Sasakawa Africa Association

54

SG 2000 Crop Productivity Enhancement Extension Approaches in Uganda

Evaluation Report

April 2013

Frances Nakakawa, Ramzy Magambo and Justine Wangila

Monitoring, Evaluation, Learning and Sharing (MELS) Theme

Table of Contents

Acronyms

AFAAS	African Forum for Agricultural Advisory Services
ATAAS	Agriculture Technology and Agribusiness Advisory Services
CAADP	Comprehensive Africa Agriculture Development Programme
CBF	Community Based Facilitators
CRP	Community Resource Persons
CVPs	Community Variety Plots
DSIP	Development Strategy and Implementation Plan-
EAS	Extension and Advisory services
FAAP	Framework for Africa Agriculture Productivity Programme
FAO	Food and Agriculture Organization
FARA	Forum for Agricultural Research in Africa
FESs	Field extension Staff
FEWs	Field Extension Workers
FFS	Farmer Field School
FLPs	Farmer Learning Platforms
GDP	Gross Domestic Product
GFRAS	Global Forum for Rural Advisory Services
IDEA	Investment in Developing Export Agriculture-
MAAIF	Ministry of Agriculture Animal industry and Fisheries
MFPED	Ministry of Finance, Planning and Economic Development
NAADS	National Agricultural Advisory Services
NARO	National Agricultural Research Organization
NRI	Natural Resource Institute
OSCA	One Stop Centre Association
PMA	Plan for Modernization of Agriculture-
PTP	Production Test Plots
SAA	Sasakawa Africa Association
SFF	Sub-county Farmers Forum
NCs	NAADS Coordinators
T&V	Training and Visit
TDS	Technology Development Site
TOPs	Technology Options Plots
UBOS	Uganda Bureau of Statistics
UFAAS	Uganda Forum for agricultural Advisory Services
USAID	United States Agency for International Development
VADs	Voucher-assisted demonstrations
WADs	Women Assisted Demonstrations

Executive Summary

The primary objective of this evaluation was to assess the agricultural extension approaches used by SG 2000 - Uganda, highlighting what works well, what does not and what can be improved to achieve CPE Theme objectives and enhance approaches. The evaluation assessed SG 2000 – Uganda crop extension approaches in relation to the national extension approaches based on farmer selection, training approaches, technology selection and targeting of farmers.

Results show that approaches used by both NAADS and SG 2000 - Uganda share several features, including use of farmer groups as entry points, training sessions that are both theory and field practicals based, and priority to farmers in selection of crop enterprise of interest (although SG 2000 - Uganda provides a "menu"). Indeed, 88% of respondents stated that SG 2000 – Uganda approaches are in line with national priorities. In addition, according to classification of approaches by Ademola (2001), both organizations employ the problem solving approach that involves defining the approach from the view point of farmers, and participation of target groups in planning and implementation of the interventions.

FLPs are relevant and to some level, effective in disseminating agricultural extension to the farmers. This was evidenced by reported learning of new technologies or practices during trainings and demonstrations. However, there is need for further training on FLPs for EAs and CBFs to understand concepts and approaches better. There was use and uptake of the promoted technologies but varied with different technologies or practices promoted by SG 2000 - Uganda. Most used technologies or practices include integrated pest management strategies, proper seed rates and line planting/spacing. Factors which influence adoption of promoted technologies include effective support from EAs, timely delivery of inputs, access and cost of inputs, farmers' attitude and perception, education and, commitment and transparency of the demonstrations host farmers and EAs.

Sustainability of SG 2000 – Uganda crop extension approaches is still a concern. Results reveal that respondents have hope of sustainability. NAADS has taken up the approach in some areas where SG 2000 - Uganda has exited. Further, there are already initiatives by both government and SG 2000 - Uganda to see this happen. These include 1) creating farmer linkages to agricultural input suppliers; 2) continued motivation of EAs, both financial and in kind incentives such as bicycles to ease outreach; and 3) Government proposed intensification of training of farmers under the new ATAAS project.

Proposed recommendations include employment of approaches that foster adoption of promoted technologies and practices such as participatory planning, monitoring and evaluation; appropriate adult learning skills; as well as use of clearly defined entry and exit strategies.

1. Introduction

1.1. Background

Over the past 25 years, the Sasakawa Africa Association (SAA) and its partner, the Global 2000 Program of the Carter Center, under the aegis of SG 2000 Programs have worked with tens of thousands of frontline extension workers and several million farmers in 14 sub-Saharan Africa countries in partnership with national governments especially the Ministries of Agriculture (MOA). Currently, SG 2000 Program focal countries are Ethiopia, Mali, Nigeria and Uganda, and work in line with host country's policies. The programs operate within government extension structures; with memoranda of understanding. SAA's vision of having a more food secure rural Uganda (Africa) with increasing numbers of prospering smallholder commercial farmers is in line with that of NAADS II program which is focusing on food security and commercializing farmers.. There is ample demonstration that there are many modern crop technologies and practices such as improved seeds, fertilizer use, integrated pest management and line planting available in Africa that can significantly increase yields. It is also clear that farmers are not only willing and able to intensify production – they are, in fact, eager to do so. However, there are formidable challenges and constraints to adoption of improved technologies such as lack of quality and profitable markets. To overcome these challenges, integrated and functional value chains are necessary - from input supply through production, harvesting, storage, processing, marketing (SAA, 2008) to consumption.

Agricultural Environment, Goals, Policies and Strategies in Uganda

1.1.1. Agricultural Environment

Agriculture sector in Uganda has for the last two decades contributed tremendously to national economic growth, poverty reduction and food security. Agriculture contributes 22.7% of GDP, accounts for over 48% of exports, provides a significant proportion of the raw materials for the industrial sector and employs over 73% of the population (UBOS, 2012). On this basis, the Ugandan government has come up with policy frameworks to ensure development of the sector.

MAAIF has developed the National Agricultural Policy (NAP) with the Development Strategy and Investment Plan (DSIP) 2011-2015 as the road map to guide public action and investments over the next five years in the agricultural sector. DSIP sector development objectives are to ensure: increase of rural incomes and improvement of livelihoods, household food and nutrition security. To effectively achieve these objectives, a new Program,Agricultural Technology and Agribusiness Advisory Services (ATAAS) has been commissioned to specifically ensure improved delivery of agricultural research and extension in Uganda. Agricultural Extension

Agricultural Extension[1] is a key element to all agricultural development processes and it describes the services that provide rural people with the access to knowledge and information they need to increase productivity and sustainability of their production systems and improve their quality of life and livelihoods (NRI-www.nri.org; Anderson, 2007 and Anderson and Feder, 2003) and has changed over time (Swanson, 2008). Extension can contribute to the reduction of productivity differentials by increasing the speed of technology transfer and by increasing farmers' knowledge and assisting them in improving farm management practices (Feder *et al*., 2004). Agriculture extension is moving away from the dominant emphasis on technology transfer, e.g., training and visit approach towards a much broader concept that includes developing the skills and management capacities of farming families. The new extensionist is faced with challenges of organizing farmers, and linking farmers to both input and output markets (Swanson, 2008).

[1] This is often used synonymously with agricultural advisory services

1.1.2. Agricultural Extension Approaches

An extension approach is the style of action within an extension system that guides the structure, methods, techniques, resources and linkages of operation (Swanson, 2008). Over the years, there has been numerous approaches and methodologies used for delivery of agricultural services and each is conceived as appropriate in particular circumstances and each has its own advantages and disadvantages. There has been different categorization of extension approaches, highlighted by Axinn (1988): general agricultural extension; commodity based; training and visit (T&V); participatory agricultural extension; project approach; the farming systems development; cost sharing and education institutions.

According to Axinn (1988), in actual practice any agricultural extension system[2], at a particular time emphasizes one approach with some characteristics of the other types. Each approach is characterized by the following dimensions: the dominant identified problem; purpose to which it is designed; control of programme planning; nature of the field personnel including their density in relation to the clientele. The other dimensions include: the level of training, reward system, origin, gender and transfer; the resources required and certain cost factors like manpower, use of media; typical implementation techniques used; and the variables or outputs by which the system measures its success. These are merely different approaches to the same agricultural extension phenomenon.

1.1.3. Agricultural Extension: The Uganda Context

Uganda has finalized its detailed national agriculture investment plan, the Development Strategy and Investment Plan - DSIP (MAAIF, 2010a). Prior, agricultural extension in Uganda has undergone a number of transformations from regulatory 1920 - 56, advisory 1956 - 63, advisory education 1964 - 71, dormancy 1972-81, recovery 1982-99, educational 1992-96, participatory education 1997-98, decentralized education 1997-2001 and agricultural services (2002-todate). Agriculture is also increasingly becoming commercial or market oriented with emphasis on modernization and use of participatory extension approaches (Semana, 2008).

1.1.4. Uganda Agricultural Policy Framework

Up to 2010, the Plan for Modernization of Agriculture (PMA) shaped the policy environment for the agricultural sector in Uganda (Uganda, 2010). Currently, there is no specific policy document on Agricultural extension. The National Agricultural Policy is under preparation since 2010 (MAAIF, 2010a). Presently, the National Agricultural Advisory Services (NAADS) spearheads agricultural advisory services to farmers in Uganda (MAAIF, 2011c). NAADS II now operates under the Agricultural Technology and Agribusiness Advisory Services (ATAAS) Program. One of the targets of NAADS II is diversification of approaches and methodologies for delivery of the services and service provider capacity development (NARO-NAADS, 2010). NAADS focuses on a decentralized, farmer-owned and public/private sector serviced extension. It envisions farmer empowerment to demand, pay and control extension services in the long run (http://www.naads). Since the transformation of extension did not build on the strengths of the past but rather relied mainly upon foreign expert advice, its sustainability remains a key contentious issue.

