



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

ASSESSMENT OF EXTENSION AND ADVISORY METHODS AND APPROACHES TO REACH RURAL WOMEN

— EXAMPLES FROM KENYA —

By Dr. Ann Kingiri and Serah Nderitu

MEAS Evaluation Series

July 2014



USAID
FROM THE AMERICAN PEOPLE





© Tahseen Jafry and MEAS Project.

This work is licensed under a Creative Commons Attribution 3.0 Unported License.

Users are free:

- To share — to copy, distribute and transmit the work.
- To remix — to adapt the work.

Under the following conditions:

- Attribution — users must attribute the work to the authors but not in any way that suggests that the authors endorse the user or the user's use of the work.

Technical editing by Kathryn Heinz. Production by Andrea Bohn.

This Discussion Paper was produced as part of the United States Agency for International Development (USAID) project “Modernizing Extension and Advisory Services” (MEAS).

www.meas-extension.org

Leader with Associates Cooperative Agreement No. AID-OAA-L-10-00003.

The report was made possible by the generous support of the American people through USAID. The contents are the responsibility of the authors and do not necessarily reflect the views of USAID or the United States government.

ASSESSMENT OF EXTENSION AND ADVISORY METHODS AND APPROACHES TO REACH RURAL WOMEN

— EXAMPLES FROM KENYA —

MEAS Evaluation Series
July 2014

Study Lead:

Professor Tahseen Jafry

Glasgow Caledonian University, United Kingdom

Research Team:

Dr. Ann Kingiri

Serah Nderitu

African Center for Technology Studies, Nairobi, Kenya



Table of Contents

EXECUTIVE SUMMARY	4
1. INTRODUCTION	6
What extension methods and approaches are being used?	6
Which of these approaches are targeting women?.....	6
What are the success factors of these approaches?	6
SYSTEMATIC REVIEW OF PEER-REVIEWED LITERATURE	6
What extension methods and approaches are being used?	6
Which of these approaches are targeting women?.....	8
What are the success factors and what are the constraints - social, cultural, economic, technical, environmental, infrastructural?.....	8
3. SYSTEMATIC REVIEW OF GREY LITERATURE	10
What extension methods and approaches are being used in Kenya?.....	10
Which of these approaches are targeting women?.....	12
What are the success factors?	13
What are the constraints impacting the effective use of these approaches (social, cultural, economic, technical, environmental, infrastructural)?	13
4. CASE STUDIES.....	15
Case Study 1: ICT- Kenya Agricultural Commodity Exchange	15
Case study 2: Transferring skills, technologies and expertise - Njaa Marufuku Kenya (NMK) Program	26
REFERENCES.....	41
ANNEX I	44
Some extension service providers in Kenya.....	44
ANNEX II	45
Data Extraction of selected peers reviewed papers and grey material.....	45

EXECUTIVE SUMMARY

Kenya has over the years embraced extension services as a means through which information is passed on to farmers. Historically, crop-based or livestock extension services have been advanced through the Ministry of Agriculture. There are now many types of extension service providers, which include commodity-based organizations targeting specific crops like tea, sugar, coffee etc., church or religious based organizations, nongovernmental organizations (NGOs), community-based organizations (CBOs) and cooperative societies. The issue of whether the extension approaches employed have been mindful of the different gender roles and needs is considered in this review.

Through an analysis of peer-reviewed literature, a number of key extension approaches were identified as being used in Kenya. The main ones are focal area approach (FAA), common interest group, farmer field schools (FFS), ICTs, farmer-farmer extension, training, value chains, and community groups. Of these, the ones used to reach rural women are mainly targeted courses, FFS and FAAs. In terms of successes of these approaches, the ones that advocate social mobilization, group identity and empowering women to be able to make decisions are documented as success factors. Despite these successful approaches, there are still many constraints in reaching rural women. These are documented as those approaches that lack focus on the poorest farmers, exclusion of women with no land or lower social status from group activities, inadequate institutional support for women, complexities of ICTs which do not address the illiterate sector, many of which are rural women farmers, lack of recognition of women as agricultural producers, and male extension agents having bias against women farmers.

An analysis of grey literature confirmed what was written in the peer-reviewed literature. The most common extension approaches being used in Kenya are field days, demonstrations, farmer visits, ICTs, trails, FAAs, tours, and FFS. Out of these, the ones that promote social mobilization are used to target women (SHGs, demonstrations, groups, courses).

In terms of constraints, recurring themes in the grey literature are the high levels of illiteracy, especially among the poorest, to be able to make use of extension services as well as the high cost associated with access; e.g., of internet access, which makes services out of reach, especially by the poorest. These are highlighted below:

- Extension in Kenya is delivered via knowledge-sharing forums or participatory-based methodologies. However, knowledge integration generally occurs at the farm or household level.
- Low literacy skills, management ability, negotiating capacity, and financial facility by small-scale farmers, especially in adoption of high value enterprises.
- Gender inequalities in ownership of resources like land, which reduce women's access to extension services, credit, information, etc.
- In some cases, women are not regarded as "economically active" farmers; hence they tend to be excluded from membership of farmer groups and cooperatives. This makes it very difficult to access or demand public extension services.

- Extension services are mostly designed for commercial farmers who grow cash crops, but most women farmers are smallholders who grow subsistence food crops.
- Extension service providers usually expect women to find them in the extension spaces/venues, but there may be social, cultural, or religious constraints. Moreover, limiting factors like educational opportunities, cultural and discriminatory practices, and lack of capacity constrain women's equal participation in extension-related endeavors.
- Women's multiple roles constrain their time and mobility, and consequently their availability to participate in different extension activities.
- Higher proportions of them are illiterate, engage in subsistence agriculture and are not up to date with current technologies.

Despite these constraints a number of success factors were identified in the grey literature. Field days and demonstrations were found to be effective by both farmers and extension agents. This may be linked to the ability to reach many farmers as well as stakeholders. Farmers, on the other hand, preferred individual farm visits, because they tend to be farmer demands driven and extension agents tend to provide personalized attention to their specific needs. The new ICT-related methods of extension are also becoming popular but are constrained by infrastructural challenges.

The focal area approach (FAA) has been extensively linked to the success of the National Agriculture and Livestock Extension Program (NALEP). In addition, other community-based approaches - namely farmers field schools (FFS) and common interest groups (CIGs) - have been found to be positively impacting farmers and, in some cases, women. These approaches focus on taking local contexts into account, understanding the social setup, learning from local indigenous knowledge, and using multiple social networks as entry points into farming communities.

The common interest groups (CIGs) approach was found to be the most effective because of its ability to mobilize women due to its social nature and the multiple entry points for extension agents.

The case studies confirmed what was written in the literature. The case studies have demonstrated that rural women do benefit from rural extension and advisory services even if the approaches are not targeting them directly. Where deliberate efforts are made to target women the impacts of extension are considerable. Rural extension services and technologies that are sensitive and responsive to women move household dynamics (e.g., the gender division of labor) in favor of women. The case studies demonstrate that appropriate targeting and providing them with knowledge greatly enhances women's ability to make informed social and economic decisions.

The case studies also indicate that no single extension method is sufficient by itself. A combination of different extension and advisory methods that complement each other yield better results. Selecting the methods that fit the social setting and context is critical. The packaging of extension messages must be sensitive to community practices and beliefs for ease of adoption and uptake. Combining extension services with grants/financing for procurement of resources for the implementation of activities facilitates quicker adoption of technology and scaling up rural enterprises that mostly benefit women. It was also clear from the case studies that women require follow-up support on a continuous basis to see

any long-term benefits and change. Above all, reaching rural women requires time, energy, resources, commitment, and a political will to drive behavioral change.

1. INTRODUCTION

This report outlines the findings of the review of both peer-reviewed and grey literature on gender and extension/advisory services in Kenya. The reviews were centered on the following key research questions:

What extension methods and approaches are being used?

What are their impacts? What is the level of uptake? What is the level of adoption?

Which of these approaches are targeting women?

What are their impacts? What is the level of uptake? What is the level of adoption?

What are the success factors of these approaches?

What are the constraints of existing approaches to reaching rural women: social, cultural, economic, technical, environmental and infrastructural?

This report also contains case studies that were conducted in Kenya to provide evidence on the impact, scale-in-use, benefits to women, as well as challenges and constraints of the selected extension and advisory services being used. The case studies were also conducted to identify factors leading to the successes of the approaches being used and constraints and challenges being faced by both the implementers of the approach and the recipients, namely, women farmers.

The case studies selected for this research are on:

1. Use of ICTs to reach rural women;
2. Transferring technical knowledge and skills to women farmers;
3. Reaching women farmers through social mobilization.

SYSTEMATIC REVIEW OF PEER-REVIEWED LITERATURE

A total of 52 peer-reviewed journal articles were identified through the systematic review process. However, during the data extraction process only nine articles on Kenya were found to contain material relevant directly and in connection with the research question set out above. A breakdown of the articles review/data extraction process is provided in Annex II. This section summarizes the peer-reviewed and grey literature read based on the four key research questions.

What extension methods and approaches are being used?

Different methods and approaches are alluded to in the literature. The analysis of many papers interprets extension approaches and methods from the nature of delivery *vis a vis* delivery and implication thereof. It is noted that most extension methodologies before 2000, when the National Agriculture and Livestock Extension Programme (NALEP) was initiated, adopted a top-down approach with extension agents dictating messages for subsequent uptake by farmers. This was the era of the

Training and Visit (T&V) approach to extension (see for example Evenson & Mwabu 2001). This approach to extension message delivery was found to be faulty and ineffective, hence the introduction of methods that were perceived to be participatory (see for example Kiara 2011). This transition is reflected in the list of methods and approaches identified in the literature are listed in Table 1.

Table 1. Overview of approaches based on peer-reviewed literature

Approach	Reference
Focal area approach (FFA) as a participatory process as implemented under the NALEP	Kiara 2011
Courses at Farmers' agricultural Training Centers (FTCs) for women at farmers' centers	Shibanda and Seru 2002
Competitive grants for research outreach Private commercial extension initiatives Private non-commercial extension services which promote several approaches as follows: - Income sources diversification - Productivity enhancing technologies - Farm level processing - Linkage to markets - Saving mobilization - Collaboration with other stakeholders	Muyanga, Milu and Jayne T.S. 2006
Training and Visit (T&V)	Evenson and Mwabu 2002
Training and Visit (T&V)	Gautam, Madhur 1999
Participatory Learning and Action (PLA)	Masoy, Aloysia 1997
Demand-driven approach	Eidt et al 2012
Common Interest Groups (CIGs)	Muyanga, Milu and Jayne T.S. 2006 Eidt, et al. 2012
Farmer Field Schools (FFS)	Odolwa, I.I. et al. 2012 Najjar, D., et al. 2012
ICT (M-PESA, mKilimo, Kilimo Salama, Radio, TV, Video)	Vignare, Karen 2013 Manfre et al. 2013
Media tools (TV, Radio, Newspapers)	Odolwa, I.I. et al. 2012
Farmer-to-farmer	
Participatory training demonstrations in the form of workshops, forums, and field days and use of books and pamphlets	Eidt et al. 2012
Gender Dimensions framework	Njuki et al. 2011
Value Chains approach – aims at the integration of gender issues	
The Gender Equity Value Chain Action Learning Approach	
Community groups	Muyanga, Milu and Jayne T.S. 2006 Manfre et al. 2013
Farmer groups- community-based extension	Ojango, J.N.K 2010 Davis, K.E. 2004
Community-based approach by Animal Health Workers (CBAHWs)	Coupe, Stuart, P. Lanyasunya and A.A Imam 2010

The FAA has been extensively linked to the success of the NALEP. In addition, other communitybased approaches namely FFS and CIGs have also been found to be impacting positively on farmers and in some cases women.

Which of these approaches are targeting women?

Through an analysis of the peer-reviewed literature, a number of approaches and methods were found favorable in reaching out to rural women. However, this information was limited.

- Targeted courses for women, e.g., at farmers’ agricultural centers (FTCs) or in their area of operation
- Farmers field schools
- Use of female mentors
- Focal area approach

What are the success factors and what are the constraints - social, cultural, economic, technical, environmental, infrastructural?

Table 2 outlines the success factors and constraints associated with the approaches identified.

