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Evaluation of the Experiences of Small-scale Producers with Multiple Public-Private Partnerships in Produce Production and Marketing Organizations in Kenya

Prepared by Florence Macia, PAFLOR Exporters International

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MEAS Modernizing Extension and Advisory Services

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EVALUATION OF THE EXPERIENCES OF SMALL-SCALE PRODUCERS WITH MULTIPLE PUBLIC-PRIVATE PARTNERSHIPS IN PRODUCE PRODUCTION AND MARKETING ORGANIZATIONS IN KENYA

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ACRONYMS

ABPC	Agriculture-based private companies
AIDs	Acquired immunodeficiency syndrome
ATC	Agricultural Training Centers
CBOs	Community-based organizations
CSW	Community service work
CV	Commercial Villages
EAFF	Eastern Africa Farmers Federation
EAS	Extension and Advisory Services
EDS	Enterprise-driven service
EPP	Extension providers' programs
ESP	Extension services providers
F2F	Face-to-face
FBOs	Faith-based organizations
FGDs	Focus group discussions
FPEAK	Fresh Produce Exporters Association of Kenya
GLOBALGAP	Global good agricultural practices
HCDA	Horticultural Crops Development Authority
HIV	Human immunodeficiency virus
IFAP	International Federation of Agricultural Producers
ILC	International Land Coalition
KAPAP	Kenya Agricultural Productivity and Agribusiness Project
KARI	Kenya Agricultural Research Institute
KENFAP	Kenya National Federation of Agricultural Producers
Kenya-GAP	Kenya Good Agricultural Practices
KEPSA	Kenya Private Sector Alliance
MOA	Ministry of Agriculture
NAFES	National Agricultural and Forestry Extension Service
NASEP	National Agricultural Sector Extension Policy
NGOs	Non-governmental organizations
PCs	Plant clinics
PMO	Produce marketing organization
PPMO	Produce production and marketing organization
SRA	Strategy for Revitalizing Agriculture
SWOT	Strengths, weaknesses, opportunities and threats
USAID	United States Agency for International Development
WRMA	Water Resource Management Authority
WRUA	Water Resource Users Association

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EXECUTIVE SUMMARY

Extension and advisory services (EAS) by private and public extension services providers (ESPs) can help improve food security, income generation, poverty alleviation and development. These services particularly benefit smallholder subsistence farmers.

This study explores EAS approaches employed by the private and public sectors and their impacts on sustainable agricultural development among smallholders.

The survey covered five out of the eight provinces in Kenya. The smallholder farmers and ESPs represented 86 percent and 90 percent, respectively, of the target respondents. The study covered farmers who had been involved in production and marketing for over 10 years and ESPs who had worked with smallholder farmers for more than two years. The National Agricultural Sector Extension Policy (NASEP) set the guidelines for the survey.

The study found that smallholder subsistence farmers are highly dependent on a wide range of extension advisory services (EAS). Nevertheless, there are, as yet, no national legal and policy frameworks around EAS concerning, for example, commercial farming, structured and harmonized extension approaches and duplication of services. It is highly recommended that the government develop and implement national policies for EAS.

The study further recommends the development of standard ESP approaches for dealing with pests, diseases and safe use requirements because these are the most critical issues influencing gross productivity and profit margins for smallholders. The project could start by targeting a number of produce production and marketing organizations established by smallholder farmers and eventually be up-scaled to cover local market days. On-farm demonstrations have been conducted over the years, but “plant clinics” could be very attractive to smallholder farmers and benefit a larger percentage of the population.

INTRODUCTION

The provision of extension services is a priority function of the agricultural sector and a major contributor to sustainable agricultural development (Kibett et al., 2005). Two conditions are required for a country to be worldwide competitive: poverty alleviation and food security. Extension services provide for the transfer and management of technology and knowledge to ensure that those conditions can be met. In Kenya, however, extension services have not been guided by a viable policy and hence have often been somewhat haphazard (Milu and Jayne, 2006).

In 2012, Kenya established the National Agricultural Sector Extension Policy (NASEP) in an effort to enhance the management and organization of agricultural extension services. The policy was intended to guide both public and private sector extension providers and beneficiaries along the value chain (NASEP, 2012). Though the effectiveness of the new policy has not yet been evaluated, it is understood that longstanding challenges still face the extension services -- adequacy, timeliness and relevance (Rivera and Schram, 1987).

Most of Kenya's population lives in rural areas, where agriculture is the economic mainstay. In high potential areas, intensive agriculture calls for enhanced extension services to optimize the opportunities and strengthen productivity of smallholder farmers. In these areas, production and marketing are mainly done by small-scale producers who are constrained by land fragmentation, low productivity and low volumes, which together limit profits (National Land Policy, 2006). To improve their livelihoods, smallholder farmers need technical expertise that will enable them to transform their agricultural enterprises into sustainable businesses.

The increasing number of small-scale producers in areas with few ESPs has led to the establishment of produce production and marketing organizations (PPMOs) in agricultural communities. The PPMOs envision viable farming businesses that will lead to sustainable development. This has resulted in a demand-driven sourcing of ESPs for technical services. Because of the limited human, infrastructural and financial resources available to most individual ESPs, multiple ESPs have been called on to provide extension services to the PPMOs.

Produce Production and Marketing Organizations

The term "PPMO" was coined by smallholder farmers. Working through the PPMOs, the farmers demand information from a range of nearby ESPs. The information is pretested by volunteers and, if effective, is then passed to the full group for adoption.

A PPMO can involve a single or multiple groups of people. Each individual group is made up of 20 to 50 members who specialize in various agricultural enterprises. The goal of the PPMO is to add value to the products of its members to maximize the availability of goods – and thus income – throughout the year. This is accomplished through well-coordinated production based on a split-programmed method that ensures high quality output all year round. Type, quality and quantity of goods are produced in accordance with seasonal demand projections. In addition, the group members in PPMOs are legally bound by the organization's constitution, fostering adherence to all the procedures in production and marketing of any given product. This goal is yet to be realized by most smallholder farmers, however.

The PPMO concept arose after the establishment of Commercial Villages (CV), an umbrella group whose aim is to develop sustainable village markets using state-of-the-art technology to preserve the quality and quantity of produce. These CVs are implemented by the Ministry of Agriculture with the support of the International Fund for Agriculture Development (IFAD). The CV project is still under development, and none of the markets have yet been completed. At the same time, the Horticultural Crops Development Authority (HCDA) has promoted the establishment of single-product-based produce marketing organizations (PMOs) that target both export and local markets. The PMOs are made up of many small groups that come together and are registered legally as associations.

Current Extension Approaches

Currently, the approaches used by various ESPs are tailored to meet the needs of consumers or smallholder farmers. These approaches include field visits; tours or excursions; computerized, telephone or office consultations; on-farm demonstrations; shows and exhibitions; films; mobile training units; courses; and plant clinics.

Extension Services Beneficiaries

Every size of farming operation in Kenya (small-, medium- and large-scale) requires extension services to enhance productivity and livelihoods. The benefits of EAS to smallholder farmers include the more effective and efficient use of inputs, improved quality of outputs, timeliness in conducting various activities, collaboration with other stakeholders, enhanced technology adoption, and economies of scale in purchasing and marketing. Small-scale producers in Kenya's agricultural sector are the prime consumers of no-cost extension services, which result in increased productivity per unit of area at a reduced cost. The cost of hiring technical expertise is beyond the means of most smallholders. Medium- and large-scale producers can afford to pay for more advanced extension services, resulting in higher employment and a growth in profits for these farmers. Meanwhile, smallholder farmers lag further and further behind.