1.1.5. The NAADS Approaches

NAADS takes a project approach, it is a high impact programme mainly supported by foreign funding with a separate management and accounting structure from MAAIF and a better facilitated staff. Empowerment in NAADS approach is participatory and farmers participate through membership in NAADS farmer groups (MAAIF, 2010b).

2 An agricultural system embodies aspects of its structure, leadership, programmes, methods and techniques, resources and the linkages with other organizations.

Under NAADS I, farmers in a Sub-county through NAADS farmer groups chose 3 enterprises: crop, livestock, fishery or beekeeping or a mixture; requested specific technologies and advisory services and applied for grants to procure those technologies and related advisory services. With this information, the NAADS Secretariat worked with the Sub-county to provide the grants, contract and supervise private professional service providers. Service providers set up demonstrations (technology development site - TDS) on host farmers' fields. The host farmer was chosen by members of the group. Proceeds from the TDS became a revolving fund for members. Select farmers, known as community based facilitators (CBFs) were also trained to extend follow-up services (NAADS, 2001).

Because of challenges around farmer and enterprise selection in NAADS I, new guidelines have been formulated for NAADS II. Mainly, farmers are categorized into the food security and commercializing farmers. Food Security farmers are 18 years and above, practicing subsistence farmers with access to land or production unit, and commercialization farmers serve as models in progression from subsistence farming through market orientation to commercialization (MAAIF, 2010c).

1.2. SG 2000 Program in Uganda

SG 2000 - Uganda started operating in Uganda in 1996 in partnership with MOA at the height of agricultural extension reforms; extension was at its low and pluralism was in vogue. The partnership required working alongside and supplementing government extension efforts; and using government extension structures. SG 2000 – Uganda participated and participates in national agricultural planning processes such as the PMA and NAADS. SG 2000 – Uganda approaches and interventions are expected to fit into the national extension framework, be complementary and in agreement with national extension goals according to the MOU with MAAIF.

1.2.1. The SG 2000 Extension Approaches in Uganda

Over the years, SG 2000 - Uganda has used a mixed-extension approach to disseminate technologies and information. SG 2000 - Uganda extension has gone through 3 phases: traditional extension - technology focused demonstration plots; One Stop Centre Associations - farmer based[3] and now, farmer learning platforms (FLPs).

Phase 1 - Traditional Extension - Technology Focused Demonstration Plots Approach: 1997-2002

In Phase 1, the key problem was low productivity due to weak links between research and farmers, and poor access to inputs especially fertilizers and labor. SG 2000 – Uganda implemented farmer trainings and demonstrations; farm research; seed multiplication; animal traction; postharvest handling and inputs delivery – stockist system. The approach used was top-down, implemented through the national extension system that is District Agricultural Officers through District Production Offices, SG 2000 – Uganda District Coordinators, Sub-county Extension Offices down to farmers, groups and associations. Like in the T&V approach, SG 2000 – Uganda staff played the role of the subject matter specialists (SMSs), training assigned government field extension workers in turn trained and visited farmers to disseminate new technologies from research mainly through demonstration plots of 0.1 ha.

Field Extension Specialists (FESs) were equipped with motorcycles and given salary top-ups to boost morale and commitment. Maize was the dominant crop promoted with a soil improvement package of inorganic fertilizers. Legumes and other cereals were added later in 1999. Activities were seasonal, highly scheduled and always culminated in field days with exhibition of successful technologies.

In 2002, SG 2000 – Uganda added on voucher-assisted demonstrations (VADs) that targeted women, youth and HIV/AIDS vulnerable farmers. VAD kits were used during group training sessions, giving the

[3] Second Phase overlapped with the 1st and 3rd Phases.

resource-poor participants the opportunity to attend and/or host demonstrations. VADs helped to improve the clients' food and income security, and boosted sales of agro-dealers who delivered inputs against the vouchers.

Measures of success were number of demonstration plots, farmers attending demonstration trainings and field days and adoption rates. Thousands of farmers benefited from the new technologies demonstrated and yields increased many-fold. However, after sometime, new challenges such as low implementation efficiency, low farmer participation and limited institutional framework for sustainability of technologies emerged. A mid-term review in 2001 of SG 2000 Programs in Africa raised a critical concern about sustainability of approaches and technologies disseminated to farmers. It showed the need to increase smallholder access to productivity enhancing services (public and private); increase intensity and scale of application of improved innovations by smallholder farmers and facilitate creation of institutional frameworks and scale out impact of improved innovations beyond project periods and areas.

Phase 2 - One Stop Centre Associations Approach: 2001-10

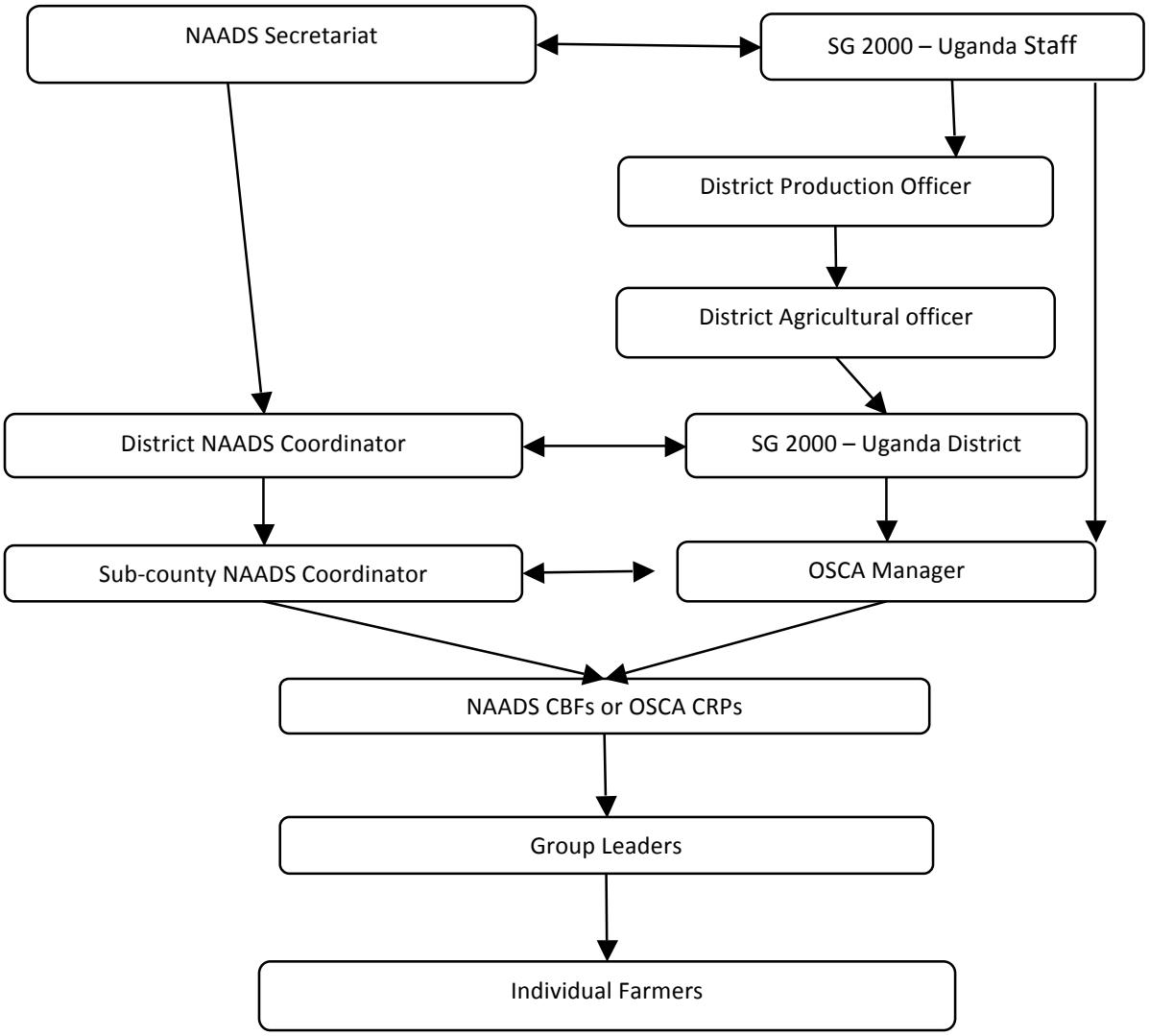
In response to the 2001 mid-term review, SG 2000 – Uganda changed the approach; designing the One Stop Centre Association (OSCA) approach (2002-2003) and aligned to both PMA and NAADS' Policy Framework (SG 2000, 2005). Concurrently, there was a new government sector-wide agricultural policy that focused on increasing productivity and integrating agricultural programs.

