



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



SAVE THE CHILDREN

Nutrition-Sensitive Agriculture Interventions

The factors affecting children's access to quality nutrition in the first 1,000 days of life are complex. At the household level, parents must understand what constitutes a nutritious diet during this critical period—pregnancy to two years, for both children and mothers. Women must be empowered to make decisions regarding their children's and families' meals and communities must overcome social constrictions that negatively impact children's diets. Once demand for nutrient-dense food is created, families must be able to access this food either by cultivating it themselves or through purchase. While several components of the Empowering the New Generation to Improve Nutrition and Economic opportunities (ENGINE) project addressed the household-level factors affecting children's diets, ➤

ENGINE TECHNICAL BRIEF 6

EMPOWERING NEW GENERATIONS TO IMPROVE NUTRITION AND ECONOMIC OPPORTUNITIES



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the project's nutrition-sensitive agriculture (NSA) interventions sought to increase the diversity of food available and sold in Ethiopia.

Ethiopia's Agricultural Growth Program (AGP) has focused on supporting agricultural productivity and commercialization. Previous U.S. Agency for International Development (USAID)-funded Feed-the-Future projects have focused on increasing production of products such as maize, wheat, sesame, chickpeas, coffee, and honey, and dairy development and livestock marketing. Neither

the AGP nor USAID projects have prioritized the cultivation of nutrient-dense produce or production of animal products at the household level. These essential foods tend to be less available and more expensive in markets than grains such as wheat or maize. To begin to create effective pathways between agricultural livelihood and nutrition outcomes and make agricultural efforts more sensitive to nutrition, ENGINE worked with the Ministry of Agriculture's (MOA) farmer training centers (FTCs) and model farmer approaches and with the Ministry of Education directly in schools.

OVERVIEW OF ACTIVITIES

Farmer Training Centers

As discussed in depth in *ENGINE Technical Brief 4: In-Service Capacity Building of the Health and Agriculture Workforce for Nutrition Services*, ENGINE worked with the MOA to support implementation of the NSA concepts introduced in the National Nutrition Program (NNP). Through classroom-based and on-the-job training, agricultural extension workers (AEWs) learned how to train farmers to cultivate vegetables and fruits and cook these nutrient-dense crops to diversify their families' diets.

ENGINE identified two to four FTCs in each project-supported *woreda* where AEWs provided nutrition education and demonstrated homestead gardening, small livestock and poultry husbandry, and cooking techniques. The AEWs also provided follow-up support to farmers during home visits and facilitated the purchase of seeds.

Through the FTCs, AEWs reached the most vulnerable

households (MVHHs), as discussed in *ENGINE Technical Brief 1: Nutrition Security and Sustainable Income for Vulnerable Households*, and expanded the project's reach to small shareholder farmers. While ENGINE's livelihoods component was designed to improve dietary diversity in targeted households, by reaching farmers who depend on cereal-based crop production for income, the NSA interventions increased the availability of nutrient-dense foods for their families' consumption, and, in some cases, excess production increased availability for purchase of vegetables in local markets.

Model Farmers

Reaching farmers through the FTCs was successful, however the project found it difficult to track the number of farmers who implemented the practices demonstrated at the centers and their reach was limited. ENGINE observed that many neighbors of MVHHs adopted NSA practices after observing the homestead gardening and animal husbandry activities. Therefore, in the fourth project year ENGINE began supporting the Government of Ethiopia's model farmer approach to disseminate NSA information and techniques more directly to communities in three *kebeles* adjacent to each project-supported FTC.

ENGINE educated 9,660 farmers who were early adopters of improved agricultural technologies, economically better-off, or regarded as thought leaders in their communities about the importance of proper nutrition and NSA strategies for homestead gardening and animal husbandry. These model farmers were expected to implement what they learned and pass the information on to others in their communities.

School Gardens

With ENGINE support, AEWs and *woreda* agriculture

Highly Nutritious Crops Promoted by ENGINE

VEGETABLES	FRUITS
Swiss Chard	Avocado
Kale	Mango
Collard Green	Apple
Head cabbage	Papaya
Carrot	
Orange-fleshed sweet potato	
Irish potato (improved variety)	
Pumpkin	
Green beans	



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experts trained two teachers in each of 161 schools (two per *woreda*) to grow vegetables and fruits. ENGINE provided seeds, fruit seedlings, and tools. Students participated in the management of the school gardens and received vegetable seedlings to plant near their homes. The schools collaborated with AEWs and HEWs to organize agronomic and cooking demonstrations for their communities. It is hoped that the schools will be able to financially sustain the activity through the sale of crops.

