

# Revisiting the Gains from Agricultural Commercialization

Calogero Carletto, Paul Corral, and Anita Guelfi

## Overview

Conventional wisdom: *Agricultural commercialization is likely to enhance economic development and nutritional outcomes at the household level.*

Findings:

- *Market involvement is commonplace among farm households; it accounts for 90 percent of production in Malawi.*
- *Contrary to common perceptions, the bulk of market participation is driven by the sale of food crops.*
- *In most cases, market participation only involves the sale of small quantities of own food production.*
- *Although female farmers appear to participate less in market activities, when they do participate, they tend to sell larger shares of the production under their control relative to their male counterparts.*
- *Simply comparing levels of commercialization of agriculture and household nutrition outcomes reveals few links between the two.*
- *Measuring nutrition in per capita food expenditure and per capita caloric consumption, the study finds little association with commercialization.*
- *No clear trends emerge when the degree of agricultural commercialization is correlated with children's anthropometrics as measured through Z-scores.*

Policy conclusion: *In line with previous research, the study finds little evidence of a relationship between increased commercialization and improved nutritional status in the three African countries covered.*

### **The Issue: Does the Commercialization of Agriculture Harm Nutrition?**

According to conventional wisdom, the transition from subsistence (or semisubsistence) to commercial agriculture represents a key ingredient for the economic development of low-income countries. By exploiting comparative advantage, the process of agricultural commercialization is expected to enhance efficiency and the gains from trade. This in turn is expected to lead to economic growth and welfare improvement at the national, household, and individual levels. The progressive move toward a market-oriented system of production in agriculture is thereby expected to initiate a virtuous cycle that, by raising income levels, improves consumption, food security, and nutritional outcomes in rural households. Nonetheless, this process requires that households choose to commercialize their production and use the returns from crop sales in ways that foster improved nutrition. Thus, although the commercialization of crops may potentially increase incomes, and thereby improve nutrition, farming households often avoid commercializing their crops. This finding is often attributed to the fact that households are not indifferent between production for the market and production for the homestead.

The empirical literature on the nutritional outcomes of agricultural commercialization can be grouped into three main strands:

1. *Earlier studies* tended to lack a proper conceptual framework, adopting instead a black box approach that neglected the processes that generate outcomes. The main approach was a comparison of nutritional outcomes between cash crop adopters and nonadopters. The evidence was often anecdotal and based on country case studies, which made it impossible to compare results across and within countries. In most of the studies, the definition and measurement of commercialization was subjective and mainly based on the adoption or nonadoption of a given list of cash crops. Von Braun and Kennedy (1994) and Von Braun, Kennedy, and Bouis (1989) provide useful summaries of this literature.
2. *The work of the International Food Policy Research Institute (IFPRI)* between 1986 and 1994 was more systematic. IFPRI first developed a conceptual framework to represent the complex set of links between the process of agricultural commercialization and the nutritional and health status of households. This framework sought to explain the variety of mechanisms through which the transition to a more market-oriented production system can affect household consumption and nutrition. IFPRI's empirical work during this period focused on Guatemala, Kenya, Rwanda, the Philippines, and The Gambia. Two key results emerged:
  - Most country studies found a positive (although relatively low) impact of agricultural commercialization on the nutritional status of rural households. This positive relationship mainly operated through income and calorie links. Cash crop adoption generally increased real incomes, thereby

stimulating a virtuous cycle through which higher incomes led to increased food consumption that benefited, on average, the household in general and children in particular.

- Agricultural commercialization of smallholder production systems is not in itself positive or negative. The complex set of links characterizing the commercialization process and its impact on household welfare and nutrition suggests that several scenarios can emerge, depending on the factors in each context. Policies aimed at enhancing beneficial outcomes while minimizing adverse ones play a key role.

3. *Recent studies* conducted since the IFPRI work have made few significant empirical contributions. One such study, by Wood et al. (2013), emphasizes that all previous evidence (including the IFPRI studies) considered periods of high stability in food prices; in contrast, recent studies seek to understand the nutritional consequences of a shock in food prices. However, the few additional studies do not provide any new, clear-cut conclusions about the positive or negative effects of agricultural commercialization on nutrition.

