

Feed the Future Ethiopia Growth through Nutrition Activity



Agriculture, Diet and Nutrition: Newer Perspectives

EXECUTIVE SUMMARY

The Government of Ethiopia has committed to both nutrition specific and nutrition sensitive approaches for improving diet quality and nutrition. This research examines the influence of production diversity, commercialization and market access on diet quality. Diversity in food group production, but not total number of crops produced, had a significant effect on diet diversity, as did commercialization of agriculture. Improved market access was a key factor modifying the effects of agriculture strategies on diet diversity. Women controlled income had a greater impact on diet quality. Policy recommendations are discussed.

INTRODUCTION

Agricultural policies and programs, globally, have multiple objectives including improved livelihood security and income, food security, diet quality, and nutrition. Tremendous gains have been made in reaching these goals in the past decade. In Ethiopia,

hunger and malnutrition have decreased. Stunting in children under age five has decreased from 46.5% in 2005 to 38.4% in 2016 (DHS, 2005, 2016). In addition, the average caloric intake per capita per day in Ethiopia has increased from 1545 Kcals in 1994 to 2192 Kcals in 2014. (FAOstat, 2017).

Despite this impressive progress, poor diet quality and food insecurity remain significant problems. Recently there has been a renewed global commitment to nutrition. The United Nations Decade of Action on Nutrition (2016-2025) has focused attention on malnutrition in all its forms: under nutrition, over nutrition and micronutrient deficiencies (FAO/WHO, 2016). In Ethiopia, the Government has committed to end hunger and undernutrition by 2030 through new initiative called the Seqota Declaration. The agriculture sector has a critical role in achieving these agreed upon goals, as articulated in the Sustainable Development Goals (UN, 2015). What has become clear is that the links between agriculture and nutrition are more complex than originally envisioned. The present research was

conducted to assess the links between agricultural production, commercialization, markets and gender on household diet diversity and to discuss resulting policy recommendations.

NEWER PERSPECTIVES

There is not a strictly linear relationship between agriculture sector initiatives and diet/nutrition. In order to capture the nuances of agriculture's potential influences on diet and nutritional status, researchers and policy officials are increasingly focused on a food systems approach to better understand: (1) pathways of impact and (2) entry points for leveraging improved diet and nutrition effects. Figure 1 presents the key drivers influencing diet and nutrition using a food systems perspective (High Level Panel of Experts, 2017). A *food system* consists of all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outcomes of these activities – namely nutrition and health status, socio-economic growth, and equity and environmental sustainability. A key link between production and diet is the food environment – the context in which the consumer engages with the food system.

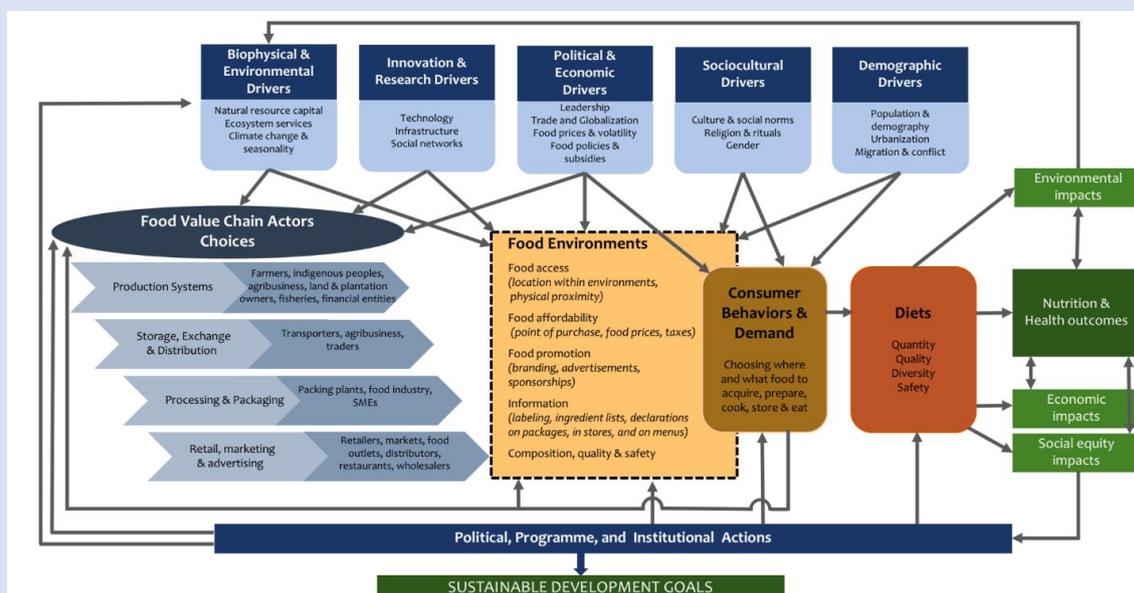
Agriculture has a critical role to play in promoting a healthy food system. A food systems approach provides a useful framework in which to analyze nutrition sensitive agriculture's effect on diet quality and nutrition. Prior meta analyses of linkages between agricultural investments and nutrition