Table 2: Summary of extension approaches and specific constraints impacting the effective use of these approaches

Approach	Success factors/strengths	Constraints
Focal area approach as a participatory process implemented	Nondiscriminatory community mobilization & participation	Donor supported, hence issues of sustainability and replication of initiated enterprises
Competitive grants for research/extension outreach & Private commercial/non-commercial extension initiatives	<ul style="list-style-type: none"> • Collaboration with other stakeholders including linkage to markets • Income sources diversification promotion • Promotion of productivity enhancing technologies & farm level processing, saving mobilization 	<ul style="list-style-type: none"> • Target agricultural high potential areas and relatively affluent farmers because they are motivated by profits • Project duration too short to have impact and sustainability • Sometimes there is government interference, e.g., in distribution of farm inputs which impedes activities • Poor physical infrastructure increases operational costs and sometimes forces
Training and visit system		<ul style="list-style-type: none"> • Poor supervision and limited coverage • Poor roads and inadequate transport • Relied on few frontline extension staff • Relied on weak extension system & research stations linkage, limiting access and availability of relevant technologies/information for farmers

Approach	Success factors/strengths	Constraints
Farmer Field Schools (FFS)	<ul style="list-style-type: none"> • Farmers ability to embrace multiple worldviews about gender roles and rights • Group identity, a new sense of social responsibility • Effective and economical in technologies & information dissemination as well as in reaching wider smallholders community 	<ul style="list-style-type: none"> • FFS farmers constrained decision-making power and choices within the FFS program • Despite the FFS focus on women’s empowerment, membership qualification barriers were reported, e.g., in some cases, women with no land and lower social status (single mothers, the widowed and the divorced) were excluded from participation in FFS
Common Interest Groups (CIGs)	<ul style="list-style-type: none"> • Enhanced empowerment through decision making process • Interaction between service providers and other multiple stakeholders 	<ul style="list-style-type: none"> • Lack of regulation and registration policies for CBAHWs at the national level • Channeling extension services through commodity-based associations or CBO’s faces the challenge of membership
Farmer groups; community- based extension e.g. Community-based approach by Animal Health Workers (CBAHWs)	<ul style="list-style-type: none"> • Effective and economical in technologies & information dissemination as well as in reaching wider smallholders community • Capitalizes on the strengths of each player, increased benefits and cut costs • The CBAHWs play a vital role in maintenance of pastoralist livelihoods in a context where the district veterinary department is overstretched • Group identity, a new sense of social responsibility 	
ICT (M-PESA, M-kilimo, Kilimo Salama, Radio, TV, Video) Media tools (TV, Radio, Newspapers)	<ul style="list-style-type: none"> • Good in content, number of technologies passed on & beneficiaries/stakeholders participation 	<ul style="list-style-type: none"> • Inadequate institutional support – rely on government coordination of financial, and mobile services • Low level of literacy • Inaccessibility by certain farmers due to distance from the information centers or poor infrastructure hence low • Complexity of use of ICT-based communication tools, e.g., utilization of internet among poor and illiterate small-scale farmers • Relatively high cost of accessing the tools for example the use of the internet, televisions and newspapers

Approach	Success factors/strengths	Constraints
Participatory training demonstrations in the form of workshops, forums, and field days and use of books and pamphlets	<ul style="list-style-type: none"> • High in content, skills acquisition, attract large number of participants; good for targeted technologies like value addition; are practical and makes understanding a certain agricultural practice easier • Cost effective 	<ul style="list-style-type: none"> • Limiting in terms of number of technologies transferred in a particular period • Low content of extension technologies disseminated, poor at imparting skills
Value Chains approach	<ul style="list-style-type: none"> • Aims at the Integration of Gender Issues into Agriculture 	<ul style="list-style-type: none"> • Women's roles and preferences can be hidden or unclear in local and informal settings like markets • Standard approaches of analyzing value chains can often miss the gender and intra-household dynamics
Courses for women	<ul style="list-style-type: none"> • Reduced negative attitude towards women 	<ul style="list-style-type: none"> • Training of women in technically scientific areas in agriculture is limited in scope
Use of women mentors in extension	<ul style="list-style-type: none"> • Effective as women identify with specific needs of women 	<ul style="list-style-type: none"> • Discriminatory practice in education and in the information delivery extension system • Male agents have a bias against females, making adoption of ideas slow among women • Women's roles are defined with no regard for modernity and gender sensitivity • Rural activities programs for women are more oriented towards their function as mothers and wives rather than agricultural producers

3. SYSTEMATIC REVIEW OF GREY LITERATURE

The materials analyzed comprised of policy documents, materials obtained from websites, and visits to respective organizations undertaking extension and advisory services operating in Kenya. The organizations visited are involved indirectly or directly in extension, e.g., development agencies, nongovernmental organizations (NGOs), community-based organizations (CBOs), and religious based organizations. Annex I contains details of extension providers.

What extension methods and approaches are being used in Kenya?

Before 1999, the government through the Ministry of Agriculture adopted the popular World Bank funded Training & Visit (T&V) approach to extension. After 1999, the National Agriculture and Livestock Extension Program (NALEP), was formulated by the then Ministry of Agriculture and Rural Development to support the implementation of the National Agriculture Extension Policy. From 2000 to date, the

extension services continue to be delivered through NALEP, which has since evolved from Phase I to Phase II. The overall aim of NALEP is to promote demand-driven extension services through, among other approaches, information dissemination and integration of multiple actors (NALEP, 2009:16). It is therefore not surprising that many of the documents reviewed make reference to this program. As alluded to elsewhere, there are other extension service providers who provide diverse community services such as health, credit, and sale of inputs that complement agricultural extension services (RoK, 2010a: 10, 14). However, the extension services offered through the Ministry of Agriculture are perceived to have a wider coverage.

The above notwithstanding, analysis of grey literature shows a wide range of methods applied by extension agents in delivering extension information to the farming communities. The main extension methodologies used to transfer innovations and technological knowledge based on preference by both staff and farmers are listed below in Table 3. It is noted that farmers' preferences of the same methods differed across regions. These methods were evaluated based on a number of factors and related indicators, namely effectiveness, efficiency, adoption, participatory inclusiveness and gender responsiveness (NALEP 2011; RoK 2007, 2010a&b, RoK 2008; IFPRI briefings).

Table 3: Summary of extension methods and approaches being used in Kenya according to grey literature

Approach	Reference
<ul style="list-style-type: none"> • Field days • Group approaches • Radio programs • Farm demonstrations • Shows and exhibitions • Individual farm visit • Residential courses and seminars • Farmers tours and visits • Farmer-to-farmer extension • ICT services 	RoK 2010; NALEP 2011
<ul style="list-style-type: none"> • Common Interest groups (CIG) 	NALEP 2009
<ul style="list-style-type: none"> • Focal area • Farmer Field Schools (FFS) • Face-to-face on farm demonstrations • Shows • Fields days • Film shows • Adaptive on-farm trials 	Ministry of Agriculture, Kenya 2007.
<ul style="list-style-type: none"> • Barazas • Field days • CIG trainings • Monthly trainings 	RoK 2007, NALEP 2011,

Approach	Reference
<ul style="list-style-type: none"> • Government extension systems focusing on food crops • Commodity- based extension systems focusing on cash crops • ICT (M-PESA, mKilimo, Kilimo Salama, Radio, TV, Video) 	IFPRI undated
<ul style="list-style-type: none"> • Community- based extension approaches (Use of para-professional) • Community-based extension system 	Practical Action undated

Among these methods, field days and demonstrations were found to be effective by both farmers and extension agents. This may be linked to the ability to reach many farmers as well as stakeholders. Farmers, on the other hand, also preferred individual farm visits, because they tend to be demands-driven, and extension agents tend to provide personalized attention to their specific needs. The new ICT-related methods of extension are gaining currency but they are constrained by infrastructural challenges.

Which of these approaches are targeting women?

The common interest groups (CIGs) approach was found to be the most effective because of its social nature and its multiple entry points, hence its ability to mobilize women (NALEP 2009; RoK 2007). Examples include social help groups that are highly localized. This approach is also integrated into NALEP (NALEP 2009:13 & 66).

Before NALEP and during the program's early implementation years, gender was not conceptualized beyond "Women undertake most of the farm activities". Recent documents have provided pointers on how gender has been incorporated in the extension activities. One of the intended outputs of NALEP is to ensure gender is mainstreamed in the different extension activities. This is done by the Gender Section in Extension Services Division of the Ministry of Agriculture and Livestock Development. NALEP identifies a number of approaches and methods for the rural women.

The CIGs approach has participatory and social characteristics. These embedded characteristics include:

- Value addition and partnerships interventions. These interventions were applied to encourage women to engage and adopt agri-based income generating technologies (NALEP 2009:13).
- Participatory analysis of poverty and livelihoods dynamics (PAPOLD). This analytical framework employs a multi-sectoral approach of problem identification (NALEP 2009:13-14).
- Resource-oriented approach. This characterized the early stage of initiation of CIGs (RoK 2007).

Other chosen methods for reaching women are (for instance, NALEP 2011; RoK 2008, 2007, 2010a&b).

- Demonstrations: female farmers prefer demonstrations when compared to male farmers.
- Group approaches are specifically preferred by female farmers.
- Courses: Residential courses are popular with women, though men usually make up the majority of participants. This is attributed to women being tied down by family responsibilities and husbands not allowing them to attend.
- ICT: Very popular with women, especially in peri-urban settings.

What are the success factors?

Socially- based Common Interest Group approach promotes context specific and localized interventions and participation and hence embraces a sustainability agenda. It cushions women from different vulnerabilities but also triggers men to embrace responsible behavior in securing improved quality of life for the families. It helps to deal with myths and beliefs related to women incapability of owning and undertaking successful business ventures. It promotes integration of local or indigenous technical knowledge (ITK) in contemporary extension services (RoK 2007:37-40). The approach promotes learning within the social set ups and amongst individual members (NALEP 2009:15). This contributes to increased social capital that enhances groups' success in terms of economic growth and social welfare (RoK 2007:28-34). As a result female farmers have a higher level of awareness of extension services and related knowledge than men. This is attributed to the multiple social networks used by extension agents as entry points into the farming communities.

What are the constraints impacting the effective use of these approaches (social, cultural, economic, technical, environmental, infrastructural)?

The main constraints identified in the grey literature include:

- Cultural definition of roles and responsibilities. This tends to place women as taking care of household chores while men are supervisors of production-related activities. This affects the overall perception and attitude of women as weaker gender, leading to a gender bias in articulation of extension-related services and activities (NALEP 2009:54-58).
- Traditional beliefs that promote certain retrogressive cultural practices, i.e., witchcraft, women's crops/versus men's crops, etc. (RoK 2007:38,40).
- Decision making and control of assets. Most important agricultural decisions are made by males as heads of households. They also have greater rights and opportunities to adopt most promising extension messages, which may be attributed to their control over land and relatively better purchasing power in terms of accessing farm inputs and valuable information (NALEP 2009: 59 - 63).
- Technical constraints (confounded by cultural factors) exist that relate to few extension workers compared to the number of women farmers. The few times they are available, women happen to be busy undertaking other activities.
- Perpetual use and introduction of low-level technologies that do not take into cognizance the factors that impact their usage (context). They are therefore not gender-friendly and are also not advancing with unprecedented technological developments (RoK 2007:36-38).
- Lack of gender responsive indicators to guide in monitoring and evaluation and also measure impact (RoK 2007:7).
- Failure by the general extension services to embrace gender. For instance, the gender extension officers are given 1-2 hours slots to articulate gender issues in CIGs meetings or other agricultural extension gatherings, like field days or barazas (RoK 2007:17).

Summary of success factors and constraints

The methods and approaches have varying success factors and constraints; these are summarized in Table 4 below. This analysis is based on the grey literature reviewed.

Table 4: Success factors and constraints of selected extension method

Approach/method	Success factor	Constraints
Field days	Reaching many farmers/stakeholders, cost-effective	Low content of extension technologies disseminated, poor at imparting skills
Demonstrations/shows and exhibitions	High in content, skills acquisition, attract large number of participants; good for targeted technologies like value addition; are practical and makes understanding a certain agricultural practice easier	Limiting in terms of number of technologies transferred in a particular period
Individual farm visit or farmer-to-farmer	Preferred by majority of farmers because of personalized attention to specific needs, minimal cost, time efficient, farmers' demand driven, participation & skills acquisition high; are important for follow-up after the other group-based activities, as each individual farmer is personally attended to.	Locks out participation of wider stakeholders, few extension providers versus its popularity with farmers
Courses	Gives detailed content of technology or innovation, high number of technologies transferred in a particular period, potential high participation of wider range of stakeholders	Limited participation because of cost and time constraints
Barazas	Ideal for quick transfer of sensitization emergency messages	Poor in content, skills acquisition and number of target technologies and beneficiaries
On farm trials	Good in content, skills acquisition & beneficiaries participation	Not popular in extension services (popular in research)
Educational tours	Promote interaction and opportunities to learn new skills	Few numbers reached/benefit, not cost-effective, distract farmers from engaging in other activities
Farmers field schools	Good in content, skills acquisition & beneficiaries participation	Few numbers reached/benefit, poor in other stakeholders participation, poor number of target technologies
Shows, exhibitions, role plays, song and dance	Good in the high number reached, timely and efficient awareness, Some, like radio programs, can combine with other activities at home, especially	Poor in content, skills acquisition and number of technologies passed on and beneficiaries/ stakeholders participation; not

Approach/method	Success factor	Constraints
	when the timing is appropriate	cost effective, not popular in many regions
ICT/mass media, radio programs	Good in content, number of technologies passed on & beneficiaries/stakeholders participation	Weak in number reached, time efficiency and skills acquisition, constrained by low computer literacy and poor ICT infrastructure
Group visit	Is demand driven, time & cost effective, in groups ideas are shared and specific needs of each group are addressed	Not widely practiced in Kenya
Common interest groups (CIGs)	Ability to mobilize different groups; effective sharing of resources; high level of participation; sense of identity	Management challenges and reconciling of different views and interests

4. CASE STUDIES

Case Study 1: ICT- Kenya Agricultural Commodity Exchange

The Kenya Agricultural Commodity Exchange (KACE) is a private sector firm that aims to provide reliable and timely market information and to link buyers and sellers of agricultural commodities. Its vision is, “Making markets work for small holder farmers and agribusiness”. KACE began operations in 1997 and over the years has developed a system that is more suitable to farmers: one that is closer, more accessible, and easier for farmers to use. The system includes traditional face-to-face interaction with modern information and communication technologies.