### The Analysis: Back to the Data and More Recent Evidence

This study covers two survey panel waves in three countries included in the Living Standards Measurement Study–Integrated Surveys on Agriculture (LSMS–ISA) program, namely Malawi, Tanzania, and Uganda. The surveys were fielded throughout the year. Given the focus, the study sample only includes agricultural households, defined as households that reported involvement in agricultural activities through ownership and/or cultivation of land in the most recently completed agricultural season. After excluding nonpanel and nonfarming households, the final sample that was used for the panel analysis consisted of 2,222 households in Malawi, 1,744 in Tanzania, and 1,587 in Uganda.

#### Defining and Measuring Commercialization

The study adopted a simple but insightful measure of commercialization, the Household Crop Commercialization Index (CCI), defined as:

$$CCI_i = \frac{\text{Gross value of crop sales}_{hi, year j}}{\text{Gross value of all crop production}_{hi, year j}} * 100$$

According to this measure, the process of agricultural commercialization can be represented on a continuum, ranging from pure subsistence ( $CCI_i = 0$ ) to a completely commercialized production system ( $CCI_i = 100$ ). The main advantage of the CCI is that it goes beyond the traditional dichotomies of sellers versus nonsellers or producers of cash crops versus producers of staple crops. The CCI provides an additional layer to the discussion and is relatively easy to apply.

### ***Measuring Nutrition***

The study adopts the following indicators of nutrition:

- Child anthropometric measures (measured as percentages of children stunted, wasted, and underweight, and through the computation of Z-scores)
- Food expenditure per capita
- Total expenditure per capita.

The data reveal high levels of malnutrition in all three countries, with an incidence of stunting among preschool children of about 42 percent in Tanzania, 36 percent in Uganda, and 31 percent in Malawi. Similarly, the share of wasted children in Tanzania amounts to 6.2 percent, compared with 3.2 percent in Uganda and 3.6 percent in Malawi. Tanzania exhibits average per capita caloric consumption of 2,044 kilocalories, compared with 2,536 kilocalories in Malawi and 2,243 kilocalories in Uganda.

### ***Exploring the Links***

As a first approximation, the study allocates households into CCI quintiles (quintile 1 having the lowest CCIs, and quintile 5 the highest). A comparison is then made across the quintiles for each of the anthropometric Z-scores (anthropometric measure expressed as standard deviations above or below a reference median):

- Height for age, a measure of stunting indicating past inadequate nutrition and/or chronic and frequent illness
- Weight for age, a measure of underweight reflecting current deprivation
- Weight for height, a composite measure of short- and long-term conditions, or wasting.

Comparison of the nutrition outcomes across the quintiles revealed little evidence of any clear link between the level of commercialization and nutritional outcomes (table 5.1). To account for the small sample of children for the anthropometric measures, the study pools the data across countries and runs a local polynomial nonparametric regression (without any control variables). The results suggest that there is some correlation between CCI and nutritional outcomes, particularly for stunting, with a more accentuated upward slope (figure 5.1).

The empirical strategy taken involved ordinary least squares (OLS) multivariate analysis with panel fixed effects using several specifications, varying the CCI and nutritional measures. For two of the dependent variables (per capita food expenditure and per capita total expenditure), sample size considerations do not apply and OLS estimates were obtained for each country separately. For children's anthropometric measures (where individual country samples were limited), the pooled data were exploited. All the regressions involved the following explanatory variables: gender, age and education of the household head, land holdings,

