

A PARTICIPATORY IMPACT ASSESSMENT OF ENGINE PROJECT'S LIVELIHOOD INTERVENTIONS IN ETHIOPIA

Final Report August 2014



ENGINE: Empowering New Generations to Improve Nutrition and Economic opportunities
A project supported by the Feed the Future and Global Health Initiatives

This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID) ENGINE project under Agreement No. AID-663-A-11-00017. The contents are the responsibility of Tufts University and Save the Children and do not necessarily reflect the views of USAID or the United States.

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Solomon Bogale and John Burns



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Disclaimer

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Cover photos clockwise potato field, cooking demonstration and small ruminants
All photos by Solomon Bogale

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Acronyms and Abbreviations

Ag Inputs	Farming Inputs
ENGINE	Empowering New Generations to Improve Nutrition and Economic Opportunities
ETB	Ethiopian Birr
FGD	Focus Group Discussion
FTC	Farmer Training Center
HDDS	Household Dietary Diversity Score
HEW	Health Extension Worker
HH	Household
HHI	Household Interview
HI	Home Improvement (maintenance)
HIV	Human Immunodeficiency Virus
IGA	Income Generating Activity
IR	Intermediate Results
M&E	Monitoring and Evaluation
MFI	Microfinance Institute
PIA	Participatory Impact Assessment
PRA	Participatory Rural Appraisal
SCI	Save the Children International
SNNPR	Southern Nations, Nationalities, and People's Regional (State)
SSI	Semi Structured Interview
Social Ob	Social Obligations
SWOT	Strengths Weaknesses Opportunities Threats (analysis)
USAID	United States Agency for International Development
VSLA	Village Saving and Lending Association

SUMMARY

1. Introduction

1.1 Background

The USAID funded Empowering New Generations to Improve Nutrition and Economic opportunities (ENGINE) is a five-year integrated nutrition project being implemented by a consortium led by Save the Children International (SCI) in 100 *woredas* in Ethiopia. With the overall goal of enabling women and children to lead healthier more productive lives, the objective of ENGINE is “to improve the nutritional status of women and young children through sustainable, comprehensive, coordinated and evidence based interventions”. This objective will be met through the following four intermediate results (IR):

- IR1 Capacity for and institutionalization of nutrition programs and policies strengthened
- IR2 Quality and delivery of nutrition and health care services improved
- IR3 Prevention of under nutrition through community-based nutrition care practices improved
- IR4 Rigorous and innovative learning agenda adopted

The ENGINE project emphasizes a robust learning agenda under IR 4, which is designed to support and guide nutrition policy and practice. The activities under this component are being carried by the Feinstein International Center, Tufts University and involve the design and implementation of a comprehensive research strategy around a variety of relevant research themes. As part of this strategy, Tufts conducted two Participatory Impact Assessments (PIA) of the livelihoods interventions being implemented under the ENGINE project in Oromia and Amhara regions. These livelihoods interventions include direct transfers of agricultural inputs (vegetable seeds) and livestock to vulnerable households and complimentary training in vegetable and livestock production. The livelihoods interventions also included a nutritional awareness component involving a set of cooking demonstrations which provided training in food preparation. The PIA’s set out to assess the impact of these interventions and activities on household nutrition and dietary diversity. The studies also set out to investigate how effectively or to what extent the information from the training/awareness component has been disseminated and utilized.

The two impact assessments were carried out between April and June 2014 with the first being conducted in Lemu Bilbilo *woreda* in Oromia region and the second being carried out in South Achefer *woreda* in Amhara region. The objective of these two case studies is to inform future programing by providing a snapshot of what aspects of the livelihoods interventions are working and what aspects need further improving. The studies do not provide a representative assessment of impact across the ENGINE project but were designed to complement other ENGINE impact studies by collecting more detailed information on the utilization of project asset and knowledge transfers.

The studies used a number of participatory rural appraisal (PRA) tools to systematically investigate the utilization of project asset and knowledge transfers carried out under the livelihoods component. The assessments also set out to identify the opportunities and challenges associated with these livelihoods interventions with a view to informing future programing. The two studies employed a variety of assessment tools and techniques including:

- Semi Structured Interview (SSI) using a standardized checklist. These interviews were used to stimulate discussion on various aspects of the livelihoods interventions.
- Participatory ranking and scoring exercises were used to assess impact in terms of project-derived benefits and the utilization of project transfers. More specifically these exercises were used to look at the impact of project livestock and seed transfers. For example, before and after scoring was used to assess the contribution of vegetables or livestock products to the household food basket before the project

started and at the time of the assessment. Income from vegetable and livestock sales was quantified in absolute terms, as was the utilization of this income (expenditure) this being a useful proxy for impact.

- The utilization and uptake of project skills and knowledge transfers from training activities and cooking demonstrations was also investigated using simple ranking and scoring exercises as well as by questioning participants on their understanding of specific topics presented in the projects livelihoods training manuals. Initially, the assessment had planned to use a simple control group of non-project participants to assess the dissemination and uptake of knowledge from the projects cooking demonstrations to the community at large. However, this was rejected due to the prevalence of similar cooking demonstrations that had been implemented in both the study areas which would ultimately have contaminated the control group and made the results somewhat meaningless.
- Problem and objective tree analysis sessions were also carried out to identify key nutrition, food production and agricultural products, marketing constraints and their outcomes. Each session had a rapid objective tree analysis component designed to identify possible interventions and opportunities along with alternative options and approaches. This was complemented by a simplified SWOT analysis to look at the strengths and weaknesses of the livelihoods interventions.

2. METHODOLOGY

Hypothesis

The studies aim to assess whether the ENGINE livelihoods interventions and activities have translated into improvements in dietary diversity amongst project participants. They also aim to investigate whether the training components have been successful in terms of uptake and application

2.1 Research Questions

1. How have the projects seed and livestock transfers been utilized by project participants?
2. What direct and indirect nutritional, food security and income benefits have these asset transfers provided?
3. To what extent have participants applied the projects skills and knowledge transfers and how useful have these been?

2.2 Sampling

In Lemu Bilbilo *woreda*, all project participants in the four *kebeles* were considered for the study given the limited number of project participants in the sampling frame. A total of 92 households were targeted for vegetable seeds and livestock transfers during the first two years of the project.¹ A total of 90 participants (83 women and 7 men) were purposively selected for the study sample (Table 1) although two of these were not available during the study period.

Seven focus group discussions (FGDs) were conducted with participants involved in the project's livelihood interventions and cooking demonstrations in the *woreda*. Each FGD included between 8-15 mothers and caregivers.

In South Achefer *woreda* the study was conducted in three *kebeles* (Lalibela, Ahuri, Abchikli). A total of 68 households were purposively selected these being recipients of the ENGINE livestock and vegetable seed transfers in years one and two of the project (Table 2). Five FGDs were carried out with project participants with between 8-10 people participating in each of these discussions.

Table 1: Lemu Bilbilo Study Sample

Kebele	Year 1			Year 2	Total
	Vegetable only	Livestock only	Both ²	Both	
Lemu Dima	9	14	12	-	35
Bokoji Negeso	13	7	-	-	20
Chiba Mickael	3	-	2	15	20
Koma Katara	-	-	-	15	15
Total	25	21	14	30	90

¹ Year-1 project implementation refers to the duration from September 2011 to September 2012

² Refers to both vegetable and Livestock interventions

Table 2: South Achefer Study Sample

Kebele	Year 1		Year 2	Total
	Vegetable	Livestock	Livestock	
Lalibela	-	10	-	10
Ahuri	-	8	-	8
Abchikli	50	-	20	50*
Total	50	18	20	68

* 20 Vegetable recipients received livestock in year 2

2.3 Data Collection Methods

Data collection methods for the household component involved structured interviews using a standardized checklist and these included a variety of participatory ranking and scoring methods (see Catley et al, 2013). The checklist was divided into the following modules:

- A) Project participation data
- B) Project transfers (vegetables)
- C) Project transfers (livestock)
- D) Household dietary diversity
- E) Household decision making
- F) Cooking demonstrations
- G) Project strengths and weaknesses
- H) Project information dissemination

Module A was used to collect information on what kind of project activities respondents participated in. Specifically this focused on the farming inputs (vegetable seeds) and livestock transfers, training in vegetable and small ruminant production, cooking demonstrations and other nutrition awareness training. Participants were also asked what benefits, if any, they derived from these interventions and asked to rank these benefits in order of importance.

Modules B&C focused specifically on the small ruminant transfers and the vegetable production project activities. Participants were asked if they actually produced vegetables or were successful in small ruminant production as a result of the project and if so how they utilized any harvest, milk or meat produced. Utilization in terms of consumption and sales was also captured proportionally using participatory scoring methods. Where applicable, the contribution of these products to the total food basket was assessed both before the project and at the time of the assessment using before and after scoring methods. Any training or extension services associated with these two project components were also assessed in terms of utilization and value.

Module D looked at household dietary diversity with participants being asked to identify any new food types being consumed since the start of the project and give reasons if any new food sources had been included in their diet or if there has been an increase in the consumption of certain types of food.

Module E assessed changes in the perceived influence women have over various types of household decisions on a scale of 1-10 with 1 representing the least influence and 10 being the most. Where positive changes were assessed participants were asked to give the reasons for these changes in terms of project or non-project factors.

Module F was used to assess the information derived from the projects cooking demonstrations. Participants were asked to describe in detail what kind of information they derived from these and whether they used the information and how useful it was.

Module G in the checklist was used to assess the projects strengths and weaknesses from the perspective of project participants. This module was only applied during FGD's and participants were asked to give

suggestions or recommendations on how the project might be improved. This exercise was then used to develop a problem tree analysis and objective tree analysis.

Module H in the checklist was originally designed to assess the extent to which the information from the projects cooking demonstrations had been disseminated to non-project participants. However, this module was eventually dropped from the study due to the lack of a reliable control group in both of the study areas.

3 CASE STUDY 1: Lemu Bilbilo Woreda, Oromia Region

3.1 Overview of ENGINE Livelihoods Interventions in Lemu Bilbilo

Vegetable Production

Training in vegetable production was provided by *woreda* experts and development agents and included the following topics:

- Site selection and land preparation for vegetables (digging deep and mixing top soils with compost)
 - Nursery preparation
 - Transplanting seedlings and row planting
 - Compost preparation
 - Weeding and other agronomic management techniques
 - Harvesting techniques
 - Marketing (place and timing)
 - Role of vegetable production and the consumption methods required to achieve proper nutrition
- At each Farmer Training Center (FTC), awareness creation and bed management and practicing were carried out.
 - Permagarden training was carried out with 120 households (37 and 83 households in 2013 and 2014 respectively). About 15 households started practicing the activity in their garden since 2013 in Lemu Dima *kebele*³.
 - A total of seven farm tools, viz. spade, hoe, pick ax, rake, watering can and smaller hoe were provided to each participant.
 - About six vegetable types were provided to each participant with each household planting 100m².
 - Carrot, cabbage, Swiss chard, kale, lettuce, potato (Irish type) and beetroot seeds were transferred to project households. In addition to this, 2-3 apple seedlings were distributed to the majority of participating households. Potato variety (*guddene*) was also provided to vulnerable households. (Potato is the major vegetable under production in most parts of the *woreda* where it is not only a garden crop but also grown in the fields away from home).
 - The majority of the vegetables were planted during the short rainy season- between March and May but two vegetable harvests are possible. However, if potato is planted during the long rainy season (July and August planting) it could be affected by the heavy rainfall in August and early September.⁴ However, the improved variety, *guddene* is more tolerant to late blight disease which occurs during rainy season and causes considerable damage to the crop. Other vegetables such as kale and Swiss chard are productive throughout the wet season.
 - Carrot, potato, kale, cabbage and Swiss chard represent the most preferred (highest demand) vegetable crops both for consumption and sale in the area. Therefore, with the exception of cabbage, the project is supplying seeds for all these vegetable crops.
 - Some project households are also involved in vegetable seed multiplication in order to generate income from sales.

³ Permagarden is helpful for conserving floods during wet season and maintain moisture in order to extend vegetable production to dry periods

⁴ During heavy rains, the crop lacks appropriate aeration

Livestock Production

Initially the project provided training in poultry production during year one of implementation. However, it was later identified that the area is not suitable for commercial poultry production and it was decided to promote sheep production instead as there is a high demand for sheep in the local market and they are well suited to both field grazing or intensive production practices.

The following activities were carried out under the sheep production interventions:

Training

- Improved sheep production skills
- Feed resource management and animal feeding
- Sheep breeding practices
- Sheep housing and its importance in reducing lamb mortality
- Common sheep disease identification and animal health care
- Lamb or offspring handling (*separation of the lambs from the flocks during certain months*)
- Vaccination of the flock
- Animal dung handling for compost preparation
- Marketing – (*when and where to sell sheep*)
- Sheep milk consumption and its nutritional value
- Reducing mechanical injuries during sheep rearing

Asset transfers

- Two sheep transfers took place during years one and two with the first taking place in September 2012 and the second taking place in August 2013.
- The animals were inspected and vaccinated immediately after purchasing with all costs being covered by the project.
- A total of four sheep (one male and three female animals) were provided to each participant with a total of 260 animals being distributed to 65 households.
- The purchasing price for female animals ranged between 550 and 650 birr while that of males was 650 to 750 birr⁵.
- Pregnant or mature female animals were selected for purchase, as were males of breeding age.
- Project households were instructed not to sell project animals (direct transfers) unless these animals proved not to be productive.

