

## Executive Summary

In 2016, the Nuru Kenya (NK) Agriculture Program aimed to improve crop yield, agricultural income and household food security by disbursing quality agriculture inputs on loan and providing training and extension services. Nuru Monitoring and Evaluation (M&E) supports this work by conducting annual evaluations of NK Agriculture's impact to address the question: *What is the impact of Nuru Kenya Agriculture on Nuru farmers?*

The findings of this report indicate:

- Increased yields over baseline and the comparison group: NK farmers in Kuria East increased crop yields by 36% over their baseline (surpassing the 32% target) and by 41% as compared to a non-Nuru group (difference-in-difference).
- Increased revenue and profit over baseline and the comparison group: Participant farmers increased agricultural profit by 55% compared to their baseline and experienced over double the profits (+107%) compared to the non-Nuru group.

These results generally indicate that the program is tracking towards consistently increasing crop yields and agricultural income, and reinforce the principal activities being carried out by the program.

## Agriculture Program

Nuru Kenya (NK) Agriculture provides farmers with a complete agricultural package: an in-kind agriculture loan, technical training, extension services, and group support structures. Throughout the growing season specifically, farmers receive technical assistance from experienced NK Agriculture field officers as well as periodic farm visits to ensure they're able to follow the most appropriate agronomic practices. Moreover, NK farmers can leverage both the knowledge and labor of their peers via the farming support group. At harvest time, farmers finish repaying their loans and commercialize their surplus produce with the assistance of Nuru Kenya.

Due to low yields in 2013 resulting from drought, NK Agriculture shifted from a monocropping strategy to a diversified crop strategy in 2014 and decided to continue with this strategy in 2015. During the 2015 long rains (LR) season, NK Agriculture offered a diversified loan package for the production of 0.75 acres of maize and 0.25 acres of either brown sorghum or finger millet. The inputs included improved hybrid seed for each of these crops as well as planting fertilizer (DAP) and top-dressing fertilizer (CAN). NK Agriculture provides farmers with a complete agricultural package: an in-kind agriculture loan, technical training, extension services and group support structures. Throughout the growing season, farmers receive technical assistance from experienced NK field officers as well as periodic farm visits to ensure they are able to follow the most appropriate agronomic practices and to monitor adoption. Moreover,

## 2016 Nuru Kenya Agriculture Program Impact Assessment: Kuria East

Nuru farmers can leverage both the knowledge and labor of their peers via a farming support group. At harvest time, farmers finish repaying their loans and commercialize their surplus produce with the assistance of Nuru Kenya. Additionally, in relation to the integrated Nuru model, farmers who participate in NK Financial Inclusion are also encouraged to deposit savings from crop sales into group savings accounts.

In 2016, Nuru Kenya consolidated farmers into cooperatives. These member-owned, member-run organizations absorb risk by administering a revolving fund that will be used to purchase inputs year after year and offering market linkages so farmers can earn income by selling surplus crops. As Nuru Kenya scales across Migori County from Kuria West to Kuria East. It will continue to establish cooperatives to give community members greater ownerships of programs and outcomes.

## Objective

This report serves as the first impact assessment for the NK Agriculture program in Kuria East, Kenya. The assessment is determined by measuring crop yields and agriculture income.<sup>1</sup> This paper presents the results from impact evaluation data over time.

In service to this approach, the Nuru Kenya (NK) M&E team administered a household level survey that built on a similar data collection in 2015 and aimed to answer the question: *What is the impact of NK Agriculture on Nuru farmers?*<sup>2</sup>

## Methodology

NK M&E administers an annual harvest yield survey (Table 1) and household survey (Table 2) of Nuru families (intervention group) and non-Nuru families (non-Nuru group) to evaluate the impact of NK Agriculture. The baseline survey was administered in 2015. To ensure the quality of the data analyzed in this report, NK M&E built a system of checks and balances into the data entry process whereby each individual survey was reviewed three separate times before final entry. Nuru intends to follow these farmers and continue to survey each household every year.

Table 1: Harvest Yield Survey Timeline and Sample Sizes

Survey group	Training dates	Number of enumerators	Survey collection dates	Data entry and quality control	Final Sample Size
Nuru farmers	Sept 5 - 12, 2016	35	Sept 13 - Oct 11, 2016	Sept 13 - Oct 12, 2016	319
Non-Nuru farmers					442

Table 2: Household Hunger Survey Timeline and Sample Sizes

<sup>1</sup> Note: Data regarding food security will not be available until 2017 harvest. Harvest data is "paired" with the food security data from the following year to illustrate the potential relationship between the two.