KACE seeks to develop a competitive agricultural marketing system that is transparent and efficient – a level playing field, where demand and supply determine the price and harness and apply information communication (ICTS) for facilitating trade and information access and use.

The Approach

ICT extension messages received are on markets prices for commodities, inputs, and technologies available.

Key elements of the approach

Rural Based Market Information Centers (MIC): These are information kiosks in the rural markets that provide market information such as current commodity prices in different markets to farmers and traders. They also link buyers and sellers by matching commodity offers and bids. Information boards are used to post the commodity prices in different markets, offers, and bids. There are 12 information centers in Western, Nyanza, Rift Valley and Eastern provinces in Kenya. An average of 550 farmers and traders visit the center each month.

Farmers, traders, agribusiness operators, and other users visit MICs to obtain information often available on bulletin boards, or they place offers and bids on trading boards for matching. MRCs are being franchised by KACE to local entrepreneurs to operate them on a commercial basis, which has helped women since these centers are brought nearer to them.

Franchised Market Resource Centers (MRCs) –These are legal entities registered under the Companies Act, owned and run by independent entrepreneurs. KACE franchises its information center model to local entrepreneurs to provide value added services including transport, storage and weighing at a fee. This is a strategy used by KACE to address its lack of capacity to respond to additional marketing services demand by the farmers, such as commodity grading, storage, transportation, shorter trade credit and access to timely affordable inputs, which the farmers and small agribusinesses in rural remote areas are willing and able to pay, product bulking, quality control, and e-services, including Internet and electronic money transfers. There are five MRCs in various towns (Machakos, Bungoma, Eldoret, Chwele and Kitale). They collect samples of the produce and prices for display; at the same time, they provide information on market requirements and prices, thus bridging the technology gap and digital division between urban and rural areas.

Mobile Phone Message service: A mobile phone owner sends a short text message to a special number (411), then information on the commodity prices in which the person is interested is automatically sent as an SMS. These messages giving current price information for a commodity in five markets would normally cost KSh.7. KACE in partnership with Safaricom, Kenya's biggest mobile provider, offer these services. This is favorable to women farmers but constraining in terms of resources when considering other needs that woman may prioritize.

Interactive Voice Response Services: This is a voice equivalent to SMS service. Callers dial a special phone number (0900-881188) and follow a simple voice-operated menu in English or Kiswahili. The service is a voice mail message with prices, trade information and extension messages. KACE provides this service in partnership with the Interactive Media Services, Ltd. The cost is KSh.20 per call, which is too expensive for women.

Internet Based Database System: KACE's website using regional commodity trade and information system (RECOTIS) provides price information for 42 commodities, plus a library (mail list) of agricultural information and a virtual trading floor. Updated market information on agricultural commodities and livestock is sent daily to RECOTIS subscribers as an excel worksheet attachment. Users subscribe to the systems for daily emails with commodity prices in markets in Kenya, Uganda, and Tanzania. Categories of subscription are: student- \$50 p.m, Individual \$100 p.m, SME's \$500 p.a. and corporate \$2,500 p.a. This is expensive and requires a certain level of education, and is therefore not favorable for illiterate farmers.

Radio: Market price information is broadcast on national radio (Kenya Broad casting corporation- KBC) and Local FM stations including Mbaitu FM in Eastern Kenya and West FM in Western Kenya reaching approximately five million listeners a week, many of whom are farmers in the rural areas. Women stand

to benefit, but the programs must be engendered; for example, a survey on when programs are aired and whether this is favorable to women considering other roles could be implemented.

Soko Hewani (Supermarket on air). This is a virtual trading floor on a rural radio station, West FM, in Western Kenya that matches offers and bids for farm commodities, input and services. Interested buyers and sellers call in, then negotiate and agree on price and terms including a negotiated commission for KACE; they then sign a sales agreement. The buyer may pay KACE with instructions to pay the seller once the goods are delivered in the quality and quantity agreed upon. This may not be women-friendly, since negotiations require some skills and therefore a certain level of education. KACE also arbitrates in cases of dispute between the buyer and the seller. Soko Hewani is accessed through KACE market call center (MCC). Partner's radio stations select a limited numbers of offers and bids from the MCC database for broadcasting on Soko Hewani. Listeners phone into the radio program and the presenter refers them to the market call center for more information.

Market Call Center: Farmers or traders call number 0900 881107, the call is received by the call center agent who captures the information on location and the needs of the caller, i.e., bids or offer for commodities. The call agent provides relevant information to the caller. Select offers and bids made through call center are aired on Saturdays by KBC. The call cost is KSh.10 per minute.

Training: KACE engaged technical agricultural experts at MRC levels to provide training in response to technical demand of the farmer groups to compliment the service offered by FMRC. Trainings are also provided using Barazas and farmer groups in collaboration with other extension providers. Promotional materials were used as conduit for disseminating information about KACE's ICT products/model.

Who does what at different levels?

KACE staff based at the MRCs and Market Information Centers (kiosks) in major markets collect data daily on the prices of commodities and sends it to headquarters where they are processed, analyzed, and shared with the different outlets of information dissemination. Data on offers and bids collected using different channels of KACE is analyzed and shared on a daily basis. Farmers and traders make the effort to reach out to KACE for information on commodity prices, markets, offers, and bids.

The Central Hub at the KACE Headquarters in Nairobi serves as the nerve center of MILS. The Hub receives, processes, manages, updates, disseminates and coordinates market information services through the MILS, using the channels described above: MRCs, SMS, IVRS, Internet, and Radio. The Hub consists of a Server, wireless internet connectivity, and several PCs linked in a LAN for fast and timely receipt, processing, and dissemination of market information by the KACE Information Technology staff.

How are the activities integrated? And how does the wider articulation happen?

The different ICT methods, which include visual boards, Radio, SMS & calls are used to disseminate information at all levels. The clients choose the options they want to use. Below is the information flow diagram for KACE extension.

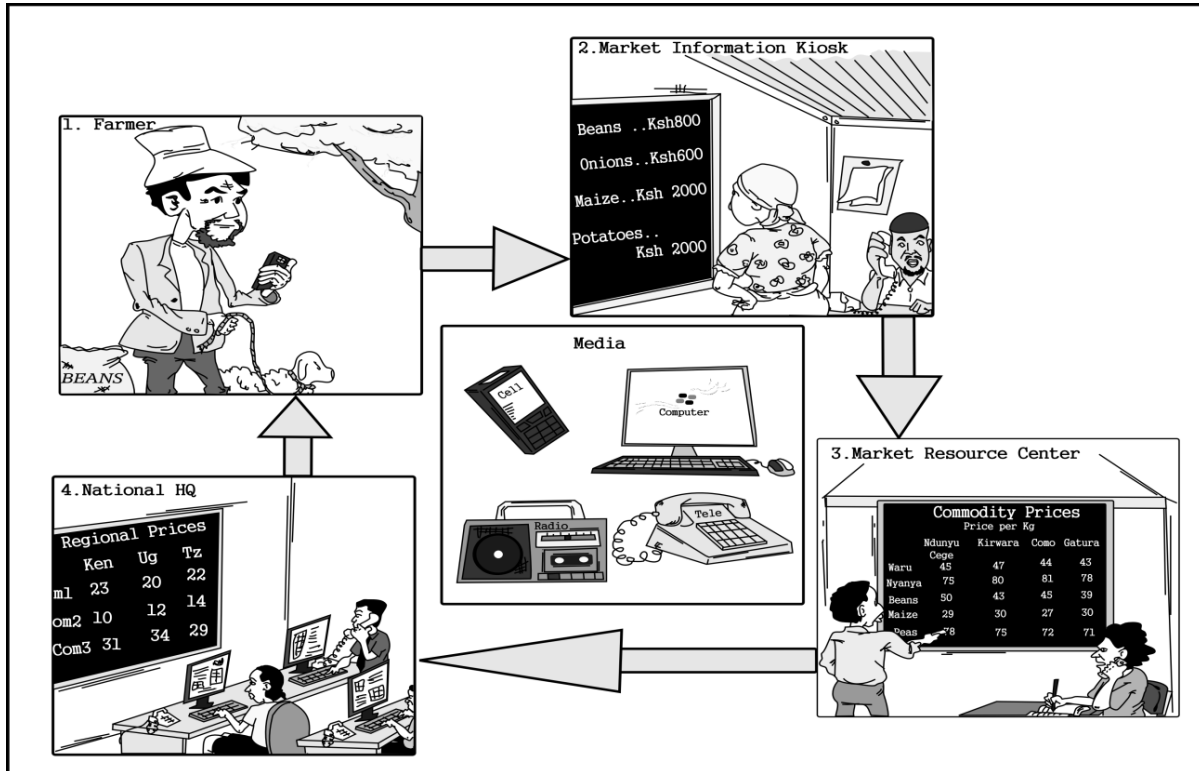


Figure 1: KACE ICT Information Dissemination Diagram

Effective ICT extension method to rural women

The available and most used media was radio, followed by SMS-Sokoni. The radio reception and coverage in all rural areas has been good. The use of local language FM helped in capturing the audience of rural women whose literacy is low. The technology of SMS is used in communication for other services and the majority of rural farmers are comfortable with its use including women who can read and write. However, a combination of the ICT methods yields better results.

According to KACE (2011), 66% of the farmers received KACE market information through KBC radio (see Figure 2).

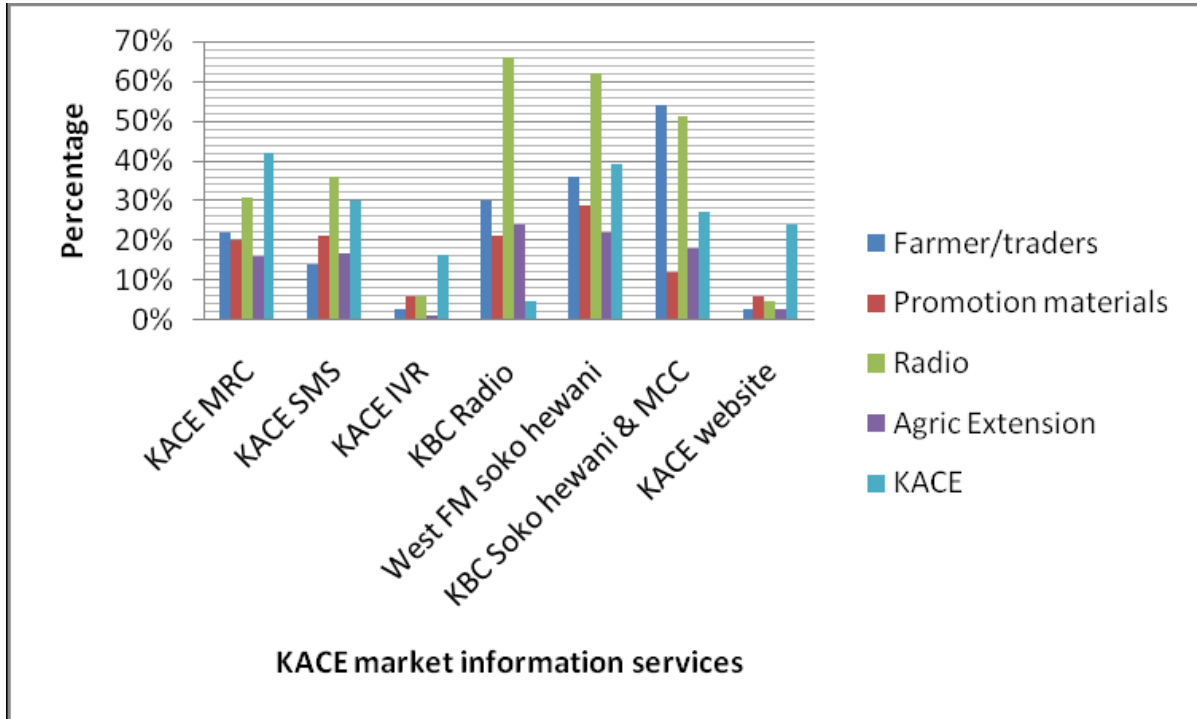


Figure 2: Sources of KACE market information

Evidence of scale in use/impacts/achievement/benefits to women of the methods used

Scale of Use:

According to KACE (2011) study report, *the market information system access* by farmers was widespread with 76% of the farmers being aware of price information, offers, and bids made through KACE-based agricultural trade service (Figure 3).