impacts found only limited or modest effects of published evidence of a causal relationship between agricultural interventions, diet quality, and nutritional status (Webb and Kennedy, 2014; Ruel and Alderman, 2013) potentially, it was hypothesized, due to weak study designs that lacked the rigor to detect extant effects. The framework in figure 1 provides a road map to “unpack” the significance of individual steps in the pathway from agriculture to diet to nutrition. The research presented in this brief will focus on household agricultural production, markets and diet quality effects.

DATA

The research presented here is based on three sources (1) existing data including the 2012 Living Standards Measurement Study-integrated Surveys on Agriculture; Ethiopia Rural Socioeconomic Survey (2) primary research conducted as part of the USAID ENGINE project (Empowering New Generations to Improve Nutrition and Economic Opportunities) and (3) synthesis of recent literature. The ENGINE project focused on implementation of both direct nutrition interventions as well as nutrition sensitive approaches. Specifically, the direct nutrition interventions included maternal, infant and young child nutrition, an emphasis on vitamin A, iron, zinc and deworming. The nutrition sensitive component focused on livelihoods with community demonstrations, homestead production emphasizing fruits and vegetables as well as provision of small livestock.

Figure 1: Conceptual Framework of food systems for nutrition and diets



RESULTS

Evidence of the association between increased production of nutritious food crops, the diversity of crop production, commercialization and linkages to improved overall diet quality has been inconclusive. The research summarized in this brief attempts to shed light on some key policy relevant questions. Here again, results are based on primary data from the ENGINE project, secondary data and existing, published literature.

DOES ON FARM PRODUCTION DIVERSITY IMPROVE DIET DIVERSITY?

An increasing number of studies have focused on the links between production diversity and diet diversity. Data from a four-country study including Indonesia, Kenya, Ethiopia and Malawi, reported that production diversity at the farm level was associated with diet diversity in some but not all cases (Sibharut et al 2015). The ENGINE study addressed this issue further by asking the question “what is the relative extent to which household dietary diversity and the consumption of specific crops are explained by production diversity” using the 2012 Living Standards Measurement Study-Integrated Surveys on Agriculture: Ethiopia Rural Socioeconomic Survey (LSMS-ISA: ERSS). Production diversity was defined as the number of different crops and animal source foods produced in the previous 12 months with diet diversity defined as the sum of the number of food groups consumed by the household in the past seven days. Maybe surprisingly, the relationship between production diversity and household dietary diversity was small and non-significant. However, as will be shown in the next section, production diversity measured in terms of food groups rather than individual items has a different result. This is important to emphasize as strategies to increase production diversity may affect diet diversity in different ways depending on crops are targeted.

DOES DIVERSITY IN PRODUCTION OF INDIVIDUAL FOOD GROUPS IMPROVE DIET DIVERSITY?

