

How are Africa RISING interventions affecting production diversity and dietary quality?

Evidence from North of Ghana



Maize is the most commonly grown crop in northern Ghana.

Photo credit: Abdul Rahman Nurudeen/ IITA

Key messages

Preliminary evidence shows that Africa RISING increased the production diversity of project beneficiaries and that production diversity had an overall positive impact on dietary quality. In turn, we did not find any direct impact of Africa RISING on nutritional outcomes, but given the early stage of the project this is not surprising. This relationship would have to be re-evaluated at a later stage.

The issue

While advances in agricultural technologies have helped improve productivity over the last several decades, achieving sustainable nutrition security remains more elusive. At the same time, the attention of nutritionists is gradually shifting from a focus on quantity (measures of calories and body structure), to a more qualitative approach that accounts for dietary diversity. A shortage of micro-nutrients in the diet is referred to as hidden hunger and is becoming increasingly prominent in the development agenda.

The three regions in northern Ghana where Africa RISING intervened cover 40% of the nation's land mass and have the highest poverty rate in the country. Small-holder farmers constitute a majority of the population and, due to the remoteness of the communities, their diets depend heavily on the crops and animals they produce.

This study investigated whether on-farm diversity and the production of nutrient-rich crops and livestock by-products contribute to the improvement of dietary diversity and micronutrient intake in the household. In addition, it evaluates what the early effects of the Africa RISING project are in Ghana on the production and dietary diversity of project beneficiaries.

Africa RISING intervention

Northern Ghana is characterized by cereal-legume production systems with low input use. Maize is by far the most commonly grown crop, followed by rice and groundnut (Table 1). In addition, about 30% of households practice intercropping, 20% apply manure, and only 2% use irrigation.

Table 1: Percentage of farmers cultivating different crops in Africa RISING intervention regions in northern Ghana

Crop	Total	Northern	Upper East	Upper West
Maize	90%	96%	77%	87%
Groundnut	52%	40%	56%	66%
Rice	43%	49%	58%	29%
Bean	29%	8%	5%	70%
Pearl Millet	24%	10%	45%	31%
Bambara Nuts	16%	5%	14%	32%
Soybean	15%	26%	3%	6%
Sorghum	12%	4%	28%	16%

The Africa RISING project started in late 2012 and, during the first two years, focused on three key technologies: improved maize varieties combined with fertilizer; improved cowpea varieties combined with pesticides; and improved soybean varieties combined with integrated soil fertility management. We expect these innovations to increase productivity and broaden production diversity of beneficiary farmers, eventually leading to better diets for their households.

Preliminary results

Simply by looking at differences in the averages we can observe that beneficiary households cultivated a significantly wider range of crops and livestock types than any other group, and especially relative to households in the control group (Fig. 1). Both the non-beneficiary groups in project target villages had higher production diversity than the control groups, which could be indicative of not only the possible spill-over effects, but also the presence of systematic differences between target and control communities independent from the project.

Figure 2 shows that, even in terms of consumption diversity, beneficiary households present the greatest dietary assortment: they consumed the largest number of different food types during the reference week, although the differences among the groups are relatively small in magnitude.

Table 2 presents the regression coefficient measuring the impact of participation in Africa RISING on the production diversity of the farm, Table 3 captures the overall effect of production diversity on dietary quality and, finally, Table 4 shows the measure of direct impact of Africa RISING on nutritional outcomes. Here the comparison is limited to project direct beneficiaries (AR2013) and pure controls.