An OSCA is a community multipurpose infrastructure that facilitates farmers' organizations and their communities to aggregate demands for services (e.g. markets) reduces transaction costs; and built their capacity to run services on commercially viable and sustainable bases. It aimed at bringing services closer to all farmers. It also aimed at strengthening institutions for inputs delivery, production, agro-processing and marketing with auxiliary services such as rural finance, literacy, health care and other social services. The OSCA approach was participatory, collaborative, market-oriented and integrated social and economic issues that could deliver on or contribute to SG 2000 – Uganda goals (SAA, 2006). The OSCA approach focused on value chains development from enterprise development to collective marketing with each centre focusing on single crop; rice for Zirobwe, maize for Mukono, groundnuts for Tororo, etc. This provided a good fit between SG 2000 – Uganda and national agricultural extension.

Measures of success for the OSCA approach included number of associations, member groups, and successful value chains developed and sustained. The OSCA approach was a viable avenue to empower farmers and provide a range of services. It was not only beneficial to farmers but also to SG 2000 – Uganda and other stakeholders, and had potential of a best practice for agricultural extension. For almost 10 years, SG 2000 - Uganda used this approach to implement activities and its work was ranked high by the Government and other stakeholders who desired to adopt the same.

However, high farmers' expectations (and to some extent dependence syndrome); physical structures taking a centre stage instead of being enabling facilities; higher and disparate management standards of the associations as compared to groups, and marketing problems due to low volumes greatly threatened sustainability (Luzobe, 2012). The flow of work was as in Figure 1 below.

Figure 1: Flow of Work in the OSCA Approach



Phase 3: SG 2000 Value Chain Approach

In 2008, SAA embarked on a strategic re-think to address challenges that faced the OSCA approach; emerging extension challenges and the need to reach more farmers. SAA adopted a value chain approach. This resulted in a new vision, mission and strategic goals. These goals were translated into 5 Themes for operationalization and implementation: Crop Productivity Enhancement (CPE); Postharvest and Agro-processing (PHAP); Public-Private Partnerships and Market Access (PPP&MA); Human Resource Development (HRD) and Monitoring, Evaluation, Learning and Sharing (MELS) (SAA, 2008). CPE Theme plays a pivotal and central role in SG 2000 Programs (SAA/SG2000, 2011) due to history and by design.

1.3. The Crop Productivity Enhancement Theme

CPE Theme aims to establish cost-effective farmer learning platforms that improve productivity in smallholder food systems, especially for resource-poor women farmers and those with low levels of technical efficiency, and increase food security and improve livelihoods. Its overall objective is to increase agricultural productivity and strengthen capacities of farmers and national extension systems

by reaching farmers directly through training and field demonstration activities, and indirectly through information and knowledge spillover in communities.

1.3.1. Theory of Change of the CPE Theme

Until 2009, most crop extension demonstrations by SG 2000 Programs promoted standardized packages of technology, generally among relatively better-off smallholders located mainly in less risky and accessible agro-ecologies and with reasonably good access to markets. Extension services generally recommended one technology package (two at the most) for each of the major food crops. The standard demonstration and training approach consisted of management training plots (MTPs). SG 2000 - Uganda also used block farms, seed multiplication, on farm research and production test plots (PTPs) to reach smallholder farmers with significant impacts. However, when a standardized technology package is extended over diverse and risky environments, the result is significant decline in technical efficiency. A greater array of technology options for farmers is needed to help ensure increased technical efficiency and productivity. Resource-poor smallholder farmers' livelihoods are constrained by low crop productivity which is mainly due to poor access to improved technologies, required inputs and poor input management which are mainly due to lack of access to information, training and extension advice (SAA, 2011c).

1.3.2. Farmer Learning Platforms (FLPs) Extension Approach

Emerging extension challenges and the need to reach-out to more farmers especially the under-served entailed a re-think and new approaches. Starting 2009, the CPE Theme adopted a Farmer Learning Platforms (FLPs) approach for capacity development of smallholder farmers. An FLP consists of two main elements: a) field demonstration of new and/or adapted and improved technologies and b) training of farmers. FLPs consist of 3 or 4 types of demonstration plots: technology options plots (TOPs), women assisted demonstration plots (WADs) and community variety plots (CVPs) as well as production test plots (PTPs). TOPs and WADs host farmers are supplied with inputs for one season by SG 2000, while PTP farmers use their own inputs, but participate in trainings and are supervised by extension agents (SAA, 2005; SAA, 2010a and SAA, 2010b). TOPs and WADs serve as the primary focal points for community- and group-based agronomic training and technology evaluation. TOPs, WADs and PTPs aim to benefit 2 categories of clients: 1) farmers including women, with low technical capacity and who have not benefited from extension advisory services in the past and 2) commercially oriented smallholders; those with surplus production.

TOPs are normally 1,500 m2 in size, and divided into three contiguous 500 m2 sub-plots. The first sub-plot is devoted to demonstrating the official national agricultural research centers' recommendations, i.e., NARO recommended technology package. The second is a lower-cost (intermediate) variation; half of NARO recommended technology package. The third plot is local farmers' practice that allows for comparison between SG 2000 – Uganda interventions and farmers' practices. TOPs and WADs are learning sites for farmers for continuous training sessions during the growth period; additionally they are also demonstrations of new technologies (SAA, 2011b;

WADS are the successor to VADs and are simplified versions of TOPs specifically intended for resource-poor women farmers. WADs comprise of two 500 m^2 sub-plots. The first plot demonstrates a lower-cost (intermediate) variation; half of NARO's recommended technology package, One plot is the intermediate technology and the other farmers' practice for comparison. A WAD is always 1000m^2 in size and the second is the farmers' practice for comparison. A WAD is always 1000m^2 in size. .

PTPs are essentially test plots on technology options by farmers who participated in FLP training and field days using their own inputs before deciding on use and scaling up of technologies with needs-based technical advice by SG 2000 staff (**SAA, 2011b**).

1.3.3. Implementation Road

In Uganda, FLPs are central to the SG 2000 crop extension approach. Therefore, demonstration of technologies through TOPs, WADs and CVPs; technical advice and training on PTPs and training sessions with Extension Agents (EAs) help to develop their skills and knowledge, provide solutions to constraints in agricultural production and inform about options and opportunities to improve farm enterprises (SAA, 2011b). Significant progress has been made in reaching smallholder farmers.

SG 2000 – Uganda promoted crop technologies include improved seeds; new crop varieties; fertilizer use; timely planting; line planting /spacing; proper seed rates; timely weeding; use of herbicides; crop rotation; integrated pest management; use of timely planting (aversive); chemical pests and diseases control; cropping system improvement and land preparation methods to control major weeds like Striga.

SG 2000 - Uganda has over the past 3 years established 1,551 TOPs, 2,216 WADs and registered 6,300 PTP farmers in the different intervention areas as indicated in Table 1.

Table 1: Number of Technology Plots: 2009-12 in Uganda

FLP	Core Project				Total plots
	2009	2010	2011	2012	
TOPS	495	504	336	216	1,551
WADs	660	504	504	648	2,216
PTPs	1,650	1,680	2,520	450	6,300

Source: SG 2000 – Uganda CPE Theme

1.4. Evaluation Rationale

SG 2000 – Uganda works with MAAIF under an MOU in Uganda. Significant investments have been made in the promotion and establishment of FLPs – TOPs, WADs and CVPs demonstrations and training, and provision of technical advice on PTPs. It is now an opportune time to look at the relevance of the SG 2000 Crop Extension Approach to Uganda's agriculture goals, agricultural and extension policies and extension approaches. Another issue of concern has been the size and location and how these affect the visibility of demonstration plots; i.e., effectiveness of demonstration plots.

The extent and depth of technology transfer, use and impact of technologies promoted through the SG 2000 – Uganda crop extension approach is not clear. It is therefore important and necessary to understand technologies use; multiplier effects; cost-effectiveness and efficiency of the SG 2000 approach in reaching farmers; effect of trainings on extension agents and farmers; effectiveness of the approach technologies in increasing yields, food security and incomes;.

It is clear that unanswered questions exist. Is there uptake after demonstrations and trainings? Do farmers respond better to certain extension approaches, and if yes, why? Why do some target farmers keep off extension services? These are some of the questions.

1.5. Evaluation Objectives

The overall objective of this evaluation was to assess the use of technologies and effect of trainings, highlighting what works well, what does not and what can be improved to achieve CPE Theme objectives and enhance approaches. This evaluation sought to identify changes in the implementation environment in Uganda and how these changes affect the CPE Theme theory of change. The specific objectives of this evaluation include:

1) To assess if SG 2000 - Uganda crop extension approaches fit the Uganda national extension systems and approaches with respect to agricultural goals, priorities, fertilizer recommendations, policies, strategies and/or plans;
2) To evaluate implementation with respect to effectiveness and efficiency of trainings, i.e., methodology, delivery, knowledge transfer, etc.; and effectiveness and efficiency of demonstrations in transferring technology to extension agents and farmers;
3) To understand the use of improved technologies and multiplier effects of the FLPs in improving production and productivity;
4) To assess the sustainability of the SG 2000 crop extension approach and activities in Uganda,
5) Identify lessons learned and best practices; areas to strengthen, change and refocus to enhance SG 2000 Crop Extension especially on TOPs, WADs, CVPs and PTPs in terms of management of plots, quality, reach, and replication, gender mainstreaming and empowerment.

The evaluation was guided by a set of key questions to address the above specific objectives. Different questions were targeted to different respondents.

