



## Welfare effects of vegetable commercialization: Evidence from smallholder producers in Kenya



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### ABSTRACT

We investigate whether smallholder horticultural commercialization is able to, as often stipulated, reduce poverty in developing countries with the help of panel household survey data from Kenya. We find evidence for a positive association between vegetable commercialization and household welfare, even when controlling for unobserved heterogeneity across households. Interestingly, the effect differs depending on which market vegetables are being produced for: commercialization through the export market is consistently positively associated with income but not wealth, while there is some limited evidence for commercialization through the domestic market channel being positively related to welfare measured by asset holdings and income, depending on the specification.

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### Introduction

Because of the remarkable growth the agricultural sector has recently experienced in many developing countries and because of its importance for many of these economies, it is often viewed as a possible driver of economic growth, development, and poverty reduction for less-developed countries (von Braun et al., 1994; Pingali and Rosegrant, 1995; Pingali, 2007; Barrett et al., 2012). Horticulture, for example, especially with respect to high-value crops, has been identified as one of the fastest growing agricultural sub-sectors in Sub-Saharan Africa in the past two decades (Gioè, 2006; Afari-Sefa, 2007; Henson and Jaffee, 2008). To give the specific case of the country being investigated in this study, Kenyan horticultural exports have increased at impressive rates of 10–15% per annum between 2000 and 2008 (GoK, 2010, 2012). The evidence for whether agricultural growth really reaches smallholder farmers and is thereby able to reduce poverty (GoK, 2007), however, is not conclusive. In this paper we attempt to contribute to this strand of the literature by investigating the impact of smallholder vegetable commercialization on household welfare, measured both by income and by the ownership of durable assets.

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While there is a relatively large body of existing literature on smallholder commercialization and its welfare impacts as outlined in the following section, our contribution lies in employing panel survey data on rural smallholder farmers, which enables us to control for unobserved heterogeneity across farmers, and in focusing on a more general definition of commercialization than contract farming or the supply to supermarkets. Overall, we find consistent evidence for a positive association between commercialization and household welfare using different specifications of commercialization, particularly between participation in the export market channel and income, but not wealth. Interestingly, we do not find evidence for a relationship between commercialization through the export market and asset holdings, and only limited evidence for commercialization through the domestic market channel being positively related to welfare, measured both by income and asset holdings.

The article proceeds as follows: Section ‘Relation of the paper to the existing literature’ reviews the relevant literature, Section ‘Data and descriptive statistics’ describes the data and provides descriptive statistics for the producers of vegetables for the domestic and export markets. We outline our empirical strategy in Section ‘Estimation strategy’ and present the results in Section ‘Results’. The final section concludes.

### Relation of the paper to the existing literature

The perception of smallholder horticultural commercialization as a means of reducing poverty at the household level is supported

in much of the literature (e.g. McCulloch and Ota, 2002; Asfaw et al., 2009a,b; Rao and Qaim, 2011; Barrett et al., 2012; Bellemare, 2012; Maertens et al., 2012; Michelson, 2013), and positive associations between the commercialization of high-value export crops and income have been found for the African cases of Senegal (Maertens and Swinnen, 2009) and Madagascar (Maertens et al., 2012), for example. Turning to evidence on Kenya as the country under investigation in the current study, Rao and Qaim (2011) find positive effects of supplying to supermarkets on household income, which are, however, mainly driven by the labor market rather than the product market in the case of small farmers according to Neven et al. (2009) and McCulloch and Ota (2002).

Still, the implications of smallholder commercialization for household welfare are not yet fully understood and the findings not always in consensus (Maertens et al., 2012), which is likely to be due to the difficulty of empirically identifying the causal relationship. The limitation of many existing studies is that they mostly use cross-sectional data, which prohibits controlling for unobserved characteristics of farmers that do not change over time (Barrett et al., 2012), for example, and that they typically focus on export-oriented market participation and thereby neglect commercialization through the domestic market channel, or on contract farming as a specific form of commercialization on which Oya (2012) provides an overview.

Using panel data and a difference-in-difference approach, Michelson (2013) finds that participation in the supermarket supply chain of vegetables in Nicaragua is associated with higher holdings of productive assets, but not of consumer durables or land. Rao and Qaim (2011), on the other hand, use cross-sectional data but address the endogeneity arising from the decision to supply to supermarkets not being exogenous and suppliers potentially being inherently different from non-suppliers with the help of an endogenous switching regression. They find consistently positive effects of participation in this type of commercialization on household income, especially for households that are poor and/or own little land. Maertens and Swinnen (2009), similarly to Neven et al. (2009), argue that the positive effects of participating in the supermarket supply chain do not accrue from the supply of produce to supermarkets due to the difficulty of meeting standards and transportation costs for small farms, but through employment in that sector as touched upon above.

