

Comparing Yields and Profits of Seed Varieties in Northern Ghana



Photo: Cephas Joshua Beujung Safwini

Improved seeds varieties can generate significantly higher agricultural yields for farmers, but recent data indicates that only 20 percent of farmers in northern Ghana use improved seeds. This study, known as the Testing Agricultural Technologies (TAT) project, compared yields and profits of several seed varieties and looked at farmer purchasing decisions to understand the performance and adoption of seed varieties in northern Ghana.

Key Findings*

Over the course of one growing season:

- The seed comparison found a wide variety in yields between seeds, with farmers who grew the foreign hybrid seed, Adikanfo, on average yielding more than double that yielded from the local hybrid seed, Mamaba.
- Contrary to expectations, the commonly-used local seed, Obaatanpa, outperformed the local hybrid seed, Mamaba.
- The study suggests a farmer cultivating one hectare of land who switched from Obaatanpa to Adikanfo would harvest about 1.8 tons more maize, translating into an increase in profit of more than 1,600 GHC.
- It is important to note these results are particular to this context and conditions, and during the growing season studied there was ample rainfall. These results cannot speak to characteristics of seeds not tested under these conditions, such as drought resistance.

**Results are preliminary and may change after further data collection and/or analysis. Note this study was not a randomized evaluation.*

Researchers: Mathias Fosu, Dean Karlan, Shashidhara Kolavalli, Christopher Udry

Partners: Savanna Agricultural Research Institute (SARI), International Food Policy Research Institute (IFPRI)

Timeline: 2015-2016

Study Sample: 10 districts in three northern regions of Ghana

The Challenge

In the last 40 years, agricultural output in sub-Saharan Africa has risen by a modest 20 percent, and much of this growth has been due to an increase in land used for agriculture, not an increase in productivity. One reason for the low rate of productivity growth is that farmers in sub-Saharan Africa have been slower to adopt technologies that have increased agricultural productivity elsewhere: only 24 percent of harvested grains in sub-Saharan Africa are from “improved” seed varieties, while over 75 percent meet this definition in South Asia and East Asia.

In northern Ghana in particular, only 20 percent of farmers use improved seeds.¹ This low rate of technology

adoption may seem like a puzzle, but from the farmer’s perspective may make more sense. First, the availability of certified seed varieties that have been proven to outperform farmers’ traditional choice is often limited in the local retailers. Second, farmers may not have enough evidence that higher-performing varieties will prove profitable in their particular local environment. This lack of demand, in turn, may lead retailers to reduce their supply of improved seeds further. Farmers may also be wary of the possibility of counterfeit seeds. As a result, researchers are interested in learning more about the yields of different seed varieties and in identifying how farmers make decisions about which varieties to use.

The Program & Evaluation

IPA collaborated with the Savanna Agricultural Research Institute (SARI), and the International Food Policy Research Institute (IFPRI) to improve information about the performance of new seeds in northern Ghana and to study the means by which farmers learn about and test new technologies.

In the first phase of the Testing Agricultural Technologies (TAT) project, researchers tested the performance of five varieties of seeds—two foreign hybrids, one local hybrid, and two local open-pollinated varieties (OPVs). This project took place in Upper West, Upper East and Northern Region.

One of the five was Obaatanpa, a local open-pollinated variety (OPV) seed that is most commonly used by farmers in the region. The other four had all been proven in at least one context to have a higher yield than Obaatanpa, but less was known about them in the local context of northern Ghana. They were:

- **Adikanfo**, a foreign hybrid variety.
- **Sika-Aburo**, another foreign hybrid variety.

- **Mamaba**, a local hybrid variety.
- **Sanzal-sima**, a local OPV used less commonly than Obaatanpa.

In each district, a primary demonstration farm was set up in a farmer’s field, where each of the five seed varieties were planted and grown under the same conditions and care protocols, and under the supervision of a SARI scientist or an agricultural extension agent (AEA) from the Ministry of Food and Agriculture. An additional four trials in each district were meant to replicate the growth, but under more realistic conditions. In these trials, farmers planted the seeds they were using at the time in their fields along with one foreign hybrid and one other variety. SARI scientists and AEAs were instructed to visit these additional plots every week and to assist farmers during key stages in the production process.