<sup>2</sup> The evaluation survey is available upon request.

## 2016 Nuru Kenya Agriculture Program Impact Assessment: Kuria East

Survey group	Training dates	Number of enumerators	Survey collection dates	Data entry and quality control	Final Sample Size
Nuru farmers	Apr 18 - May 3, 2016	40	May 3 - June 2, 2016	May 3 - June 3, 2016	334
Non-Nuru farmers					511

### Crop Equivalent Yield

For purposes of comparability across Nuru and non-Nuru farmers and versus baseline, NK Agriculture and M&E developed one composite picture of crop performance: Crop Equivalent Yield (CEY).

The CEY calculation utilized by M&E converts the performance of select crops into one standard unit of maize kilograms per acre. This is done using the farm gate prices per kilogram of brown sorghum, finger millet and maize. Finally, M&E transforms all crops into maize via the price ratios of sorghum or millet versus maize. One way to interpret this calculation is to ask: *If farmers only grew maize this season, how much maize would they have produced?* While on average, absolute yields per acre of sorghum and millet are lower than maize, the farm gate value per kilogram of these crops tends to be higher. Ultimately, if Nuru farmers successfully plant maize and either sorghum or millet, the overall value of their production after the harvest should be higher than if they relied on a mono-cropping strategy. Thus, the CEY formula is optimal for demonstrating the value add of a diversified crop approach.

### Agricultural Profits

In 2012, M&E adopted a methodology known as gross margin analysis to determine the overall agricultural profits generated by Nuru farmers.<sup>3</sup> In gross margin analysis, costs for Nuru farmers are represented by the total amount of Kenyan Shillings spent on the NK Agriculture loan.<sup>4</sup> NK M&E then calculates revenue via multiplying average crop equivalent yield per acre by the farm gate price of the particular crop. Finally, to calculate agriculture profits, loan costs are subtracted from revenue.<sup>5</sup> For comparison group farmers, NK M&E collects cost-related farming data equivalent to an NK Agriculture loan. Calculations for revenue and profits are generated for the non-intervention group and then agriculture profits is compared between the two groups.

<sup>3</sup> This methodology is used by other organizations including One Acre Fund.

<sup>4</sup> Gross Marginal Analysis Tools. Retrieved from

<http://dpiwwe.tas.gov.au/agriculture/investing-in-irrigation/farm-business-planning-tools> on 18 November 2014.

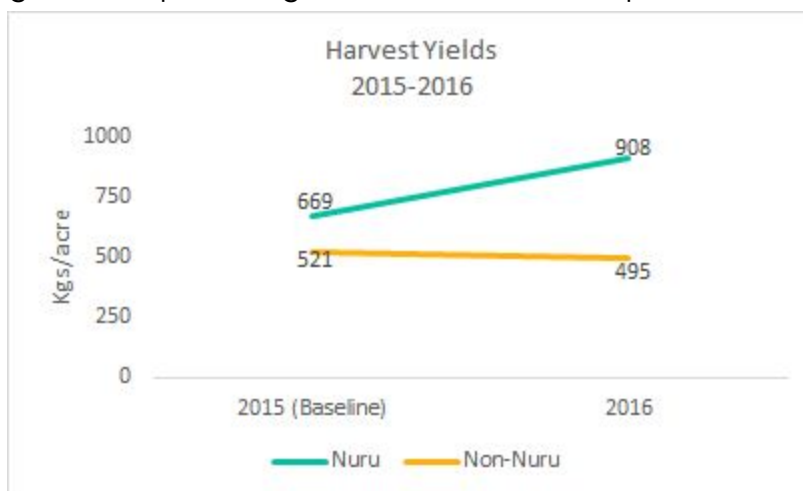
<sup>5</sup> Gross marginal analysis excludes opportunity and labor costs.

## Results & Discussion

### Crop Yield

In 2016, NK farmers in Kuria East increased crop yields by 41% from 2015 to 2016 and as compared to a non-Nuru comparison using difference-in-difference calculations. Agricultural profitability of Nuru farmers was over double (+107%) compared to the non-Nuru comparison group in 2016. Moreover, compared to their own 2015 baseline, Nuru farmers increase crop yields by 36% to 908 kgs/acre. The crop yield increase of 41% surpasses the target benchmark of 32%, meaning the program hit their target this year in Kuria East. The Agriculture Program intervention helped households achieve substantially and significantly higher incomes and crop yields than the non-Nuru comparison.

