Dynamics of greenfield development: Evidence from the "20,000 plots" project in Dar es Salaam - housing and neighbourhoods

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De novo (greenfield) projects address the problems of informal housing by purchasing cheap agricultural land on the city edges, surveying it, and partitioning it into formal plots that people can buy and build homes on.

Research suggests three keys to the success of these projects: securing formal property rights, good road access, and a group of "pioneers" who are eager to settle early. Below are key recommendations to improve the planning of *de novo* projects.

- Lower the minimum size of formal plots and increase the share of small plots in *de novo* areas; this will improve gains and offer affordable options for lower-income groups.
- Prioritise acquiring greenfield areas with good existing roads connecting to the city centre. When this is not feasible, ensure that a new road is built to connect the areas before settlement is expected to begin.
- Coordinate "pioneers" to move into *de novo* neighbourhoods, initiating residential clusters. A critical mass of residents is necessary to produce public goods and services.
- Prioritise the delivery of plots above the floodplain on flat land far from water sources.

POLICY BRIEF TZA-20168

MAY 2025

This project was funded by the IGC

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Introduction

This policy brief presents research findings on *de novo* urban planning projects in Dar es Salaam, Tanzania. We use *de novo* to refer to projects that acquire agricultural and mostly unbuilt greenfield land, plan and parcel this land for residential development, build local dirt roads or other services, and sell the parcels to private individuals.

People have been planning towns and cities for millennia. However, systematic economic evaluations are scant, especially for planning *de novo* neighbourhoods. In Western countries, land is regulated by land-use policies that are solidly enforced and implemented; in the fast-growing cities of developing countries, motley tenure arrangements can lead to land remaining unplanned. Urban informality reduces private investments, lowers tax bases, and exacerbates urban disamenities in those cities. Therefore, projects that plan effectively for fast-growing cities are important to provide formal housing and urban services.

A key policy tool to address this problem is *de novo* urban planning. Yet, there is very little systematic evidence on the effects of *de novo* planning, particularly in relation to the size and configuration of residential and non-residential plots. To fill this gap, this research analyses the consequences of a diverse range of planning decisions in Tanzania's "20,000 Plots" project. This research will inform new initiatives, such as the 42 other cities in Tanzania starting to replicate this programme, and new Sites-and-Services (S&S) strategies in different countries, such as Rwanda.

Overview of the “20,000 plots” project in Tanzania

The "20,000 Plots" project, initiated in the late 1990s by the Tanzanian government to meet the demand for formal *de novo* plots, stems from the World Bank Sites and Services (WB-S&S) projects carried out across the globe during the 1970s and 1980s[1]. The World Bank stopped those projects because of the criticism it received for poor investment repayment rates and for not improving the land tenure rights of low-income people. However, recent evidence suggests that the projects effectively provided good-quality housing and price-premium for middle-class residents (Michaels et al., 2021). This realisation has fostered renewed interest in S&S schemes in policy circles (Lamson-Hall et al., 2019; Choi et al., 2020; Ministry of Lands, Housing and Human Settlements Development, 2018; United Republic of Tanzania, n.d.), and African countries

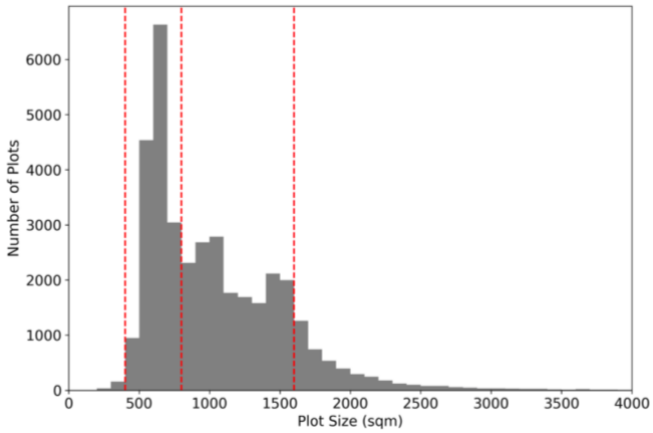
[1] The WB S&S projects were carried out in many countries such as Tanzania, Indonesia, Vietnam, Myanmar, Uganda, Nigeria, Ethiopia, Egypt, India and many Latin American countries.

(such as Ethiopia, Rwanda, and Tanzania) are reconsidering implementing those strategies within their cities.