In the second phase, researchers offered certified seeds at subsidized prices to further assess seeds’ performance as well as to investigate farmers’ adoption decision. Results from the second phase are forthcoming.

¹ Disseminating Innovative Resources for Smallholders in Northern Ghana (DIRTS)

Preliminary Results and Conclusion*

*Results are preliminary and may change after further data collection and/or analysis.

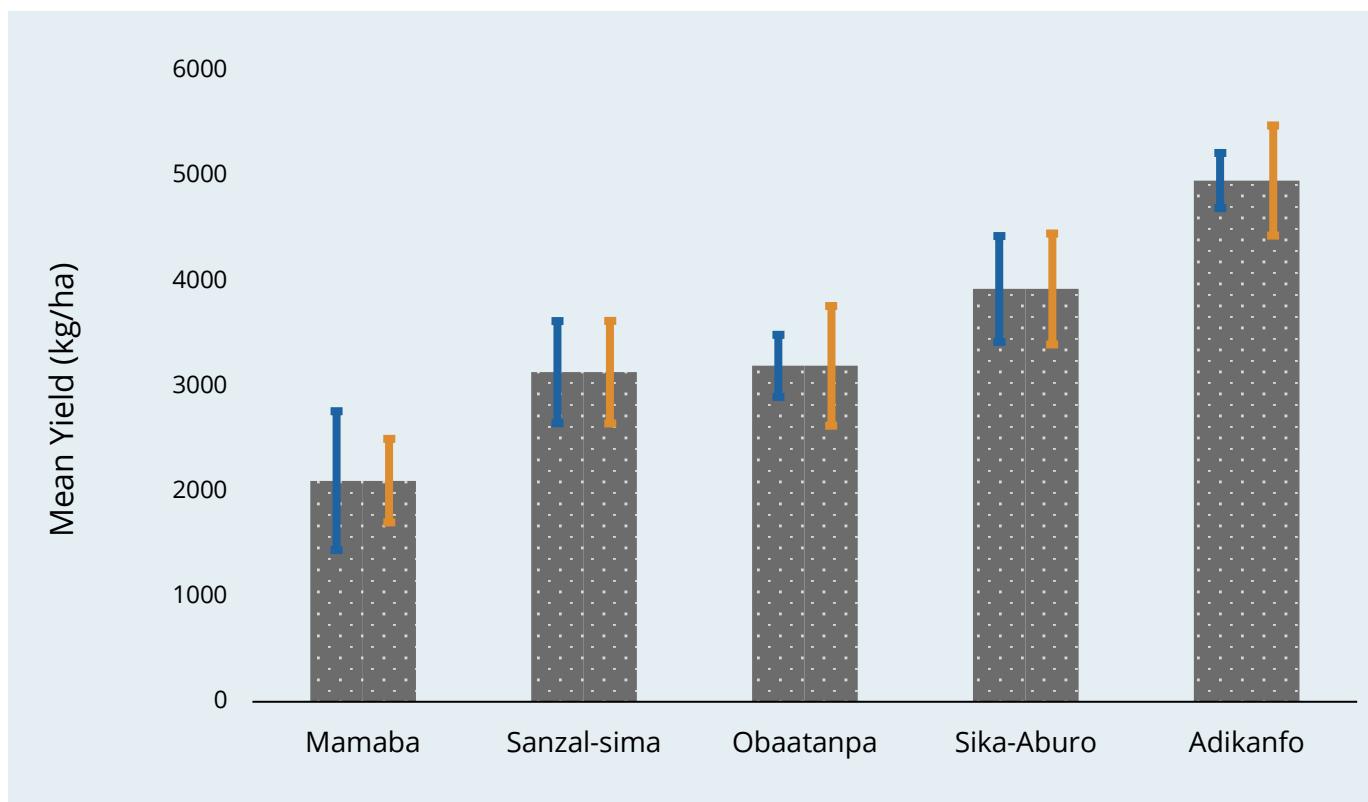
Overall, results found that the foreign hybrid seeds, particularly Adifanko, had substantially higher yields than local OVP and local hybrid seeds, and that even given their higher cost were more profitable.