Pluralistic Extension Services

A pluralistic system of extension services has been embraced in Kenya (Nambiro et al., 2005). This includes the Ministry of Agriculture (MOA) as the dominant ESP, with agriculture-based private companies (ABPC), non-governmental organizations (NGOs), community-based organizations (CBOs) and faith-based organizations (FBOs) also playing a role. The ministry is well-structured and its staff knowledgeable, and its extension services reach all parts of the country, but its effectiveness is hampered by inadequate infrastructure and human and financial resources. The other organizations concentrate their attention on particular target areas and products. Despite the desire for the involvement of multiple players in extension services, a lack of strong collaborative links between the government and the other ESPs is likely having a negative impact on the producers.

Recognizing this, the 2012 national extension policy called for greater collaboration with the private sector on extension. Now the challenge for the government is to reduce costs and duplication of efforts while improving coordination in the pluralistic extension services and increasing their effectiveness and efficiency.

Fresh Produce Exporters Association of Kenya

The Fresh Produce Exporters Association of Kenya (FPEAK) was established in 1975 as an extension services provider association. Today, FPEAK is Kenya's premier trade association, representing growers, exporters and service providers in the horticulture industry. FPEAK supports growers and exporters by providing technical and marketing information and training. It serves as an information center and runs active lobbying and advocacy programs to enhance the produce sector's competiveness. A key activity was the development and implementation of the Kenya Good Agricultural Practices (Kenya-GAP) protocol, which is tied to the GLOBALG.A.P.[1] FPEAK is engaged in training programs to help smallholder farmers comply with the protocol. Linking these farmers to the export companies that are FPEAK members is another way that the association benefits smallholder producers of fruits, vegetables and flowers.

Kenya National Federation of Agricultural Producers

The Kenya National Federation of Agricultural Producers (KENFAP) was established in the late 1990s as an umbrella body of farmers' organizations. Today, it represents the interests of 1.8 million farm families. KENFAP is a member of the Kenya Private Sector Alliance (KEPSA), the Eastern Africa Farmers Federation (EAFF), the International Federation of Agricultural Producers (IFAP) and the International Land Coalition (ILC). Its purpose is to amplify the voices of Kenyan farmers through strategic partnerships and to empower them to make informed agricultural production choices. The organization is supposed to provide or support extension services for all agricultural enterprises in Kenya, though it has narrowed its EAS to various locations around the country.

Importance of Extension and Advisory Services

According to the National Agricultural and Forestry Extension Service (NAFES) (2005) and NASEP (2012), EAS is most important to smallholder farmers. These farmers should therefore be the primary beneficiaries of EAS. The success of EAS relates to the effectiveness of the communication of information by the ESP to the farmers and from farmer to farmer. The importance and value of EAS in developing countries cannot be underestimated because they rely heavily on agriculture as the backbone of their development. To realize sustainable development in social, economic and environmental sectors, farmers must be educated. The information that is transferred along production and marketing value chains through extension must be high quality, adequate, relevant and timely. It should aim to empower farmers by providing them with knowledge, technologies, innovations and skills. Therefore, EAS needs to draw on an integrated, complete information system involving agricultural research, agricultural education and information-providing businesses.

EAS benefits farmers in many ways:

- EAS is the critical change agent for transforming subsistence farming to modern and commercial agriculture that will ensure year-round food security and nutrition.

[1] GLOBALG.A.P. is a non-governmental organization that sets voluntary standards for the certification of agricultural products around the world.

- Applying scientific findings and best practices to daily farming and homemaking routines can raise the standard of living of farming families and communities.
- EAS improves the effectiveness and efficiency of agricultural production and marketing logistics by promoting adoption of state-of-the-art technologies and innovations.
- EAS helps to link farmers to one another and to other stakeholders along the value chain, creating relationships that facilitate problem solving.
- ESPs provide advisory services in a way that is appropriate to the learning capacities of most semi-literate farmers in developing countries.
- Farmers are able to make informed opinions about what kinds of technologies to adopt or not to adopt. Using tools provided by ESPs, the farmers are better able to analyze opportunities and challenges and to determine profitable strategies for their farming enterprises.

The ESPs mostly provide their services for free or at negligible cost to farm families on their farms, in their homes or in group venues. Large- and medium-scale producers may be able to hire technical staff members to manage their farms on a daily basis, but the smallholders cannot afford to do so and have to rely more on ESPs. The ESPs' assessment of farmers' needs is based on their interaction with these smallholder farmers.

Validation of Extension Services in Kenya

A general consensus exists that extension services, if properly designed and implemented, will improve agricultural productivity (Romani, 2003). The importance of EAS in the fight against poverty has been underscored in Kenya's Strategy for Revitalizing Agriculture (SRA) (2004:2015), which identified the declining effectiveness of the public extension service as one of the factors impeding agricultural growth in Kenya. Yet the current number of extension service providers is inadequate to meet the needs of Kenyan farmers. Consequently, high-potential regions and farmers who produce for the local market have not benefited equally from EAS. In addition, the lack of coordinated approaches by multiple ESPs operating in the same areas has led to duplicated efforts and has hindered effective and efficient EAS dissemination to farmers.

Improving agricultural productivity, profitability and sustainability in the developing world depends on the ability of rural people to change and innovate in their use of technologies, management systems and environmental resources. The capacity to innovate depends on access to knowledge and information services. International development agencies have provided several billions of dollars for programs to support and upgrade extension services in developing countries. Yet development practitioners have generally concluded that the performance of extension services in developing countries has been disappointing (Rivera and Sulaiman, 2009). The needs of farmers and rural communities have changed over time and, consequently, in recent years it has become clear that traditional public agricultural extension cannot meet all of their challenges. A main cause of the inadequate performance of public extension is the ineffective incentive structures for public extension agents. Moreover, the lack of information and feedback on the needs and priorities of farmers hinders the design of relevant and effective extension programs (Anderson and Feder, 2007).

Private sector extension where individual farmers contract the services of EAS have been of limited relevance in Kenya. The recent interest of private actors in providing agricultural extension has raised questions about their strengths and weaknesses. FPEAK, KENFAP and other private ESPs, for example, use various modern extension service approaches to reach their organizational goals, with varying degrees of success.

PURPOSE OF THE STUDY AND METHODOLOGY USED

The overall purpose of the study was to explore the extension and advisory services approaches employed by several private and public entities in Kenya and their influence on sustainable agricultural development among smallholder farmers.

The specific objectives of the study were to:

1. Determine the degree of ESP involvement with smallholders and the various approaches to EAS in Kenya.
2. Identify and, as needed, suggest ways to improve the conditions under which such approaches can be implemented.
3. Determine the effectiveness of EAS approaches in improving on-farm production and postproduction processes.
4. Analyze the strengths, weaknesses, opportunities and threats (SWOT) of the EAS approaches.

The study targeted small-scale agricultural producers located in these five zones of Kenya:

- **Coastal -- Zone 1**: Agribusiness for chilies and agroforestry for smallholders program -- Mombasa County.
- **Eastern -- Zone 2**: Establishing a farmers' business group for mango fruits and a local food crops program -- Machakos County.
- **Central -- Zone 3**: Developing agro-enterprises for potato production and an agro-processing unit for premium market outlets nationally -- Nyandarua County.
- **Rift Valley -- Zone 4**: Venturing into potato production and developing a group agro-processing unit for untapped local markets -- Uasin Gishu County.
- **Nyanza -- Zone 5**: The diversification and utilization of fruits (exotic and local); developing a value addition unit and a poultry processing activity targeting regional markets in eastern Africa -- Kisumu County.