Informants confirmed that supplementary feeding is practiced by some of the households where browse legumes such as tree lucerne are among the recommended supplementary feeds for sheep.⁶

Cooking Demonstrations

- The demonstrations mostly involved pregnant women and mothers with children under 2 years old but some male households representing the village's 'Development Groups' also participated in these.
- Before the cooking demonstrations, participants were informed about infant and young child feeding practices and its importance to child health as well as the importance of nutrition to pregnant woman. The information delivered during this period included:
 - Complementary feeding
 - Different types of food preparation based on the age and condition of individuals
 - The need for proper feeding for infant and young children and its impact on healthy child and family development

⁵ Every household is usually provided with four mature animals irrespective of the price of the animals in the local markets

⁶ Some of the participants have established permanent fodder trees for their animals on marginal land

- Various food types and their nutritional benefits
 - Protection against harmful germs particularly in case of milk feeding⁷
 - Good sanitation practices
 - Proper feeding during pregnancy
- Two types of porridge: soft and semi-solid are prepared during demonstrations. Soft porridge is made to feed children aged between 6 and 12 months while the semi-solid porridge is for children 12 months or older.
 - The flour is made from cereals and legumes at a ratio of 3:1 for porridge making. Similarly vegetables such as kale, carrot etc. and animal products such as milk, eggs and dried ground meat are recommended to be included as ingredients.
 - The participants were also informed about sanitation and the importance of washing hands before food preparation and during child feeding.



Potato planting in Lemu Bilbilo



Kale field Lemu Bilbilo



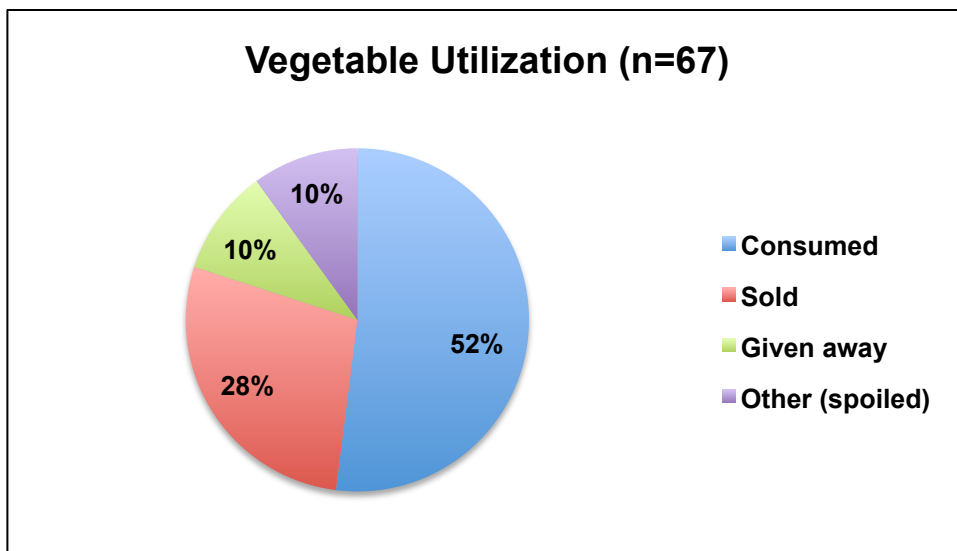
Cooking Demonstration Lemu Bilbilo

⁷ Appropriate boiling of milk before feeding

3.2 RESULTS Lemu Bilbilo

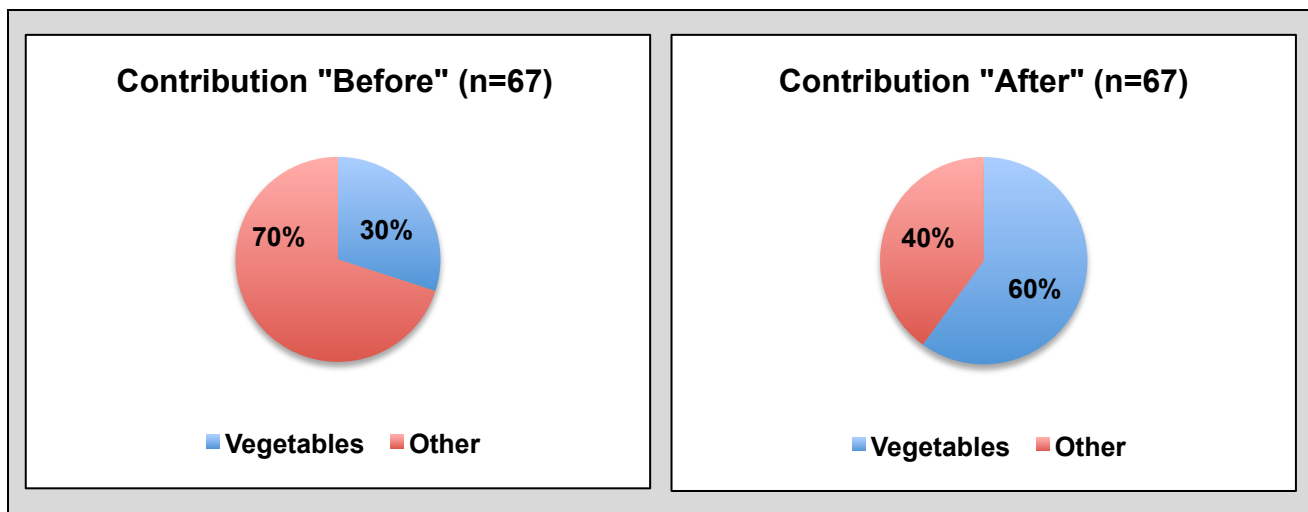
3.2.1 VEGETABLE PRODUCTION INTERVENTIONS

Figure 1: Utilization of vegetables



Method: Proportional piling using 50 counters

Figure 2: “Before” and “After” contributions of vegetables to the household food basket



Method: “Before” and “After” scoring using 40 counters

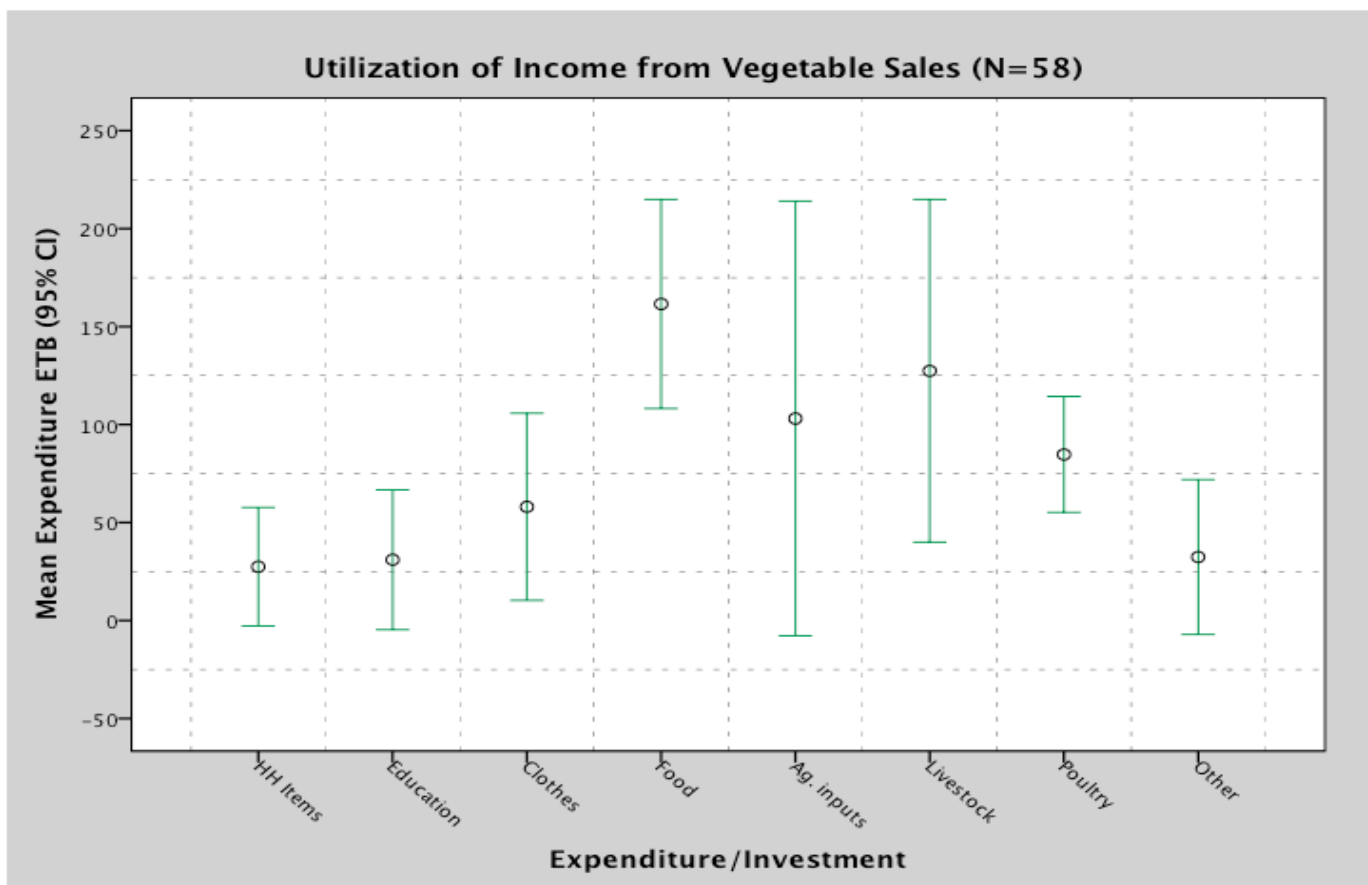
Notes for figures 1&2

Figure 1 shows the utilization of vegetables produced as a result of the projects vegetable promotion activities. The results show that the majority of the vegetables produced were consumed with a considerable proportion also being sold. This would suggest a positive impact on household nutrition. This is supported by the results from figure 2 which shows the relative contribution of vegetables to the household food basket before the ENGINE interventions took place and at the time of the assessment (after). The results show a 30% relative increase in the contribution (importance) of vegetables to the food basket since the project started which would indicate an associated improvement in household nutritional status.

Table 3: Income derived from the sale of “ENGINE” vegetables

N= 58	ETB
Total Income	36,495
Mean income (95% CI)	629.2 (436.8, 821.7)

Figure 3: Utilization of income from the sale of “ENGINE” vegetables⁸



HH Items = Household Items / Ag. Inputs = farming inputs (seeds/tools/fertilizer etc.)

Notes for table 3 and figure 3

Table 3 shows the actual income derived from the sale of vegetables produced as a result of the ENGINE livelihood activities. Figure 1 shows that 28% of the vegetables produced were sold and the results show a mean income of 629 *birr* from the sale of these crops (Table 3). The majority of this income was spent on a variety of livelihoods investments with food purchases being the most important (app 150 ETB) followed by investments in livestock and farming inputs. Arguably these three expenditures would directly or indirectly translate into improvements in household nutrition.

⁸ Total expenditure = ETB 36,440 and Mean expenditure (95% CI) = 628.3 (435.8, 820.8)

Table 4: Changes in vegetable production and consumption

Before and After comparisons (n=58)	Mean Quantity (95% CI)
# Vegetable varieties consumed “before”	2.1 (1.9, 2.3)
# Vegetable varieties consumed “after”	5.7 (5.2, 6.2)
Land allocated for vegetable production “before” (m ²)	547.3 (391.9, 702.7)
Land allocated for vegetable production “after” (m ²)	1176.2 (973.8, 1378.6)

Notes on table 4

Table 4 shows changes in the amount of land used for vegetable production and the number of different vegetable types consumed both before and after the ENGINE project started. The results show a significant increase in the amount of land allocated towards vegetable production and a corresponding significant increase in the number of vegetable types consumed since the project started. This also supports the results from Figure 2 showing an increase in the relative contribution of vegetables to the household food basket.

Table 5: Application and usefulness of vegetable promotion training activities

Training application and utilization	(n=90)
Number (percentage) of people who applied training techniques	63 (70%)
Perceived value (mean score) of the training on a scale of 1-5 (95%CI)	3.8 (3.6, 4.0)

Notes on table 5

Table 5 shows the actual number of people who applied the techniques transferred during the training activities carried out under the vegetable promotion intervention and the perceived value of the training component. The results show that 70% of the trainees actually applied the techniques. These participants then scored the value of the training on a scale of 1 to 5 with 5 being the most useful and 1 being the least. The results suggest that the participants valued the training with scores ranging from 3.6 to 4.0.