2. Evaluation Approach

2.1. Scope

This evaluation is an open, transparent learning process for clients, partners and stakeholders that aimed to understand the institutional and working environment, achievements, pitfalls and constraints – as well as opportunities and challenges in Mukono, Luweero, Wakiso, Jinja and Tororo Districts in Uganda. The focus was extension as a *mechanism or tool* for improving farmers' knowledge and management practices in ways that lead to improved agricultural productivity and food security. This was specifically on SG 2000 crop extension approaches and activities, i.e., farmer learning platforms covering trainings, TOPs, WADs and CVPs and PTP farmers. As per the evaluation objectives and the need to address issues related to implementation, performance, progress and achievements; data and information was collected at different intervention, management and administrative levels starting with the farm and from different respondents.

2.2. Approach

2.2.1. Framework and Tools

The evaluation used a hybrid Evaluation Framework and a mix of quantitative and qualitative methods (IFPRI, 2010) on the basis of the CPE theory of change and evaluation questions while following standard evaluation steps. Generic tools were developed by the MELS Theme in consultation with other SAA and SG 2000 Themes and staff. The MELS Theme followed a two-step consultative process: a) SAA Management reviewed the evaluation questions, and MELS Theme in consultation with CPE Theme identified respondents for different questions. The tools were then reviewed and adapted to Uganda-specific conditions for relevance.

2.2.2. Sampling Strategy

A mix of multi-stage stratified and purposive sampling strategy was used to select a representative sample of different respondents at different spatial and implementation levels; i.e., from Villages through Parishes, Sub-counties, Districts to the National; and from farmers through extension agents to policy- and decision-makers. Being an evaluation, respondents constitute people who have interacted with SG 2000 – Uganda in one way or another as clients, partners or stakeholders. The Sample frame and strategy were discussed extensively within SG 2000 – Uganda and with partners to assure representation, credibility and buy-in into the evaluation process.

2.2.2.1. Farmers

SG 2000 - Uganda has worked in over 25 districts in Uganda; 5 districts where different activities were implemented by SG 2000 – Uganda under the FLP approach were purposively selected: Mukono, Luweero, Wakiso, Jinja and Tororo. Selection of respondents was done from 3 categories of farmers around an FLP: 1) TOPs and WADs hosts; 2) farmers not hosting TOPs and WADs but from the same farmer groups as those farmers selected in 1) above; and 3) PTP farmersaround selected FLPs..

Two Parishes were randomly selected from one purposively selected Sub-county in each of the 5 Districts. Therefore, in each Sub-county, 10 WADs and 10 TOPs host-farmers, 10 non-host farmers (members of farmer groups around an FLP) and 10 PTP farmers were selected for this evaluation. This resulted in 40 farmers from each District and 200 farmers for evaluation in Uganda.

2.2.2.2. Key Informants

Three categories of key informants were included in the sample of respondents: a) District – one SG 2000 – Uganda District Coordinator, 1 Government Extension Agent from each selected Sub-county and 2 CBFs from each Parish; b) National (MAAIF) - Minister of State for Agriculture; Commissioner for

Agriculture; Director, Crop Production and SAA Desk Officer and c) SG 2000 – Uganda staff - Country Director, Deputy Country Director, CPE Thematic Coordinator and CPE Theme Program Officers.

2.2.3. Recruitment and Training of Interviewers

Senior MAAIF staffs were interviewed by the MELS Theme Director. Due to the urgency and importance of evaluation and limited SG 2000 – Uganda MELS human resources, experienced interviewers in data collection were brought on board. These interviewers have previously engaged with SG 2000 – Uganda starting with the CIMMYT/SG 2000 Impact Assessment Project, Needs Assessments and Baseline Surveys. Two Data Entry Technicians were also recruited.

A one-day training workshop was undertaken for Interviewers and Data Entry Technicians.

2.3. Data Collection and Analysis

The evaluation collected and used both secondary and primary data. The starting point was a literature review of relevant documents; published and grey documents such as the SAA Strategic Plan, CPE Theme Concepts and Procedures, Logframes, Baseline Reports, Needs Assessment Reports, Relevant SG 2000 Publications, National Agricultural Extension and Fertilizer Policies and Strategies among others. CPE Theme provided the necessary available data, information and documents. Primary data were collected through face to face interviews with a number of respondents.

Collected data was analyzed using mixed - quantitative and qualitative approaches.

3. Evaluation Results

3.1. Socioeconomic Characteristics of Farmers

Socioeconomic characteristics of farmers play an important role in agriculture, especially extension. Table 3 shows that farmers in all the different categories had an average land size of 1.4 ha. Each interviewed household had a family size of least 7 persons. In all categories of farmers, women were the majority: WADS (98.1%), PTP farmers (53.8%), non-host group members (57.1%) and TOPs (52.9%). This implies that SG 2000 – Uganda reaches more women through demonstrations.

Education of farmers plays a significant role in the acquisition and use of information and technologies. Studies have observed that education creates a favorable mental attitude for acceptance of new practices especially related to information and management (Waller *et al*. 1998 and Caswell *et al*., 2001). Most interviewed farmers have some formal education. All PTP farmers interviewed had some formal education.

Table 2: Socioeconomic Characteristics of Uganda Farmers

Characteristic		FLP			
Sex of Host (%)		**WADs**	**TOPs**	**PTPs**	Non-host Group Farmers
	Male	1.9	47.1	46.2	42.9
	Female	98.1	52.9	53.8	57.1
Family size (#)		7	9	7	8
Education (%)	No formal education	5.8	5.9	0.0	0.0
	Dropped out in Primary School	40.4	29.4	1.9	9.5
	Still in Primary School	0.0	0.0	0.0	2.4
	Completed Primary School	19.2	18.6	44.2	59.5
	Dropped out of Secondary	34.6	31.4	53.8	28.6
	Completed Secondary School	0.0	3.9	0.0	
	Tertiary Education	0.0	2.0	0.0	0.0
	Diploma in Secondary School	0.0	3.9	0.0	0.0
	University	0.0	3.9	0.0	0.0
Land size (Ha)	Average	1.7	2.0	1.8	1.4
	Minimum	0.2	0.4	0.4	0.2
	Maximum	6.1	8.1	6.5	6.1
	Standard Deviation	3.0	3.5	3.5	3.0

Source: CPE Enhancement Evaluation 2012

3.2. National versus SG 2000 Crop Extension Approaches

3.2.1. National Extension Systems' Approaches

National Agriculture Advisory Services (NAADS) currently drives extension in Uganda. Farmers are lead clients of extension. NAADS approach is grounded on farmers' groups. Farmers are engaged through membership in farmers' groups. Farmers' groups aggregate into farmers' fora at Sub-county, District and National levels. At whatever level, different fora are responsible for planning, contracting, determining priorities, allocating resources and reviewing local government plans for agricultural development. These fora also monitor, evaluate and provide feedback on performance and quality of service and influence policy direction in the agricultural sector. Key aspects of the NAADS approaches include:

Farmer Selection/Criteria - Village Farmer Fora (VFF) meet with farmer groups to select farmers to participate in NAADS programs. List of farmers are forwarded to Sub-county Farmer Forum (SFF) for

compilation and final decision. The selection criteria are not clear but require some form of residence of host farmers; no special attention is given to women. At the center the need is to reach farmers en masse. Under NAADs farmers fall into 4 categories:

1) Food Security farmers: with access to land and practicing subsistence farming in the village;
2) Market-oriented (model) farmers: early adopters/innovators who set the pace for market orientation by demonstrating to other farmers in the group promising technologies for the priority market oriented enterprises in the Parish;
3) Commercializing model farmers or groups: practices commercial farming through enterprise specialization or enterprise mix with clear linkages to markets and support services in Sub-counties or Districts; and
4) Nucleus farmers or farms employing professional management and labor in farm operations; selected at the national level.

Uganda's poorest people include many subsistence farmers in remote areas who do not have access to agricultural services and lack inputs and technologies (IFAD, 2012). PMA stressed extension services and empowerment of these farmers (MAAIF and MFPED, 1997). However, there is no clear demarcation between the poor and non-poor farmers.

Enterprise Selection - selection process is initiated by farmers guided by Assistant Community Development Officers (ACDOs). Farmers in groups in Parishes select and prioritize enterprises based on majority rule. Selected enterprises are forwarded to the SFF that convenes to prioritize 3 or 4 enterprises from a mix of crop, livestock, fish or bee enterprises. SFF also applies for grants to procure necessary inputs, technologies and advisory services (NAADS, 2009).

Training Approach - agricultural service providers (subject matter specialists) are sub-contracted to train farmers on husbandry, postharvest handling and marketing. Extension staffs facilitate trainings at the Parish. Extension service providers are expected to train farmers after accessing inputs from NAADS; However, there was no or frequency of trainings and visits was low and did not match farmers' needs especially on input use and handling. This is problematic for farmers who do not know how to use inputs properly.

Demonstration Sites – NAADS works with Sub-counties to provide grants, and contract and supervise private service provision for demonstrations on host farms or technology development site (TDS) which are managed and monitored by farmers' groups. A combination of TDSs and advisory services are more effective. TDS attract more attention and interest farmers compared to ordinary demonstrations because they relate to commercial farming.

3.2.2. SG 2000 – Uganda CPE Extension Approaches

SG 2000 - Uganda aims to help smallholder farmers to learn and use new skills achieve food and income security through proven productive and profitable enterprises using the FLPs approach.

