Introduction

A team of two experts conducted training on scientific writing to a total of 41 participants in two rounds for a period of 12 days at the College of Agriculture of Hawassa University. The training was organized by Dr Sheleme Beyene of the College and principal investigator (PI) of the project titled "Improving Food Security in the Highlands of Southern Ethiopia through Improved and Sustainable Agricultural Productivity and Human Nutrition".

The funding of this project comes from the Canadian International Food Security Research Fund (CIFSRF) Project, which in turn draws its funding sources from the Canadian International Development Agency (CIDA) and the International Development Research Center (IDRC). This project provided both financial support and hands-on training on scientific writing for MSc and PhD students who graduated during the 2011/2012 academic year. The training was offered by two trainers (Dr Zemede Asfaw from Addis Ababa University and Professor Heluf Gebrekidan from Haramay University) from 28 January –01 February, 2013; which finally led to the preparation of a Research Booklet and several manuscripts ready for submission to scientific journals. The manuscripts are now at different stages moving towards publication.

The Project Management, having found the previous training very useful for the trainees and having been encouraged by the quality of the deliverables, commissioned the same trainers and organized the present training from 16-27 December, 2013. In this second scientific writing training, graduate students of the College who received financial support for their MSc and PhD theses were invited. Also invited were academic staff who have been granted staff research funds from the same project.

The training had a theoretical component of interactive PowerPoint lectures and practical exercises on different parts of the scientific paper, illustrating with draft manuscripts of some participants and other materials. The training went through two consecutive rounds where 20 students took part in the first round, conducted from December 16-23 and 14 academic staff from December 24-26, 2013. Most of the graduate students (except two) and the academic staff (except two) who participated in the training have not yet completed the preparation of manuscripts.

The main objective of the training was to assist the graduate students and junior academic staff (some of them PhD candidates) in their efforts to produce their theses as well as original scientific publications out of their research findings. A total of 27 graduate students and 14 academic staff participated in the training. This report, along with the appendices, briefly shows the activities of the second scientific writing training.
Preface

The Canadian International Food Security Research Fund (CIFSRF) Project at College of Agriculture of Hawassa University has been supporting the thesis researches of many graduate and post graduate students. In addition, the project organized hands on training on scientific writing inviting prominent academicians in the country. The training on write up of scientific manuscripts a year before has helped most of the students to publish their works.

CISRF project organized a six-day (August 22-27, 2016) research proposal development training workshop at College of Agriculture. The main objective of the workshop was to equip students with theoretical and practical knowledge of scientific proposal development and support and guide them to write standard scientific proposals for their MSc theses. The two trainers were Dr, Ferdu Azerefgne and Dr. Tewodros Tefera from Hawassa University.

This report contains sixteen executive summaries of proposals which were prepared under the guidance of the trainers. The trainer were at different levels of proposal development, some have almost complete proposals and others were had identified the broad thesis research area and came up with a title only. The trainers made presentations on the structures and components of proposals laying the foundation for students to review their proposals. In each section of the presentation, the students held group exercises and all had the opportunity to present part of their proposal and got comments and reviews. In addition, one-to-one discussion was held with students to help them finalize the documents.

The trainers and trainees enjoyed the excellent organization of the training setup and support from the project leader and his team. The trainees were very enthusiastic about the training, punctual attentive and interacting at all levels.

Ferdu Azerefgne, Hawassa University
Tewodros Tefera, Hawassa University
August 2016
# Table of Contents

## 1. Agribusiness and Value Chain Management

| 1. Besufekad Belayneh: Role and Trend of Pulse Crops Production and Marketing on Household Income and Consumption in Damot Gale and Humbo Woredas of Southern Ethiopia | 7 |
| 2. Eyob Adane: Analysis of Chickpea Commercialization in Meskan and Sodo Districts, Southern Ethiopia | 8 |
| 3. Hanna Mamo: The Effect of Gender Differential in Productivity and Marketing of Haricot Bean and Chickpea in Halaba and Misrak Badawacho Districts, Southern Ethiopia | 9 |
| 4. Solomon Admasu: Analysis of Community based Chickpea and Common bean Seed Value Chain in Damot-Gale and Halaba, Southern Ethiopia. | 10 |
| 5. Jemal Ahmed: Consumers’ Preference Analyses Towards Pulse Enriched Food Products in Shashamane and Hawassa City, Southern Ethiopia | 11 |
| 6. Tamirat Girma: Resource Use Efficiency and Comparative Profitability of Smallholder Haricot Bean and Chickpea Producers in Damot Gale and Halaba Special Districts, Southern Ethiopia | 12 |

## 2. Agronomy

| 1. Kamil Temam: Growth and yield performance of chickpea varieties cultivated as double cropping sequence at Damotgale district in southern Ethiopia | 14 |
| 2. Lake Mekonnen: The Effect of Supplementary Irrigation and Blended Fertilizer on Yield and Yield Components of Chickpea at Meskan District, Southern Ethiopia | 15 |