The ENGINE analysis of LSMS-ISA data also analyzed the association between the production of groups of on-farm commodities and the consumption of foods in each group. Unlike production diversity (which measured the number of

total crops and animal sourced foods produced) food group production measures number of food group categories (such as fruits and vegetables, pulses, and egg) that households produced at least one item from. In contrast to the production diversity/dietary diversity results, data indicate that production of a non-cereal food group in the past 12 months was positively associated with consumption of that food group. Specifically, households that reported producing pulses, roots and eggs were nearly twice as likely to consume those food groups, while households producing fruit and dairy were 2.7 to 3.9 times more likely to consume those types of foods than households that did not produce their own. While overall increased number or diversity of crops and animal source foods does not need seem to correlate with increased household diet diversity, when households do produce more nutrient-rich foods, they are more likely to consume them, indicating that targeting of increasing production of certain crops rather than overall diversity is more likely to be useful in improving household diet quality.

DOES COMMERCIAL AGRICULTURE IMPROVE DIET DIVERSITY?

There has been a trend for agricultural policy to encourage commercialization of agriculture with the dual goal of:

- (1) increasing the growing food demand, in part spurred by urbanization
- (2) Increasing incomes of cash crop farmers as one pathway for improving diet quality and nutrition.

However, the research results on the cash crop – nutrition link have been mixed (Von Braun and Kennedy, 1994).

Analyses under ENGINE using the LSMS data found that agriculture income, as a proxy for agricultural commercialization (almost all cash income from crop and livestock sales), was significantly associated with diet diversity. This effect was independent of obvious confounders such as wealth and non-agricultural income. The data in Figure 2 illustrate that increasing agricultural income has a significant effect on increasing household diet diversity. Households in the highest agricultural income quartile were 2.5 times more likely to have consumed vegetables, 2.1 times more likely to have consumed dairy and 1.9 times more likely to have consumed

oils/fats compared to those in the lowest quartile of income. Cash cropping households, in general, have more diverse diets than subsistence farmers (Sibharut et al, 2015). In addition, households with greater levels of commercialization that were headed by women had a higher level of diet diversity.

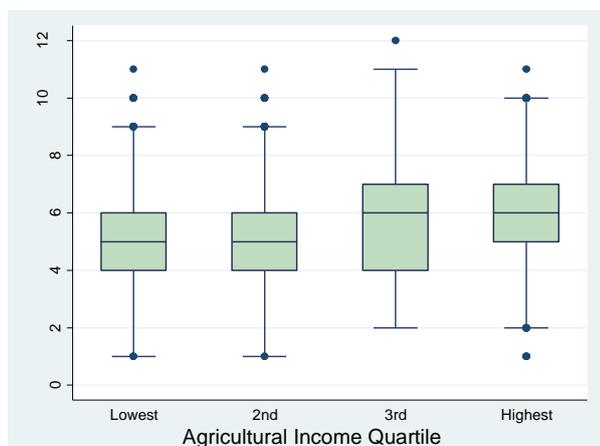


Figure 2: Boxplots of Household Dietary Diversity Scores, by Agricultural Income Quintile

Figure 2 illustrates the dietary diversity scores of smallholder households, disaggregated by agricultural income quartile. The overall mean HDDS was 5.4 food groups, with the lowest agricultural income quartile reporting a mean of 4.9 and the highest agricultural income quartile reporting a mean of 6.0. An Adjusted Wald F test comparing the mean HDDS among all four agricultural income quartiles yielded a highly significant result at $p < 0.001$, showing a strongly positive association between the two variables.

DOES MARKET AVAILABILITY INFLUENCE DIET QUALITY?