FIGURE 1: 12 project areas of the '20,000 plots' project in Dar es Salaam

The "20,000 Plots" project in Dar es Salaam provided over 36,000 residential plots in 12 project areas on the fringes of Dar es Salaam in the early 2000s (Figure 1). The implementation phase started in the early 2000s, with half of the land sales complete by the end of 2004. The land use plans considered residential plots (~38 square kilometres), land reserves for non-residential use (~12 square kilometres), hazard-free areas, and a grid of local roads that provided direct road access to every household in the area (~25 square kilometres). Residential plot sizes in this project ranged from 400 to 4,000 square meters and were formally surveyed and titled (see Figure 2).

FIGURE 2: Histogram of residential plot sizes in the '20,000 plots' project in Dar es Salaam



The "20,000 Plots" project successfully recuperated investment through a speedy sale of plots. Currently, land in these areas sells at a 71% premium compared to adjacent unplanned areas (see Figure 3), with 44% due to titling and 27% due to better road access, regular plot layouts, and other planning features. However, as with many other S&S projects before, the project attracted relatively better-educated and higher-income buyers. The project did not provide low-income families with the opportunity to obtain formal land rights and other benefits of urban development. Therefore, the "20,000 Plots" project constitutes an opportunity to learn from experience and improve knowledge gaps that might positively impact Tanzania's population, now that 42 other cities have shown interest in replicating this approach.

FIGURE 3: Comparison of two aerial pictures taken in 2001 and 2021 of a "20,000 plots" greenfield site

Methodology

Our project adopts a rigorous methodology to understand how planning decisions produce certain outcomes in these areas by exploiting a variation of planning choices within the project areas. To begin our work, we asked, "What planning choices work better than others?" To answer this question, we draw on a series of data such as: survey maps; town-planning drawings; interviews with residents, local leaders, and real estate agents; a census of the non-residential plots; high-resolution satellite imagery for tracing building evolution in 2005, 2010, 2015, and 2020/21; and a series of historical maps.

What do we learn from planning successful *de novo* neighbourhoods?

What sizes of plots are valued more?

Households have preferences for relatively smaller plots, but the project did not provide enough of those. The government sold plots at a flat price per square metre (sqm) across each project area. However, when these plots were resold between private parties on the market, the price per sqm of small plots was approximately double that of big plots. This means that a 1,600 sqm plot worth

USD 16,700 today could be sold for USD 33,600 if subdivided into four plots of 400 sqm (see Figure 4). These figures point to an overprovision of big plots in the "20,000 Plots" planning stage caused by Tanzania's minimum plot size planning restrictions inherited from the colonial area (currently lowered from 400 to 300 sqm). Therefore, prospective projects might benefit from providing lower quantities of big plots and greater quantities of small plots, which would increase project revenue, making it more profitable for the government and more accessible for low-income families.

FIGURE 4: Gains from planning smaller plots

What plot features are valued more?

Households have a clear interest in road accessibility. By 2021, the land price of "20,000 Plots" dropped by 15% for each kilometre further away from major paved roads connecting the project area with Dar es Salaam city centre. The likelihood that these plots were developed also dropped by 4%; a common issue of greenfield development because *de novo* planning requires rural land that is cheaper for governments to acquire, but can be quite remote. *De novo* neighbourhoods are therefore less appealing to households that still depend on daily commutes to the city hub. Future projects must balance the government's needs for more affordable development locations in peri-urban areas with residents' needs for good connectivity to the city.

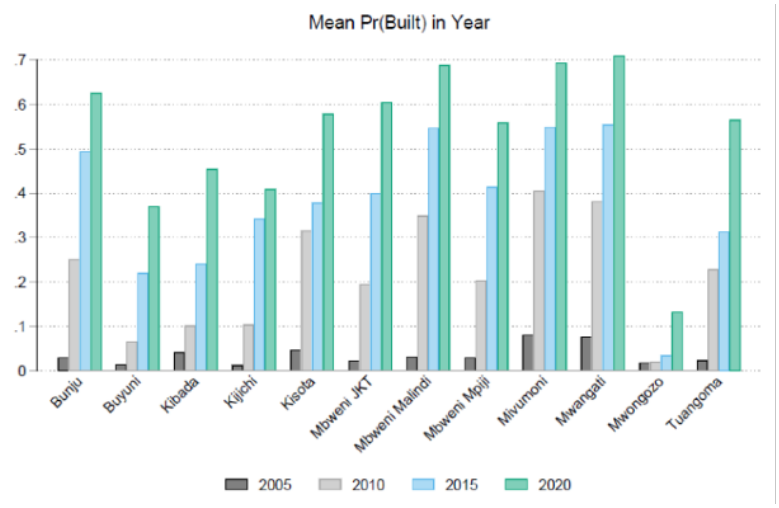
Buyers also valued features such as plots placed in higher elevation grounds, away from water enclaves (rivers, streams, or wetlands), and flat parcels (versus sloped ones). Similarly, there is a preference for plots inserted in regular plot layouts and placed near similar-sized plots. Urban planners working on these initiatives should be aware of such preferences to provide plots that are appealing to people and trigger good housing development and occupation.