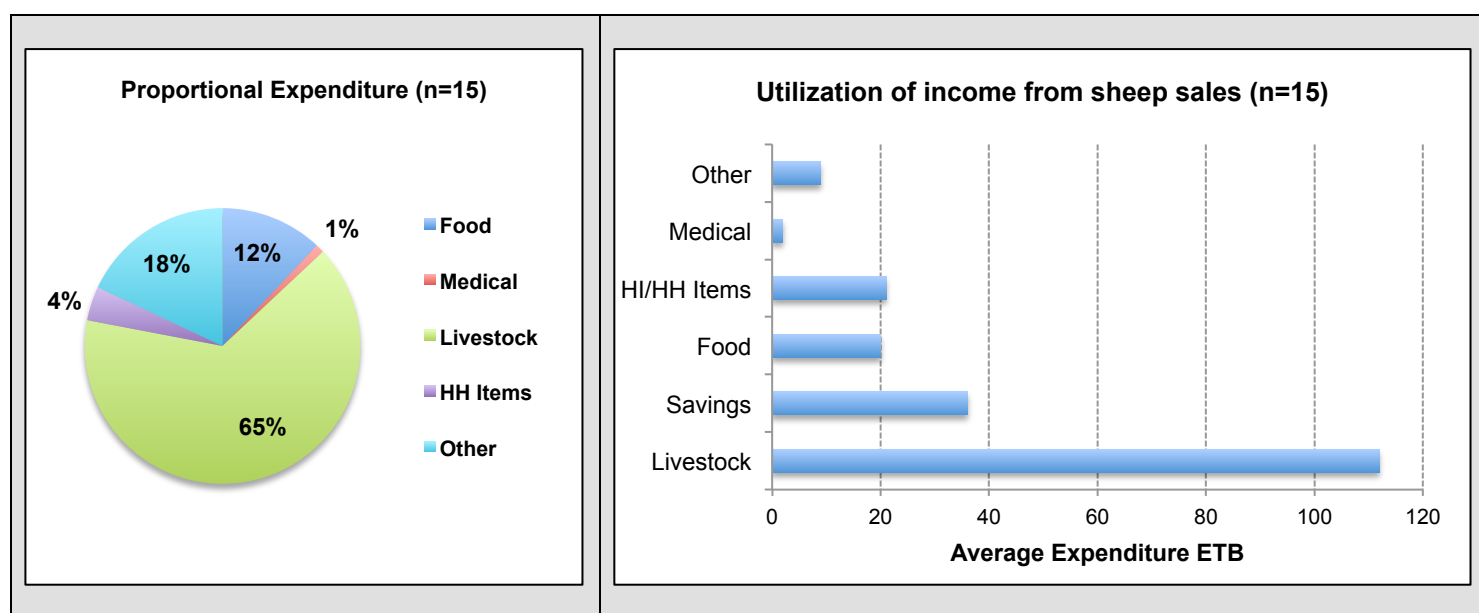
3.2.2 SHEEP PRODUCTION INTERVENTIONS**Table 6: Production sales and income from ENGINE sheep transfers**

N=65	Total	Average/HH	%
Sheep transfers	260	4	NA
Offspring from project sheep	169	2.6	NA
Project sheep died	29	0.3	11%
Project sheep sold (sheep + offspring)	22	0.2	8%
Income from the sale of project sheep ETB	15,300	170	NA

Table 7: Changes in livestock holdings

Livestock ownership (n=65)	Mean Quantity (95% CI)	
	Before	After
Sheep holdings	1.5 (0.8, 3.9)	6.8 (6.2, 7.4)
Cattle holdings	0.5 (0.3, 0.8)	1.0 (0.7, 1.4)

Figure 4: Utilization of income from sheep sales



Notes on tables 6&7 and figure 4

Each participating household received 4 sheep comprising 3 females (ewes) and one male animal. The results show fairly high mortality 11% which key informants attributed to sheep pox. Only a small number of animals 22 had been sold at the time of the assessment (including 13 of the original project animals and 9 offspring). This largely had to do with the fact that participants are encouraged to only sell the offspring and the assessment took place before the majority of these offspring had reached maturity or could be sold for a worthwhile return. This would suggest that the full impact of this intervention has yet to be realized.

Nonetheless the short-term impact can be seen in terms of herd growth (table 7) which shows a significant increase in sheep holdings in contrast to cattle. These assets arguably represent potential future income. Participants described one of the key benefits of the sheep transfers in terms of household insurance. In other words people viewed their sheep holdings as an asset that could be converted into cash in times of need or crisis. As such these livestock holdings represent impact in terms of improved resilience to future shocks or potential income from future sales. Participants also suggested that these sheep holdings provided collateral enabling them to access loans, and that the sheep by-products were being used as fertilizer, which can also be viewed as short-term impacts.

Although only a limited number of sheep had been sold at the time of the assessment, the utilization of income from the sale of these sheep may be indicative of future trends. The results show a good portion of this income (12%) being spent on food with potential nutritional benefits and the majority (65%) being spent on livestock assets (figure 4). If this pattern holds we might expect considerable impacts on nutritional status, income and assets over the longer term.

Table 8: Application and usefulness of sheep production training activities

Training application and utilization	(n=65)
Number (percentage) of people who applied training techniques	61 (94%)
Perceived value (mean score) of the training on a scale of 1-5 (95%CI)	3.5 (3.7, 3.9)

Notes on table 8

Table 8 shows the actual number of people who applied the techniques transferred during the sheep production training activities and the perceived value of the training component. The results show that 94%

of the trainees actually applied the training skills they acquired. These participants then scored the value of the training on a scale of 1 to 5 with 5 being the most useful and 1 being the least. The results suggest that the participants valued the training with scores ranging from 3.7 to 3.9.

3.2.3 COOKING DEMONSTRATIONS

Table 9: Utilization and dissemination of information from cooking demonstrations

Questions (n=81)	Yes (%)
Have you actually used any of the information from the cooking demonstrations?	88%
Have you prepared the same recipes taught at the cooking demonstrations?	79%
Have you shared any of the information you learned with friends or neighbors?	88%

Table 10: Usefulness of cooking demonstrations

N=81	Mean Score (95% CI)
Perceived value of the cooking demonstrations on a scale of 1-5	3.7 (3.4, 3.9)

Notes on tables 9&10

Table 9 gives an indication of the uptake and dissemination of information transferred during the projects cooking demonstrations. The results show that 88% of participants have actually used the information and shared this information with friends or neighbors. The results also show that 79% of participants have used the specific recipes provided during the demonstrations. The participants also scored the usefulness of the demonstrations on a range of 3.4 to 3.9 out of 5 suggesting that these were perceived to be valuable (Table 10).

Figure 5: New food types being consumed since the project started

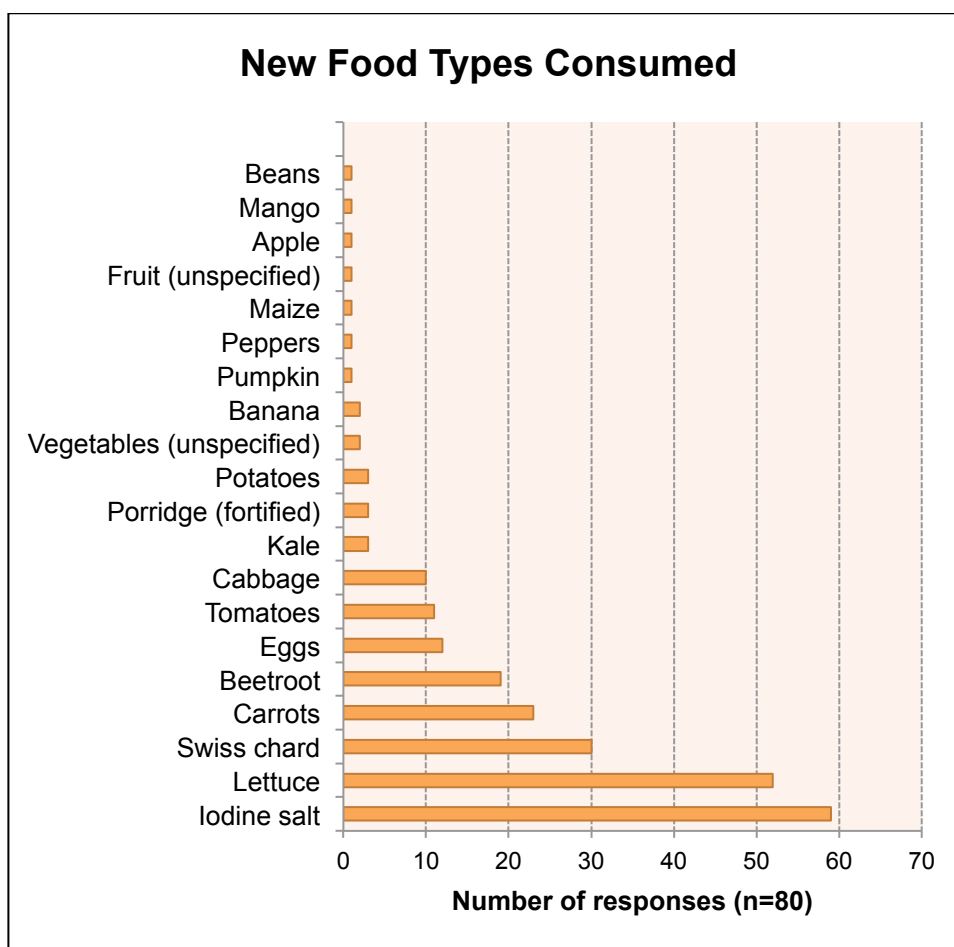


Table 11: Ranking of factors contributing to improvements in dietary diversity

Factors	Ranking and Frequency		
	1 st	2 nd	3 rd
ENGINE training	49	22	3
ENGINE seed transfers	NA	NA	9
ENGINE savings groups (VSLA)	NA	1	NA
Other	31	57	69

Other = increased income/production/extension services/irrigation and non-project seed transfers

Notes on figure 5 and table 11

Figure 5 shows new food types being consumed by households since the ENGINE project started. The results show 20 new food types being recorded with a noticeable increase in vegetable consumption and iodized salt. Participants ranked project related factors such as ENGINE training activities and vegetable seed transfers as the most important factors contributing to this increase in dietary diversity (Table 11).

Figure 6: Women's influence over livelihoods decisions

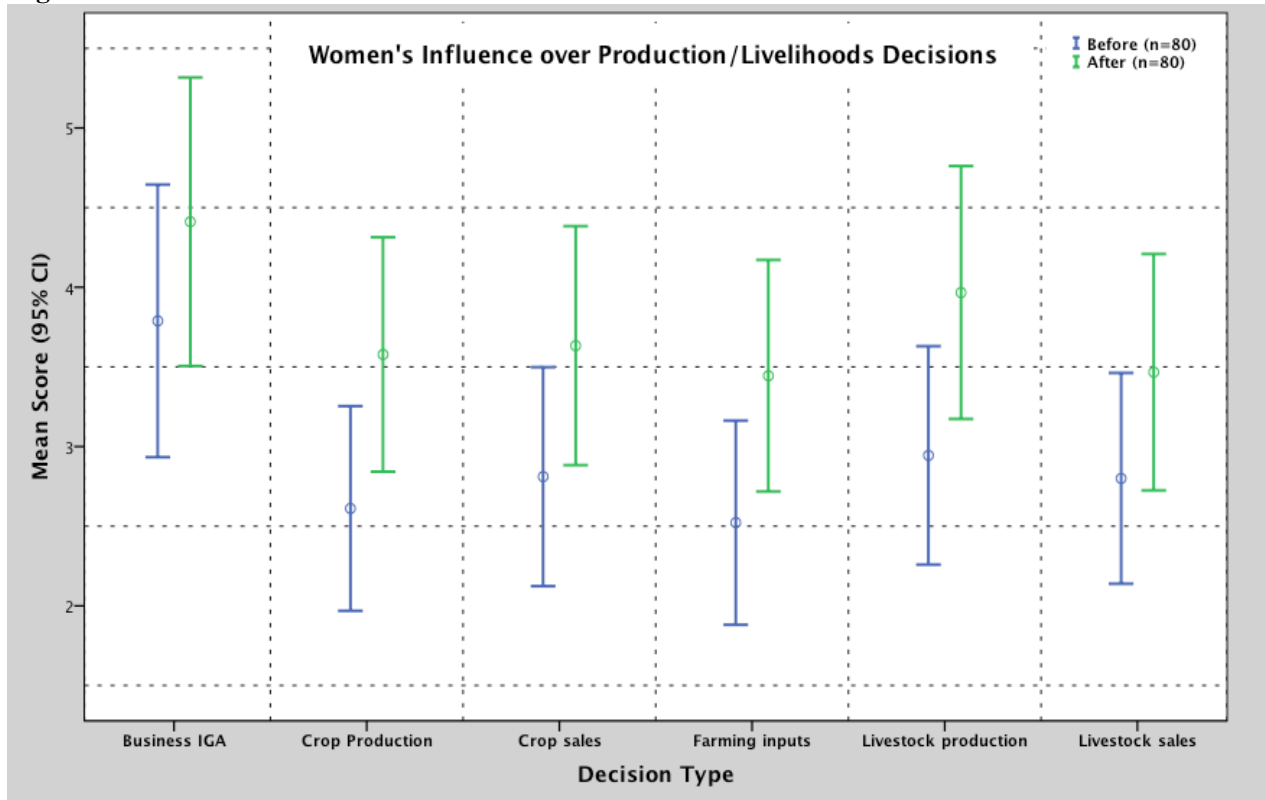
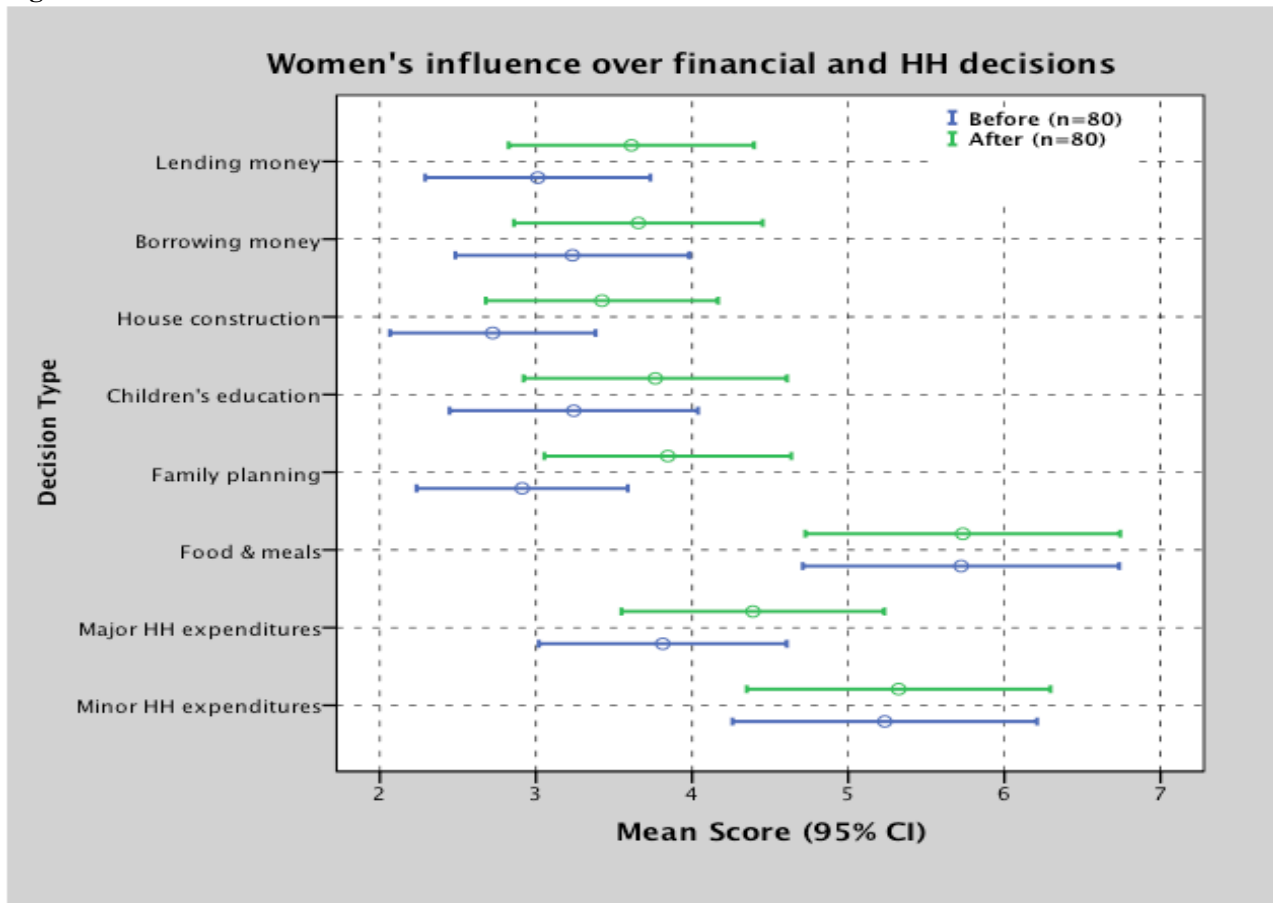


Figure 7: Women's influence over financial and household decisions



Notes on figures 6&7

Female-headed households were excluded from this exercise, as were male participants in households without a female adult. This was done based on the assumption that female household heads would in most cases have considerable influence over household decisions and female minors would have little. For each type of decision, participants were asked to give a score between 1-10 representing the amount of influence they perceive women in their household to have, with 1 representing little to no influence and 10 representing a considerable amount of influence.