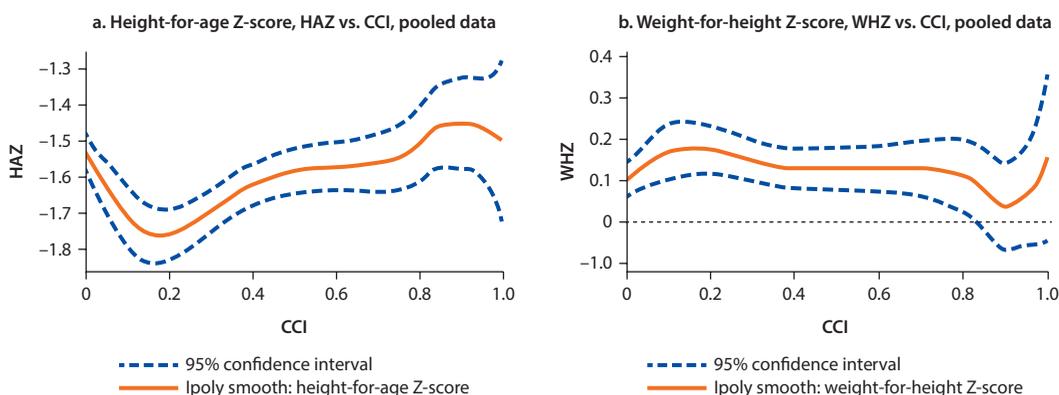
**Table 5.1 Little Evidence of a Link between Nutritional Outcomes and Commercialization**

Country and quintile		Nutritional measure						Food expenditure (\$)	Kilo-calories	
		HAZ	WAZ	WHZ	Stunted	Wasted	Underweight			
Malawi	No Sales	-1.31	-0.52	0.29	25.6	3.9	5.7	0.42	2418	
	CCI quintile	1	-1.22	-0.48	0.28	25.2	3.0	4.7	0.47	2352
		2	-1.53	-1.57	0.41	32.8	2.7	7.5	0.53	2546
		3	-1.32	-0.41	0.46	30.3	3.6	5.5	0.54	2670
		4	-1.40	-0.54	0.35	30.5	4.7	6.8	0.55	2538
		5	-1.52	-0.51	0.47	36.5	3.8	7.7	0.57	2640
Country mean	-1.39	-0.57	0.39	30.7	3.6	6.4	0.52	2536		
Tanzania	No Sales	-1.72	-0.95	0.02	42.6	5.7	14.4	0.63	1972	
	CCI quintile	1	-1.81	-1.10	-0.15	43.4	7.7	24.1	0.66	2215
		2	-1.85	-0.97	0.10	47.2	7.1	16.9	0.59	2051
		3	-1.67	-1.02	-0.13	45.1	6.2	15.5	0.61	2004
		4	-1.62	-0.88	0.03	40.1	5.5	12.1	0.62	2074
		5	-1.58	-0.92	-0.06	32.4	5.5	14.0	0.64	2044
Country mean	-1.71	-0.96	-0.02	41.9	6.2	15.6	0.63	2044		
Uganda	No Sales	-1.43	-0.83	-0.04	32.1	2.4	14.5	0.35	1954	
	CCI quintile	1	-1.35	-0.58	0.26	36.8	1.7	9.4	0.40	2229
		2	-1.85	-1.01	0.07	45.6	6.1	16.1	0.41	2299
		3	-1.59	-0.78	0.18	37.0	5.1	12.3	0.44	2546
		4	-1.57	-0.70	0.27	31.8	1.6	10.7	0.40	2362
		5	-1.44	-0.58	0.31	34.4	2.4	7.9	0.44	2132
Country mean	-1.53	-0.75	0.16	36.0	3.2	11.9	0.40	2243		

Source: Computations based on LSMS-ISA data.

Note: Food expenditure and kilocalorie data are per capita, and at the household level. CCI = Household Crop Commercialization Index; HAZ = height-for-age Z-score; WAZ = weight-for-age Z-score; WHZ = weight-for-height Z-score.

**Figure 5.1 Some Correlation between Commercialization and Nutrition**



Source: Computations based on LSMS-ISA data and local polynomial nonparametric regressions.

Note: Local polynomial for pooled data. CCI = Crop Commercialization Index; HAZ = height-for-age Z-score; poly = Smoothed local polynomial; WHZ = weight-for-height Z-score.

land holdings squared, wealth index, distance to market, distance to population center, value of the household harvest, and regional dummies. In addition, the household's per capita expenditure, child's age in months, and gender were added to the child anthropometric analysis. Alternative measures of CCI were used as regressors, in part to test for the sensitivity of the results to the measure of commercialization. The measures were disaggregated by gender and crop. The study counsels caution in interpreting the results, given the potential endogeneity of the CCI variable.

