

**DETERMINANTS OF ADOPTION OF IMPROVED SOYBEAN VARIETIES
AMONG SMALLHOLDER FARMERS IN EASTERN UGANDA**

BY

LAUREN MUSIKA

B.SC. AGRICULTURE (MAK)

REG. NO 2013/HD02/1917U

**A THESIS SUBMITTED TO THE DIRECTORATE OF RESEARCH
GRADUATE TRAINING IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF
SCIENCE IN AGRICULTURAL ECONOMICS OF
MAKERERE UNIVERSITY**

DECEMBER, 2017

DECLARATION

This thesis contains my original work and has not been submitted for any degree award in any other university or institution of higher learning.

Signature.....

Date.....

Musika Lauren

This thesis has been submitted with our approval as supervisors:

Dr. Peter N. Walekhwa

Department of Agribusiness and Natural Resource Economics,
College of Agricultural and Environmental Sciences, Makerere University,
P.O. Box 7062, Kampala, Uganda

Signature.....

Date.....

Assoc. Prof. Theodora Hyuha

Department of Agribusiness and Natural Resource Economics
College of Agricultural and Environmental Sciences, Makerere University
P.O. Box 7062, Kampala, Uganda

Signature.....

Date.....

DEDICATION

I Dedicate This Thesis To My Mother Joviah Tukahairwa and My Employer Africa 2000 Network Uganda.

ACKNOWLEDGEMENT

During the writing of this research I was able to interact with various people who contributed directly and indirectly to the accomplishment of its objectives. I am extremely grateful to my supervisors especially Dr. Peter N. Walekhwa and Assoc. Prof. Theodora Hyuha who rendered their endless support in research supervision and thesis writing. I am also grateful for expert advice and guidance received from Dr. Cargele Masso (IITA, Nairobi), Dr. John Baptist Tumuhairwe (Makerere University, Kampala) and Dr. Christopher Kyeswa (A2N Uganda, Kampala).

I also recognize the financial support received from COMPRO II that funded data collection during this study. I do appreciate the peer support from the graduate students especially Nimusiima Mercy, Sanka Marco, Nalunga Asha, Namwangye Dianah, Namanda Rachael, Angudubo Stephen, Abraham Billy and Kabyanga Moris for their irreplaceable contribution during course of the study. I thank my family members and friends especially Hellen Agondeze, Carol Katusiime, Generous Kabarongo and Rukundo Isaac for the moral support during the course of study.

Many thanks go to A2N extension workers who assisted me in data collection. These included Mr. Koteki Nathan, Ochieng Andrew, Olwenyi Joseph, Ibrahim Caritas and Koma Stephen not forgetting the respondents from whom the valuable data was collected.

TABLE OF CONTENTS

DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
ABBREVIATIONS AND ACRONYMS	viii
ABSTRACT.....	ix
CHAPTER ONE	1
1.0 INTRODUCTION.....	1
1.1 Background to the study	1
1.2 Strategies to promote improved seed varieties for addressing low agricultural productivity	2
1.3 Problem Statement	4
1.4 Objectives of the study.....	6
1.4.1 General Objective	6
1.4.2 Specific objectives of the study	6
1.5 Research Hypotheses	6
1.6 Significance of the study.....	7
1.7 Scope of the study.....	7
CHAPTER TWO	9
2.0 LITERATURE REVIEW	9
2.1 Introduction.....	9
2.1.1 Cardinal Importance of soybean crop	9
2.1.2 Global production, trade and consumption of soybean	10
2.1.3 Overview of Soybean production in Uganda.....	11
2.2 Awareness on improved varieties	12
2.2.1 Awareness of recommended soybean production technologies.	12
2.2.2 Increasing awareness of improved varieties	16
2.3 Attributes of improved soybean varieties preferred by farmers	16
2.4 Definition and Conceptualization of the Technological Adoption	17
2.5. Factors Associated With Farmers Adoption Decision Farmers.....	19
2.5.1 Farmers' Socio-demography Characteristics	20
2.5.2 Institutional Factors	20

2.5.3 Farmers' Perception of Characteristics of Technologies	22
2.5.4 Risks and Economic Attributes.....	23
CHAPTER THREE.....	26
3.0 METHODOLOGY	26
3.1 Introduction.....	26
3.2 Research design	26
3.3 Description of study area	26
3.3 Sampling procedures and sample size	28
3.4 Data collection methods and tools	28
3.5 Data processing and analysis	29
3.5.1 The Logit Adoption Model	30
3.5.2 Empirical Model Specification	32
3.5.2.1 <i>Apriori</i> expected influence of different independent variables on adoption of improved soybean varieties.....	34
CHAPTER FOUR.....	37
4.0 RESULTS AND DISCUSSION	37
4.1 Profiling Soybean Farming Households in Eastern Uganda.....	37
4.2 Awareness of the existing improved soybean varieties by smallholder farmers in Eastern Uganda	42
4.2.1 Selected soybean varieties cultivated in Eastern Uganda	45
4.2.2 Rate of adoption and degree of adoption of improved soybean varieties in study area .	47
4.3 Perceptions of farmers towards key attributes of improved soybean varieties grown in Eastern Uganda.	49
4.4 Determinants of adoption for improved soybean varieties by smallholder famers in Eastern Uganda.	54
CHAPTER FIVE	58
5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	58
5.1 Summary	58
5.2 Recommendations.....	61
5.3 Areas for future research.....	61
REFERENCES.....	63
APPENDICES	73