Early literature suggested that decisions regarding production and consumption were made by households independently. This premise is now questioned. There are several strands of evidence that shed light on the effects of markets on decision making. Recent studies suggest that if markets are not functioning, then decisions about agricultural production and consumption are “non separable.” (Carletto et al, 2015). Data from 93 woredas in Ethiopia reveal that cow ownership is strongly associated with an increased frequency of milk and dairy consumption among children; these effects, however, are two to three times higher in non-market villages. (Carletto et al, 2015). These significant effects, however, disappear in market villages. In another study, cow ownership had a large

and positive effect on dairy consumption and linear growth of preschool aged children (Hoddinott et al, 2015). Here again, however, in villages where there were large functioning markets, cow ownership had no impact on linear growth. Milk and dairy may be unique products since they are perishable and therefore must either be sold or consumed. If milk cannot be sold in the market, it will need to be consumed at the household level. Thus, the availability and structure of existing markets influences the household’s decisions on whether to sell or consume. A study by Stifel and Minten (2017) in Ethiopia, reinforce the larger literature; households in more remote areas have significantly less agricultural production (likely due to less access to inputs) and market 50% less of their agricultural surplus. The net effect in that more remote households are significantly more likely to be food insecure. The implications of these findings are that understanding the impact of specific production strategies on diet diversity and/or nutrition can be modified to a large degree by market access and infrastructure.

The effects of market access on diet go beyond individual crop/livestock products. The ENGINE Agriculture-Nutrition Panel data document that distance to market has a significant, negative effect on household diet diversity. As noted in a four-country study, including Ethiopia, “improved market access has positive effects on diet diversity that are larger than those of increased production diversity.”

DOES GENDER-SPECIFIC INCOME CONTROL INFLUENCE DIET AND NUTRITION?

A large amount of literature documents that female controlled income is related to better diet quality and improved child nutritional status when compared to male or jointly headed households. Mental accounting, or the practice of treating different sources of income as not fully fungible, has emerged to explain this pattern (Villa et al, 2011). Income and assets controlled by women are used differently than male controlled income. The ENGINE analyses from the LSMS data show that female asset ownership was associated with a significantly higher probability of consumption of roots, vegetables, oils/fats, sugar/honey, and meat. At a national level in Ethiopia, female controlled income was associated with greater household diet diversity. In addition,

above and beyond female controlled income, ENGINE results document that women's involvement in decision making was positively, significantly related to better quality household diets.

DO WE KNOW WHAT FACTORS AFFECT PARTICIPATION IN NUTRITION SENSITIVE INTERVENTIONS?

A key assumption in many national nutrition plans is that multi-sector programs will have more of a positive impact on diet quality than direct nutrition interventions alone. Yet it is surprising that very little information is available on what factors contribute to households' participation in nutrition sensitive programs. As noted, the nutrition sensitive approaches in the project involve a combination of emphasis on livelihoods, homestead production of nutrient rich foods, and the provision of small livestock. Under ENGINE, data were collected in the Oromiya and SNNPR regions comprising a total sample of 1196 households.

The richest 20% and middle 40% of households stratified by income were significantly more likely to participate in ENGINE when compared to the poorest 40% of households. Participation in social groups such as farmer's organizations, women's groups and religious groups were associated with higher rates of participation in nutrition sensitive interventions. Households with a higher child dependency ratio were found to be more, not less, likely to participate in nutrition sensitive interventions. One explanation is that households with more children per adult have extra labor which can free of time of adults to participate in programmatic interventions.

In ENGINE areas that operated both direct and indirect interventions, the rates of participation in nutrition sensitive programs were 23% higher than localities offering only nutrition-specific approaches.

Somewhat surprisingly, however, female headed households were 28% less likely to participate in nutrition sensitive interventions compared to male headed households. This is a missed opportunity to potentially increase woman-controlled income and the concomitant positive effects on household diet quality and improved child nutrition.