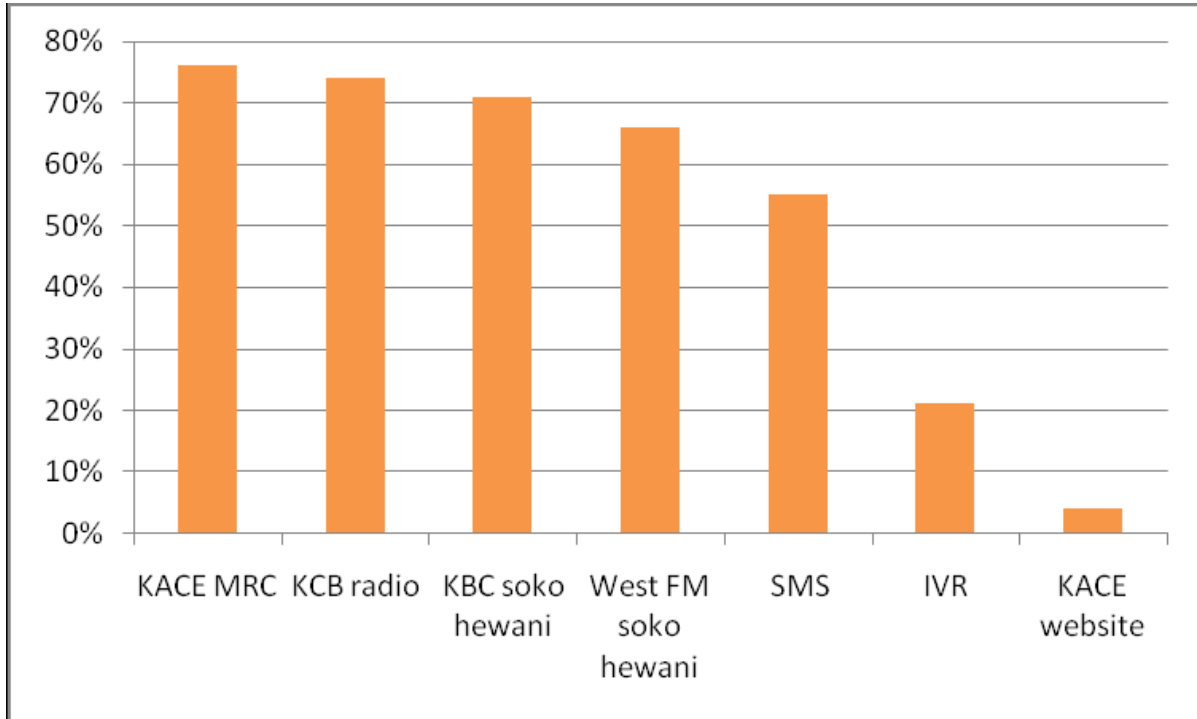


Figure 3: Access of KACE market information

60% of the farmers accessed and used KACE market information services aired on KBC radio and 5% used information from KACE interactive voice response services (Figure 4).

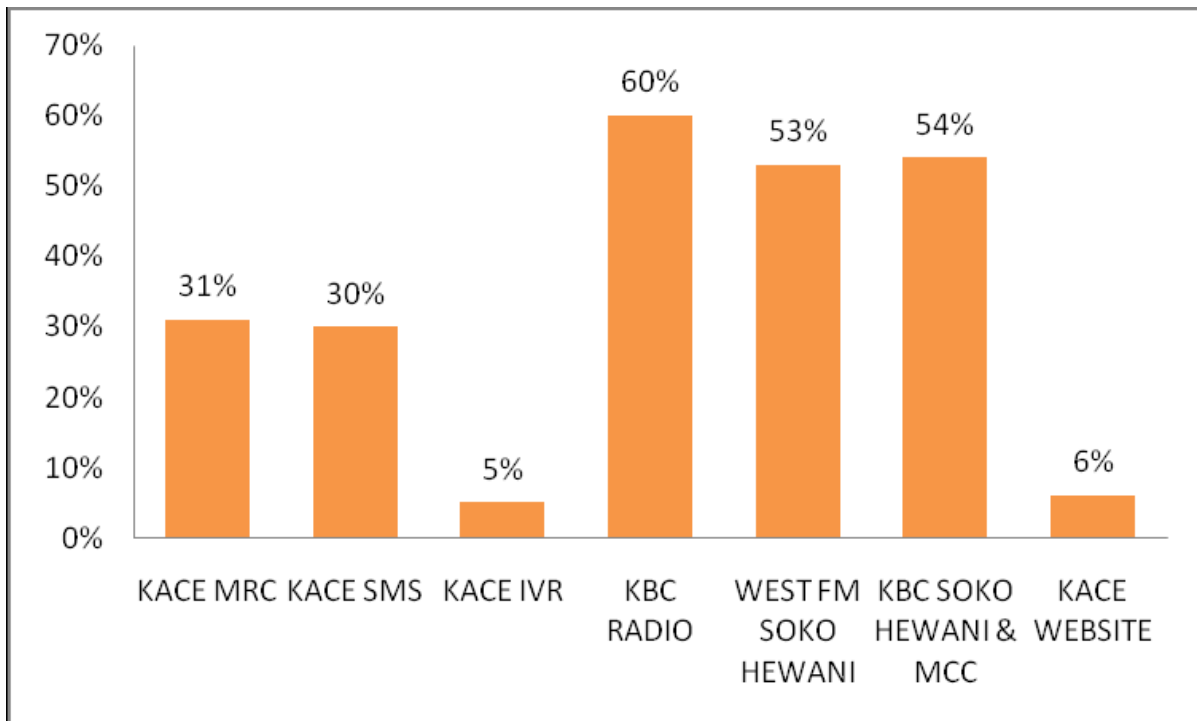


Figure 4: Use of KACE market information services

Farmers sought varying types of information with price and trade information being the most sought (Figure 5).

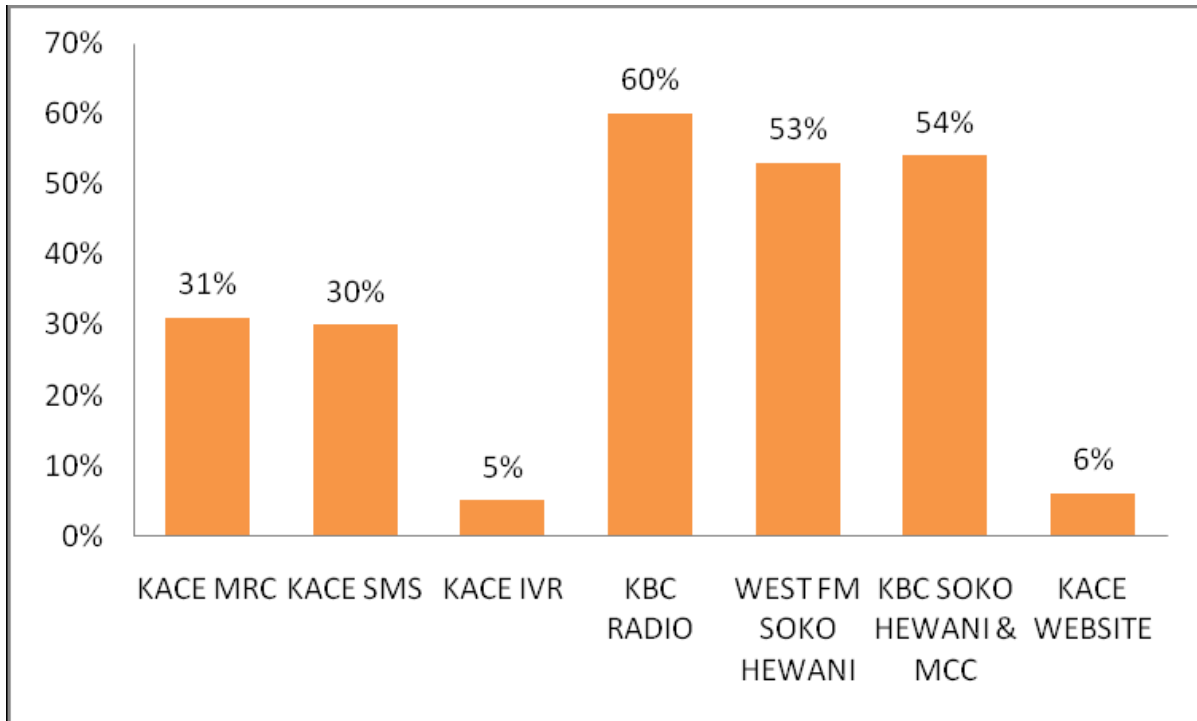


Figure 5: The market information sought by farmers

In terms of frequency of accessing KACE market information services, 38% of the farmers listened to Soko Hewani program aired on West FM radio broadcast daily, KACE website was the least accessed. 21% of the farmers used the Short Message Services (KACE SMS) when trading as shown in figure (6) below.

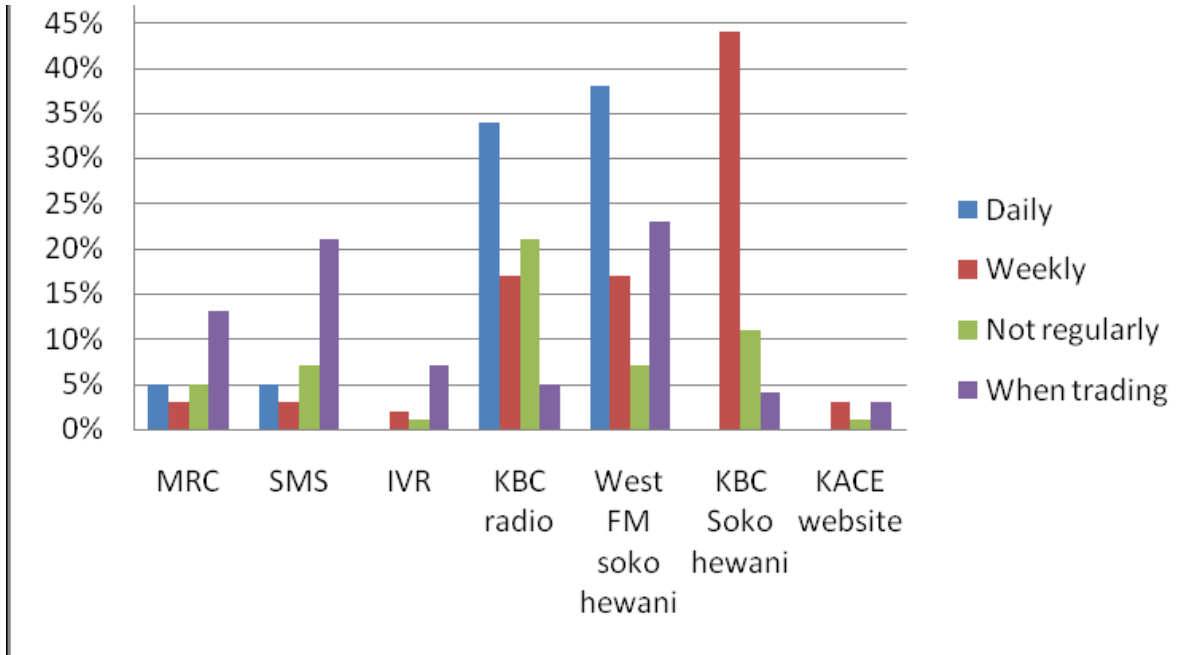


Figure 6: Frequency of accessing KACE market information services

There are varying benefits attributed to utilizing the information services by the farmers (Figure 7). It was noted that farmers who used market information demonstrated an increase in revenue generation by an average of 20% between year 2008 and 2010.

