Lusanga. Kisanga is another village under consideration for inclusion in TURUWASSA's areas of jurisdiction for the delivery of domestic water services. Currently, TURUWASSA is only supplying clean water to water users, as it is yet to set up sewerage systems. TURUWASSA depends on its own sources to cover 65% of its operating costs, 35% of which it receives from Mvomero district council.

Other formal actors with influence on domestic water governance within EUCs include the district water department through the District Water Engineer (DWE), Township Executive Officer (TEO), Ward Executive Officer (WEO), Village Executive Officers (VEOs) and elected village and street chairpersons. In Ilula Township, the TEO is invited to IUWASSA's board meetings. As shown in Figure 6.1, the TEO and IUWASSA share information and advice on a regular basis on domestic water-related issues. The TEO also conveys concerns about water-related challenges from IUWASSA to the district council to consider resource allocation. The IUWASSA Chief Executive Officer or a representative is invited to the township council's quarterly meetings to present IUWASSA's quarterly progress report.

The TEO works in collaboration with IUWASSA management in responding to water-related challenges at the township level and forwards them to the district level whenever necessary. Sub-village and street leaders (Figure 6.1) work closely with IUWASSA technicians and management in ensuring an effective water supply. They search particularly for joint solutions to water access-related challenges, including water infrastructure breaking down, communicating water-rationing schedules and disruptions, if any, and enforcing by-laws, particularly those restricting human activities at water sources.

Informal actors also play important roles in domestic water supply within EUCs, for example, households, water vendors, and well- and tap- attendants. Domestic water-tap attendants (sellers) are responsible for ensuring proper water access by water users (e.g. enforcing queuing arrangements) and the collection of water access charges or fees. There is regular interaction between domestic water-tap attendants and IUWASSA, since the former are required to submit the collected water fees to IUWASSA the day after the water flow. Water-tap attendants also have direct interactions on a daily basis with households and vendors as part of their daily responsibility to ensure proper domestic water access. Households and sub-village or street chairmen or VEO interact only when water-related complaints are forwarded to the sub-village authorities.

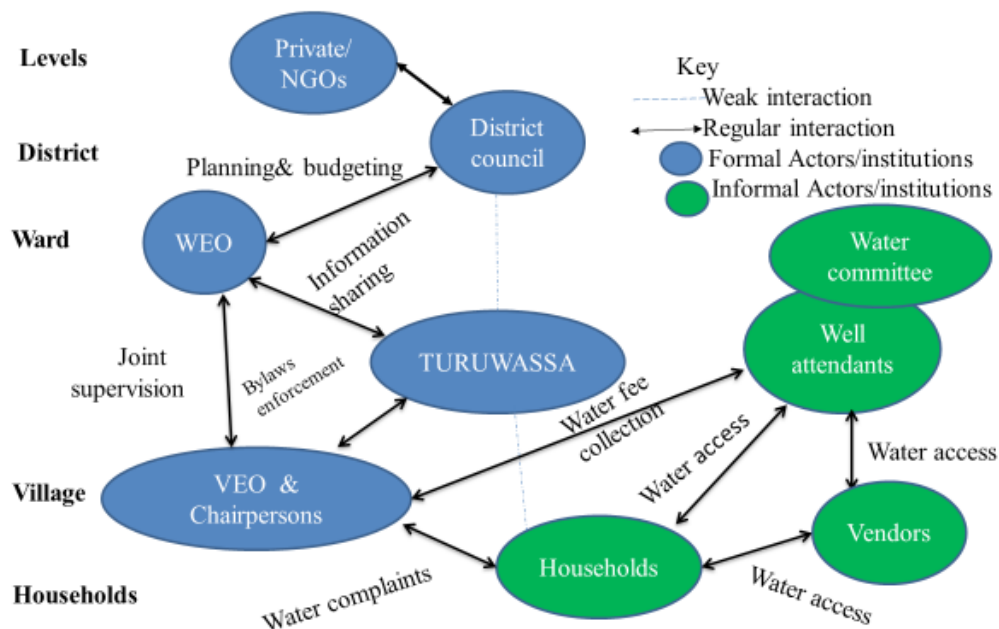


**Figure 6.1: Institutions and actors for domestic water governance in Ilula EUC**

In Madizini EUC, domestic water governance institutions and actors differ (Figure 6.2) from those in Ilula EUC due to the existence of multiple sources and the lack of a township administrative structure like the Township Authority and appointment of a TEO in Ilula. In the absence of a township structure, it is the Ward Executive Officer (WEO) who is responsible for coordinating with the district-level and village authorities on issues related to the planning and budgeting of domestic water provision. Each hand-pumped public well has a water committee elected by the village council. At water points well attendants are responsible for collecting and keeping records of water fees, maintaining queuing arrangements and reporting well breakdowns to village leaders or treasurers for maintenance purposes.

Village leaders facilitate the maintenance of wells in collaboration with well attendants. In the case of motor-powered public wells, private supervisors are responsible for collecting water fees and undertaking well maintenance. Households with a private well and tap

inside the compound make informal arrangements to provide water to their neighbours either free of charge, by sharing bills or for a fixed amount per month. Private-sector actors such as Non-Governmental Organizations, faith-based development partners and international non-governmental organizations – for example, the Kuwait Foundation, iWash (USAID funded) and WHO in Madizini EUC – have provided significant support in addressing increasing water shortages by funding various water projects.



**Figure 6.2: Institutions and actors for water governance in Madizini EUC**

For both EUCs, regardless of their differences in township administrative status and population growth, there is a plurality of formal and informal arrangements for domestic water governance, which are mainly influenced by water sources, administrative status (township status announcements) and urban characteristics (increases in water demand). Results from this study about plurality of water governance structures are in line with results reported by Kabote and John (2017). Furthermore, the results reflect the theoretical conceptions from institutional bricolage (Cleaver and De Koning, 2015) and the importance of formal and informal institutions for governance a resource of interest (Nunan, 2015).



Furthermore, by analysing the historical development or evolution of water governance institutions based on theoretical insights drawn from institutional bricolage, results revealed that, actors and institutions in domestic water governance in the two EUCs have changed in support of the process of rural-urban transformation. Similarly, the formal and informal or old and new water governance institutions and actors that are responsible for domestic water allocation are based on water sources. Decisions on who should participate in decision-making for purposes of water allocation in EUCs is influenced by multiple domestic water providers or actors, as shown in Figures 6.1 and 6.2.

Water providers such as IUWASSA and TURUWASSA operate at different administrative (village, ward, township and division) and geographical (rural and urban) scales based on the legal mandates governing their establishment and the diversity of water sources (tap and well). Therefore, contrary to the study's hypothesis, the level of township administrative transition does not exclusively influence governance structures and practices for domestic water access, despite significant statistical differences in water sources, providers and locations between the two EUCs. It is therefore essentially the increased demand for domestic water that influences domestic water-access practices and not necessarily administrative status.

Moreover, it was learned from KIIs that, the establishment of water utility authorities like IUWASSA and TURUWASSA has led to improvements in water access within EUCs and improved the timeliness of responses to domestic water access-related challenges such as the maintenance of water infrastructure. For example, in Ilula EUC key informants argued strongly that with the establishment of IUWASSA there is currently a clear rationing schedule. If the schedule is disrupted, this is communicated to sub-village leaders.

IUWASSA has also managed to repair thirteen kilometres of main water pipe and distribution line, as well as install more public domestic water points.

### **6.7.2 Domestic water access situation within EUCs**

The domestic water-access situations in Ilula and Madizini EUCs differ considerably due to different context-based factors: population growth rates, local geography and water infrastructure development. In Ilula township key informant interviews revealed that insufficient domestic water supply has been a challenge for decades. In addition, despite domestic water scarcities, current water infrastructure development is not keeping pace with the increased demand for water, as is the case for Ilula EUC. The population increase of 13% between 2002 and 2012 (Lazaro *et al.*, 2017) in Ilula EUC increased the demand for water for multiple uses, including domestic, institutional and by commercial businesses.

Currently, in Ilula Township, IUWASSA has two gravity water schemes at Idemule and Ilomba. The Idemule stream, located in Mazombe village, has an average production of 940m<sup>3</sup>/day, and the Ilomba intake, located in the Imalutwa mountains, has an average production of 259.3 m<sup>3</sup>/day. By March 2017, these two water sources were producing a total of 1 328.83 m<sup>3</sup> /day distributed via a 51.35 km pipe network. IUWASSA has six water-storage facilities with a capacity of 357m<sup>3</sup>, though this is still not enough to service the population needing provision. IUWASSA also runs seventy domestic water points, of which only 56 are functioning, the other fourteen (20%) failing due to insufficient water supply in the main pipe system. Nationally, the non-functioning of water points in Tanzania was reported to be about 40% (World Bank, 2018). Therefore, the situation of water-

sources functioning within Ilula EUC and potentially in Madizini EUC as well, is better than the situation nationally.

The estimated water demands in Ilula Township, including its urban outskirts like Mazombe, Ikuvala and Ikokoto, is estimated at 2687m<sup>3</sup>/day, while the actual production capacity is 1230m<sup>3</sup>/day (IUWASSA, 2017; EWURA, 2017). By 2016/2017 IUWASSA's area of jurisdiction had a population of 38 383, of whom 18 790 or 49% are currently being served. According to IUWASSA's quarterly progress report (January to March 2017), the total number of private connections in yards or houses was 1069, of which 330 (35%) are metered. Due to water scarcity within Ilula EUC, there are clear rationing schedules for each zone or sub-village. Each zone is supplied with water once a week, and water flows on average for six to eight hours a week.

However, the water-rationing schedule and hours of flow differ with water-user categories, only 11.7% of IUWASSA's customers being supplied with domestic water for 24 hours (IUWASSA, 2017). For example, hospitals and schools require water to deal with emergencies and technical interruptions, leading IUWASSA to consider re-scheduling and reducing the hours of water flow. Hospitals are supplied with water on three days a week on Sundays, Wednesdays and Fridays in quantities of between 355m<sup>3</sup> and 380m<sup>3</sup>. Hospitals are also supplied with water in emergencies, for example, when water runs out before the next rotation. Ilula secondary school is supplied with water on two days a week (Sunday and Wednesday) in quantities of between 35m<sup>3</sup> and 80m<sup>3</sup>/day. Ilula secondary school is also supplied with water in emergencies. Mtua and Mwaya primary schools receive 1000 litres of water each once a week on Fridays, but because of their low consumption they have enough storage for the whole week until the next rotation.

For domestic water users (households), the hours of water-flow rationing differ between those with private or in-house connections and those who access water through public domestic standpoints or kiosks. On average, domestic water users with private or in-house connections receive 4000 litres at night on average for three to four hours, while domestic users fetching water from public domestic standpoints receive water during the day on average for six to eight hours. Occasionally, domestic users using public kiosks can be supplied with water at night, particularly in cases of emergency (technical interruption) from 7 pm to 12 am. The factors influencing water-rationing schedules include volumetric capacity, which governs rationing hours, and the type of customer, among others.

In addressing domestic water shortages, Ilula township authority has secured funds from the district council for a new water project to be sourced from the Mgombezi River. The District Water Engineer (DWE) informed us that the new water project is expected to be completed sometime in 2019. The project will cost 4 billion TZS and will be funded by the government of Tanzania through internal sources and funds. The project will be implemented in three phases: phase I will cover the construction of the water intake and 2.9 km of a water distribution network, while phase 2 (May 2018 to 2019) will cover the remaining activities within the project. Upon successful completion, the project will supply 5 184 000 litres a day. With its additional volumetric capacity, it is estimated that water supply within Ilula township will be enough for the rapidly growing urban population and industrialization. However, under the new water project, the water supply to new settlements in the urbanized part of the township will be based on individual requests, since there is no plan to provide distribution points or lines under the new water project.

In Madizini EUC, water availability is generally adequate (accessible within a convenient distance) due to the availability of multiple water sources, including open and closed

community and private wells, water street vendors, and tap water supplied by TURUWASSA. TURUWASSA collects water from two main water sources, namely Mpaji River source (gravity source) in Ngulu South Hills in Mhonda village, with a total production capacity of 3 500m<sup>3</sup>/day, which is insufficient compared with the estimated water demand of 3 673m<sup>3</sup>/day. In addition, there is a borehole in Madizini, though it is not currently operational, mostly being used in emergencies such as the 2016/2017 drought. The TURUWASSA area of responsibility is estimated to have a total population of 52 397, of whom 20 435 are currently being served (EWURA, 2017).

The water-rationing schedule for TURUWASSA's water sources is relatively good compared to IUWASSA's sources, since water flows on average for sixteen hours every other day. A key informant from TURUWASSA stated that:

*“Water is supplied on average for twenty days per month”* (Key informant interview in Madizini, March 9, 2018).

However, from in-depth household interviews it was learned that water rationing can last for more than three days and that water only flows for twelve hours at the most in a day. One respondent in Madizini revealed that:

*“Sometimes there is water rationing for the tap water from TURUWASSA that can last up to five days, particularly during the drought season”* (In-depth household interview in Madizini, May 7, 2017).

Through support from the district council and the Mtibwa Sugar Estate (MSE), TURUWASSA is planning to install a new gravity water source in the Divue River (two km long). The new water source is expected to increase TURUWASSA's volumetric capacity, widen its spatial coverage to Kidudwe, Lungo, Kunke and Kisala villages, address seasonal water shortages and increase revenue collection. In November 2017 TURUWASSA also started promoting in-house/yard private connections for six months, in

which the first ten households to apply were connected free of charge and the following connections were charged 10 000 TZS instead of the usual 20 000 TZS for connection. Other plans include the rehabilitation of electric-powered boreholes that will help in emergencies during the drought season. TURUWASSA is also planning to launch an information campaign promoting private connections. The aim of promoting private connection was that, unlike water accessed through shallow and open wells, the water supplied by TURUWASSA is portable water due to regular water treatment being undertaken at water intakes.

### **6.7.3 Main domestic water sources within EUCs and day-to-day practices for domestic water access**

This section presents data on available water sources within the two EUCs to determine whether they can be connected to the degree of rural-urban transformation achieved so far and other factors such as local geographical conditions. From the overall household survey, we learn that 75% of households access domestic water from taps, the remaining 25% from wells (Table 6.1). Relatively similar domestic water sources were reported by Kabote and John (2017). However, there are significant differences in primary domestic water sources between the two EUCs. While 95% of surveyed households in Ilula EUC access domestic water from taps, only 30% of households in Madizini EUC do so (Table 6.1). The high proportion of households accessing water through taps in Ilula EUC is due to the limited availability of other water sources, since the only reliable water source is the tap water provided by IUWASSA. The large proportion (70%) of households in Madizini EUC that access domestic water from wells reflects local geography. Madizini lies in the lowlands next to a mountain range, and therefore the water table is relatively close to the land surface. Hence, people can dig wells and obtain adequate water at shallow depths (on average within twenty metres).



**Table 6.1: Main domestic water sources within each EUC**

Domestic water sources within EUC (%)	EUC			Chi-square statistics
	Ilula (n = 323)	Madizini (n = 145)	Total (n = 468)	
Tap	307(95)	44(30)	351(75)	230.629(.000)
Well	14(5)	102(70)	116(25)	

Significant at 1%, RUT Project Household Survey, 2016

The available domestic water sources within the two EUCs reflect not so much their degree of rural-urban transformation than local geography, hence, for example, the presence of more wells in Madizini compared to the greater use of tap water in Ilula EUC. However, in some instances, the reported multiple water sources within EUCs are influenced by domestic water uses. For example, a respondent during in-depth interviews revealed that:

*“I access domestic water through two main sources: the community or public well and private tap, both located outside the compound. I use water from the public well for washing clothes and cleaning (because it is salty) and I use water from TURUWASSA’s private tap for drinking”* (In-depth household interview, Madizini, May 7, 2017).

Furthermore, day to day practices of accessing domestic water differ based on domestic water sources and providers. For example, at IUWASSA’s public domestic water points in Ilula EUC, people queue in a line to fetch water under the principle of first come first served. Based on the location of domestic water points, one can fetch between 6 to 12 buckets of 20 litres in the first round and water vendors can fetch 30 buckets of 20 litres in the first round. The elderly and people with special needs do not queue to fetch water and can fetch 6 buckets of 20 litres or more. The practice of limiting the number of buckets when drawing water only apply when there are many people at domestic water points. Domestic water-access practices change with seasonality due to low water flows and



tightened water-rationing schedules, including reduced water-flowing hours, particularly during the drought season. From participant observation and through key informant interviews with tap attendants, we concluded that practices for accessing domestic water are adhered to fairly by customers drawing water from public domestic water points.

Similarly, in Madizini EUC, water point attendant(s) at public hand-pumped wells ensure proper queuing and that only those who have paid the fee draw the water. However, the situation can be negotiated if one has no cash on one at the time. In open wells drilled under the Kuwait-sponsored project, people access water freely. However, some open wells are locked to prevent free-riding by those who refuse to contribute the amount suggested for water access. All Kuwait-sponsored motor-powered wells are under the control of private providers to ensure effective water-service delivery following the failure of water committees to supervise wells effectively. Most motor-powered wells are not functioning due to regular motor breakdowns and the associated costs. Increases in the number of people with private taps from TURUWASSA has caused the population fetching water from public wells (both open and hand pumped) to fluctuate depending on TURUWASSA's water-rationing schedule.

Domestic water providers (government and private) take both market- or demand-driven and non-market (government equity policy) criteria into account when it comes to domestic water provision. In the case of market- or demand-driven criteria, for example, the water utility authorities prefer areas with high populations (mostly EUCs), as this provides greater certainty in income generation. About 37% of TURUWASSA's customers are in Madizini EUC, 546 (92%) of 595 customers being metered. Of the 1 069 IUWASSA customers with a private tap connection, 330 (35%) in Ilula EUC are metered (287 domestic, 25 institutional and 18 commercial).

The non-market criteria are based on the government's equity policy for domestic water provision and are also taken in account in relation to water distribution within EUCs. For non-market criteria, government- and donor-funded water projects, identify households or individuals who cannot afford water charges. This, for example, is the case with 86 households in Ilula EUC who do not pay for domestic water at domestic public water points. The most common criteria in deciding free water provision are poverty status in general and having a disability.

#### 6.7.4 Location of domestic water sources

Despite the locations of domestic water points, domestic water providers in the two EUCs are both government-owned and private (Table 6.2). However, there are significant differences between the two EUCs in the proportions of households that are provided with domestic water by either government or private providers. For example, while 72% of surveyed households are provided with domestic water by the government in Ilula EUC, this applies to only 28% of surveyed households in Madizini EUC. The government water providers are IUWASSA in Ilula EUC and TURUWASSA in Madizini EUC. Private water providers are of two categories, those with private wells, and those with private in-yard taps connected to the water utility authorities, who provide drinking water to their neighbours under informal arrangements.

**Table 6.2: Provision of domestic water service within EUC**

Domestic water service providers (%)	EUC			Chi-square statistics
	Ilula (n = 321)	Madizini (n = 144)	Total (n = 465)	
Government	231(72)	40(28)	271(58)	79.8171(.000)
Private	90(28)	104(72)	194(42)	

Significant at 1%, Source: RUT Project Household Survey, 2016

Furthermore, there is a significant difference in the location of water sources between the two EUCs (Table 6.3). While domestic water sources located outside compounds dominate in both EUCs (69% in Ilula and 85% in Madizini), almost one third (31%) of the surveyed households in Ilula EUC have their domestic water sources (mostly taps, as shown in Table 6.1) inside their compounds compared to only 15% in Madizini. The predominance of domestic water sources outside compounds is associated with water-source providers, since most public domestic standpoints are located outside compounds.