The results compare the level of influence before the ENGINE project started and at the time of the assessment. Where an increase in the level of influence was reported participants were asked to give the reasons for this change and the frequency of project (ENGINE) related factors is shown in table 12 below. The results show no significant difference (mean value) in the influence women have over various decisions since the project started. However, it should be mentioned that this exercise was carried out more out of interest than to assess impact as it was unclear if any specific ENGINE activities had been carried out to improve women’s influence over these types of decisions in the study areas.

Table 12 Project related factors contributing to an increase in women’s influence over decisions

Decision type		Frequency
Production Livelihoods	Crop production	6
	Farming inputs	6
	Crop sales	3
	Livestock production	3
	Livestock sales	1
	Business/IGA	0
Financial	Major HH expenditures	1
	Minor HH expenditures	0
	Borrowing money	1
	Lending money	0
Household	Food & meals	0
	Children's education	0
	House construction	1
	Family planning	0

Table 13: SWOT analysis for vegetable production interventions

Strengths	Limitations/Challenges
<ul style="list-style-type: none"> • Training has improved participants skills in vegetable production • Provision of farm tools has encouraged and helped people to practice recommended agronomic practices in vegetable production • Improved nutrition as a result of consumption of various vegetables • Income generated from vegetable sales, and ability to purchase other food types with this income • Vegetable production has provided an alternative livelihood source • The project has encouraged people to work hard to improve agricultural production and child nutrition 	<ul style="list-style-type: none"> • The quantity of seed supplied (for some varieties) is not sufficient to significantly increase consumption • Vegetable seeds were supplied after the appropriate seeding time: In some <i>kebeles</i>, planting materials were transferred to participants in June while the right planting time is between March and May • Sustainable seed supply is challenging as quality seeds for vegetables, namely cabbage, carrot, pumpkin and lettuce are not available locally • Potato planting material is bulky and costly in comparison to other vegetables • At Koma Katara <i>kebele</i>, the farmers did not appreciate the seed varieties distributed (<i>guddene</i>) indicating that it is not useful for making traditional 'wot'⁹ • After November, aphids are a problem for cabbage production • Some households received both sheep and vegetables while the rest received only one commodity without any strong justification.¹⁰

Source: HHI and FGD



Cabbage attacked by Aphids

⁹ Participants suggested that that this variety takes longer to cook

¹⁰ The respondents indicated that recipients were not treated equally regarding animal transfers creating a lack of trust between ENGINE staff and project participants who did not receive animals

Table 14: SWOT analysis for sheep production interventions

Strengths	Limitations/Challenges
<ul style="list-style-type: none"> • Insurance level of households improved due to livestock ownership as well as increased herd size: the participants are now able to access loans either individually or in groups from MFIs • The use of manure has helped participants increase vegetable production • Some households are able to sell the offspring to generate income for purchases of food and various household consumables • The project has encouraged people to work hard to improve their agricultural production and child nutrition 	<ul style="list-style-type: none"> • Late livestock transfers: consequently the majority of participants had not yet sold the offspring resulting in delayed impact • Mortality of project animals as well as lamb mortality (offspring) • Livestock morbidity resulting from internal parasites has translated into lower productivity • Feed shortage and reduced grazing areas during cropping seasons in some areas • Predators such as fox/jackals during the day in the grazing fields and hyena attacks at night in the home • Feed shortage during cropping seasons in <i>kebeles</i> like Koma Katara where most of the land is put to cropping

Source: HHI and FGD

Table 15: SWOT analysis cooking demonstrations

Strengths	Limitations/Challenges
<ul style="list-style-type: none"> • Improved mothers and caregivers skills in child food preparation and their knowledge on the importance of proper feeding for infants and young children • The activity has encouraged participants to include new food sources and diversify their diet • It has helped improve child nutrition 	<ul style="list-style-type: none"> • The training is often carried out with large groups (more than 50 people) and many are unable to grasp the concepts being conveyed during the demonstrations • Economic limitations (cost of ingredients) • Availability/Shortage of diversified foods is a major challenge to feeding children throughout the recommended period of child feeding • Cultural influences - husbands and grandmothers did not receive training • The foods prepared particularly porridge is not consumed by the children who are accustomed to other food types (they dislike the taste and color of the porridge)

Source: HHI and FGD

Figure 8: Problem tree analysis for vulnerable households' nutrition

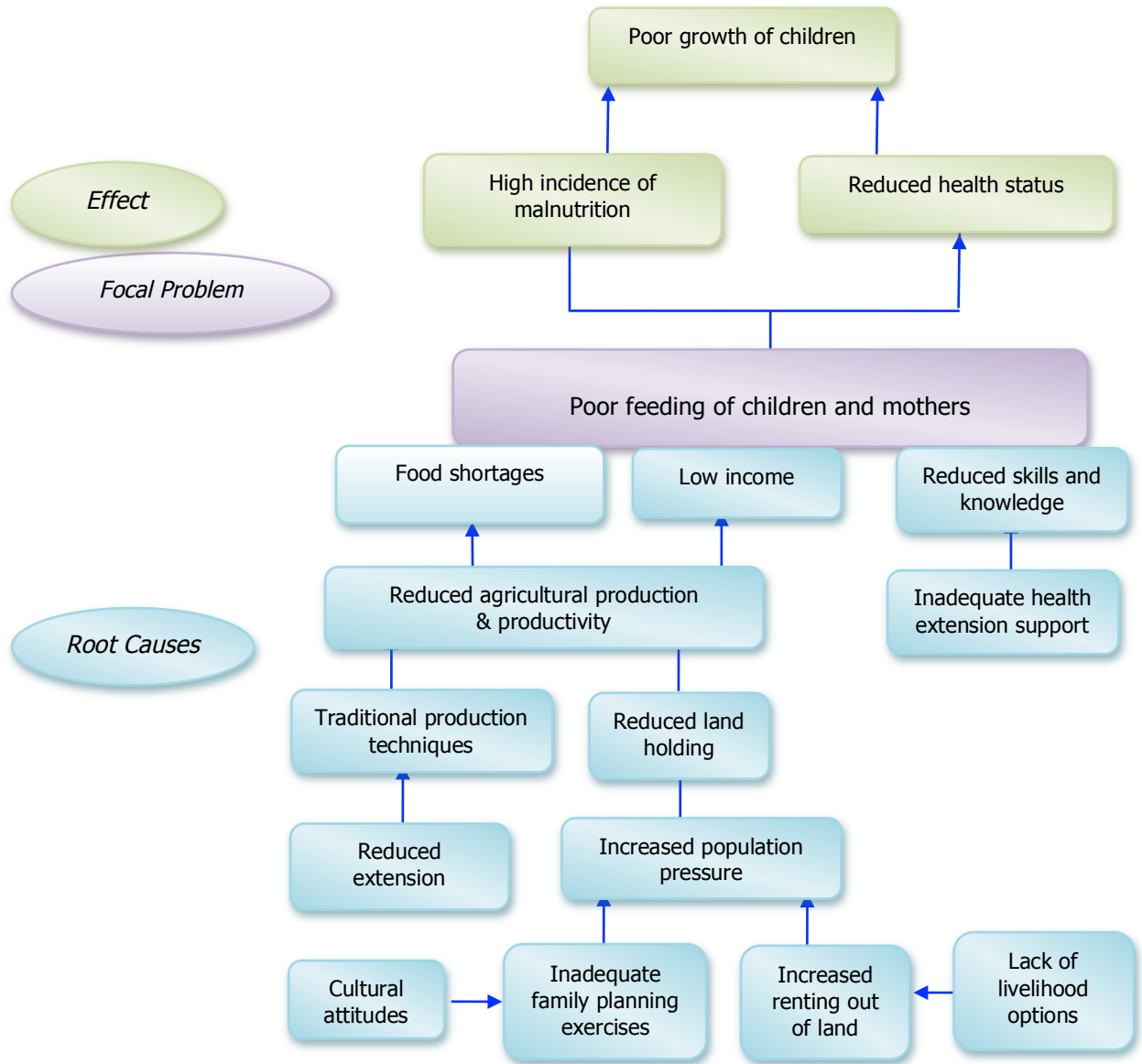
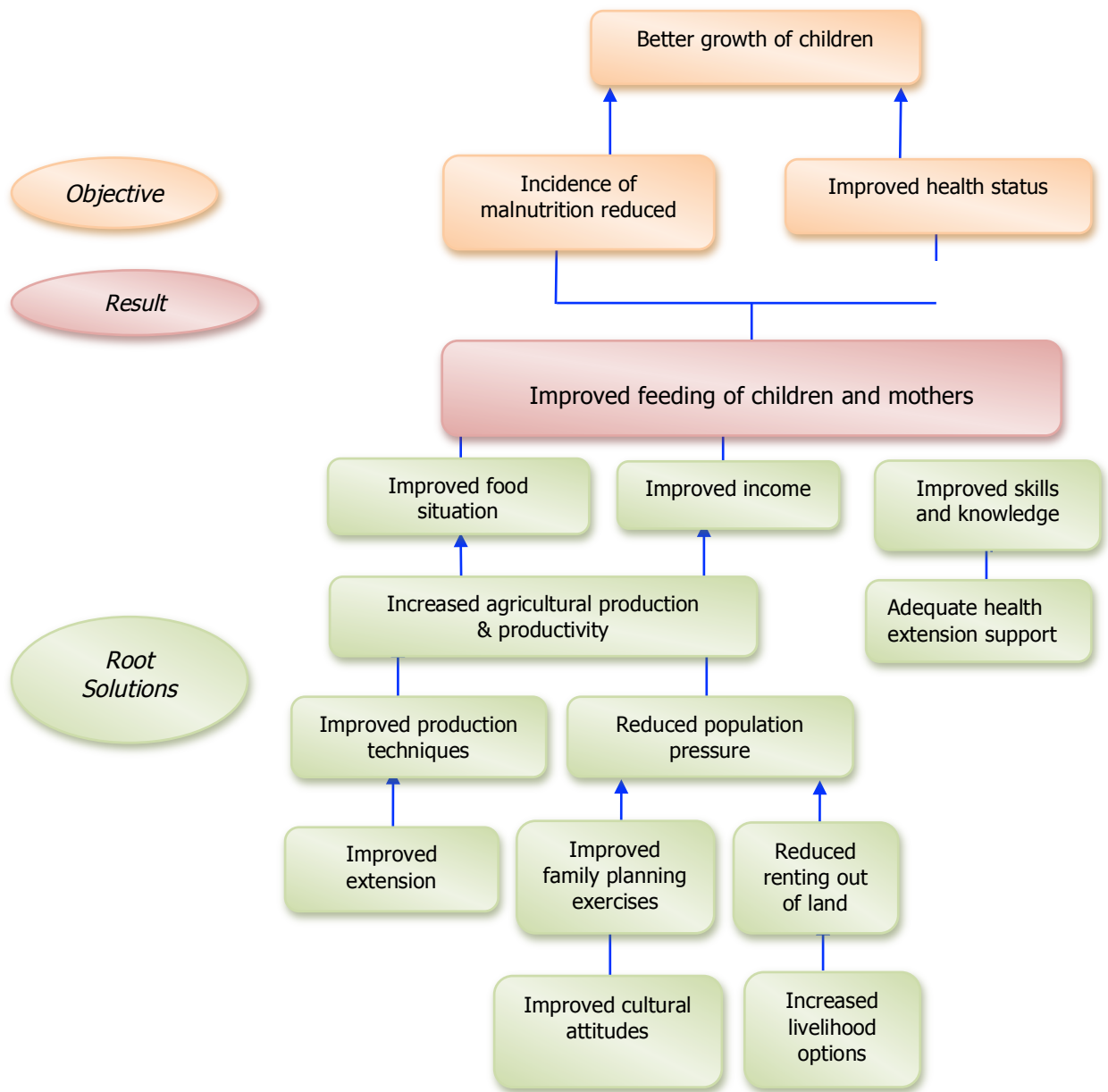


Figure 9: Objective tree analysis for vulnerable households' nutrition



4. CASE STUDY 2: South Achefer Woreda, Amhara Region

4.1 Overview of ENGINE Livelihoods Interventions in South Achefer

A total of 70 households were targeted for both livelihoods interventions in the three *kebeles* in year one of project implementation and 20 of these same households were selected for livestock transfers in year two of the project. In year three livelihoods support was expanded to five *kebeles* bringing the total number of participating households to 120. The *woreda* office of agriculture took the lead in implementing these interventions being responsible for the selection of households and the transfer of vegetable seeds and livestock to project participants. Other features and activities carried out under the ENGINE livelihoods component in South Achefer include:

- Development agents were trained in nutrition sensitive agriculture including vegetable, poultry and livestock production¹¹
- Targeting focused on vulnerable households with children under 2 years of age as well as households with HIV positive members.
- However, *woreda* experts maintained that they are over committed with a considerable workload of routine activities and this resulted in the late transfer of vegetable seeds as well as poor supervision of the livelihood activities.
- Project households participated in a three-day training exercise in August 2013. This included training in vegetable and sheep production. However, FGD participants suggested that some households that received livestock transfers had not been involved in the actual training exercise.
- Training in poultry production was provided in 2014 and participants were provided with corrugated iron sheets to enable them to build chicken coops.
- Demonstration sites were established at (FTCs) in the selected *kebeles* and “field days” were scheduled to provide training and demonstrations on production practices and the nutritional benefits derived from vegetable consumption.