The study utilized a three-pronged approach:

- **Desk research** to review past survey reports and other relevant documents.
- **Qualitative design** using **focus group discussions (FGDs).** The FGDs targeted stakeholders from both the private and public sectors. Smallholder farmers made up the majority of the interviewees. The private sector included KENFAP and FPEAK, among others. Public institutions involved were mainly the Ministry of Agriculture, the Horticultural Crops Development Authority (HCDA) and the Kenya Agricultural Research Institute (KARI).
- **Quantitative design** employing **face-to-face** interviews with smallholder farmers and private and public ESPs from the five target zones.

The goal for the FGD was to have a total of 150 participants; for the face-to-face interviews, at least 50.

Focus group discussions: As documented in Table 1, the FGD achieved 86 percent of the target sample size. In Machakos County, the turnout was quite impressive (107 percent) because more people showed up than had been expected. This was due to the fact that the smallholder farmers had vast experience in group production and marketing and were a highly cohesive and active group. Their monthly meeting coincided with our survey, so we allowed a larger number of farmers to participate. The other regions recorded an average of 81 percent participation, which was an adequate turnout that gave assurance of reliable and valid data.

Table 1. Sample size for focus group discussions.

Targeted zone	Target sample size	Achieved sample size	Percent turnout
Mombasa	30	24	80
Machakos	30	32	107
Nyandarua	30	24	80
Uasin Gishu	30	25	83
Kisumu	30	24	80
Total	**150**	**129**	**86**

Face–to-face (F2F) interviews: Overall, 88 percent of the targeted interviewees turned out for the face-to-face activity. Machakos recorded a 100 percent turnout; all the other regions had an average of 85 percent of the targeted participation. The information is summarized in Table 2.

Table 2. Sample size for face-to-face interviews.

Targeted zone	Target sample	Achieved sample	Percentage turnout
Mombasa	10	9	90
Machakos	10	10	100
Nyandarua	10	10	90
Uasin Gishu	10	9	90
Kisumu	10	8	80
Total	**50**	**44**	**88**

Selection of Survey Participants

The ESPs were informed of the intended survey activities in advance and were actively involved in the FGDs and F2F activities. The ESPs selected the target locations and the number of participants for each activity.

Capacity Building for Research Assistants

A number of research assistants were trained prior to data collection. The training mainly covered five key areas: instrument administration, interview techniques, procedures and skills, importance of the survey and research process. The training, which took two days, focused on several objectives:

- Familiarizing research assistants with the survey questions and the flow of the questionnaire.
- Ensuring a clear understanding of the survey questions.
- Exploring diversified strategies that could be used by the research assistants in ensuring that the respondents understand the questions and give relevant and satisfactory answers.
- Communicating the relevance of questions to the general objectives of the survey.
- Explaining how to record information.
- Ensuring integrity in the field.

Limitations of the Survey

During the survey, several challenges were commonly encountered in all the participating regions. Many of the ESPs were inactive and could not be reached at the time of the survey. In addition, some of the smallholder farmers and ESPs either declined to participate in the survey or dropped out during data collection, citing lack of education/time/busy schedule. Subsequent follow-ups with these actors were not successful. As a result, the initial target sample of 30 participants for each agro-ecological zone could not be achieved. However, at least 80 percent of the targeted sample was achieved in each zone.

SURVEY RESULTS AND FINDINGS

The surveys looked at a number of key issues: the profile of the ESPs, smallholder farmers' characterization of the ESPs, preferred approaches, challenges faced in EAS approaches and exploration of possible remedies, and a SWOT analysis of EAS based on existing knowledge of farmers along the value chain. Further, a baseline survey sought to establish the roles of target organizations and farmers in the provision of EAS in Kenya.

Profiles of Extension Services Providers

All of the survey areas had ESPs from both the private and public sectors. In most cases, strong partnerships existed between the various organizations targeting smallholder farmers. The organizations offering EAS in the target areas include the Ministry of Agriculture, the Horticultural Crops Development Authority, the Fresh Produce Association of Kenya, the Kenya Agricultural Research Institute, the Kenya Federation of Agricultural Producers, agro-chemical companies, exporters and PPMOs. Table 3 outlines the support provided by the ESPs to farmers in the target zones.

Table 3. Profiles of extension services providers.

	Role in agricultural sector development and provision of EAS	Support services
AGROVETS (OSHO, Bayer, Syngenta etc.)	Provide seeds, fertilizers and pesticides	Disseminate knowledge on safe use of agro-chemicals
Exporters	Offer EAS related to production and marketing logistics to farmers, agro-inputs providers, middlemen and importers	Link key stakeholders along the production and marketing chain
Farm Concern[2]	Provides EAS on production of traditional vegetables	Offers seeds aimed at food security and safety of farmers and their dependents
Agribusiness support for smallholders project, 2010-2013, funded by (FAO);	Provides EAS on agribusiness investments by smallholder farmers	Capacity building, funding, facilitates links between producers and marketers
FPEAK	Coordinates activities of exporters of fresh produce in Kenya, including providing EAS to the members.	Offers EAS to exporters and farmers on topics such as standards compliance, policy advocacy and mobilization of farmers/producers
HCDA	Implementation agency for the EAS policy developed by the Ministry of Agriculture Development and implementation of PMOs for horticultural farmers	Co-formulation (with other stakeholders) and implementation of the national EAS policy
KENFAP	EAS provider	Provides EAS to farmers on advocacy, mobilization of farmers/producers and collaboration with other stakeholders
KAPAP	Offers EAS related to potato production and national policy	Provides certified seeds and information on production technology
Komaza Forestry Project[3]	Offers EAS on forestry and traditional vegetables	Distributes seedlings of trees and vegetables
Middlemen/ agents	Offer EAS on market logistics to farmers and marketers	Promote links between farmers and marketers

[2] Farm Concern is an Africa-wide market development agency.

[3] Komaza is an agro-forestry project funded by World Vision.

	Role in agricultural sector development and provision of EAS	**Support services**
MOA	Sets the policy framework and provides EAS on all farm enterprises and links EAS providers to other stakeholders and smallholder farmers Leads the development and realization of commercial villages	Establishes policy and enabling environment for ESPs
Smallholder farmers	ESP beneficiaries	Provide the clientele for the ESPs, demonstration farms; implement what is learned through the ESP
WRMA (Water Resource Management Authority)	Offers EAS on water management technology; develops water management policy	Similar to WRUA
WRUA (Water Resources Users Association)	Offers EAS on water harvesting and accessibility	Provides engineers free of charge to provide infrastructure information to farmers
World Vision	Offers EAS on income generation	Pays farmers working on the Komaza Forestry Project

Characteristics of Smallholder Farmers

A key objective of the study was to profile the target farmers in terms of various demographic characteristics. This information is crucial for the development of ESP strategies.

Target group composition: Eighty-six of the surveyed farmers -- 67 percent of the total -- were females; 43, or 33 percent, were males. Many respondents -- 45 percent -- were between 41 and 50 years of age. Most of the participants involved in the FGDs were illiterate. Eighty-four percent had mobile phones, which they used in communicating EAS information to fellow farmers and to the ESPs. Table 4 provides a detailed breakdown of gender, age and mobile phone ownership. For further information on group details, refer to Annex II.

Table 4. Profiles of participating smallholder farmers.

