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Impact of an Agricultural Value Chain Project on Smallholder Farmers, Households, and Children in Liberia

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Summary. — We explore the impact of a rural agricultural value chain project in Liberia on smallholder farmers, their households and children in order to better understand the link between household economic welfare and child wellbeing. Drawing on longitudinal field-based quasi-experimental survey data, we estimate the causal effect of the project on the use of modern farming techniques and production, household assets and food security, and child education, health and nutrition. Mixed-methods include multiple rounds of focus groups with farmers, key informant interviews with community leaders, and project monitoring farmer diaries. Treatment farmers showed increased use of modern farming techniques and improved production, households experienced greater access to food, and while no significant changes were found for children, for the outcomes of interest, treatment children outcomes trended in the positive direction. The evaluation suggests that participation in agricultural value chain interventions contributes to positive farm outcomes and social assets, but economic-focused activities alone are insufficient to improve children's lives. Since improving the lives of children from birth is critical to breaking the intergenerational cycle of poverty, economic strengthening programs like value chain interventions, must monitor their effects on children: to do no harm and to identify and take advantage of opportunities to improve the lives of children.

Key words — economic development, program evaluation, panel data, value chain, household economic welfare, child wellbeing

1. INTRODUCTION

More than two billion people live on less than US$2 a day (World Bank, 2015b). For most rural poor, agriculture is the main occupation and source of income (World Bank, 2015a). Market-based solutions such as agricultural value chain interventions have become increasingly popular to reach this population and facilitate their entrance into larger markets, providing a means to improve their economic welfare (Staritz, 2012). At the same time, the development field increasingly recognizes that building a strong foundation in childhood is more likely to interrupt the transmission of poverty from one generation to the next (Alderman, 2012; PEPFAR, 2012). Recent research shows that household economic status and child well-being are highly correlated (Campbell, Handa, Moroni, Odongo, & Palermo, 2010). It behooves economic development policy makers and practitioners to better understand the connection between household economic welfare and child well-being, as well as the interventions that affect positive change for households and those living within them.

This paper examines the impact of one such intervention—the agricultural value chain project Agriculture for Children's Empowerment (ACE)—in rural Liberia. ACE was designed to build relationships among actors in agricultural value chain networks and increase crop volume, thereby increasing sales for farmers and food security for households. Increasing income from farms was expected to increase spending on children's education, and improve nutrition and access to health care.

This paper is organized as follows. The rest of this section provides background information on the evidence-based impact of agricultural value chain projects, the link between household economic welfare and child well-being, the agricultural context in Liberia, and the ACE project. Section 2 describes the study methods and Section 3 provides mixed-methods results for smallholder farms, households, and children, including the potential for contamination. Section 4 is a discussion of results, Section 5 describes study limitations, and Section 6 provides a conclusion.

(a) *Agricultural value chain interventions with vulnerable populations*

Few agricultural value chain programs with vulnerable populations have been rigorously evaluated for impact, and none of the evaluations have examined the effects on children. The challenges of evaluating these complex programs are well documented (Creevey, Dunn, & Farmer, 2011). Yet this type of intervention has become increasingly common in the past 10 years. This is likely because of its systemic approach for sustainable development, including positive results at the farm or enterprise level, with large outreach and positive spillover effects (Dunn, 2014). Therefore, it is critical for the development field to understand the impact of these interventions on multiple levels.

Krieger (2014a, 2014b, 2014c) has reported results from three impact evaluations, as part of the World Food Programme's Purchase for Progress (P4P) 20-country, five-year pilot initiative. P4P tested ways to link smallholder farmers

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to formal commodity markets, using a model that depended on the local context and enabling environment. In Ethiopia and Tanzania, P4P worked with farmer organizations, agricultural cooperatives, and savings and credit cooperatives. In Ethiopia, results included a significant increase in maize (staple) yield at the farmer level. In Tanzania, households that received the interventions were more likely to sell maize through savings and credit cooperatives and received a higher average price for maize. In El Salvador, P4P's model included working with farmer organizations to improve assistance packages, build extension services' capacity to deliver packages, and facilitate access to finance the purchase of packages. Krieger found statistically significant improvements in all of the maize production indicators measured, including likelihood to plant maize, average area under production, use of certified maize seed, yield, and quantity and quantity sold. Despite farm-level improvements in some cases, none of the three studies found statistically significant differences with regard to key household outcomes: income, assets, livestock, and food consumption.