Poultry Farming

ENGINE also supported FTCs to train local communities in small livestock and poultry husbandry. The project provided livestock such as goats, sheep, cows, and chickens to MVHHs through its livelihoods component and trained AEWs to support farmers to grow foraging crops, prepare feed for chickens, and breed and sell offspring.

Evaluations of the nutrition-sensitive livelihoods component found that raising chickens had a greater impact on families' nutrition than goats, sheep, or heifers. However, local chicken breeds produce just 30 to 80 eggs per year, far too few to have significant impact on a family's nutrition or income. Previous projects' efforts to introduce improved chicken breeds faltered, mainly because the chickens were sterile or overly prone to disease. After one false start with a breed that had excessive mortality, ENGINE identified and sourced *koekoek* chickens, a relatively low-cost, self-reproducing breed that lays 180 to 220 eggs per year and grows quickly.

Once introduced to communities, demand for these

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chickens grew quickly and their supply in Ethiopia was limited. ENGINE thus designed a partnership with the private sector to establish a sufficient supply of chickens. The project upgraded two private chicken growers' hatcheries, provided them with incubators and parent *koekoek* stock obtained from research centers, and trained staff to care for the eggs.

The hatcheries could not support the birds once hatched and day-old chicks would not survive on rural farms. Therefore, ENGINE identified commercial outgrowers who raised the chicks for two to three months until they were strong enough to survive in rural households. ENGINE then purchased the chicks from the outgrowers to provide to MVHHs.

Vegetable Seed Supply

To ensure a sustainable and reliable supply of vegetable seeds, ENGINE identified a private sector seed supplier or farmers' cooperative in each of 66 supported *woredas*. The project provided training in vegetable seed handling and linked the suppliers with vegetable-producing farmers, AEWs, and wholesalers in their surrounding areas. The remaining 20 percent of project-supported *woredas* where ENGINE did not identify a vegetable seed supplier can access seeds from the neighboring *woredas*.



Model farmers reported growing more leafy greens, pumpkin, and sweet potato. Ninety-five percent of the farmers reported consuming part of their harvest and selling the rest, which has positive impact on both their household's nutrition and the availability of fruits and vegetables in the market.

A 2014 assessment found that 58 percent of the FTCs and 47 percent of schools had no way to irrigate their fields. Other challenges included a lack of fencing to protect crops and soil unsuitable for cultivation of fruits and vegetables. Nonetheless, the same study showed promise for the work and at project's end, FTCs and schools had reached 42,690 farmers with vegetable production and cooking demonstrations.

RESULTS

FTCs and Schools

ENGINE's work with FTCs and schools was challenging in the beginning. A March 2014 study found that just 76 percent of 106 FTCs assessed had carried out cooking or farming demonstrations, completing only 52 percent of the expected number in the two years prior to the study. Similarly, of 160 participating schools, 78 percent had conducted demonstrations within the last two years, but only 60 percent of the planned number had been completed.

Much of this slow start was due to the choice of FTCs and schools—the assessment found that 58 percent of the FTCs and 47 percent of schools had no way to irrigate their fields. Twenty-nine percent of FTCs and 37 percent of schools did not have a fence to protect crops from wild animals. Seven percent of schools' garden plots and two percent of the FTCs' fields were unsuitable for vegetable and fruit cultivation.

Nonetheless, the same study showed promise for the work. Forty-four percent of FTCs and 56 percent of schools had distributed planting materials for NSA activities to local communities and about half of the schools and 42 percent of FTCs reported earning income from the sale of nutrient-dense crops promoted by ENGINE.

Subsequent to the assessment findings, ENGINE replaced the FTCs and schools that lacked the conditions necessary for farming. The pace of demonstrations increased and by the project's end, ENGINE-supported FTCs and schools had reached 42,690 farmers with vegetable production and cooking demonstrations.

