

2. Theoretical Perspectives

"It can take a lifetime to learn about one place – how much more difficult to build analyses through a range of different contexts!" (Robinson 2006: 167)



Photo 2.1: Thika Highway between Juja and Thika (Source: Author).

The theoretical foundation of this master thesis is built from multiple perspectives that can enrich the understanding of the various aspects of large transportation infrastructure projects. The following discussion of relevant research literature will illustrate how these perspectives emerge from different research disciplines and theoretical schools. At the same time, it will be shown how they all can be put in direct relation to the topic of this thesis – by considering the interrelation between different perspectives, identifying gaps in the existing research, and developing questions out of this theoretical discussion.

First, research from road infrastructure economics will be introduced, followed by a discussion on the relation between transport mobility and urban form. The research field of peri-urbanization will be presented with regard to issues of land and housing markets. In addition, a critical dialog between research contributions from the Global North and the Global South to the field of urban studies will be developed. The perspective on the role of planning will provide another theoretical input into this thesis. In the last part of this chapter, these multiple perspectives and their interrelations will be summarized.

2.1 Road Infrastructure Economics

The research on road infrastructure with respect to economic studies of the relation between highway construction and urban development is very relevant to this thesis. Mostly based on econometric analyses, researchers in this field have been plagued with the 'chicken-or-egg' question: Does new highway construction trigger new urban development or does new urban development lead to or necessitate new highway construction? This question exemplifies the common issue of figuring out causalities, while the research objects and the relevant parameters are highly difficult to define and assess precisely. Thus Sanchez concludes:

"The literature on the effect of transportation infrastructure on the development of land is large but reaches few definitive conclusions and provides little empirical guidance." (2000: 3)

Some scholars have shown that highway construction decreases travel costs and makes far-out land more accessible, which decreases the price of developing this land, thus resulting in lower densities – the classical framework for an understanding of sprawl (for an overview, see Boarnet 1998; Sanchez 2000). Conversely, researchers point out that there are more variables to this logic than just the provision of roads (such as infrastructure and basic services or land development control through zoning). Furthermore, rather simple mono-centric forms of urban areas used in the applied econometric models do not represent the polycentric forms of many urban agglomerations (Boarnet & Haughwout 2000: 4). These objections are further supported by studies that show how highway construction in metropolitan regions has actually increased the price of land and led to higher densities along transport corridors (Sanchez & Moore 2000: 4; Boarnet & Chalermpong 2001: 576).

It all gets more inconclusive when inter- and intra-regional effects of transportation projects are considered. Scholars found out that urban growth induced by highway construction in one place might have happened anyway – just in another area of the metropolitan region (Sanchez 2000: 19; Boarnet 1998). While all these research contributions aim at figuring out the effect of building roads, the effect of *not* building roads is very much unknown and likely goes beyond the ability of econometric modeling for real-life examples (Sanchez & Moore 2000: 3). This might be even more relevant when different hierarchies of roads are considered and highway construction is not seen in isolation from road networks.

It has to be stressed that the literature on the impact of transportation infrastructure on urban development is very much centered on the United States and thus embedded in a particular context and history of both politics and planning. Nevertheless, the past years have seen some relevant contributions to road infrastructure economics with examples from the Global South, Africa in particular. Often directly interlinked with development agendas and/or programs of multilateral development banks and international agencies, there are two opposing research factions: one that seems to have a pro-growth bias and one that is rather skeptical with respect to the causality or the interrelation between road construction and (urban/rural) socio-economic development.

In what can be described as the predominant or mainstream literature on this topic, the role of road construction is often clearly linked to issues of tapping the underused economic potential of regions (Arnold 2005; Ndulu 2006; Calderon & Serven 2008). Road infrastructure is seen through a macro-economic and macro-regional perspective under the framework of developing functioning transport corridors that

connect African countries and thereby ensuring the cost-effective and safe movement of goods and people (cf. Buys et al. 2006; Nathan Associates 2011; SOFRECO 2012). The 'underdevelopment' of these countries, it is argued (Ndulu 2006: 214), is rooted in dysfunctional, deteriorated, or non-existing basic infrastructures (particularly roads) and related public services (for instance, smooth customs controls at national borders through streamlined trade policies).