How fast were the plots developed?

In its early days, the project designed 36,200 residential plots across the twelve project areas of Figure 1. The land was quickly sold, but housing development took a long time. By 2005, only 968 plots were built, with small constructions of 72 sqm on average. By 2021, the development rate was still only 50%: about 5,500 constructions emerged every five years with a median building size of

175 sqm. Development was uneven across the twelve areas, as seen in Figure 5.

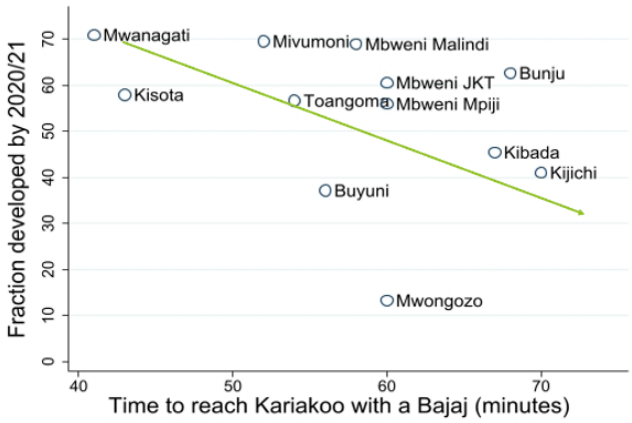
FIGURE 5: Fraction of plots developed by year and "20,000 plots" area



What led some areas to develop faster?

As shown in Figure 6, the rate of plot development was in direct correlation with the driving time it took to reach Dar es Salaam in the "20,000 Plots" areas. Areas with better access to the city centre have higher development rates than remote places. Therefore, to speed up plot development rates, we encourage future projects on greenfield sites to consider acquiring land as near as possible to city centres and facilitating road access.

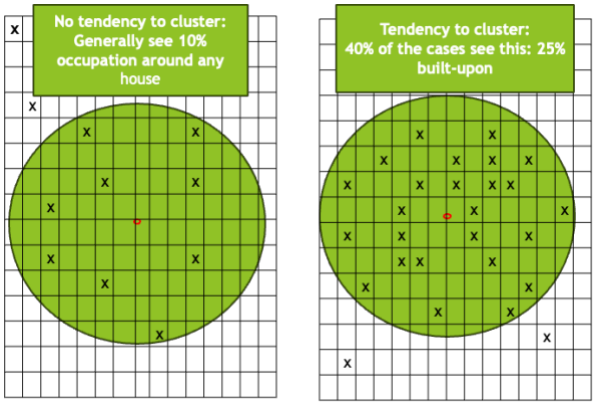
FIGURE 6: Relationship between plot development (by 2022/21) and distance to Dar es Salaam city centre



Moreover, plots surrounded by already-developed plots were more prone to be occupied than those within unoccupied areas. For instance, in the Kibada project area, the expected rate of occupation was around 10% (Figure 7). However, 40% of areas in Kibada developed residential clusters with higher

occupation rates of at least 25%. This result highlights that people seek neighbours to socialise, improve safety, lobby for collective provision of goods (roads, schools, shops, etcetera) and collective action to maintain public goods such as ditches, roads, and open spaces. To attract "pioneer" residents that trigger the spontaneous development of residential clusters, future projects should consider coordinating and incentivising early movers, for instance by sharing interested buyers' contact details, providing model houses at cheaper prices or financial advantages to buyers developing land within the government framework of three years.