### **The Results: Little Evidence of a Link between Nutrition and Commercialization**

The results are mixed, depending on the regression specification and the country.

*Dependent variable: Z-score level.* These regressions use the pooled data covering all three countries. The fixed-effects results consistently fail to show any relationship between the CCI and anthropometric outcomes, however defined. The level of per capita expenditure is also not significant in these regressions.

*Dependent variable: percentage stunted, wasted, and underweight.* The probability of a child being stunted, wasted, or underweight is also modeled with pooled data. The coefficients only show a significant and negative effect of greater commercialization by women on short-term nutritional indicators, which is possibly a reflection of the potentially deleterious effect of lower levels of child care on child nutritional status. Per capita expenditure in this instance seems to play a role, with an increase in expenditure negatively related to the child's likelihood of being stunted and underweight.

*Dependent variable: household per capita food expenditure.* The study finds little evidence of a relationship between CCI and food expenditures, except for Uganda, where the coefficient is negative and marginally significant. All the other coefficients provide little support for the existence of a relationship between commercialization, in its different specifications, and food expenditures in any of the countries analyzed.

*Dependent variable: household total per capita expenditure.* There is little evidence of any effect of commercialization on total expenditures. This lack of impact may be because although commercialization is widespread across farmers, sales often involve small amounts, which fail to have a significant impact on total household per capita expenditures.

### **The Implications**

Despite the inconclusiveness of the available empirical evidence to date, agricultural commercialization among poor smallholders continues to be heralded as an effective solution to foster growth in rural areas, reduce poverty, and improve household food and nutrition security. Based on new, comparable data from across Sub-Saharan Africa, the study contributes to the ongoing debate by investigating

the relationship between increased agricultural commercialization and several nutritional indicators in three African countries, differentiated by gender and types of crops.

Against the conventional wisdom, the data reveal a very high level of market involvement by even the poorest and smallest landholders, with rates of market participation as high as 90 percent in Malawi. Similarly, against the common perception, a considerable portion of this market presence is driven by the sale of staple and other food crops, and not necessarily by traditional cash crops. This finding is in part because the great majority of smallholders are still specializing in the production of food crops (between 80 and 90 percent in the three countries analyzed), with only a relatively small share cultivating food and traditional cash crops, and virtually none specializing in cash crops. However, in most cases, particularly in Malawi, market participation only involves the sale of small quantities of own food production, resulting in a rather low food CCI (at 10 percent for the entire sample, and only 14 percent among the largest farmers).

Another important finding of the cross-country descriptive analysis is that although female farmers appear to participate less in market activities, when they do, they tend to sell larger shares of the production under their control compared with their male counterparts.

Finally, the study finds little evidence of a relationship between increased commercialization and improved nutritional status. The only exception is a weak, negative relationship between the portion of commercialization accruing to females and short-term nutritional indicators, which could be the result of the negative effect of greater female market participation on time allocated to child care and homemaking. Although the use of panel data partly resolved some of the endogeneity issues of the proposed specification, and the availability of comparable cross-country data helped in making some of the conclusions more robust, some caution is warranted in interpreting the findings.

## **Additional Reading**

### ***This chapter draws on:***

Carletto, Calogero, Paul Corral, and Anita Guelfi. 2017. "Agricultural Commercialization and Nutrition Revisited: Empirical Evidence from Three African Countries." *Food Policy* 67: 106–18. <https://doi.org/10.1016/j.foodpol.2016.09.020>.

### ***Other key references:***

Von Braun, J., and E. Kennedy, eds. 1994. *Agriculture Commercialization, Economic Development, and Nutrition*. Baltimore: Johns Hopkins University Press.

Von Braun, J., E. Kennedy, and H. Bouis. 1989. *Comparative Analyses of the Effects of Increased Commercialization of Subsistence Agriculture on Production, Consumption, and Nutrition*. Washington, DC: International Food Policy Research Institute.

Wood, B., C. Nelson, T. Kilic, and S. Murray. 2013. "Up in the Smoke? Agriculture Commercialization, Rising Food Prices and Stunting in Malawi." Policy Research Working Paper 6650, World Bank, Washington, DC.