Average Yields (Figure 1): The most commonly grown seed variety, Obaatanpa, yielded an average of 3190 kg/ha. Neither Mamaba nor Sanzal-sima had higher mean yields than Obaatanpa's, contradicting experts' previous field tests in other contexts. However, the two foreign hybrids, Adikanfo and Sika-Aburo, did have higher yields than Obaatanpa. Adikanfo had the highest mean yields, which

were 57 percent higher than Obaatanpa's, and 27 percent higher than Sika-Aburo's, and over twice as high as Mamaba's.

Yield Variation (Figure 1): Mamaba, the local hybrid, had the highest variation in yields between different districts—but was relatively consistent from one plot to the next within a district. Sika Aburo also had high levels of variation. Sanzal-sima, meanwhile, had high levels of variation both between and within districts. Adikanfo and Obaatanpa performed relatively consistently both within and between districts.

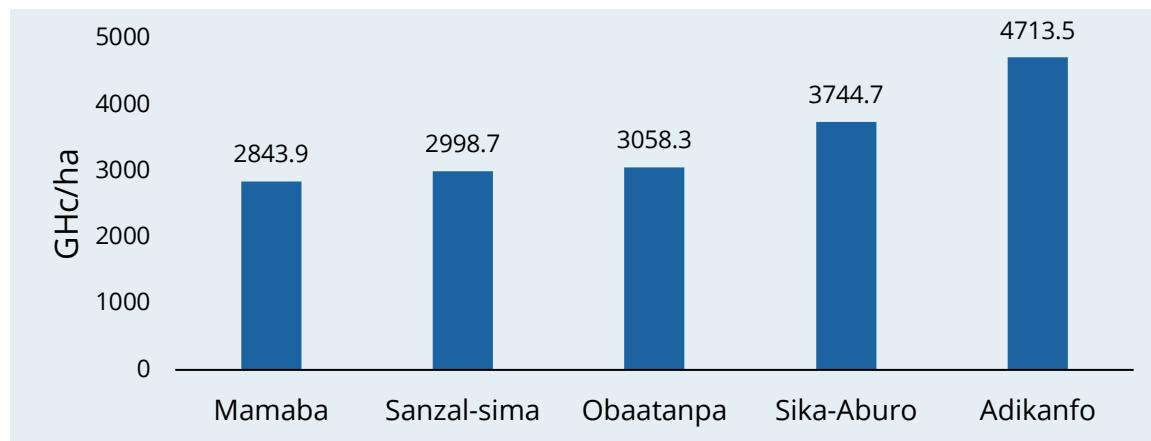
Figure 1: Mean yields and variances by seed variety



Profitability (Figure 2; see next page): A profitability analysis suggests that, despite their higher cost, on average Adikanfo and Sika Aburo were more profitable per hectare than other varieties. Adikanfo had the highest mean

profits, which were 16 percent higher than Sika Aburo's and 37 percent higher than Obaatanpa's. Obaatanpa's mean profits exceeded both Mamaba and Sanzal-sima's.

Figure 2: Profitability by seed variety



The results suggest that the foreign hybrid seed varieties are well worth the cost, but information about the profitability of the seed may be needed since demand for the seed is generally low.

A farmer cultivating one hectare of land who switched from Obaatanpa to Adikanfo would harvest about 1.8

tons more, which would translate into an increase in profit of more than 1,600 GHc.

It is important to note that these results are particular to the growing season of the period studied, which included ample rainfall. These results cannot speak to characteristics of seeds not tested under these conditions, such as drought resistance.

Acknowledgments

This project was made possible by generous support from the International Food Policy Research Institute.



Innovations for Poverty Action (IPA) is a research and policy non-profit that discovers and promotes effective solutions to global poverty problems. IPA designs, rigorously evaluates, and refines these solutions and their applications together with researchers and local decision-makers, ensuring that evidence is used to improve the lives of the world's poor. Our well-established partnerships in the countries where we work, and a strong understanding of local contexts, enable us to conduct high-quality research. This research has informed hundreds of successful programs that now impact millions of individuals worldwide.

Innovations for Poverty Action—Ghana

HN8 Saflo Street, Abelemkpe, Accra, Ghana

Postal Address: PMB 57, Osu-Accra, Ghana

+233 030-279-0372

info-ghana@poverty-action.org

www.poverty-action.org/ghana