Speaker Summary Note

Session: **Learning from Evaluations**

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Title: **KickStart—Treadle Pumps in Africa**

1. Background—KickStart Program and Evaluation

KickStart International is a social enterprise,[1] a non-profit organization dedicated to advancing solutions to social problems by applying market-driven strategies to development. Their primary mandate is to alleviate poverty in Sub-Saharan Africa. In response to widespread dependence on rain-fed agriculture and the associated risks for small farmers, KickStart began selling low-cost irrigation pumps and other productive assets in 1991. Their approach was and continues to be application of a business model in which farmers, primarily women, purchase pumps from local retail shops. Non-governmental organizations also purchase and distribute pumps. The human-powered irrigation pumps range from small hip-pumps (US$35) to larger Super Money-Maker pumps (US$100) that can draw water from depths of up to 8 meters or approximately 25 feet. To date, KickStart has sold over 100,000 pumps in Tanzania, Kenya, Uganda, Ethiopia, Zambia, Mali and Burkina Faso.

Internal monitoring activities and years of observation have shown the potential for tremendous impact from the pumps extending beyond poverty reduction into the realms of education, health, and nutrition. KickStart recognized the importance of involving independent evaluators to examine more rigorously these effects. In 2009, KickStart partnered with the International Food Policy Research Institute (IFPRI) and Washington University in St. Louis, MO to undertake a large-scale impact evaluation in Kenya and Tanzania. Funding was received from the Bill and Melinda Gates Foundation, 3ie, and Voxtra to conduct this study.

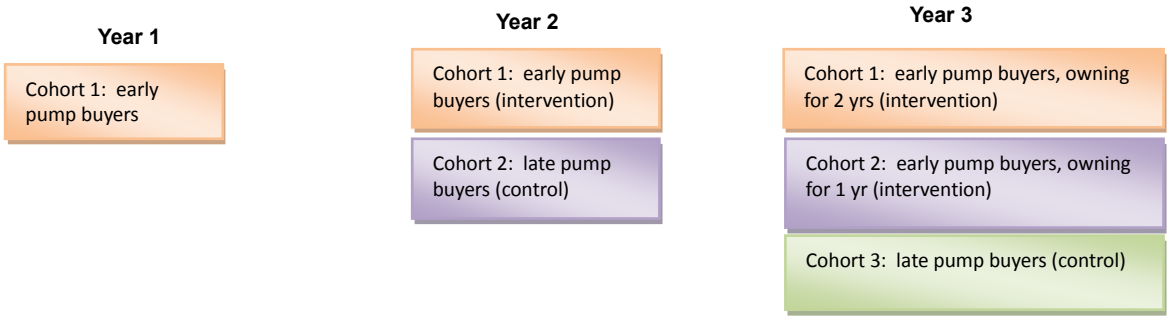
2. Evaluation Innovations: Design and Pathways

Design Innovations. While the primary intent of the KickStart impact evaluation is to evaluate poverty outcomes, the KickStart impact evaluation is uniquely designed to explore the effectiveness of an agricultural intervention on both health and nutrition outcomes. It is a 3-year, longitudinal study comparing the impacts of treadle pump ownership between control and intervention groups.

The first design innovation lies in the *construction of the comparison groups*. Similar to others in the social enterprise field, KickStart implicitly places value in the importance of particular characteristics of its

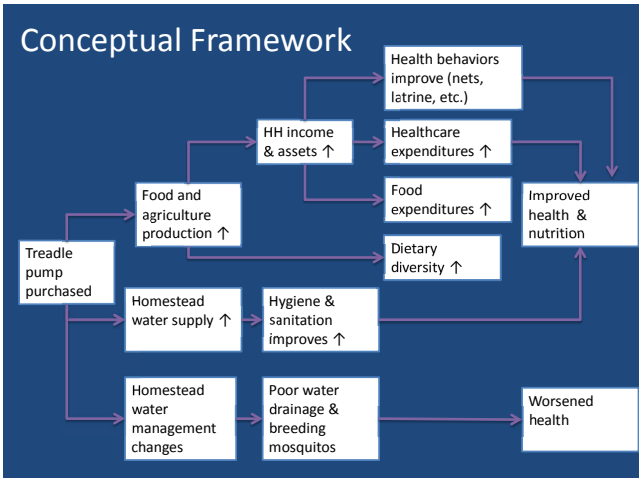
[1] Bornstein D. and Davis, S. *Social Entrepreneurship: What Everyone Needs to Know*. Oxford University Press, 2010.

targeted population of farmers. In particular, an entrepreneurial spirit and willingness to invest in agricultural inputs are two features associated with success. Thus, during the planning phase, much consideration was given to constructing a representative sample of typical pump buyers. The challenge was to find an appropriate control group, ultimately decided to be a group of farmers who recently purchased pumps but not yet realized any of the associated benefits. Simply defined, the control group includes 2 cohorts of "late pump buyers" and the intervention group including 2 cohorts of "early pump buyers" (one group owning for 1 yr, and one group for 2 years) in the following schematic. The full set of indicators is being collected annually, and the health and nutrition outcomes every 6 months owing to a faster rate of change and seasonality of determinants.