From in-depth household interviews at both sites, it emerged that water sources outside compounds are on either private or institutional land due to settlement patterns, land availability, the volumetric capacity of water sources, the spatial coverage of water networks and household income levels. The location of water points has implications for household's productive labour time and the costs of accessing water. The location of domestic water points has impacts on productive labour time because of the time that must be spent in fetching water. According to the World Bank (2018) only about 10% of Tanzania's population has access to piped water in their homes. The World Bank (2018) also reported that fewer than 50% of either rural or urban residents in Tanzania have access to water from an improved source within thirty minutes of collection time, meaning that time that could be spent on productive activities goes on fetching domestic water. Participant observation and key informant interviews indicated that, although households in both EUCs might be walking convenient distances to fetch domestic water, they must often spend long periods of time queuing due to either high population levels where there are domestic water points or the low volumetric capacity of the available domestic water sources.

Moreover, households are not able to collect enough water when there is long queue for water access and rationing is tight. A respondent stated during an in-depth interview that:

*“The water point only affects productive labour time when it is located far from the household and when there is long queue at water points because all production activities are cancelled during water flowing day since water flowing day is fully dedicated for water fetching because water may not flow as expected”* (In-depth household interview, Ilula, May 31, 2017).

Water location has also implications for transaction costs for water access, since water fees differ based on distance from water points, particularly in the case of water supplied by water vendors.

**Table 6.3: Location of domestic water service within EUCs**

Location of domestic water service within EUC (%)	Ilula (n = 323)	EUC Madizini (n = 145)	Total (n = 468)	Chi-square statistics
Inside compound	101 (31)	22 (15)	123 (26)	13.3838(.000) *
Outside compound	222 (69)	123 (85)	345 (74)	

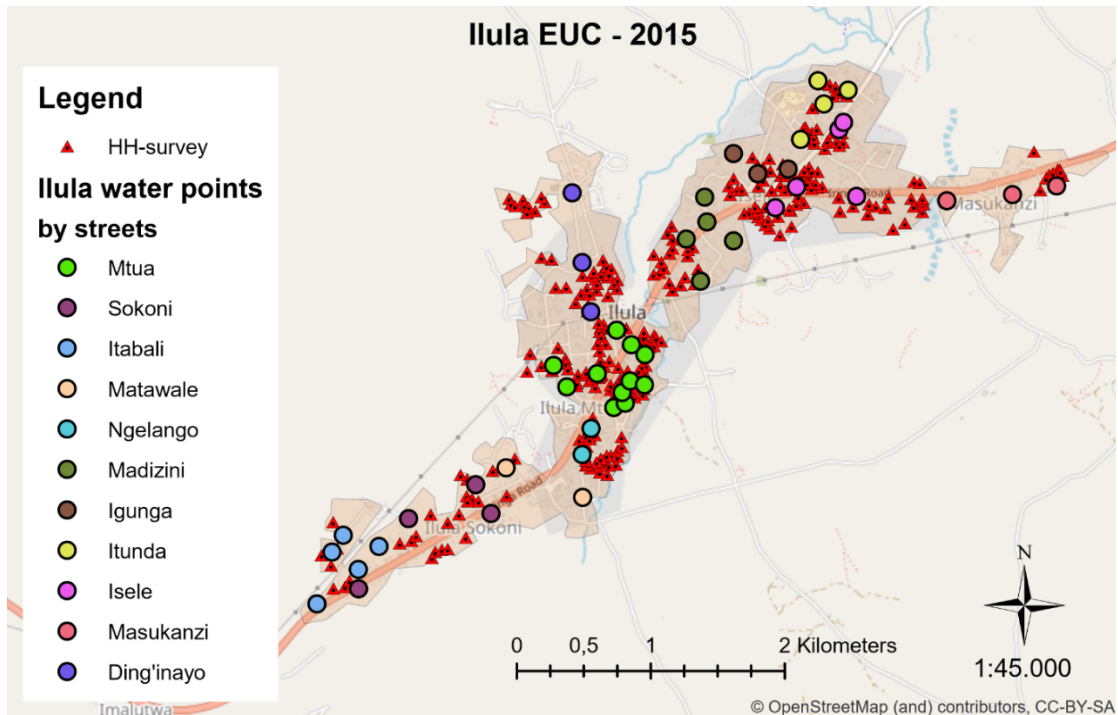
\* Significant at 1% level, Source: RUT Project Household Survey, 2016

The Energy and Water Utilities Regulatory Authority’s (EWURA) guidelines stipulate that the average distance between public domestic water points should be four hundred metres. This guideline is provided to ensure that enough users and households are served, which in turn ensures that an income is generated for maintenance costs. Within Ilula and Madizini EUCs, it was observed that public domestic water taps, or wells are closer to each other than four hundred metres in most neighbourhoods. However, the spatial distribution of domestic water points within different neighbourhoods is uneven despite the establishment of water utility authorities.

From key informant interviews with IUWASSA and TURUWASSA officials, different factors are taken into account in establishing new domestic public water-tap points, including population or demand in the neighbourhood (to maximize income generation),

the geographical location of the main pipe (making it easy to branch or connect to a new area or zone) and the costs of a new connection (by-pass branch, pipes, connectors and congregating the tap surface to control mud generated by water drops). Priority is given to areas with no connection at all. People who can afford the costs of a private connection in-house or in the yard that is located in planned settlements (allowing placement of water infrastructures) stand a better chance of acquiring spatial water coverage.

The results of a spatial analysis of domestic water-point as mapped in Ilula EUC (Figure 6.3) and observations from transect walks indicate that Ilula Sokoni has five public domestic water points, a situation which is linked to the early establishment of settlements and a geographical location along the main water pipe that passes along both sides of the main road or highway. One public water point is shared between Ilula Sokoni and Matalawe. Itabali has five public domestic water points due to residents' reluctance to connect private taps in many new or recently constructed houses. In Ngelango, there are only two public domestic water points, a situation that was explained during key informants' interviews as being linked to housing densification. In Ilula Mwaya, where 100% have access to tap water, and Mtua, with 93% accessing tap water, there are eleven public domestic water points, a situation that is linked to the earlier establishment of settlements prompting the introduction of tap-water infrastructure.



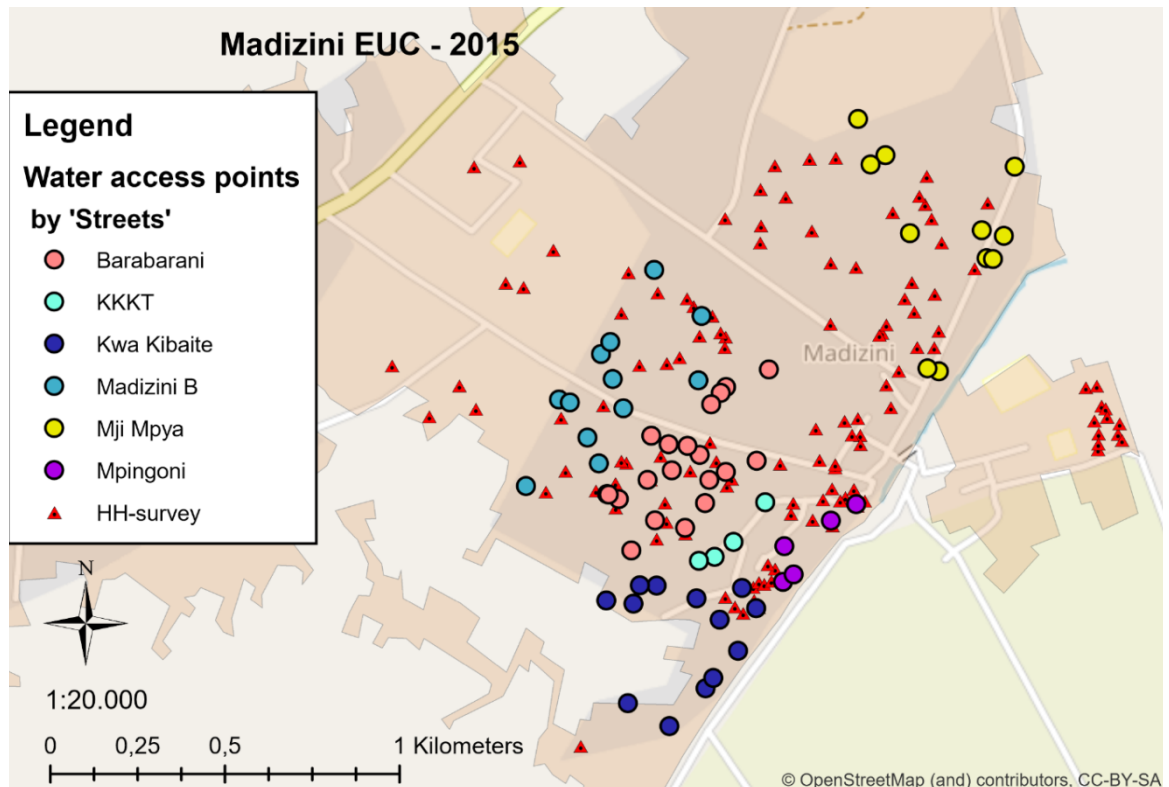
**Figure 6.3: Spatial distribution of public domestic water points (DPs) taps water in Ilula EUC**

In Itunda there are four public domestic water points, but only three in Igunga, despite its high degree of housing densification. In Madizini there are five public domestic water points, and 100% of households interviewed have access to tap water, a situation linked to this being a new residential area with less dense settlement. In Masukanzi/Isele there are eight public domestic water points, a situation that reflects less dense settlement patterns, allowing the introduction of water distribution infrastructure.

In Madizini EUC, the spatial analysis of mapped water points indicates differences in the spatial distribution of public and private wells across different sub-villages (Figure 6.4). For example, in Barabarani, of the 19 wells in total, 5 are open wells, 4 hand-pumped wells, 5 private wells and 2 motor-powered wells. In Mpingoni there are 5 public wells: 2 hand-pumped wells, 2 motor-powered wells and 1 open well. In Kwa Kibaite, with 13 wells, there are 5 open wells, 6 motor-powered wells and 2 hand-pumped wells, sponsored by the government in 1981. In KKKT sub-village, with 4 wells, there are 2 hand-pumped

wells sponsored by the government in 1981 and 2 motor-powered wells sponsored by Kuwait. Since 2015 and more intensively in 2016, TURUASSA has started supplying in-yard connections with taps in these sub-villages. Overall, the level of service provision in these old parts of Madizini EUC is influenced by the degree of housing densification, settlement patterns and early settlement. The motor-powered wells in these old parts are located on private land due to the challenges of land availability and the need for electricity connection.

In Madizini B there are 11 public wells: 6 motor-powered wells, 4 open wells sponsored under the Kuwait program, and only 1 public hand-pumped well sponsored by the government in 1981. In Mji Mpya there are 11 private and public wells: 6 private wells, 1 hand-wheel well (sponsored by USAID under the iWASH programme in 2015), 2 open wells, 1 motor-powered well sponsored by Kuwait program, and 1 hand-pumped well sponsored by the government in 1981. The presence of more private wells in Madizini B and Mji Mpya is associated with land availability and planned settlement patterns that allow both the digging of private wells and the installation of tap-water distribution infrastructure. Furthermore, Madizini B and Mji Mpya are areas with the highest densities of tap-water distribution infrastructure established by TURUWASSA. As a result, of the 43 (30%) households accessing tap water in Madizini EUC (Table 6.1), 17 (41%) are in Mji Mpya and 9 (30%) are in Madizini B.



**Figure 6.4: Spatial distribution of public wells in Madizini EUC**

### 6.7.5 Payment for domestic water

Overall, 81% of surveyed households are paying for domestic water service (Table 6.4) but comparing the two EUCs results revealed statistically significant difference in the number of households not paying for domestic water (30% in Madizini and only 14% in Ilula). The difference between the two EUCs is linked to the available water sources and providers. In Ilula EUC, the main water source is tap water, which people pay to access, while in Madizini EUC households have private wells and ‘open public’ wells, which people do not pay to access.

In addition, from key informant interviews with water utility authority officials, street vendors and well and tap attendants, it emerged that water access fees and tariffs differ based on the category of water user (households, commercial, institutions), water sources



and providers. For example, in Madizini EUC, for hand-pumped public wells households pay a domestic water-access fee of TZS 1000 a month, irrespective of the amount of domestic water the household draws. One respondent from Madizini stated that:

*“After paying TZS 1000 I can fetch whatever amount of water I want for the whole month”* (In-depth household interview, Madizini, May 7, 2017).

The price charged for using motor-powered wells under private individuals who oversee these wells differs slightly across sub-villages. The standard price ranges from TZS 50 to TZS 100 per twenty litres, and TZS 100 for three buckets of ten litres. Some private individuals charge a fixed amount of TZS 3000 a month regardless of the amount of water drawn. In open wells, water users pay between 200 and TZS 500 a month. Some households with an in-yard water connection sell water to their neighbours at 50 TZS for twenty litres as a way of sharing water bills. Water vendors charge different water prices to customers based on the charges or fees at the water points and the distance from their customers.

**Table 6.4: Paying for domestic water**

Household payment for domestic water (%)	Ilula	EUC Madizini	Total	Chi-square statistics
	(n = 323)	(n = 145)	(n = 468)	
Paying	278 (86)	101 (70)	379 (81)	67.1415(.000) *
Not paying	45 (14)	44 (30)	89 (19)	

\* Significant at 1% level, Source: RUT Project Household Survey, 2016

As presented in Table 6.5, IUWASSA and TURUWASSA charge different water fees based on water-user categories and whether water sources have metric meters. The differences in water pricing or tariffs by different water providers for in-yard connection and public

standpipes or kiosks has also been reported in other studies (GIZ, 2012; Rugemalila and Gibbs, 2015; EWURA, 2017). Water-users accessing domestic water in sources with metric meters supplied by IUWASSA pay lower fees compared to similar categories of water-user supplied with water by TURUWASSA. Conversely, water-users accessing water from sources with no metric meters supplied by TURUWASSA pay lower fees compared to a similar category of water-users supplied with water by IUWASSA.

**Table 6.5: Water charges by IUWASSA and TURUWASSA**

S/N	Water-user categories	Price charged by water utility authorities (TZS/m <sup>3</sup> )	
		IUWASSA (Ilula EUC)	TURUWASSA (Madizini EUC)
<b>Accessing water from sources with metric meters</b>			
1	Domestic	395-495	800
2	Institutions	450-550	845
3	Commercial	455-560	945
4	Kiosk/Public Standpipes	1000	
<b>Accessing water from sources with no metric meters</b>			
5	Domestic	4500	3600
6	Institutions	10 000- 21 500	18 500
7	Commercial	9500 – 30 000	20 000
8	Kiosk/Public Standpipes	100/60 liters	

Source: (EWURA, 2017; Key informants' interviews, 2017/2018)

The fees for domestic water are paid in different forms, such as payment at water points based on the amount of water drawn (paid to well and water-tap attendants), a fixed monthly contribution, particularly for public or government water sources, and payments to the water utility authorities. In in-depth household interviews, households generally confirmed that they can afford to pay domestic water-access fees. However, households with in-house connections complained about having to pay fixed service charges regardless of water-rationing schedules. Some households are discouraged from connecting water in their compounds by the fixed charges. The water utility authorities are making significant

efforts to place metric meters in private connections inside compounds in order to improve their revenue collection.

### 6.7.6 Changes in domestic water access status and practices in Ilula and Madizini EUC

In order to assess potential changes in domestic water-access status in the last decade (2007-2017) as a result of population and economic growth in both EUCs, households were asked if there have been any changes in such status. The results of the household survey generally indicate that changes in domestic water-access status between the two EUCs follows similar patterns (Table 6.6). The two EUCs have experienced improved ('better') access to domestic water in the last decade, though more than 50% of households in Madizini did not see any change in domestic water-access status compared to less than a third in Ilula EUC. Furthermore, the largest group of respondents in Ilula are those in the 'worst' category, percentage-wise double the rate for Madizini (Table 6.6). The worst water-access status in Ilula EUC is associated with increases in population exposing the low volumetric capacity of IUWASSA's water sources and water infrastructure regularly breaking down. Low responses regarding the worst status of domestic water access in Madizini EUC can be associated with the existence of multiple water sources there.

**Table 6.6: Changes in access to domestic water access status compared to ten years ago**

Changes in access to domestic water status (%)	EUC			Chi-square statistics
	Ilula (n = 320)	Madizini (n = 115)	Total (n = 435)	
Better	112 (35)	34 (30)	146 (34)	30.5683(.000) *
Same	92 (29)	64 (56)	156 (36)	
Worse	116 (36)	17 (15)	133 (31)	

\* Significant at 1% level, Source: RUT Project Household Survey, 2016

Therefore, as illustrated above, there are big variations within EUCs based on different developments in domestic water provision within different neighbourhoods. Some

households have experienced the establishment of new domestic water sources (feel better), while others have experienced increased competition at water points due to more people using them (feel worse). A respondent from Madizini stated that:

*“Water access status has improved due to additional water sources from TURUWASSA, rainwater harvesting and private wells, and therefore water is always available at a convenient distance”* (In-depth household interview, March 6, 2018).

Other notable changes in domestic water-access practices in both sites include changes to the institutional arrangements from water committees to water utility authorities like IUWASSA and TURUWASSA based on urban status, and the amount of water allowed to be drawn. One respondent in Ilula EUC stated that:

*“The amount of water one is allowed to fetch for the first round has changed from three buckets to six buckets of twenty litres due to increase in volumetric capacity of water flow following improvement in water infrastructures by IUWASSA”* (Key informant interview in Ilula, May 25, 2017).

Furthermore, the water fee charged by water vendors has been reduced from TZS/litre 1.67 to TZS/litre 1.25. In addition, hours of water flow have also changed from only three hours to an average of six to eight hours a day due to increases in the volumetric capacity of the available water sources and water infrastructure maintenance.

Slight changes in domestic water access status within the two EUCs in the past ten years are in line with other studies conducted in Tanzania. For example, Kessy and Mahali (2016) showed that, in Tanzania access to safe and clean water among rural households

slightly improved from 45% in 2004/05 to 57% in 2012, while in urban areas it declined from 79% to 77% within the same period. Another study by the World Bank (2018) revealed that water access in rural areas improved from 45% in 1990 to 48% in 2016, while in urban areas it declined from 92% to 86%. The decrease in water access in urban areas could stem from population growth and the high level of rural to urban migration, which is straining public services, domestic water included (World Bank, 2018).

#### **6.7.7 Domestic water access challenges within EUCs**

Domestic water access-related challenges in both EUCs have changed from time to time based on different urban characteristics. For example, the volumetric capacities of domestic water sources under IUWASSA and TURUWASSA are not able to meet the actual domestic water demand given the high rate of urbanization, population increase and concentration of economic activities. The low volumetric capacity and non-functioning of water points has led to tightening water-rationing schedules by the water utility authorities. Therefore, delays in implementing township administrative status have impacts on urban planning, including planning domestic water provision.