Area	PPMO	Atten-dants	Sex		Age range			Have mobile phones?	
			Male	Female	20-40	41-50	>51	Do	Don't
Mombasa	Sokoke farmers	24	13	11	10	8	6	13	11
Machakos	Mikuyu Catchment	32	10	22	7	16	9	28	4
Nyandarua	Halleluyah Acres	24	3	21	9	10	5	24	0

Uasin Gishu	Gatina Self-help Group	25	10	15	6	10	9	21	4
Kisumu	Purber Group	24	7	17	3	14	7	22	2
Total		129	43	86	35	58	36	108	21

Education levels: Overall, most of the participating farmers had primary education as their highest level of education, with an average of 53 percent. Thirty-eight percent of the farmers had secondary education, and 9 percent had attended college. A cross-analysis by regions shows that most of the respondents in Uasin Gishu (70 percent) and Mombasa (67 percent) had attained a primary level of education, and 50 percent of the farmers surveyed in Machakos and Nyandarua had finished secondary education. Table 5 provides data on the level of schooling of farmers from the five regions.

Table 5. Farmers' schooling levels.

Highest level of education	Rating (%)					Mean (%)
	Mombasa	Machakos	Nyandarua	Uasin Gishu	Kisumu	
Primary	67	40	40	70	50	53
Secondary	32	50	50	20	38	38
College	1	10	10	10	12	9
Graduate	0	0	0	0	0	0
Postgraduate	0	0	0	0	0	0
Total	100	100	100	100	100	100

Farming activities: The survey results showed that most of the smallholder farmers in the target zones required intervention by the ESPs in the production of their crops or animals. Most attributed their success to readily having access to EAS on demand and free of charge. The farmers in the coastal region were involved in the production of high-value forest trees and traditional vegetables. In the eastern region, the production of mangos was prevalent; farmers in the central region were mostly producing potatoes. The Kisumu region produced traditional vegetables and fruits.

Extension Services Approaches

The study looked at human resources and communication issues to determine the most efficient and effective ESP approaches.

Smallholder farmers' motivation in extension: Most of the demand and supply for EAS was driven by the farmers' enterprises, with an average of 73 percent (see Table 6a). Market-related issues were of no significance to EAS recipients in the targeted regions; production was of moderate interest in Machakos.

Table 6a describes the findings concerning EAS demands based on farmers' needs in relation to enterprises, marketing issues, production issues, and ESPs' institutional operations or activities.

Table 6a. Smallholder farmers' motivation to seek out extension services.

Location	Demand reasons (%)			
	Driven by enterprises	Market issues	Production issues	Institutional operations
Mombasa	90	0	0	10
Machakos	1	0	70	19
Nyandarua	85	0	0	15
Uasin Gishu	90	0	0	10
Kisumu	100	0	0	0
Average	**73**	**0**	**14**	**11**

Extension staff requirements: All respondents (smallholder farmers and ESPs) attested to having demanded or provided EAS for assorted needs along the production and marketing value chain. There was a general feeling that the number of extension staff members was inadequate by a factor of 45 percent (24 staff members) in its capacity to meet all of the farmers' needs. Nevertheless, most of the ESPs had not recruited new staff members in the past five years. The number recorded in Table 6b remained unchanged since 2009 in the respective areas.

Table 6b. Planned versus actual number of staff members across all ESPs.

Location	Actual number of ESP staff members	Target number of ESP staff members	Deficit
Mombasa	3	6	3
Machakos	5	10	5
Nyandarua	10	15	5
Uasin Gishu	5	10	5
Kisumu	6	12	6
Total	29	53	24
Total %	**55**	**100**	**45**

Programs, approaches and benefits of EAS: All of the ESPs used a range of extension approaches. It was found that using a range of approaches maximized the EAS benefits for the smallholders. EAS benefits to farmers are shown in Table 7.

Table 7. EAS approaches used and benefits to farmers.

Area	Organization	Programs	EAS approaches	Benefits to farmers
Mombasa	KENFAP	Farming business	Farm visits, trainings, demonstrations	Enhanced income generation, food safety
	Komaza	Forestry and vegetables	Demonstrations	Environmental protection, food security
	World Vision	Income generation	Demonstrations	Poverty alleviation, economic development
Machakos	KENFAP	Mango value chain development	Farm visits, seminars, demonstrations, shows	Increased yields, soil conservation, food safety
	KARI	Weather focus	Telephony, demonstrations, field day	Increased productivity, food security
	Agro-chemical companies	Safe use of agro-chemicals	Demonstrations	Enhanced cost benefits
Nyandarua	KAPAP	Potato value chain	Farm visits, training, demonstrations	Seed production, food security, value addition
	KENFAP	Farming business	Farm visits, training, demonstrations	Enhanced income generation, food safety
	FPEAK	Kenya GAP compliance	Trainings	Sustainable market access
	WRUA	Water accessibility	Demonstrations	Adequate water for farming & household use
	Agro-chemical companies	Safe use of agro-chemicals	Demonstrations	Enhanced cost benefits
	WRMA	Water management	Demonstrations	Effective and efficient water resource utilization
	MOA	Potato value chain	Seminars, demonstrations	Seed production, food security
Uasin Gishu	KENFAP	Farming business	Farm visits, shows, tours, demonstrations	Certified seeds, income generation, food security
	FAO	Relief	Farm visits, trainings	Food security, increased productivity
	MOA	Farming business, soil testing	Shows, demonstrations, trainings	Soil nutrition managed, income generation
	Agro-chemical companies	Safe use of agro-chemicals	Demonstrations	Enhanced cost benefits

Area	Organization	Programs	EAS approaches	Benefits to farmers
Kisumu	KENFAP	General extension	Trainings, field days	Diversification of crops under production
	HCDA	Horticulture development	Field visits, demonstrations	Diversification of crops under production
	USAID	Indigenous vegetables	Demonstrations, trainings, field visits	Food security, income generation
	Farm Concern	Indigenous vegetables, dairy goats	Trainings, demonstrations, field visits	Household nutrition, food security, income generation

Preference ratings: The approach that was most highly preferred by smallholder farmers in all regions was the use of radio programs in local languages. Plant clinics were rated a close second at 48 percent. This approach was introduced by CABI and the Ministry of Agriculture in Kenya. In this approach, famers bring problematic plants or plant parts to the clinic for diagnosis and recommendations by the extension officers. This is particularly effective on local market days, since most of the farmers are not busy with on-farm activities. The high rating may be a result of the fact that it was a new approach that the farmers related to in their day-to-day undertakings. The third most preferred approach was field visits, with an impressive 42 percent rating. The ratings of approaches studied in the survey are compared in Table 8.

Table 8. Farmers' ratings of EAS approaches.

Approach	Ratings (%)					Average (%)
	Mombasa	Machakos	Nyandarua	Uasin Gishu	Kisumu	
Training	44	45	30	26	40	37
Field visits	26	50	53	51	29	42
Office consultations	31	43	26	26	31	31
Demonstrations	29	24	40	33	41	33
Tours/excursions	29	19	33	28	31	28
Field days	36	19	40	34	50	36
Shows/exhibitions	26	21	33	26	43	30
TV	30	40	35	30	45	36
Radio	40	54	42	60	50	49
Internet/computer village	10	10	8	0	0	6
Plant clinics (CABI)	40	52	40	58	50	48
Workshops/seminars	21	30	25	15	10	20

Communication approach ratings: The results of the survey showed that face-to-face communication in local languages was highly preferred. This amounted to 75 percent, on

average, followed by publications in Kiswahili at 43 percent. Mass media, although important, was ranked third, at 35 percent. A similar trend was observed during the FGD forums. Table 9 shows the breakdown of the ratings of methods of communication.

Table 9. Communication ratings.