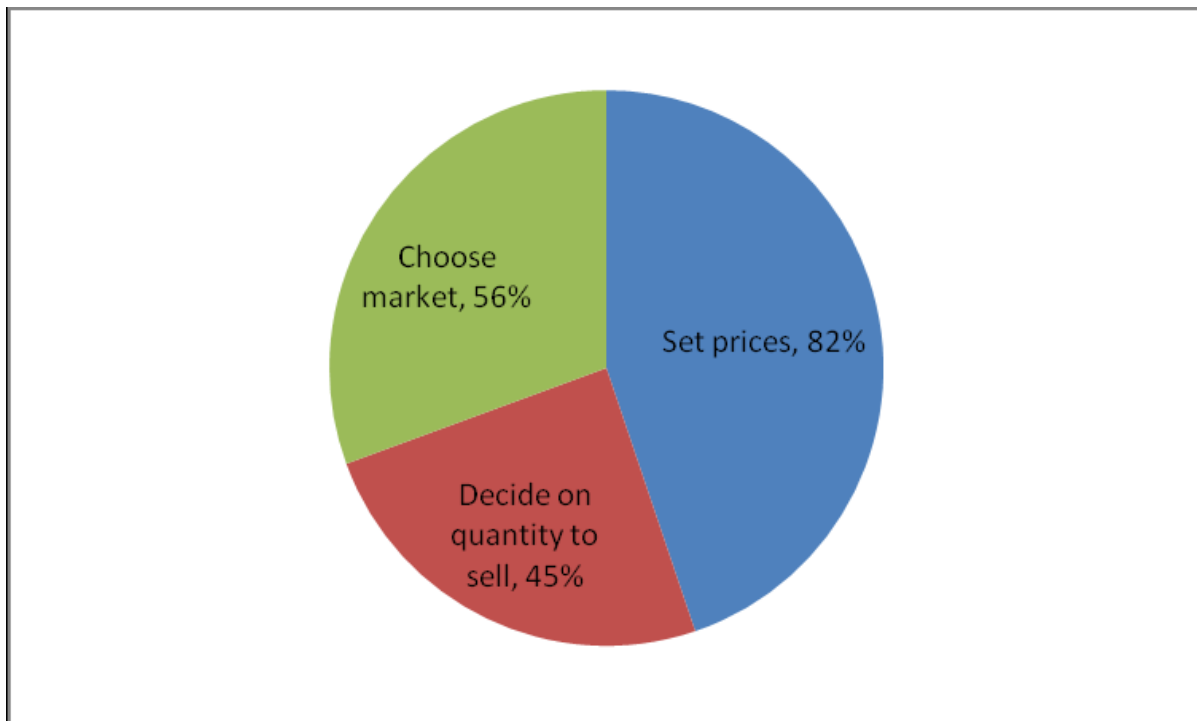


Figure 7: Benefits of utilizing the information services by the farmers

Impacts/achievements/benefits to women of the method used

- Enhanced knowledge about market information empowered the smallholder farmers' (women) bargaining power to market their produce
- By accessing market information, women farmers were empowered to choose the market with highest benefits
- Women/farmers gained knowledge and skills on inputs to use and where to find them, crop husbandry, organic farming and alternative inputs like compost manure (how to make and use), environmental conservation, and growing of medicinal trees (Mulinga, Aloe Vera, hibiscus, etc.)
- Increased income from sales of small stock (women stock, e.g., chicken, eggs) and milk and harvest at better prices
- Ability to pay school fees/needs from income generated by the women
- Reduced cost of production inputs through adoption of compost manure use
- Family food security improved through adoption of better farming technologies and diversification of crops (drought resistant crops and high values crops, quick maturing varieties) which have increased the yields and improved the family health
- Reduced workload for women through adoption of water harvesting technologies that eases access to clean drinking water
- Positive behavioral changes with farmers wanting to know the commodity prices and demanding for technical information
- Self-employment for women through farm-based enterprises that have high markets and good prices

Success factors

- Well-developed ICT infrastructure for radio and mobile phone coverage
- Majority of the rural household own a radio and a mobile handset
- Familiarity of SMS tool as a means of communication in mobile phones
- Use of Kiswahili and Local language (FM) facilitate reach to wider audience in case of Kiswahili, while the local FM facilitates reach to illiterate farmers, majority being women
- Partnership that has brought synergy in technical support and financing for the ICT systems and complementary extension services, like training

Leveraging on the success factors

- Widening the partnership base to improve the financing of services and outreach to the farmers
- Continuous development of the ICT products and revising the existing once for improved information sharing
- Upgrading the IT system
- Franchising the MRC Model for efficiency and income generation

Failure factors

- The high costs of using the radio limits the frequency of usage, while the high call costs make ICT inaccessible to the poor but willing farmers; indeed, this and high costs of the ICT system maintenance make ICT unaffordable to the rural women
- Market forces of demand and supply interference by cartels, which bar farmers from accessing the markets at the right prices
- Slow adoption of ICT in extension due to poverty, apathy, and illiteracy among the rural poor women

- Complexity of use of ICT-based communication tools and relatively high cost of accessing the tools such as the internet in remote areas limit ICT accessibility to rural women
- Climate change with negative effects on farm yields, which in turn affect the use of ICT information
- Poor road infrastructure inhibiting farmers access to markets; long distance from the information center

Wider analysis

- Accessing the various sources of information, namely radio, short message services, interactive voice response, internet, and subscribing to selected sources enhances knowledge about market information and empowers the smallholder farmer bargaining power to market their produce and to choose the market with highest benefits; farmers who use market information had an increase in revenue and yields as compared to farmers who did not
- Farmers' access to information increases the level of agricultural commercialization among smallholder farmers as they are able to adopt profitable production alternatives
- Access to market information enables farmers to set prices of farm produce, choose the market at which to sell their produce, and decide when appropriate to create time utility for their produce by storing non-perishable products to sell at a later date or create place utility by transporting their produce to a well-paying market
- Provision of timely and adequate market information cushions farmers from exploitation by middlemen who dominate most agricultural product value chains



Photo 1: Women farmers in Machakos who are beneficiaries of extension services

Recommendations

- Increase the frequency of the radio days and change the timing to correspond with family calendar – evening between 8.00pm and 9.00.pm when women are able to listen.
- Policy interventions that would enhance affordability of ICT by the rural poor. This could mean engaging more players/ICT service providers to reduce the cost of products/services or targeted support for rural women, e.g., subsidized calls.

Success story: Using ICT to commercialize local chicken production and marketing, James Muthoka

James Muthoka hails from Kaathi Village, in Kimutwa Location, Machakos Central division, Machakos County. He is 62 years old and married to Jenifer Nzilani; together they have five children. James was retrenched from formal employment in 2000. At the time his children were joining secondary school while others were in upper primary. He had to do something to generate income. In 2003, through the support of a friend, James attended a two-month training program in poultry keeping and later an additional two weeks in crossbreeding of local chicken with high quality chicken for improved chicken quality. James realized the need for active participation of his wife early enough and introduced her to the selective breeding technology. Later they were trained together by Kenya Agriculture Research Institute (KARI) on commercial chicken rearing technology.

In his first business venture of chicken rearing, James invested KSh.20,000 and bought 200 chickens, but the project failed. In the second venture, he bought 6 hens and one cockerel, costing him KSh.5,000. He used selective breeding technology and Metro data to prepare for vaccination, treatment of different diseases (hot and cold weather) to ensure that the chicken start laying eggs the same day, incubate and hatch chicks together. His chickens go through four cycles of laying, incubating, and hatching per year.

James uses KACE information service, market linkages and personal internet connection to acquire orders and market his one day chicks and fertilized eggs. One chick sells at KSh.380 and one egg at KSh.15. In one cycle he earns KSh.27,360 and in the four cycles of a year, KSh.109,440. Customers come for the chicken at his home on agreed dates. Due to the high market demand, James is training other farmers in the technology with strict supervision to ensure quality is not compromised. During the interview he remarked, “I sell quality, not the size of the chicken”.

In addition, James uses metro-data to plan the planting of crops on the farm, which gives him good yields on maize and beans. He also markets the produce using ICT, earning an average of KSh.132,500 per year. His total average income per year from chicken and crop production is KSh.241,940.

James and Jenifer have used their income to educate all the children to the university level, build a permanent house, and buy 4 acres of land. The family has also upgraded their Zebu cattle to Guernsey breed, which have a higher milk yield.

By embracing use of ICT, James and Jenifer have managed to change their incomes and living standard, a real transformation.

Case study 2: Transferring skills, technologies and expertise, Njaa Marufuku Kenya (NMK) Program

Njaa Marufuku Kenya is a collaborative initiative of the Ministries of Agriculture, Livestock, Fisheries Development, Cooperative Development and Marketing, Education, and Health in the fulfillment of Millennium Development Goal I: Eradication of extreme poverty and Hunger by 2015. The project was formulated within the context of the strategy for revitalizing agriculture (SRA) to provide an overall strategic framework for a ten-year action plan for hunger eradication in Kenya (2005- 2015) (RoK 2005).

The overall objective is to contribute to the reduction of poverty, hunger, and food insecurity among poor and vulnerable communities in Kenya by 2015. The project aims to increase agricultural productivity, higher rural incomes, health and nutrition improvements, and conservation of the natural resource base.

Target beneficiaries are rural and urban resource-poor individuals who are actively involved in agricultural production, organized in groups and registered by relevant authorities.

The Approach

NMK used was technical support and grants to buy inputs for the implementation technologies.

Key components of the approach

- a. Support to community-driven food security improvement. NMK provided grants of KSh.120,000 for crop enterprises and Ksh.150,000 for livestock and aquaculture enterprises. Key activities include: small-scale irrigation and water harvesting; production of high value crops, value additions and marketing, environmental conservation; draft animal power; promotion of livestock and aquaculture (fish farming) enterprises; artificial insemination and animal health services.
- b. Support to community nutrition and school meals. NMK supports community-based school meals program to improve food access for school going children (pre-school and primary level), address “hidden hunger” and promote agricultural education to the youth. Supported schools source their food requirement from the local small-scale farmers, creating ‘micro-markets’ for the surrounding community.
- c. Support to private sector food security innovations. NMK applies the Private Public Partnership development concept to support registered community based organizations, non-governmental organizations, faith-based organizations, and private sector organizations to scale up hunger and poverty reduction innovations with the potential for replication. Key activities include: seed bulking and multiplication of cleaning planting materials, high quality inputs, agro-processing and value addition, agricultural technology transfer, small scale irrigation technology transfer, rain water harvesting, and environmental conservation.

Extension methods

The extension methods used include:

- Demonstration at different stages of the enterprises
- Farm visits
- Field days within the community and learning exchange tours
- Barazas mobilization and awareness raising among the beneficiaries and the local leadership and partners
- Training on management for school management committees and volunteer community nutrition

Most effective methods

The most effective method was demonstration-driven by the motto ‘What is seen is easy to practice’. Demonstration allows for question and answer, practice and observation. However, it is noted that no method is sufficient on its own; a combination of methods yields better results. The extension messages originate from the relevant ministries.

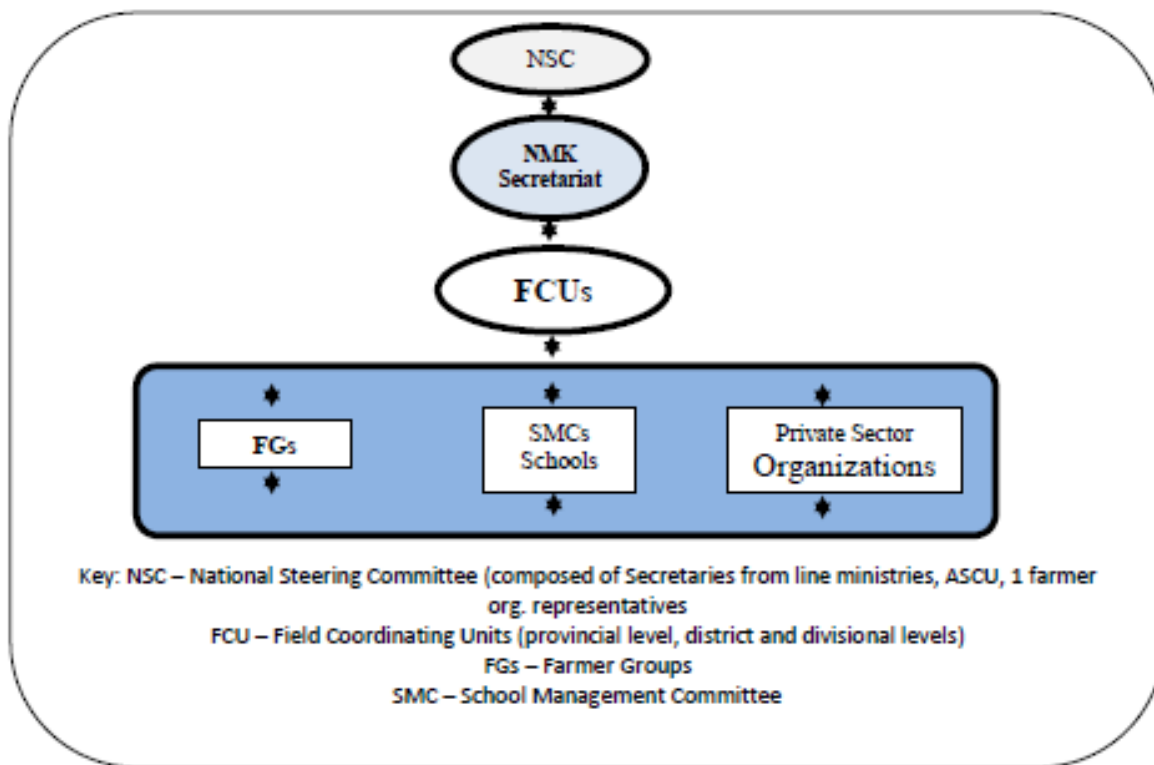


Figure 8: Stakeholders and their integration in extension services dissemination

Evidence of scale in use/impacts/achievements/benefits to women of the method used