## 3. Applied Human Nutrition

| 1. Abinet Hailu: Effectiveness of Government Structure in Grass Root Level on Knowledge Transfer of Pulse Use in Hawassa Zuria Woreda, Southern Ethiopia. | 17 |
| 2. Aniley Shewaneh: Comparison of the Effect of Nutrition Education on Knowledge, Attitude and Practice/KAP/ on Household Pulse Consumption among Male and Female Farmers in Daramalo Woreda, Southern Ethiopia. | 18 |
| 3. Felegush Dargie: Effects of Peer-led Nutrition Education Intervention on School Aged Children’s Knowledge, Attitude, Practice and Nutritional Status in Misrak Badiwacho Woreda, Hadiya Zone, Southern Ethiopia | 19 |

## 4. Gender and Family Studies

| 1. Yeshimebet Yirga: The Effect of Gender Power Relation on Chickpea Production in Rural Household: the case of Halaba Special Woreda, Southern Ethiopia | 21 |

## 5. Soil Science

| 1. Jemaludin Salih: Effect of Different Formulas of Blended and Bio fertilizer on Yield of Common Bean (*Phaseolus vulgaris* L.) on Cambi Soil of Inseno at Meskan District, Southern Ethiopia. | 23 |
| 2. Rameto Wabela: Influence of Topography on Soils and theirs Physico-Chemical Properties in Gerba Sub-watershed, Southern Ethiopia. | 24 |

## 4. Appendix

| 1. Contents of Research Proposal Training | 26 |
| 2. List of Participants | 27 |
1. Agribusiness and Value Chain Management Graduate Program
Role and Trend of Pulse Crops Production and Marketing on Household Income and Consumption in Damot Gale and Humbo Woredas of Southern Ethiopia

Graduate Student: Besufekad Belayneh

Advisor: Tewodros Tefera (PhD)

Agribusiness and Value Chain Management Graduate Program, School of Environment, Gender and Development Studies, Hawassa University, College of Agriculture,

Executive Summery

Pulse crops accounts for 13% of croplands and the second most diet components in Ethiopia, providing main protein sources and playing critical role in the export sector and in foreign currency generation. This research will aim to study the role and trend of common bean and chick pea production and marketing on household income and consumption. The study will be undertaken in Damot Gale and Humbo woredas in Southern Ethiopia. Pulse production is characterized by subsistence level of farming, poor usage of external inputs, limited access to credit, poor marketing system, price volatility, prevalence of diseases and erratic rainfall. Multi-stage sampling techniques will be used to determine the last sample units of the study. The study areas will be selected purposively because they are the potential pulse crop producing areas. By using simple random sampling techniques 4 sample kebeles (Gututo Larena, Bonsa Wanche, Taba and Gacheno) will be selected out of 40 pulse crops producing kebeles. Following the sample frame is prepared by stratifying project participants and non-participant household. Lastly 182 sample households will be selected by simple random sampling using probability proportional size method. The study will use mixed research design where both primary and secondary type and sources of data will be explored. The primary data will be collected using questionnaire, FGD and KII. Secondary data will be obtained from BoANRD, CSA, NGOs, journal articles, etc. The study will be employed multiple leaner regressions for data analysis to investigate the magnitudes of explanatory variables influence on income and consumption of common bean and chickpea crops. To examine the trends in area allocation, production and yield of common bean and chickpea crops; the study uses the compound growth rate and decomposition procedure. To analyze determinants of common bean and chickpea crops market participation and extent participation, the Heckman two-stage selection model will be employed. The study is expected to generate information on the role and trend of common bean and chickpea, identify determinants of income and consumption and market participation. By doing so, the research will generate pertinent information for policy makers, practitioners and pulse producing farmers. The research study will be carried out from September, 2016 to April, 2017 and a total of 50,000 ETB will be needed to execute the intended study.

Key words: Household, Common bean, Chick pea, production, consumption, marketing

Besufekad Belayneh email: belayneh.besufekad@gmail.com
Analysis of Chickpea Commercialization in Meskan and Sodo Districts, Southern Ethiopia

Graduate Student: Eyob Adane

Major advisor: Getachew Ayele (PhD)
Co-advisor: Tewodros Tefera (PhD)

Agribusiness and Value Chain Management Graduate Program
School of Environment, Gender and Development Studies, College of Agriculture, Hawassa University

Executive Summary

Ethiopian economy is dominated by smallholder agriculture and it is on way of transiting from subsistence to commercial agriculture. Commercialization of agriculture has been promoted as a strategy to bring dynamic change in the traditional agriculture of smallholder farmers. Chickpea is one of the main annual crops in Ethiopia known for its multidimensional role in terms of its role for nitrogen fixation, source of plant protein, cash generation and crop diversification. Despite its crucial role and good potentials, the production system is not adequately charted for market-orientation and competitiveness. Therefore the objective of this study will be to assess the level of chickpea commercialization and its determinant factors. The study will be conducted on the in Guaraghe zone Meskan and Sodo districts, Southern Ethiopia. Mixed research design where both primary and secondary type and sources of data will be employed. The target populations for the quantitative study will be all the chickpea producer farmers while the discussants will be relevant government officials and development agents. The required data will be collected from both primary sources using data collection techniques such as interviews, observation and structured & semi-structured questionnaire while secondary data will be collected form published and unpublished sources. The study will employ descriptive statistics to summarize and computes Crop Commercialization Index (CCI) and order logit econometric models to identify determinants of commercialization. Thus, this study will be expected to fill the information gap by measuring the existing level of chickpea Commercialization and identifying factors influencing the process of commercialization in smallholder chickpea production. The study will be conducted from September 2016 to April 2017 and it will expend a total cost of 50,000 ETB.

