

# Synopsis: Crop commercialization in Rwanda: Current market participation and drivers

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As Rwanda emerges from the effects of COVID-19 and global price shocks caused by the Russia/Ukrainian conflict, there is an opportunity to focus on agricultural fundamentals to drive its economic transformation. One aspect of the transformation is how farm households are engaging in crop commercialization. This policy note outlines basic findings and suggested recommendations derived from a 2022 Rwandan commercialization household survey. Our basic unit of analysis is total crop sold divided by total value produced, averaged at either the household or individual crop level. Key findings include:

- ▶ Approximately 20% of our sampled smallholder households do not sell any crops. However, contrary to a subsistence/commercial farm dichotomy, most households sell on a broad continuum ranging from 1 – 100% with an average of 33% of their total crop production marketed.
- ▶ Crop value per hectare increases with greater marketed sales, indicating that farmers switch from lower value food crops (e.g. beans, cassava, maize) to cash crops such as fruits and vegetables where they market higher percentages.
- ▶ Crop value per hectare is not correlated with land size, revealing that crop choices drive value and not increasing land-related economies of scale. This finding underscores the pivotal role of crop selection in determining agricultural productivity and economic returns, rather than mere expansion of land holdings.
- ▶ Irrigation, land size, hiring labor and input purchases increase market participation as well as percentage of sales. Conversely, a larger family size has a negative effect on both.

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<sup>1</sup> This research summarizes results from Warner, James; Benimana, Gilberthe; Mugabo, Serge; and Ingabire, Chantal. 2024. [Crop commercialization in Rwanda: Current market participation and drivers. Rwanda SSP Working Paper 11](#). Washington, DC: International Food Policy Research Institute.

## Background

In theory, a farmer with perfect information, competitive markets, and no transaction costs would choose to produce the crop that maximizes their profit, from which they would sell all their crops and use the revenue to purchase food and other consumer goods that maximizes the household's welfare. An economic explanation for subsistence, or less than full commercialization, is linked to a violation of any of these concepts and research generally attributes lower levels of commercialization to three potential problems that include transaction costs, risk and a lack of assets.

A central component of Rwanda's Fourth Strategic Plan for Agriculture Transformation (PSTA 4) is the commercialization of the country's smallholder production systems during the period 2018-24. Efforts to address issues around accelerating smallholder commercialization are limited by the absence of data and analysis on returns to commercial production systems. This analysis is based on the results of a national and province level representative smallholder farmer survey conducted in late 2022 of 2,020 agricultural households.<sup>2</sup> Most of the results are presented in graphical format, cross tabulating crop type by level of sales. In order to determine drivers of crop commercialization we made a couple of basic assumptions. Regarding crop marketing in the regression model, we assume that Rwandan smallholder farmers make two separate, but interrelated, decisions and use a model, referred to as a double hurdle model, to incorporate these economic decisions. The first step (hurdle) estimates whether or not farmers market any crops at all and is called the *participation decision*. The second hurdle estimates the conditional outcome, level of sales, for those who have decided to market crops and is referred to as the *quantity decision*.

