

# THE IMPACT OF ACCESS TO CITIES ON DEVELOPMENT: EXPERIMENTAL EVIDENCE FROM THE D.R. CONGO\*

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## 1 Introduction

Throughout the world, cities are drivers of economic growth. They are hubs of innovation, entrepreneurship, and social change. Sub-Saharan Africa is no exception. Relative to other contemporary regions and to historical experience, Africa is much more urbanized than its level of economic development would predict. Yet, the mechanisms through which the economic benefits of cities occur remain poorly understood because many social and economic forces change in tandem with urbanization. This project seeks to provide causal evidence about the impacts of access to cities in rural Africa on individuals' behaviors, beliefs, and economic wellbeing.

We study the randomized rollout of a program promoting urban access in rural villages in the Democratic Republic of the Congo (DRC). Implemented by a local NGO called Congo Helping Hands (CHH), this 'City Access Program' (CAP) provides regular weekly transportation by motorbike taxi to the city of Kananga to individuals living in rural villages surrounding the city. CHH's City Access Program has two different components, which form the treatment arms of our study. In a first 'market' arm, CHH provides weekly transportation directly to Kananga's central market, allowing villagers to sell produce and buy goods there as they please. In a second 'social' treatment arm, CHH provides villagers weekly transportation to the city along with an invitation to attend a church group. Churches are the main hub of

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social networks in Kananga and many African cities. Our project studies the effects of CHH’s programs on economic behaviors and outcomes as well as on individuals’ beliefs and values.

## 2 Background and Setting

The study takes place in the city of Kananga, in the Kasai Central Province of the Democratic Republic of Congo (DRC). Kananga, a city of roughly 1.6 million (the fourth largest in Congo), is the seat of the Provincial Government of Kasai Central. Transport infrastructure in Kasai Central is in severe disrepair, due to heavy rain and a lack of maintenance. As a result, transportation in rural areas is difficult even for 4x4 vehicles. Traveling 50 kilometers out of the city can take up to 4 hours on a motorbike. But most villages are unable to afford motorbikes or other forms of transport, and so they spend days walking to reach the city, or they simply remain in their villages. Congo Helping Hands’ City Access Program was designed to help solve this problem.

## 3 Data

### 3.1 Research Design

We study Congo Helping Hands’ City Access Program, which aims to increase access of rural villages to Kananga. The program provides personalized round-trip transportation to and from Kananga for individuals living in rural villages around the city.<sup>1</sup> The City Access Program has both ‘market’ and ‘social’ components. Individuals in the market arm receive transportation directly to Kananga’s central market and are invited to transport goods if they like, or to buy products they could resell in the village. Individuals in the social arm receive transportation along with an invitation to join an urban church congregation.

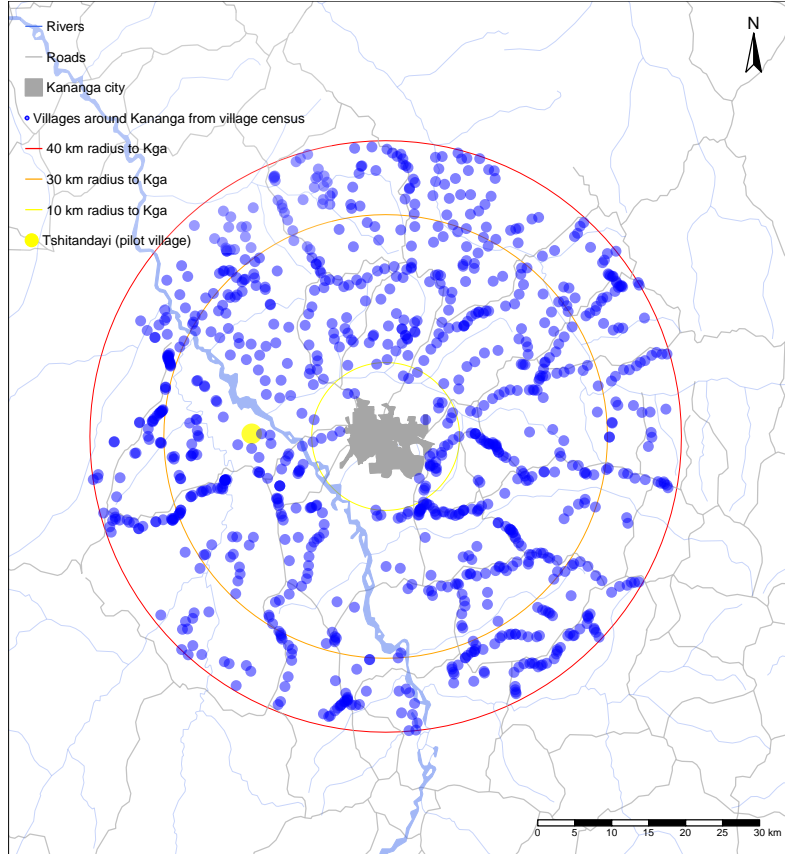
CHH agreed to randomize villages into the ‘market’ or ‘social’ arms of their program or to a control group of otherwise similar villages. We collaborated with CHH to achieve a randomization that will enable an impact evaluation of the program. Sampling of respondents and random assignment of villages into the treatment arms occurs in several steps. First, using satellite data and driving time data, we identified all villages that are less than a 3-hour drive from the city’s limits. We conducted a village census to collect basic information such as village size and accessibility (Figure 1). We then worked with CHH to identify a set of 300 villages that would be eligible for their program according to the following criteria: (i) accessibility by motorbike, (ii) a population of fewer than 300 families (where access to services found in cities is especially limited), and (iii) continual settlement all year round