While also using cross-sectional data and investigating contract farming, Bellemare (2012) outlines the issue of self-selection and, addressing it with the help of an instrumental variables technique, finds that an increase in the likelihood of participation in contract farming is associated with an increase in household income, a shorter duration of the hungry season experienced by households, and a decrease in the variability of household income. Controlling for unobserved, time-invariant heterogeneity across farmers but focusing on a different form of wellbeing, Dedehouanou et al. (2013) find that contract farming is positively associated with self-reported happiness.

Empirical studies using panel data, including the exploration of its characteristics by controlling for time-invariant heterogeneity, and measuring the extent to which the horticultural sub-sector impacts on rural poverty based on welfare outcomes other than income are non-existent to the best of our knowledge. To examine the potential of horticultural farming as a strategy to reduce poverty, consistent estimation of the livelihood impacts of smallholder commercialization is necessary, for which issues arising from the participation in commercialization being a choice need to be addressed. We attempt to do this in this study with the help of panel data by controlling for unobserved heterogeneity across farmers.

Despite the widespread positive reputation of smallholder commercialization as a means to reduce poverty, there are also less optimistic views. A first concern is that smallholder farmers are being pushed out of the horticultural business: with the increasing integration of developing countries in global trade, non-tariff barriers such as food quality and safety standards are becoming increasingly constraining for small producers as compliance is costly (Dolan and Humphrey, 2000; Jaffee, 2003; Henson and Reardon, 2005; Okello and Swinton, 2007; Jaffee et al., 2005; Muriithi et al., 2010). In line with this, exporters are shifting away from smallholder contract farming to large-scale producers or to diversifying their own agribusinesses into crop production (Adekunle et al., 2012; Graffham et al., 2007; Okello et al., 2007; Maertens and Swinnen, 2009; Maertens et al., 2012). Furthermore, the modern vegetable marketing channels in the domestic market also present challenges to smallholder farmers (Neven and Reardon, 2004) as, similarly to the international market, domestic supermarkets have established stringent food safety standards (Neven et al., 2009). Alternative market pathways for smallholders are traditional supply chains which are, however, highly uncoordinated and provide returns that are low in comparison (Muendo and Tschirley, 2004).

Apart from standards, Barrett et al. (2012) mention geographical constraints as well as micro-level constraints such as limited access to productive assets as a challenge to smallholder participation in contract farming arrangements when synthesizing evidence from five countries in Asia, Africa, and Central America. In a related study, Barrett (2008), in a review of the literature on smallholder producers of cereals in eastern and southern Africa, also argues that the focus should be on micro-level rather than macro-level policy efforts: smallholders need easier access to productive inputs and modern production technologies, and rural marketing channels need to be more cost-efficient and organized in order for this activity to act as a means of poverty reduction. Further constraints regarding the commercialization of smallholder horticulture include the lack of physical infrastructure (information technology, roads, markets); high marketing risks and transaction costs; the lack of access to credit, production technologies such as high yield crop varieties, affordable fertilizer, post-harvest processing equipment, and irrigation infrastructure; and high production costs (Jaffee, 2003; Adekunle et al., 2012).

In addition, competition in the international market is increasing, especially from North Africa and South America, where horticultural production costs are often lower due to subsidized farm inputs (Adekunle et al., 2012). Similarly, since early 2011, a high influx of horticultural produce into the regional market from neighboring countries such as Tanzania and Uganda, where production costs are lower, has been observed (USAID, 2011; GoK, 2012). The high production costs in Kenya are partially due to the reliance on imported chemical fertilizer, whose price has risen sharply over the last decade (Gitau et al., 2012), and to increasing labor costs because of inflation (Muriithi and Matz, 2014).

Despite the growing demand for horticultural produce due to population growth, smallholder market participation has been decreasing (McCulloch and Ota, 2002; Jaffee, 2003; Narrod et al., 2009; Muriithi and Matz, 2014). For these reasons and in recognition of Narayanan (2014), who finds that the participation in high value agriculture by means of contract farming has heterogeneous effects on farmers in southern India, the gains from the commercialization of smallholder horticulture and its ability to act as a poverty-reducing rural development strategy are still a matter of debate. This is particularly important for a country like Kenya, where, despite agriculture predominantly occurring in rural areas and acting as the backbone of the economy, poverty is widespread with just under half of the rural population living below the poverty line (IMF, 2012).

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