Mode	Ratings (%)					Mean (%)
	Mombasa	Machakos	Nyandarua	Uasin Gishu	Kisumu	
Face-to-face	79	73	72	77	74	75
Publications	37	42	40	44	53	43
Mass media	44	31	33	32	37	35

Value chain EAS information ratings: The survey results showed that information on dealing with pests and diseases was most in demand by farmers (49 percent, on average), followed by good production practices (45 percent). Information on technology, research findings and standards certifications were not highly sought after, accounting for 25 percent, 33 percent and 34 percent of demand, respectively. Postharvest handling and marketing logistics were moderately sought at average rates of 42 percent and 39 percent, respectively (Table 10).

Table 10. Information ratings.

Value chain issues	Rating (%)					Mean (%)
	Mombasa	Machakos	Nyandarua	Uasin Gishu	Kisumu	
Technology	11	25	23	31	34	25
Research findings	21	27	28	52	36	33
Safe use of agro-chemicals	30	35	43	49	43	40
Production practices	40	41	45	53	48	45
Pests and diseases	37	38	55	74	40	49
Postharvest handling	33	28	37	77	34	42
Marketing logistics	26	35	36	59	40	39
Standards	28	34	19	50	38	34

Ratings of ESPs: Seven of the extension services providers were seen to offer prompt, reliable and valuable EAS: KENFAP, agro-chemical companies, MOA, KARI, HCDA, Komaza and World Vision. KENFAP received positive ratings from an average 74 percent of participants. Agro-chemical companies were also seen as offering EAS of major importance to the farmers: they received 66 percent positive ratings. The Ministry of Agriculture came in third, followed by KARI and HCDA at 42 percent and 32 percent, respectively (Table 11).

Table 11. Providers' ratings.

Organization	Rating (%)						
	KENFAP	**Agro-chemical companies**	**MOA**	**KARI**	**HCDA**	**Komaza**	**World Vision**
Mombasa	80	80	80	50	50	0	0
Machakos	50	50	20	50	0	70	70
Nyandarua	90	60	50	70	30	0	0
Uasin Gishu	70	60	60	40	40	0	0
Kisumu	80	80	80	0	40	0	0
Mean	74	66	58	42	32	14	14

Possible remedial measures: The respondents proposed some remedial measures that would ensure more effective and efficient provision of EAS. The measures were matched with the organizations that would take the lead responsibility for putting the measures in place in the various areas. The measures that were addressed by the study included: full implementation of EAS practices acquired in the past, participation in EAS by all farmers, cooperation among farmers, use of farmers in Training of Trainers (TOTs), use of diverse approaches, reduction of duplication of efforts in EAS, addition of extension staff members and group dynamism management as shown in Table 12.

Table 12. Remedial measures and responsibility

Measure	Responsible organization(s)				
	Mombasa	**Machakos**	**Nyandarua**	**Uasin Gishu**	**Kisumu**
Full implementation of EAS practices acquired in the past	Farmers	Farmers	Farmers	Farmers	Farmers
Participation in EAS by all farmers	Farmers	Farmers	Farmers	Farmers	Farmers
Cooperation among farmers	Farmers	Farmers	Farmers	Farmers	Farmers
Use of farmers in Training of Trainers (TOTs)	KENFAP, agro-chemical cos., KARI, MOA, Kumanza, World Vision	KAPAP, KENFAP, agro-chemical cos., KARI, MOA, FPEAK	KAPAP, KENFAP, WRUA, agro-chemical cos., KARI, WRMA, MOA, FPEAK	KENFAP, FAO, MOA, agro-chemical cos.	KENFAP, MOA, HCDA, ICIPE, KARI, USAID, Farm Concern, agro-chemical companies
Use of diverse approaches	ESPs and farmers	ESPs and farmers	ESPs and farmers	ESPs and farmers	ESPs and farmers
Reduction of duplication of efforts in EAS	ESPs	ESPs	ESPs	ESPs	ESPs

Addition of extension staff members	ESPs	ESPs	ESPs	ESPs	ESPs
Group dynamism management	Farmers	Farmers	Farmers	Farmers	Farmers

Benefits of EAS

The extension and advisory services offered to farmers were highly valued for delivering social, economic and environmental benefits.

Social benefits: In Machakos, Mombasa, Kisumu, Sokoke, Purber and Nyandarua, farmer associations had been in existence for 12 years; farmers' groups in Mikuyu and Halleluyah had been together for 13 years. The youngest was Gatina in Uasin Gishu at 11 years. All of the groups were registered with the Ministry of Gender, Youth and Social Services and therefore were legal entities under national law. The farmers' associations had memberships of 50 each, with an average of 36 members who were actively involved in group activities and enjoyed various benefits. The survey results on the social platforms are tabulated in Table 13.

Table 13. Social benefits

Organization	Formed	Years active	Registration	Rating (%)		Benefits
				Members	Active	
Sokoke	2001	12	Yes	50	40	Satisfying returns for members; helps guarantee better prices for produce and better and more prompt modes of payment; enjoyment of economies of scale in production and marketing
Mikuyu	2000	13	Yes	50	30	
Halleluyah	2000	13	Yes	50	30	
Gatina	2002	11	Yes	50	40	
Purber	2001	12	Yes	50	40	
Mean		12		50	36	

Economic benefits: Most of the farmers surveyed were highly enterprising in generating household income. The enterprises in which they were involved ranged from the production and marketing of forest products and traditional vegetables in Mombasa, mangos in Machakos, and potatoes in Nyandarua and Uasin Gishu to production of exotic and indigenous fruits and vegetables in Kisumu. The average production acreage per farm was 48, and average profits in Kenya shillings (KShs.) of 42,000 annually. These profits were used to build houses and educate family members. Additionally, the farmers were involved in community service work where they cared for orphans, disabled people and HIV/AIDS victims. Table 14 shows the breakdown on the economic findings of the survey.

Table 14. Economic benefits.

Organization	Enterprise	Production (acres)	Profits (KShs/ year/ acre)	Use of profits	Community service
Sokoke	Forestry/ vegetables	40	50,000	Housing, education	Orphans
Mikuyu	Mangos	50	50,000	Housing, education	Orphans
Halleluyah	Potatoes	50	40,000	Housing, education	Disabled
Gatina	Potatoes	50	40,000	Housing, education	Internally displaced persons
Purber	Fruits/vegetables	50	30,000	Housing, education	HIV/AIDS victims
Mean		48	42,000		

Environmental benefits: Respondents involved in the FGDs indicated that farmers in the Mombasa, Nyandarua, Uasin Gishu and Kisumu regions received valid and reliable information on forestry and agro-forestry production. The application of manure was promoted throughout the surveyed regions. The construction of gabions, terraces and drainage ditches was advocated in some areas. Various benefits resulted from implementing the techniques (Table 15).

Table 15. Environmental benefits.

Organization	Environmental conservation technique	ESP(s)	Where implemented	Benefits
Sokoke	Forestry, manure, gabions	KENFAP, World Vision, Kumanza	All farms	Increased productivity per unit area, profitability and soil nutrition
Mikuyu	Terraces, cover crops, manure	KENFAP, KARI	All farms	Increased productivity per unit area, higher income and soil nutrition
Halleluyah	Agro-forestry, terraces, manure	KAPAP, KENFAP, MOA	All farms	Increased productivity per unit area and soil nutrition
Gatina	Agro-forestry, terraces, manure	KENFAP, MOA	All farms	Increased productivity per unit area, soil and water conservation
Purber	Agro-forestry, drainage ditches, manure	KENFAP, MOA	All farms	Increased productivity per unit area, profitability and year round production

Challenges Faced by Farmers and ESPs along the Value Chain

Both the ESPs and the smallholder farmers face a number of challenges (Table 16). The challenges differ depending on the role of the actors in the value chain of any given enterprise and region.