Scale in use

- Support to community-driven food security improvement has been provided to 4,278 groups and grants, amounting to Ksh.535.9 million disbursed. Over 60% of the beneficiaries are women
- Support to community nutrition and school meals have been provided to 80 schools, with Ksh.185.7 million disbursed for the activities. It has been observed that funded schools have

significantly improved enrolment, retention, and performance of the pupils. Communities around the schools have trained nutritional volunteers, who continue to offer nutritional services. Capacities for school management committee responsible for school meals programs for the funded schools have been built

- Support to private sector food security through Private Public Partnerships has enhanced synergy in technology transfer with 109 private sector organizations (71 in food security and 38 environmental initiatives) funded and ksh.1,717 million disbursed

Impacts/benefits to women

- Women have gained knowledge and skills on different enterprises being promoted by NMK, as the program has a conditional requirement that 60% of the beneficiaries are women
- Increased income for women through increased production and engaging in agribusiness trade
- Empowerment to make social and economic decisions as a result of change in economic activities as well as change in division of labor resulted from the adoption of new technologies that facilitate commercialization of enterprises of less interest to men and innovative/economical group enterprises
- Grants provided to the group serve as revolving table bank for women where they can borrow to implement individual initiatives
- Retaining girls in school, girls who would otherwise be married especially in the arid and semi-arid areas, has contributed to increased literacy among women
- Change of occupation from pastoralist to mixed farming in the semi-arid, e.g., among the Maasai in Narok, has facilitated women's access to land where they plant crops for family and sale within their control
- Improved diet and nutritional health knowledge
- Improved decision-making by women at household and individual levels attributed to the change in livelihoods sources
- In the pastoralist community, women have been settled to homes
- Improved food security, which reduces the burden of women to look for food and in turn, improves the family health reducing the burden of care for the sick by women
- Reduction in domestic violence and economic independence of women on men as a result of alternatives incomes

Success factors

- Availability of funds from the government and human capital with expertise in extension and technologies
- Political will and support from administration and stakeholders
- Positive perception and reception of the program by the community
- Combining methods of extensions and grants support for inputs made it easy to implement the technology innovations
- Institutional structures for management and coordination of the project implementation with clear mandates

- Collaboration among several ministries including agriculture, livestock, fisheries, education, public health and sanitation, and in the private sector like the world food program supported by the FAO, which helped in pooling together technology, skills, and resources for the success of the innovations
- Combination of the three components of the NMK, which facilitated the integrated innovations implementation and skills synergy for better results
- Cooperation from the target group and the communities
- Close follow up on the implementation of activities/innovations beyond the grant period
- Clear implementation guidelines, training manuals and education materials
- Multi-tiered institutional framework for coordinated decision-making and supervision

Leveraging on the success factors

- Collaboration with different stakeholders for technical and financial support for initiatives that complement the innovations/enterprises
- Involvement of the local administration in continuous awareness-raising, mobilization for community participation in the school gardens, and access to land for demonstrations as well as conflict-resolution
- Negotiations with relevant ministries and partners to retain technical staff in a given geographical area for the period enough to complete the implementation of innovations and enterprise

Failure factors

- Climate change with negative impacts on the enterprises
- Poor road infrastructure
- Transfer of technical teams involved in the implementation of the enterprises/innovations to different locations which interferes with the pace of implementation and at times the performance
- Extension teams that are not up-to date with technological changes
- High poverty rate, apathy, and overall negative attitude from the beneficiaries
- Mindset and feeling that government should give things for free
- Change of political office bearers, which affects cooperation among stakeholders
- Inclusion of the District Coordinating Units as signatories to grants given for community enterprises as a measure for ensuring good governance cause delays in access to the funds and timing of activities
- Limited transport facilitation for the extension technical staff
- Illiteracy and language barriers in technology transfer
- Wide areas covered by one field extension officer

Wider analysis

- NMK-integrated approach has contributed to different international agreements and conventions including MDG 1, 2, 3 & 7, and Convention of elimination of discrimination against women
- The 4-k club has succeeded in creating agriculture interest among the student and in turn replication of agricultural-activities at the household level. Having more projects targeting 4-k clubs and youth outside school will facilitate easy adoption of technologies and innovation among different gender groups
- Deliberate decision of NMK to have 60% of the beneficiaries as women in different innovations have reduced the gender gap in extension support to women; consequently, they made an attribution to their social economic empowerment
- Targeting the lower pyramid and supporting initiatives with high potential for replication increased the impact of the project
- Collaboration attracted other stakeholders who would not have supported the innovation and technology

Recommendations

- Reach out to more youth and interest them in agriculture
- Improve publicity, documentation and dissemination
- Grants to be given directly to the community with strict supervision and reporting timelines by coordinating teams
- Regular refresher courses for the extension teams to up-date their technological skills

Success Story: Ongata Naado Primary school; school meal program

Ongata Naado Primary School is seated on 50 acres, located in Ongata Naado location in East Mau division, Narok County in Kenya. The sub-location covers an area of 105.7km² and has a population of 2337 people (1135 male and 1202 female). The sub-location has four villages: Enatarior Kiteng, Enelera, Enorpopong and Ongata Naado. The inhabitants of this location are Maasai and their main source of livelihood is nomadic pastoralism. Land is communally owned.

Before the start of the project, the area served as a migratory corridor for elephants. Human and wildlife conflict was high. Sociocultural traditions involving early marriage for girls and nomadic lifestyle adversely affected school attendance. The poverty level was 59%, and it was ranked as the fourth poorest sub-location in the district. The primary school was served by four early child development centers – one from each village. School enrolment was low, especially for girls. Retention and completion rates were also low.

Ongata Naado was selected as one of the three pilot projects in the whole republic of Kenya for the implementation of NMK component 2 (community nutrition and school meals program) in 2005. The objectives of the component were linking local production to school markets, nutrition intervention, and improved school performance of children.

Key objectives of the components were:

- Empowering of school committees through capacity building and provision of start-up grants
- Encourage involvement of youth in agriculture through 4-k clubs and revitalizing of school gardens

The school received KSh.1,792,479 for school meals, capacity building, and initiation of 4-k club activities from 2006-2009. The school community received KSh.120,000 under component 1 to support a food production project for the school. The school also benefited from the third component of NMK Private Public Partnership where World Concern (NGO) was supported to develop the farm infrastructure, i.e., fencing of the school garden to keep wildlife away.

The main achievements include; electric fence built all around 28-acre school garden; equipped solar power system; school management committee (SMC) of 14 (13 parents and one head teacher) trained on management; wider community training on farming technologies using barazas, demonstrations, and field days; formation of 4-k clubs; cultivation and production of food crops on 28 acres of land to feed the children; a borehole and water tanks for clean drinking water; boarding facility for girls; trees planted for environment conservation; earth dam for irrigation.

These achievement were made possible by the participation of various stakeholders including: NMK who provided financial grant and capacity-building for the community, volunteer nutritionists and students; community/parents who provided management for the project and labor support in the school garden; World Concern under Public Private Partnership with NMK, which fenced the school farm with an electric fence powered by solar system and de-wormed the children; collaborators such as County Council-LATIF, which built the girls dormitory and kitchen; World Food Program that donated two energy-saving jikos; Operation Eye Sight that drilled a borehole; Anglican Church of Kenya, which donated two water tanks; ENSIDA, which donated 2,000 trees; and parents who donated money to buy a generator and piping the water to different facilities in the school.

The significant changes/impacts of the intervention are many and include: increase in the number of teachers from five to 20 (with 15 female); increased school enrolment from 264 in 2005 to 723 in 2013, with girls enrolment increasing from 94 in 2005 to 353 in 2013; performance in KCPE improved from a mean score of 212 with 12 candidates in 2005 to 252 with 20 candidates in 2012 with all those who passed transitioning to secondary school; promotion of three ECD to primary schools (Enorpopong in 2010, Enelerai in 2011, and Olmunuda in 2013), boarding facility for 160 girls, which improved retention and completion rates, reduced early marriages/pregnancies - this contributed to girls performing better than boys, which made the boys move in to sleep in two classes; rescued girls (ten) are getting free education; the school farm has been developed to produce food for sustainability of the school meals and income generation every year; 4-k clubs membership increased from 80 to 180; integration of agriculture as a co-curriculum in the school.

At the community level impacts include adoption of crop farming and increased understanding of crop varieties; replication of 4-k club activities in the homestead; expanding the transfer of technology; community adaption to growing vegetables, planting exotic trees and use of farm implements; elephants changed their migratory corridor reducing, human-wildlife conflict; community realized

importance of fencing for controlling domestic and wildlife animals with 40 community members working together to replicate the school garden fencing model; cultivating 100 acres; economic occupations have changed from nomadic pastoralism to mixed farming, which have increased the household incomes; land ownership changed from communal to individual ownership with each household owning 25 acres; change of diet and nutritional health knowledge; and positive change of attitude towards girls' education.

Impacts on women include acquisition of skills in agriculture and access to land where they grow food for family and income generation they control, improved living standards and hygiene since they can afford more clothing from their own incomes, and reduced domestic violence due to their economic independence.

Overall measures of sustainability and social audits have successfully been built in the program. The School Management Committee is divided into departments (garden, co-curriculum, curriculum, finances). The school's farm is divided into villages for labor contribution and rewards given according to number of bags harvested. Each student pays KSh.100 per year. Maize stock and grass are sold to the community. Extra labor for weeding and harvesting is sourced in the community at low rates KSh.100 instead of the market rate of KSh.250. At least 50% of committee members remain on board at any given time. The impacts have motivated all to live to the slogan, "Tenda wema, nenda zako" (in English, "Do good, and go your way").



Photo 2: Maize grown on the Ongata Naado School's Farm

Case Study 3: Social Mobilization: African Conservation Tillage (ACT) Network, Case for Conservation Agriculture in Laikipia East Sub-County

FAO defines conservation agriculture as a concept for resource-saving agricultural crop production that strives to achieve acceptable profits together with high and sustained production levels while concurrently conserving the environment. CA is based on enhancing the natural biological processes above and below the ground. Interventions such as mechanical soil tillage are reduced to an absolute minimum and the use of external inputs such as agrochemicals and nutrients of mineral or organic origin are applied at an optimum level, in a way and quantity neither interferes with nor disrupts the biological processes (Kaumbutho and Kienzie 2007).

The ACT notes that conservation agriculture is not an actual technology; rather it refers to a wide array of specific technologies that are based on applying the one or more of the three main conservation agriculture principles. These principles are:

- Minimum soil disturbance or if possible no tillage seeding
- Soil cover – if possible permanent completely and continuously throughout the year
- Useful crop rotations and associations

Key elements of the approach

The extension methods used include:

- Farmer field schools
- Individual farmers
- Farmer exchange visits to link farmers to technology
- Training for partners induction
- Participatory rural appraisals to map the resources and entry points

Most effective methods is the Farmer field schools (FFS)

Advantages of FFS

- Facilitate farmers' active participation in learning together from their ideas and marry them with the extension messages which create ownership
- Gives the farmer an opportunity to experiment and get a menu to choose from
- Allows farmers to communicate in a language that they understand
- Creates harmony as farmers share ideas
- Farmers learn as they do (experiment and observe)

Disadvantages (weaknesses) of FFS

- Requires substantial capital inputs to be established
- Farmers who do not like working with others are excluded
- Vulnerable groups may shy away, leading to their exclusion from extension services
- Misguided intention of the farmers, which may negatively affect extension services
- Inability to attract couples' involvement due to family competing time needs, which affects the speed of adoption and continuity
- Poor lease agreements for the FFS

Individual/contact farmer method

Advantages

- Training with minimal resources (cheap and easy)
- Use of farmer's resources
- Easy adoption since the farmer is already doing it

Disadvantages

- Limited information flow
- Limited outreach (cannot reach many farmers)
- Conservative farmers may not apply the new knowledge and technology
- What extension messages?
- The messages include: conservation agriculture three principles, farm implements, technology and types of cover crops. Most of the technology exists outside with the farmers and ACT adapts and promotes what can work for a given area.

Who does what?

Stakeholders and their role

The ACT network creates awareness on CA using different avenues such as workshops, media, and agricultural show exhibitions. They also conduct capacity building to provide knowledge and skills through training, policy dialogue, regional meetings, formal education, and discussion workshops, among others. They also help in networking and partnership for collaborative adaptive research and coordination of communities of practice (COP) to strengthen knowledge and information sharing. Thereafter, ACT packages the research information for dissemination and keeps a database on CA.

The Kenya Agriculture Research Institute (KARI) conducts research and development of technology. The Ministry of Agriculture extension department and NGOs conduct identification of the beneficiaries and provide extension services and training to the farmers. The extension teams collect data on the implementation from the farmers groups and shares it with ACT. Farmers groups and individual farmer provides land, labor and apply the extension messages. They also keep records of the activities and yields used by the field extension for reporting on progress.