LIST OF TABLES

Table 1: Released soybean varieties 1990-2013	3
Table 2: Independent variables in the Logit model and their expected effects	33
Table 3: Selected Categorical Socioeconomic and Demographic Characteristics of Soybean Farmers in Eastern Uganda.....	38
Table 4: Selected Continuous Socioeconomic and Demographic Characteristics of Soybean Farmers in Eastern Uganda.....	39
Table 5: Level of awareness about improved soybean varieties among soybean growing households in Eastern Uganda	42
Table 6: Main Sources of agricultural information on soybean production	44
Table 7: Sampled farmers that grew different soybean varieties in Busia, Tororo and Namutumba among the adopters	46
Table 8: Adoption rate and degree of adoption of improved soybean varieties by district	47
Table 9: Respondents' distribution by adoption of improved soybean varieties.....	49
Table 10: Ranks of most important soybean attributes for farmers when they want to choose varieties to grow.....	50
Table 11: The Logit regression estimates of factors determining adoption of improved soybean varieties by smallholder farmers.....	54

LIST OF FIGURES

Figure 1: Conceptual frame work of adoption of improved soy bean varieties.....	25
Figure 2: Awareness of farmers on improved soybean varieties	42
Figure 3: Knowledge levels of farmers on improved soybean	44
Figure 4: Major types of soybeans grown by farmers	45
Figure 5: Proportion of farmers growing selected soybean varieties	46
Figure 6: Key Attributes of improved soybean varieties grown by farmers.....	50

ABBREVIATIONS AND ACRONYMS

A2N	Africa 2000 Network Uganda
A2N Project	Improving Smallholder Productivity and Controlling STriga in Eastern Uganda. Grant Number 2010 SHP 008
AGRA	Alliance for Green Revolution of Africa
CAADP	Comprehensive Africa Agriculture Development Program
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Center
DSIP	Development Strategy and Investment Plan
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HIV/AIDs	Human Immune Virus/ Acquired Immune Deficiency syndrome
ISVs	Improved Soybean Varieties
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
NAADs	National Agricultural Advisory Services
NARS	National Agricultural Research System
NDP	National Development Plan
NPA	National Planning Authority
NIOP	National Institute of Oilseed Products
NOPA	National Oilseed Processors Association
PMA	Plan for Modernization of Agriculture
UBOS	Uganda Bureau of Statistics
USDA	United States Development Agency

ABSTRACT

Improved soybean varieties were introduced by Africa 2000 Network Uganda (A2N) project (*Improving Smallholder Productivity and Controlling Striga in Eastern Uganda* funded by AGRA in three selected districts of Tororo, Namutumba and Busia. However, since their introduction there has not been adequate documentation on adoption of these improved soybean varieties. This study therefore examined the adoption rates and factors that influenced the adoption of improved soybean varieties in Eastern Uganda. Data were collected through structured questionnaires from 239 smallholder soybean farmers selected through multistage sampling in the three districts and analyzed using descriptive statistics and Logit regression. Results of the study showed that the average age of soybean farmers was 43 and most of them had attained at least eight years of formal schooling. Most households (82%) were male headed, 61.1% did not receive any extension visit in a farming season and majority (89.1%) lacked access to credit. The key attributes of improved soybean varieties that influenced farmers' preference for different varieties were; high yielding capacity (21.7%), big size of seed (17.1%), short maturity periods (14.5%), pest resistance (12.5%), pleasant taste (11.3%), drought tolerance (8.7%), rust resistance (5.8%), resistance to pod shattering (4.5%) and appealing seed color (3.9%). Rate of adoption and degree of adoption of improved soybean varieties in Eastern Uganda was estimated at 73% and 57% respectively. Determinants found to significantly influence adoption of improved soybean varieties among smallholder farmers in Eastern Uganda included farmer participation in training on soybean agronomic practices ($p \leq 0.01$), number of times a household is visited by extension workers ($p \leq 0.05$), yield of soybean variety ($p \leq 0.05$) and size of the household ($p \leq 0.1$). It is therefore recommended that breeders focus on incorporating the key attributes of varieties mostly preferred by soybean farmers in their breeding programmes. A2N Uganda and other institutions should focus on improving knowledge levels of farmers in key aspects of the entire soybean value chain including agronomic practices, application of bio-inoculants and value addition. Government and A2N Uganda extension workers should upscale and sustain their extension service delivery as these have proved to be reliable source of agricultural information for increased uptake of improved soybean varieties in the rural areas.