## Findings

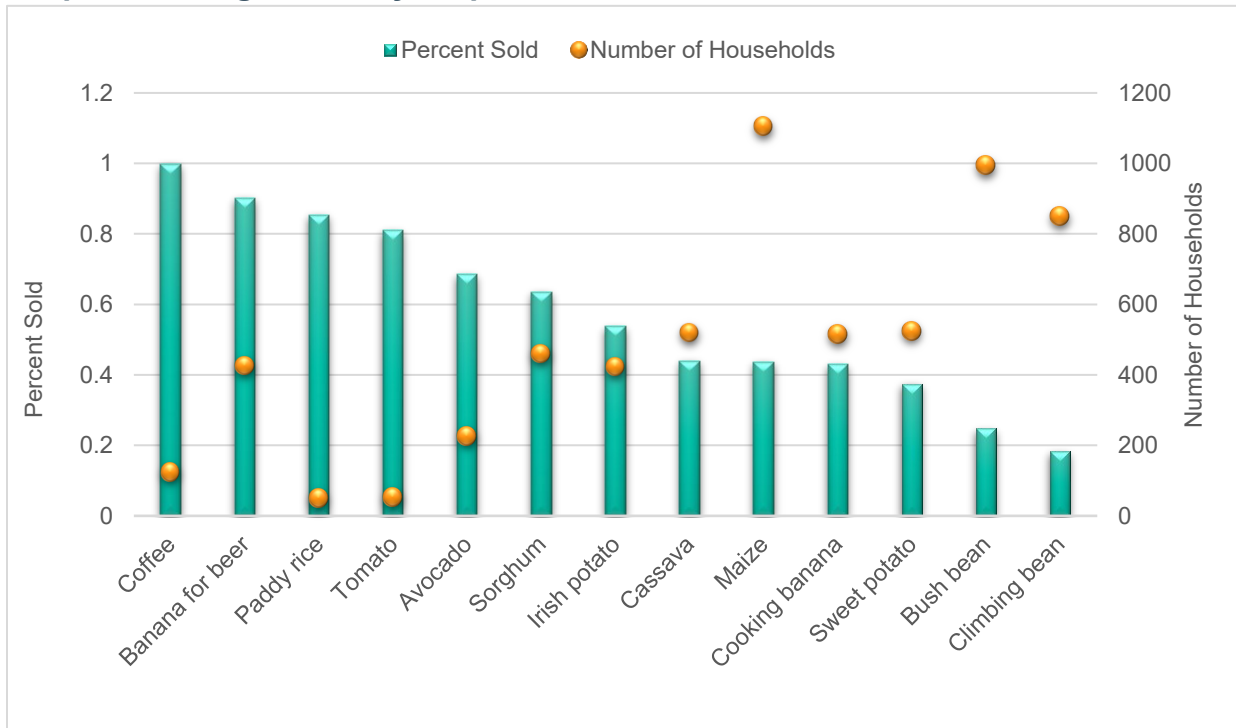
Our survey finds that approximately four out of five farmers currently sell crops, which indicates significant market participation by most smallholder farmers. However, average sales by the typical household are only 33 percent which highlights that two-thirds of crop production is either used for own consumption, saved for next season planting, or other uses. While high-value crops are grown and sold, a disproportionate number of smallholder farmers produce lower value food crops for their own consumption. Graph 1 depicts average sales by crop to show the relative importance of their commercialization. The left axis estimates the percentage of each crop sold and the right axis indicates the projected number of farmers who produce the crop. Interestingly, many of the most commercialized crops, including coffee, rice, tomato, and avocado, are sold at higher percentages but are not commonly produced by farmers. Following this level of commercialization is sorghum, Irish potato, and cassava which typical percentages sold are between 40 to 60% and produced by about 20% of farmers. Cooking banana, sweet potato, bush and climbing beans are less commercialized but are much more commonly produced. Maize is an exception as it is commonly produced by over half of our sample and about 44% of

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<sup>2</sup> International Food Policy Research Institute (IFPRI), 2024, "Smallholder Agriculture Commercialization in Rwanda, 2022", Harvard Dataverse, V1.

the total crop is sold. This unique crop typically serves as a food crop for most household consumption but is also highly commercialized by a select group of larger landholding farmers.