POLICY AND PROGRAMMATIC RECOMMENDATIONS

- Policies to increase commercialization of agriculture can have powerful effects on increasing diet diversity. The current successful emphasis of the government through the Agriculture Growth Program on agricultural commercialization at the household level and market linkages should be expanded to a broader range of households.
- The positive effects of cash crop production appear to operate through market access. Therefore, strategies to improve market access, particularly for small-holder agricultural households, can have a significant effect on improving diet quality.
- Production diversity (number of different crops) was not associated with consumption diversity. Production of individual crops, however, including fruits, vegetables, pulses, dairy and eggs had more of an effect on diet diversity than overall production diversity. Thus, the ENGINE program's emphasis on homestead production of fruits and vegetables should be expanded to reach a broader audience. Strategies to pursue production of these individual food groups should be stressed rather than simply overall production diversity.
- Women and men's income are often used differently suggesting that examining the effects of total household income on diet and nutrition may miss important household dynamics. An assessment of different sources of gender specific control of income may more effectively identify points of entry for improvement of dietary diversity.
- Agricultural programs are typically targeted at the level of the agro-ecosystem, not the individual or household. The most vulnerable households may not be reached through geographical targeting. Given this, additional strategies for generating program demand such as outreach around farmer demonstrations and extension activities should be employed to expand the participant base of nutrition sensitive approaches.

AREAS FOR FUTURE RESEARCH

The brief provides insights into what households have chosen to pursue regarding production, consumption, and commercialization. However, there is still limited information on what motivates these decisions. A focused, qualitative study on households' decision making would make a valuable contribution to understanding potential levers that can be used to enhance the effectiveness of nutrition sensitive interventions.

REFERENCES

1. Ethiopia Demographic and Health Survey 2005. Addis Ababa, Ethiopia: Central Statistical Agency/Ethiopia and ORC Macro, (2006).
2. Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: Central Statistical Agency/Ethiopia and ICF, (2016).
3. Food and Agriculture Organization of the United Nations. (2017). FAOSTAT Database. Rome, Italy: FAO. Retrieved August 22, 2017 from <http://faostat3.fao.org/home/E>.
4. FAO/WHO. Nutrition and Food Systems: Proceedings. (2016). FAO, Rome.
5. United Nations. Transforming our world: the 2030 Agenda for Sustainable Development. Online (2015). <https://sustainabledevelopment.un.org/post2015/transformingourworld>.
6. HLPE (2017). Nutrition and Food Systems. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.
7. HLPE (2014). Food losses and waste in the context of sustainable food systems. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. Available at <http://www.fao.org/3/a-i3901e.pdf>
8. Webb, P., & Kennedy, E. (2014). Impacts of agriculture on nutrition: nature of the evidence and research gaps. *Food and nutrition bulletin*, 35(1), 126-132.
9. Ruel, M., Alderman, H. & Maternal and Child Nutrition Study Group. (2013). Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition" *The Lancet* 382(9891), 536-551.
10. Hoddinott, J., Headey, D., & Dereje, M. (2015). Cows, missing milk markets, and nutrition in rural Ethiopia. *The Journal of Development Studies*, 51(8), 958-975.
11. Sibhatu, K. T., Krishna, V. V., & Qaim, M. (2015). Production diversity and dietary diversity in smallholder farm households. *Proceedings of the National Academy of Sciences*, 112(34), 10657-10662.
12. von Braun, J. and Kennedy, E. (eds) (1994). *Agricultural Commercialization, Economic Development, and Nutrition*. Published for IFPRI by Johns Hopkins Press, Baltimore, MD. Available at: ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/129374.
13. Carletto, G., Ruel, M., Winters, P., & Zezza, A. (2015). Farm-level pathways to improved nutritional status: introduction to the special issue. *The Journal of Development Studies*. Available at: www.tandfonline.com/doi/full/10.1080/00220388.2015.1018908
14. Villa, K., Barrett, B., & Just, D. (2011). Whose Fast and Whose Feast? Intrahousehold Asymmetries in Dietary Diversity Response among East African Pastoralists. *American Journal of Agricultural Economics*, 93(4), 1062-1081. First published online: August 8, 2011.

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