Key words: Smallholder, Commercialization, Order Logit Model, Crop Commercialization Index (CCI)

Eyob Adane email: adaneyol2@yahoo.com
The Effect of Gender Differential in Productivity and Marketing of Haricot Bean and Chickpea in Halaba and Misrak Badawacho Districts, Southern Ethiopia

Graduate Student: Hanna Mamo

Advisor: Tewodros Tefera (PhD)

Agribusiness and Value Chain Management Graduate Program
School of Environment, Gender and Development Studies College of Agriculture, Hawassa University,

Executive summary
Pulse crops are the principal plant protein source in Ethiopia and accounts for approximately 15 percent of total protein intake. In spite of the significant and growing role of pulse production for the economy, emerging evidence suggests that women farmers may have lower returns to agricultural production than men farmers, further contributing to the gap in agricultural productivity. Female-headed households and women farmers in male-headed households represent a large production resource in the agricultural sector, particularly in pulse cropping. Yet many studies in this field indicate that men are the key players in the production, and are also the principal beneficiaries in terms of control over the income generated from the sale of produce. Therefore the general objective of study will be to investigate the effect of gender differentials on productivity, marketing and income of pulse crops. The specific objectives are; to investigate gender differentials in productivity and marketing of haricot bean and chickpea, to identify determinant factors contributing to gender disparity in production and marketing of haricot bean and chickpea, to analyze the influence of gender differential on income variability from haricot bean and chickpea, to assess gender differential in access to, control over and decision making for chickpea and haricot bean production and marketing. The study will be conducted in four kebeles from two districts of southern Ethiopia namely, Halaba and Misrak Badawacho. The study will use mixed research design and both primary and secondary data will be collected. The research methods of this study will be survey and focus group discussion. The study will use descriptive and inferential statistics as well as econometric models mainly Cobb-Douglas production function, output decomposition model, and Gini-coefficient. The study is expected to identify factors contributing to gender difference in productivity and marketing of haricot bean and chickpea and it's implication on income. This work is expected to be carried out from September 2016 to March 2017 and it will cost a total of 50,000 ETB.

Key words: Gender, productivity, income variation, access to, control over, disparity.

Hanna Mamo email: hannamammo@gmail.com
Analysis of Community based Chickpea and Common bean Seed Value Chain in Damot-Gale and Halaba, Southern Ethiopia.

Graduate Student: Solomon Admasu

Advisor: Tewodros Tefera (PhD)
Co-Advisor: Demelesh Kefela (PhD)

Agribusiness and Value Chain Management Graduate Program
School of Environment, Gender and Development Studies, College of Agriculture, Hawassa University,

Executive Summary
This study will analyse community based chickpea and common bean seed value chain in Damot-Gale and Halaba districts in Southern Ethiopia. The success of achieving sustainable agricultural productivity depends, among others, on the existence of an efficient seed supply system. Seed supply system and marketing in Ethiopia is weak and inefficient and characterized by weak coordination and linkage among seed supply value chain actors. In the study area there are mismatch between demand and seed supply and insufficient distribution of improved chickpea and common bean seed. Therefore, this study aim to investigate the performance of community based chickpea and common bean seed value chain; to describe the community based chickpea and common bean seed value chain, to identify seed value chain actors and their roles, to analyze the cost and profit margins of pulse value chain actors along the chain and to identify the determinants of chickpea and common bean seed supply to market. The study will use mixed research design and both primary and secondary data will be collected. A multistage sampling technique will be used to determine the sample unit. First, the study districts and kebele administrations will be selected purposively. Following the community based seed producer households and other value chain actors will be selected using simple random selecting techniques. The Primary data will be collected from seed chain actors, enablers and influencer whereas secondary data will be collected from published and unpublished sources. The techniques used to collect primary data will include questionnaire survey, KII and FGD. For data analysis descriptive statistics, inferential statistics and multiple linear regression models will be employed. The study will be expected to deliver information on common bean and chickpea value chain actors and their roles, distribution of benefit along the chain and identify determinants of seed supply. The study will be conducted from September 2016 to April 2017 and it will spend a total cost of 50,000 ETB.