Figure 1: Crop Yield (kgs/acre) of Nuru and Comparison Farmers



### Income Model

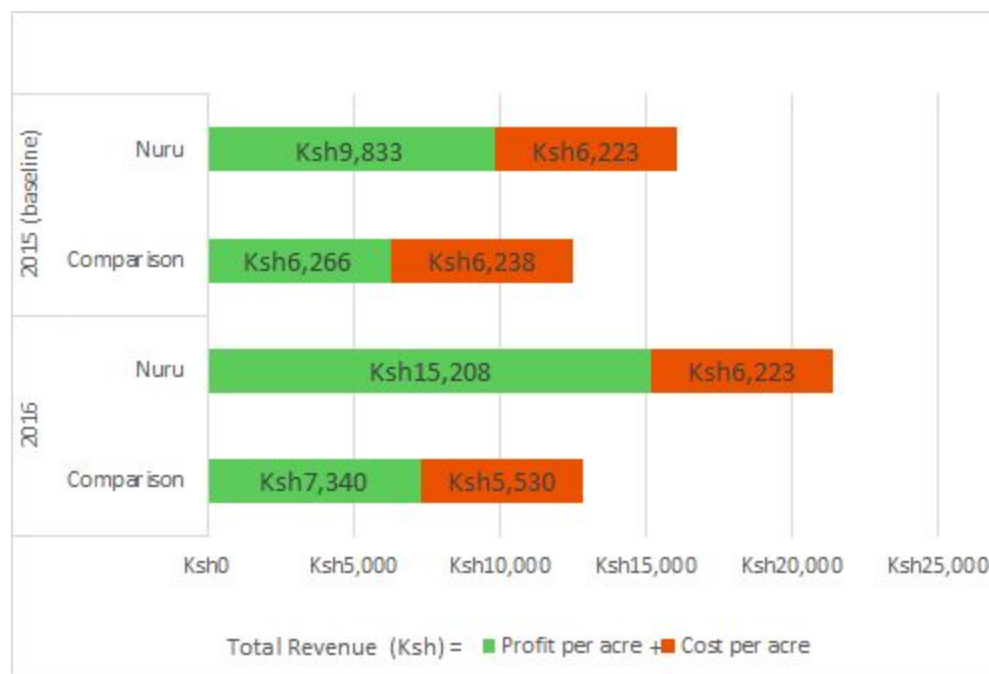
Figure 2 illustrates total revenue, profits and costs for Nuru and comparison farmers. Overall revenue is shown as the sum of profit (in green) and costs (in red). This graphic contextualizes Nuru farmers' revenue and profitability, given the increased costs of Nuru farming methods compared to baseline methods and a non-Nuru group.

In absolute terms, NK farmers in Kuria East profited \$152 per acre in 2016 as compared to a profit of \$73 per acre for comparison farmers. NK Kuria East farmers saw their profits increase by 55% in 2016 over their 2015 baseline, substantially more than the 17% experienced by the non-Nuru group. In other words, Nuru farmers in Kuria East saw their agricultural incomes increase by \$53 from pre-intervention baseline to the 2016 intervention point, while the

## 2016 Nuru Kenya Agriculture Program Impact Assessment: Kuria East

non-Nuru comparison group only increased agricultural income by \$11 from the 2015 baseline to 2016.

Figure 2: Total Revenue, Costs, and Profits per Acre(Ksh)



## Conclusion

In conclusion, Nuru farmers in Kuria East have shown strong improvements in crop yields since baseline in 2015. 65% of farmers in Kuria East opted for a diversified crop package that included maize with a combination of sorghum, millet, or both. Loan repayment across Nuru Kenya operating areas increased from 2015 to nearly 90% in 2016. In Kuria East, farmers also experienced profitability of 55% over their 2015 baseline, substantially more than the 17% experienced by the non-Nuru group. Though the correlation between increased agricultural income and increased food security amongst Nuru Kenya farmers is yet to be seen in Kuria East, the surplus yields and profits created by the Nuru Kenya agriculture program in 2016 have helped to lay the foundation for a strong economic base for Nuru Farmers.