Model Farmers

The model farmer approach showed promise for rapidly disseminating NSA information. A March 2016 assessment of 80 model farmers found that all had adopted new agricultural technologies and the proportion of respondents who cultivated vegetables increased from 86

percent prior to the intervention to 100 percent after model farmer training. In particular, the farmers reported growing more leafy greens, pumpkin, and sweet potato. Ninety-five percent of the model farmers reported consuming part of their harvest and selling the rest, which has positive impact on both their household's nutrition and the availability of fruits and vegetables in the market. The majority (85 percent) of these farmers had access to irrigation, enabling them to continue growing vegetables for their families and for sale in the market during the dry season when many families struggle to meet their nutritional needs.

Perhaps most importantly, 80 percent of respondents reported knowing of other farmers who adopted NSA practices as a result of what they had learned from the model farmers. The group estimated that about 615 farmers had started growing vegetables in the season directly following the training, an average of about nine new adoptees per model farmer.

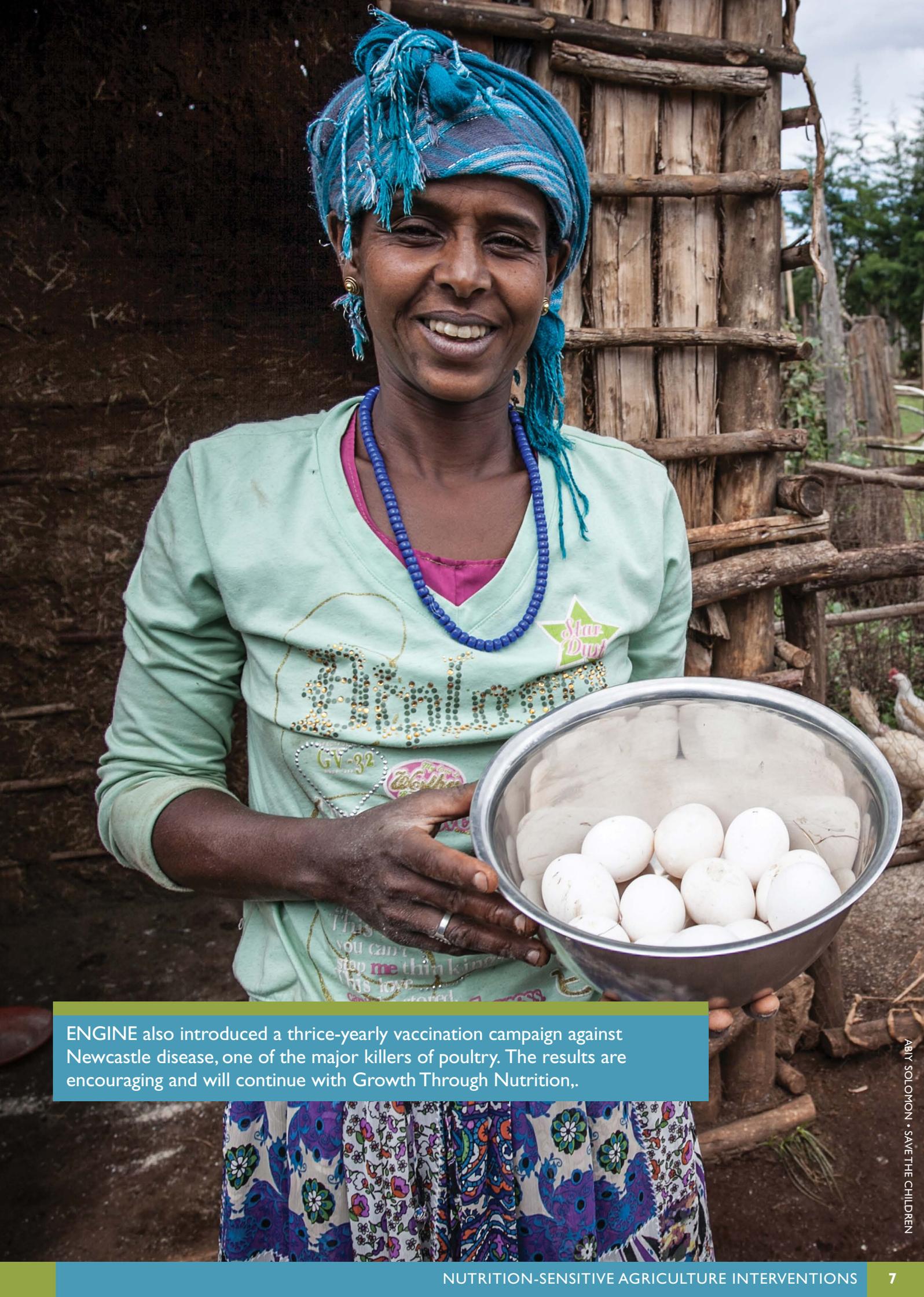
Poultry Farming

The public-private partnership ENGINE established with the private sector for the breeding and sale of *koekoek* chickens was effective in establishing a sufficient and sustainable supply of chicks. Both the hatcheries and outgrowers profited and demand for the birds was high—78 percent of ENGINE-supported chicken farmers reported selling eggs to neighbors for the purpose of developing a flock and 67 percent had hatched *koekoek* eggs themselves.

The introduction of *koekoek* chickens has likely had a strong impact on nutrition in rural Ethiopia. In addition to supplying ENGINE, outgrowers sold birds to the Ministry of Livestock Development and Fisheries and other development projects, both of whom presumably passed the birds to rural poor households.

LESSONS LEARNED

- ◆ **Responding to community demand and partnering with the private sector creates sustainability within NSA systems.** The introduction of *koekoek* chickens was successful for two main reasons: 1) The project identified the key reasons previous poultry interventions had failed; and 2) It developed a practical solution to meet farmers' needs. Demand for the birds increased rapidly and the project developed an economical, practical solution to meet that demand. The hatchery owners and outgrowers all reported profiting from *koekoek* sales and intend to continue the work after ENGINE's closeout. ENGINE's success in establishing the private sector system for the *koekoek* supply chain will inform the development of partnerships with private seed distributors under the Growth Through Nutrition project.
- ◆ **Outgrowers and hatcheries need more training in the management of parent stock.** Though ENGINE provided information on replacing parent stock, hatcheries struggled to plan in advance for the rearing of chicks to replace old stock. At times this limited the availability of day-old birds, which stalled outgrowers' work as well. Growth Through Nutrition will provide additional training on parent stock management to prevent long gaps in production at each level of the system.