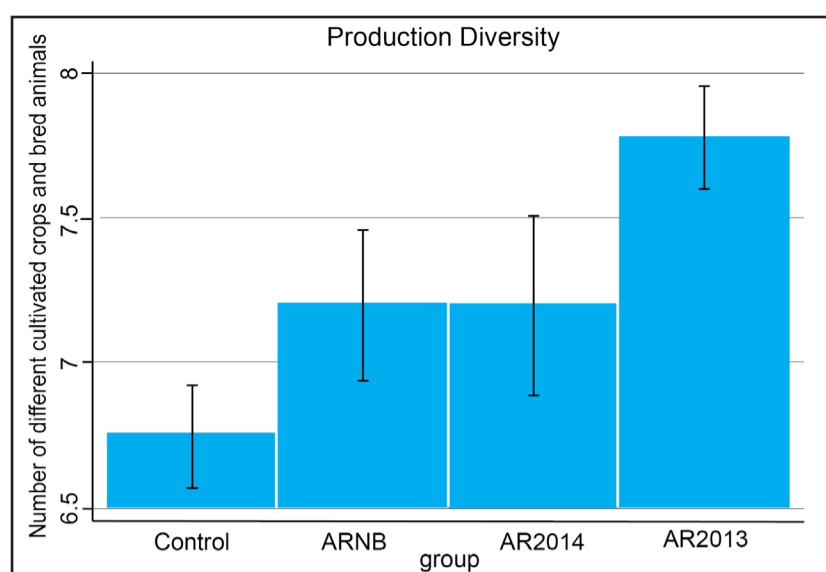


Figure 1: Number of crop and animal-based food items produced

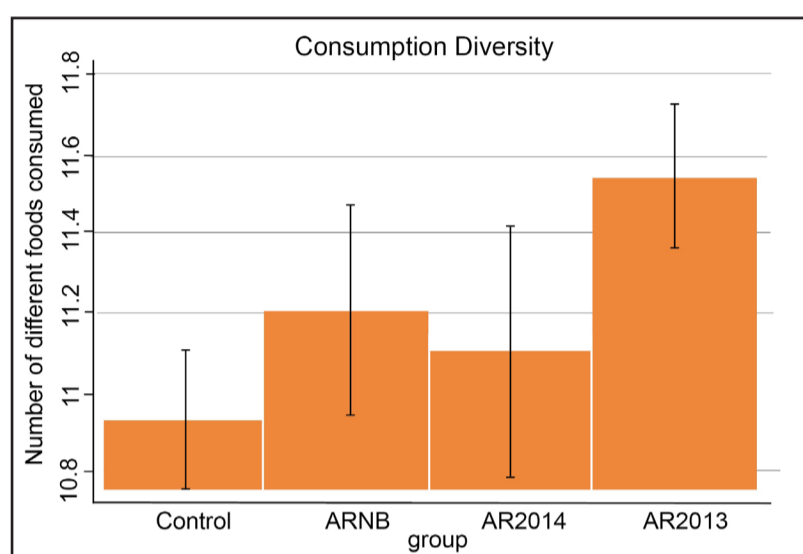


Figure 2: Total number of food items consumed

We can notice that for the first two relationships we obtain robust and consistent positive relationships across all estimators, while for the last one we find no significant impact. This can be explained by the fact that, given the early stage of the project, it is still early to measure a direct impact of improved agricultural technology on nutritional outcomes.

Table 2: Regression results: AR on production diversity

	Production Diversity (count)		
	OLS	IV	IV-GMM
	coef/se	coef/se	coef/se
Treatment	0.739*** (0.200)	0.946** (0.416)	1.022** (0.411)

Table 3: Regression results: production diversity on diet quality

	Dietary Diversity (count)		
	OLS	IV	IV-GMM
	coef/se	coef/se	coef/se
Production Diversity (count)	0.885*** (0.105)	3.695** (1.773)	3.543** (1.746)

Table 4: Regression results: interaction effects on diet quality

	Dietary Diversity (count)		
	OLS	IV	IV-GMM
	coef/se	coef/se	coef/se
Production Diversity (count)	0.842*** (0.118)	3.155 (2.179)	4.248** (1.993)
Treatment	-0.284 (1.010)	10.391 (9.561)	12.349 (9.430)
PD*Treatment	0.171 (0.174)	-2.328 (2.078)	-2.765 (2.048)

Recommendations

We showed that, independent from productivity, the diversity of crop and livestock products produced on-farm has a significant positive effect on the dietary quality of the farming households of northern Ghana.

We thus recommend that the Africa RISING implementers keep emphasizing the importance of farm diversification as one of the main pillars of sustainable intensification and, whenever possible, couple it with nutrition trainings to encourage all family members to diversify their diets.

Data and Methodology

A total of 1,284 households participated in a socioeconomic survey conducted in the summer of 2014 by IFPRI. Detailed data were collected on household demography, costs, and quantities of agricultural inputs; crop-level area cultivated and harvest, household-level food consumption, assets owned, and child and women anthropometric measures.

The survey included four different groups: 2013 project beneficiary households (AR2013); households that showed an interest in participating the project in 2014 (AR2014); non-beneficiary households in project target villages (ARNB); and households in non-project target villages with similar agroecologies as target villages but distant enough to avoid contamination (Control).

Through an instrumental variable approach (IV and IV-GMM) accounting for the simultaneity between the variables of interest, we recover the causal impact of Africa RISING on production diversity, the contribution of production diversity on dietary quality and, finally, the direct link between project participation and nutrition outcomes.



The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads an associated project on monitoring, evaluation and impact assessment.

Prepared by: Sara Signorelli, IFPRI

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