Table 16. Challenges faced by farmers and extension service providers

Actor	Challenge
Smallholder farmers	Lack of access to credit facilities, thus unable to purchase agro-inputs such as pesticides and fertilizers, resulting in reduced productivity. Farmers are slow to implement the practices learned through EAS.
	Unpredictable weather and other effects of climate change disrupt the production cycle and cause losses in production.
	Poor prices for fresh produce, leading to low income/returns.
	Inadequate loyalty/inactivity of PPMO members. This has led to inability to meet quantities of fresh produce as agreed with the exporter, thus poor returns and premiums.
	Poor infrastructure: poor feeder roads from the farms to the markets lead to quality deterioration of the produce before it reaches the market.
	Lack of vital facilities -- e.g., storage and packhouse facilities -- leads to post-production losses if the fresh produce is not bought immediately after harvest.
	High cost of production, especially inputs.
	Lack of sufficient extension services when and where they are needed.
	Inadequate land available for production activities means farmers are unable to ensure enough food for household use. In addition, land fragmentation has been on the increase.
	Inadequate knowledge on production and postproduction activities -- e.g., water and soil conservation techniques, use and application of chemicals and pesticides, recordkeeping.
	Deteriorating production levels due to lack of water, especially during prolonged droughts and as a result of poor soil conservation techniques.
	Policies at the macro level address the concerns of large-scale producers and largely ignore smallholder producers.
	Exploitation by unscrupulous traders.
KENFAP	Limited resources for capacity building for staff.
	Inadequate extension staff numbers so that only one or two staff members must provide services throughout the entire county.
	Increasingly, new and different pests and diseases mean that the information disseminated by EAS in the past is no longer relevant.
	Increased costs of giving demonstrations to farmers.
	Poor recordkeeping by farmers means that KENFAP is unable to follow up on EAS delivered over the years to determine the farming processes implemented by the

Actor	Challenge
	farmers at various times. This helps track EAS dissemination.
Agro-chemical companies	Lack of accurate and timely production and marketing information in written form from the smallholder farmers; the verbal information provided is highly subjective and thus prone to error. Further, a lack of records on issues affecting farmers, specifically crop diseases and other calamities (e.g., whitefly, frost) makes it difficult to prescribe correct solutions.
	Failure by the farmers to implement EAS practices in a timely fashion results in inadequate feedback to companies.
	Increased pressure from pests and diseases due to climate change requires high investments in producing new chemical solutions. The control measures for these pathogens have resulted in Maximum Residues Limit (MRLs) standards based on the amount of chemical that a human is allowed to consume after it has been left on the produce.
MOA	Most MOA staff members are not provided with current and continual training needed to meet the day-to-day EAS requirements of the farmers.
	Continued use of obsolete publications that are not applicable to the agro-ecological zones requiring EAS.
	Inadequate EAS infrastructures, including transport, communications, coordination, publications and policy.
	Communication problems arise between ESPs' staff members and local farmers because farmers may be using a tribal language that the staff members are not sufficiently proficient in.
	Compliance with the MRLs legislation for international trade.
KARI	Inadequate EAS infrastructure to disseminate research findings in a timely fashion to smallholder farmers.
	Inadequate research funding to address critical issues affecting smallholder farmers.
	Compliance with the MRLs legislation for international trade.
HCDA	Inadequate EAS infrastructures, including transport, communications, coordination, publications and policy.
	Communication problems arise between ESPs' staff members and local farmers because the farmers may be using a tribal language that the staff members are not sufficiently proficient in.
	Compliance with the MRLs legislation for international trade.

SWOT ANALYSIS AND RECOMMENDATIONS BY REGION

Table 17. Mombasa SWOT Analysis - *Sokoke Farmers Association*

Summary profile
Location: Mombasa County
Existence: 12 years
Registered with the Ministry of Gender[4] in 2001
Current group membership: 50 members (28 men, 22 women)
Enterprises: Forestry and vegetables (cowpea, amaranths)
Main ESPs: KENFAP, Komaza, World Vision

Internal	
Strengths	**Weaknesses**
• Excellent group dynamics and strong management, with the area administrative chief heading all group activities. • Strict group working rules concerning the farmers' work on a different member's farm each day. • Almost equal gender distribution with a highly energetic young population 20-30 years of age. Adequate number of mobile phones to use in the EAS. • Knowledgeable of the Kiswahili language, which is used in EAS communication. • Demonstration of prior EAS success stories.	• Lack of records -- i.e., no minutes of group meetings on EAS activities. • The farmers feel overworked from working several hours per day on other members' farms as advocated by World Vision and Komaza. • Low level of education: most of the members are primary school dropouts who have difficulty understanding the English terms used in EAS. • Limited funds to ensure that all EAS information is used by all members.
External	
Opportunities	**Threats**
• Located in the coastal region, where the agro-ecology is favorable for the accelerated production of forest trees and traditional vegetables; accessible to the lucrative Mombasa fresh produce market for the vegetables and to the Kenya Power and Lighting Company, which purchases local trees for electricity poles through the ESPs. Sokoke group has an opportunity to generate income by selling trees to the electricity company for poles. ESPs assist in signing contracts between	• Limited ability of farmers to borrow money or receive favorable terms from credit facilities makes it difficult to purchase adequate agro-inputs advocated by ESPs. • Characteristic perishability of the fresh produce is increased by the hot climatic conditions and lack of cold storage facilities.

[4]The Ministry of Gender is the government body that deals with the registration of farmers' associations.

the farmers and the Kenya Power Company. • Existence of three ESPs in the location with six staff members available to provide EAS. • Existence of other EAS approaches such as shows and exhibitions and plant clinics that can be utilized for maximum knowledge dissemination and retention. The farmers in this area are semi-literate. Use of other approaches in disseminating the information is an opportunity that needs to be exploited.	

Recommendations:

- ESPs to invest in a funding facility that would mutually benefit the farmers, producers, market players and the ESPs' institutions in the area.
- ESPs to assist the farmers to understand the mutual benefits of communal labor.
- World Vision and Komaza have paid farmers cash to implement the advice given, but this can be counterproductive because the money may be diverted toward other family needs. The author of this study therefore recommends that the organization should offer payments in kind -- i.e., to provide the inputs that the farmers are supposed to use.
- KENFAP to complement farm visits with other EAS approaches, such as tours, shows, plant clinics, etc.

Table 18. Machakos SWOT Analysis - Mikuyu Catchment

Summary profile
Location: Machakos County
Existence: 13 years
Registered with the Ministry of Gender in 2000
Current group membership: 50 (17 men, 33 women)
Enterprise: Mangos
Main ESPs: KENFAP, KARI

Internal	
Strengths	**Weaknesses**
• Cohesiveness among group members. • Strict bylaws that ensure members' commitments to EAS required for the quality and productivity of their enterprises. • Horticulture production requires a lot of traditional women's skills such as long bending hours during harvesting, fast hand	• Limited funds to ensure that all EAS information is being used. • No viable strategic approaches that have succeeded in involving inactive members in EAS and stopping the sale of produce to agents who frequent the area tempting the farmers to sell their produce on the side,

packaging of produces, grading of produce, etc. The group has a large number of women, so these skills are readily available. • Technical level training of at least two or three of the group members, one of whom was in executive management of the group. • Adequate number of mobile phones to use for the EAS.	contrary to the ESPs' advocacy of contract farming.
External	
Opportunities	**Threats**
• Located in the southeastern region where the climatic conditions are favorable for mango production for export markets Proximity to the Jomo Kenyatta International Airport in Nairobi enables cheap and fast transport of export products. • Existence of two readily available ESPs in the location with four staff members who can provide EAS. • Room for EAS approaches such as plant clinics and tours to maximize knowledge dissemination and retention.	• Middlemen or agents who frequent the area tempting the farmers to sell their produce on the side, contrary to the ESPs' advocacy of contract farming. • Characteristic perishability of fresh mangos is accelerated by lack of cold storage facilities in the area. Additionally, the farmers lack processing or value addition facilities to dry the fruit, extract juices, etc. This is mainly because of lack of finances and favorable credit facilities. • Inadequate credit accessibility by the farmers that would ensure maximized value addition of farm produce, which would enhance diversified income generation. The credit facilities have stringent requirements for the farmers to meet.