FIGURE 7: Example of plot development in Kibada in 2010

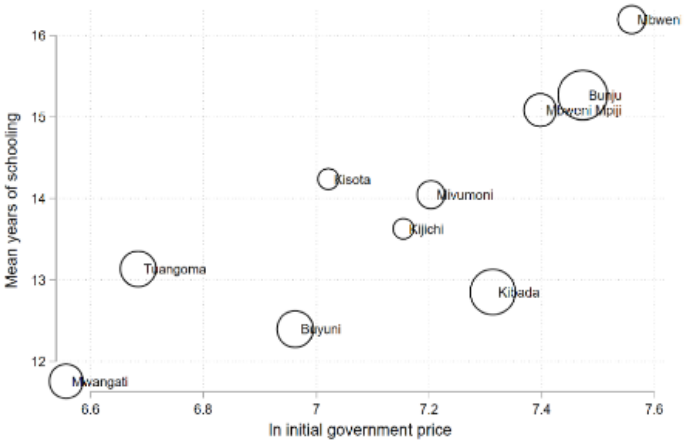


Who builds and lives in these areas?

People living in the "20,000 Plots" project areas come from privileged educational and income backgrounds. This phenomenon is called "residential sorting" and is particularly high in the neighbourhoods of Mbweni and Bunju, where the government sold plots at a higher price. Taking years of schooling as a proxy for lifetime earnings, we see that the residents of all project areas have incomes above the country average.

According to the Demographic and Health Survey (DHS) in 2014, the average years of household head schooling in Dar es Salaam is 8.7 years. Figure 8 shows that household heads in the "20,000 Plots" areas have 11.5 years of education overall: 2.8 points higher than the national average. Moreover, when the household heads are landowners (instead of tenants or usufructuaries), they have an average education of 13.8 years, more than five points over the national average. This gap is evidence that the "20,000 Plots" project failed to accommodate Tanzanians in the lower-middle and lower classes. The gap can be tackled in prospective projects by developing selling criteria that enhance the inclusion of low-income populations and facilitating their acquisition of smaller and cheaper plots.

FIGURE 8: Sorting of owners across the 20k areas



What is the provision of local roads?

Of all the public goods planned by the "20,000 Plots" project, roads have the highest rate of implementation (82% by 2021). While it is true that road implementation was high and largely followed the original plans in terms of location, the actual size of roads is hardly aligned with planning decisions. Moreover, roads were neither paved nor surfaced, suggesting that more could be done to coordinate road implementation and maintenance over time (see Figure 9).

FIGURE 9: Planned versus executed roads in relation to plot provision

	Planned	2005	2010	2015	2020
With Road	54796	8833	38120	42047	44902
≤ 4m	0	7366	21672	22810	18665
(4,8]	33485	962	14094	16770	20881
>8	21311	505	2354	2467	5356

What about the development of non-residential uses: public goods and services?

A severe lack of plan implementation is found for all non-residential land uses, especially for recreation spaces (playgrounds and open spaces), service trade facilities, markets, public buildings, and housing estates. Indeed, housing agencies that acquired land in the project areas also delayed development as private landowners. However, about 40% of the plots intended for educational or religious purposes were implemented as planned by 2020/21. Additionally, we see little correlation between having facilities in place and larger rates of plot occupation, contradicting expectations that amenities will attract higher occupation rates (following a typical pattern of urban development in the US and European countries). Instead, our research suggests that residents value

the existence of pre-existing clusters of residents more, where collective action can help lobby for the provision of infrastructure, services, and maintenance. We see that where there are clusters, there is better development of non-residential plots and roads and better road maintenance.

FIGURE 10: Non-residential uses in Mbweni Mpiji

Policy implications

In general, the "20,000 Plots" project successfully supplied plots that met households' demand for planned and titled plots: plots were quickly sold, and land values escalated over time compared to the surroundings. However, prospective projects need to improve the occupancy rate of the plots, which currently revolves around 50%, and facilitate lower-income buyers, who were largely excluded from the "20,000 Plots" project. In addition, accommodating more residents within these areas may also raise the 'per capita' contributions to develop public goods and services in the future.

To face this problem, the research team recommends changing land use planning to lower current minimum size plot allowances; prioritising the acquisition of greenfield land that is well connected to the city, even if the value is higher than greenfield land sites in further locations; promoting the development of transport infrastructure to those sites and ensuring their maintenance in the long-term; looking into incentives and regulations that encourage some housing development and occupation within a limited time (with clear allowances for future incremental building); and promoting policies that allow a slower process of land sale, prioritising the needs of low-income groups and holding off purchase for speculative purposes.

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