Furthermore, the water utility authorities in both EUCs are experiencing regular water infrastructure breakdowns either to the main water pipe or private metered taps or both. Regular water infrastructure breakdowns were reported to be associated with aged infrastructures causing severe water losses, since people do not report problems in a timely fashion even to sub-village leaders. Unplanned settlement patterns (Chapter 4, section 4.8) are another impending challenge for new water connections and infrastructural maintenance. Settlement patterns also increase the costs of private domestic water connections due to increases in connection distances, since sometimes installations must

follow the roads due to the limited availability of land. Moreover, the water utility authorities are facing the challenge of low capital because they are required to be self-sufficient and only receive a limited capitation from the district council.

The limited fiscal challenges facing the water utility authorities are affecting the establishment of more domestic points (DPs) to allow more people to access safe water at convenient distances. Seasonal water shortages are mostly due to low volumetric capacity during the drought season (August to December), while water losses in the rainy season due to infrastructure breakdown aggravate water scarcity. The water utility authorities lack operational facilities like cars to aid them in the timely maintenance of water infrastructure or with water quality and leakage monitoring or installing new connections and providing public education. Unmetered customers impact income generation and thus the institutional capacity of the water utility authorities to widen their spatial coverage of domestic water supply. In its performance review for 2016/2017, EWURA (2017) reported similar challenges being encountered by water utility authorities, including IUWASSA and TURUWASSA.

## **6.8 Conclusions and Recommendations**

Changes to domestic water governance structures are running ahead of changes to township administrative status following the establishment of water utility authorities in both EUCs. The key reason for the rapid transformation of the water utility authorities was the failure of the earlier water committees to meet the increased demand for water. This has contributed for allowing changes to the domestic water governance structures and access practices, to become a priority in over achieving the administrative transition to township status. Water governance structures and access practices are mostly influenced by the extents of water sources and water demand. Due to the availability of multiple water

sources in both EUCs, different actors (water utility authorities, households, vendors, well and tap attendants) are also involved in making decisions about domestic water allocations. The water utility authorities in both EUCs are operating at different geographical and administrative scales based on the legal mandates governing their establishment and the demand for water in both urban and rural areas.

The situation regarding access to domestic water within the two EUCs differs significantly due to differences in local geography, the volumetric capacities of the available water sources, seasonality and settlement patterns. In both EUCs, water infrastructure development and volumetric capacity are not keeping pace with the rapid growth in domestic water demand. Water providers, both government and private, take both market and non-market criteria into account in deciding water allocations. The delay in the administrative transition from rural village to urban township has impacts on domestic water access within each EUC due to the consequent lack of autonomy in planning, budgeting and implementing water service provisions by local government authorities (township and village).

To address the prevailing water-access challenges within EUCs in relation to water infrastructure development and maintenance, the low volumetric capacity of water sources and the spatial distribution of water services, the study recommends that government, private and community actors all provide more water sources with enough volumetric capacity, build more water-supply infrastructure and water-supply institutions, and ensure that financial and human resources and capacities are all strengthened. Fair practice regarding domestic water access at public domestic water points should also be maintained.

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## CHAPTER SEVEN

### **SOLID WASTE MANAGEMENT STRUCTURES AND PRACTICES IN ILULA AND MADIZINI EMERGING URBAN CENTRES, TANZANIA.**

#### **7.1 Abstract**

Solid waste generation is increasing gradually in both developed and developing countries due to rapid population growth, urbanization and industrialization. However, solid waste collection is often insufficient and solid waste disposal inappropriate in many urban centres. This chapter focuses on solid waste management structures and practices within emerging urban centres (EUCs) using the examples of two EUCs in Tanzania, Ilula and Madizini, that are at different points along a process of rural-urban transformation. A combination of research methods was employed, including a baseline survey of 468 households, 33 key informants' interviewees, 39 household in-depth interviews, transect walks and observation. Descriptive and content analyses were used for data analysis, while Multinomial Logit (MNL) was used to determine factors in households' choices of solid waste disposal practices. The results of the household survey indicate that 70 percent of households dispose of their solid waste in garbage bins on their compounds, 12 percent in burning pits on their compounds, 17 percent in public waste dumps and 1 percent in both garbage bins and by burning on their compounds. The local government by-laws for solid waste management (for example the case of Ilula EUC) requires the residents to have a garbage bins/pits on their compounds or transport their waste to a public dumping sites. EUC of residence, household size and membership of waste management committees were statistically significant regarding households' choices of solid waste disposal practices ( $P < 0.05$ ). The level of administrative transition as an aspect of rural-urban transformation has impacts on solid waste management structures and practices within the two EUCs,

related to the planning of solid waste management and its enforcement through by-laws. The study recommends that immediate efforts be undertaken by public, private and community actors to secure funds and facilities for solid waste management within EUCs. Land for solid waste disposal should be secured at convenient distances by the respective local government authorities. Public education on proper solid waste-management practices as per local government by-laws for waste disposal should be provided regularly to households, businesses and institutions. Waste recycling (organic/crop residues, plastics and metals) should be promoted by government, individuals and manufacturers to minimize solid waste generation and tap into the social, environmental and economic potential associated with waste recycling and reuse.

**Key words:** urbanization, emerging urban centres, waste management structures and practices

## 7.2 Introduction

Solid waste generation is increasing gradually in both developed and developing countries (D'Amato *et al.*, 2012). As a result, different actors, both globally and locally, have made efforts to document the status of waste generation and management and address waste management challenges in different contexts (UNDP, 2016a; Kaza *et al.*, 2018). As a global concern, waste management is clearly embedded in the Sustainable Development Goals (SDGs) for 'Sustainable Cities and Communities' (SDG 11 target 6) and 'Responsible Consumption and Production' (SDG 12 targets 3, 4 and 5) (Rodić and Wilson, 2017; UNDP, 2016b). Waste management poses challenges beyond individuals and households to include broader threats to humanity, the environment and livelihoods, as well as economic and social development (UNDP, 2016a; Kaza *et al.*, 2018).

Given rapid population growth and urbanization, waste management in many urban centres in the Global South (Mahler, 2017) has deteriorated, since waste collection is often insufficient and waste disposal inappropriate (Medina, 2010; Kaza *et al.*, 2018). The composition of waste generated by urban centres includes refuse from households, crop residues, biowaste, paper, plastic and street sweepings (Simon, 2008). The heterogeneity of waste generation in urban centres (Miezah *et al.*, 2015) requires different management practices. The leading sources or generators of waste in urban centres are households, i.e. are residential, followed by markets and commercial areas (Okot-Okumu and Nyenje, 2011; Maskey and Singh, 2017). For example, a study of waste classification and quantification in Ghana by Miezah *et al.* (2015) estimated that households generate about 55-80 percent of the solid waste of urban areas.

As waste-management practices (collection and disposal practices) differ from country to country, between rural and urban areas, and between residential and industrial generators of waste, they should be context-specific and locally sensitive (Aleluia and Ferrão, 2016). Waste collection is an important step in waste management (Kaza *et al.*, 2018). Despite the efforts made to improve waste management in urban centres, many urban centres collect less than half the waste they generate (Medina, 2010). Moreover, the service is mostly confined to just a few urban areas, particularly urban centres and high-income neighbourhoods, while low-income neighbourhoods and areas outside urban centres have few or no waste collection services at all (Muller and Hoffman, 2001; Kironde and Yhdego, 1997). In a study of solid waste in Dar es Salaam it was found that, only 50 to 70 percent of urban residents receive garbage collection services, and substantial amounts of waste remain uncollected (Kaseva and Mbuligwe, 2005).

Waste disposal remains a major problem in developing countries (Wilson *et al.*, 2013). Most urban residents and operators must bury or burn their waste in their backyards or dispose of it haphazardly in areas of their convenience, such as roadsides, open spaces, or in valleys or drains (Shah *et al.*, 2012; Binyaruka, 2015; Medina, 2010; Kironde and Yhdego, 1997). Over 90 percent of waste generated in developing countries is disposed of in open dumps or burned (Kaza *et al.*, 2018). Consequently, uncollected waste has consequences for public health (diarrhoea and respiratory infections among children) through drainage systems being blocked and flooded, possibly leading to the spread of water-borne diseases (Wilson *et al.*, 2013).

Similarly, waste-management structures (actors, institutions and regulations) differ from one context to another. Waste management is one of the most basic and visible social services in urban areas, its effectiveness serving as an indicator of the level of local

governance (Kaseva and Mbuligwe, 2005). Normally, local government authorities have the responsibility for providing waste-management services in urban centres (Chen and Urpelainen, 2015; Muller and Hoffman, 2001). In most cases, their role in waste management in urban centres includes the formulation and enforcement of policies and laws, coordination, budgets, facilities provision and awareness-raising (Binyaruka, 2015; Simon, 2008). Urban waste management is a major problem and is getting worse, since most governments are unable to keep up with the increase in the amount of waste generated (Nthambi *et al.*, 2013; Binyaruka, 2015). Furthermore, due to high population densities and the concentration of economic activities in urban areas, waste generated cannot be disposed of effectively on an individual basis (Kironde and Yhdego, 1997).

The barriers and constraints on effective waste collection and disposal are often issues of governance (Wilson *et al.*, 2013). Governance challenges in waste management following rapid urbanization (Medina, 2010; Cheng and Urpelainen, 2015; Gu *et al.*, 2015; Gupta *et al.*, 2016) need to be addressed in order to make urban centres healthy and comfortable for living. To achieve improvements in urban cleanliness (Kironde and Yhdego, 1997), governance must be based on a combination of positive collaboration between the urban authorities and local community responses (Kironde and Yhdego, 1997; Wilson *et al.*, 2013).

Therefore, local government authorities cannot deliver solid waste management without the active participation of all stakeholders, including waste generators and clients, providers (government, informal and private sectors) and external agents like national governments (Wilson *et al.*, 2013). The inclusion of all stakeholders in solid waste management is important in ensuring appropriate coverage of service users and open economic niches for both formal and informal service providers (Wilson *et al.*, 2013).



Because of the inadequate capacity of local government to provide waste-management services, informal waste collectors, private companies and civil-society organizations are currently involved in waste management in most urban areas (Simon, 2008; Kassim and Ali, 2006). The nature of the division of power, responsibilities and resources between the various tiers of government and their relationship with civil society in waste management becomes important (Kironde and Yhdego, 1997). Furthermore, the economic aspects of waste management have also received attention in the existing literature in efforts to address increasing waste-management challenges, in particular economic efficiencies in respect of waste disposal (cost-benefit analysis for waste disposal practices), incineration, waste recycling, waste minimization, and the recovery of materials and energy from waste (Cox, 2011; Busello *et al.*, 2012; D'Amato *et al.*, 2012; Numata and Managi, 2012). All these aspects need to be economically viable in light of specific contexts and conditions.

Moreover, despite increasing challenges in waste management, solid waste management in developing countries has received less attention from policy-makers and scholars (Medina, 2010). A lack of reliable data is one of the major drawbacks in deciding on an effective system of waste management (Maskey and Singh, 2017). Waste management data are important for planning and policy formulations in the local context (Kaza *et al.*, 2018). As the existing literature on solid waste management has so far focused on large urban centres (Medina 2010; Wilson *et al.*, 2013; Gu *et al.*, 2015), this chapter will contribute to the existing literature by focusing on solid waste management structures and practices in Emerging Urban Centres (EUCs) that are in the process of becoming urban townships.

### **7.3 Waste Management in Tanzania**

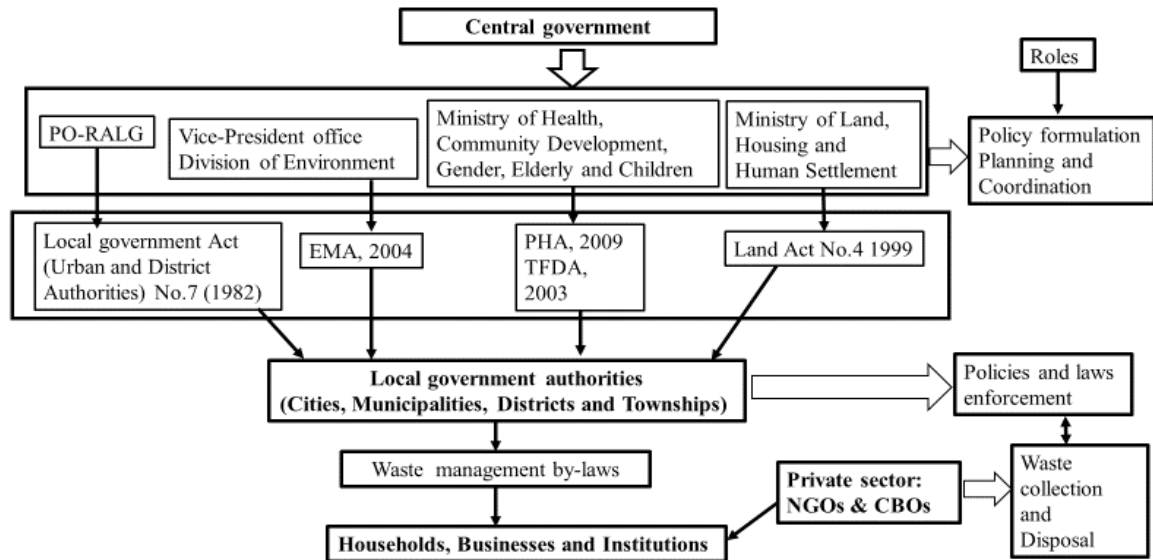
In Tanzania, different central government ministries and departments and private and community actors are responsible for waste management (Figure 7.1). Therefore, laws exist requiring urban authorities to manage waste in their areas of jurisdiction. These laws include the Local Government Authority (Urban Authorities) Act of 1982 section 55 (g and i), which gives urban authorities the responsibility for removing waste from any public or private place, the disposal of sewage from all premises and houses, and cleaning all trunk roads within their authority area (URT, 1982). The Environmental Management Act of 2004 (EMA) (URT, 2004) sections 114-119 requires local government authorities to ensure that appropriate waste-management practices are followed in their geographical areas of jurisdiction (urban and peri-urban areas) by establishing waste transfer and final disposal facilities (Breeze, 2012; Simon; 2008). EMA also provides guidelines for the involvement of private and Non-Governmental Organizations (NGOs) in planning and raising awareness about waste management issues.

The Public Health Act (PHA) of 2009 (URT, 2009) provides guidelines for the collection, sorting, transportation and disposal of solid and liquid waste from domestic and commercial premises, markets, institutions and factories. Tanzania Food, Drugs and Cosmetics Act (TFDA) Act of 2003 (URT, 2003), which emphasizes the placement of dustbins in business and service provision areas. All these laws have different penalties for infractions of waste management laws. In addition to national-level laws for waste management, each local government authority has by-laws governing waste management within its jurisdiction. Furthermore, township and ward health committees and village social and environmental committees are tasked with dealing with environmental and

health-related issues, including solid waste management in a specific context, either rural or urban.

Despite the existence of both national laws and local by-laws for waste management, as well as strategies and institutions governing waste management in urban and peri-urban areas, Ntakamulenga (2012) argues that, while cities and towns are generating ever-increasing volumes of waste, the effectiveness of waste management systems is declining. Indeed, only a fraction of the waste that is generated daily is collected and safely disposed of by the responsible urban authorities (Kironde and Yhdego, 1997). About 69 percent of waste generated in Tanzania is disposed of in open dumps and 36.2 percent is placed in pits or buried (Kaza *et al.*, 2018). Given the declining effectiveness of waste-management systems, the government is designing innovative and effective approaches to waste management, including the engagement of private-sector actors in waste management (Simon, 2008; Kassim and Ali, 2006).

Moreover, as rural villages are transformed into urban townships following the announcement of their status as townships, increases in population, in the concentration of economic activities and in the establishment of social institutions (Lazaro *et al.*, 2019) also increase the rate of solid waste generation. As has been observed in other parts of the world, the increase in urbanization rates usually implies an increase in the demand for waste-management services (Shamshiry *et al.*, 2011), as has also been the case in the context of the EUCs in this study (Larsen and Birch-Thomsen, 2015; Lazaro *et al.*, 2017). However, despite mounting increases in the waste being generated, with associated risks to public health and the environment, households, local government authorities and private actors in both EUCs are still facing challenges in dealing with increases in the rate of solid waste generation.



**Figure 7.1: Institutions and regulations for waste management in Tanzania**  
(Modified from Bakanga, 2014).

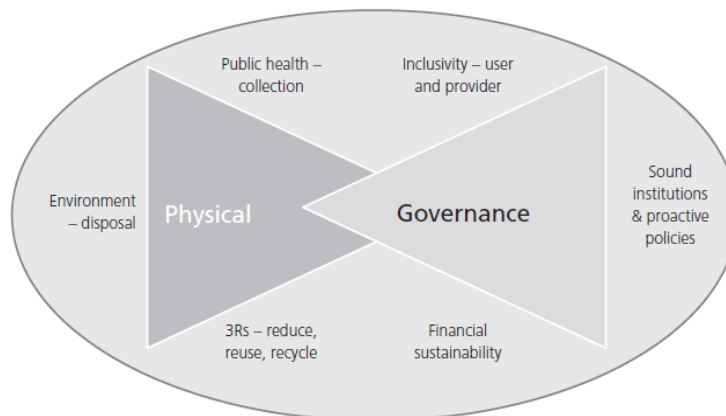
As in other developing countries, most studies of solid waste management in Tanzania have focused on large urban centres (for example, Kironde and Yhdego, 1997; Simon, 2008; Binyaruka, 2015). Therefore, knowledge of such practices in EUCs in the context of the ongoing rural-urban transition is generally scanty. This chapter therefore sets out to investigate the current governance structures and practices of solid waste management by the government, households, businesses and private actors within EUCs in the context of rural-urban transformations.

#### 7.4 Theoretical Framework

Waste management entails the collection, sorting, transportation and disposal of waste from household garbage and cleaning household compounds, streets and public places (Muller and Hoffman, 2001; Marinela, 2009). The purpose of waste management is to prevent waste from posing risks to human health and the environment (Pongrácz *et al.*,

2004). Several theories have been developed in studying waste-management practices in different contexts. This chapter uses the so-called Integrated Sustainable Waste Management (ISWM) framework, which promotes the idea that waste management is a complex problem that cannot be addressed by focusing only on the technical aspects of waste collection and safe disposal (Muller and Hoffman, 2001). The ISWM examines both the physical components and the governance aspects of waste management (Figure 7.2). The physical components include the collection, disposal and recycling of solid waste, while the governance aspects cover the issues of the inclusion of users and providers of waste services, ensuring financial sustainability and providing effective institutions supported by proactive policies (Wilson *et al.*, 2013).

The physical components address public health issues (waste collection), environmental protection (waste disposal) and the recovery of materials and nutrients for beneficial uses (waste recycling). The governance aspects advocate governance strategies that enhance effective systems ensuring the participation of all stakeholders and the provision of cost-effective and affordable service-delivery models and sound institutions. The application of the ISWM's analytical framework helps document existing realities and explores the challenges and opportunities regarding solutions in solid waste management (Wilson *et al.*, 2013). Furthermore, the ISWM helps in understanding the principles of adequate waste management (Muller and Hoffman, 2001). By drawing theoretical insights from the ISWM framework, this chapter investigates how different actors (government and formal and informal actors) within EUCs are organized (governance structures) in dealing with increasing solid waste management challenges in respect of waste collection services, transportation and waste disposal practices.