Recommendations:

- ESPs to invest in a financial savings strategy for smallholders so that they can benefit from government and private sector loans.
- ESPs to promote the importance among all members of honoring contract farming.
- KARI to provide appropriate and diverse planting materials to the farmers during their EAS missions.
- KENFAP to complement farm visits with other EAS approaches, such as tours, shows, plant clinics, etc.

Table 19. Nyandarua SWOT Analysis - Halleluyah Acres

Summary profile
Location: Nyandarua County
Existence: 11 years
Registered with the Ministry of Gender in 2002
Current group membership: 50 (3 men, 47 women)
Enterprise: Potatoes
Main ESPs: KENFAP, KARI, MOA, KAPAP

Strengths	Weaknesses
• Chairperson is the head of the county umbrella group of all smallholder farmers, hence has knowledge about ESPs that would benefit the group the most. • The highly skewed gender equilibrium enables the group to easily access national EAS funding for women. • Technical level training of at least two or three of the group members, one of whom was in executive management of the group. In addition, 50% of the group members had hands-on experience of between 41 and 50 years. • Adequate number of mobile phones to use for EAS.	• No known strategic approaches have succeeded in gaining the participation of the inactive members in EAS.
Opportunities	**Threats**
• The location in the central part of Kenya ensures adequate favorable climate conditions for producing potatoes for local markets. • Proximity to the Nairobi, Nyeri and Nakuru fresh markets outlets ensures freshness is preserved in line with the ESP directives on produce handling. • Existence of four readily available ESPs with eight staff members who can provide EAS.	• Middlemen or agents who trade produce frequent the area. They favor marketing in oversized gunnysacks at a reduced price. Because they can readily provide cash for goods, they tempt the farmers to side sell, contrary to the ESPs' advocacy for group marketing with standardized packaging at higher prices.

Recommendations:

- ESPs to promote member commitment to standardized packaging.
- ESPs to provide viable strategies to facilitate the full involvement of the inactive members in implementing EAS and other group activities.

Table 20. Uasin Gishu SWOT Analysis - Gatina Self-help group

Summary profile:
Location: Uasin Gishu County
Existence: 13 years
Registered with the Ministry of Gender in 2000
Current group membership: 50 members (22 men, 28 women)
Enterprise: Potatoes
Main ESPs: KENFAP, MOA

Strengths	Weaknesses
• Cohesiveness among group members due to political unrest in the region. • A highly experienced population of between 41 and 50 years of age	• The level of education is very low: 70% of the members have not completed the primary school level.
Opportunities	**Threats**
• Located in the Rift Valley region where productivity is very high on virgin soils and/or lands left fallow for a year. • Value addition of the crop by making crisps and chips that are either sold when deep fried or frozen. These practices may increase the shelf life and enhances income generated all year round. • Room to use approaches such as plant clinics, tours, etc., to maximize knowledge dissemination and retention.	• The region is prone to political violence during election years. This disrupts productivity because the members flee to safe locations outside the region. • Exploitation by middlemen because the region is far from lucrative markets such as Nakuru, Nairobi and Mombasa.

Recommendations:

- ESPs to introduce adult education courses alongside the EAS programs to enhance the level of literacy among the farmers in the region.
- ESPs to assist in promoting strategies to reduce unrest during political election year. Just as the issues of HIV/AIDs, malaria, gender and disability, among others, have been integrated into agricultural extension, the ESPs can similarly integrate strategies that would promote peaceful co-existence in this area hosting diverse ethnic groups.

Table 21. Kisumu SWOT Analysis - Purber Self-help Group

Summary profile
Location: Kisumu County
Existence: 12 years
Registered with the Ministry of Gender in 2001
Current group membership: 50 members (18 men, 32 women)
Enterprise: Exotic fruits, mangos, avocados, traditional berries and vegetables, cowpeas, etc.
Main ESPs: KENFAP, MOA, Farm Concern

Strengths	Weaknesses
• The group's bylaws are intertwined with a strong ethnic culture that ensures cohesive bonding in implementation of EAS practices. • High recognition of the importance of improving crop production to enhance food security. • The education level of this community is high compared to all other regions. Large pieces of land owned by the members provide room for agricultural expansion.	• Cultural traditions dictate fishing practices that are counter to EAS recommendations. • Members insist on rearing traditional livestock against the recommendation of ESPs to grow hybrids. • Farmers' production of traditional vegetables and fruits is weak because of inbreeding and the high cost of hybrid varieties. • Because the area is low-lying and frequently waterlogged because of high rainfall frequency and intensity, it is a good breeding place for various pathogens that cause outbreaks of diseases such as cholera among members of the farmers' group.
Opportunities	**Threats**
• A wide range of crops under production. • Adequate rainfall coupled with favorable temperatures throughout the year, ensuring production and marketing of quality produce. • Possibility to grow produce that is highly regarded by bordering countries such as Uganda, Tanzania and Somalia. • Commitment of the ESPs to disseminate dynamic strategies for modern farming.	• Flooding could occur if the drainage ditches are not well-established and maintained. • The area is near the border entry point to Kenya from other countries, such as Uganda, Tanzania, Burundi, Rwanda, etc., so there is potential for transfer of pests and diseases from neighboring countries. • The border is very porous, allowing the entry of uncertified products and resulting in a high cost of implementing regional phytosanitary and sanitary standards for marketable produce.

Recommendations:

- ESPs to invest in promoting the importance of improved animal breeds and phytosanitary and sanitary services for produce, along with improved packaging and means of transport.

Overall Analysis of ESP

Table 22. SWOT Analysis of ESPs - Public and private sector ESPs

Summary profile
Location:
Mombasa: KENFAP, World Vision, Komaza, agro-chemical companies
Machakos: KENFAP, KARI, HCDA, agro-chemical companies
Nyandarua: KAPAP, MOA KENFAP, FPEAK, HCDA, agro-chemical companies
Uasin Gishu: MOA KENFAP, agro-chemical companies
Kisumu: KENFAP, MOA, KARI, Farm Concern, HCDA
ESPs group composition: 23 members (20 men, 3 women)

Strengths	Weaknesses
• The majority of ESPs are represented in all the areas, including KENFAP, MOA and agro-chemical companies. • Extension staff members in all areas have a high level of education in EAS work. • Farming community participates in Identification and selection of EAS programs to be implemented on a prioritized basis. • Approaches befitting the target region and farmers have been prioritized and adopted by the ESPs. • Mode of communication has been refined to disseminate EAS information to target farmers' groups. • PPMOs exist to promote the production and marketing of agricultural products.	• Inadequate finances to engage enough extension staff members and the needed infrastructure to reach all farmers in the region. • Lack of/poor technical knowledge among some ESP staff members. • General ignorance of other actors in the region offering EAS. • MOA's inability to enforce the implementation of the EAS policy, leading to non-conformity with the guidelines. • Advocacy of commercial villages that are not registered legally by MOA. • Promotion of PMOs among the horticultural farmers based on a specific product while the farmers practice mixed agriculture. This neglects the other products used for profit diversification by farmers.
Opportunities	**Threats**
• Readily available supply of farmers eager for extension services. • Implementation of the national policy by all ESPs aimed at enhancing effective and efficient EAS amongst the farmers. • Profiling and creation of ESP networks for implementation of programs or projects. • Capitalizing on approaches and communication	• Farmers do not always fully implement EAS practices and therefore do not realize maximized productivity, profitability and development. • Increased costs of dissemination of EAS nationally because of poor infrastructural networks. • High agro-input costs.

modes with maximum returns on EAS adoption by farmers in any given region. • Climate change has resulted in incredible EAS knowledge that is provided by the staff members.	• Communications barrier between farmers and ESPs.