Evidence of scale in use/impacts/achievements/benefits to women of the method used

Scale in use

- Wide knowledge dissemination on CA to farmers, extension agents, researchers, and policy makers
- Created awareness on CA to academic institutions
- Organized a third world congress in 2005 on conservation agriculture
- Stakeholders, like manufacturers, brought on board to provide knowledge on their services to the farmers
- Local artisans trained on how to fabricate CA equipment
- Wide network of promoters of CA established
- Groups practicing CA increased to more than 30 groups
- Farmers have increased yields and graduated to services providers

Impacts/benefits to women

- Over 60 % of the beneficiaries are women
- User-friendly technology and equipment
- Increased labor productivity through use of animal drafts and CA equipment reduces the burden of labor for women in land preparation, planting, weeding and threshing
- Reduced costs of production, which saves money that can be used for other needs and also enables women to designate a larger area for food crops on the farm
- Time saved through use of CA is used by women to engage in alternative productive work and participate in active public life (e.g., meetings and trainings); women are able to counter the effects of climate change
- Increased participation of women in decision-making in the family land use
- Reduced domestic violence
- Change in division of labor with men taking interest in agriculture because of the technology in use

Success factors

- Adequate technical capacity building at different levels
- Continuous follow-up on implementation
- Material support to fill gaps
- Positive support by all stakeholders
- Believing in conservation agriculture, which triggers passion and sustains momentum
- Readily available chemicals in right packages at the right locations
- Knowledgeable extension officers

Leveraging success

- Instilling the values of CA to extension teams with support of reference materials
- Using successful groups to train others in the neighborhood
- Replication of the initiatives to reach more groups

Failure factors

- Farmers' negative attitudes towards CA
- Inadequate funds limiting the coverage
- Inadequate personnel
- Conflict of interest at partner level
- Existing policy not incorporating conservation agriculture
- Conflict in the use and interpretation of opportunity costs and myths leading to reluctance in adoption of technology
- Age factor: most of the farming is done by people over 45 years, the majority of whom are 50-75 years old, and it is not easy to change their ways of doing farming
- Belief that only chemicals spoil the soil and the inability to conceptualize the negative impacts on the soil from the practices of disturbing the soil
- Small land size 0.7 acres to 2.5 acres per household and continuous subdivision makes it impossible to apply the CA principles
- The cultural belief that group work is for women and the cultural division of labor, meaning men are the only ones who can spray and handle draft animals

- Men leaving the community to go and work outside, yet they have to make decisions on land use
- Contradiction of chemical application in control of weeds to the principles of CA
- Conservation agriculture is a wide technology and it is complicated for farmers to adopt completely.
- Climate change – too much rain or extreme drought inhibits CA practices
- Conservation agriculture is not done in absentia of other agriculture practices, hence the delays in adoption
- Competition on the use of materials (e.g., maize stock) to feed livestock or use for mulching

Addressing the challenges

- Continuous dialogue with the stakeholders
- Putting in place terms of reference and deliverables for the partnership
- Back-stopping and Monitoring & Evaluation visits
- Regular meetings and emails to review progress
- Promotion of cover crops as an alternative to mulching

Wider analysis

- CA agriculture practices are organic and consumption of such produce contributes to good health of the people. However, there is need for favorable policies and marketing systems that will appreciate the value of this kind of produce
- A cabinet paper 2012 on conservation agriculture was done to enlighten the policymakers on CA and persuade them on the need to incorporate CA in the agricultural policy
- There is a global concern on the need to redefine conservation agriculture as a measure for mitigating and coping with the climate change

Recommendations

- Model conservation agriculture per area putting into consideration the people's practices in order to maximize production against diminishing land sizes and the need for food security, e.g., cover crops with economic value to the farmer should be introduced and promoted
- The message packages should be sensitive to the community practice and beliefs for ease of adoption
- There is need for harmony in extension training with refresher training to equip them with knowledge on emerging technology as well as a need for a well-designed facilitation mechanism commensurate with assignment for the field extension
- Raising community awareness on CA could be more effective if delivered as civic education in agriculture
- Waiver on taxation of CA and farm equipment and inputs with a policy on farming as a business will enhance adoption and adaption of conservation agriculture

Success story: Susan Wangeci, a farmer practitioner of CA

Susan Wangeci, 65 years old, is married to Hezron Ndung'u. They have six children. Susan hails from Muchiri Village, Murungai sub-location, Umande location, Ndaiga division, Laikipia East Sub-County. Susan is a member of a group of 17 (five male and two female). In 2007, her group approached the agricultural extension department for support to start a farmer field school where they could learn about conservation agriculture. Susan gave one acre of her farm for the establishment of FFS with an agreement of four years, which lapsed in 2010.

As a participant in the group, Susan learned the principles of CA and their advantages, technologies of the sub-soiler, ripper, and use of herbicides, and the uses of cover crops like dolichos, butternut squash, and pigeon peas. Like the other farmers, Wangeci practiced what she learned in CA on her farm.

Before Susan started practicing CA, her yields were low and at times she harvested nothing. She could only cultivate two acres of land due to labor constraints. Since she started practicing CA, land under cover crop has increased to four acres. Yields per acre increased to 20 bags (each 90 kg) and last year 480 stocks of maize yielded five bags. Other benefits include new knowledge on water conservation, increased soil productivity, being able to counter effects of climate change, and exploring alternative livelihoods like dairy goat and local chicken keeping using her saved time.

Susan attributes her success to her willingness to adopt new technology, reduced labor due to the use of CA technology and herbicides, cooperation and support from her family, and her power to make decisions on the land use as the producer of food. Susan says CA technology is good because it has reduced labor and cost of production in the farm. She says she will continue with the practice of CA.



Photo 3: Wangeci using shallow weeder technology

Success Story: Henry Mwiti; CA farmer and Services Provider in CA Technology

Henry Mwiti, 40 years old, is married with three children. He hails from Kieni dam village, Kalalu sub-location, Umande location, Ndaiga division, Laikipia East Sub-County. After completing secondary school, he bought a bicycle for KSh.1700 and started a milk business. With the savings from the sales from milk, he bought two bulls in 1998 for KSh.7500. He borrowed a plough from his brother and started service provision to farmers in 1999 for KSh.600 per acre. At the end of the year, he bought a plough for KSh.5000 and continued to provide services to farmers in conventional agriculture. In 2000 he bought a cart at KSh.12000 for use in transporting the harvest and animal fodder as a business. In the year 2003, conservation agriculture was introduced, which he embraced as a farmer and service provider. Every season he cultivates an average of six acres using CA technology.

Since the introduction and training on CA, he has gradually purchased equipment; this includes two direct planters, one ripper, one sub-soiler, two carts, two maize cellars, and dam-scoping equipment. Using this CA equipment, he provides services to 70 farmers in the eastern region. Services provided include ripping and sub-soiling at KSh.1500 per acre, planting wheat, peas, and dolichos at ksh.1400 per acre and beans at KSh.1600 per acre. He also offers services for harvesting potatoes and transporting farm produce and fodder for the farmers from the farm to the homestead. He has trained and employed six young men who support him in delivery of the services.

Using the income generated from service provision and CA farming, Henry has achieved the following: he set up a wooden green house, constructed of an animal shed, bought 1 ½ acre piece of land, installed an irrigation system, constructed a permanent house (almost complete), educated a child up to secondary school, piped a water system, and bought a motorcycle for monitoring the service delivery. His net income per years is KSh.340,000.

Henry attributes his success to supportive government policy and NGOs that provided material and technical support; commercial farmers and small competition on manual labor, which disfavor the small holders who opt for CA technology; outmigration of the young people from the community, leaving behind the elderly to tend the land against their failing energy which pushes them to use his service, collaboration with ACT and the Ministry of Agriculture, which has given him exposures and provided a platform for him to market his services, and continuous community sensitization on CA technology.

Henry has also faced challenges, including competition from conventional agriculture service providers that affects the use of CA technology, extreme drought leading to competition for the scarce water among crops to be grown, and tension on whether to use crop residuals for mulching or for feeding animals. Additionally, the bulls sometimes eat into the profits and high turnover of the bulls negatively impacts the customers. Insecurity in the area and stock theft threatens the security of his bulls, there is a lack of cooperation at the household level, which leads to backsliding of CA adopters, and a lack of adherence to CA due to male interference (grazing the cattle in the farm). Also, transfer of weeds from the neighbors' farms make CA practices less effective and erratic rainfall the limits the outreach.

Henry's message to the world is, "If the world is to feed its people sustainably, conservation of agriculture is the way to go. It conserves environment, reduces costs of production, increases yields and ensures soil fertility and productivity."



Photo 4: Mr. Mwiti demonstrating how the ripper works

Success story: Kalalu Agricultural Promotion Group - Farmer Field School

Kalalu Agricultural promotion group started its operations in 2005 with 40 members; it now has 22 members of mixed sex (10 male, 12 female) of different ages. Initially the group's activities included a tree nursery for agro-forestry and ornamental trees, and horticultural produce (vegetables, carrots, etc.). In 2006, the group received support from Njaa Marufuku Kenya for dairy goats. In 2008 and 2009, the groups used the income from tree sales to start poultry keeping. Each member received three chicks to take care of in their homes. Some part of the money was used to start a micro-credit service where farmers borrow money and pay it back after three months with a 10% monthly interest rate. The group has three pieces of land where they conduct different activities.

In 2010, the group was introduced to CA and they started a farmer field school. The FFS has five plots with different practices for experiment and learning. The group uses the three pillars of conservation agriculture (minimum soil disturbance, soil cover, crop rotation) in this plot and applies the four principles of FFS (visiting regularly from time to time, keeping good livestock, and growing crops as a business, working in a good environment, role modeling the FFS practices in individual farms). The group has adopted the use of CA equipment, such as the shallow weeder, direct planter, and jab planter. The group members use the FFS to practice new knowledge, socialize, and share experiences and ideas.

As members of the CA farmer field School, their individual benefits include: reduced labor and input costs in farming, increased yields and soil improvement, increased incomes, and increased farm area under food crop resulting in food security.

Benefits to rural women include: women's participation in decision making on land use, changes in division of labor in favor of women, reduced work load for women as food producers, reduced domestic violence, increased participation of women in community events and public life, time used to listen to radio and watch TV where they gather new ideas/technology and stay in touch with national development.

The success of the FFS is attributed to members' adherence and willingness to apply the knowledge gained, availability of training inputs, easy technology being promoted, farmer-to-farmer extension, which is a motivation, cooperation and support among couples (alternating in the participation of the FFS activities) and participating in exposure tours where they learn by seeing from others. Most of the farmers (non-members of the group) in this community have adopted CA, acquiring the skills through observation in the FFS and farmer- to- farmer extension by the FFS members.

The major challenges facing the FFS include a lack of a suitable economical cover crop, high costs of some of the CA equipment for use on bigger plots, and climate change resulting to erratic rains which affect the germination and, consequently, the yields.

REFERENCES

- “A Gender Analysis of NASEP (National Agriculture Sector Extension Policy). 2009. CGD policy brief. April. Action Aid International 2011. *What Women Farmer Want: A Blueprint for Action*.
- Adolwa, I.S., P.F. Okoth, R.M. Mulwa, A.O. Esilaba, F.S. Mairura and E. Nambiro. 2012. “Analysis of Communication and Dissemination Channels Influencing the Adoption of Integrated Soil Fertility Management (ISFM) in Western Kenya.” *Journal of Agricultural Education and Extension* 18 (1): 71-86.
- Coupe, S., P. Lanyasunya and I. Abdel-Azim. 2010. “Impact of Community Based Animal Health Workers in Samburu District, Kenya.” Case Study: Practical Action. January.
- Davis, K.E.. 2004: “Technology Dissemination Among Small-scale Farmers in Meru Central District of Kenya: Impact of Group Participation.” A Dissertation presented to the Graduate School of the University of Florida in partial fulfillment of the requirements for the degree of Doctor of Philosophy.
- Eidt, C.M., G.M. Hickey and M.A. Curtis. 2012. “Knowledge Integration and the Adoption of New Agricultural Technologies: Kenyan Perspectives.” *Food Security* 4: 355–67.
- Evenson, R. E. and G. Mwabu. 2001. *The Effect of Agricultural Extension on Farm Yields in Kenya*. African Development Bank. 23.
- Gautam, M.. 1999. *Agricultural Extension: The Kenya Experience*. Washington, D.C.: World Bank Operations Evaluation Department. Report No.19523, June 30.
- IFPRI (undated). “Agricultural Extension and Advisory Services Worldwide.” Facilitated by Extension and Advisory Services in Kenya. www.worldwide-extension.org. Accessed Feb. 2013
- “Implementing Community Based Extension.” (No date). Practical Action Briefing. 42.
- Information and Linkage System 2013. KACE. <http://www.kacekenya.co.ke/section.asp?ID=64>. Accessed April 11, 2013.
- Kabutha, C. and M. Okumba, eds. 2013. *Agricultural Sector Gender Policy*. Republic of Kenya (RoK).
- Kenya Agricultural Commodity Exchange (KACE). 2011. *KACE Services: The KACE Market*.
- Kiara, J.K. 2011. “Focal Area Approach: A Participatory Community Planning Approach to Agricultural Extension and Market Development in Kenya.” *International Journal of Agricultural Sustainability* 9 (1): 248-257.
- Kaumbutho, P. and J. Kienzle, eds. 2007. *Conservation Agriculture as Practiced in Kenya: Two Case Studies*. FAO, CIRAD, ACT and World Agroforestry Center. 41.