Some studies show the positive impacts of investing in infrastructure projects:

"We find robust evidence that infrastructure development – as measured by an increased volume of infrastructure stocks and an improved quality of infrastructure services – has a positive impact on long-run growth and a negative impact on income inequality. The evidence also suggests that these impacts are not different in Sub-Saharan Africa vis-à-vis other regions." (Calderon & Serven 2008: 29)

However, what becomes apparent in these research contributions is this two-step causality model in which investment in infrastructure supports the realization of economic potential of 'sleeping' regions that then triggers social development – a logic that can be found in the well-known cost-benefit analyses of many infrastructure appraisal reports by development banks (as it is apparent also in the African Development Fund's appraisal report for the THIP, ADF 2007; also see ADF 2009, 2010a, b). First come productivity, efficiency, and growth; then, issues of access to basic services, equality, and human development are addressed. While this logic is deeply entrenched in the research literature as well as the development (investment) work of international agencies, one can ask why investment in social development would not be able to help regional economies to evolve to full potential – thus applying the economic-to-social growth argument in reverse. One challenge here can be seen in the missing link and even analytical challenge of connecting macro-economic and supra-regional transport corridor analyses to micro-economic, smaller-scale considerations of social and spatial development (Ayogu 2007: 115-117; Thomas 2009: 4; for Asia, see for instance Banerjee et al. 2012).

This aspect is taken up by the skeptical research faction. Concerning methodological issues, Button emphasizes the challenge of necessary data for working with causality models which "is an imprecise art at the best of times, and when there are significant lags involved it moves into the abstract school" (2002: 2-3). Furthermore, the seemingly clear findings by the 'pro-growth' research faction appear much patchier if the existing studies are analyzed in-depth. Ayogu in his literature review thus concludes:

"A review of this empirical research reveals that the productivity effects of public capital vary from negative to positive and from small to large, with causality working in either direction." (2007: 82)

Connecting this back to the above paragraph, it becomes clear that causalities are not clear and that other aspects have to be taken into account when the impacts of large transportation infrastructure projects are to be analyzed. Here, the findings on inter- and intra-regional interdependencies with regard to growth come into play, where some regions experience increased development following heavy infrastructure investments, while regional systems overall lose their stability in terms

of a spatially balanced economic and social development (i.e. transport corridor development bias; Salmon 2011: 16-23).

Eventually, every large transportation infrastructure project – even if it is meant to foster inter-regional trade connectivity – needs to be grounded in a smaller-scale setting (communities), which raises questions of integrating these projects into other policy programs. One prime example for this aspect is the Maputo Development Corridor (MDC) – a transport corridor between Mozambique and South Africa that has been developed since the mid-1990s to facilitate and revive inter-regional trade (i.e. the flow of goods and people) with an intended trickle-down effect on regional development (Louis Berger Group 2005: 9-17). Developed under the framework of the South African Spatial Development Initiative, this corridor is seen as having been designed under a neo-liberal paradigm that aims for less government and puts social issues aside in favor of global investment in an opening market, as Söderbaum and Taylor aptly describe:

“Such strategies cast everything within a profit-seeking and ‘bankable’ framework which allows very little space for tackling the social and ecological implications that the various projects engender. (...) the MDC is designed first and foremost for ‘big business’, and local participation is more by coincidence rather than a guiding component (...) with the real intention to increase export growth and GDP [gross domestic product] rather than people-centred development. It is basically an ‘investment initiative’ of gigantic proportions (...).” (2001: 685)

Again, a causality is assumed in the logical framework of the Maputo Development Corridor: infrastructure investment supports economic growth that will trigger social development. It is not that authors like Söderbaum and Taylor (2001: 691-693) are denying the possibly positive impacts of such projects on the local scale. However, they are criticizing the narrow focus of infrastructure projects that are not integrated into the development of local capacities (also see Louis Berger Group 2005: 14-17). State functions are limited, commercialized, or privatized, with the state losing its mediating role to buffer global economic impacts on local communities. These generally promising typical public-private partnerships for large transportation infrastructure projects are not applied to their ideal functions:

“What is emerging is not a partnership between state and capital in the service of the public good, but rather a deal between the political elite and transnational capital, supported by the IFIs [international financial institutions] and the donor community, to rush headlong into liberalisation.” (Söderbaum & Taylor 2001: 687)

To summarize, the literature from road infrastructure economics reaches few definitive conclusions on the interrelation of infrastructure investment/construction, economic and social development, as well as spatial impacts on metropolitan areas or regions in general. A research field that has been heavily focused on case studies of the Global North, especially the United States, is increasingly turning to Global South examples. Therefore, one cannot yet expect extensive findings and a well-developed set of ‘lessons learnt’ – particularly in light of the rather young history of internationally-financed large transportation infrastructure projects in Sub-Saharan Africa.

Questions clearly arise from the objectives of such projects in consideration of targeted scales and underlying assumptions on causalities. Not only will the aspect of project impacts be discussed in this thesis, but also the relation between the state, the private sector, and affected communities. Various variables influencing the design, implementation, and outcomes of highway projects have to be taken into account. In this thesis, it will not be argued against the fact that the road infrastructure in many African countries is in a very bad state impinging upon daily lives in terms of both economic and social development (Kumar & Barrett 2008: x). Nevertheless, the mainstream 'trickle-down' argument needs to be discussed critically and the focus of road infrastructure economics has to be widened: What are transportation infrastructure projects for? Why is there so little consideration of non-motorized transport when transport networks are assessed? Why is the focus so much on road construction instead of road (traffic) management? These questions are directly related to the next research perspective of transport mobility and urban form.

2.2 Transport Mobility and Urban Form

As road infrastructure economics exemplifies, there is no simple formula for understanding how infrastructure provision impacts economic and social features in a particular setting. The real-life complexities of urban development, as it is happening in Sub-Saharan Africa, make it even harder to apply theoretical models. The literature that focuses on the interrelation between transportation infrastructure and urban form is rooted in the Global North and some of its concepts (such as smart growth) only seem partly helpful in exploring corresponding issues in countries of the Global South (cf. Angel 2011). However, one major conclusion from transport mobility studies is that the "freeway" is definitely not the right road design solution to deal with increasing traffic in urban areas (ITDP & EMBARQ 2012: 2). That hints at the conflict potential of the Thika Highway cutting through already developed settlements – and the following discussion of the interlinked concepts of mobility and accessibility will underscore this point.

While a broad presentation of mobility studies' findings from case studies goes beyond this thesis, UN-Habitat's Global Report on Human Settlements, titled "Planning and Design for Sustainable Urban Mobility", offers in-depth insights into the state of research and practice, underscoring the strong relationship between urban form and mobility. A major concern in this report is the challenge of sprawling metropolitan areas in the Global South – a process that is happening even more rapidly than it was experienced in the Global North (UN-Habitat 2013: Ch. 5). Even though case-specific contexts have to be taken into account, the UN-Habitat report's general statement summarizes the main problems:

"The dispersal of growth from the urban centre is a worldwide phenomenon. Dispersal, as a form of decentralization, at least when it is poorly planned, lies at the heart of unfolding patterns of urban development that are environmentally, socially and economically unsustainable. With dispersal comes: lower densities, separation of land uses and urban activities, urban fragmentation, segregation by income and social class, consumption of precious resources such as farmland and open space and more car-dependent systems." (ibid.: 77)

In this setting, an important differentiation has to be made between the two main concepts of mobility and accessibility.² While mobility has been primed for many decades as the chief goal of improving transport systems, more recent studies identify issues of accessibility as being key for developing an urban system in which people can move, work, and live in a cost-efficient, socially equitable, economically prosperous, and environmentally sustainable way (UN-Habitat 2013: Ch. 5, Ch. 8; Beukes et al. 2011: 453; Cervero 2005). What distinguishes this perspective from the dominant reading in the road infrastructure literature is that contexts as well as political features are studied more closely. People have different needs and means. Institutions and political settings, power relations between stakeholders, provision of infrastructure beyond roads as well as social services all affect the functionality of an urban transport system that can support the achievement of other policy objectives. Therefore, context-sensitive design solutions are required for (large) infrastructure projects to further the achievement of broader policy goals.