**Figure 7.2: The integrated solid waste management framework (Wilson *et al.*, 2013:57)**

## 7.5 Research Methodology

### 7.5.1 Research sites

Geographically, Ilula EUC is in Kilolo District, Iringa Region, and Madizini EUC is in Mvomero District, Morogoro Region (Figure 4.1). Ilula and Madizini are experiencing rapid population growth and the concentration of economic activities, and consequently increased waste generation and waste-management challenges. The human populations of Ilula and Madizini increased by 13 percent and 72 percent respectively in the period 2002 to 2012 (Lazaro *et al.*, 2017; 2019). The growth in population in a particular area (Yhdego and Kingu, 2016), as well as the nature of economic activities, like agricultural value chains, a crop market (Ilula) and business establishments (in both Ilula and Madizini), are important determinants of the amount of waste generated. The dominant agricultural value chain in Ilula EUC includes tomato production, packing, marketing and processing, as well as other businesses. In Madizini EUC, the dominant agricultural value chain is sugarcane production and processing by the Mtibwa Sugar Estate (MSE) and small sugar out-growers (farmers), as well as crop diversification (paddy cultivation and processing) and other businesses.

Administratively, Ilula is at an advanced stage in its rural-urban transformation, with an established Township Authority, while Madizini still has a rural (village) administrative structure. The difference in the stage reached in the administrative transitions of the two EUCs has an impact on solid waste management structures and practices based on established institutions for solid waste management as well as autonomy in decision-making regarding the planning of service provision, including garbage collection and disposal services. The prevailing situation therefore prompts the need to investigate current structures and practices for solid waste management in both EUCs, given their rapid population and economic growth, in order to recommend measures for improving solid waste management. The chapter hypothesise that there is no association between the level of administrative status and solid waste management practices among households within the two EUCs.

### **7.5.2 Data collection and analysis**

A combination of research methods was employed in this study. In August 2015 a preliminary field visit was conducted to obtain a general overview of waste-management practices in both EUCs. In February 2016 a household survey was conducted of 468 households (323 Ilula and 145 Madizini) to collect quantitative data on household management practices and household participation in waste management. A proportional sampling strategy was used to determine the sample size for each EUC based on population figures and household sample size drawn from national population censuses. At the sampling point (neighbourhoods) within the EUCs, households for the survey were selected using a systematic random sampling strategy, ten households being selected at each sampling point by selecting every second house. Household survey data were

collected using structured questionnaires. It should be noted that the differences in sample size and observations presented in Tables 7.1 and 7.2 are due to ‘non-responses’, while the observations in Table 7.3 represent households doing a certain type of business in the EUC.

In-depth household interviews were conducted with 39 interviewees (20 in Ilula and 19 in Madizini). The sample size for these in-depth household interviews was determined on the basis of the sample size determination procedure for the in-depth interviews (Dworkin, 2012; Guion *et al.*, 2011). The households for in-depth interviews were purposively selected on the basis of variations in household responses in the household survey that required further inquiry regarding household practices in the disposal of both household and productive waste from businesses. The selected households were interviewed using semi-structured interview guides. Furthermore, 33 key informant interviewees were conducted with health officers, street or village leaders, the heads of utilities, informal waste collectors and shopkeepers (productive waste management).

Data collected from in-depth interviews and key informants included detailed information on waste-management practices in both EUCs, including the existing practices, challenges and strategies involved in addressing the growing challenges in solid waste management. Physical observations at waste disposal sites and streets were also undertaken. A chi-square test was performed to determine whether there was any association in household waste management practices between the two EUCs based on their stage of administrative transition. Furthermore, the chapter employed a Multinomial Logit (MNL) model to determine the factors influencing choice (the decisions) of households when disposing with household solid waste among the available waste-disposal practices. The MNL uses individual characteristics as explanatory variables (Nthambi *et al.*, 2013). Let  $y$  be the dependent variable (household waste disposal) with  $j$  nominal unordered outcomes, and let



$\Pr(y=m|x)$  be the probability of a household choosing practice  $m$  given available practices  $x$ .

Therefore, following Long (1997), a multinomial logit model as a probability model for  $y$  can be constructed as:

$$P_r(y = m | x_i) = \frac{\exp(x_i \beta_m)}{\sum_{j=1}^J \exp(x_i \beta_j)} \quad (8)$$

The dependent variables (unordered outcomes)  $y$  were burning pit on compound, public waste dump and garbage bin on compound (used as base outcome since it has many observations in both sites). Age, sex, household size, main occupation, education, EUC of residence, land size and membership of waste-management committee were the explanatory variables that determine a household's choice of waste disposal practices.

## 7.6 Results and Discussion

### 7.6.1 Solid waste generation situation within EUCs

The observed generators of waste in both EUCs are households, businesses, workshops, agricultural processing factories and agricultural crop markets. A common waste composition consists of domestic (households' residues) and commercial waste (boxes, papers), expired chemicals (drugs and pesticides), plastic and organic/crop residues and residues from construction. Simon (2008) reported relatively similar sources and composition of solid waste in Kinondoni Municipal. The situation with solid waste generation in both EUCs is associated with multiple factors, including population growth (13 percent in Ilula and 72 percent in Madizini) (Lazaro *et al.*, 2017), the establishment of businesses (65 percent in Ilula and 62 percent in Madizini) (Nyaki *et al.*, 2019), the concentration of economic activities, organic waste and crop residues and infrastructure

development and housing construction (Table 7.1). TASAF tomato market in Ilula EUC is a practical example of organic waste production from dominant agricultural crop (tomato). Nyampundu *et al.* (2020) reported crops or food and animal product remains to be the most generated solid wastes (94.4%) at the Majengo Market in Dodoma city.

Moreover, the establishment of agro-processing factories like the Dabaga tomato-processing factory in Ilula and multiple paddy-processing mills in Madizini, among others, are other important sources of solid waste generation in EUCs. In practice, agro-processing factories encourage both immigration (permanent and temporary) and the production of dominant agricultural crops that in turn increases the amount of organic residues as waste.

The factors driving waste generation differ between the two EUCs and have similarly resulted in increases in the rate of solid waste generation, though with different compositions. However, the actual amount of waste generated from multiple sources within these EUCs is not known. When asked during in-depth interviews, key informants estimated that Ilula EUC generates approximately two tonnes and Madizini EUC approximately three to five tonnes of solid waste a day due to high housing densities and business concentrations. Of the estimated amounts of waste generated, it is also not known how much is collected and properly disposed by households, businesses or informal waste collectors. Ntakamulenga (2012) argued that, in most urban centres in Tanzania, less than half of the solid waste generated is collected.

Drawing from ISWM framework theoretical insights about an integrated solid waste management, despite the amount of waste generated in the two EUCs, waste-collection services, waste transportation and disposal practices are still challenges. As argued by Yhdego and Kingu (2016), most of the urban centres have minimal areas where solid waste

service is available. The challenges for integrated solid waste management within the two EUCs are mostly embedded in a lack of designated sites for waste disposal, a lack of facilities for waste transportation and the location of public waste dumps. Consequently, due to the absence of an EUC-wide organized system of waste collection and inappropriate disposal, considerable accumulation of large mounds of waste around private graveyards, undeveloped plots, crop fields and water canals or trenches, together with heavy street litters and stinking gutters, were observed in both EUCs during transect walks.

**Table 7.1: Solid waste generation situation within EUCs**

Driving factors for solid waste generation	EUC	
	Ilula	Madizini
Population growth rate (2002-2012)	13%	72%
Business flourishing (2011-2016)	65%	62%
Agro-processing factories and organic waste/crop residues	Dagaba tomato-processing factory, food waste, maize stalks, damaged tomatoes	Paddy-processing mills, food waste, paddy refuse and weekly crop markets
Infrastructure development and housing construction	Road and housing construction	Road and housing construction

In practice, as EUC populations increase and businesses flourish, solid waste generation is expected to increase as well. In these circumstances, three important options for integrated waste management are presented: minimization of solid waste, efficient waste disposal practices, and the strengthening of waste-management institutions. Nevertheless, actors and institutions in solid waste management are organized in varying degree in ensuring an integrated waste-management system exists in both EUCs as presented in section 7.6.2.

### 7.6.2 Solid waste management structures in the two EUCs

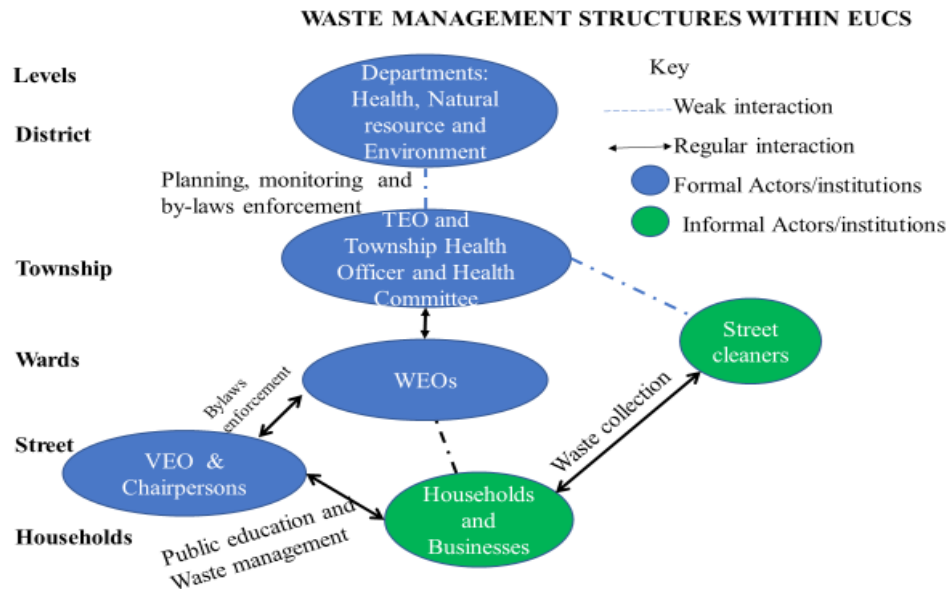
Administratively, Ilula has a township structure (Figure 7.3), while Madizini currently retains its village structure (Figure 7.4), meaning that the actors and institutions that are responsible for solid waste management differ. In the context of waste management, actors

or stakeholders are those individuals or organizations with an interest in participating in waste management, including households, organizations and enterprises (Muller and Hoffman, 2001).

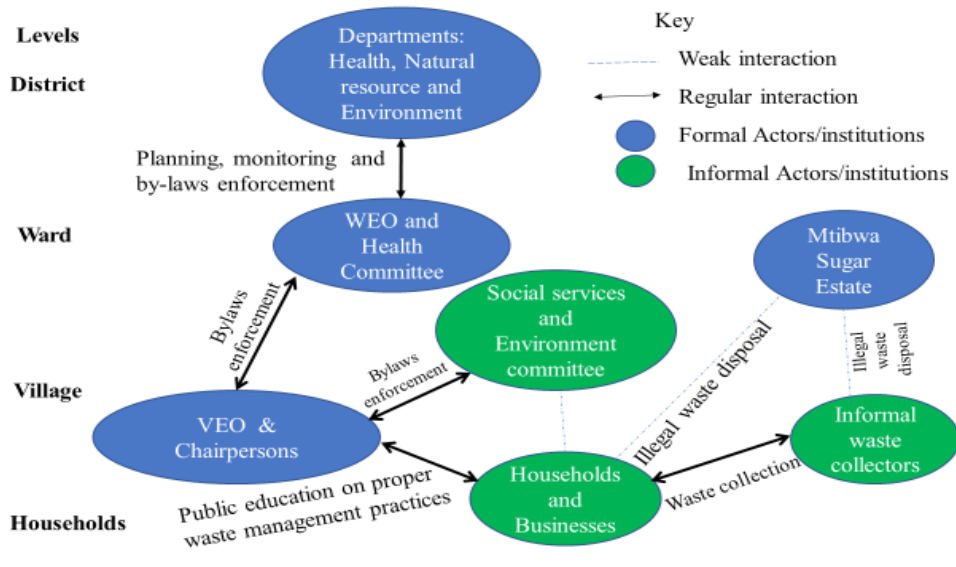
In the context of this chapter, waste-management actors include both formal (legally registered) and informal (not legally registered) institutions responsible for waste management. The formal actors include district departments: Health and Natural Resource and Environment, Township Health Committee, Ward Health Committee, Township Executive Officer (TEO) and Ward Executive Officer (WEO). Other formal actors are Village Executive Officers (VEOs), Village Chairperson, Social Health Workers and private-sector actors. Informal actors include Social Service and Environment Committees, informal waste collectors (without formal registration) and street cleaners. Households, businesses people or service providers and institutions are other important actors in waste management in both EUCs.

In practice, actors in solid waste management in both EUCs work in collaboration with each other depending on their roles and the scope of operations. Their collaboration can take the form either of regular interaction (interacting more frequently) or weak interaction (not interacting regularly). At district level, the Department of Natural Resources and the Environment and the Health Department are responsible for drawing up by-laws, allocating funding and monitoring waste management at the township, ward and village levels in collaboration with the Township and Ward Health Committees and Health Officers. The TEO, Township Health Officer and WEO (in the case of Ilula Township) and Ward Health Committees (in Madizini) are responsible for by-law enforcement and providing public education and inspecting and monitoring waste management in the EUCs in collaboration with village and sub-village leaders. The Social Services and

Environmental Committees are responsible for awareness-raising on health-related issues, including waste management at the village and sub-village levels.



**Figure 7.3: Actors and institutions for solid waste management in Ilula EUC**



**Figure 7.4: Actors and institutions for solid waste management in Madizini EUC**

Based on existing solid waste management structures, to some extent and in some areas of both EUCs, different actors are organized in solid waste management. For example,

business-people organize individual or collective solid waste collection and the transportation of waste to public dump sites (the case of Ilula EUC) by either hiring a truck to transport the waste or engaging street sweepers and cleaners to collect and transport waste to designated public dumping site. Private actors like the Mtibwa Sugar Estate (MSE) organize their own waste collection and transportation to designated waste dumping site in their compounds. Similarly, crop markets like the Ilula TASAF tomato market is organized in waste collection and transportation to designated dumping sites by hiring a truck. Households and informal waste collectors are strongly linked and interact regularly in waste collection and the payment of waste collection fees (Figures 7.3 and Figure 7.4).

Local government organs like the health committees and health officers also involve households and businesses through the provision of public education and the enforcement of waste-management by-laws to ensure proper management practices within the EUC based on local government and national laws for waste management. Informal waste collectors and street-cleaners are engaged privately and informally by businesses and households to collect waste from their compounds.

As observed during transect walks and shared during discussion with key informants, there is a tendency where informal waste collectors dispose the waste in places that are not officially designated as public waste disposal sites. The extent to which actors for solid waste management within EUCs are organized are in line with theoretical insights from ISWM framework that suggest clarity in actor's roles and proper coordination among actors in different operational levels.

However, despite the existence of the current waste-management structure and the degree of interaction among solid management actors, there is still a coordination challenge

between district councils and local government authorities within townships and EUCs regarding waste-management planning (land for waste disposal) and budgeting. The involvement of all stakeholders in neighbourhoods is essential and this concurs with Muller and Hoffman (2001) who argued that, the distinctive roles of all stakeholders will contribute to improving the situation regarding solid waste management. Drawing experience from Tanzania, Ntakamulenga (2012) argued that, the main challenge is to identify and verify the role that the formal private and/or community and informal private sectors can effectively play in delivering waste management service.

In the EUC context, the inclusion of users and household involvement in waste-management committees is still minimal (Table 7.2), which in turn has implications for proper waste-management practices by households. Efforts must therefore be made to involve households in waste-management services both as service users and waste generators. The ISWM framework suggest that, all important actors (household included) for waste management must be effectively engaged.

**Table 7.2: Household involvement in waste management**

	Ilula	EUC Madizini	Total
<b>Household member in waste management committee</b>	<b>(n = 317)</b>	<b>(n = 138)</b>	<b>(n =455)</b>
Yes (%)	13 (4)	6 (4)	19 (4)
No (%)	304 (96)	132 (96)	436 (96)

Source: RUT Project Household Survey, 2016

To enhance an integrated, sustainable and effective system of solid waste management, as postulated under the ISWM framework applied in this chapter, all waste-management actors in both EUCs need to be organized in terms of resource mobilization and planning so that waste management can address the environmental, human and economic effects

associated with the current waste management practices. An integrated system of solid waste management should be clear about the roles and accountability of actors, planning for waste disposal sites, the allocation of resources to waste management, and the provision of public education on proper solid waste management practices.

### **7.6.3 Day-to-day practices for solid waste disposal in both EUCs**

This section presents information about waste disposal practices by households and informal waste collectors and street-cleaners, the regularity of waste collection, and the collective solid waste collection and disposal practices of business-people and crop markets like Ilula's TASAF tomato market.

Waste-management practices differ based on the generators and composition of the waste presented under section 7.6.1. From household survey results, 70 percent of surveyed households are disposing of their household waste in garbage bins on their compounds, and only 17 percent in both sites were disposing of household waste in public waste dumps (Table 7.3). The 17 percent of households in Madizini were using public dumps at small sites in different neighbourhoods that are perceived as public dumps mostly for open burning but are not officially designated as public waste dumps.

As shown in Table 7.3, there is no significant difference in household waste disposal practices between the two EUCs despite their differences in administrative status. The hypothesis underpinning this study is therefore rejected. However, in key informant interviews it emerged that, some efforts are being made to address waste-management challenges, particularly in Ilula EUC, making some relatively significant differences between the two EUCs.



As emerged from key informant and in-depth household interviews, the low proportions of households (17 percent in both sites) disposing of their waste in public waste dumps are associated with the lack of designated areas for waste disposal (in the case of Madizini) and the location of public dumps away from residential areas (in the case of Ilula EUC) at a distance of approximately 2.7 kilometres. One respondent stated during an in-depth household interview that:

*“For household waste, I usually collect and keep it in the plastic sacks (without sorting) and engage an informal waste collector to come and collect it”* (In-depth household interview, Madizini, May 7, 2017).

Local government authorities’ capacities, such as the technical, financial and lack of facilities to collect, transport and dispose of waste, are other factors impeding effective waste management within EUCs. Furthermore, 48 percent and 73 percent of surveyed households in Ilula and Madizini respectively are involved in businesses. Of the households that responded to the question about productive solid waste management practices, relatively similar practices are evident as those used in managing household solid waste (Table 7.4). During one in-depth household interview, a respondent stated that:

*“For productive wastes, I burn them in dust pit on the compound”* (In-depth household interview, Madizini, May 7, 2017).

From observations, most households have their businesses in their dwelling houses and therefore tend to use similar practices in disposing of both household solid waste and productive solid waste from these businesses.