Key words: Actors, profit distribution along chain actors, governance, chain upgrading, mapping

Solomon Admasu email: solomonadmasasu2014@gmail.com
Consumers’ Preference Analyses Towards Pulse Enriched Food Products in Shashamane and Hawassa City, Southern Ethiopia

Graduate Student: Jemal Ahmed
Advisor: Tewodros Tefera (PhD)
Co-advisor: Girma Tesfahun (PhD)

Agribusiness and Value Chain Management Graduate Program
School of Environment, Gender and Development Studies, College of Agriculture, Hawassa University,

Executive summary
Food legume crops represent an important component of crop production and considered as critical for achieving food and nutrition security in developing countries. The growing interest among consumers cholesterol free plant protein makes pulses food one of the fastest growing sectors in the global food industry. Understanding consumer choices with respect to pulse enriched food products is an important and newly emerging research area. Given the credence nature of pulses food attributes, many food industries are developing new pulse enriched food products. Recently there are new pulse enriched food products developed by Hawassa University School of Nutrition and Guts Agro Industry in the form of snack food which are not known on the market, so before producing in bulk knowledge of consumers’ preference for the products is vital. Therefore the objective of study will be to assess and analyze the consumer preference for different pulses food products attributes. The study will be conducted in Shashamane and Hawassa city on randomly chosen 1000 consumers by using structured questionnaire and products profile cards. The study hypothesis is to test whether different attributes of pulse enriched food products and socioeconomic and demographic characteristics of the consumer have significant effect on their choice. The theoretical framework of this study will be based on random utility theory. A stated preference choice experiment will be designed to examine consumers’ choices to different pulse enriched food products. Descriptive statistics techniques will be used to make some inferences that could be evident from the data. Discrete choice models will be employed to estimate the relative importance of each attributes to consumer choice and to assess the factors affecting a consumer’s choice to consume pulse enriched food. The conditional logit and multinomial logit, are the most common tools used to analyze discrete choice variables and Willingness-To-Pay for pulse enriched food products. The study will identify important product attributes and recommend market segments. The study will be conducted from September 2016 to March 2017 and it will cost a total of 50,000 ET Birr.

Key words: Attributes, Consumer choice, discreet choice analyses, Willingness-to-pay

Tamirat Girma email: tamrat.girma@yahoo.com
Resource Use Efficiency and Comparative Profitability of Smallholder Haricot Bean and Chickpea Producers in Damot Gale and Halaba Special Districts, Southern Ethiopia

**Graduate Student:** Tamirat Girma

**Advisor:** Tewodros Tefera (PhD)

Agribusiness and Value Chain Management Graduate Program
School of Environment, Gender and Development Studies College of Agriculture, Hawassa University

**Executive summary**

Pulses are among major crops produced in Ethiopia. However, their production have got less attention in terms of crop management, supply of improved technology and external input utilization. Therefore this study is aimed to analyze profitability and resource use efficiency of smallholder haricot bean and chickpea production in Damot Gale district of Wolaita Zone and Halaba Special district in Southern Nation Nationalities Peoples Region. The study will use multistage sampling technique to collect relevant primary data from selected sample smallholder producers. The sample size will be determined based on statistical procedure and the selected sample will be distributed to selected kebeles based on the probability proportional to size sampling technique. Both qualitative and quantitative data will be collected from primary and secondary data sources through structured questioner, key informant interview and literature review from published and unpublished sources. The analytical methods that will be used to achieve the objectives of the study include budgetary technique, estimation of stochastic Cobb-Douglas production function and estimation of allocative efficiency. The study therefore will generate empirical evidence on the profitability and resource use efficiency of haricot bean and chickpea production in the study areas. Additionally, the study will generate information regarding factors that are critically influencing the output and possibility of improving productivity of smallholder haricot bean and chickpea production in the study areas which is helpful to stakeholders in decision making. This study will take a period of one year starting from June, 2016 to June, 2017 and require a total budget of 50,000 Ethiopian birr.

**Key words:** Production function, Allocative efficiency, budgetary technique

Tamirat Girma *email: tamrat.girma@yahoo.com*
2. Agronomy Graduate Program
Growth and Yield Performance of Chickpea Varieties Cultivated as Double Cropping Sequence at Damotgale District in Southern Ethiopia.

Graduate Student: Kamil Temam

Advisor: Berhanu Abate (PhD)
Co-Advisor: Walelign Worku (PhD)

Agronomy Graduate Program
School of Plant and horticultural sciences
College of Agriculture, Hawassa University

Executive summary
Increasing production and productivity of the existing arable land through intensive crop production system which include growing high yielding crop varieties with appropriate agronomic packages and cropping systems that enable to produce two or more times in a year are essential. Rotation of cereal with cereal and pulse with pulse is not usually recommended. Farmers in Damot-gale district produce chickpea as double cropping in various sequences: Chickpea after haricot bean, chickpea after early planted maize, and chickpea after fallow. The merits of these sequences and the cropping sequence which is more productive for chickpea double cropping is not investigated. The experiment will be conducted at Gacheno kebele in Damot-galle district Wolayta zone, southern Ethiopia, during 2016/17 cropping season. The growth and yield performance of chickpea cultivars cultivated as double cropping in maize-chickpea, haricot bean–chickpea, and fallow-chickpea cropping sequence will be determined. Four separate experiments, i.e., fallow-chickpea, maize-chickpea, tef-chickpea and haricot bean-chickpea cropping sequences will be carried out at four separate fields on one farm land. The maize variety PH3253, teff variety Kuncho and Haricot bean variety Hawassa-dume will be used. Three chickpea varieties namely Habru, Mastewal and local variety will be planted in randomized complete block design having three replications. Each plot will have a size of 9.6m² (4m x2.4m) with inter and intra-row spacing of 40 and 10cm, respectively. DAP will be applied at the rate of 60 kg/ha just before planting. Soil samples will be collected before the treatments are applied and after harvesting. Data on crop phenology, plant growth, yield and yield components, incidence of disease will be recorded. The data will be subjected to analysis of variance and means will be separated with Tukey’s test at 5% probability. Correlation coefficients will be computed to assess the relationships between yield and yield components. The study will help identify productive and economically feasible cropping sequence for chickpea double cropping. The study requires ETB 50000.