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<sup>1</sup>The treatments are similar to the transport subsidy analyzed by [Abebe et al. \(2021\)](#), with the key difference that we study rural-to-urban transport rather than transport within cities.

(rather than only during harvest season, e.g.). We selected the 300 villages that are closest to Kananga by straight line distance, but further than 10 km from the city centre, that fulfilled these criteria.

**FIGURE 1: MAP OF VILLAGE CENSUS AROUND KANANGA**



This map shows the 988 villages mapped in our village census.

Second, in all eligible villages, our enumerators randomly sample households and invite them to participate in a baseline survey. Enumerators follow a village-specific house skip pattern to conduct a screening survey. Based on the screening survey, we randomly select main respondents for the baseline survey. Since the CHH program works with couples, we randomly select three couples, i.e. six main respondents per village.<sup>2</sup>

To enable estimation of spillovers, our enumerators also conduct a shorter baseline survey with additional individuals with and without connections to the main respondents. They interview (i) one close friend of the main respondents, as revealed in a social network module, and (ii) two additional randomly sampled individuals without connections to the main

<sup>2</sup>Note that this sampling approach generates random variation in the share of the population that is treated. We will use this random variation to explore if treatment and spillover effects are more pronounced if a larger share of the village is treated.

respondents in each village.<sup>3</sup> The survey will enable us to estimate spillover effects on non-participating individuals connected through social networks to participating individuals as well as more generalized spillover effects on individuals sampled randomly in the village.

Third, we randomly assign villages to the two treatments or to control. We stratify the randomization on (i) distance from Kananga, and (ii) village size.<sup>4</sup> Once the treatments are randomly assigned at the village level, CHH staff invite the main respondents to participate in their program. Table 1 summarizes the numbers of participants across all treatment arms. There are 100 villages in the each of the three treatment groups (including control). In each village, there are six main respondents, or 600 total participants. With six main respondents, up to six network respondents, and two pure control respondents in each village, we expect a full sample size of around 4,200.

To shed light on the mechanisms of the market arm, we randomize the location of selling at the market within the market arm at the village level. The ‘retail’ and ‘wholesale’ sub-treatment arms should introduce further variation in wholesale and retail selling, the number of interactions with customers, and the probability of having repeat customers. The villages in the ‘social’ arm are randomly assigned to one of 30 churches that CHH works with, which are broadly representative of the landscape of churches throughout Kananga.<sup>5</sup> CHH works with the largest churches in Kananga of different denominations, such as Pentecostal, Protestant, Neo-Apostolic, and Kimbangu. We see this natural heterogeneity of denominations, doctrines, and practices as an asset to our investigation of the program. We plan to examine heterogeneous treatment effects of this treatment as we describe in more detail below (see Section 3.2).

**TABLE 1: ALLOCATION OF UNITS ACROSS TREATMENT GROUPS**

	Urban social treatment	Urban market treatment	Pure control
<b>Main Respondents</b>	600	600	600
<b>Network Respondents</b>	600	600	600
<b>Non-Network Respondents</b>	200	200	200
<b>Total Respondents</b>	1,400	1,400	1,400
<b>Villages (clusters)</b>	100	100	100

<sup>3</sup>All of these surveys occur before villages are assigned to treatment or control, allaying concerns that enumerators’ sampling or respondents’ availability could be endogenous to treatment.

<sup>4</sup>Note that this generates geographical variation in distance to other treated and control villages. We will use this random variation to explore spillover effects across villages.

