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Sustainably improving Kenya's coffee production needs more participation of younger farmers with diversified income

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ABSTRACT

Kenya's Arabica coffee is highly rated in the world and is a major source of income for over half a million smallholder farmers. Production has declined by 50% over the past 25 years despite efforts by initiatives. This study tries to unravel what drives coffee production in Kenya. Data were collected on six cooperatives through household interviews and discussions with farmers, cooperative officials, and key informants. Yields ranged from ten to 3889 kg/ha/year, averaged 474 kg/ha/year and were positively correlated with intensity of crop management ($r = 0.09$, $P < 0.05$). Coffee represented about 25–50% of total household income. The oldest farmers (average 63 years) were poorer, had less diversified income sources and managed coffee less intensively than younger farmers. Intensity of management differed among cooperatives and was positively correlated with trust in the cooperative ($r = 0.209$, $P < 0.001$). Households that received credit from marketers were 30% more likely to use fertilizers than other households. We show that the yield gap can be closed by existing practices, and intensification is influenced by household characteristics and services received. We conclude that increasing the participation of young farmers in coffee production and creating an enabling environment for intensification can have a positive and sustainable effect on national production.

1. Introduction

Kenya's Arabica coffee is among the highest rated coffee in the world due to its high quality (Bagal et al., 2013). Kenya's coffee attracts high prices (Bagal et al., 2013), with some of the premium coffees attaining double the average Arabica price on the New York market (Andae, 2018). The Kenyan coffee is mainly exported to Germany, Belgium, USA and Sweden (Kenya Coffee Traders Association [KCTA], 2012). Coffee is an important export commodity in Kenya and a major source of income for over half a million smallholder (< 5 ha) farmers (KCTA, 2012).

In Kenya, coffee is marketed under a business model that is hierarchical and highly regulated. Before the 1990s, the government regulated the coffee sector, provided milling and marketing services. In the early 1990s, the government initiated steps to liberalize the coffee sector (Kisii County Government, 2014). By 2006, coffee milling and marketing was fully liberalized and the government's role became facilitative and regulatory (Kisii County Government, 2014). Currently, farmers with less than two acres of mature coffee, or with annual production of less than 20 tonnes of fresh cherries are not allowed to pulp, mill and market their own coffee (Kenya Law, 2016). Hence, they deliver coffee to cooperative societies, where it is wet-processed and dried. The coffee is then transported to registered millers for milling and grading. Registered marketers then sell most of the coffee by competitive bidding, through Kenya's central coffee auction, under the supervision of the Coffee Directorate. Some premium coffees are sold directly to 'niche market' buyers. Large scale coffee growers wet-process and sometimes mill and market their own coffee. Some cooperatives fall under unions, which have a facilitative role and provide services to their member cooperatives. The government participates in

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setting of indicative prices (Kenya Law, 2016) and the farmers advice marketers on the minimum acceptable prices. Farmers receive payment several months after harvest (Dada, 2007).

The Kenyan coffee sector model provides an opportunity for rewarding good quality with good prices (Pinard and Aithal, 2008). Above all, the model produces premium quality coffee (Pinard and Aithal, 2008) and is highly regarded by other coffee producing countries in the East African region (e.g. Rwanda, Uganda, Ethiopia), who increasingly focus on increasing their export revenues by improving the quality and branding of their coffee.

Despite being lauded for its coffee quality, coffee production in Kenya has declined by about 50% over the past 25 years (Food and Agriculture Organization [FAO], 2018). To curb this trend, there has been an increase in initiatives for sustainable coffee production over the past 5–10 years. For example, the expansion of sustainability certification has been supported by non-governmental organisations (NGOs). According to a review of literature by (Ruben and Fort, 2012), Fair Trade aims to encourage coffee production by smallholders by guaranteeing a minimum price for coffee and supporting the strengthening of producer organisations. Other sustainability standards, such as UTZ, 4C, and Café Practices primarily focus on improving agricultural practices for improved sustainability and productivity (Hoebink et al., 2014). In Kenya, international roasters such as Nespresso (Nestlé, 2015) and Starbucks (2007) also provide training support on agricultural practices. Projects like the coffee value chain project by the Bill & Melinda Gates Foundation further support the productivity improvement agenda (International Trade Centre, 2011). In addition, credit access for smallholder farmers to enhance agricultural inputs use is encouraged through public-private partnerships (Equity, 2013). In 2016, the 4% government fees and levies from coffee marketing were waived to stimulate production. However, these initiatives are yet to have an impact on national production. The 'big' question is why many farmers seem unresponsive to these initiatives, and what (structural) changes need to be made to improve production at scale.