**Table 7.3: Disposal of household solid waste**

	<b>Ilula</b>	<b>EUC Madizini</b>	<b>Total</b>
<b>Household waste disposal practices</b>	<b>(n = 317)</b>	<b>(n = 138)</b>	<b>(n = 455)</b>
Garbage bin on compound (%)	229 (72)	89 (65)	318 (70)
Burning pit on compound (%)	32 (10)	17(23)	55 (12)
Public waste dump (%)	53(17)		53 (12)
Perceived 'public waste dump' (%)		24 (17)	24 (5)
Both garbage bin and burning on compound (%)	3 (1)	2(1)	5 (1)
Chi-square Statistics:			
X2 value 4.508			
P value .212			

Source: RUT Project Household Survey, 2016

**Table 7.4: Disposal of productive solid waste (from businesses)**

	<b>Ilula</b>	<b>EUC Madizini</b>	<b>Total</b>
<b>Household waste disposal practices</b>	<b>(n = 153)</b>	<b>(n = 101)</b>	<b>(n = 254)</b>
Garbage bin on compound, (%)	90 (59)	60 (59)	150 (59)
Burning pit on compound, (%)	29 (19)	24 (24)	53 (21)
Public waste dump (%)	34 (22)		34 (13)
Perceived 'public waste dump' (%)		16 (16)	16 (6)
Both garbage bin and burning on compound (%)	0	1(1)	1 (0.4)

Source: RUT Project Household Survey, 2016

Even though there is no significant statistical difference (Table 7.3) in household solid waste management practices between the two EUCs based on differences in their administrative status, some potential differences were gleaned from key informant interviews and physical observations. Hence, there are consequences in the different solid waste management practices between the two UECs. For example, the establishment of the Ilula Township Authority has had significant positive impacts on waste management in different ways, including the provision of public education on proper waste management practices, allocating a designated area for a public dump, organizing sewerage waste sucker on regular basis (upon request) and the enforcement of by-laws by sub-villages and institutional (e.g. school) leaders respectively. Kilolo District Council has also employed four street cleaners responsible for waste collection within Ilula EUC.

Township and street leaders in Ilula Township usually participate in public cleanness days by inspecting different streets. For example, Township and Ward Health officers, in collaboration with ward, street and sub-village authorities, undertake regular awareness-raising among households, business groups and institutions on a monthly and quarterly basis to emphasize proper waste-management practices in their compounds. These efforts by Ilula EUC are one potential sign of the difference between the two EUCs regarding township status and leadership.

On the other hand, street-cleaners and informal waste collectors in both EUCs reported different waste-disposal practices for both household waste and productive solid waste from businesses (Table 7.5). However, in practice, as physical observations and in-depth household interviews revealed, informal waste collectors in Madizini EUC tend to dispose of waste in water canals or bury it deep underground in places of their convenience and do not make full use of the practices presented in Table 7.5 below. In Ilula EUC, street-cleaners bury and burn waste in dedicated semi-official public dumping sites (Plate 7.1).

**Table 7.5: Solid waste disposal practices by street-cleaners and informal waste collectors based on composition of waste**

<b>Waste type or composition</b>	<b>Disposal or management practices</b>
Metals and glass	Buried deep underground or given to scavengers for recycling
Chemicals from pharmacies and agricultural and veterinary shops.	Buried very deep underground for greater safety
Expired goods from shops, for example, biscuits and juices	Buried deep underground for greater safety and to prevent children from collecting them
Plastic materials like bags and bottles	Burned or given to scavengers who sell them to recycling companies in Morogoro and Dar es Salaam.
Food remains from restaurants, hotels and streets vendors.	Buried very deep underground to prevent children from collecting them

Moreover, from key informant and in-depth household interviews we learned that in Ilula EUC households, services and businesses located within 160 meters of the main tarmac road (Iringa-Morogoro road) are restricted by township by-laws from having garbage pits on their compounds, requiring them to transport their waste to the public waste dump. However, households in unplanned settlements (Chapter 4, section 4.8) where there are accessibility problems (households situated over 160 metres from the main road) are required under the same township by-law to dig garbage pits on their compounds. Households that violate instructions or by-laws passed by the sub-village or township authorities are penalized based on their circumstances, like the lack of a garbage pit, among other things. The penalties range from TZS 5 000 to TZS 50 000 depending on the response to the warning given by local government officials and the socioeconomic status of the person charged (ability to pay increases the penalty).

Despite the by-law requirements and penalties, practice on the ground is different, since not all households transport their waste to public dumps. However, due to the convenient distance to the semi-formal waste dump in Mwaya Street, households in Mtua and Ilula Mwaya are likely to adhere to these by-laws. In the household survey, results revealed that,

68 percent and 38 percent of households in Mtua and Mwaya respectively reported that they dispose of household waste in public dumps.

Streets-cleaners divide their cleaning up throughout the week so that each cleaner has a specific part of the main road and feeder roads to clean. Wednesday is dedicated to cleaning households and business areas. However, depending on the nature of the waste generated, for example it cannot be kept for long, some business areas are cleaned daily, for example, restaurants, hotels, chip kiosks and fish-selling points. Arrangements to collect waste from households, services and businesses areas are based on phone requests or door to door visits to see if there is any waste in the dust pits that needs collecting. For example, one respondent stated that;

*“I organize waste collection and disposal arrangements from my grocery. I usually collect waste in small dustbins inside the grocery and then I transfer into the big waste bin outside the grocery. When the waste bin outside is full, I call a “Bajaji” (not permanent) to transport the waste to the public dump”* (In-depth household interviews, Ilula, May 29, 2017).

The regularity of waste collection in both EUCs is determined by the amount of waste generated, its composition and individual negotiations. One household head in Ilula stated that:

*“The regularity of waste collection to the public dumping site depends on when the big dustbin is full”* (In-depth household interview, Ilula, May 29, 2017).

Another household head in Madizini reported that:

*“An informal waste collector passes by to collect the waste every 2nd or 3rd day”*

(In-depth household interview, Madizini, May 7, 2017).

As noted earlier, in Madizini EUC, informal waste collectors are engaged privately, particularly by households and businesses, to collect waste, which they dispose of in unknown/unofficial places as listed in the following paragraph. During an in-depth household interview, one respondent stated that:

*“I have got no idea where the informal waste collectors dispose waste, but I usually see waste in forest areas like Kidudwe, market places and along the river sides”*

(In-depth household interview, Madizini May 7, 2017).

The informal waste collectors and households rarely sort the waste before disposing of it. In Madizini EUC, for example, the unofficial places most commonly used by informal waste collectors to dispose of waste are open spaces (for example, the old KKKT church in KKKT sub-village, which is perceived as a public dump, as shown in Tables 7.3 and 7.4, graveyards, undeveloped plots, fields, water drainage trenches or canals, river banks, forests, a teak plantation and across the bridge toward the Mtibwa Sugar Estate compound. The most common means of waste collection by informal waste collectors are wheelbarrows or pushcarts, bicycles, three-wheel motorcycles (when the amount of waste is high) and using one's hands. Ntakamulenga (2012) reported similar waste collection and transportation mechanisms.

Furthermore, in Ilula EUC, streets-cleaners bury and burn waste at a ‘semi’-official dump (Plate 7.1) in Ilula Mwaya sub-village, which is close to the village due to a lack of transport facilities with which to transport waste to official public dumps at Mapusungu. The business-people in Ilula EUC (example on collective waste management by business-people in Box 7.1) have either individual or collective arrangements with street-cleaners or truck-drivers to collect waste from their compounds or business areas.



**Plate 7.1: Open waste burning point in Ilula EUC**

In Ilula’s TASAFA tomato market, waste usually consists of small tomatoes or *masalu*, rotten tomatoes, the grass used to cover tomatoes in boxes, bits of tomato boxes and food remains. Sunday is dedicated to market cleaning so as to start the week afresh. However, if more waste is generated, cleaning can be organized before Sunday. Cleaning is supervised by the Environmental Committee, which is composed of four members elected by the Market Central Committee. On cleaning days, at least two committee members must be present together with the committee secretary. During the cleaning day, market leaders engage two or three casual labourers to collect waste within the market compound, pack it on to the truck (Plate 7.2) and transport it to the public dump. On average, a three-ton truck can do seven trips a day. Nyampundu *et al.* (2020) reported the dumpsite as the main site

for solid waste disposal (80.1%) at the Majengo in Dodoma city. Despite the market management making good arrangements to ensure proper garbage collection within the market compound, rotten tomatoes are improperly disposed of just a few metres away from the TASAF tomato-market compound.

**Box 7.1: Collective solid waste management among businessmen in Ilula Mwaya**

*“I started operating my current shop in 1998. Waste management practices among businessmen in Ilula Mwaya have changed over time. In 2011, we were informed by the Township Health Officer that everyone should have a dustbin in his/her business place, and the township organized waste collection (hired a truck) on weekly basis. The businesspeople were paying 500 TZS per week as waste collection fee. The organized waste collection failed, and everyone has been tasked to organize their own or collective waste collection and disposal. I and five other shop-owners in Ilula Mwaya have organized collective waste collection. Each shop-owner has a private dustbin, but we all transfer our waste into one common waste collection point without sorting. We then engage the street-cleaners on weekly basis or when enough amount of waste is accumulated to collect waste from the common waste collection point to where street-cleaners burn the waste. Each shop-owner pays between 500 TZS to 1000 TZS per week to street-cleaners in waste collection charges. We (businessmen) also participate in the public cleanness day. Other businessmen in our street make individual arrangements for waste collection and disposal. For example, some would hire a three-wheeler motorcycle to transport waste to the public dump site at Mapusungu.” (In-depth household interview with business owner, Ilula, May 30, 2017).*



**Plate 7.2: Truck loading waste in Ilula TASAF tomato market**



Overall, the current practices of solid waste management in the two EUCs (Tables 7.3 and 7.4) pose potential risks to the environment (unsafe disposal through open burning and unofficial dumps), human health (insufficient waste collection) and economic development (businesses closures and discouraging investment). For example, in Madizini EUC restaurants and food vendors were closed for three months in 2016 due to a cholera outbreak.

#### **7.6.4 Factors determining household solid waste disposal practices**

The factors that influence or determine households' choices of solid waste disposal practices were analysed using the MNL model. The results are presented in Table 7.6. Our model fitted the data reasonably well [LR chi2 (16) =32.75, Prob > chi2=0.0080]. Thus, the hypothesis that all coefficients of independent variables are jointly equal to zero was rejected. On the test of multicollinearity, the chapter employs a variance inflation factor (VIF), the results suggesting that there is no serious multicollinearity problem (mean VIF= 1.06).

The results revealed that, of the eight explanatory variables considered in the econometric model, three (EUC of residence, household size and membership to waste management committee) were statistically significant in determining household choices regarding their solid waste disposal practices (Table 7.6). EUC of residence was statistically significant in influencing household decisions to dispose of household solid waste from garbage bin on the compound (base outcome) to burning pit on the compound. Households in Ilula EUC prefer (negative coefficient) burning pit on compound less than households in Madizini EUC. This situation is mostly associated with regular public education on proper waste management procedures provided by Ilula Township and Wards Health Officers and the

by-law that requires households living within 160 metres of the main road to transport waste to the public burning point at Mwaya sub-village or the public dump.

Household size and membership of a waste-management committee were significantly associated with household choice in favour of the public waste dump over a garbage bin on the compound. The results indicate that larger households prefer to dispose of their waste in public dumps, a situation linked to the rate of waste generated that cannot be disposed of in garbage bins on the compound. Furthermore, households with a family member on a waste-management committee in the EUC prefer to dispose of household waste in public dumps, a situation which can be linked to the level of awareness of proper waste-management practices.

**Table 7.6: Determinants of household choices of solid waste disposal practices**

Household waste disposal	Burning pit on compound				Public waste dump			
	Coef.	Std. Err.	z	P> z	Coef.	Std. Err.	z	P> z
Occupation	-0.4530	0.3127	-1.4500	0.1470	0.3018	0.2971	1.0200	0.3100
EUC of residence	-0.6339	0.3211	-1.9700**	0.0480	-0.1539	0.3017	-0.5100	0.6100
Sex	0.5573	0.3966	1.4100	0.1600	0.0185	0.3105	0.0600	0.9520
Waste-management committee membership	1.1218	0.7356	1.5300	0.1270	2.0666	0.5366	3.8500***	0.0000
Land size	-0.0034	0.0038	-0.8900	0.3720	0.0012	0.0032	0.3800	0.7030
Household size	-12.2387	696.1049	-0.0200	0.9860	1.7024	1.0449	1.6300*	0.1000
Age	-0.0122	0.0103	-1.1900	0.2350	-0.0061	0.0091	-0.6800	0.4980
Education	-0.3078	0.1964	-1.5700	0.1170	-0.0855	0.1589	-0.5400	0.5910
_cons	11.7048	696.1053	0.0200	0.9870	-3.0224	1.2613	-2.4000	0.0170
Garbage bin on compound   (base outcome)								
Multinomial logistic regression								
Number of obs	=		452					
LR chi2(16)	=		32.75					
Prob > chi2	=		0.008					
Pseudo R2	=		0.0451					
Log likelihood	=		-346.2728					

\*, \*\* and \*\*\* significant at 10, 5 and 1 % probability levels respectively.

### 7.6.5 Waste collection fees

In Ilula EUC, street-cleaners stated that the minimum amount paid by households for a waste collection service is TZS 500, while restaurants pay TZS 1000 and hotels pay between 5000 and TZS 6000 a week. Waste-collection fees are paid on the spot. However, the amount paid for waste collection is negotiable, depending on the amount of waste generated. One respondent stated during an in-depth interview that:

*“The amount I pay for waste collection is negotiable. Usually, I pay 5 000 TZS per trip or per week”* (In-depth household interview, Ilula, May 29, 2017).

In Ilula's TASAF tomato market, the casual waste collectors are paid 5000 TZS per trip. The truck is hired at a cost of TZS 35 000 per trip. In Madizini EUC, the amount paid for waste collection also depends on the amount of waste collected. For example, waste that fills a large sack is charged at TZS 10 000 and for a small sack 5000 TZS. Households with low amounts of waste usually pay between TZS 2000 and 3000 a month. The fee is usually paid on the spot or is weekly based on individual negotiation and trust (long service provision). One respondent stated during an in-depth interview that:

*“I pay the informal waste collector depending on the amount of waste. On average I pay between TZS 200 and TZS 1000. I do the payment for waste collection on the spot or sometimes I negotiate depending on the degree of understanding (long partnership)”* (In-depth household interview, Madizini, May 7, 2017).

Due to the lack of any EUC-wide arrangement for waste collection, households and businesses in EUCs might pay high fees for waste collection, since under the organized system of waste collection, households and businesses pay a fixed amount per month. The only differences would have been that, the amount paid by businesses may differ from that paid by households.

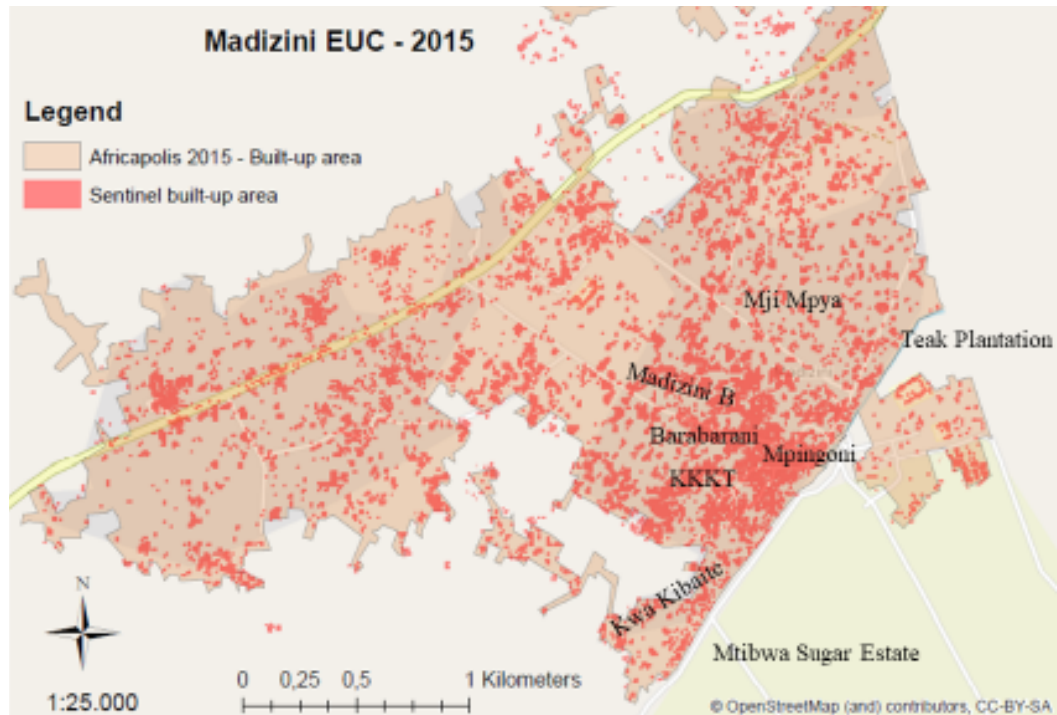
#### **7.6.6 Solid waste management challenges for EUCs**

The current governance structures for solid waste management in the two EUCs are not effective given the many technical and governance challenges. As documented in other urban centres (though larger ones) in Tanzania, waste-collection capacities differ among urban centres due to various factors, including the availability of waste-collection facilities, having the manpower to coordinate waste-management systems and involvement by community and private actors (Yhdego and Kingu, 2016).

From key informant interviews, in-depth interviews with households, transect walks and observations, different factors emerged that were observed to have an influence on current solid waste-management practices in both EUCs. In both sites, local government authorities are lagging behind in the financial allocation and planning of waste management, a situation which is mostly linked with the stage in the administrative transition from rural village to urban township in both EUCs, but more so in Madizini than in Ilula.

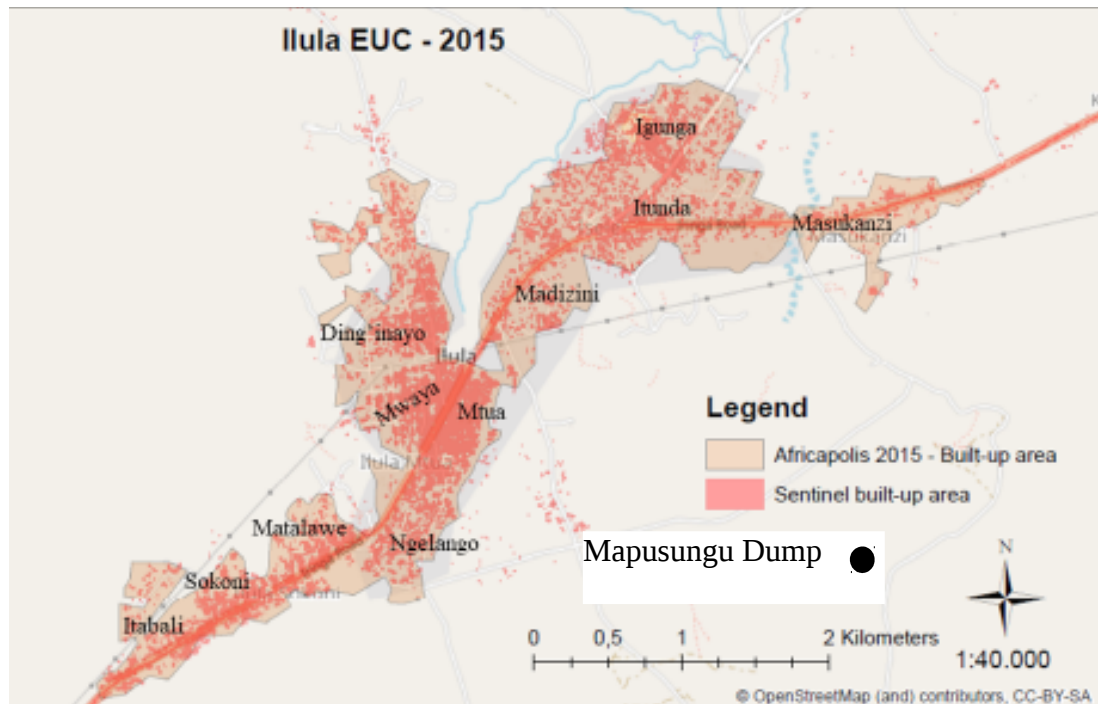
The stage that each EUC had reached in the township administrative transition process has an influence on its waste-management practices through financial constraints and the lack of facilities for waste collection, transportation and disposal. For example, in Madizini EUC, a key challenge has been the lack of funding in securing land for a waste-disposal site. There is a feeling among local leaders that, if Madizini EUC was part of a fully-fledged township with a township authority in place, the revenue it collected would have been retained by the township, making it possible for the township council to allocate funds for the felt needs of EUC residents, including securing land for the dumping of waste. In Ilula EUC, due to the lack of funds, the township authority has failed to purchase a truck to transport waste from waste collection points to the official public dump. The lack of financial return in respect of waste-management and waste-collection fees paid to informal waste collectors poses challenges for the financial sustainability of waste management in both EUCs. Yhdego and Kingu (2016) argued that, most urban centres do not earn anything from solid waste management services and consequently leading to inefficiency of collection and transportation of solid waste.

