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## Strategy Support Program



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SYNOPSIS OF ESSP WORKING PAPER 91

## *Synopsis:* Cities and agricultural transformation in Africa: Evidence from Ethiopia

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Due to the rapid growth of cities in Africa, many more farmers are now living in rural hinterlands in relatively close proximity to cities. However, empirical evidence on how urbanization affects these farmers is scarce. To fill this gap, this paper explores the relationship between proximity to a city and the production behavior of rural staple crop producers. In particular, we analyze data from teff farmers in major teff producing areas around Addis Ababa, the Ethiopian capital. We find that farmers located closer to Addis Ababa face higher wages and land rental prices, but because they receive higher teff prices they have better incentives to intensify production. Moreover, we observe that modern input use, land and labor productivity, and profitability in teff production improve with urban proximity. This urban proximity has a strong and significant effect on these aspects of teff production, possibly related to the use of more formal factor markets, lower transaction costs in crop production and marketing, and better access to information. In contrast, we do not find a strong and positive relationship between rural population density increases and agricultural transformation – increased population density seems to lead to immiserizing effects in these settings. Our results show that urban proximity should be considered as an important determinant of the process of agricultural intensification and transformation in developing countries.

### INTRODUCTION

Agricultural transformation is crucial for poverty reduction and improvements in food security in sub-Saharan African countries. The agricultural sector in much of Africa is characterized by small-scale, low productivity, low external input usage, and family labor oriented farming. Fostering higher agricultural productivity and providing incentives for less efficient farmers to move away from agriculture to seek employment in other sectors, therefore, are often the focus of public investments or policies interventions in such settings.

This paper considers how proximity to a large urban city affects farmers' agricultural production practices in Ethiopia for farmers producing teff, one of the major staple crops and the most important cereal nationally in value terms and on which many producers depend for their livelihoods. Teff is an economically superior commodity in urban areas, where its demand is increasing. Production of teff has doubled in the last decade in Ethiopia.

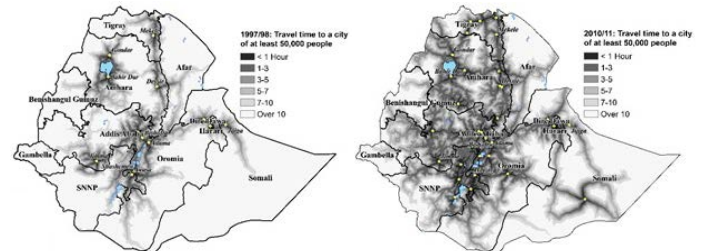
### URBANIZATION IN ETHIOPIA

Urbanization, in particular, is seen as an important new factor for transformation in Africa and a key driver of economic development and long-term structural transformation. It encourages the shift from agricultural activities to more recompensing non-farm activities. Urbanization also indirectly affects rural poverty through urban-rural spillovers and economic linkages, such as remittances and rural non-farm income opportunities. Moreover, it brings about important economic and welfare effects through food and agricultural markets. For example, increased urban consumption and changing preferences for high-value and higher quality agricultural products increase urban demand and willingness-to-pay for agricultural products.

Urbanization in Ethiopia is one of the lowest in the world. However, rapid growth of cities has occurred in the recent past and even faster changes are expected in the future. The World Bank (2015) projects an annual growth rate of the urban population of 5.4 percent in coming decades, which would lead to a tripling of the population in the cities of Ethiopia from 15.2 million in 2012 to

42.3 million in 2034. By 2028, 30 percent of the population will be living in urban areas. Access to cities from rural areas is also improving quickly. In 1997/98, only 15 percent of the population of Ethiopia was located within 3 hours of a city with a population of at least 50,000. By 2010/11, due to massive investments by the government of Ethiopia in road construction, this number had increased to 47 percent of the population (Figure 1).

**Figure 1: Travel times across Ethiopia to a city of at least 50,000 people in 1996/97 (left) and 2010/11 (right)**



Source: Kedir et al (2015)

### DATA AND METHOD

For our empirical analysis, we use data from a large-scale survey of teff producers in Ethiopia. Our sampling method involved randomly selecting farmers from both the smallest and largest teff producing woredas (districts) in five major teff production zones. A total of 1,200 farmers were surveyed. The majority of teff producers in the study zone are male, over 45 years old, and have received at least some education. Other data for our analysis, such as agricultural prices and land rental rates, were collected through additional community level surveys.

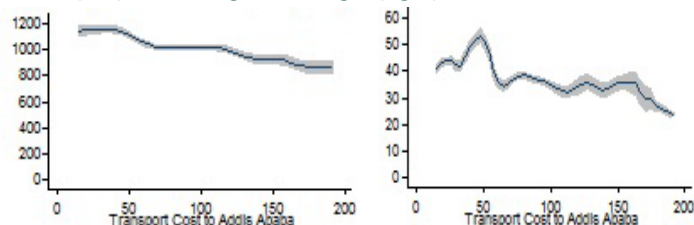
Urban proximity is the main independent variable examined in this study. The measure we use is the cost of transporting one quintal (0.1 metric ton) from the farm via local market centers to the urban wholesale market of Addis Ababa (ETB/quintal).