Vegetable production

- Training was provided in vegetable production.
- 50 households in Abchikli *kebele* were targeted for vegetable production during the first year of the project.
- Demonstrations on production techniques were carried out at each FTC in the three-targeted *kebeles* and at some schools followed by the transfer of cabbage, carrot, beetroot and Swiss chard seeds.
- In May 2014, three types of farm tool were given to each selected household to assist in vegetable production



**Land preparation for vegetable production
at a Farmer Training Center in South
Achefer**

¹¹ The training was provided by experts from *woreda* agriculture office

Livestock production

The recipients were all vulnerable or HIV positive women and the following activities were carried out under the sheep production interventions:

- Improved sheep production skills training
- Feed resource management, animal feeding and housing
- Sheep breeding
- Animal health care and vaccination awareness
- Lamb or offspring handling
- Animal dung handling for compost preparation
- Livestock marketing

Asset transfers

- Only 20 households were targeted for sheep production in year one of the project with an additional 20 households receiving animals in year two.
- A total of 3000 birr /participant was allocated for the purchase of the animals. Typically this was used to purchase 3 (mature, pregnant or lactating) ewes.
- The animals were inspected and vaccinated in some of the *kebeles* with the recipients' covering the cost although some study participants suggested that they waited for a long time before getting their animals vaccinated.
- Some participants faced problems of housing these animals and feeding them since many are landless women living in rented houses in the nearby rural towns.
- The study findings indicate that most of the recipients practiced free grazing. However, some of them, particularly landless and labor poor households, practiced half day free grazing and the rest supplementary feeding and these households spend a considerable amount of money purchasing animal feed.
- High livestock mortality particularly of lambs during delivery was widely reported by participants.
- The purchasing price of project animals ranged between 950 and 1100 birr with the sale price being determined by when the animals are sold¹². Livestock prices are usually lower during planting and rainy periods.



Small ruminants free grazing in South Achefer

¹² This may also be partly explained by the fact that pregnant sheep were purchased by the project as opposed to young sheep that were sold

Cooking Demonstrations

Two days of training was provided to Health Extension Workers (HEW). This included training on child nutrition and cooking demonstrations. Some participants felt that the training could have benefited from being longer than two days.

- Cooking demonstrations were carried out in all three *kebeles* during the first year of the project.
- Pregnant women and mothers with children under 2 years were selected to participate in these demonstrations.
- According to key informants both partners were invited to participate but typically only females attended the demonstrations.
- The information delivered during the demonstrations included:
 - Complementary feeding
 - The importance of proper feeding for infants and young children and its impact on healthy child development
 - Various food types and their nutritional benefits
 - Good sanitation practices
 - Proper feeding during pregnancy
- Cooking demonstrations were conducted at eight sites during the first year of the project. However, key informants suggested that these did not follow the correct guidelines due to the lack of resources (ingredients). Apparently participating households are expected to provide these resources.

4.2 Results

4.2.1 VEGETABLE PRODUCTION INTERVENTIONS

Figure 10: Utilization of vegetables (S. Achefer)

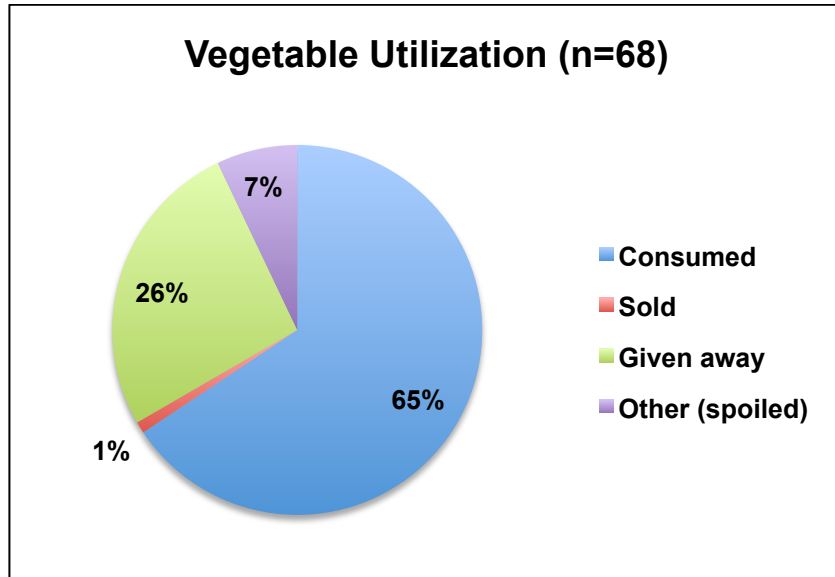
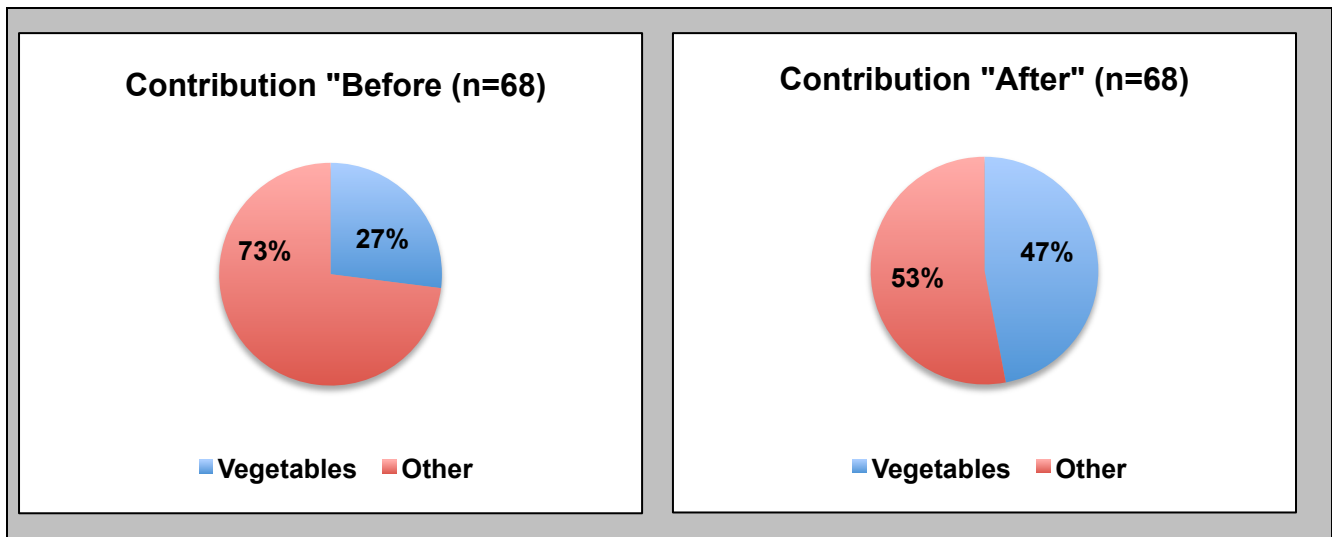


Figure 11: "Before" and "After" contributions of vegetables to the household food basket



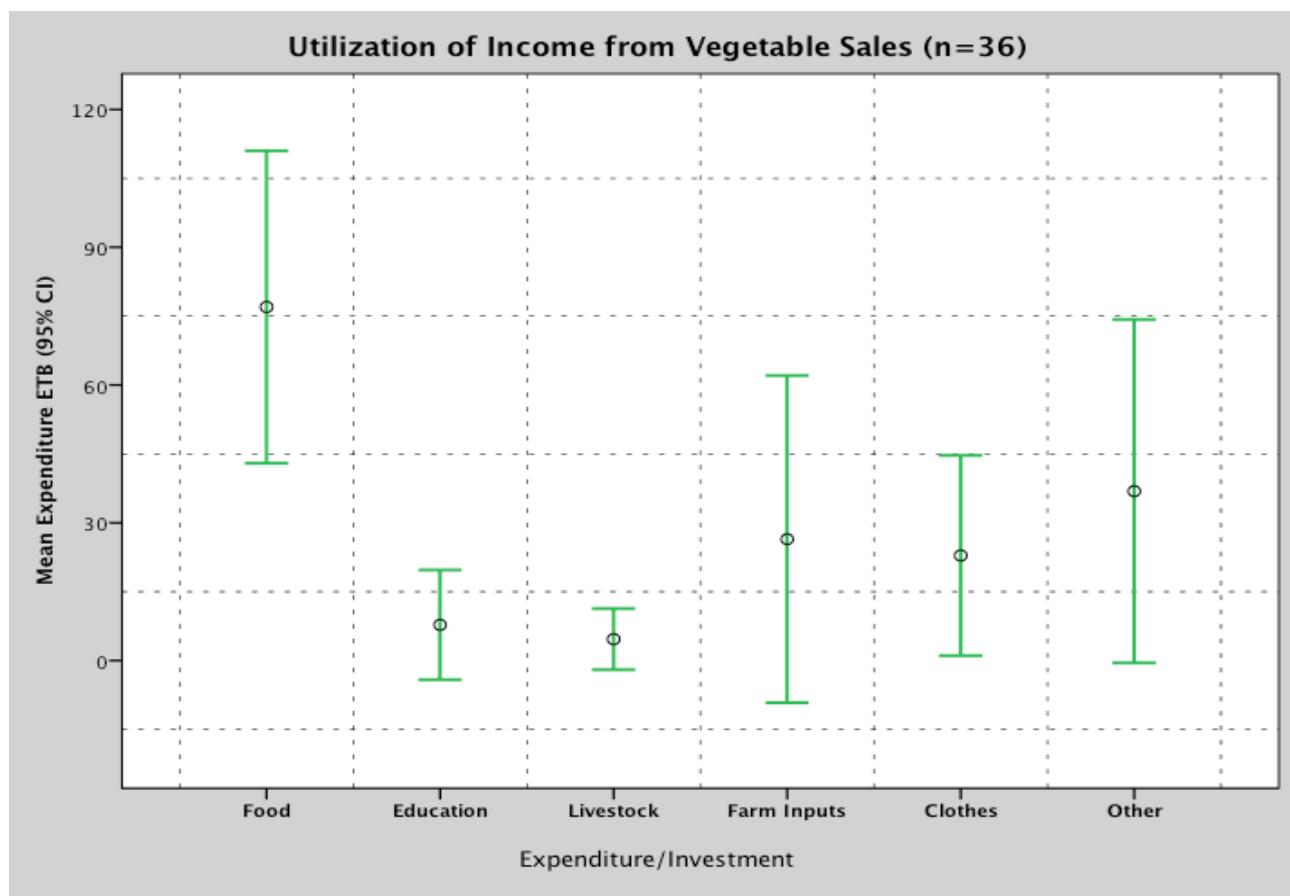
Notes for figures 10&11

Figure 10 shows the utilization of vegetables produced as a result of the projects vegetable promotion activities. The results show that the majority of the vegetables produced were consumed suggesting a positive impact on household nutrition. This is supported by the results from figure 11 which shows the relative contribution of vegetables to the household food basket before the ENGINE interventions took place and at the time of the assessment (after). The results show a 20% relative increase in the contribution (importance) of vegetables to the food basket since the project started which would indicate an associated improvement in household nutritional status.

Table 16: Income derived from the sale of “ENGINE” vegetables

N=36	ETB
Total Income	8,395
Mean Income (95% CI)	123.5 (73.3, 173.6)

Figure 12: Utilization of income from the sale of “ENGINE” vegetables¹³



Other = mostly savings

Notes for table 16 and figure 12

Table 16 shows the actual income derived from the sale of vegetables produced as a result of the ENGINE livelihood activities. However, Figure 10 shows that only 1% of the vegetables produced were sold and the results from Table 16 correspond with this showing a relatively low mean income of 123 *birr* from the sale of these crops. A large proportion of this income was spent on food purchases arguably translating into improvements in household nutrition. Other expenditure’s included clothes and farming inputs although these were relatively minor.

Table 17: Changes in vegetable production and consumption

Before and After comparisons (n=68)	Mean Quantity (95% CI)
# Vegetable varieties consumed “before”	1.7 (1.2, 2.1)
# Vegetable varieties consumed “after”	5.8 (5.1, 6.4)
Land allocated for vegetable production “before” (m ²)	306.7 (128.2, 485.2)
Land allocated for vegetable production “after” (m ²)	534.7 (291.7, 777.8)

¹³ Total expenditure = 8,395 ETB and Mean expenditure (95% CI) = 123.5 (73.3, 173.6) ETB

Notes on table 17

Table 17 shows changes in the amount of land used for vegetable production and the number of different vegetable types consumed both before and after the ENGINE project started. The results show an increase in the amount of land allocated towards vegetable production although this was not significant. However, the results do show a significant increase in the number of vegetable types consumed since the project started. This also supports the results from Figure 11 showing an increase in the relative contribution of vegetables to the household food basket and figure 14 showing the new food types being consumed.