Farmer Selection/Criteria – Districts are selected by SG 2000 – Uganda without consulting MAAIF to keep out politics. SG 2000 then engages District leadership on the selection of Sub-counties within the District. SG 2000 – Uganda involves Sub-county governments and NAADS District Coordinators in the choice of Parishes. EAs seconded to SG 2000 – Uganda by Sub-counties provide list of farmer groups and members for selection of demonstration host farmers. Based on information provided to farmer groups on interventions; members select competent farmers as a community based facilitators (CBFs). Host farmers are selected by group members and the CBFs with guidance from EAs based on SG 2000 - Uganda criteria for TOPs, WADs, CVPs and PTP farmers.

Targeting the Right Farmers – farmer selection process has direct implications on reaching target clients, smallholder farmers underserved by extension especially women. SG 2000 – Uganda faces the challenge

of reaching poor farmers. This is because poverty is relative and varies from one community to another and the assumption that women are poor. SG 2000 – Uganda farmer selection or targeting criteria exist. But selection and targeting is done by District authorities and oftentimes it is subjective based experience and preference.

Technology Selection: SG 2000 – Uganda has fixed priority enterprises which are presented to farmers as a 'menu' composed of mainly cereals, legumes and root tubers; yet it is not a direct responsibility of SG 2000 – Uganda to influence farmers. This leads to limited empowerment of farmers to participate in selection of preferred enterprises. Key informants reported that choice of preferred enterprises follows identification of problems and solutions based on individual ideas, discussions and reaching consensus in a participatory manner; however, income considerations weighed in more than food security..

Training Approach –SG 2000 – Uganda staff gives 3 trainings to SG 2000 – Uganda District Coordinators, EAs and CBFs to be trainers of trainers (TOTs). These were: a) pre- season training on communication methods, agronomy, FLP approach, report writing, etc; b) mid-season to orient EAs on how to train farmers and review of the season; and c) end-season on season review, yields and the following year's plans. Farmers learn from the CBFs while Extension agents give technical support to CBFs and farmers. Other SG 2000 – Uganda Themes offer technical training on the whole value chain in these trainings. Other trainings and promotion activities include field days, exchange visits, agricultural shows, TV documentaries and radio talk shows.

A principal component of an FLP and avenue training were demonstration plots. Combined trainings and demonstrations that is a 'learning-by-doing' approach is very effective. PTP farmers who are graduates of FLPs are expected to be the early users or adopters of technologies and practices. Evaluation results show that on average a TOPs farmers group has 9 women and 5 men and a WADs farmers has 4 women and 2 men. More women participate in FLPs (demonstrations) and some men participate in WADs.

Strengths of Training Approach – SG 2000 – Uganda staff indicated that key strengths include its participatory nature; subject matter specialists are brought on board; espouses theory and practice; uses existing government extension staff thus reducing recruitment and staff costs.

On the down side, it was felt that allocated time (1 day) for training is not enough for the course context for training of EAs and CBFs... Farmers thought training by CBFs was long and hectic; training materials and manuals were not in local languages and was not adult learning oriented. Reporting and feedback on trainings by EAs was weak.

Exit Strategy C&Ps states that SG 2000 - Uganda intervenes in a Parish for 2 seasons spread over 2 years. This evaluation observed that there are no clear terms to guide the process. SG 2000 – Uganda CPE Theme has exited Wakiso District for example, and interventions are not easily traceable. Are 2 seasons enough to register impact and assure sustainability?

3.3. Relevance and Effectiveness of Farmer Learning Platforms

Sub-objectives of the Agricultural DSIP (1010/11-2014/15) is to ensure increased farmer access to relevant information, knowledge and technology through effective, efficient, sustainable and decentralized extension services coupled with increasing private sector involvement in line with government policy (MAAIF, 2010). SG 2000 - Uganda works within the government extension framework under an MOU. It was therefore important for this evaluation to find out the relevance and effectiveness of SG 2000 – Uganda crop extension approaches.

3.3.1. Understanding of Farmer Learning Platforms

District Coordinators, Extension Agents and Community Based Facilitators were trained on the concept of farmer learning platforms, i.e., WADs, TOPS and PTPs farmers. Over 90% of the respondents reported understanding the process of setting up an FLP. However, District Coordinators, EAs and CBFs could not

wholly specify the elements or treatments in an FLP; they basically understood an FLP to be a demonstration. This is evidenced by responses in Table 4 below. SG 2000 – Uganda has to put more effort in the training of EAs on FLP approaches.

Table 3: Responses on Elements of FLPs

Variable	Frequency		
	SG 2000 Coordinators	Extension Agents	Community Based Facilitators
Bunds		1	2
Different technology options	1	1	
Does not know	1	1	1
Farmer practice			1
Fertilizer		1	1
Full NARO		1	
General Farmers		1	
Use of chemicals		1	
Half NARO		1	1
Improved seeds		1	2
Lay out of inputs			1
Preparation of fields			1
PTP		1	
Site identification			1
TOP		2	
WAD		2	

Source: CPE Enhancement Evaluation 2012

Tables 5 and 6 present the knowledge of EAs and CBFs of WADs, TOPs and PTP farmers. Knowledge was gauged by the meaning and purpose of the 2 demonstration types and PTP farmers. Six (6) EAs were interviewed and a majority (5) knew the meaning of a TOP and 4 that a WAD but did not their purposes. Results further indicate that only 5 of the 12 CBFs interviewed clearly what a WAD is. CBFs could not spell out what a PTP farmer is; nor correctly state the purpose of PTP farmers.

Table 4: EAs Knowledge of TOPs, WAD and PTP Farmers

Variable	Response	Frequency
TOP stands for	Technology Option Plot	5
	Doesn't know	1
Purpose of TOP	Compare input levels in different plots	1
	Introduce farmers to 3 gardens with different plots	1
	The farmer takes a decision on what option from experience	1
	To learn the difference between yields	1
	Farmers compare benefits from the different input levels for 3 plots	1
	Expose farmers to options and influence on self-decision	1
WAD stands for	Women Assisted Demos	4
	Women Adoption Demonstration	1
	Doesn't know	1
Purpose of WAD	Introduce farmers to 2 gardens with different plots	1
	Same as TOP but those who can't afford full package	1
	With different resources, the farmer can yield more	1
	To learn the difference between yields	1

	Compare different technologies	1
PTP stands for	About adopters	2
	Not sure/Doesn't know/forgotten	3
Purpose of PTP	Demonstrate possible output	1
	Self-selection after seeing other farmers	1
	Not sure	1
	To find out if technology has been learned	1
	To make other farmers/community learn from copying other trained farmers	1

Source: CPE Enhancement Evaluation 2012

Table 5: CBFs Knowledge of TOPs, WAD and PTP FLPs

Variable	Response	Frequency
TOP stands for	Technology Option Plot	5
	A garden that has all inputs and different options to use	1
	Doesn't know	1
	Three plots	1
Purpose of TOP	Compare input levels in different plots	2
	Compare outputs from different input levels	2
	Three technologies	1
	Helps farmers assess the importance of fertilizers	1
WAD stands for	Women Assisted Demos	6
	Compare input levels	1
	Small gardens prepared by poor women	1
	Help women adopt technologies	1
Purpose of WAD	To enable women improve their yields	1
	To compare different input levels for women	1
	To tell the difference between old farmers' practice and new farming practice	1
	Determine from which plot to get high yields	1
	Doesn't know	1
PTP stands for	About adopters	
	Knowledge on modern technologies	1
	Not sure/forgotten	2
	Production test plot	1
	A person who saw a new technology and went back to try it out	1
Purpose of PTP	Demonstrate possible output	
	Enable farmers to adopt new technologies	3
	Asses farmers' adoption of technology	1
	Not sure	1
	Reminds farmers what they have learnt	1
	To make other farmers learn from copying other trained farmers	1

Source: CPE Enhancement Evaluation 2012

3.3.2. Learned Technologies and Practices

All the respondents learned at least one new skill, technology or practice from trainings. Lessons are stated in Table 7 below. Results indicate that the EAs mainly learned on line planting/spacing (41.4%), fertilizer use (24.1%) and timely planting (13.8%). PTP farmers learned line planting (14.8%), fertilizer use (14.8%) and proper seed rates (11.4%). TOPs host farmers learned line planting (13.1%), use of chemicals (12.8%) and fertilizer use (11.4%). WADs hosts learned line planting (14.8%), proper seed rates (12.3%) and timely weeding (12.3%). Other farmers in FLP groups learned fertilizer use (16.2%), timely planting (14.5%) and improved seed (11.8%).

Table 6: New Technologies Learned by Clients

	Percentage response				
Technologies/practices	**EAs**	**Farmers**	**PTP Farmers**	**TOP hosts**	**WAD hosts**
Fertilizer use	24.1	16.2	14.8	11.4	9.7
Crop rotation	0.0	4.0	5.9	4.6	4.5
Timely planting	13.8	14.5	9.8	10.6	7.6
Line planting/spacing	41.4	9.8	14.8	13.1	14.8
Proper seed rates recommendations	3.4	5.4	11.4	10.6	12.3
Improved seed	0.0	11.8	10.5	9.2	11.4
Timely weeding	3.4	11.1	7.9	10.1	12.3
Use of herbicides	3.4	5.1	4.8	7.0	6.5
Integrated pest management strategies	3.4	1.0	1.5	2.8	1.4
Use of chemicals for pests and diseases	3.4	9.8	10.0	12.8	10.5

Source: CPE Enhancement Evaluation 2012

3.3.3. SG 2000 – Uganda Crop Extension Approach and the National Priorities

One of the main challenges in the Ugandan agricultural sector in Uganda is low productivity. DSIP 2010/11 - 14/15 is designed to address such constraints by increasing agricultural production and productivity (MAAIF, 2010). SG 2000 - Uganda extension approaches are expected to fit national extension priorities. Results show that 88% of EAs responded that SG 2000 – Uganda crop extension approaches are in line with national priorities. They argued that one of key objectives of SG 2000 – Uganda is to increase crop productivity for food and income security for smallholder farmers.