Farming households are diverse in resource endowments, and household production objectives (Tittonell et al., 2005) and these household characteristics influence the adoption of technologies (Bongers et al., 2015). Understanding and exploiting the diversity among farming households and communities may be key for achieving productivity growth at scale. Socio-economic characteristics of households can influence adoption of technologies (Bidogeza et al., 2009). Grouping farming households into typologies allows for an easier understanding of the wide diversity among farms (Alvarez et al., 2014).

Besides understanding the diversity in farming households, there is increasing interest in understanding the diversity in coffee cooperatives (e.g. Vorlaufer et al., 2012). These cooperatives offer additional services, which can include the provision of credit and farm inputs, training and extension support (Mude, 2007). However, the types and quality of services offered differ strongly among cooperatives (Nduati, 2012). Cooperatives differ in the trust that members have in them (Hoebink et al., 2014) and the satisfaction of members with services provided (van Rijsbergen et al., 2016).

Investments made in production by members can be influenced by (i) the relative importance of coffee in their farm livelihoods, (ii) the resources available, (iii) the services received from cooperatives, (iv) the expected benefits from coffee production, (v) and members' perceptions of, and trust in, their cooperative (Mude, 2007).

In this publication, we try to unravel what drives smallholder coffee production and sustainability in Kenya. We take Mt. Elgon in western Kenya as an example – a region that has a long tradition of coffee production in Kenya since colonial times (Shanguhyia, 2015). We sample diverse coffee cooperatives in the coffee sector in an effort to capture and understand the diversity and drivers of adoption within cooperatives, between cooperatives, and along the value chain. This study tries to answer the following three research questions:

(i) How important is coffee for income of diverse smallholder households?
(ii) Does adoption of intensification practices differ between different household typologies within and between cooperatives?
(iii) To what extent are these differences in adoption related to differences in smallholder access to resources and services?

Based on the findings, we want to make suggestions on innovations or changes that may be required to improve coffee production and income of diverse smallholders.

2. Materials and methods

2.1. Site characteristics

The study was conducted in Bungoma County, in western Kenya on the southern slopes of Mt Elgon in 2015. Farms average about 1 ha per household (Jaetzold et al., 2005), the total population is about 1,361,390, and 50.3% of the population work on family agricultural holdings (Kenya National Bureau of Statistics, 2013). Farmers mostly own the land they cultivate and practice mixed farming. The main food crops grown include maize, beans, banana, millet, onions and the main cash crops are coffee, sugarcane and tobacco (Jaetzold et al., 2005).

In this coffee growing region, annual average rainfall ranges from 1200 to 1800 mm and is bimodal; annual mean temperature is 19–21 °C (Jaetzold et al., 2005). The soils are predominantly ferralsols and acrisols (Jaetzold et al., 2005). The surveyed farms are located between latitudes 0°51.4′ and 0°42.4′ North, and longitudes 34° 33.8′ and 34°24.5′ East. The altitude ranges from 1385 to 2253 m.a.s.l.

2.2. Sampling framework and methods

The study used a 'mixed methods' approach to collect qualitative and quantitative data by carrying out i) structured household interviews, ii) semi-structured meetings with cooperative officials, (iii) focus group discussions (FGDs) with farmers in each cooperative, and iv) semi-structured but open-ended interviews with key informants and experts.

2.2.1. Selection of cooperatives

At the time of data collection, two of the six cooperatives included in this study were preparing for combined UTZ and Fairtrade certification with technical support from a coffee marketing agent (CMS) and financial support from an NGO (Solidaridad). These cooperatives had been selected for certification by the marketing agent based on the anticipated potential for improving production and the cooperatives' support and ability to engage in certification. Hence, selection of the cooperatives for certification had not been random but had been guided by discussions among cooperative members, the marketing agent and the supporting NGO. An additional four cooperative societies were selected that could act as controls for the two cooperatives that were preparing for certification. All the 29 coffee cooperatives in the Mt. Elgon region (KCTA, 2012) were identified, and the eight cooperatives with the greatest similarity to the two preparing for certification were visited. Four of the eight cooperatives were selected as 'controls' based on similarity with respect to (i) member number, (ii) location, (iii) total production, (iv) member objectives, and (v) stability in respect to internal wrangles and (vi) technical support from initiatives.

In this paper, we denote the six cooperatives by the codes Co-op1, Co-op2, Co-opP3, Co-opP4, Co-op5 and Co-op6. The first two cooperatives were preparing for certification.

2.2.2. Selection of farmers within cooperatives

For each cooperative, a total 120 farmer names were selected from the registers using a stratified random method. The stratification was with respect to the electoral regions. The selection was random and per