- ◆ **Farmers must have reliable access to veterinary services for prevention and treatment of disease.** Illness among livestock is inevitable and can devastate small farmers' flocks and livelihoods. AEWs provide advice and referrals to district veterinarians; however, the strength of these linkages varies and the increase in livestock in the ENGINE-supported regions has stretched AEWs' and veterinarians' capacity to respond. The MOA's livestock vaccination coverage is also inadequate in some areas. ENGINE introduced a thrice-yearly vaccination campaign against Newcastle disease, one of the major killers of poultry. The results are encouraging and Growth Through Nutrition will continue this activity in addition to investigating private sector solutions through livestock input companies and community-level workers. The project will also partner with the USAID Value Chain project, the Agricultural Growth Project, and HEWs to ensure that farmers have access to veterinary services.
- ◆ **Social customs and norms that inhibit uptake of NSA activities can be overcome.** ENGINE introduced intercropping of green beans with maize, sorghum, or millet to help replenish the nutrients in soil. Uptake of this technique was slow outside of MVHs, possibly due to the local perception of green beans being a "poor man's crop." However, ENGINE was encouraged to find that cultivation increased among model farmers after their training. Growth Through Nutrition will continue to encourage intercropping of green beans for both their soil-replenishing and highly nutritional properties and will work with model farmers who have adopted the practice to identify ways to overcome stigma associated with the plant. Similarly, raising chickens is traditionally associated with lower socioeconomic class in Ethiopia. Though the sale of goats and sheep creates more income for farmers, raising chickens was associated with greater impact on families' nutrition. Growth Through Nutrition will thus continue to encourage chicken farming, focusing on the activity's positive impact on nutrition. It is possible that as farmers become increasingly competent in caring for their *koekoek* stock they will realize greater profits and thus negate some of the stigma.
- ◆ **Working within and in support of existing government structures is essential to realize success in the development and implementation of national policies.** When the FTCs first integrated NSA practices, an AGP coordinator visited an FTC that was displaying vegetable seeds and home-stead gardening technology in addition to information about value-chain crops. Unfamiliar with the NNP and the MOA's role in its implementation, the coordinator asked the FTC to stop educating farmers on anything unrelated to the value chain covered by the AGP. Fortunately, because ENGINE partnered with the government at all levels and worked in support of government policies rather than developing parallel structures or implementing its own agenda, the issue was resolved with a few phone calls.
- ◆ **The model farmer approach results in rapid dissemination of knowledge and uptake of NSA practices.** As discussed above, other farmers quickly adopted practices introduced by model farmers. Growth Through Nutrition will expand the model farmer approach, allowing the project to reach all *kebeles* in the target areas. This approach will be combined with seed vouchers for MVHs and other nutrition-sensitive livelihood activities to support a wider swath of the population than ENGINE was able to engage.
- ◆ **Farmers have proven they value and will invest in their livestock but need additional education regarding the care and long-term maintenance of flocks.** Though *koekoek* chickens are hearty, all ENGINE households raising the birds encountered health problems with their flocks. Seventy-three percent of these households reported paying for formal veterinary services, which is an encouraging indicator