Key Words:- cost-benefit, residual, pulse, moisture,
The Effect of Supplementary Irrigation and Blended Fertilizer on Yield and Yield Components of Chickpea at Meskan Destrict, Southern Ethiopia

Graduate Student: Lake Mekonnen
Advisor: Walelign Worku (PhD)
Co-Advisor: Sheleme Beyene (PhD)

Agronomy Graduate Program
School of Plant and Horticultural Sciences
College of Agriculture, Hawassa University

Executive Summary
Chickpea (Cicer arietinum L.) grows across a wide range of environments and is considered one of the most drought tolerant food legumes. Commonly, chickpea is grown as a sole crop without proper fertilization following the harvest of main crops. This practice exposes the crop to substantial terminal drought and nutrient deficiency. The objective of this study is to assess the productivity of chickpea with different nutrient fertilizations at planting time and receiving supplementary irrigation at different crop growth stages. The study will be conducted at Meskan district, Southern Ethiopia. A split plot design with three replications will be used. Four irrigation levels (no irrigation, irrigation at flowering, at seed filling and at flowering and seed filling) will be assigned as main plots and five fertilizer levels (0, DAP, NPS, NPSZnB, NPKSZnB) as sub-plots. Spacing of replicates, main plots, and sub-plots within the main plots will be 1.5m, 1m and 0.5 m, respectively. Each sub-plot will have a size of 4.8m² (2m x 2.4m). Chickpea (Mastewal) seed will be inoculated with Rhizobium and sown manually with inter and intra spacing of 40cm and 10cm. Phenological data (days to emergence, days to flowering, days to pod setting, physiological maturity), morphological and agronomic data (plant height, number of primary branches, number of pods per plant, number of nodules, symptoms of major diseases and pests, biological yield, hundred seed weight, straw yield, grain yield) will be collected. In addition, the Harvest index (HI) will be calculated. The data will be subjected to ANOVA and means will be separated using LSD at 5% probability level. In addition, regression and correlation tests will be used to investigate relationships and associations of the different parameters. The study will enable us select the best interacting combinations of irrigation timing and blended fertilizer formula for a sustainable chickpea production in the context of scarcity of water resources. An estimated budget of ETB 50,000 is required for this study.

Key words: Chickpea, supplementary irrigation, blended fertilizer, grain yield

Lake Mekonnen email: lakemekonnen@gmail.com
3. Applied Human Nutrition
Effectiveness of Government Structure in Grass Root Level on Knowledge Transfer of Pulse Use in *Hawassa Zuria Woreda*, Southern Ethiopia.

**Graduate Student:** Abinet Hailu  
**Advisor:** Susan Whiting (PhD)  
**Co. Advisor:** Addis Alem Mesfin (MSc)

**Applied Human Nutrition Graduate Program**  
School of Nutrition, Food Science and Technology, Department of Applied Human Nutrition  
College of Agriculture, Hawassa University

**Executive Summary**

Nutrition education can make significant contributions to improved dietary practices. Well-designed and effectively implemented nutrition education can motivate participants to change dietary behaviors and provide them with the knowledge and skills to make healthy food choices in the context of their lifestyles and economic resources. In Ethiopia 57% of childhood deaths are associated with malnutrition. To mitigate this problem the Ethiopian government has designed to equip Health Extension Workers with nutrition education to enable them transfer the acquired knowledge effectively to women development army (WDA). The WDA then will share the knowledge to the 1-5 network leaders and then these leaders transfer the knowledge to the 1-5 network. This study is designed to investigate the effectiveness of women development army in delivering nutrition education for mothers with children of 6-23 months on pulse use. The study is limited to *Hawassa zuria woreda*, which is one of the most affected *woredas* with malnutrition in *Sidama Zone*, southern Ethiopia. Quazi-experimental method will be used. Three modes of training delivery; HEWs educate mothers, HEWs educate WDA and WDA share to 1-5 network leaders, and these leaders educate mothers, and no intervention, will be investigated. The study uses both probability and non-probability sampling techniques for both baseline and end line data. Health extension workers and mothers with 6-23 months old children will be selected with purposive sampling. A minimum of 300 mothers with children will be involved. If the number of mothers with 6-23 months old children and 1 to 5 network leaders' is high, simple random sampling technique will be used. Questionnaires with open and close ended questions will be used to evaluate the knowledge transfer. The data will be subjected to analysis of variance and significant means will be separated using Tukey’s test at 5% probability. The qualitative evaluation data from focus group discussions will be narrated. The study will help to understand better about nutrition education methods and their effectiveness and design better modes of delivery. The research will be carried out from October 2016 to June 2017 and requires a total budget of ETB 50,000.