3.3.4. Differences between SG 2000 – Uganda and National Extension Approaches

About 57% of respondents stated that there was not difference between SG 2000 - Uganda and national extension technologies. Reasons for minimal differences include livestock technologies in NAES. Similarities include use of farmer groups as entry points, training sessions that both theory and field practical based, and priority to farmers in selection of crop enterprise of interest although SG 2000 - Uganda provides a 'menu'.

3.4. Innovativeness of SG 2000 Approaches

Innovation is the process by which organizations master and implement design and production of new goods and services (Hall *et al*., 2004). In this case, goods and services are new SG 2000 – Uganda crop extension approaches, technologies and practices. Besides use of CBFs to pronounce the presence of SG2000 on the ground and spread coverage, other innovative means observed from this evaluation are briefly described below.

3.4.1. Planning with Partners

SG 2000 – Uganda organizes planning meetings to review and plan strategic activities at different levels in a participatory manner. Men, women and youth were well represented. However, targeting the poor within the different categories was a concern of some of the key informants. SG 2000 – Uganda District Coordinators play an important role in the planning process. Resultant plans are availed to the farmers. However, SG 2000 – Uganda information sharing mechanisms with farmers is not clear. Two modes appear to emerge: a) all inclusive - regardless of participation and b) exclusive – FLP farmers only. In terms of feedback, farmers receive information on improvable weaknesses to perform better in future in planning meetings, training sessions and as advice during farm visits to individual farmers.

3.4.2. Use of Extension Agents and Community Based Facilitators

SG 2000 - Uganda commenced activities in Uganda at a time when MAAIF was finalizing the restructuring of public extension into a devolved system whose implementation process was weakened by funding lapses. SG 2000 - Uganda motivated and used extension personnel experienced in participatory farmer development; an innovative approach. Use of CBFs is a very effective innovation because these are volunteer farmers who complement and reinforce the training efforts of SG 2000 – Uganda and other partners. This in a way has reduced SG 2000 - Uganda operational costs since the CBFs leave in the same community as farmers and help reach more farmers. CBFs also mobilize farmers for planned events and communication especially sustainability after SG 2000 – Uganda exit.

3.4.3. Self-supervision and Monitoring

This is undertaken by farmers. CBFs also undertake follow-up visits to their respective groups to supervise and monitor progress of activities. Key informants reported that this was a strategic approach to smooth implementation. Though SG 2000 – Uganda and Zonal CBFs follow-up on activities; key informants reported that participatory monitoring of impacts is rarely done. Empowering farmers and group leaders to self-monitor would sustain better practices and create higher impacts.

3.4.4. Field Days

Farmer field days are held bi-annually (for the first and second seasons) to reflect on and asses the implementation of technologies and practices. SG 2000 – Uganda District Coordinators take lead of field arrangements, while SG 2000 – Uganda CPE Theme assisted by other Themes facilitate and backstop field days. A prequalification exercise is undertaken during which a shortlist of farmers to participate is generated, and farmers to participate are notified in advance. Farmers are encouraged to concentrate on fields and practices in their neighborhoods. On these days, best practices or experiences weakness in SG 2000 – Uganda extension approaches are identified and shared including visits to several demonstration plots, stalls and farms. However, some farmers do not attend field days and planning meetings, thereby missing on important feedback. Nevertheless, SG 2000 – Uganda staff take note and make explicit reference to areas of weakness and suggest remedies during on-farm visits.

3.4.5. Farmer Exchange Visits

Exchange visits have not been conducted as widely or as frequently as the expected or as prescribed in CPE Theme concepts and procedures. Few exchange visits were noted by SG 2000 – Uganda District Coordinators in the Eastern region but not in Central. EAs stated that communities had not implemented interventions long enough to warrant meaningful exchange visits. In a few instances where exchange visits have been organized, only CBFs and one or two farmers participated in the visits due to budgetary constraints. Those who participated reported that exchange visits enhanced farmer-to-farmer learning and aided emulation of good performing farmers.

3.4.6. Management Style

SG 2000 – Uganda uses a hybrid style - individual and group management. In this approach, host farmers do day to day management of the demonstration plots under CBF oversight. WADs are managed by farmers' groups, with mostly female members. Harvest from the demonstration plot is kept by the host. This incentivizes the host to manage the plot better for higher yields which contributes to better learning outcomes and use technologies by other farmers in the neighborhood. This is differs from organizations' approach, e.g, CARITAS Uganda, where a group of 8 - 12 farmers jointly own and manage a demonstration plot; share labor and reduce management costs; making it cost-effective. In addition, input costs are shared; risk is spread; and community participation is not only galvanized but participatory monitoring of progress also takes place. Farmers who abandon their responsibilities lose out massively; especially on produce.

3.4 Cost of FLPs and Coverage

The cost of setting up a demonstration plot or conduct a training session as proxies for efficiency of CPE extension approachare detailed in Table 8 below. Practical training is organized in an intervention Parish. It is attended by at least 80 farmers: group and non-group members. The objective is to equip farmers with practical skills. An FLP consists of 1 TOP, 3 WADs, trainings and follow-up and on average costs about US$ 133. One (1) farmer would therefore cost about US$ 1.7 to access practical knowledge and skills related to the promoted technologies in a season.

In comparison, support for food security farmers under the NAADS programme is US$ 40 per farmer that covers procurement of agricultural inputs. Target number of farmers under NAADS depends on available resources based on District budgets. Average targets was 6 farm households per Parish (NAADS, 2010).Based on data from SG 2000 – Uganda CPE Theme, the cost of setting up a demonstration or conduct a training session is very low per farmer in terms of farmers reached and practical skills transferred to farmers.

Table 7: Average Cost of Demonstration Plots and Training Sessions

FLP	Average Cost (US$)
Training session	53
TOP	50
WAD	30

Source: CPE Enhancement Evaluation 2012

3.5. Use of SG 2000 – Uganda Promoted Technologies

Uptake of new technologies and practices is co-determined by institutional, economic and social-cultural factors. Results show all farmers are using SG 2000 – Uganda promoted technologies to different extents. Technologies in use include integrated pest management, proper seed rates and line planting/spacing. Details are presented in Table 9 below.

Table 8: Use of Technologies

Technologies	Frequency	Percentage
Fertilizer use	52	25.8
Crop rotation	54	27.2
Timely planting	75	37.5
Line planting/spacing	107	53.5
Proper seed rates recommendations	72	35.9
Improved seeds and new varieties	76	38.1
Timely weeding	71	35.5
Herbicide use	55	27.7
IPM strategies	95	47.6
Chemical use for pests and diseases	79	39.4
Improved cropping and land preparation methods to control major weeds like Striga	64	31.8

Source: CPE Enhancement Evaluation 2012

3.6. Farmer to Farmer Extension & Multiplier Effects

Multiplier effects manifest when TOPs, WADs and CVP host farmers; members of TOPs, WADs or CVPs farmer groups; PTP farmers (direct clients) teach other farmers (indirect clients), most likely in the neighborhoods. This happens via farmer to farmer extension or by indirect clients observing demonstrations or other farmers' plots. Multiplier effects are central to the FLP approach and are enshrined in the CPE Theme C&Ps.

This evaluation observed that the transfer of knowledge and skills from one farmer to another happened to some extent. CPE Theme crop extension approach aims to work with a manageable number of 4 host farmers - 1 TOP and 3 WADs in a given Parish. Each trained farmer is expected to transfer the acquired knowledge and skills on technologies to at least 20 farmer group members. Results indicate that the proportion of farmers that has received knowledge and skills from other farmers or the demonstration plots did not reach 50% of the target. Further, training and demonstrations directly reach average number of 6 and 14 farmers from WADs and TOPs, respectively (Table 10). In addition results indicated that on average 8 farmers learned from observing WADs and TOPs demonstration plots.

Table 9: Multiplier Effects

FLP	No. of farmers	
	Direct	Indirect
TOP	14	9
WAD	6	8
PTP Farmers	5	0

Source: SG 2000 – Uganda CPE Theme

The implication of these results is that the rate of diffusion did not depend on the intensity of reach by the CPE Theme but rather seems to have depended much on the willingness of transferor and transferee of technologies and skills. However, this does not mean that the approach of farmer to farmer technology transfer is not effective. The rate of transfer of other technologies seems to have

depended much on the type of technology and not on the mechanisms. The most transferred was line planting and fertilizers use, followed by timely planting and use of chemicals.

3.6.1. Impact on Crop Production

Results indicate an increase in productivity of almost all the SG 2000 promoted crops. SG 2000 - Uganda has contributed to increased productivity of client farmers. Except for cassava and Soya beans whose production have decreased by a 10% and 56% other crops have seen increased production. Beans, maize, rice and millet are on a steady increase in production after the SG 2000 – Uganda interventions and increases in cultivated land as shown in Table 11. Allocation of more land to some crops probably indicates an appreciation for promoted technologies.