While this thesis deliberately refuses to advocate for blueprint solutions that lack context-sensitivity, the transit-oriented development (TOD) model has proven to be a promising practice (UN-Habitat 2013: 93-94). TOD is rooted in Cervero's work on urban form and travel patterns with the famous 5 D's of density, diversity, design, destination accessibility, and distance to transit. This means that settlements are (re-) designed aiming at a compact form with short distances, thus being pedestrian-friendly. The urban form is oriented towards transit modes of mobility. Probably most important, the TOD paradigm aims at mixed settlements, where residential, commercial, educational, and leisure-related uses form 'complete' neighborhoods. While the actual implementation in an urban area poses multiple challenges in living up to these objectives, the laudable idea is the consideration of providing transportation infrastructure with consideration of concerned settlements and their spatial and socio-economic features.

Applied to a specific case, one can refer to studies on South African urban development. The setting in South Africa's urban areas is characterized by a Sub-Saharan typical stark segregation along socio-economic (and thus also often racial and ethnic) lines. Todes (2012a, b) analyzes the government's response to this challenging context in the case of Johannesburg's Spatial Development Framework (SDF). Early on, the SDF proved insufficient in tackling political, socio-economic, and environmental issues of the Johannesburg metropolitan region, because spatial planning was not linked with infrastructure planning. Due to the para-statal structure of infrastructure agencies, the state could not reach into all relevant policy fields in an orchestrated way. This has then partly changed with the development of a Growth Management Strategy that is strictly knotted to a Capital Investment Management System that strategically directs funds for infrastructure works in consideration of

² While very specific and complex definitions of mobility and accessibility exist, dictionary-based explanations of the two words are already precise: Mobility describes the ability of a person to move between places (Merriam-Webster Dictionary 2013b). Accessibility describes the ability of a person to enter and exit places (Merriam-Webster Dictionary 2013a). The former state is rather concerned with the flow between places and the modes of transport/moving, while the latter state is rather concerned with places (and related services etc.) being reachable/accessible and the conditionalities/variables of people to have this access. Both concepts are interdependent and go beyond physical/technical features, since other criteria such as social and economic in-/equality result in different abilities of people to enjoy mobility or accessibility. Several authors argue that accessibility is a more fine-grained challenge to achieve in an urban (transport) system (Cervero 2005: 1-4; UN-Habitat 2013: Ch. 5).

urban development objectives.³ It goes without saying that the success of such an interlinked development approach requires long-term political commitment, sufficient financial and human resources, and a favorable implementation setting (Todes 2012b: 163). Nevertheless, this case highlights the importance of going from planning to actual implementation and benefitting from the interdependencies of transportation systems and urban development.

Literature on transport mobility and urban form shows how accessibility and mobility are two sides of one coin – they can be harmonized or are sometimes at conflict with each other (UN-Habitat 2009: 155-156). There is still a significant car bias in approaches to planning and managing transport systems that can lock in urban areas through a path dependency of misplaced investments (ibid.: 155-156; UN-Habitat 2013: 78-82). Even the concept of accessibility is not of help here if it is limited to an idea of access to private properties, resulting in a car-dependent, gated community-style urban fabric (Beukes et al. 2011: 453). Other elements, such as the role of public places, growth nodes, and mixed-uses of settlements, play a vital role. While questions of livability are often raised in the context of the Global North, major concerns in countries of the Global South still deal with the livelihood of urban dwellers.⁴ This hints at the difficult task of translating lessons from one context into another (for instance from the United States to Kenya with regard to context-sensitive design or transit-oriented development).