We used two types of models to estimate the effects of urban proximity on prices, agricultural inputs, and intensification outcomes, assessing both the direct (i.e., transaction costs) and indirect (i.e., wages and land rental rates) effects of urban proximity on the productivity and profitability of teff production.

## RESULTS

Illustrated through a series of graphs, our results show the correlation with urban proximity for teff production related outcome variables. Figure 2 suggests a negative correlation between transportation costs to Addis Ababa and the output price of teff. There is also a clear negative association between urban remoteness and the local wage rate, with wages dropping by more than 50 percent in more remote villages. Land rental prices (not shown) also decline with increasing transportation costs to Addis Ababa.

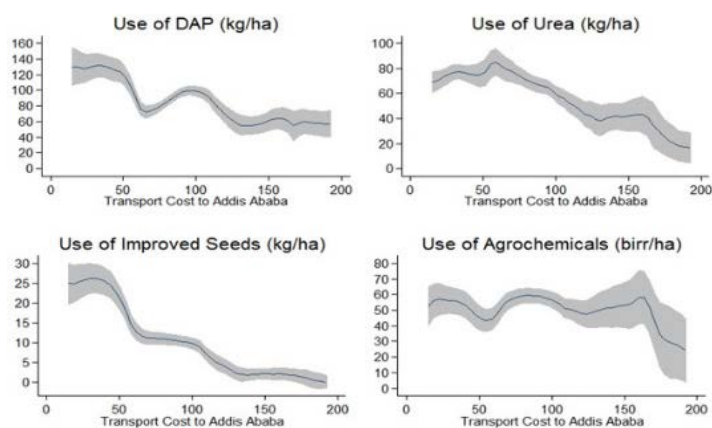
**Figure 2: Effect of transportation costs to Addis Ababa on teff price (left) and average local wages (right)**



Source: Authors' computation

We also look at correlations between urban proximity and input use on teff. Higher chemical fertilizer application rates are used by farmers living close to Addis Ababa (Figure 3). The intensity of use of both Diammonium Phosphate (DAP) and urea fertilizers (kg/ha) drops by more than half for the most remote households. The effect of urban proximity is most pronounced in the use of improved teff seed – use of improved seed drops to almost zero at the right, most distant, end of the transport cost distribution. However, there is no clear relationship between remoteness from an urban center and the use of agrochemicals, such as pesticides. Although not shown here, the total use of labor on teff plots increases with distance from Addis Ababa even though the share of hired labor used considerably declines with urban remoteness.

**Figures 3: Effect of transportation costs to Addis Ababa on the use of inputs of various sorts for teff production**



Source: Authors' computation

With regards to the substitution of inputs, the ratio of the value of agrochemicals used in teff production over the value of labor used declines as transportation costs increase, as does plow ownership. The ratio of fertilizer and improved seed use to the amount

of land used in teff production are both negatively correlated with urban remoteness. Hence, teff farmers who are located close to Addis Ababa use their land more intensively.

In terms of productivity, farmers close to Addis Ababa achieve more than 12 kg of teff per person-day of labor use. This decreases to 6 kg for the study farmers furthest away. There is a clear reduction in expenditures in teff production and in profits in households located far from Addis Ababa. Notably, there are no strong effects of population pressure on intensification of teff production.

## EXPLAINING THE EFFECT

We identify three potential channels to explain these results:

- 1. Transaction costs** – We see a significant correlation between urban remoteness and increased transport times and associated transaction costs in accessing markets to sell teff and to buy inputs.
- 2. Monetization of production factors** – We find a substantial drop in the share of purchased seeds, hired labor, and rented land with increasing transportation costs - the declining effects of formal markets with distance from the city.
- 3. Access to information and knowledge** – We find the share of households that received a visit from an extension agent, acquired knowledge on improved technologies, and that own a mobile phone, decreases over distance from Addis Ababa.

## CONCLUSIONS

From the analysis, we find a strong positive effect of urban proximity on output prices, wages, land rental rates, input use, and profitability. Hence, urban proximity should be considered as a main determinant of agricultural intensification and transformation. Moreover, we illustrate the importance of urban market demand as a driver for transformation in the staple food sector.

## POLICY IMPLICATIONS

These findings have important implications on programs aiming to stimulate agricultural transformation. Our results show the importance of increasing investments in roads and other physical infrastructure to reduce farmers' transportation costs and provide greater access to markets. Similarly, new communication systems make information exchange, cost searching, and communication less costly. Once farmers are better connected with cities, they experience stronger incentives to intensify their farm production – with cities becoming an engine for agricultural transformation.

However, land tenure policy has been a restrictive factor in developing the Ethiopian hinterland. Improving land tenure conditions to encourage farmers to make land investments are crucial to increase productivity levels. The land tenure system policy has slowed down the rate of urbanization and thus the growth of cities in Ethiopia. This perhaps unintentionally has restrained farmers from benefitting from increased urban demand for food and the positive link between urban consumption and rural production.

## REFERENCES

See [ESSP Working Paper 91](#) for a full list of study references.

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