There is the influence of planned and unplanned settlements (Chapter 4, section 4.8) on solid waste management to consider. Yhdego and Kingu (2016) argued that, in Tanzania, almost all urban centres have unsupportive urban planning for improving solid waste management. Unplanned settlements are difficult to access, while in the planned areas with large plot sizes they are both accessible and make it possible to dig garbage pits on their compounds. Results from this study concur with Kassim and Ali (2006) on the extent to which planned areas receive better waste-management and waste-collection services than unplanned settlements. For example, in Mji Mpya sub-village and some parts of Madizini B within Madizini EUC (Figure 7.5), the streets are planned with new settlements on larger plots and therefore having more space in which to dig garbage pits in the compound. Furthermore, it was observed during transect walks that streets and the areas around house in Madizini B and Mji Mpya sub-villages are free from solid waste to a great extent. In the southern part of Madizini village this includes Barabarani (business centre), Mpingoni, Kwa Kibaite and KKKT, where there are high housing densities, unplanned settlements and small plot sizes, and therefore no space to dig garbage pits in the compound.



**Figure 7.5: Madizini EUC settlement patterns based on 2015 Africapolis (Africapolis, 2018) and Sentinel (2016) built-up area data**

In Ilula EUC (Figure 7.6), in some parts of Mwaya (in the western part of Mwaya), streets have been planned and plots sizes are larger, therefore households can dig garbage pits in their compounds. In Itabali, Matalawe, Ding'inayo, Madizini and Masukanzi streets there are crop fields and larger compound sizes. However, in Ilula Sokoni, Ngelango, Mtua, some parts of Mwaya, Itunda and Igunga streets are not planned, there is a high settlement density and small plot sizes, yet also a high concentration of economic activities. The nature of settlement patterns therefore requires planned settlement as an essential strategy for setting up an integrated system of solid waste management (settlement accessibility).



**Figure 7.6: Ilula EUC settlement patterns based on 2015 Africapolis (Africapolis, 2018) and Sentinel (2016) built-up area data**

Moreover, land availability challenges in both EUCs have an influence on waste management. Land shortages have forced local government authorities in both EUCs to look for land for waste disposal in distant places, further increasing the costs of waste management. Waste generation and collection practices are also influenced by seasonality. In the dry season, for example, the rate of waste generation (mostly crop residues) is high, but it can easily be collected since the roads are passable, and it is easy to collect waste by using pushcarts. In the rainy season, conversely, the amount of waste generated is low (crop residues), and the state of the roads is poor, their being muddy making it not easy to push the pushcarts.

Similarly, the extent of solid waste recycling in the two EUCs is still low, except for plastic collection by individual actors. Solid waste recycling and the reuse of organic waste and crop residues, plastics and metals are important in minimizing waste generation in ways that will have positive impacts on humanity (public health) and the environment



(environmental protection). The economic potential of solid waste recycling by informal waste collectors and other actors will reduce the financial impacts of waste collection and disposal for local government authorities, households and businesses alike. The solid waste-recycling potential of tomatoes, sugarcane, maize and paddy residues as composite manure and animal feed is one example. Plastics and metals waste can also be reused or recycled into new valuable forms.

#### **7.6.7 Recent-past development in solid waste management within EUCs**

Within the last decade (2007 to 2017), authorities within the two EUCs have made many different efforts to address the increase in waste-management challenges. In Ilula EUC, on 12 November 2012, the street-cleaners signed a contract with Kilolo District Council to collect waste in Ilula EUC. Piloting this organized system of waste collection started after Mwaya village set aside thirteen acres at Mapusungu for a public dump (Figure 7.6). Thereafter, the Ward Health Officer, in collaboration with village governments, made efforts to implement an effective waste-collection system, including demarcation of the public dump, road clearance to make the dump accessible and raising community awareness of the piloting of an organized waste-collection system in Mwaya and Mtua villages.

Street-cleaners mostly collected waste from households and business places along the main road in Mwaya and Mtua villages. Both villages were covered by a waste-collection service due to their earlier engagement with informal waste collectors and positive community responses during the piloting of the organized waste-collection system. Other reasons were the high rate of waste generation in the two villages due to the high level of business concentration and services like hotels, restaurants, street food-vendors, bars and rest houses. Waste was collected in these two villages once a week. At the village level,

there were specific committees responsible for collecting waste and collection fees and organizing car hire to transport waste from the refuse bases to public dumps in collaboration with the street-cleaners. During key informant interviews with township officials it emerged that the waste-collection fees differed from one waste generator to another. For example, households paid a flat rate of TZS 1000, hotels between TZS 10 000 to TZS 15 000 and restaurants TZS 5000 to 7000 a month.

In 2015, the organized system of waste collection failed due to problems in collecting the waste collection fees. Lack of government support in providing funds for equipment to collect waste from refuse bases to dumps, together with problems with road maintenance, dump clearance, sand refilling and digging holes to dispose of liquid wastes were also mentioned as contributing to the failure of the system. Consequently, village governments took over the responsibility for waste collection and disposal, but they too failed to organize a proper waste-collection system due to insufficient payments of waste-collection fees and the lack of facilities with which to transport waste to a public dump.

In 2016, four street-cleaners were contracted by the district council under three-month contracts to clean the main road and public open spaces. The spatial coverage of waste collection by the street-cleaners was still restricted to Mtua and Mwaya sub-villages for the same reasons as those mentioned above. Currently, apart from cleaning the main road and public places, the street cleaners are also collecting waste from households (few), restaurants, hotels, shops, kiosks and government offices (sub-village offices).

Other waste-management efforts in Ilula EUC include raising public awareness through education regarding waste management, which is provided continuously through sub-villages (all 16 sub-villages on a quarterly basis). During Ward Development Committee

(WDC) meetings, residents are made aware of waste-management practices such as placing waste bins in business areas and transporting waste to dumps, general sanitation, the risk of diseases breaking out, and inspections of business and service areas like restaurants. Funding proposals to address waste management challenges within the EUC have been sent to the district council. There is also a plan to construct a sewerage disposal dam in Ikuvala, outside Ilula EUC.

In Madizini EUC, attempts to establish an integrated system for waste collection and disposal have also been unsuccessful due to the lack of any site designated for waste disposal. Other reason reported by key informants was the low level of community response regarding proper waste management practices. Due to the lack of any organized system for waste management, waste collection is primarily a private responsibility involving informal agreements with informal waste collectors, particularly business-people and households. Public education for waste management is provided by the Ward Health Officer in collaboration with village and sub-village leaders. Notwithstanding regular public education in waste-management provision, the rate of community response is still low. Therefore, continuous public awareness about keeping the urban environment clean, along with adherence to waste-management laws to resolve waste-governance challenges within the township, remain critical.

Furthermore, the village and district government authorities are still struggling to obtain funds to purchase land outside Madizini EUC for a waste disposal site and facilities for waste collection. In key informant interviews with Mvomero District officials it emerged that budget proposals have been drawn up for the 2018/2019 financial year to construct a waste disposal dump for Madizini EUC. Moreover, the Mtibwa Sugar Estate (MSE) has made significant efforts to curb illegal disposal of waste by Madizini residents in the MSE

compound. These efforts include digging a large dump and collecting waste from households which are administratively under Madizini village and were covered by the household survey but are located within the MSE compound. The MSE is willing to dig a waste-disposal site for Madizini village, which is only asked to contribute by supplying diesel for the digging machines. MSE is also temporarily willing to allow Madizini village to dispose of its waste in the MSE dump provided that the village makes such a request and acquires its own waste-collection facilities.

Generally, despite numerous efforts made by different actors to address the increasing solid waste management challenges in the two EUCs, both still lack a township or EUC-wide integrated system of solid waste collection, transportation and disposal. The lack of an integrated solid waste management system in either EUC is mostly challenged by existing structures (linked with the stage of administrative transition), settlement densification and land availability (local geography). As argued by Wilson *et al.* (2013), to address waste-management challenges, the governance aspects (institutions capable of delivering public tasks and proactive policies) should be given critical consideration. Furthermore, strong and transparent institutions are essential for the effective governance of solid waste management (Wilson *et al.*, 2013). Therefore, local government authorities within EUCs should strengthen the capacities of waste management institutions through the deployment of human resources, financial allocations, the provision of waste collection facilities and dedicated sites for public waste disposal at convenient distances.

## **7.7 Conclusions and Recommendations**

Given the rapid growth of the two EUCs in terms of both population and business activities, waste generation is expected to increase, necessitating waste minimization, waste collection in different neighbourhoods and efficient waste disposal practices, as

proposed by the ISWM framework. Despite still facing challenges, Ilula, with its more advanced transition process, is some steps ahead of Madizini in handling waste issues, a situation which can be partly or mostly linked to its more developed administrative structures. In both EUCs, however, waste collection is insufficient since informal waste collectors cover only a few parts of both EUCs, mostly the business areas. Solid waste is not properly disposed of, since households in both sites choose different practices to manage both household and productive waste from business. The most common practice is open burning in either one's own compound or at official waste-disposal sites. Considerable accumulations of garbage, heavy street litter and stinking gutters can be observed in different streets in both EUCs. The extent of solid waste recycling in both EUCs has still not been properly initiated except by a few individual actors who mostly sell plastic bottles and metal scrappers outside the EUCs.

Given the observable environmental, economic and health risks associated with the current solid waste-disposal practices in both EUCs, the study recommends that actors responsible for solid waste management (township and ward health committees) should consider establishing an integrated approach as suggested in ISWM framework for effective and sustainable solid waste management. Any such approach should consider all important aspects, administrative (specified actors' roles), financial (budgetary consideration), legal (by-laws enactment and enforcement) and planning (settlement accessibility and dedicated public waste dump). Public and private actors should continue to provide public education about proper solid waste management practices and behavioural changes by households, businesses and institutions.

Waste-management institutions within EUCs such as township and wards health committees should be endowed with the required human resources, facilities and financial allocations for them to be able to provide waste services within their jurisdictions. Public waste dumps should be secured, waste collection should be organized in all neighbourhoods in both EUCs, and proper solid waste disposal practices should be promoted based on solid waste composition. The government, the private sector, the community and informal waste collectors should promote waste prevention, recycling and reuse (creating waste value through recovery) based on solid waste composition to protect the environment, promote public health and harness economic potential through waste recycling. The chapter also recommends further studies on economic and efficient solid waste disposal practices taking local conditions into account.

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## CHAPTER EIGHT

### GENERAL CONCLUSIONS AND RECOMMENDATIONS

#### 8.1 General Conclusions for Different Thematic Areas

##### 8.1.1 Administrative transition from rural (village) into urban (township) and changes in governance structures and practices

Despite the rapid growth of EUCs, it is generally accepted in the existing literature that there is scant knowledge about EUCs development dynamics. Accordingly, this study has aimed to explore how challenges related to the governance of land, domestic water and solid waste management issues are handled within both formal governance systems and more informal governance practices in support of rural-urban transformations within Ilula and Madizini emerging urban centres in Tanzania. The overarching research question for this study was: how have governance structures and practices relating to access to resource and services changed in support of processes of rural-urban transformation within Ilula and Madizini EUCs?

The broad objective of this study was to identify how governance structures and practices (public and private) in relation to land, domestic water and solid waste management have developed in support of rural-urban administrative transformations. Specifically, the study analyses the dynamics taking place within the two EUCs with a specific focus on the densification and spatial expansion of EUCs, governance structures and practices for resource and service access at the district, townships and village levels, the level of resource availability and the monitoring of recent past developments in resource governance and service provision.

As part of processes of rural-urban transformation, many rural villages in Tanzania are transforming into urban townships driven by multiple factors. The transformation process is guided by the administrative system, policies and regulations. However, the administrative system and regulations supporting the transformation process are inadequate, since they do not specifically focus on the different stages of the transformation process in terms of clear guidance regarding the planning of service provision and infrastructure development. Consequently, the administrative transition from rural (village) to urban (township) is a long process, is not linear and has no defined timeframe due to the social, political and structural changes that drive rural-urban transformation.

### **8.1.2 The impacts of the ‘village to township’ transition on resource (land) and service (domestic water and solid waste) governance structures and practices**

Both EUCs (study sites) are yet to achieve full township status, despite more than ten years having passed since the announcement of township status in Government Gazette. By not having autonomous township authorities, during the transition, the EUCs governance structures and practices on land, domestic water and solid waste are guided by by-laws, rules and regulations enacted by respective district councils.

However, in practice, the enforcement of the by-laws, formal rules and regulations is limited by insufficient human resources (for example, district land officers), local realities (resources characteristics) and flexibility in enforcing various by-laws. In some cases, the level of administrative transition partly influences the development of the EUC, as well as land-use dynamics and levels of services. However, the longer the transition period, the

greater the uncertainties in planning service provision because of limited dedicated efforts by local government authorities.

As described in chapters four to seven, empirical analysis indicated that, changes in administrative status, coupled with rapid population growth, the concentration of economic activities, housing densification and spatial expansion within Ilula and Madizini EUCs, have led to changes in resource and service governance structures and access practices.

In Tanzania, government decision-making related to land, domestic water and solid waste are made at different administration levels: national, district and township/village. However, coordination (vertical and horizontal) in planning is lacking between the different decision-making institutions for example between township or village authorities and district councils and between district councils and ministries. Furthermore, the different levels of administrative transition between the two sites has impacted on access to resources and planning for service provision given their influence on the decision-making autonomy of local government authorities within townships. For example, there is evidence that, the establishment of a Township Authority in the case of Ilula has had direct implications for the management of land (regular extension service related to land), domestic water (establishment of a clean and safe water distribution system and rehabilitation of water sources) and solid waste (designated site for waste disposal). Plans are also underway to secure a sewer water disposal site.

In the process of facilitating rural-urban transformations, formal and informal governance structures within the announced townships have changed in two ways. First, new governance institutions are established in line with township administrative status, such as the Township Authority (TA) and appointment of Township Executive Officers (TEOs)

instead of village councils and Ward Executive Officers (WEOs) in the case of Ilula township. Secondly, existing institutions related to land, water and waste governance structures are reformed to correspond to the actual township administrative status, the actors involved and increased demand for resources from the rapidly growing population. These include, for example, the establishment of water utility authorities in both sites to replace the village water committees.

Furthermore, governance practices related to land, domestic water and solid waste have changed during the process of rural-urban transformation. These include, for example, the presence of land-brokers, the formalization of housing and land, collective labour groups like informal waste collectors, domestic water access rationing schedules, access fees and queuing arrangements. However, due to the specific characteristics of the two study sites, changes in governance practices have developed in different ways.

### **8.1.3 Land use changes in the last decade (2007 to 2017)**

Land-use changes in the form of housing densification, spatial expansion and the reallocation of land-use categories from farming to residential areas without regulated planning have created challenges for service provision mostly where there is limited public land such as land for construction of schools, hospitals, market places and administrative buildings. Consequently, in both EUCs there are remnants of village planning mixed with new urban planning. Urban planning considers service provision like access roads, placement of domestic water distribution pipes and electricity supply among others while under rural planning in some cases there is limited consideration for service provisions.

#### **8.1.4 Level of resources and service availability within EUCs as a result of rural-urban transformations**

The state of the availability of resources (land) and services (domestic water supply and solid waste collection) differs both within and between the two EUCs due their differences in geographical location, rates of population growth and levels of administrative transition. In the land governance domain, household socio-economic characteristics are important in determining the likelihood of households accessing land within EUCs. In both sites, there is no vacant general or public land that can be allocated to people in need of plots, for example, plots for new immigrants to settle in or plots for the development of public services. Land is therefore accessed through private landowners, whom the government must compensate either in monetary terms or by providing alternative land if the government wants to undertake urban planning, including planning urban infrastructural development. Land access in the form of uncleared bushes have changed into housing plots while sources of land access have changed from knowing the natives to direct contact with landowners and through land brokers. Similarly, land tenure has change from communal to household and private land. The factors that influenced their changes include increases in population, economic activities and the level of administrative transition.

The situation regarding domestic water access differs significantly both within and between the two EUCs due to local geography, available domestic water sources and providers. The domestic water demand has exceeded the volumetric capacity of the available water sources. Similarly, domestic water infrastructure development and spatial distribution are not keeping pace with the increasing demand for domestic water. A large proportion of domestic water sources are located outside household compounds, which has significant impacts on productive labour time and the costs of accessing water. Changes in



domestic water governance structures and practices as part of the rural-urban transformation, has to some extent led to improvements in domestic water provision through the improved maintenance of water infrastructure and securing new water sources. However, the available domestic water sources within the two EUCs reflect not so much their degree of rural-urban transformation as the local geography.

With rapid population growth and flourishing businesses, solid waste generation has been increasing. However, solid waste management is still a challenge in both sites due to either a lack of designated public dumping sites (Madizini) or waste disposal sites being located far from residential areas (Ilula). In neither EUC is there an integrated system of solid waste collection, transportation and disposal. As a result, waste generators are employing different practices for solid waste disposal, mostly open burning pits and disposal in unofficial sites. The current practices of waste management have negative implications for human health (waste collection), environmental threats (waste disposal) and economic development (businesses closure) that in turn call for the need to create waste value through recycling, reuse and reduction.

#### **8.1.5 Recent past development in resource and service governance within EUCs**

The government, private-sector actors and communities have undertaken different initiatives to address the challenges of and be able to cope with the transition process within the two EUCs. Examples of these initiatives include the issuing of for example 23 residential licenses in unplanned settlements in Madizini EUC by March 2018 and the reduced costs of land surveying and property formalization from TZS 250 000 to TZS 150 000 in April 17, 2019. Other initiatives include secure new domestic water sources and the rehabilitation of water infrastructure (the case of IUWASSA in Ilula), as well as

the enactment of by-laws for solid waste management for example the by-law that requires household in Ilula EUC to have garbage bins in their compounds.

Notwithstanding the fact that EUCs are not easily generalizable, there are many such small economic hubs across different regions of Tanzania that call for attention regarding resource access and planning for service provision and the implementation of an effective local government governance system. However, most local government authorities are lagging behind in planning for the rapid growth they are faced with. Thus, these places (the EUCs) are experiencing governance and planning (land, water and waste) challenges in both old residential areas and in the new settlements into which they are expanding spatially. The main reasons for local government authorities failing to keep up with the rapid growth include, among others, uncoordinated planning, insufficient funds, inadequate changes in the governance system, and the lengthy bureaucratic transition process from village (rural) to township (urban).