<sup>5</sup>The one exception is that CHH does not work with the Catholic Church because of logistical problems: there are only Catholic services in Tshiluba—the only language understood by most rural residents—at 7 am on Sundays, which is too early for the villagers to arrive on time. Later services are conducted in French without Tshiluba translation.

Finally, we plan to collect an endline survey in all villages with the same set of 4,200 respondents sampled at baseline. These surveys will be conducted roughly six months after the conclusion of the CHH programs (in treatment villages and nearby control villages).

### 3.2 Other Data

We collect additional data to study mechanisms and alternative hypotheses:

1. Administrative data on the City Access Program collected by Congo Helping Hands staff in both the market and social arms. These include weekly data on attendance and other details on participation (e.g., the goods bought and sold).
2. Village census around Kananga. Collected by our enumerators, these data provide information about the location and amenities in villages around Kananga.
3. Chief village survey. Collected by our enumerators, these surveys ask the chief about the village and its history.
4. Church census in Kananga. Collected by our enumerators, these data provide basic information about the size and denomination of all houses of worship in the city.
5. Pastor surveys. Collected by our enumerators at a subset of the largest churches in the city and in all villages, this survey focuses on doctrine and congregant details.
6. Church service recordings and surveys. We also collect audio recordings of church services to enable text analysis of their content. Enumerators also record the elements and proceedings of services.

## 4 Analysis

The project’s goal is to study the causal effects of access to cities — their social and commercial networks — on rural individuals’ beliefs, values, and economic behaviors. The City Access Program of Congo Helping Hands provides a rare opportunity to provide causal evidence on well-established ideas in the literature on cities and development.

Specifically, a large literature argues that cities bring income and productivity benefits and are important drivers of aggregate economic growth (Molotch, 1976; Glaeser and Maré, 2001; Melo et al., 2009; Bryan et al., 2014a). The economic mechanisms underlying these benefits, such as scale economies and knowledge spillovers, have been well-described theoretically (Lucas, 1988; Greenstone et al., 2010). Yet, well-identified evidence about the causal effects of urban access on economic development — and the mechanisms underlying such effects — remains scarce.<sup>6</sup>

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<sup>6</sup>We do however have good evidence that seasonal migration brings a range of labor market benefits (Bryan et al., 2014b; Akram et al., 2017). Another related paper is Brooks and Donovan (2020), which examines how building bridges reduces uncertainty associated with local flooding and leads rural villagers to increase their net labor supply inside and outside the village.

To help fill this gap, we will examine a range of economic outcomes, including income, wealth, labor supply, formal and informal employment, savings (monetary and in kind), borrowing, lending, investments in productive technologies (e.g. animals, sewing machines, carts for transporting goods, etc) and education, the extent of home production, the extent of in kind or monetary trading, and entrepreneurship. Most measures will come from our baseline and endline survey, though we will also measure income, specialization, occupational choice, and trade using CHH’s administrative program data.

The aforementioned literature would predict that the market arm of our experiment — which creates exposure to larger markets — would improve participants’ economic livelihoods on these dimensions.<sup>7</sup> This literature would also predict that the social arm — which integrates villagers into urban social networks — would improve participants’ economic livelihoods by facilitating knowledge spillovers and boosting social capital (Granovetter, 1973; Romer, 1990; Putnam, 1992). A large literature in anthropology and economics also expects exposure to urban churches to cause economic changes. An example is Comaroff and Comaroff (2000), which connected the rise of Pentecostalism in Africa — the most common type of church in Kananga today — to Weber’s (1958) famous hypothesis concerning the “Protestant Ethic and the Spirit of Capitalism,” and catalyzed a research agenda on this topic in anthropology.<sup>8</sup> This literature argues that urban pentecostal churches have increased work ethic, labor supply, savings and investment, and entrepreneurship. Given that the modal participating church in CHH’s program is pentecostal — and many non-pentecostal churches have responded to the popularity of pentecostal preachers by emulating aspects of their doctrine and practices — the field experiment offers a unique opportunity to bring causally identified evidence to bear on this hypothesis.<sup>9</sup>

The literature on the economics of religion also foresees economic benefits from a dense social network of religious groups and thus the ‘belonging’ channel of religious participation. Religious groups provide insurance and welfare and fill the gap left by weak states and a lack of formal markets in many developing countries (Auriol et al., 2020). Focus groups in Kananga have corroborated this function of church congregations. Congregants employ each other and buy from each other. They step in in the case of death or illness. Moreover, focus groups have pointed to the important role of churches for the transitioning of villagers to

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<sup>7</sup>It would also predict effects from learning and network formation and access to activities with higher returns such as a switch in the occupation, increased trade, and a switch in in-kind vs monetary trade.