**Key words:** health extension worker (HEW); women development army (WDA); one to five network, knowledge transfer.

Abinet Hailu  
email: abinethai@gmail.com
Comparison of the Effect of Nutrition Education on Knowledge, Attitude and Practice/KAP/ on Household Pulse Consumption among Male and Female Farmers in Daramalo Woreda, Southern Ethiopia.

Graduate Student: Aniley Shewaneh

ADVISOR: Carol Henry (PhD)
CO-ADVISOR: Addisalem Mesfin (Msc)

Applied Human Nutrition Graduate Program
School of Nutrition, Food Science and Technology, Department of Applied Human Nutrition
College of Agriculture, Hawassa University

Executive Summary
Pulses have important roles in the Ethiopian agriculture and food making, particularly in rural and semi-urban communities. Pulses are treated as other cereals and used improperly, mainly because of limited knowledge on their nutritional values which is prevalent among rural households. Improper food consumption at household level aggravates the malnutrition problem. Appropriate nutrition education is important to alleviate these problems and improve the knowledge, attitude and practice (KAP) of farmers. This study will be undertaken to improve on the consumption of pulse-based protein-rich foods. A cluster randomized control trial with pretest-posttest methods will be conducted. The intervention and control “Kebeles” will be selected purposively and study groups/clusters of each household and the male and female farmers will be sampled randomly. Tests will be administered at baseline, third and sixth months of intervention. A pulse diversified food frequency, questionnaire survey will be used. The KAP of the intervention group of household male and female farmers will be expected to improve their KAP on household pulse consumption. Differences in knowledge, attitude and practice among male and female farmers and changes in attitude is expected to differ among intervention groups compared to the baseline and control group. The data will be checked for missing values and outliers, and descriptive statistics including frequencies, proportions, figures and cross tabulations will be employed. Differences in socio-demographic characteristics between control and intervention groups will be determined using the $\chi^2$ test. Paired sample t-test will be used to investigate the difference in KAP of household pulse consumption before and after the intervention and the intervention and control group disaggregated by gender. Association between independent and dependent variables will be determined with bivariate analysis. Multivariate logistic regression analysis will be used to control for confounding and identify the most important determinant variables. Qualitative (FGD) data on the attitude change of the intervention group will be narrated. The mean frequency of household pulse consumption pattern after intervention is expected to increase from the base line. The findings of this study would ultimately contribute to our effort to address the problem of protein malnutrition and sustain food security for the rural household.

Key words: Food frequency, gender,
Effects of Peer-led Nutrition Education Intervention on School Aged Children’s Knowledge, Attitude, Practice and Nutritional Status in Misrak Badiwacho Woreda, Hadiya Zone, Southern Ethiopia

Graduate Student: Felegush Dargie

Major Advisors: Carol Henry (PhD) & Gordon Zello (PhD)
Co-Advisor: Hailu H/Mariam (MSc)

Applied Human Nutrition Graduate Program
School of Nutrition, Food Science and Technology Department of Applied Human Nutrition
College of Agriculture, Hawassa University

Executive summary
School age children are one of the most critical and vulnerable segment of the population. Lack of knowledge about feeding amount, frequency, type of food contributes significantly to poor nutritional status among school age children. Nutrition education could be one of the strategies to overcome such nutritional problems. Pulses contain many important nutrients and phytochemical, and when combined with grains, they form a complete protein. The use of pulses as components of common food stuffs in combination with cereals is recommended, as this would give cheaper cereals with more complete protein. The objective of this study is to assess the effects of peer-led nutrition education on promoting pulse consumption among school aged children’s knowledge, attitude, practice and nutritional status. School based randomized controlled trial will be used. A total of 202 (101 in each group) school age children will be included in the study. Pre-test, delayed post-test and anthropometric measurements will be conducted at baseline and end of intervention. The mean KAP score difference will be analyzed using Kolmogorov-Smirnov test, Independent two sample t-test, and Paired t-test analysis using SPSS version [20.0]. In addition, anthropometric indices will be calculated using WHO Anthrop Plus software version [1.0.4]. The study will contribute to our understanding on nutrition education and the study requires a total budget of 34,960.00 ETB.

Key words: anthropometric measurements, theory of planned behavior (TPB),

Felegush Dargie email: dargie.felegush@yahoo.com
Assessment of Haricot Bean (*Phaseolus vulgaris*) Postharvest Handling Practices for its Quality in *Hadiya Zone*, SNNPR

Graduate Student: Gezahegn Demeke

Advisor: Kebede Abegaz (PhD)
Co-Advisor: Gezahegn Nigussie (Msc)

Food Science and Postharvest Technology graduate program: Processing and Preservation
School of Nutrition, Food Science and Technology
College of Agriculture, Hawassa University