Overall, in assessing the development dynamics of EUCs, it is important to focus on their levels of administrative transition since this has impacts on planning for service provision. In addressing the governance challenges resulting from rural-urban transformations, government agencies and other actors within the community and the private sector need to address governance challenges beyond land, laws, regulations and policies to focus more on people and their livelihoods. This includes addressing the challenges related to planning the delivery of basic services like domestic water, as well as solid waste collection and its proper disposal in response to the rapid increases in population.

### **8.1.6 Reflection on the broader perspectives of rural-urban transformations**

A lesson learned from the two EUCs encourages reflection on the global perspective of the dynamics of rural-urban transformation and urbanization of rural areas. Drawing on the existing literature, rural-urban transformations are occurring in many developing countries, Tanzania included (Bryceson, 2011; Christiaensen and Todo, 2014; Christiaensen *et al.*, 2016; Satterthwaite, 2016; Tacoli and Agergaard, 2017; Agergaard *et al.*, 2019; Lazaro *et al.*, 2019). In different contexts, rural-urban transformation is generally a complex process, given both the opportunities and the negative effects associated with the transformation process. Small urban centres play important roles in rural-urban transformation given their development potential for both household economies and rural and national development due to the roles played by EUCs as centres for the provision of goods and services, employment creation, technological innovation, markets for smaller holders' agricultural crops and businesses development (Tacoli, 2003; Roberts, 2016; Tacoli, 2017; Tacoli and Agergaard, 2017).

However, it is worth noting that, the importance of EUCs to rural-urban transformations must be influenced by policies, levels of governance and government institutions (national and district) because EUC development is not a linear and self-sustaining process. Furthermore, EUCs transformations may have negative impacts both socially (no cohesion among people, insecurity of land tenure) and environmentally (inappropriate solid waste disposal practices). To address the negative effects and encourage an inclusive process when it comes to rural-urban transformations, effective governance systems, including policies, institutions and regulations, are important (IFAD, 2016; McGranahan *et al.*, 2016).

Empirical evidences from the two case studies in this study reflect on both the broader perspective on the dynamics of rural-urban transformation and the importance of EUCs to such transformation. The two case studies are at different stages in their administrative transition from rural (village) into urban (township). The drivers of the development of the two EUCs and possibly of other EUCs across the country are multiple and vary considerably given the geographical locations of the EUCs, their dominant agricultural value chains and their levels of service provision. Like findings from other studies (Bryceson, 2011; Christiaensen and Todo, 2014; Christiaensen *et al.*, 2016; Tacoli and Agergaard, 2017), this study's findings have shown the possible important role Tanzanian EUCs are playing in rural-urban transformations. For example, in the two EUCs, the level of social-service provision like schools, hospitals and administrative institutions have been relatively improved, and many people are being attracted to come and settle in the EUCs in search of employment and businesses opportunities, in part due to the availability of social services there.

Furthermore, in both sites there are different agro-processing factories such as a number of paddy mills and the Mtibwa sugar processing factory in Madizini and the Dagaba tomato-processing factory in Ilula, which add value to agricultural crops produced in the EUCs and their rural hinterlands. These agro-processing factories are creating both permanent and temporary employment opportunities for EUC residents and people from distant regions. The sugar factory in Madizini provides different employment opportunities, as does tomato-marketing and cultivation in Ilula. In both sites, agricultural crop markets have been established for the dominant agricultural value chain crops in the respective EUC, such as the weekly (every Wednesday) crop market in Madizini and the TASAF tomato market in Ilula. The findings from this study are supported by other studies (Lazaro *et al.*, 2014; FAO, 2017; Tacoli and Agergaard, 2017). Moreover, from 2011 to 2016 both

sites experienced business activity increasing by 65% and 62% in Ilula and Madizini EUC respectively (Nyaki *et al.*, 2019).

## **8.2 Recommendations and Way Forward**

The EUCs are rapidly growing demographically and economically. However, the governance structures and access practices related to land, domestic water and solid waste are not keeping the pace of the rapid growth. Therefore, this study provides recommendations on areas that call for attention in addressing the governance structures and access practices related challenges for resource access and service provision that are emanating from rural-urban transformations within EUCs, as presented below.

### *i. Administrative transition to township status*

The levels of administrative transition have impacts on township development, the dynamics of land use and the level of social services availability. It is therefore important for the Ministry of the President's Office Regional Administration and Local Government Authorities (PO-RALG) in collaboration with regional and district council authorities to fast-track township formalization processes so as to give the local government authorities within townships autonomy for planning, budgeting and decision-making given the revenue-generating potential and local peculiarities of EUCs. By doing so, local government authorities within township councils will be able to address the needs of their rapidly growing populations in a more timely and effective manner.

### *ii. Planning for service provisions*

Rapid increases in population growth within EUCs add pressures on land access, use and tenure and increase the demand for domestic water and solid waste generation based on how the local government authorities respond to the situation. However, despite the

revenue-generating potentials of EUCs currently, district councils are not allocating enough budget for service provision to the rapidly growing townships in their areas. The reasons for this are that, the revenue collected is spent on the development of the entire district and not specifically on the respective townships or EUCs from which revenues have been collected. This study recommends that a certain percentage of the revenue collected from the EUCs be retained within the respective townships or EUCs for infrastructural development and service provision.

Furthermore, private-sector actors (for example, development partners, land-brokers, water-vendors and informal waste-collectors) have significant roles to play in support of rural-urban transformations by complementing government efforts and roles in facilitating access to resources and services within the rapidly growing urban centres. Therefore, for purposes of resource mobilization, effectiveness and sustainability, planning for service provision should be participatory and involve government, the private sector and non-governmental and community-level actors respectively.

Moreover, in planning for service provision, consideration should be given to the heterogeneous nature of community groups such as farmers, the poor, the marginalized, the young and businesses, as well as to spatial distribution within EUCs to ensure that the rural-urban transformation process is inclusive. Failure to undertake the required planning for service provision within the rapidly growing EUCs will limit their success. If planning for service provision is not undertaken in a timely fashion, EUCs will likely face the planning and service provision challenges that are currently experienced by large urban centres. Informal practices regarding access to resources and services should inform the government's plans, policies and interventions in so far as these are geared towards EUC development.

iii. *Securing fertile agricultural land*

Following population increases and economic growth within EUCs, built-up areas are increasing in the form of housing densification and spatial expansion while fertile agricultural land is decreasing for being converted into built-up area. Given significant conversions of agricultural land into built-up areas, rules, regulations and land-use planning to secure and protect fertile agricultural land should be enacted and enforced, since some households are engaging in agriculture for household consumption and selling.

iv. *Further research*

In addressing the current knowledge gap regarding the development dynamics of EUCs, more exploratory and applied research should be undertaken to explore in depth the different context-based development potential of EUCs and thus assess existing gaps in accessing resources and service provision and the required policy interventions. The most important areas for further research should include but not be limited to; rural-urban internal migration patterns (migrant profiling and rural-urban remittances), EUC development trends (stagnation and growth) and the comparative geographical advantages of EUCs for economic development.

### **8.3 Contributions of this Study**

This study makes three important contributions: the existing literature on urbanization in rural landscapes or the dynamics of rural-urban transformation, the strengthening of governance structures and practices in support of rural-urban transformations and methodological contribution. As presented in chapter 1 (section 1.1.5.2) EUCs development as part of rural-urban transformation process is not unique to our two case studies or Tanzania context alone but it is a process occurring in different regions. Thus,

this study contributes scientifically into the broader literature about rural urbanization by highlighting service provision challenges emanating from rural-urban transformation process. Specifically, this study has provided insights into the development dynamics of EUCs as urban centres in the early stages of urbanization or the urbanization of rural areas. Furthermore, in Tanzania context, the dynamics of rural-urban transformation are based on multiple influencing factors such as agricultural value chains, administrative transitions and economic activities. However, the process of rural-urban transformation is not a linear or self-sustaining process due to the various local peculiarities that can either foster or constrain rural-urban transformations in the respective rural landscape. Therefore, there is a need for context-based development interventions to make rural-urban transformations inclusive, since many settlements in rural areas are rapidly growing, but off the radar of government agencies.

Moreover, most urban centres in rural areas like the two EUCs in this study have urban characteristics in terms of population growth (13% in Ilula EUC and 72% in Madizini EUC), economic activities, densification and spatial expansion, but are still governed by rural administrative structures. Similarly, the formalization of township status is a long process without a definite timeframe and consequently affects expected development and planning for service provision. There is therefore a need for decision and policy-makers to ensure that townships at different stages in their administrative transitions are given due consideration in respect of planning, service provision and infrastructural development to enable them tap into the economic potential associated with rural-urban transformations. Methodologically, combination of GIS, household survey and qualitative data enhanced precision and validity of data through contextual reflection.



#### 8.4 References

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## APPENDICES

### **Appendix 1: Household survey questionnaire for Rural-Urban Transformation project**

This household questionnaire collects information on the daily activities, livelihood practices, employment and mobility of urban households in this township. With your consent this interview will last about 40-45 minutes. The information provided by you shall be confidentially used for research purposes only. You will not be identifiable in any datasets or publications.

Sokoine University of Agriculture (Tanzania), University of Copenhagen (Denmark)

#### FORM A: Household Data

- ➔ In order to define the household, we are using the following criteria: Those who live in the house/compound and eat of the same pot PLUS other dependants of the household living elsewhere
- ➔ If the household consist of a single person, just capture data for the ONE person in BOTH A.1 AND A1.1 and jump to A4



10							

A-1.1: Information on occupational activities of the PRESENT household members, above the age of 16 years.

The purpose of this section on individual level, is to gain a better understanding the households income diversification

HH member ID Must match ID number from A-1	Main activity (occupation) <b>(What do the Head of Household consider to be the main activity for each member?)</b>		Labour position in relation to main activity  ( 1. Self-employed 2. Permanent on contract 3. Casual wage labour 4. Family workers without pay 5. Others, specify_____
	No.	Specification	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

## A-2: For those HH members who are usually absent (code 2 from A1)

HH member ID	Reason for being absent	Current location	How long has the person been staying somewhere else?	How many times did they visit this household in the last 12 months?
	1. Education 2. Employment 3. Business 4. Other, specify____	1. Nearby village 2. Village in same district 3. Village in another district 4. Town/city in same district 5. Town/city in another district 6. Abroad  Specify the name of the place (District, town, village...)	Years and months	

## A-3: Settlement and Mobility of Household

Has the Household relocated to the township from somewhere else?	When did the Household move to the township? <b>(Please capture data for the Head of household)</b> <b>Give year of first arrival in the township</b>	Main purpose of moving to the township for the household <b>(Please indicate if multiple reasons)</b> 1. For taking up occupation 2. To join family 3. For education 4. To seek employment 5. For marriage 6. Others, specify	Prior to this location have the Household lived elsewhere in the township?	If yes, how many places before current location	Please tick off applicable boxes for reasons for shifting to current location (multiple answers are allowed)  1. Access to land 2. Moving into own house 3. Access to services (water, electricity, roads) 4. Cheaper rent 5. Other
<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No		

## A-4: Single person household information (ONLY TO BE ASKED FOR SINGLE PERSON HOUSEHOLDS)

Do you consider yourself member of a household located elsewhere?	If yes, indicate name of village/town	When did you move to the township? <b>Give year of first arrival in the township</b>	Main purpose of moving to the township <b>(Please indicate if multiple reasons)</b>  1. For taking up occupation 2. For education 3. To seek employment 4. Others, specify
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<input type="checkbox"/> Yes			
<input type="checkbox"/> No			

**FORM B: Income generating activities and mobility**

**B-1: Information on agricultural activities of the household**

Is the household engaged in agricultural production for own consumption?	Is the household engaged in agricultural production for selling?
If yes prompt below questions	If yes prompt below questions
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
<input type="checkbox"/> <b>No</b>	<input type="checkbox"/> No

Is the Household involved in the production of the main crop of the area? Igowole – Tea Kibaigwa – Maize Ilula – Tomato Madizini – Sugar cane	Location of agricultural production of main crop	If outside township, indicate distance from township?		Compared to 10 years ago is this activity more or less important in relation to income?  1. More important 2. Same 3. Less important
<input type="checkbox"/> Yes	<input type="checkbox"/> Within township	In walkin g time	In kilometer s	
<input type="checkbox"/> <b>No</b>	<input type="checkbox"/> Outside township <input type="checkbox"/> Both			





	Other agricultural production, incl. gardening (If multiple sites indicate in separate fields) 1. Crops production 2. Livestock 3. Trees 4. Mixture 5. Others specify__	Location of agricultural production		If outside township, indicate distance from township?		Compared to 10 years ago is this activity more or less important in relation to income?  1. More important 2. Same 3. Less important
		1. Within township	2. Outside township	In walking time	In kilometers	
1						
2						
3						
4						
5						

## B-2: Information on business activities of the household



Type of income	Regularity (tick appropriate box)	Income/type Ask according to regularity in relation to income If non-monetary, specify whether consumables or commodities
Income from renting out land	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
Income from renting out housing	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
Pension	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
Government support	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
NGO support	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
Remittances from WITHIN household	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
Remittances from OUTSIDE household	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
Others, specify	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	
	<input type="checkbox"/> Monthly <input type="checkbox"/> Seasonal <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once	

B-4: Composition of household incomes (over the last year). At a household level please rank the top 5 most important income sources and how they have changed over time?

Household earnings from	Ranking Please rank according to the most important, if applicable, 1 for most important, and so forth	Has this ranking of importance of activities changes over the last 10 years? If yes, please explain
Agricultural production		
Livestock		
Self-employed work		
Salaried employment		
Casual wage work		
Rent		
Pension		
Remittances		
Other (specify)		
Total		

### FORM C: Access to Housing and Land

C-1: Status of current housing by the household

Please indicate the tenure status of current housing	Through whom did you get your current housing?	Has this status in housing changed over the last 10 years?	If yes, what was the status of your housing 10 years ago
1. Owned (with registered title) 2. Owned (without registered title) 3. Rented 4. Rent-free use 5. Other (specify ___)	1. Through social relations 2. By housing brokers 3. Constructed the house 4. Inherited from relatives 5. Government (village and/or district government) 6. Others, sepcify	1. Yes 2. No	1. Owned (with registered title) 2. Owned (without registered title) 3. Rented 4. Rent-free use 5. Other (specify ___)

C-2: General information on landholdings by the household WITHIN township (on plot level: specify per plot)

Plot s	Landholding - size  (Does the household have access to land within the township)  1. Yes 2. No	If yes, what is the land used for  1. Housing 2. Business 3. Agricultural production 4. Other	Ownership/ tenure  1. Owned by household 2. Rented 3. Borrowed 4. Community land 5. Owned by cooperative 6. Owned by clan 7. State land 8. Other (specify___)	Through whom did you get access to the land?  1. Through social relations 2. By land brokers 3. Directly from owner 4. Inherited from relatives 5. Government (village and/or district government) 6. Others, sepcify	Location of plots  Specify location (street/sub-village), for each landholding, if applicable

Has the household sold land within the township over the last 10 years?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Has the household bought land within the township over the last 10 years?	<input type="checkbox"/> Yes

township over the last 10 years?	<input type="checkbox"/> <b>No</b>
If you don't own any land inside the township, could you explain why?	

**C-3: Information on landholdings by the household OUTSIDE township**

Plot s	Landholdin g - size (Does the household have access to land outside the township)	If yes, what is the land used for	Ownership/ tenure	Through whom did you get access to the land?	Location of plots
	1. Yes 2. No	1. Housing 2. Business 3. Agricultural production 4. Other	1. Owned by household 2. Rented 3. Borrowed 4. Community land 5. Owned by cooperative 6. Owned by clan 7. State land 8. Other (specify___)	1. Through social relations 2. By land brokers 3. Directly from owner 4. Inherited from relatives 5. Government (village and/or district government) 6. Others, sepcify	1. Rural 2. Urban 3. Both

Has the household sold land outside the township over the last 10 years?	<input type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>No</b>
Has the household bought land outside the township over the last 10 years?	<input type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>No</b>

**FORM D: Access to Services****D-1: How does the Household access water?**

Access to water	Water source  1. Tap 2. Well 3. Surface water 4. Rainwater 5. Other (specify_ _)	Location of service (tick appropriate box)	If outside compound, please indicate walking distance in minutes	Do you pay for the water	Provision of water source 1. Government 2. Private 3. Community 4. Others, specify	How has the access to water changed compared to 10 years ago?  1. Better 2. Same 3. Worse	Are any members of the household involved in a community group in relation to the provided service, if yes, please write name of group
Access to drinking water		<input type="checkbox"/> Inside compound <input type="checkbox"/> Outside compound		<input type="checkbox"/> Yes <input type="checkbox"/> No			
Access other types of water		<input type="checkbox"/> Inside compound <input type="checkbox"/> Outside compound		<input type="checkbox"/> Yes <input type="checkbox"/> No			

**D-2: How does the Household access electricity?**

Does the household have access to electricity? (tick appropriate box)	Provider of service 1. Generator 2. Solar 3. General grid connection 4. Other (specify_ _)	How has the access to electricity changed compared to 10 years ago?  1. Better 2. Same 3. Worse
<input type="checkbox"/> Yes <input type="checkbox"/> No		

**D-3: How does the Household dispose of waste?**

Handling of waste	Disposal of waste	Are any members of the household involved in any initiatives in relation to waste management? If yes, please write name of group/initiative



	1. Garbage bin on compound 2. Burning pit on compound 3. Public waste dump 4. Others, specify ____	
Household waste		
Productive waste (from business/		

D-4: How does the Household have access to mobile phone and internet?

How many members own the following?	If no members own a phone, how does the household get access to phone services?	Do any members in the household use the internet?	If yes, how
Mobile phone _____  Smart phone _____		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Smart phone <input type="checkbox"/> Tablet <input type="checkbox"/> Computer in house <input type="checkbox"/> Computer outside house

**FORM E: Household Expenditure**

## E-1: Information on economic expenditure for farming

<b>Does the household spend money on farming activities?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	<b>Productive expenditures (Tick appropriate boxes)</b> <input type="checkbox"/> Hired labour <input type="checkbox"/> Hired equipment <input type="checkbox"/> Farming inputs (seeds, fertilizer, irrigation etc.) <input type="checkbox"/> Land rent <input type="checkbox"/> Membership fees cooperative <input type="checkbox"/> Other (specify) _____
--	--

## E-2: Information on economic expenditure for business activities

<b>Does the household spend money on business activities?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	<b>Productive expenditures (Tick appropriate boxes)</b> <input type="checkbox"/> Hired equipment <input type="checkbox"/> Farming inputs (seeds, fertilizer, irrigation etc.) <input type="checkbox"/> Rent of business space <input type="checkbox"/> Stock <input type="checkbox"/> Membership fees cooperative <input type="checkbox"/> Other (specify) _____
---	--

## E-3: Information on consumables at the household level

<b>Consumer expenditure</b>	<b>Indicate share of income spent on:</b>
Housing (Rent and Utilities (water, energy...))	
Food and drinks	
Schooling	
Medical	
Transport	
Social: celebrations, weddings, funerals, etc.	
Consumer goods (mobile phones, clothes etc.)	
Other (specify):	

E-4: Locality of purchase of household goods

Does the household buy any goods for the household outside the township?	If yes, what	And where do you buy it?	How often do you travel for buying goods?
<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once
			<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once
			<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once
			<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once
			<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once
			<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once
			<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Others, but regular <input type="checkbox"/> Irregular <input type="checkbox"/> Once

E-5: Information on money and goods sent by the household during the past 5 years

Do the household support people outside the township? If yes, whom	Do you support with money? If yes, what is the primary purpose of the support?	Do you support with Goods? (specify)	How often
1. Member s of the household 2. To people outside the household	1. Education 2. Health 3. Wedding/Funerals 4. Farming 5. Others		1. Sometimes 2. Once a year 3. Regularly/When needed?