Table 10: Impact on Crop Production and Productivity

Crop	Area (Ha)		Production (MT)		Productivity (MT/Ha)	
	Before	After	Before	After	Before	After
Beans	0.6	0.5	0.1	0.2	0.2	0.5
Maize	0.4	0.9	0.3	1.2	0.7	1.3
Sweet	0.8	1.0	1.3	1.9	1.6	1.9
Ground	0.3	0.5	0.1	0.3	0.4	0.6
Soybeans	0.8	0.4	0.3	0.1	0.4	0.3
Rice	0.1	0.4	0.2	1.0	2.0	2.5
Millet	0.4	0.4	0.2	0.3	0.4	0.8
Cassava	0.1	0.1	0.3	0.3	2.6	2.5

Source: SG 2000 – Uganda CPE Theme

Evaluation results indicate that productivity has increased compared to the period before SG 2000 – Uganda interventions though it was not possible to quantify the increases in this evaluation. This was reported by 96.2% of the interviewed farmers.

3.7. Factors that Influence Technology Use

3.7.1. Institutional Factors

Participatory Approaches used by SG 2000 – Uganda in identification and implementation of these enterprises have contributed to success achieved by the CPE Theme. This gave farmers freedom in the choice of enterprises with potential to meet their needs. However, participatory approaches have down-sides. SG 2000 - Uganda presents a menu of 4 - 5 priority crop enterprises from which farmers have to choose a preferred enterprise. Thus, though participatory selection and planning was a novel idea and greatly applauded by the EAs, CBFs and SG 2000 – Uganda District Coordinators, process happened a bit too fast and farmers did not have ample time to logically think through enterprises and benefits thereof. Doing selection on the spot; makes it rush and can have deleterious effects.

Support from CBFs and **Extension Staff -** after initial sensitization and training, some farmers reported effective guidance and regular backstopping by CBFs and EAs contributing to continued interest in SG 2000 – Uganda promoted technologies by farmers.

Demonstration Plots - in principle, SG 2000 – Uganda supports only a few host farmers and small-sized WADs, TOPs and CVP plots and PTP farmers. This affects adoption because visibility especially by PTP farmers who want to commercialize but cannot clearly see benefits except through extrapolation.

Further, respondents felt this was too restrictive; this need widened scope and increased size of plots so that a range of problems that might arise can be tackled adequately.

Exit and entry strategies- it is clear that there are no clearly defined strategies to guide entry and exit from an intervention areas. Specifically, it was observed that as much as farmers are informed of exit after 2 years, there is no clear basis to indicate sustainability once SG 2000 – Uganda exits. Consequently, farmers feel abandoned and are not motivated to continue using technologies. But this also brings about the question of time. Does SG 2000 - Uganda exit when farmers have learnt enough and are able to take up the technologies?

3.7.2. Economic Factors

Timely delivery of Inputs - virtually in all Districts visited, inputs for demonstration were delivered on time by SG 2000 - Uganda. These inputs included improved seeds, fertilizers, herbicides and pesticides, etc. This was a major catalyst for uptake given the fact that host farmers had accessed the inputs on time at the start of the season; and is a good practice because timely planting was achieved and farmers picked this lesson.

Flow of inputs from SG 2000 – Uganda to farmers faced some challenges. In Wakiso District, some host farmers especially for WADs, neither received same amounts of inputs nor at the same time. This delay caused FLP group farmers and others to fail to plant and follow the cropping calendar in a timely manner. Evaluators feel that much as SG 2000 – Uganda delivers inputs on time, host farmers should directly access inputs from SG 2000 - Uganda.

Expensive and Costly Technologies - adoption is an investment decision. This decision represents a shift in farmers' investment options; adoption depends on cost of technologies and farmers' purchasing power (Caswell *et al*, 2001). Cheaper and affordable technologies are likely to be adopted more easily and quickly unlike those that require large expenditure outlays. Farmers in evaluation Districts did not use some technologies especially fertilizers because of high costs and un-affordability.

3.7.3. Social Cultural factors

Attitude and Perception - this evaluation found that the attitude and perceptions of farmers towards certain technologies is a key use factor; it is both a pull and push factor. Such forces are related to earlier experiences with the technologies and approaches used to introduce technologies and impressions on performance (Adesiina and Baidu-Forson, 1995 and Baidu-Forson, 1999).

Education - creates a favorable mental attitude for the acceptance of new practices especially of information- and management-intensive practices (Caswell *et al*., 2001). Technology complexity has a negative effect on adoption; however, education reduces perceived complexity in a technology; increasing a likelihood of adoption (Rogers, 1983). This evaluation found that education is significantly related to understanding of the SG 2000 activities; more educated farmers are better placed to improve productivity. This is an opportunity for farmer-to-farmer extension.

Commitment and Transparency – this varied across host farmers, CBFs and EAs during the implementation period. The key issues were sense of belonging and ownership of the demonstration plots that is created through involvement in planning, early implementation, and rapport between the SG 2000 – Uganda staff and farmers, CBFs, EAs and Local Councils. Significantly, farmers attributed this on capacities of CBFs and EAs - transparency and accountability in the distribution and use of inputs. Commitment is two-way.

During closing stages of SG 2000 – Uganda activities, uncertainty creeps in about the sustainability, this was in all Districts. This led to wavering in commitment to activities by farmers. Key informants indicated that farmers were not adequately prepared to link up with other potential agencies that could support

them to sustain the activities. All said and done, SG 2000 – Uganda needs clear entry and exit strategy and proper communication of disengagement.

Externalities - there are factors that influence the level of technology uptake and adoption such weather and its effect on demonstration plots, seed quality and yields from demonstration plots.

3.8. Sustainability of SG 2000 – Uganda Crop Extension Approaches

Majority (61%) of key informants - District Coordinators, Extension Agents and Community Based Facilitators felt that the government has the means and will to carry on with SG 2000 crop extension approaches. However, perceptions varied with level and degree of operation in the SG 2000 – Uganda extension chain. CBFs operate in Parishes, EAs at Sub-counties and SG 2000 – Uganda District Coordinators at the Districts.

An interesting scenario emerges here. This evaluation suggests that CBFs should be linked and integrated into government extension systems rather than be siloed in Parishes or Sub-counties. Recognition of CBFs is priority and paramount for sustainability because farmer-extension interactions hinge on CBFs.

Continuity SG 2000 – Uganda Crop Extension Approaches by the Government sustainability mechanisms in all the Districts have not been well thought out and are not very clear. Involvement of other development players is not on board. However, some measures are in the pipeline in some Districts especially to solve problems in the interim; and if successful could ensure some degree of sustainability. Linking farmers to stockists and agrodealers for access to necessary agricultural inputs is one of the measures.

In a recent CPE Theme Review Workshop (2012) with all the relevant stakeholders and identified several areas for improvement were identified. These include:

- Continued motivation of EAs and CBFs through financial bonuses and other incentives like bicycles to ease transport;
- SG 2000 – Uganda District Coordination form the convergence of activities of all SG 2000 – Uganda Themes and is good for sustainability. However, SG 2000 – Uganda District Coordinators mostly work on CPE Theme activities. SG 2000 – Uganda would be pivotal in coordinating activity if SG 2000 – Uganda exited but would need clarity and specificity of roles and responsibilities. A starting point is expanding mandate of SG 2000 – Uganda District Coordinators to significantly engage in other Themes' activities beyond those of the CPE Theme. In SG 2000 – Uganda exited districts, some farmers continued SG 2000 – Uganda with interventions more out of own initiative rather than government support. . Discussions with key informants revealed that since farmers have practiced promoted technologies, they are able to access inputs on credit from the OSCAs such as in Zirobwe District and could be a lesson for government take-over;
- NAADS initially aimed at reaching many farmers over a short period. However, bureaucracy and long procedures have not allowed effective and efficient delivery of services to farmers. Government has no structures to monitor and evaluate interventions at the grass roots; this may impede farmers' performance. Unless, the government intensifies farmer visits, supervision and monitoring visits, all efforts by SG 2000 – Uganda will wither on exit; and
- Government aims to intensify training of farmers, and NAADS acknowledges relevance of CBFs. However, CBFs have not yet been empowered or facilitated with new innovations, materials and resources. Extension staffs need more training on SG 2000 – Uganda crop extension approaches beyond technical aspects and especially on mixed enterprises – crops and livestock and on value chains.