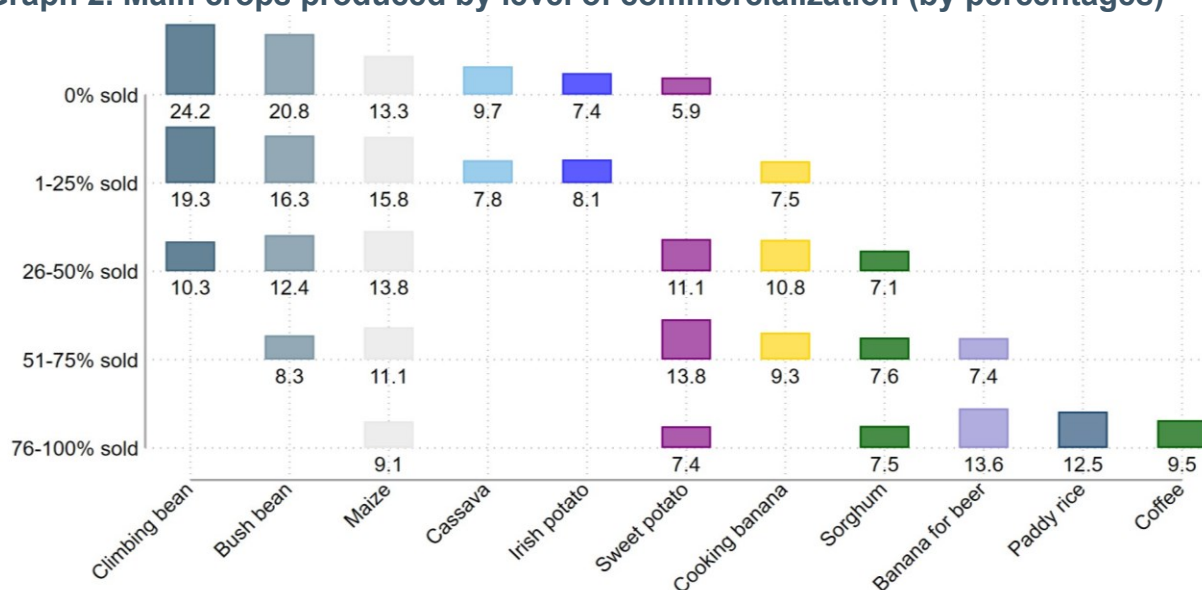
**Graph 1. Average Sales by crop**



Source: Authors' calculations

Graph 2 presents the top six most produced crops by sales category and reveals that as households undertake higher marketed sales, they alter crop choice from principally consumed crops to those produced almost exclusively for sale. For example, the top row identifies, of those selling zero percent, the most produced crops include climbing bean (24.2% of all value produced in this category), bush bean (20.8%) and maize (13.3%). A few crops, including maize and sweet potato, are both consumed directly by those that have low levels of crop sales and are sold by those farmers who sell more of their crops. Banana for beer, paddy rice and coffee are almost exclusively represented by those selling between 75 and 100%. While coffee, rice and tomatoes are grown by less than 15% of our sample, banana for beer is much more commonly grown by smallholders (over 40%), suggesting that it is a key cash crop for many agricultural households.

**Graph 2. Main crops produced by level of commercialization (by percentages)**



Source: Author's calculations

## Drivers of Commercialization

While basic statistics can depict relationships between two variables, econometric models, control for a variety of potential influences to better understand and isolate the effects of key variables of interest. These commercialization drivers are important for understanding motivations of how Rwandan farmers engage in market activity and identifying these relationships is important for potential interventions to enhance market activity and accelerating the agricultural transformation. Graph 3 uses icons representing statistically significant regression coefficients, derived from the models, into a matrix of possible outcomes to identify how they influence either participation or level of sales. For example, consider *female household heads*, the icon in the top left square reveals that women headed households equally participate in crop commercialization but do not sell as high a percentage as male headed households (i.e. first hurdle insignificant, second hurdle negative).

Located in the top right panel, icons depict variables that exhibit positive contributions to both participation and the percentage of crop value sold and include *agricultural inputs such as land, fertilizers, hired labor and irrigation*. The statistical significance of these variables predicts that expanding any of these variables would increase both crop market participation and sales. Conversely, a larger household size negatively affects both commercialization and amount sold Targeted credit (input credit and tool credit) positively influenced either sales or participation, respectively. In terms of interventions, engagement in the farmer field school suggests increased participation in commercialization but not increased levels of sales.

**Graph 3—Estimated drivers of both crop marketing participation and sales**



Source: Author's calculations

## Conclusion

This paper explores agricultural commercialization among smallholder farmers in Rwanda and how increasing crop commercialization would have the potential to enhance the welfare of rural households and accelerate the agricultural transformation. A key finding is that value per hectare rises with crop sales, and it is the crop choice, over productivity increases, that increases market value. This insight suggests that policies should consider farmers across various land sizes and encourage the cultivation of more profitable crops to boost household income.

## Suggested policy options to increase crop commercialization.

- ▶ **The impacts of agricultural interventions could be viewed between the twin goals of either encouraging participation and/or increasing crop sales.** Articulating intervention objectives between these strategies could improve targeted efficiency of programs.
- ▶ **Increase access to irrigation.** While irrigation levels are currently at relatively lower levels, this research found it to be highly impactful on commercialization. Predictable access to water likely alters crop choice including reorienting towards higher value cash crops.
- ▶ **Improve agricultural labor markets.** Better developed labor markets could facilitate improved access to additional labor and increase commercialization.

- ▶ **Expanding farmer capacities via farmer field schools.** Empowering farmers to participate in crop commercialization could likely improve overall sales and improve income.
- ▶ **While improved credit access assists overall crop commercialization, different types of credit might better target commercial objectives.** This research suggests that credit for agricultural tools could increase participation and credit for inputs could increase marketed percentages. Depending on intervention goals, these types of credit could be used.
- ▶ **Further research regarding how land consolidation improves market sales and participant welfare** seems warranted.
- ▶ **Research to better understand larger family motivations related to crop choice** seems important for designing improved strategic interventions to enhance welfare. This is likely due to perceptions of risk.
- ▶ **Further explore motivations on why some farmers do not sell crops.** Twenty-two percent of all sampled smallholders did not sell any crops and targeted research on why this is the case would likely improve potential strategies for commercial engagement.

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