The first two perspectives offered in this theoretical chapter illustrate how different views on large transportation infrastructure projects increase the understanding for their multiple facets and possible directions of impacts. Some interrelations of infrastructure development and settlement planning have already been pointed out; however, the THIP was implemented in the Northern Nairobi Metropolitan Region that is characterized by peri-urbanization with distinct features of land and housing markets. Therefore, a corresponding third research perspective needs to follow.

³ A Capital Investment Management System is a GIS-based system in which capital investments by the public sector (in infrastructure and other program areas) are directly tested towards their linkage to the Growth Management Strategy of the metropolitan region and its development objectives. The budget allocation will then be based on a prioritization of public investment projects vis-à-vis their 'linkage' scores with the Growth Management Strategy (Todes 2012a: 406, 2012b: 163).

⁴ With regard to definitions (cf. Hendriks 2010: 165-166), livelihood is understood in this thesis as the fundamental basis of an individual's life. This means that certain conditions are necessary to sustain the survival of that individual. These conditions concern ecological and health aspects (concerning harm against the body), economic aspects (with respect to occupations that provide the necessary means to afford things for daily life), social aspects (referring to the role of communities and social capital as well as educational features), infrastructural aspects (describing the physical-technical elements necessary to sustain life as well as their affordability and safety), and political aspects (meaning the political setting/context, in which an individual's life is not threatened or severely inhibited by means of abusive power). Some of these elements are reflected in the United Nations Millennium Development Goals. Overall, these aspects are deeply related to matters of accessibility.

On the other hand, livability – as it is understood in this thesis – builds up on a secured livelihood and refers to the quality of life and matters of improving the daily environment with regard to above-mentioned aspects. However, the focus is on an improvement of an already given 'quality', in that objectives of improvement are followed that are not solely based on survival necessities, but on broader political aims of making life more just, healthier, more efficient and more effective, more enjoyable, less resource-dependent, more inclusive, more democratic, more transparent, more in harmony with nature, more sustainable/long-lasting, etc. (cf. UN-Habitat 2009: 178). Therefore livability, as it is conceptualized here, can only be built upon a sufficient livelihood base.

2.3 Peri-Urbanization vis-à-vis Land and Housing Markets

Land and housing markets are of importance when studying Sub-Saharan areas with respect to urban development and related topics (such as infrastructure provision). This is even more so when peri-urban areas are considered. Before turning to the more specific literature on this region, a characterization of the peri-urban is necessary. Even though the following definition is derived from a European Union-funded research project on peri-urban development in Europe, it provides a detailed characterization that increases the understanding of a distinct spatial zone in urban agglomerations:

“The peri-urban area is the dynamic transition zone between the denser urban core and the rural hinterland, consisting of a lower density discontinuous urban fabric and a mix of residential, commercial and leisure-related land uses. Peri-urban areas exhibit throughout Europe very different characteristics regarding spatial structure and density of the different land uses, ranging from continuous low density urban fabric, to scattered medium density settlements and commercial sites; from dense horticultural areas to arable and range land, to forests and natural areas. The peri-urban is not just an in-between fringe. It is instead a new and distinct kind of multifunctional territory, and often the location for opportunities such as airports, business parks and high value housing, which are all seen as essential to urban/regional development. However, in most cases, it is also the location for problems: urban sprawl, wasted public funds, traffic congestion, agricultural land under pressure, damage to landscapes and biodiversity, fragmented communities and social polarisation.” (Piorr et al. 2011: 22)

Comparing this definition to other sources (cf. UN-Habitat 2005; GSAPP 2006: 1; Bengs 2005) as well as field observations in the Northern Nairobi Metropolitan Region (see chapter 3.5 introducing the study area), it becomes apparent that certain similarities in the characterization of peri-urban areas exist – which makes literature from both the Global North and the Global South useful for this analysis. There are shared issues; for instance, the conversion of land (most often from agricultural to residential/commercial), the lack of clear government responsibilities (regarding administrative boundaries as well as government scales), or the challenge of ecosystem services (in light of over-use and inter-regional imbalances).⁵

Scholars have come to the conclusion that the traditional ascription of urbanization phases to settlements is no longer sufficient, since a vast heterogeneity in the development of areas in urban agglomerations can be identified.⁶ Thereby, peri-urban areas can exhibit lower as well as higher density development – again related to the problematic topic of causalities discussed above with respect to infrastructure provision and land development. Furthermore, peri-urban areas are not just functionally interlinked with the urban agglomeration. There is also a symbolic aspect

⁵ See Annex A for a comprehensive illustration of driving forces and dynamics of peri-urbanization based on the EU-funded research project PLUREL (Piorr et al. 2011).