3.9. Agricultural Extension Support Organizations

In the areas where SG 2000 – Uganda has operated or operates, there are other organizations that support agricultural extension. This was confirmed by 94% of key informants. Details on the organizations and what they do are shown in Table 12. Most of these organizations' approaches have some similarities with those of SG 2000 – Uganda. Which approaches are better, is hard to say. All approaches stem from previous pilots/experiences, farmer needs/problems and in some cases donor conditionalities

Table 11: Other organizations' Crop Extension Approaches

Organization	Extension Approach
Farm Concern International	Existing CBFs are recruited to reach out to the farmers
Voluntary Action for Development	Uses community resource persons who coordinate and train farmers on a wide range of themes
Agriculture for Integrated Rural Development (AFIRD)	• Uses community resource persons who coordinate and train farmers on a wide range of themes. • However, often staff train farmers directly • Promote and train farmers on organic farming
Community Development Project (CDP)	Engages resource persons to train farmers who are organized in groups
Kulika	• Selects only interested farmers • Trains farmers have attained a certain level of education. These later get back to the communities to train other farmers
Plan International	• Target beneficiaries are children. • Hire extension agents to train farmers mainly on livestock management. • Mixed farming is encouraged, though • For continuity, lead farmers are trained to train other farmers
VEDCO	Community based persons

Source: SG 2000 – Uganda CPE Theme

4. Lessons and Good Practices

A number of lessons and good practices have come out of SG 2000 – Uganda interventions. These include:

- **Farmer selection**- SG2000-U's approach of participatory selection of host farmers and technologies encourages ownership which eases implementation of the different interventions;
- **Training of CBFs to train the farmers** – given the fact that the national extension system is constrained with an extension agent: farmer ratio of about 1:2500; use of the CBFs to train farmers is a plus for SG 2000 - Uganda. CBFs approach has ensured more coverage and reach of farmers as well as reductions on operational costs;
- **Establishment of WADS** - WADs specifically target women farmers; this encourages more participation from women. Since Tops also target both women and men; FLPs are reaching more women than men. However, the youth remain out of SG 2000 - Uganda radar;
- **Timing of trainings** – trainings conducted immediately after timely delivery and distribution of inputs improves technology uptake;

- **Criteria for area selection - s**election of new intervention areas in a district is left to the District authorities and this is likely to have biases. This is further exacerbated by exclusion of NAES in choice of new SG 2000 – Uganda Districts.
- **Input distribution channels** – is a down-side. Inputs are centrally procured by SG 2000 – Uganda and snake slowly through SG 2000 – Uganda District Coordinators to host farmers through CBFs. Consequently, in some cases there are delays, inadequate quantities, compromised quality and target farmers are left out;
- **Lack of exit and entry strategies** with clear criteria contributes highly to uncertainty and impediment of adoption and sustainability;
- **Limited resources** and budgetary constraints lead to reduced coverage, reach, participation and technologies up-take; including small-size of demonstration plots;
- **Use of District extension personnel**: SG 2000 – Uganda District Coordinators and EAs for supervision is a good idea but there are challenges. Competing interests with organizations such as NAADS implies reduced time allocated to SG 2000 – Uganda activities. This is essential. There is an assumption of commitment of by SG 2000 – Uganda Districts which is not always a given; and
- **High Cost of inputs** especially fertilizers limit use of SG 2000 – Uganda promoted technologies.

5. Conclusion

This evaluation aimed at assessing SG 2000 – Uganda crop extension approaches, highlighting what works, what does not and what can be improved to achieve CPE Theme objectives and enhance approaches. The evaluation period was 2009-12 using both purposive and random sampling techniques to collect data from SG 2000 - Uganda farmers, extension agents and CBFs as well as key informants from 5 Districts of Luwero, Wakiso, Mukono, Jinja and Tororo. Highlights of results include:

- SG 2000 - Uganda is working in line with national priorities by aligning its interventions to the Agricultural DSIP. SG 2000 – Uganda FLP extension approaches share several features with national (NAADS) extension as both use farmer groups as entry points, training sessions are sessions are both theory and practical based.
- Farmers select priority crop enterprises from an SG 2000 – Uganda menu. Following Ademola (2001), both organizations employ a problem solving approach that entails farmers expressing needs and preferences and being involved in planning and implementation;
- FLPs-trainings and demonstrations are relevant and to some level, effective approaches in disseminating agricultural extension to farmers. This was evidenced by reported learning of new technologies or practices by farmers, CBFs and EAs;
- There is evidence of use and uptake of the promoted technologies though variable across technologies and practices. Most popular ones adopted include integrated pest management, proper seed rates and line planting/spacing;

- Factors which influence adoption of promoted technology included effective support from EAs, timely delivery of inputs, access and cost of inputs, farmers' attitude and perception, education level as well as commitment and transparency of the host farmers, CBFs and EAs;
- Sustainability of SG 2000 – Uganda crop extension approaches is still a concern. Results show that sustainability is uncertain and rests more on hope. NAADS has taken up the approach in some areas where SG 2000 - Uganda has exited; and
- The Government and SG 2000 – Uganda have put some initiatives such as 1) creating farmer linkages to agricultural input suppliers, 2) continued motivation of EAs, both financial and in kind incentives such as bicycles to ease and increase reach, and 3) government has proposed intensification of training of farmers under the new ATAAS Project.

6. Recommendations

This evaluation made the following recommendations:

- Participatory planning approaches should be given enough time and resources to ensure all target farmers and group members participate in all the stages. Measures should also be taken to ensure that men do not dominate the process and that the outcome reflects the needs of the women and the poor;
- Management approaches that foster sustained commitment should be employed. This entails emphasis away from individually hosted and managed TOPs and WADs to group management and ultimately to community managed demonstration plots under community set guidelines. This is particularly important for rapid multiplication of seed for use by more farmers and for wider coverage;
- It is very clear that SG 2000 – Uganda lacks clear entry and exit strategies which are needed to take care of deleterious impacts, increase use and adoption of technologies and practices and increase chances of sustainability. As such, these should be clearly documented and shared.
- Adult education should be organized for non-literate farmers and adult learning skills for CBFs and EAs to enhance their capacity to transfer information and knowledge to farmers; and increase use and uptake of technologies and practices;

7. References

AFAAS (2012). The Africa Forum for Agricultural Advisory Services: Strategic Plan(2012-16)

Axinn, G.H. (1988). The guide on alternative extension approaches: Prepared under the guidance of and sponsorship of the Agricultural Education and Extension Services (ESHE) Human Resources Institutions and Agrarian Reforms Division. Rome: FAO.

CAADP (2010). News: Uganda signs CAADP Compact http://www.caadp.net/news/?p=639 as downloaded on 3rd October 2012

Caswell, M., K. Fuglie., C. Ingram., S. Jans and C. Kascak (2001). Adoption of Agricultural production practices: Lessons learned from the US. Department of Agriculture area studies project. Washington DC. US Department of Agriculture. Resource Economics Division, Economic Research service, Agriculture Economic Report No. 792. January 2001.

Directorate of Extension Services (nd): Agricultural Extension Approaches being implemented in Ghana

FARA (2006). Framework for Africa Agricultural Productivity

GGRAS (2012). Global Forum Rural Advisory Services Annual Report 2011 http://www.g-fras.org/en/knowledge/gfras-publications/file/72-gfras-annual-report-2011 as downloaded on 3rd October 2012

Hall. Andy, Mytelka. L, Oyeyeinka. B. 2004. The Agricultural Innovations System diagnostic assessment methodology paper: United Nations University, Institute for New Technologies (UNU-INTECH).

IFAD. 2012. Enabling Poor Rural People to overcome Poverty. International Fund for Agricultural Development, Rome, Italy

Isaac M. B. Shinyekwa (2011) The Implementation of the Comprehensive Agricultural Development Program in East Africa, the Case of Small Scale Farmer' Participation in Uganda: A Desk Study for Eastern and Southern Africa Small Scale Farmers Forum (ESAFF).

Luzobe B. N. (2011). The Genesis and Evolution of the One Stop Centre Concept and Approach in Uganda (2001-2010) :Sasakawa Global 2000

MAAIF (2010a). Agriculture Sector Development Strategy and Investment Plan 2010/11- 2014-15

MAAIF (2010b). Agricultural Technology and Agribusiness Advisory Services Project (ATAAS)

MAAIF (2010c). NAADS Implementation Guidelines : Farmer Selection And Support for Progression From Subsistence To Commercialization. *http://www.drt-ug.org/book_files/NAADS_PHASEII_Implementation Guidelines.pdf as at 3rd October 2012*

MAAIF (Draft). The draft Agricultural policy

MAAIF and MFPED (1997). Plan For Modernisation of Agriculture (PMA). Document for the Government of Uganda

NAADS (2001). PRE-APPRAISAL -Working Papers

NAADS website: http://www.naads.or.ug/about-naads/naads-phase-ii/vision-mission-and-strategic-elements/ as at 8th October 2012

NARO-NAADS(2010). The NARO-NAADS Partnership Framework

SAA (2011). T1 – Crop enhancement, Concepts and Procedures

SAA (2008) The SAA Extension Project Uganda Action Plan

SAA (2011): Strategic Plan 2012-2016

SAA (2012). Sasakawa Africa Association: Strategic Plan

Sasakawa Africa Association. (2006). One Stop Centre Association: Implementation Manual.

Sasakawa global 2000 (2008b). Profiling of One Stop Centre Associations (OSCAs) in Uganda in Terms of Functional Attributes and Economic Viability.

Sasakawa Global 2000 (2009). Sasakawa Global 2000 –SAA Extension Program in Uganda: 2009 Annual Report.

Sasakawa Global 2000. (2005a). Mid-Term Evaluation of a One-Stop Centre Model as a Tool for Empowering Farmers for Food and Income Security.

Semana, A. R. 2008. "Agricultural Extension Services at Crossroads: Present Dilemma and Possible Solutions for Future in Uganda." Mimeo, Department of Agricultural Extension/Education, Makerere University, Kampala, Uganda.

Swanson, B.E. (2008) Global Review of Good Agricultural Extension and Advisory Services Practices. Rome: FAO.

UBOS (2012): 2012 Statistical abstract

UFAAS (2011). The Africa Forum for Agricultural Advisory Services: Strategic Plan(2011-16)

Uganda (2010).The National Development Plan

Waller, B.E., C.W. Hoy., J. L Henderson., B. Stinner and C. Welty (1998). "Matching Innovations with Potential Users: A Case Study of Potato IPM practices." Agriculture, Ecosystems and Environment. 70(1998):203-215.