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of the value they place on their animals. Yet 41 percent of households did not follow ENGINE's guidelines on preparing chicken feed and many did not prepare enough food for their flocks—undernourished birds will not lay as many eggs nor provide as much meat as well-fed stock. Keeping chickens penned rather than letting them forage is counter to local custom, which may account for some of the resistance to investing in the birds' feeding.

Evaluation showed that farmers had limited knowledge of how to manage their flocks. Only 32 percent knew they had to plan for replacement of their stock and of those who were planning to replace their stock, fewer than half could correctly cite the age at which they should be replaced.

◆ **There is room to incorporate nutrition in Feed the Future-funded value chain resilience and emergency projects.** ENGINE influenced projects in the following ways:

- Agribusiness Market Development (AMDe) amended their social and behavior change communication materials which said “sale more for more” to “sale more for more and eat more.”
- Livestock Market Development (LMD) included poultry as an intervention.

- Graduation with Resilience to Achieve Sustainable Development (GRAD) customized ENGINE's enhanced community conversation materials for use with village savings associations and modified their poultry intervention to use the *koekoek* breed.
- Through an Office of U.S. Foreign Disaster Assistance (OFDA)-funded project, GOAL promoted NSA in partnership with ENGINE to complement their efforts to address community management of acute malnutrition.

◆ **Individual farmers, FTCs, and schools require additional support for marketing and sale of their produce.** One-quarter of model farmers interviewed reported that marketing and selling their vegetables was challenging. Similarly, the FTCs and schools had only moderate success in supporting their NSA activities through the sale of their harvests. Growth Through Nutrition will provide additional business training for farmers to assist in bringing their harvests to market and increasing their income. Alternatively, group marketing approaches may be tested since volume of individual farmer production is low. The project will also train farmers to negotiate with seed suppliers and arrange for group purchases from wholesalers. ◆

ABOUT ENGINE

The Empowering the New Generation to Improve Nutrition and Economic opportunities (ENGINE) project was the U.S. Agency for International Development Ethiopia Mission's flagship multisector nutrition project. ENGINE, which was implemented from September 2011 to September 2016, built on the Government of Ethiopia's National Nutrition Program and the U.S. Government's Feed the Future initiatives to prevent undernutrition during the first 1,000 days of life, from the start of pregnancy until the child is two years of age. The project was led by Save the Children in partnership with Tufts University, Jhpiego, Land o' Lakes, the Manoff Group, Valid International, and Jimma University and worked in 116 *woredas* across the Amhara, Tigray, Oromia, SNNPR, and Somali regions of Ethiopia.

ENGINE partnered with Ethiopian ministries to strengthen existing multisector coordination and support the development and revision of nutrition policies, guidelines, and standards. It integrated instruction on nutrition into the pre-service curriculum for health and agriculture workers and built the capacity of frontline

workers to provide high quality nutrition services. The project's social and behavior change communication activities promoted optimal maternal, infant, and young child feeding practices and dietary diversity at the community level. Work with vulnerable households educated participants about nutrition-sensitive agriculture techniques and livestock management to increase consumption of nutrient-dense foods and augment household income. ENGINE promoted improved water, sanitation, and hygiene practices to prevent diarrhea in children and improve nutritional status, mainstreamed gender in all its activities, and implemented a rigorous research strategy to support and guide effective nutrition policies and practices.

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