Table 18: Application and usefulness of vegetable promotion training activities

Training application and utilization	(n=68)
Number (percentage) of people who applied training techniques	45 (65%)
Perceived value (mean score) of the training on a scale of 1-5 (95%CI)	3.3 (3.1, 3.5)

Notes on table 18

Table 18 shows the actual number of people who applied the techniques transferred during the training activities carried out under the vegetable promotion intervention and the perceived value of the training component. The results show that 65% of the trainees actually applied the techniques. These participants then scored the value of the training on a scale of 1 to 5 with 5 being the most useful and 1 being the least. The results suggest that the participants valued the training with scores ranging from 3.3 to 3.5.

4.2.2 SHEEP PRODUCTION INTERVENTIONS

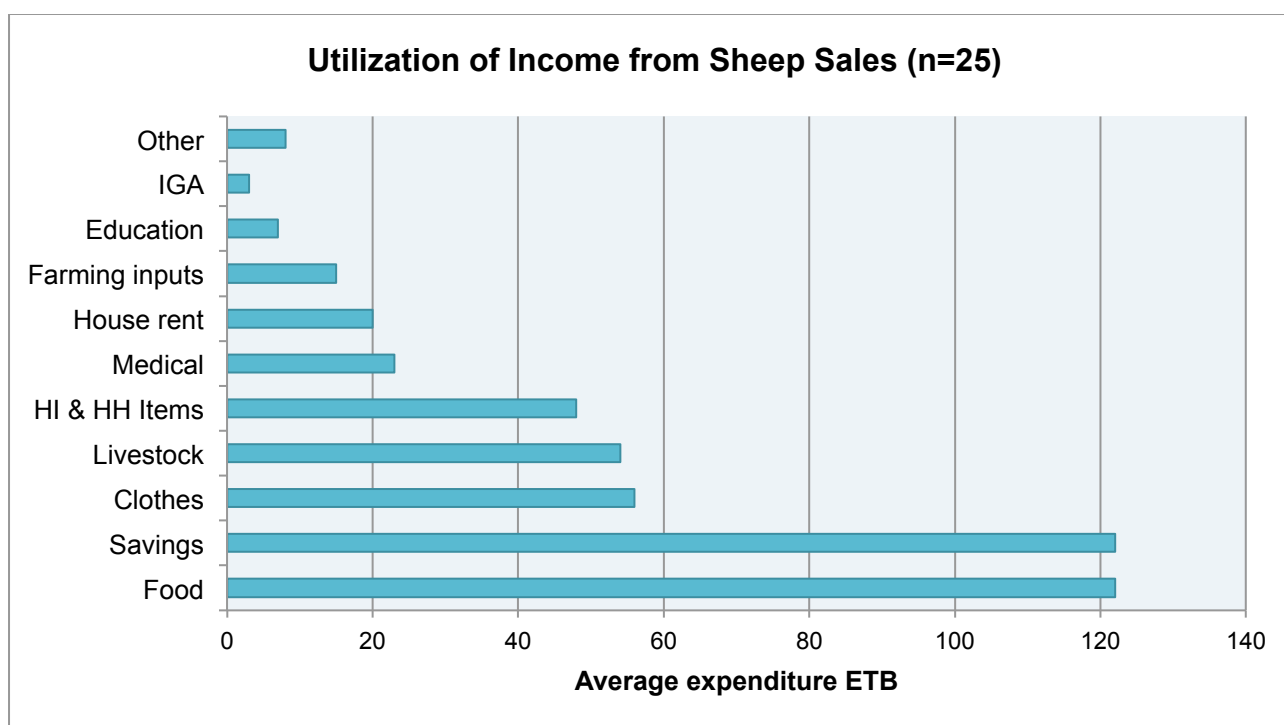
Table 19: Production sales and income from ENGINE sheep transfers

N=38	Total	Average/HH	Percentage
Sheep transfers	118	3	NA
Offspring from project sheep	127	4	NA
Project sheep died + (<i>stolen</i>)	39	1	31%
Project sheep sold (sheep + offspring)	66	2	27%
Income from the sale of project sheep ETB	26,470	389	NA

Table 20: Changes in livestock holdings

Livestock ownership (n=38)	Average Number	
	Before	After
Sheep holdings	1	3
Cattle holdings	2	3

Figure 13: Utilization of income from sheep sales



Notes on table 19 and figure 13

Each participating household received 3 sheep (average). The results show extremely high mortality (31%) although a fair number of animals (66) had also been sold at the time of the assessment (including 8 of the original project animals and 58 offspring). The utilization of income from the sale of these animals shows that a considerable portion of this income was spent on food with potential nutritional benefits. The results also show that a similar amount of this income was saved which might be representative of improved household resiliency as these savings could potentially provide a buffer against future shocks or to help smooth consumption during hunger periods.

Table 21: Application and usefulness of sheep production training activities

Training application and utilization	(n=38)
Number (percentage) of people who applied training techniques	25 (71%)
Perceived value (median score and range) of the training on a scale of 1-5	3 (2, 4)

Notes on table 21

Table 21 shows the actual number of people who applied the techniques transferred during the sheep production training activities and the perceived value of the training component. The results show that 71% of the trainees actually applied the training skills they acquired. These participants then scored the value of the training on a scale of 1 to 5 with 5 being the most useful and 1 being the least. The results suggest that the participants valued the training with an average score of 3 out of 5 being assessed.

4.2.3 COOKING DEMONSTRATIONS

Table 22: Utilization and dissemination of information from cooking demonstrations

Questions (n=35)	Yes (%)
Have you actually used any of the information from the cooking demonstrations?	77%
Have you prepared the same recipes taught at the cooking demonstrations?	77%
Have you shared any of the information they learned with friends or neighbors?	89%

Table 23: Usefulness of cooking demonstrations

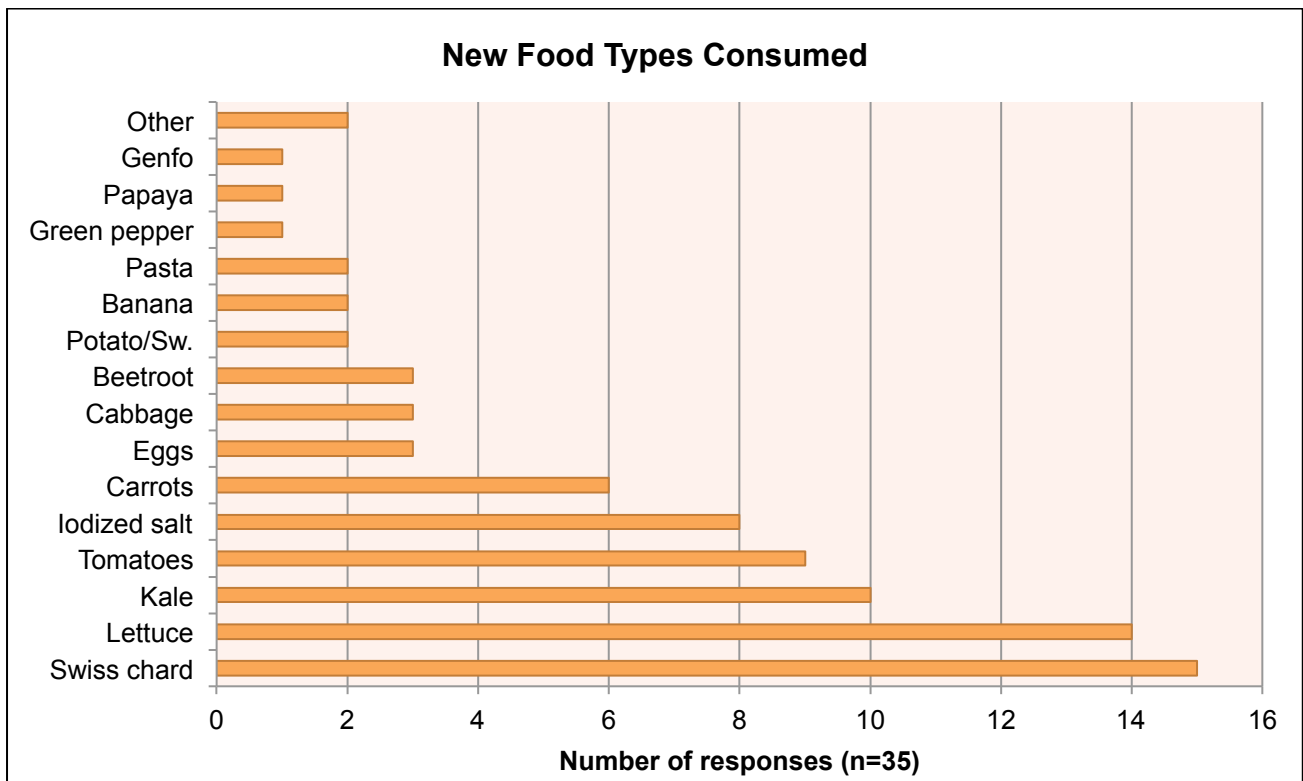
N=35	Median Score (range)
Perceived value of the cooking demonstrations on a scale of 1-5	3 (2, 4)

Notes on tables 22-23

Table 22 gives an indication of the uptake and dissemination of information transferred during the projects cooking demonstrations. The results show that 77% of participants have actually used the information and prepared the specific recipes provided during the demonstrations. The results also show that 89% of participants have shared the information transferred during the demonstrations with friends or neighbors, which could be a useful proxy for information dissemination. The participants also scored the usefulness of the demonstrations with an average score of 3 being assessed (Table 23).

4.2.4 DIETARY DIVERSITY

Figure 14: New food varieties consumed since ENGINE Started



Potato/Sw. = potatoes and sweet potatoes

Table 24: Project and non-project factors contributing to increased dietary diversity

Factors	Ranking and Frequency		
	1 st	2 nd	3 rd
ENGINE training	19	9	1
ENGINE seed transfers	13	7	1
Other	3	6	4

Other = increased income/extension services and irrigation

Notes on figure 14 and table 24

Figure 14 shows new food types being consumed by households since the ENGINE project started. The results show 16 new food types being recorded with a noticeable increase in vegetable consumption and iodized salt. Participants ranked project related factors such as ENGINE training activities and vegetable seed transfers as the most important factors contributing to this increase in dietary diversity (table 24).

4.2.5 WOMENS EMPOWERMENT

Table 25: Changes in women’s decision-making influence

Decision type		Before n=26	After n=26
Production Livelihoods	Crop production	46%	73%
	Farming inputs	50%	85%
	Crop sales	62%	77%
	Livestock production	62%	73%
	Livestock sales	58%	81%
	Business/IGA	73%	81%
Financial	Major HH expenditures	69%	88%
	Minor HH expenditures	100%	100%
	Borrowing money	62%	73%
	Lending money	62%	77%
Household	Food & meals	100%	100%
	Children's education	69%	92%
	House construction	58%	73%
	Family planning	73%	85%

Notes on table 25

Female-headed households were excluded from this exercise, as were male participants in households without a female adult. This was done based on the assumption that female household heads would in most cases have considerable influence over household decisions and female minors would have little. For each type of decision, participants were asked to give a score between 1-10 representing the amount of influence they perceive women in their household to have, with 1 representing little to no influence and 10 representing a considerable amount of influence.

The results show the proportion (%) of participants that scored the level of influence as medium to considerable (5 or above) with the balance (%) representing those that scored the level of influence as little to none (4 or less). The results compare the level of influence before the ENGINE project started and at the time of the assessment. Where an increase in the level of influence was reported participants were asked to give the reasons for this change and the frequency of project (ENGINE) related factors is shown in table 26 below. Where an increase in the level of influence was reported some participants attributed this to project related factors. However these results should be treated with caution given the limited sample size.

Table 26 Project related factors contributing to an increase in women’s influence over decisions

Decision type		Frequency
Production Livelihoods	Crop production	6
	Farming inputs	6
	Crop sales	3
	Livestock production	3
	Livestock sales	1
	Business/IGA	0
Financial	Major HH expenditures	1
	Minor HH expenditures	0
	Borrowing money	1
	Lending money	0
Household	Food & meals	0
	Children's education	0
	House construction	1
	Family planning	0

Table 27: SWOT analysis for vegetable production interventions

Strengths	Threats/Challenges
<ul style="list-style-type: none"> Improved skills in the production of vegetables as a result of the training activities Improved dietary diversity due to the production and consumption of new varieties of vegetables Increased income from the sale of vegetables for some households 	<ul style="list-style-type: none"> Poor targeting in Abchikli <i>kebele</i>¹⁴ where non-vulnerable households received seeds Seed transfers were undertaken at the end of the rainy season in year 1 limiting production benefits and impact Farm tools were not provided to the targeted households during the first year of project implementation Some targeted vulnerable households are landless and therefore cannot participate in vegetable production particularly in Ahuri and Lalibela <i>kebeles</i> Production is dependent on rainfall as there is little irrigation or ground water in the area Some households discontinued vegetable production, as the project did not provide them with seeds after year 2 bringing into question the sustainability of this intervention.