Humphrey and Navas-Alemán (2010) have examined reports on 30 value chain interventions, not all in agriculture, finding that the majority did not conduct impact evaluations to determine if the programs had any effect on poverty. Of those programs that engaged in agriculture linkage activities, only one (Bringing Knowledge to Vegetable Farmers in Rangpur, Bangladesh) included a quantitative impact evaluation, but no report has been found beyond an early assessment (Gibson, 2005).

A recent review of findings on the impact of agricultural value chains on vulnerable populations concludes that although there is some evidence to indicate that smallholders may experience an increase in enterprise profit, this may not translate into an increase in household income (Dunn, 2014). One possible reason for this is that household income is a more distal outcome (Dunn, 2014). Other known contributors include the lack of sensitivity in measurement tools (such that small changes in income are not statistically significant) and that with money being fungible, it is difficult to accurately collect data across all potential household sources of income and expenditure.

A quasi-experimental impact assessment of three value chain interventions—horticulture, maize, and dairy—in Kenya found a positive impact on poverty reduction but no statistically significant impact on household income (Oehmke, Jayne, Aralas, & Mathenge, 2010). Creevey *et al.* (2011) found that two additional value chain program assessments with counterfactuals showed positive outcomes at the farm level with increased productivity or revenue from the sale of produce.

(b) *Child well-being and economic welfare*

Research shows a strong correlation between household economic welfare and child well-being. Campbell *et al.* (2010) examined an array of socioeconomic outcomes including nutrition and education. After controlling for other possible intervening factors, they found that "household wealth is the single most important correlate of better outcomes." Low household economic status was a stronger predictor of negative outcomes than was orphan status, which is particularly relevant given the number of HIV/AIDS-related orphans. Akwara *et al.* (2010) found that both household economic status and parental education levels were the most consistent predictors of negative outcomes for children. They too found that household economic condition was a stronger predictor of negative outcomes for children than was orphanhood.

The U.S. President's Emergency Plan for AIDS Relief's (PEPFAR's) Guidance for Orphans and Vulnerable Children Programming states that a positive foundation for children would increase the likelihood of interrupting "the transmission of poverty from one generation to the next" (Alderman, 2012; PEPFAR, 2012). The U.S. Government Action Plan on Children in Adversity (United States Government, 2012) is the first ever U.S. government system-wide strategy for international assistance for children. Driven by evidence illustrating that failing to address children's needs results in negative social and economic outcomes, the plan's primary goals are to build strong beginnings for children, protect them from violence and exploitation, and keep them in or return them to family care so they grow up in the best environment possible. The plan seeks to strengthen child welfare and protection systems, integrate the plan throughout U.S. government agencies, and promote evidence-based policies and programs. This paper supports the latter and calls for more research to improve our understanding of what interventions work best for both households and the children living within them and how systemic programs like value chain interventions can be tailored to have greater impact for children, their families, and their communities.

(c) *Study region*

The challenges left in the wake of the 15-year civil war in Liberia have profound implications for all aspects of recovery and reconstruction, and have created obstacles to the development of the country. Issues such as limited economic opportunities for youth and the presence of unemployed ex-combatants at ACE project inception in 2008 need to be addressed in order to promote an effective and sustainable reintegration and reconstruction process (United Nations, 2006). In 2013, Liberia was ranked 174 out of 185 countries on the Human Development Index scale, with 83.8% of the population below the US$1.25 per day poverty line and 63.8% below the national poverty line (UNDP, 2013).

Agriculture is the mainstay of the rural economy, and at the time of ACE project inception, agricultural activities employed close to 70% of Liberia's population (Liberia Institute of Statistics & Geo-Information Services LISGIS, 2009). This has changed little since project inception, as illustrated by the Comprehensive Food Security and Nutrition Survey (CFSNS), which states that 67% of the population relies on agriculture as their primary livelihood. Most people living in rural Liberia depend on a combination of "food and cash crop production, petty trading or street vending, hunting/gathering, casual labor, palm oil, charcoal production or rubber tapping" (World Food Programme, 2013). Households generally adopt livelihood strategies based on the natural resources available to them, and it is not uncommon to find several generations of farmers or rubber tappers. However, this cycle now appears to be shifting, with young people reluctant to become farmers, despite the opportunities in the sector and rising food prices (Education Development Center *et al.*, 2012). Though possessing abundant arable land and opportunities in the agricultural sector, Liberia continues to import about half of its staple foods (World Food Programme, 2013).

Initial post-conflict donor programs focused on asset replacement to create a foundation for the transition to a more market-based agriculture system, which is essential to reduce Liberia's continuing dependence on food imports. Yet this

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