<sup>8</sup>There is a large literature on this topic. A non-exhaustive list of a few of the key citations includes Smith (2001); Martin (2002); Meyer (2004); Ranger and Ranger (2008); Marshall (2009); Van Dijk (2012); Freeman (2012); McCain (2013); Swidler (2013); Ojo (2015).

<sup>9</sup>As we note below, we plan to explore heterogeneous treatment effects of the social arm according to the specific doctrines and practices that our data collection reveals to characterize the participating churches in CHH’s program. One would expect the predictions of this ethnographic literature to be more pronounced among churches that espouse versions of the prosperity gospel and emphasize individual responsibility for one’s economic wellbeing, consistent with much of the pentecostal movement in Africa.

new urban environments. New rural congregants are supported in starting a new city life by the church for example through housing, finding a job, and generally learning about how to navigate the city. We will use survey measures and the detailed administrative data of the program to shed light on the social network of churches as a driver for economic wellbeing.

## 5 Heterogeneity

We plan to investigate the following as sources of heterogeneity in the impact of the CAP on outcomes:

1. *Distance to Kananga.* The City Access Program is more of a shock to villagers' access to Kananga in more remote villages. We therefore anticipate larger treatment effects farther from Kananga.
2. *Market landscape in the village.* Participants vary in their baseline access to markets. We expect more pronounced treatment effects of the market arm where participants had less access to markets before the CAP. We will use data from our initial village census as well as baseline surveys to measure market access.
3. *Religious landscape in the village.* Participants vary in their baseline access to churches and religiosity. We expect more pronounced treatment effects in villages with less prior exposure to Christian churches, especially Pentecostal churches (which remain predominantly an urban phenomenon). We will use baseline data on participants' religiosity as well as data from the village census and chief survey to estimate access to churches, including mission stations. We will also explore how treatment effects vary by specific types of religious beliefs held by participants. Generally, there may be two countervailing forces at play: those with prior beliefs more concordant with those espoused at the urban church might be more inclined to participate every week, which would magnify effects; but, at the same time, the treatment would also be less novel for this subgroup and likely have a smaller effect. Which of these effects dominates is an empirical question we hope to explore using program administrative data on attendance and a combination of baseline and endline data on beliefs.
4. *Urban church doctrine and practices.* The 30 churches participating in the CAP are heterogeneous in their doctrines, practices, and social networks. As noted throughout, we therefore anticipate studying heterogeneity by different types of beliefs, practices, and other church characteristics. We will use detailed data from surveys with pastors as well as recordings of sermons and church service proceedings to characterize this variation

and study its heterogeneous impacts on outcomes.

5. *Agricultural productivity.* Among the villages participating in the CAP, there are different climatic zones with variable suitability for different crops that can be sold in Kananga. We have natural variation in these crop suitabilities and the seasons during which the CAP was running. We can use this variation to study whether villages in zones with suitabilities for more lucrative crops conditional on the season exhibit more pronounced treatment effects.
6. *Exposure to Kamuina Nsapu.* A recent violent conflict, known as the Kamuina Nsapu insurgency, triggered large-scale displacement and claimed thousands of lives. We expect impacts of the program on welfare to be more pronounced in areas that were more affected by this violent conflict.
7. *Time gap before endline survey.* Because of the staggered rollout of the intervention and endline survey, there will be natural variation in the time gap between the two. We will use this variation to study whether treatment effects decay or persist over time.
8. *Duration and frequency of attendance.* We expect stronger effects where participation was exogenously higher. Although participation may often be endogenous, we aim to explore whether shocks like weather, pregnancy, and family deaths may serve as exogenous shifters of participation to obtain variation in treatment intensity.
9. *Village size.* We have natural variation in the size of villages and thus the share of the village that is treated by the CAP. We can use this variation to study spillovers to non-participants in the treatment village. For instance, we can assess whether such spillovers are larger when a larger share of the village is treated, and whether we find evidence for tipping-point effects.
10. *Age.* Research often finds that children and young adults are more plastic in their beliefs than the elderly. Although we do not have children or young adults in our sample, we will examine whether younger participants are similarly more responsive when examining belief outcomes.
11. *Gender.* Women and men often have distinct economic roles. For instance, in focus groups, we learned that some agricultural products are typically sold by women, while others are typically sold by men. This means that the market arm might have differential effects by gender — if for instance the type of customers with whom men and



women interact in the city different because of the products they sell (or for some other reason). Similarly, churches often discuss gender and family issues extensively in sermons, and these discussions might impact the sexes differently. Some churches have gender segregated seating or activities. We will therefore explore gender heterogeneity.

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