Recommendations:

- National policy on EAS is not well-known or well-understood by many ESPs in Kenya. Thus they often operate on independent platforms that are not guided by the policy. The government should take steps to raise awareness of the policy as a necessary tool of the trade. In addition, stronger enforcement mechanisms are needed to support the policy.
- There is room to improve on the communication approaches of all ESPs in Kenya.

CONCLUSIONS

The study explored progressive success of extension and advisory services (EAS) provision in Kenya by examining the importance of EAS, the nature of the ESPs, their technical expertise and the success of the EAS national policy.

The study concluded that EAS is a priority function that has enhanced agricultural and economic development in Kenya over the years. It has been important for large-, medium- and small-scale farmers. The number of small-scale farmers has been on the increase over the decades because of population growth that has led to farm fragmentation. However, they have benefited enormously as a result of working together as farmer groups to seek and implement EAS from a growing number of ESPs that implement diversified projects or programs appropriate to the farmers' diverse enterprises. The study showed that these farmers formed produce production marketing organizations that enhanced collective sourcing of EAS. The EAS acquired enhanced production and marketing of produce. This increased income generated and thus improved the standard of living of the farmers.

The study demonstrated that Kenya's EAS provision was pluralistic in nature, as is characteristic in most of the agriculture-dependent countries worldwide. The ESPs were drawn from both public and private sectors. The number of ESPs in these sectors has grown immensely over the years, and many of the extension advisory services provided by ESPs to the farmers were highly duplicated. Each ESP worked with farmers on the basis of specific roles or responsibilities targeted by the respective project and/or program implemented. Hence the most emphasized EAS disseminated by any given ESPs differed from one group to the next depending on the project and/or program under implementation. This was independent of geographical location of the groups.

The study established that technical expertise was in high demand by the farmers nationally because agriculture is the backbone of socioeconomic development. Language barriers and lack of literacy were obstacles to farmers' gaining this expertise. The ESPs posted their staff members in accordance with respective expertise and experience on any given project and/or program. The government had diversified staff members drawn from the main ministry and agencies. The private sector had legally registered ESPs drawn from non-governmental organizations (NGOs), churches and companies, among others. Staff numbers in any given study location were limited in proportion to the general populations of the areas. This was a general occurrence across the nation, even though the number of staff members had been trending upward over the years.

The study illustrated that farmers had their preferred approaches. Plant clinics introduced by the Ministry of Agriculture and CABI are an innovative approach that is growing in demand among the farmers, who said that it was a very convenient way to receive needed EAS. The popularity of mobile phone services and vernacular radio program approaches had grown steadily for the past decade. The demand for all three approaches by farmers was growing steadily.

In 2012, Kenya established the National Agricultural Sector Extension Policy (NASEP) in an effort to enhance the management and organization of agricultural extension services among the ESPs. This was a major milestone because it provided guidelines to all ESPs countrywide. The implementation is lagging because enforcement by the government is lacking. Newly formed ESPs carry out their operations oblivious of the policy. Except for the Ministry of Agriculture, previously existing organizations drawn from both public and private sectors hadn't pegged their operations on the policy, and farmers -- large-, medium- and small-scale -- were generally unaware that the policy existed. They interacted mostly with the private sector ESPs, who had little knowledge on the policy.

Lessons Learned

Nations that have agriculture as the mainstay of their development must embrace innovative and creative development of EAS. As the world has evolved to be a global village, adoption of the produce production and marketing organizations (PPMOs) concept by other nations would enhance development of EAS provision among the medium- and small-scale farmers. According to the study, the concept of PPMO was developed by smallholder farmers producing goods for fresh local and export markets. The concept was important for the sustainable development of all farm enterprises owned by smallholder farmers. The benefits included economies of scale and collective bargaining for inputs and sales. However, for a PPMO to work successfully, efficiently and effectively, the group must be active, cohesive and guided by strict bylaws. These functional groups increased adoption of EAS provided and, by implementing new knowledge and good practices, enhanced productivity and income.

The pluralistic nature of EAS provision has been a success over the years in Kenya and worldwide in general. The registered and projected progressive success would steadily grow if public and private sectors grow in number and diversity. This is in implementation of projects and or programs at various locations nationally and internationally.

Various growth-induced challenges characterized Kenyan agricultural EAS. The population grew highly, especially in the high-potential areas, resulting in increased fragmentation of land and reduced ratios of EAS staff member to farmers. All agriculture-based economies should plan strategically to enhance the number of EAS staff members with technical expertise. This would ensure adequacy in EAS provision when populations escalate.

Innovative and creative approaches are always emerging worldwide, so agricultural stakeholders should be steadfast in sourcing and evaluating new approaches. The successful, efficient and effective ones should be adopted within the shortest time possible because innovation and creativeness are very dynamic, and the rate of technology development that leads to new approaches is very high.

Policy establishment requires commitment to enforcement and implementation by relevant organizations. Therefore, all Kenyan stakeholders should be made aware of the national policy's existence. NASEP, established in Kenya in 2012, embraced all the issues within national EAS as indicated by the stakeholders involved in its development and offered very important guidelines. Because of lack of awareness by the ESPS and inadequate enforcement by the Ministry of agriculture, these guidelines were not implemented by the majority of ESPs.

Therefore, to realize any progressive success, it is important to not only establish but also to enforce and implement such policies.

RECOMMENDATIONS

Extension advisory services have played an integral part in the progressive and sustainable development of the majority population in Kenya, which lives predominantly in the rural areas. We recommend that the government continue to provide an enabling environment for investment and innovation by new ESPs and for the expansion of existing ESPs, both from the public and the private sectors, and encourage public and private sector partnerships. The operations of any given ESP must be evaluated in reference to the projects to be implemented, and duplication of projects and/or programs reduced. One way to do this would be through a team of stakeholders vetting projects for a defined administrative area. Successful projects and/or programs may then be up-scaled and carried out across diverse administrative areas.

Policy formulation and progressive development are realized by public and private sectors' collaborative contribution. The policy must provide for an adequate number of staff members in each administrative location to serve the needs of the area's farming population. The stakeholders in each area should strive to increase the number of staff members to satisfaction within a strategized period.

Innovative and creative EAS approaches should be provided for by ESPs. These approaches must be evaluated by the ESP team within any given administrative area. The most highly demanded, effective and efficient approach should be duplicated. Since the world has emerged over the years as a global village, these approaches may be adopted from any local or international ESPs. Currently, plant clinics, radio programs and mobile phone services have proven successful and should continue to be utilized in Kenya.

The government is the sole agency in Kenya that provides and enforces policies. The ESPs drawn from the public and private sectors should be made aware of any policy developed that relates to their operations. The government should seek partnerships aimed at empowering the stakeholders on policies related to EAS provision in Kenya. Private sector should come up with projects and/or programs that seek to empower the stakeholders on such policies.

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