⁶ This point is illustrated in a recent UNEP report: Traditional phases of rapid urbanization are followed by stabilizing urbanization and incremental densification, which increasingly mix with urbanization patterns of de-densification and re-densification, resulting in a large heterogeneity of such development patterns – the authors describe this as the “emergence of a lumpy ‘rural-urban continuum” (2013: 29).

of peri-urban areas being interlinked and thought of as part of a metropolitan region (Lambert 2011; GSAPP 2006: 5; Piorr et al. 2011: 24-25).

Besides these similarities, peri-urbanization shows some features in countries of the Global South, particularly Sub-Saharan Africa, that are distinctive (Kreibich & Olima 2002; Rakodi 1997d; UNEP 2013: 31). This is related to the rapid rural-urban migration. In a process of de-agrarianization⁷ and increasing urban primacy⁸, people flee from rural areas desperate for securing their livelihood and following an often disappointed dream of better life in the city (Adebayo 2005: 52-53; Oucho 2005: 89-90). However, cities in Sub-Saharan Africa are not fit to deal with the massive influx of people – Nairobi is no difference here (UN-Habitat 2010: 2). Urban areas are stretched beyond their limits concerning economic opportunities (i.e. livelihood-sustaining occupation), infrastructure and basic services, as well as social and ecosystem services⁹. In this process, cities are encroaching on their rural hinterland, thus transforming these areas into peri-urban transition zones that are fraught with conflicts in everyday lives with regard to infrastructure provision and government control of residential and commercial land uses (GSAPP 2006: 1; UN-Habitat 2005; Kante 2005: 246; McGregor et al. 2006).

In contrast to periods of rural bias or urban bias in Sub-Saharan Africa, when development programs by state authorities and/or international agencies were privileging one zone over the other, scholars as well as practitioners increasingly acknowledge that rural-urban dichotomies are neither helping to understand the rapid transformation processes nor are they supporting effective policies in dealing with above-mentioned challenges (Simon et al. 2006: 4-7; Parnell & Simon 2010: 56). It is still apparent that interlinkages between urban, peri-urban, and rural areas are not well understood. While case studies address these interdependencies, comparative work remains patchy. This might be due to the character of these studies. Mbiba and Huchzermeyer (2002: 115-118) criticize that much of the peri-urbanization research has been contracted by international development agencies, which resulted in an abundant body of descriptive studies. What is still missing so far are more critical analyses of peri-urbanization processes in which underlying causes and political aspects are discussed. The objective then would be to go beyond a characterization of peri-urban areas and to discover stakeholders and their interests in using/making

⁷ The term de-agrarianization describes a long-term process in which rural populations adapt their economic activities to access new income sources, which is accompanied by changes to their social and spatial aspects of livelihood from more rural to more urban contexts (Oucho 2005: 90).

⁸ Urban primacy is sometimes defined in quantitative terms, where the primate city in a country has a significantly larger population than the next largest cities and/or hosts a large number of the total population of a country. However, a more qualitative perspective on urban primacy is helpful to understand how the primate city's dominance in economic, political, and/or social terms can result in its congestion, the shortage of land, price increases, over-burdening of its ecosystem, and environmental degradation. At the same time, other urban areas receive much less attention and too little support in their development (UN-Habitat 2010b: 147).