Another design feature is that enumerators are conducting surveys using *mobile phone technology and the EpiSurveyor software*.[2] This allows for more rapid feedback and error checks in the data. Additionally, GPS coordinates are being recorded in the phones for later use in analyses. With the innovations and design features described above, there will be an opportunity to apply an interesting combination of analytic methods to rigorously assess the effects of the treadle pump on health and nutrition.

Transdisciplinary pathways. The connections between irrigation pump ownership and health and nutrition impacts are not readily obvious. This evaluation explores pathways through which such an agricultural investment may influence household health behaviors, expenditures and consumption, but more importantly, the morbidity and nutrition outcomes among young children less than five years.



Two main pathways, each with multiple branches, are being explored for the hypothesized positive health and nutrition outcomes: (1) increased food and agricultural production leading to increased income and assets; and (2) increased water supply close to the homestead for uses extending beyond irrigation. Conversely, poor water management practices both at the homestead and on the land plots could lead to negative health outcomes, are also to be explored. A range of factors along these pathways are captured: agricultural production (irrigated and rain-fed); livestock; assets; markets; income; rural services; water use, sanitation, and hygiene; mental health and aspirations; household food consumption; and young child nutrition (diet and anthropometry) and morbidities related to nutrition, water and sanitation (diarrhea, respiratory conditions, fever and malaria, trachoma, and helminthe infections).

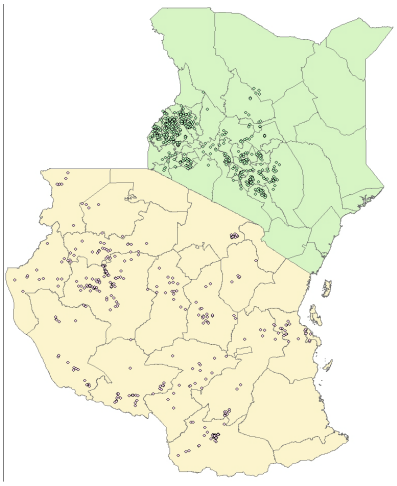
3. Preliminary Findings & Early Lessons for Large Scale Evaluations

Baseline data collection is now complete for cohort 1. A total of 1264 households were surveyed, 614 from Kenya, 650 from Tanzania, and 458 children under five years from both countries (see map below with

[2] http://www.episurveyor.org/user/index

GPS coordinates of households visited). Some preliminary results from the full sample related to health and nutrition are presented, with the caveat that the data cleaning is not yet finished. Several of the nutrition and morbidity outcomes were aligned with findings from the Demographic and Health Surveys from these countries.

In the dry season, the common domestic water sources for households were *covered wells located within the compound* (13%), a *natural spring or stream* (13%), or *a public well* (11%) suggesting the potential for KickStart pumps to improve water supply and access. Few households reported using the pumps yet for domestic purposes, but only about one half had begun to use them for irrigation. The average time to collect water during the dry season was 15 minutes with a high degree of variability and taking up to 3 hours from some families. *Adult women* have the primary responsibility for water collection (83%) in this region, offering the possibility of time and labor savings if the pump is used for domestic purposes. Almost one-half of the sample indicated they do not treat water before drinking (46.5%). Many families reported owning one or more bednets (88%), but very few use flush toilets (20%) and rely on latrines in various forms or nature. Increases in income and wealth from KS ownership may drive changes in some of these health behaviors.



Household food consumption reported from the previous week was greater for *cereals, vegetables,* and *legumes* when compared to *meats (beef, fish, poultry), dairy, and fats* groups. For the latter three groups where we hypothesize a change based on previous studies of food type demand elasticities, there was a consistent trend in frequency of consumption; approximately 80% of household did not report any consumption compared to 20% reporting some consumption. Patterns of consumption were similar among children less than five years. Prevalence of morbidities in previous two weeks in young children were: 13% diarrhea; 30% with fever; and 9% with acute respiratory illnesses. Very few reported trachoma or guinea worm infections. Anthropometric Z scores have not yet been calculated.

Early lessons are emerging for evaluating the impacts of an agricultural intervention on health and nutrition outcomes. (1) The transdisciplinary nature of the study team (nutrition, public health, agriculture economics, GIS/demographers) and involved partners seems to have fostered innovation through the convergence of ideas and methods. (2) All involved partners are working towards building an evaluation legacy within KickStart. Capacity strengthening of the impact evaluation and monitoring staff at KickStart is integral to the work of IFPRI and Washington University, and is being accomplished through training and involvement in the evaluation work. (3) More pilot testing of the survey instrument and use of the phone would have been helpful. (4) Collecting data from remote, hard-to-reach areas can be prohibitively expensive; and (5) Finally, the results from this study suggest there may be new approaches in agricultural development for improving nutrition and public health.