Source: HHI and FGD

¹⁴ Vegetable seeds were not transferred to project participants during year 1 and 2 in Lalibela and Ahuri *kebeles*

Table 28: SWOT analysis for sheep production interventions

Strengths (anticipated impact/benefits)	Threats/Challenges
<ul style="list-style-type: none"> • The livestock provide vulnerable households with some insurance against unanticipated shocks • Households prestige/status improved as a result of livestock ownership or increased herd size • Income generation from livestock sales • Use of manure for crop production (even for landless households who reportedly gave manure to relatives with land for crop production) • Improved access to credit as the animals provide collateral for both formal and informal loans 	<ul style="list-style-type: none"> • Poor targeting and delayed livestock transfers was reported in one of the three <i>kebeles</i> in in 2014 • High mortality of project animals and lambs (largely related to limited vaccination coverage) • The recipients are vulnerable households who are unable to cover the costs of medical treatment for their animals • Sheep housing and feeding is a problem for landless women particularly in Lalibela and Ahuri <i>kebeles</i> who live in rented houses • Seasonal fluctuations in the price of animals has reduced the anticipated benefit obtained from livestock sales • High costs of production inputs such as feed for households with little access to free grazing ¹⁵

Source: HHI and FGD

Table 29: SWOT analysis cooking demonstrations

Strengths	Limitations
<p>Improved awareness/knowledge on:</p> <ul style="list-style-type: none"> • Dietary diversity • Infant and young children feeding practices 	<ul style="list-style-type: none"> • Low uptake due to lack of resources (ingredients) and equipment • The foods prepared particularly porridge is not easily accepted by the children who are accustomed to other food types • Mothers are too busy to prepare children's food in the right way. Similarly, cultural influences and economic limitations particularly where husbands and elders did not receive training

Source: HHI and FGD

¹⁵ Frequent purchases of industrial by-products will lead to lower benefits to be generated from livestock production

Figure 15: Problem tree analysis for vulnerable households' nutrition (South Achefer)

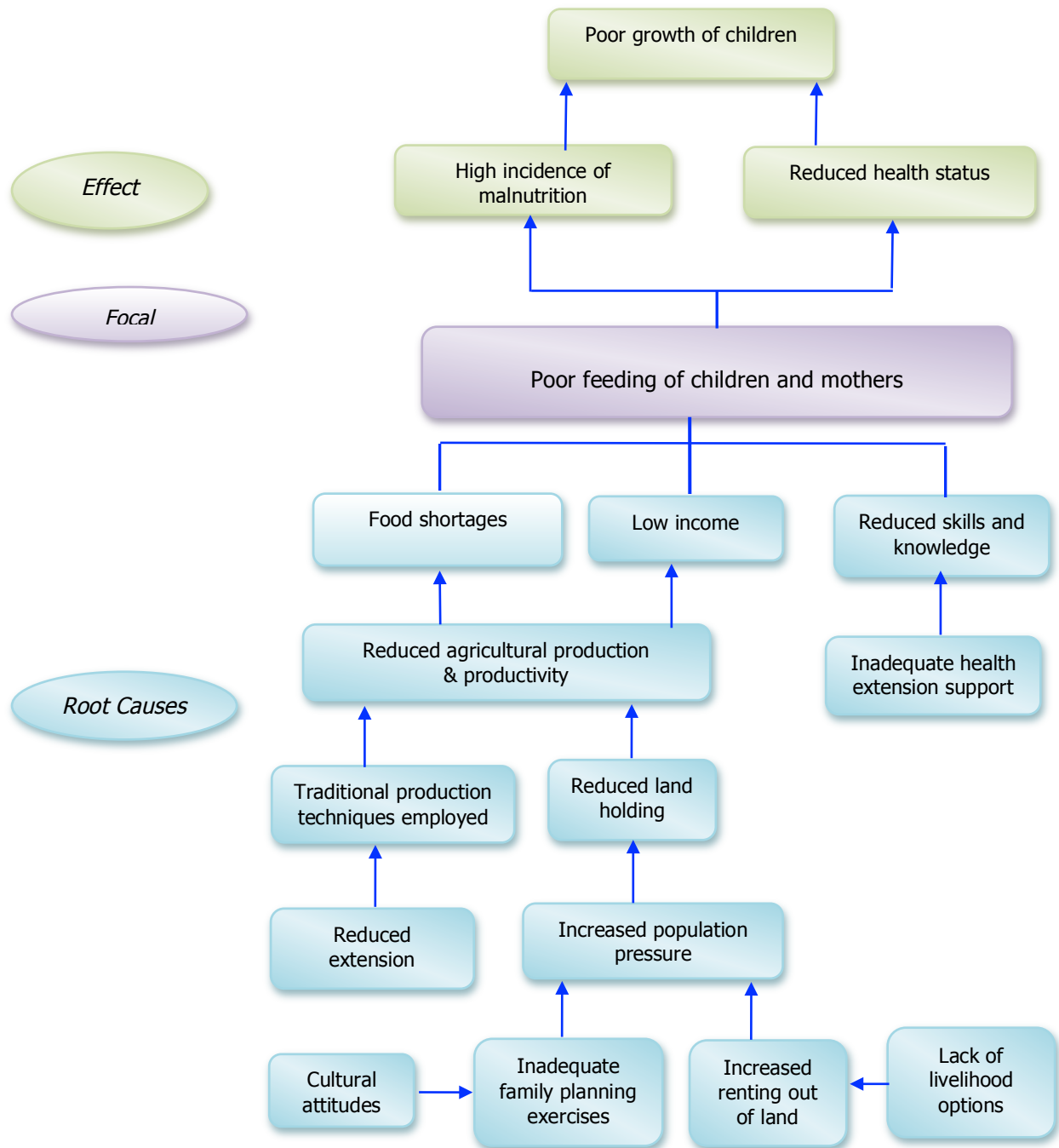
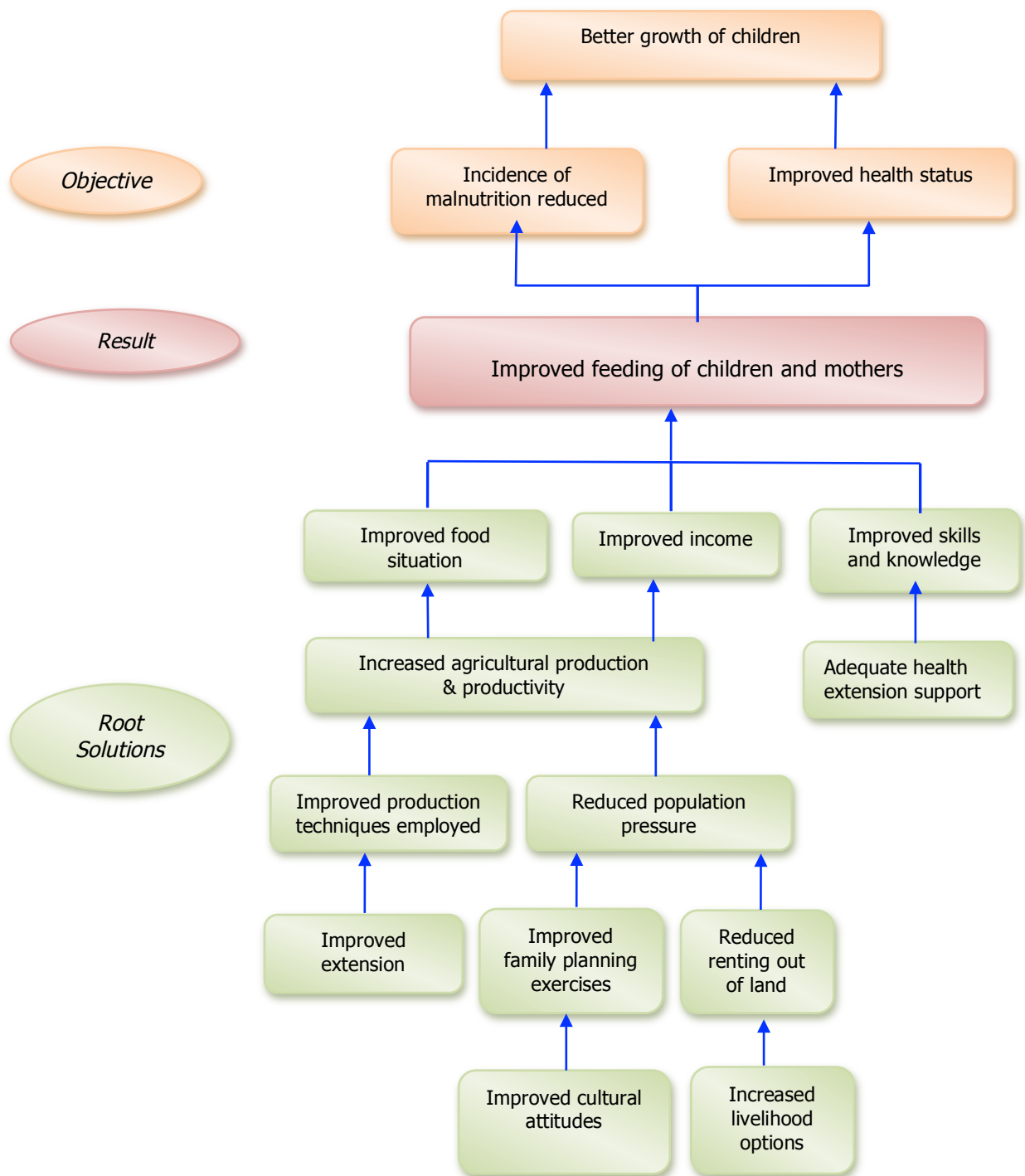


Figure 16: Objective tree analysis for vulnerable households' nutrition (South Achefer)



5. DISCUSSION

Overall the results from both case studies are fairly encouraging although arguably the impact of the livelihoods activities has been minimized or not yet fully realized due to challenges and delays in implementation. It would also appear as though contextual factors as well as differences in the quality of implementation have resulted in greater impact in the first study area in Oromia. However, this cannot be concluded with a great deal of confidence as the limited sample size from the Amhara case study excluded the possibility for statistical comparisons between the two study areas.

5.1 Project Impact and Benefits

5.1.1 Vegetable Production

For the vegetable production activities, there has been some positive impact on food security in both areas with a considerable increase in the contribution of vegetables to the household food basket. This is also supported by the overall results, which show a significant increase in the number of food types being consumed since the project started in both study areas. The results also show a strong association between this increase and ENGINE related activities as project factors were ranked as the most important reasons for this increase. In this respect these interventions can be seen to have met their objectives in improving household dietary diversity.

The vegetable production component has also provided income benefits to some households through the sale of vegetables. This was more evident in the Oromia case study where a greater proportion of households were involved in vegetable sales translating into roughly 630 birr (mean income) in contrast to 124 birr in Amhara region. This income has allowed households to cover basic needs including food purchases and FGD participants indicated that these purchases included food items such as cooking oil, iodized salt and vegetables suggesting that this income may have had some indirect impact on household nutrition and food security. Some households also used this income to make investments in livestock and farming inputs, which might represent future nutrition and food security benefits but again this was more evident from the Oromia case study.

Participants also suggested that the income derived from the sale of vegetables has enabled them to join savings groups and the evidence suggests that in the context of highland Ethiopia, these groups can be instrumental in smoothing consumption and protecting assets during times of food and income shocks (Burns and Bogale, 2012).

More general benefits include the skills and knowledge transfers and participants appreciated new and improved skills in vegetable crop management including weeding and harvesting techniques. In Oromia participants also specifically mentioned the increased yields derived from the *guddene* potato variety that had been introduced estimating that up to 300 quintals could be harvested per hectare in contrast to only 30 quintals/hectare for barley. As such they see the potential for utilizing limited land resources more efficiently by increasing crop production on small plots. Participants also mentioned that vegetables such as potato can be useful in improving soil fertility and that vegetables in general are an effective way of utilizing limited water resources where supplementary irrigation is being used.

5.1.2 Livestock Production

The most obvious impact from the livestock production interventions has been in terms of income from the sale of project offspring and the utilization of this income. The results show no direct nutritional benefits as sheep milk is not commonly consumed in the study areas and none of the participants reported slaughtering the animals for household meat consumption.

The income derived from the sale of project animals was more pronounced in South Achefer (Amhara) where more people sold sheep and three times as many animals were sold in comparison to Lemu Bilbilo (Oromia). Correspondingly, the average income derived from project sheep sales was 389 birr per household in Amhara in contrast to 170 birr in Oromia. This can be explained by the fact that over half of the recipients in Lemu Bilbilo only received the animals in year two of the project and consequently only a few offspring had reached maturity and been sold¹⁶. Furthermore, participants in Lemu Bilbilo were discouraged from selling the original project animals whereas apparently this was not the case in South Achefer.

In terms of income utilization, participants in Amhara either saved the majority of this income or spent it on food. These food purchases could arguably represent indirect nutritional benefits and the savings may represent future investments in any number of livelihoods assets. Household savings can also be a useful resilience indicator as they can be utilized to smooth consumption or protect assets in the event of a food or income related shock. In Lemu Bilbilo the majority of the income from sheep sales was reinvested in livestock (including cattle) with some of the balance being saved or spent on food. These results cannot be considered representative given the limited number of people that actually sold animals. However, they may be indicative of future trends once more project animals have reproduced and if continued herd growth translates into increased livestock sales over time. This would be a reasonable assumption, as typically households with few livestock will initially pursue a strategy of herd growth until they have a viable herd. However, high disease related livestock mortality, particularly in South Achefer would appear to negate this assumption.

Other benefits from the restocking include the less tangible knowledge transfers in animal husbandry and participants mentioned improved understanding of breeding, lamb rearing, housing, feeding and animal health care practices as a result of the training activities. Some households also identified having manure for fertilizer as an additional benefit from the livestock transfers.

Participants also claimed that livestock ownership had given them improved social status and perhaps this may be the most salient project benefit if we accept Krishna's (2009:187) argument that "social recognition matters as much as economic conditions in defining poverty within communities". Consistent with this livestock ownership has provided participants with collateral allowing them to access both formal and informal credit.

5.1.3 Cooking Demonstrations

The increase in dietary diversity can be seen as a proxy impact indicator for the projects cooking demonstrations. However, it would be difficult to isolate this impact from the vegetable and livestock components. For example increased consumption of vegetables largely had to do with the increased production of these crops. Therefore, the impact from these demonstrations can mostly be assessed in terms of knowledge transfers and the utilization of this knowledge.