E-6: Usage to savings and credit institutions (incl. Government and NGO/CBO)

Does the household or any member of the household member use saving or credit institutions?	If yes, which ones? Name	If yes, purpose of saving/credit
<input type="checkbox"/> Yes <input type="checkbox"/> No		

E-7: Usage of banking services

Does the household use banking services?	If yes, which	If yes, purpose of saving/credit
<input type="checkbox"/> Yes <input type="checkbox"/> No		

E-8: Usage of saving and credit from other sources

Does the household access credit from elsewhere? (Family, friends, money lenders, informal credit groups, etc.)	If yes, which	If yes, purpose of saving/credit
<input type="checkbox"/> Yes  <input type="checkbox"/> No		

## E-9: Mobile money

Does the household use mobile phone for banking or saving (mobile money)?	If yes, is it spent on any the any of the following services? (Tick appropriate boxes)
<input type="checkbox"/> Yes  <input type="checkbox"/> No	<input type="checkbox"/> <b>Land renting</b>  <input type="checkbox"/> House rent  <input type="checkbox"/> <b>Water services</b>  <input type="checkbox"/> Electricity services  <input type="checkbox"/> <b>Waste Services</b>  <input type="checkbox"/> Others, specify _____

Does the household use mobile phone for business?	If yes, specify
<input type="checkbox"/> Yes  <input type="checkbox"/> No	

**FORM F: assets and services at the household level**

(Collection is based upon observation of enumerators)

## F-1: Housing

Construction materials			Kitchen	<b>Sanitation</b>
<b>Floor</b>	<b>External Walls</b>	<b>Roofing</b>		
1. Cement	1. Concrete blocks	1. Tiles	1. Separate kitchen in house 2. Kitchen is part of other room 3. Outside the house 4. Other (specify___)	1. No toilet or latrine 2. Flush toilet to a septic tank or sewer 3. Private latrine with a slab or platform made from cement or wood, with a squatting hole or seat 4. Private latrine without a slab or platform, just a mud floor with a hole in the ground 5. Public/shared latrine 6. Other (specify___)
2. Tile	2. Burnt bricks	2. Corrugated iron sheets		
3. Mud	3. Mud bricks	3. Tins or metals other than corrugated iron sheets		
4. Bare earth	4. Wood	4. Thatch		
5. Other (specify___)	5. Pole/bamboo	5. Wooden tiles		
	6. Mud	6. Other (specify___)		
	7. Other (specify___)			

## F-2: Available assets

Commodities		Transportation	
Item	No. owned	Item	No. owned
Radio		Motorcycle	
Television		Car	
Solar panel		Bicycle	
Generator		Donkeys	
Fridge		Ox cart	
Stove		Other	
Others			

Thank you very much for participating in this interview. Would you be willing to receive us again for a follow-up interview?	Yes	No
If yes, could we please have your telephone number		

Note to enumerator, remember to indicate finish time of interview on front page.

## Appendix 2: Guide to sampling strategy/procedure for household survey

### Overall sampling strategy

The questionnaire survey is conducted in the four study sites (EUCs: Igowole, Ilula, Kibaigwa, Madizini). Since the four EUCs vary in size (number of households) it has been decided to do proportional sampling according to the number of households reported in the national census (2012 or 2002). Due to changes in the enumeration areas, streets/sub-villages and wards, an estimated household number (in 2012/2002) for the EUC has been used to represent the 'urban' part of the 'townships' (existing/announced). Using the 2002 census the following number of households has been estimated based on population figures and average household size for each of the reported areas (units available):

1. Teams	2. EUC (2002)	3. Total population	4. Number of households	5. Proportion by pair of sites (for total sample)		6. Number of Households per site in pairs (based on total)		7. Number of enumerators	
Team 1	Igowole	6249	992	19%	(10%)	68	(72)	6	7
	Ilula	20446	4238	81%	(45%)	292	(324)		
Team 2	Kibaigwa	8449	2330	55%	(25%)	199	(180)	6	5
	Madizini	7811	1895	45%	(20%)	161	(144)		

The proportion of households in percent (column 5 in above table) is calculated based on the 2002 number of households for the Igowole-Ilula and Kibaigwa-Madizini EUCs, and for all EUCs (total HHs; in red). The capacity of the survey teams (numbers of questionnaires) has been calculated based on an estimated capability of each team - number of enumerators per team (6); number of questionnaires per day (5); number of days in each EUC (6); number of sites (2) – and comes to 360 questionnaires for two sites combined ( 'black' numbers in column 6). This is based on the proportion between sites in pairs (for the two teams). The proportion could also be calculated based on all four sites (indicated in 'red' in column 5 and 6). Using the proportional distribution of



questionnaires calculated for the total sample (using the 2002 numbers) enumerators should be distribute as indicated in red figures in column 7.

### **Sampling points**

The number of questionnaires for each site is calculated in the paragraph above. In order to get a representative geographical distribution of the households (HHs) within the EUC the sampling of HHs is done at 'sampling points. These are distributed based on satellite images of the area defined as the 'EUC' (the 'urban/urbanized' areas of the townships -identified based on visual interpretation of the images and general knowledge of each sites).

### **Distribution of points**

Points are distributed based on visual assessment of density of houses on image and distributed proportionately (between high and low density of houses). At each point 10 HHs are sampled using the principal of selecting every second house. It is suggested that enumerators work in teams of 2-3, and start sampling in separate direction from the sample point. The teams of enumerators should start in opposite direction/ends of the EUC in order to prevent potential overlap between sampling points.

### **Household sampling**

Definition of 'household': Those who live in the house/compound and eat of the same pot PLUS other dependants of the household living elsewhere. In the case where a household have tenants, the number of tenants is recorded. If the household have one tenant, a questionnaire is conducted with the tenant-household (this also includes single 'person households') – if more than one tenant, select one randomly among the tenants.

### Appendix 3: In-depth households interviews guide

1. Household unique ID (from Baseline survey) .....

Township.....

Sub village.....Interview date.....

Interviewer .....

2. Household categorization or classification

#### A. Land access

1. What factors enabled your household to access land within township? (tick appropriate)
2. What are practices for land access at household level?
3. How land is governed at household level?

#### B. Households sold land within EUC

4. How many acres of land did you sold in the last 10 years? .....
5. Who did you sell the land to?
6. What was the purpose of selling?
7. Who was involved in the land transfer or selling process?
8. What was the use of the land sold?
9. (a) Do you know the current use of the land you sold in the past 10 years?  
(b) If yes what are the current use of the sold land?

#### C. Households bought land within township

10. How many acres of land did you bought in the past 10 years? .....
11. Who was involved in the land transfer or buying process?
12. What are uses of the land bought?

**D. LAND TENURE: Households owning land (farms) without formal title deeds**

13. (a) What are the reasons for not processing formal title deeds for your land (or farm)?  
(tick all appropriate)
- (b) Do you think there any threats of owning the land without formal title deed?  
If yes, mention the threats
14. How do households participate in land governance at township/village level?
15. What are implications of inclusions of farmland into township uses? (housing and industrial development)

**E. Households water access practices (urbanization and access to water service)**

16. (a) When was water connected in your household (in-house/yard)? Year .....
- (b) Is there water metric measure in your connection (water source)?
17. Is the current water price per month affordable?
18. When was a public standpipe connected in your area (Year).....?
19. What factors influenced you to access water from the source (s)? (tick appropriate)
20. How much does it cost you to fetch water per week?
21. Do you afford to pay for the water charges?
22. What are water storage facilities in your house?
23. What are the alternatives sources of accessing water when water runs out before next rotation?
24. What are attributing factors for your response regarding status of drinking water access in the last 10 years? (better, same or worse)
25. How do you dispose sewer water?
26. Does the current water fetching point distance or time spend in collecting water affects your production (farming, business, civic or private employment) schedule?

27. How do you perceive the state of water quality from the sources you are collecting water from?

**F. Households waste disposal practices**

28. Who collect waste from household premises or business?

29. How regularly are wastes collected?

30. How much is paid for waste collection service by the household? Amount per day, week/month (TZS).....

31. What factors influencing your current practices for household waste disposal?

32. What factors are influencing your current practices for productive waste from business disposal?

33. Do you do waste sorting before disposal?

#### Appendix 4: Thematic areas for key informants' interviews

S/ N	THEMATI C AREA	Key informant categories	Themes discussed
1	LAND	TEO (Ilula), WEO Villages chairpersons and VEOs	<ul style="list-style-type: none"> <li>Decision making related to Land: Land access/allocation, uses, Land conflicts (among villagers, immigrants and investors), urban planning and participants in land governance institutions at ward and village level</li> <li>Land governance challenges related to urbanization.</li> </ul>
		Ward land council Secretary	<ul style="list-style-type: none"> <li>The role they play in land governance in particular land conflict resolutions including: practices for conflicts resolution, the magnitude of land conflicts along township development.</li> </ul>
		Agricultural Extension Officer	<ul style="list-style-type: none"> <li>Impacts of urbanization on agricultural production including: Production level and access to agricultural land.</li> </ul>
2	DOMESTI C WATER	IUWASSA and TURUWASS A	<ul style="list-style-type: none"> <li>History of establishment and operation including spatial areas of jurisdiction</li> <li>Water sources under IUWASSA and TURUWASSA, spatial coverage, access practices, fee, water quality and mechanisms for sustainable water use</li> <li>Actors and institutions collaborating with IUWASSA and TURUWASSA in water service delivery</li> <li>Water provision challenges faced by IUWASSA and TURUWASSA</li> </ul>
		WEOs village chairpersons and VEOs	<ul style="list-style-type: none"> <li>Water access situation (water availability, sources, and access arrangements and spatial coverage) at ward and village level and participants in institutions responsible for water service delivery.</li> </ul>
		Domestic taps and Well Attendants	<ul style="list-style-type: none"> <li>Volumetric capacity of water sources, population, day to day practices, impacts of increased water demand as a result of urbanization on water access practices.</li> <li>Water access challenges</li> </ul>
3	SOLID WASTE	WEOs and Villages chairpersons and VEOs	Solid waste management situation at ward and village level: collection, sorting and disposal, spatial coverage, public education; participants in solid waste management institutions.
		Health Officer	<ul style="list-style-type: none"> <li>Solid waste management practices at ward level: generation, arrangements waste collection and disposal, spatial coverage of waste collection service, dedicated site for waste disposal.</li> <li>EUC population and economic growth and changes in waste governance practices: actors, sewer water system, public</li> </ul>

			education and by-laws enforcement.
		Informal Waste Collectors	<ul style="list-style-type: none"> <li>• Number of informal waste collectors, spatial coverage (number of households and businesses), arrangements for waste collection and disposal and waste disposal challenges along urbanization growth.</li> </ul>
		Mtibwa Sugar Estate (MSE) (Madizini)	<ul style="list-style-type: none"> <li>• Waste generation and management practices within MSE compound including the residential camps that are administratively under Madizini village</li> <li>• Plans underway to address illegal waste disposal by informal waste collectors from Madizini village.</li> </ul>

## **Appendix 5: Key informants interview guides for township/district/ward land officers on land governance**

### **1. Land access**

- Changes in sources of land access along township development (change from village status into a township status)
- Township spatial planning as per urban planning acts and land allocation procedures

### **2. Impacts of township development on land access**

- Changes in procedures for land access; easy, costly or complicated procedures for land access by different categories of people including migrants
- Implications for future development of the EUC ('service provisions')?

### **3. What are the determinants factors for the current uses of land within township?**

- Township laws (restriction of agricultural production)
- Population growth (increased demand for housing)
- Change in the value of land (more valuable when constructed/developed)

### **4. Land tenure**

- Changes in land tenure following township spatial expansion and enforcement of land governing legislations
- Security of tenure for different categories of land users such as households, institutions, cooperatives and individuals

Keywords; Registration and land rights transfer including household land under plot-based land use development into urban planning

### **5. The implications of inclusion of farm land into township uses**

- Community response on the inclusion of farm land into urban planning
- Forms of compensation, value determination and time for compensation

6. Influence of changes in the value of land on land governance within township
  - Plots and housing prices and land uses
7. Institutions and actors in land governance within township
  - Changes in actors and institutions (formal and informal, public and private) with influence on land governance within township

Keywords; Roles and position/level (street, ward, township and district), interactions (vertical and horizontal) and influence for township transformation in relation to land governance
8. Land governance challenges within township
  - Coordination, conflict of interests and power plays



**Appendix 6: Key informants interview guides for heads of water related authorities (IUWASSA-Ilula and TURUWASSA-Madizini)**

**1. Water sources**

**Keywords;** History and present status of water access situation within township including current projects/initiatives and water sources within EUCs

**2. Demand for water sources within township/EUC**

- Number of water users (households, commercial, institutions industries)
- Proportional distribution per day for each domestic water users' group
- Forms of access (public standpoints, private connection in yards or private/public wells)
- Institutional capacity to deliver water service including volumetric capacity per day (amount billed and lost), water infrastructure, financial and technical capacities to deliver water service
- Other providers and the extent they met water demand in the township

**3. Determinant factors for spatial water supply**

**Keywords: factors for spatial supply within township, rationing, location of public stands points and in-house connection**

**4. Increase in water demand and changes in water access governance practices**

- Institutions and actors (changes in roles and interactions)
- Providers, access practices and water access status
- Sources rehabilitation, new water project and local initiatives
- By-laws enactment and enforcements

**5. Water access fees/pricing**

- Who determine the amount of water charges? What are the factors considered in determining the amount to be paid? Does the amount paid worth the service provided? Did increased demand for water as a result of township

transformation influence the amount currently paid? How maintenance costs for non-paid water sources secured?

**6. Mechanisms for controlling water use (sustainable water use)**

- Enforcement of sustainable water use among different users including costs for maintenance and supply infrastructures
- Influence on water accessibility

**7. Actors and institutions for water governance within township**

- Formal and informal, public and private actors and institutions including roles, levels and interactions and influence for township transformation
- Changes in actors and institutions along township population increase and economic growth

**8. Water accessibility challenges**

**Keywords:** Seasonality, physical infrastructures, institutional capacity challenges respectively and plans under way to address water governance related challenges

**Appendix 7: Key informants interview guides for informal waste collectors/street cleaners**

1. How many informal waste collectors/street cleaners are collecting waste within the EUCs?
2. What is the spatial coverage in waste collection within EUCs? (number of households and business)
3. What is the system of engagement between informal waste collectors and waste generators (households, business and institutions: any common practices?)
4. Did township population increase and settlement spatial expansion changed the way informal waste generators operate? (If yes how?)
5. What are the main challenges faced by informal waste collectors/street cleaners?

**Appendix 8: Key informants interview guides for public domestic taps attendants, private and clan or community well owners**

**1. Volumetric capacity of water source per day**

- Amount per day
- Number of users served (households, business and institutions)

**2. Day to day practices for water access**

- Queues arrangements (any prioritization?)
- Fee amount per litre and payment procedures

**3. Impacts of increased water demand as a result of EUC demographic and economic growth on day to day practices for water access**

- Water rationing (possibility limited amount to fetch)
- Queue arrangement
- Fee amount
- By-laws

**4. Water access challenges in general**

**Appendix 9: Key informants interview guide (s) for township executive officer (TEO) or ward executive officer (WEO)**

**1. Township establishment**

- Criteria for establishments (current status/ongoing initiatives)

Keywords: TEO/WEO appointment and accountability (chain of command), township authority establishment and functions

**2. Decisions making regarding resources governance**

- i. TEO/WEO, Ward/Township land council, Health Officer, District Land Officers and Private sector representatives (NGOs, CBOs and FBOs)

**Keywords; Land:** Allocation, conflicts resolution and urban planning, **Water:** Spatial distribution, sources rehabilitation and securing and **Waste:** Waste collection arrangements

- ii. Engagement and coordination with other stakeholders at district and national level

**3. Institutional framework and township transformation**

- Facilitation of township transformation

Keywords: Land council, water committee/association and waste committee (address resources access and governance challenges)

**4. Township development impacts on agricultural production (main crop)**

- Spatial expansion
- The implications of township spatial expansion on agricultural production
- Enforcement of urban laws restricting cultivation of agricultural crops in urban boundaries

## **Appendix 10: Key informants interview guides for township/ward health officers**

### **1. Waste generation and composition**

- i. Main waste generators and composition

### **2. Waste governance practices**

**Keywords:** Arrangements for waste collection

- Collection arrangements, sorting, disposal or recycling within EUC (based on waste composition)
- Spatial coverage of waste collection (time started)
- Dedicated site for waste disposal
- Recycling efforts by individuals or groups
- Payment (amount and means of payment)

### **3. EUC population and economic growth and changes in waste governance practices**

- Bylaws enactment and enforcements (specific bylaws)
- Wide coverage of waste collection services
- Sewer water system/infrastructures in the EUCs (households, commercial, institutions and industrial connected; micro-system or integrated network)
- Public awareness/education and facilities for waste management including effectiveness of waste collection service education
- Participating actors or institutions including their interaction and their impacts on township transformation

**Appendix 11: Key informants interview guides for villages or streets chairperson and VEO's**

**1. How decisions making/governance in your township/village?**

**a. Land**

- iii. Villages chairpersons, VEOs and Land council/committee members

**Keywords:** land access/allocation, uses, Land conflicts (among villagers, immigrants and investors); participants in these institutions

**b. Water**

- iv. TURUWASSA and ILUWASA sub-offices, village chairpersons and VEOs, Public Standpoints/Wells Attendants and Private Wells owners and households.

- **Keywords:** spatial distribution, rationing, access fees and access arrangements on days to day basis; participants in these institutions

**c. Waste**

- v. Villages chairpersons and VEOs, Social and Environmental committee and Informal Waste Collectors

**Keywords:** Waste collection, sorting and disposal, spatial coverage, public education; participants in these institutions

**2. Township development and influence on resources governance**

- Situation before, current and anticipated changes: Land access, uses and tenure, water access governance and waste handling practices
- Institutional framework for resources governance: Operational institutions, required institutions to be established and reforms required

## **Appendix 12: Transect walks and observations plan**

### **1. Purpose**

To orient and familiarize with different neighborhoods/streets within EUCs

### **2. Criteria for selection of transect walk routes/streets**

1. Housing densification and spatial expansion based on satellite images and physical knowledge about the area
2. Sub villages (enumeration areas) that were covered during RUT household baseline survey questionnaire in February, 2016

### **3. Issues to observe and note**

- Housing densification and development (nature of housing and spatial coverage for newly constructed houses) including special patterns, common characteristics and potential differences.
- Service access practices e.g. water stand points and waste handling practices
- Township spatial development including changes in land uses (e.g. conversion of agricultural fields into housing plots and types of crops cultivate i.e. Maize and rice cultivation instead of sugar by the small out growers/smallholder farmers).

4. **Methods:** GPS points recording and description (take important notes e.g. issues of interests and photographs)

5. **Transect walk outputs:** Transect walk observation report from the field notes, GPS points recording and field photographs