⁹ Concerning the terminology, Neuman defines infrastructure as "(...) built facilities and networks, which are above or below ground ('grey' infrastructure), and non-built, yet planned and managed landscapes that provide human and nature services ('green' infrastructure). This broad take includes publicly, privately, and jointly owned and operated systems (...)" (2009: 205). In these systems, he includes utilities, public works, community facilities, telecommunications, and green infrastructures. However, in this thesis, the term *infrastructure* refers to the actual concrete/physical material of utilities, public works, and telecommunications. The term *basic services* includes the works/activities that are necessary to provide, for instance, water, electricity, or waste disposal. Under the term *social services*, Neuman's "community facilities" are subsumed, including services in education, security, health, recreation, etc. Neuman's "green infrastructures" are termed in this thesis *ecosystem services*, including water bodies, arable land, forests, crops, etc. (ibid.: 205).

use of peri-urban areas in processes of rapid metropolitan growth. This is what this thesis will do when putting the THIP in its spatial context.

One crucial element in this regard is the discussion of peri-urbanization vis-à-vis land and housing markets. Edited volumes, such as by Rakodi (1997d), discuss the weakness of classical economic land and housing market theory in the Sub-Saharan context (and probably even beyond): The concept of a willing seller and a willing buyer that find each other on a perfectly efficient market is non-existing in real-life settings (Rakodi 1997c; Durand-Lasserve 2003: 3-4). There is a lack of information both in quantity and quality, the institutional framework is not sufficient, and access to 'the market' is not equitable, thus a blind faith in it must result in sub-optimal, i.e. often disastrous, outcomes (Rakodi 1997c). Well-known critiques of inefficient bureaucracy, missing or wrong incentives, too strict or not enforced regulations and codes, unclear legal systems, and lack of access to credit form the basis of such fragmented land and housing markets (ibid.). Formal and informal land and housing systems exist next to each other, are interrelated, or sometimes even amalgamated (ibid.). This impacts on a variety of actors, such as land and housing owners, renters, sellers, constructors, investors, buyers, squatters, etc. As a result, there is a highly insufficient provision of land and housing that qualifies as accessible, affordable, and safe (ibid.; Tacoli 2002: 10; UN-Habitat 2010: 154-159; Obala & Kimani-Mukindia 2002: 169).

This situation is aggravated with the fundamental role of land (and property on that land) in Sub-Saharan Africa. In some contexts, historically rooted cultural aspects have made land a valuable asset; in other settings, land has become an important asset through political and economic transformations (see for instance Cooper 2008; Klopp 2000). This is highly relevant to the topic of peri-urbanization, since land has a double nature as a "natural resource and marketable commodity" (Opoku Nyarko & Abu-Gyamfi 2012: 3). Land performs several purposes through its physical features, its cultural value, its socio-economic function, its political-historical role – there is hardly any policy area in Sub-Saharan Africa that is not related to issues of land (ibid.; Tacoli 2002: ii; Douglas 2006).

With the provision of infrastructure, access to and use of peri-urban land become more contentious. Particularly transportation infrastructure opens up peri-urban areas and thereby shifts the balance of what Calderon Cockburn (1999: 5-8) describes as the urban and rural functions of land profits: Increased access to peri-urban land through transportation infrastructure means a shortening of the distance to urban areas, increasing possible urban profits from that land (i.e. residential, commercial, industrial uses). This means that agricultural (rural) uses of that same land can only be preserved if rural profits from the land increase as well. Since government support for increased agricultural efficiency is often not provided, a process of land subdivision and conversion into urban uses is triggered. Farmers become 'speculators' by holding back their land from the market until seeking the 'once-in-a-lifetime' opportunity to sell (some of) their land for high profits (ibid.: 14; Tacoli 2005: 122). If speculation precedes the actual physical opening up of peri-urban or still rural areas, the development of land will happen in an uncoordinated, fragmented, and infrastructure-deficient way. Governments will have to follow with often under-budgeted reactions to this process of peri-urbanization (Calderon Cockburn 1999: 16). As a result, land is put into the highest individual uses instead of balancing it with "public welfare considerations" (Olima & Kreibich 2002: 6) – meaning ecosystem functions, equitable land access, incremental infrastructure provision, etc.

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