Executive summary

Haricot Bean (*Phaseolus vulgaris* L.) is one of the important pulse crop grown nearly in all parts of the world. It is a cheaper source of protein and other micro-nutrients. Postharvest losses, which can be classified as quantitative, qualitative, and economic, are major constraints in utilization of haricot bean. This research is designed to assess and evaluate different postharvest practices of haricot bean on grain quality and food safety. The research will be conducted at *Bolgita kebele*, *Hadiya Zone*, Southern Ethiopia, which is one of the target kebeles included by Canadian International Food Security Research Fund (CIFSRF). The haricot bean samples will be subjected to four drying (indoor hanging, indoor under roof, outdoor under roof, and dominating local practice (control) and three threshing (manual beating, hand splitting and animal hoof) techniques. Completely randomized design (CRD) with 4x3 factorial arrangement will be used. Quality parameters (floatation test, moisture content, 100 grain weight, total soluble solids, and germination percentages) and safety tests (total microbial count, fungal growth) will be tested at Hawassa University, Food science and Postharvest Technology Laboratory. The data will be subjected to analyses of variance and significant means will be separated using Tukey’s test at 5% probability. Finally, the best interaction effect of drying and threshing method will be identified. Survey will also be conducted to generate data on existing postharvest handling of haricot bean in the study area. The survey data will be summarized using descriptive statistics including frequencies, proportions, figures and cross tabulations, and narrated. The study will enable us to assess the losses incurred through the postharvest value chain, the fators involved and finally come up with sound management practices. The study requires a budget of **ETB 34551.80**.

Key words: mycotoxin, hard to cook, postharvest losses, food safety

Gezahegn Demeke email: dmk.gezahegn@gmail.com
4. Gender and Family studies
The Effect of Gender Power Relation on Chickpea Production in Rural Household the case of Halaba Special Woreda, Southern Ethiopia

Graduate Student: Yeshimebet Yirga

Advisor: Alemante Afera (PhD)
Co-Advisor: Woldemicahael Somano (MSc)

Gender Studies Graduate Program
School of Environment, Gender and Development Studies College of Agriculture, Hawassa University
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Executive summary
The gender power relation of rural household in Ethiopia has been a less studied field which is getting more attention. Ethiopian rural households are diverse in agroecology, production and productivity of crops and animals, and the levels of intensification. Understanding the gender power relation is very important to design any intervention and extension program. Therefore, this study investigates the effect of gender power relation on chickpea production at household level in Halaba Special Woreda, Southern Ethiopia. The study area is located about 85 km southwest of the Southern Nations Nationalities and Peoples Regional (SNNPR) state capital of Hawassa. The Woreda comprises 79 rural kebeles and 2 sub cities. It has a total population of 325,255 out of which 159,375 (48.9 %) are male and 165,880 (51.1 %) are female. A minimum of 172 households will be involved in this study. Data will be generated using both qualitative and quantitative research methodologies, questionnaires, Focus Group Discussions (FGD), and key informant interviews. Descriptive statistics, including frequencies cross tabulations, and figures will be employed to provide a summary of variables. The study will contribute to the body of knowledge in the area and also support policy makers in their effort to narrow gender power relation gaps on chickpea production decision making at household level and could serve as a lesson to other similar agriculture communities. The study will be started on November, 2016 and completed in May, 2017 and requires a budget estimate of ETB 50,000.
4. MSc in Soil Sciences
Effect of Different Formulas of Blended and Bio fertilizer on Yield of Common Bean (*Phaseolus vulgaris* L.) on Cambi Soil of *Inseno* at Meskan District, Southern Ethiopia.

**Graduate Student:** Jemaludin Saliha  
**Advisor:** Girma Abera (PhD),  
**Co-Advisor:** Sheleme Beyene (PhD)

Science in Soil Science Graduate Program  
School of Plant and Horticultural Sciences  
College of Agriculture, Hawassa University

**Executive Summary**

The soils of the country lack many essential nutrients due to continuous cultivation and biomass harvest without replenishment. Therefore the soils need replenishment with balanced fertilization. This study is conducted to determine effect of different formulas of blended and bio fertilizer on yield of common bean (*Phaseolus vulgaris* L.) on cambi soil of *Inseno* at Meskan district, which is located at latitude of 08° 06' 09"44"N and longitude 38° 22' 34"1" E and altitude of 1842 m.a.s.l.. The Experiment will be conducted to determine the effect of blended fertilizer on yield of common bean (*Phaseolus vulgaris* L.). The field experiment comprises six treatments which will be laid out in a randomized complete blocked design (RCBD) with three replications. The treatment will be recommended rates of NPS, control (without fertilizer) and other four different blended formulas. Each plot will be 3 m x 4m (12m²) with 1.5 m spacing between blocks and 1.0 m between plots. The plots will have 10 rows while each row will have thirteen plants. The inter-row and intra-row spacing will be 40 cm and 10cm, respectively. The central eight rows will be used for data collection. Phenological data including days to pod filling, and physiological maturity; morphological data like plant height, and number of primary branches, number of pods per plant, number of seeds per pod, biomass and grain yield, and 1000 seed weight will be recorded on the central six rows and harvesting index, calculated. Number of nodules per plant will be recorded at flowering in the remaining two rows. One composite soil sample before planting and from each plot after harvesting will be collected and analyzed. The greenhouse experiment with twelve treatments will be conducted in a completely random design (CRD) having three replications and the treatments will be control, NPS and other four blended with and without bio fertilizer. The data will be subjected to analysis of variance and means will be separated with Tukey’s test at 5% probability. Correlation coefficients will be computed to assess the relationships between yield and yield components of the common bean varieties across the blended formula. The study will identify which blended formula and bio fertilizer combinations is best for haricot bean productivity economically feasible. The study will be conducted in the 2016 main cropping season and 35 thousand Ethiopian birr will be needed.