Participants specifically identified improved knowledge and understanding of proper child feeding practices and the importance of including vegetables, animal products and iodized salt in children's diets as benefits

¹⁶ Typically 6-12 months would be needed to benefit from this type of small ruminant transfer

from these demonstrations. Focus group participants also mentioned that more people are reporting having healthier children, which they attribute to improved nutrition.

In terms of knowledge utilization, between seventy seven to eighty eight percent of the participants (all areas) claimed to have used the information from the demonstrations with seventy seven to seventy nine percent reporting that they prepared the actual recipes they were taught at home. The participants also appear to have valued the demonstrations giving a mean score of between 3-3.7 out of a maximum (value) score of 5.

Although the dissemination of information from these demonstrations could not be captured due to the absence of a reliable control, over eighty four percent of participants claimed to have shared this information with friends and neighbors providing a useful proxy for dissemination.

The real testimony to the impact of these demonstrations is shown in the significant increase in the number of new foods being consumed since the project started. As mentioned, this impact cannot be isolated from the other interventions and particularly the vegetable production activities. However, we can safely assume that this impact can be partly attributed to the cooking demonstrations or at least that these demonstrations complemented the dietary diversity objectives of the livelihoods interventions. For example, FGD participants specifically mentioned an increased awareness of the importance of including iodized salt as a result of these demonstrations and this was the most frequently mentioned new food source reported by study participants in Oromia.

6. CONCLUSIONS

A number of project related and external challenges were identified in relation to the livelihoods interventions some of which might be addressed or taken into account as these activities are scaled up or introduced into new areas.

For the vegetable production component, generic problems such as pests and the shortage of water for irrigation were mentioned and participants in both study areas mentioned aphids as being a problem particularly for cabbage production. Wild animals (specifically porcupine) were also identified as being destructive.

A common challenge for all interventions targeting the poorest most vulnerable households is the fact that these households often can simply not afford the required inputs. Participants specifically mentioned that many of them did not own livestock and therefore had no access to manure for fertilizer. However they had also been advised that inorganic fertilizer was not recommended for vegetable production but in any case even if recommended (organic) fertilizer was readily available it is unlikely that these participants could afford it unless it was highly subsidized.

Consistent with the issue of targeting the poorest, informants in South Achefer claimed that many of the selected participants were divorced females who had no access to land and therefore could not participate in vegetable production as they were living in rented houses in rural towns. If accurate, one would have to question the appropriateness of this intervention for this group. However, there is no reason why a modified approach to this activity such as urban gardening (see Shroff et al, 2011) or community gardens could not be explored for landless households.

Participants also felt that they could have benefited from more training and follow up. In Oromia, this concern seems to have been partially addressed as participants in year three received two days of training as opposed to only one day that was provided in years one and two. Ironically however, the participants in years one and two also felt they had been treated unfairly by the project illustrating how mid-project adjustments or improvements can be perceived to be biased.

Seed supply, both quality and quantity was also identified as a challenge for many. Relating to this and of specific concern to the project is the fact that FGD participants in South Achefer suggested that many of the original project participants discontinued with vegetable production after year two of project implementation. They attributed this to the fact that nobody was in charge of organizing them to make group purchases or share seeds. If this is the case a relatively small investment in coordination would address this problem but without it the sustainability of the project would have to be brought into question. Fortunately this problem was only identified in one *woreda* and in one study area but nonetheless it represents a wasted investment and a lost opportunity.

In both study areas participants complained about the timeliness of the seed supply in relation to the planting period suggesting that the optimum time for the seeds to be supplied is between March-May. According to key informants, in South Achefer the seeds were only supplied in July, which might explain the limited vegetable sales and associated income benefits assessed from this case study?

Project staff in Oromia also mentioned that it is difficult to procure quality seeds locally and for this reason they suggested that they would discontinue providing cabbage seeds in the future. Participants in Oromia also specifically mentioned the poor quality of the kale seeds provided maintaining that they received the early flowering (white cultured type) as opposed to normal kale seeds.

In the long term a sustainable seed supply needs to be established perhaps through greater investments in farmers who have the means and the capacity to establish economically viable nurseries to produce and supply seeds and planting material locally. Often the imperative with development projects is to assist as many vulnerable households as possible but many of these will fail to benefit from the project, or only benefit for the duration of the project as the intervention model is designed around the provision of free or subsidized inputs. In order to address this, development organizations will at times have to convince donors and policy makers of the need to focus on quality over quantity and make strategic investments in areas that will enhance the sustainability of other pro-poor interventions. These case studies clearly justify the need for such investments.

A number of challenges were also identified for the livestock production interventions. As mentioned delayed transfers in Oromia has meant that the full impact of this intervention has yet to be realized. It would also appear that the purchase of project animals in Amhara might have distorted the market as participants suggested that the price of productive female animals was particularly high during the first year of the project due to the high demand associated with a single market purchase. They also indicated that the price of an equivalent animal in 2014 was far lower (350-650 ETB) translating into reluctance on the part of some project participants to sell their animals or forcing others to sell low thus minimizing the potential income benefits from the intervention.

Again targeting appeared to be an issue with the livestock intervention in South Achefer with divorced “landless” women being selected as recipients for the animal transfers. As many of these women rent houses in rural towns, they have limited access to free grazing and the resulting overhead on expensive food purchases minimizes the economic benefits that could otherwise be derived from these interventions. Although communal grazing is available in South Achefer it is associated with theft and one participant reported having their entire herd stolen in the communal grazing area during the daytime.

Of particular concern for the livestock component is the high livestock mortality of project animals with participants reporting 11% losses of project animals in Oromia and a staggering 31% losses in Amhara. While it’s possible that these losses may have been exaggerated, even so the results are quite alarming. Assessment participants attributed these losses to sheep pox in Lemu Bilbilo and under utilization of animal vaccinations in South Achefer. Project staff maintained that animal vaccination is not commonly practiced in the latter study area and that project participants had a poor understanding of livestock management. While this may be the case any project that involves livestock transfers should by design include an awareness component emphasizing the importance of disease prevention and the relative cost ratio between vaccinating animals and income losses associated with livestock mortality.

Some participants suggested that project animals had been purchased with pre-existing diseases but again good practice for any livestock transfer interventions (including credit) would exclude this possibility with the inclusion of an animal inspection and vaccination component. Where possible, future livestock transfers should follow the national guidelines for livestock interventions in pastoralist areas. These recommend that livestock health inspections be carried out at the time of transfer/distribution, and that recipients have access to at least basic veterinary care from a community animal health worker or recognized veterinary expert after distribution (MoARD, 2008, pp 91-92). These guidelines appear to have been followed in the first case study and not in the second and this may well explain the differences in reported livestock mortality between the two areas.

Relating to this, participants repeatedly bemoaned the prohibitive cost of livestock disease treatment attributing high animal mortality to the fact that many of them could not afford to treat their animals. This may be symptomatic of the limited availability of animal health services in these areas but it also relates to the aforementioned challenge associated with the provision of assistance that requires costly inputs, to the poorest households. There's a lot of misguided rhetoric about creating dependency through the provision of free inputs but the reality is that the poorest households in rural Ethiopia often just cannot afford basic inputs such as animal treatments. If this is the case then these inputs should be subsidized or provided in kind by the project. Without this provision the intervention could be inappropriate and risks being a wasted use of development funds.

Regarding the projects cooking demonstrations, although these are a low cost way of raising awareness on nutrition, converting this into improvements in household dietary diversity remains particularly challenging in the context of rural Ethiopia. Factors such as socioeconomic status and household resources will largely determine the types of food consumed within a household and it is unlikely that children from poor families will be fed milk or other animal products. Consistent with this, study participants repeatedly mentioned their inability to purchase the required ingredients for the recipes being promoted. Therefore, although the results show that a high percentage of participants prepared the proposed recipes at home, they may have only done this once or twice in which case there would be little overall impact on child nutrition. Participants also repeatedly framed the benefits derived from the cooking demonstrations as being specific to better-off households.

Aside from cost, availability was also frequently mentioned as a limiting factor. For example some FGD participants in Lemu Bilbilo maintained that iodized salt was rarely available in the market and in any case when it was it was too expensive for vulnerable households to purchase.

Seasonality and geography also determine the availability of many of the foods/ingredients being proposed in the cooking demonstrations. For example few fruit species are grown in the Ethiopian highlands and vegetables are typically only available when they are being produced locally during the rainy season. Therefore in the absence of irrigation or without improved supply and demand for some of these products in the local market, there will continue to be seasonal variations in people's ability to prepare these recipes regardless of their socioeconomic status.

According to study participants in South Achefer, only one cooking demonstration was carried out in each *kebele* during the first year of the project but they felt they could have benefited from more. The reason they gave for this was the shortage of ingredients (which are provided by the participants themselves). It is unclear whether this shortage was related to availability or cost but either way it is illustrative of the design limitations of the cooking demonstrations and their failure to adjust for the local context and target group. For future interventions the proposed recipes need to be more creative and to the extent possible incorporate locally available and inexpensive ingredients.

A number of participants also suggested that their children would not eat the prepared recipes, as they did not like the taste. Others complained that the preparation of the recipes was time consuming and their own busy workload meant that they rarely used these recipes. Again these two examples suggest that there is room for creative improvements to these recipes in terms of preparation time and taste.

Another complaint about the cooking demonstrations was that they focused exclusively on mothers and excluded other influential community and family members such as elders, husbands and grandmothers. It was suggested that young mothers often lack the confidence or influence to make their own decisions and culturally grandmothers or mother-in-laws are consulted regarding what to feed children (this includes child medication). Similarly, husbands are also influential in deciding on children's feeding and a number of participants implied that their husbands were reluctant to spend the money to purchase the required ingredients for the proposed recipes. This would suggest that these interventions would benefit from broader awareness and outreach to the community in general.

Another cultural factor or constraint to improved dietary practices mentioned by key informants is that for Orthodox Christians, a considerable number of days in the year are fasting days. On these days no animal source foods are consumed by adults or prepared in the home and therefore they are not fed to children.

More on the level of implementation than design, FGD participants in South Achefer felt that the cooking demonstrations carried out at the health posts were not given a great deal of attention as they are not considered a priority in comparison to other routine activities conducted at the health posts. Project staff identified the need for stronger linkages and coordination between the *woreda* health extension office and agricultural extension office if more effective promotion and messaging is to be achieved on the cross cutting issue of nutrition. Key informants also cited high staff turnover and heavy workloads of HEW as factors competing with the successful implementation of these demonstrations. This was reflected in the testimonies of FGD participants who felt there were considerable disparities in the knowledge of different HEW and insufficient "counseling" and follow up.

Overall the cooking demonstrations appear to have been appreciated by participants and they have increased people's awareness on dietary diversity and proper child feeding practices. However, the findings also indicate that improved knowledge alone does not always translate into longer-term behavior change or improved dietary diversity.

7. RECOMMENDATIONS

The assessment findings highlight a number of challenges associated with the ENGINE livelihoods interventions and these should be seen as contextual guidance to inform future programming. The following recommendations should therefore be seen as general as they may not apply to all project areas and will certainly be more relevant in some places than others.

For the vegetable production activities:

- It will be essential to ensure a sustainable seed supply for certain varieties of vegetable promoted by the project. The project should monitor the extent to which participants continue to produce and consume these in the absence of project seed transfers. In areas where participants have stopped growing these crops the reasons should be investigated and if possible addressed. This may require internal and external discussions and brainstorming in order to find solutions to address issues around seed access and availability.
- Timely procurement and distribution of seeds will need to be insured to coincide with and take advantage of the optimum growing season. The ideal timing for seed distributions may vary from place to place and hence this should be discussed with project participants in each intervention area and documented for future planning.
- Where possible, up to three days of training training should be provided for the vegetable production activities and greater follow up. This follow up does not necessarily have to be as elaborate as refresher courses but may just involve identifying and investigating problems people have faced during monitoring visits and providing advice or support on how to address these.

For the livestock production activities:

- In some areas the awareness and messaging needs to be improved with greater emphasis on the importance of disease prevention and the relative cost ratio between vaccinating animals and income losses associated with livestock mortality.
- The project also needs to investigate why some participants in some areas sold the original project sheep and if applicable address this issue through improved sensitization or targeting.
- More generally, livestock transfers in all areas should follow national good practice guidelines (see MoARD, 2008) in order to reduce avoidable livestock losses.

For the cooking demonstrations:

- These need to be more inclusive or at least be complemented by an awareness component targeting other members of the community such as husbands and elders who influence or make decisions over food purchases, preparation and consumption.
- It may also be worthwhile to start documenting and making an inventory of what ingredients (food types) are readily available and accessible to the poorest households in different project areas. This could then be used to tailor recipes to the poorest households in different areas. Although this exercise would be too late to benefit the ENGINE program it could provide a useful resource for scaling up cooking demonstrations in the future.

More generally:

- The issue of targeting needs to be investigated to understand why and to what extent landless households are being selected for vegetable and livestock interventions even though land ownership was used as a selection criteria for these interventions¹⁷. This issue may be limited to certain project areas but then again it may not, which justifies further investigation so as to avoid this occurring elsewhere.

It should be emphasized that these studies are not representative of the project as a whole and the intervention areas presented in the narrative should not be seen as prescriptive but as suggestions to guide planning and discussions around future interventions. For example it is possible that some of these challenges are specific to the two study areas. Having said this it is unlikely that they are unique to all intervention areas although considerable spatial variations in the scale and degree of these challenges might be expected as exemplified in the differences in livestock mortality between the two study areas. Therefore, for future programming the overall recommendation would be to verify areas where challenges or programming limitations exist, assess the scale of these, and jointly identify ways to address these challenges in consultation with project participants and communities. This would require participatory dialogue and greater engagement with project communities and possibly less emphasis on the routine collection of standardized M&E and impact indicators. Ultimately however the project should aim to ensure consistent and high quality implementation across all project areas through an ongoing process of identifying and addressing challenges and project limitations.

¹⁷ Comment provided by ENGINE staff member reviewing the first draft of this report

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