**Keywords:** blended fertilizer, bio-fertilizer, micro nutrient, soil profile

Jemaludin Saliha  
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Influence of Topography on Soils and their Physico-Chemical Properties in Gerba Sub-watershed, Southern Ethiopia.

Graduate Student: Rameto Wabela

Advisor: Sheleme Beyene (PhD)
Co-advisor: Semira Mohammed (PhD)

Soil science Graduate Program
School of Plant and Horticultural sciences College of Agriculture, Hawassa University,

Executive summary
The crop productivity in Gerba area is constrained by the lack of adequate data on soil and land form and lack of knowledge on slope variation which cause inappropriate selection of crop type and also the management of the soil. The study will be conducted at Gerba sub-watershed, southern Ethiopia and aimed to determine the influence of topography on soils and their physico-chemical properties. The study area will be selected by stratified sampling method and the soil profile by random sampling. A total of five pedons, a pedon from each slope category, will be opened and morphological properties will be described in the field while the physico-chemical properties of the soils will be determined by laboratory analysis of soil samples collected from different soil horizons. The soil analyses include particle size, pH, organic carbon, total nitrogen, available phosphorous, exchangeable basic cation, cation exchange capacity, percent base saturation and available micronutrients. The bulk density, particle density and soil moisture content (FC, PWP) will be determined from soil samples collected at 0-15 and 15-30cm depths. The impact of slope change on soil properties will be analyzed using general linear model procedure and the relationship between soil depth, soil type and land position will be investigated using correlation tests. The findings from this study will contribute to the knowledge about the effect of topography on soil fertility and productivity. In addition, it will help researchers, extension workers and farmers to design better soil fertility management practices to increase crop productivity. The study will be carried out from June 2016 up to June 2017 and requires a budget of 50,000 ETB.

Key words: pedon, soil properties, soil taxonomy, toposequence, WRB legend,

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5. Appendix
## Contents of research proposal training

<table>
<thead>
<tr>
<th>Topics to be covered</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>What is research proposal</strong></td>
</tr>
<tr>
<td></td>
<td>a. Characteristics of good proposal</td>
</tr>
<tr>
<td></td>
<td>b. Components of research proposal</td>
</tr>
<tr>
<td></td>
<td>c. Major gaps in research proposal writing</td>
</tr>
<tr>
<td>2</td>
<td><strong>Title page and others</strong></td>
</tr>
<tr>
<td></td>
<td>a. Title</td>
</tr>
<tr>
<td></td>
<td>b. Table of contents</td>
</tr>
<tr>
<td></td>
<td>c. Abbreviation and acronyms</td>
</tr>
<tr>
<td></td>
<td>d. Abstract</td>
</tr>
<tr>
<td>3</td>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td></td>
<td>a. Background of the study</td>
</tr>
<tr>
<td></td>
<td>a. Statement of the problem</td>
</tr>
<tr>
<td></td>
<td>b. Objective (general and specific)</td>
</tr>
<tr>
<td></td>
<td>c. Research questions/hypothesis</td>
</tr>
<tr>
<td></td>
<td>d. Significance of the study</td>
</tr>
<tr>
<td></td>
<td>e. Scope and limitation of the study</td>
</tr>
<tr>
<td></td>
<td>f. Structure of the paper</td>
</tr>
<tr>
<td>4</td>
<td><strong>Review of literature</strong></td>
</tr>
<tr>
<td></td>
<td>a. Context reviews</td>
</tr>
<tr>
<td></td>
<td>a. Historical review</td>
</tr>
<tr>
<td></td>
<td>b. Theoretical review</td>
</tr>
<tr>
<td></td>
<td>c. Integrative/empirical review</td>
</tr>
<tr>
<td></td>
<td>d. Methodological review</td>
</tr>
<tr>
<td>5</td>
<td><strong>Methodology</strong></td>
</tr>
<tr>
<td></td>
<td>a. Research Design</td>
</tr>
<tr>
<td></td>
<td>b. Description of the study Area</td>
</tr>
<tr>
<td></td>
<td>c. Target Population</td>
</tr>
<tr>
<td></td>
<td>d. Sampling</td>
</tr>
<tr>
<td></td>
<td>e. Research Instruments</td>
</tr>
<tr>
<td></td>
<td>f. Pre-Testing</td>
</tr>
<tr>
<td></td>
<td>g. Validity and Reliability</td>
</tr>
<tr>
<td></td>
<td>h. Data Collection Techniques</td>
</tr>
<tr>
<td></td>
<td>i. Data Analysis</td>
</tr>
<tr>
<td></td>
<td>j. Work plan</td>
</tr>
<tr>
<td></td>
<td>k. Logistical and Ethical Considerations</td>
</tr>
<tr>
<td>6</td>
<td><strong>References and citation</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
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<td></td>
<td><strong>Oral Presentation</strong></td>
</tr>
</tbody>
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## List of Participants

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<tr>
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