- Manfre, C., D. Rubin, A. Allen, G. Summerfield, K. Colverson, M. Akeredolu. 2013. *MEAS Discussion Paper 2: Reducing the Gender Gap in Agriculture Extension and Advisory Services*. MEAS Project.
- Marufuku, N. 2012. *Kenya Project Newsletter*. 1.1. April.
- Masoy, A. and P. Pridmore. 1997. *Participatory Learning and Action to Reduce Women's Workload in East Africa*. Institute of Education, University of London.
- Mbagaya, G.M. and V.A. Anjichi. 2007. "Gender Differences in Agriculture Extension Services and Training Programmes in Western Kenya." *Global Approaches to Extension Practice* 3 (2): 122-130.
- Muthoni Thuo, C.. 2011. "The Influence of Enterprise Diversification on Household Food Security Among Small-scale Sugarcane Farmers: A Case Study of Muhoroni Division, Nyando District, Kenya." *The Journal of Agricultural Education and Extension* 17:3, 223-38.
- Muyanga, M. and T.S. Jayne. 2006. "Agricultural Extension in Kenya: Practice and Policy Lessons." Tegemeo Institute of Agricultural Policy and Development Working Paper 26. Egerton University.
- Najjar, D., H. Spaling, A.J. Sinclair. 2012. "Learning about Sustainability and Gender through Farmer Field Schools in the Taita Hills, Kenya." *International Journal of Educational Development* 33.5: 466-75.
- National Agriculture and Livestock Extension Programme (NALEP). 2009. *Particular Assets and Vulnerabilities of Rural Women within the Agricultural Sector in Kenya*. Final Report: 135. August.
- National Agriculture and Livestock Extension Programme (NALEP). 2011. *A Guide to Effective Extension Methods for Different Situations*. Sida. 14.
- National Agriculture Sector Extension Policy (NASEP). 2007. Ministry of Agriculture.
- Njuki, J., S. Kaaria, A. Chamunorwa and W.M. Chiuri. 2011. "Linking Smallholder Farmers to Markets, Gender and Intra-household Dynamics: Does the Choice of Commodity Matter?" *European Journal of Development Research* 23: 426-443.
- Ojango, J.N.K, A. Ahuya, A.M. Keyo and J.E.O Rege. 2010. *FARM- Africa Dairy Goats Improvement Project In Kenya: A Case Study*. International Livestock Research Institute.
- Republic of Kenya (RoK). 2007. *Gender Needs Assessment Report: Organizational and Client Level*. Final Report, Gender Section. Ministry of Agriculture. June. 53.
- Republic of Kenya (RoK). 2008. *Engendering the Provision of Agriculture and Livestock Extension Services: Extension Services in Policy, Kenya Republic*. Ministry of Agriculture. Ch. 1: 1-38.

- Republic of Kenya (RoK), 2010a. *Gender Responsiveness of Extension Methodologies and Approaches*. Study Report, Gender Section. Ministry of Agriculture. June: 36.
- Republic of Kenya (RoK) 2010b. *Gender Responsiveness of Extension Methodologies and Approaches*. Study Report, Gender Section. Ministry of Agriculture. June.
- Republic of Kenya (RoK) 2005. *Strategy for Revitalising Agriculture (SRA): 2004-2014*. (Short version). Feb 2005.
- Republic of Kenya (RoK) 2010c. *Gender Mainstreaming Strategy*. Ministry of Agriculture. March.
- Shibanda, G.G. and J.I. Seru. 2002. "Human Resource Strategy for Kenyan Women Stakeholders." *Gender in Management: An International Review*.
- Shibanda, G.G. and J.I. Seru. 2002. "Human Resource Strategy for Kenyan Women Small Holders." *Women in Management Review*. 17 (6): 285-296.
- Vignare, K. 2013. *MEAS Discussion Paper 1: Options and Strategies for Information and Communication Technologies within Agricultural Extension and Advisory Services*. MEAS Project.
- Rivera, W.M. 2008. "Access of the Poor to Agricultural Services: The Role of Farmers' Organizations in Social Inclusion." *The Journal of Agricultural Education and Extension* 14:4, 359-363.

ANNEX I

Some extension service providers in Kenya

Organization	Activities/Type
Ministry of Agriculture	Government
APHA II	Food and drugs, Nutrition education
Technoserve	Marketing of farm produce, capacity building
CARE	International NGO, Banking and credit training
Catholic Church	Religious organization/Dairy goats promotion
Anglican Church of Kenya (ACK)	Religious organization
Red Cross	Food and drug distribution
Universities	Funding agricultural projects
World Vision	Health empowerment and food distribution
FIP	Maize and soy beans promotion
HCDA	Horticultural development
PLAN International	Capacity building
Arid land project	Funds for purchase of pumps
Farm input companies	Farm visits and demonstrations
International Livestock Research Institute (ILRI)	Livestock research & extension
International Center for Research in Agroforestry (ICRAF) now known as World Resource Institute	Agro forestry research & extension
The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	Crops research & extension
African Women in Agricultural Research and Development (AWARD)	Capacity building and mentoring program
Kenya National Federation of Agricultural Producer (KENFAP)	Farmers association pursuing general rural agricultural extension
Action-Aid	NGO pursuing advocacy targeting rural farming communities; dairy goats promotion and crop extension
Heifer International	NGO, livestock extension
East Africa Dairy Development Project	Livestock extension
Center-for-African-bio-entrepreneurship (CABE)	NGO with policy and practice orientation
National Commission of Churches of Kenya (NCCK)	Religious organization

ANNEX II

Data Extraction of selected peer-reviewed papers and grey literature

Mbagaya, G.M. and Anjichi, V.A. 2007. "Gender Differences in Agriculture Extension Services and Training Programmes in Western Kenya." *Global Approaches to Extension Practice 3 (2): 122-130.*

This was a cross-section study, it does not respond to the questions of the study directly; rather it provides insights into the realities of extension. Some examples are given below.

- Over half 78.3% of the extension staff in the western province were men and 23.7% were women.
- In the majority of the households, 59.5%, men owned land compared to 29.5% households jointly owned by men and women and 11% fully owned by women.
- Access to extension information was dominated by men, as 47.5% of the men had access while 27.5% of the women had access
- Over half of the extension staff preferred dealing with women. This was attributed to the presence of women on the farms and their ability to adopt information and new technologies faster than men
- Training in the farmers training centers (FTCs) indicated that the majority of those trained, 62.5 %, were men
- Student records at Bukula institute of agriculture revealed that 69.3% of those being trained were men while 30.7% were women

Findings showed that despite the important role women play in agricultural production, disparities exist in delivery of extension services and training programs. This calls for the urgent need to train, deploy, and target women in extension services.

Njuki, Jemimah, S. Kaaria, A. Chamunorwa and W.M. Chiuri. 2011. "Linking Smallholder Farmers to Markets, Gender and Intra-household Dynamics: Does the Choice of Commodity Matter?" *European Journal of Development Research 23: 426–443.*

This document does not directly address the study question but makes a contribution to extension approaches and related constraints. The article attempts to analyze what influences income distribution between men and women, focusing on the type of commodity, type of market, and approaches used. The results indicate that commodities generating lower average revenues are more likely to be controlled by women, whereas men control commodities that are high revenue generators, often sold in the formal markets.

The document highlights existing frameworks and approaches for gender and intra- household issues as:

- Gender Dimensions framework
- The Integrated Gender Issues into Agriculture Value Chains approach
- The Gender Equity Value Chain Action Learning Approach

These approaches, however, are not specific to rural women. Rather, the article identifies key gender-related constraints that are social, cultural, economic, technical, environmental, and infrastructural in nature.

- Empirical studies on intra-household gender dynamics in Africa have shown that when a crop enters the market economy, men are likely to take over for the women, therefore women do not benefit from market-oriented production.
- Social and cultural roles may assign productive and reproductive roles to men and women that can affect their access to markets.
- Most of the analysis on former markets linkages is based on patriarchal theories that assume a unitary household model.

- In many market activities women's roles and preferences can be hidden or unclear, especially given that they are likely to participate more in local and informal markets.

General lessons from this paper include:

- Standard approaches to analyzing value chains can often miss the gender and intra-household dynamics.
- Gender-sensitive analysis can help identify the actual potential roles for women within these market commodities and help to develop strategies to benefit men and women without undermining the control of these commodities by either category.

Masoy, Aloysia and Pridmore, P. 1997. *Participatory Learning and Action to Reduce Women's Workload in East Africa*. Institute of Education, University of London.

This article does not directly address the gender issues in relation to agricultural extension. Instead it addresses the aspect of division of labor and women's workload, a critical factor in agriculture extension and technology adoption by women because it affects their time and ability. It highlights Participatory Learning and Action (PLA) approach as a method for raising awareness of women's workload. The method is also aimed at influencing positive change in attitudes and behaviors in men and boys, encouraging them to take a greater share of the household tasks. Overall, participatory approaches can enable people to examine critically the role and status of women in rural communities and to consider how this impacts their health and wellbeing. Consequently, this is supposed to inform policies and strategies for action.

The paper also alludes to the contribution women make household food security and the family economy through the purported subsistence activities they undertake.

Participatory approaches as analyzed in this paper generalize men and women. The paper also brings some of the constraints that relate to more generally to gender to the forefront. Some of these constraints are:

- The economic planners continue to underestimate the time women spend on household tasks, thereby increasing the women's workload through the structural adjustment programs.
- Some government policies are in favor of cash cropping. This has implications. For instance, women may be forced to give up the land on which they previously grew food crops and move to less fertile and more remote lands. Further, the capacity for women to participate in development activities is reduced by the heavy workloads.

Muyanga, Milu and T.S. Jayne. "Agricultural Extension in Kenya: Practice and Policy Lessons." Tegemeo Institute of Agricultural Policy and Development, Egerton University (2006).

This analytical document addressed what exists, what works, and what does not work and why in Kenya's agricultural extension. It gives a critical review of the donor supported National Agriculture and Livestock Extension Program (NALEP) implemented by the Ministry of Agriculture. This program aims to enhance the contribution of agriculture and livestock to social and economic development and poverty alleviation by promoting pluralistic, efficient, effective, and demand-driven extension services to farmers and agro-pastoralists.

The extension approach involves the shifting Focal Area Approach (FAA) in which officers with specialized skills are deployed in an area to work with the Frontline Extension Workers (FEWs) and farmers for a specific period (one year) before shifting to a new area. Other embedded extension methods include stakeholders' divisional and district forums.

Specific features of this program include:

- *Competitive grant for research outreach*- Kenya Agricultural Research Institute (KARI) embarked on Agricultural Technology and Information Response Initiative (ATIRI) to empower farmers to make technology and information demand on agricultural service providers. Targets are community-based organizations as beneficiaries and intermediaries.
- *Private companies (commercial)* - Commercial extension initiatives provide extension services in areas where it is profitable as part of their marketing strategy. The extension methods include conveying information, demonstrating the technologies that the company promotes, and co-financing major

agricultural shows. For instance, the agrochemical and dairy industries give extension advice through farm inputs merchants (stockists), demonstration and field days, direct advice to farmers, and training.

- *Private non-commercial extension providers*- These include many non-governmental organizations, faith-based and community-based organizations that provide farmers with agricultural extension services to promote the commercialization of small-scale agriculture. Communities identify the crops that can grow well and the program assists them in producing such crops as viable commercial crops. Training is also offered on marketing and calendarization (stagger growing among farmers to avoid depressing output prices). They go beyond production to support value addition and link farmers with output markets. Some development agents support farmers with credit. Most of the private non-commercial extension providers rely on government research institutions such as KARI for technologies development, while others have established links with international research centers. Some of these extension providers adopt an integrated approach to extension to reach out the farming communities. Most of the non-commercial extension agents are collaborating with public sector extension workers. Groups are also registered to become legal entities to enable them to enter into procurements or produce marketing contracts and borrow money.
- *Income sources diversification promotion*- Supporting promotion of high value crops, training on income generation activities such as beekeeping (including making modern beehives), fish farming, poultry, and dairy goat keeping.
- *Promotion of productivity enhancing technologies*- Through demonstrations, some providers promote technologies in partnership with manufacturers. In the livestock sectors, providers are supporting improvement of local goats and cows by promoting crossbreeding activities, which result in faster growing and heavier stocks. For local poultry improvement, farmers receive assistance in securing high quality cockerels.
- *Promotion of farm-level processing*- Providers supporting value addition are assisting smallholder farmer groups in acquiring skills to undertake simple farm-level processing, such as producing dried chips, crunches, and cakes from sweet potatoes, butter from groundnuts, oil from sunflower, yogurt from milk, and jam from tomatoes, packaging and labeling honey, sorting, grading and bulking maize, and preserving vegetables by drying.
- *Linkage to markets*: Non-commercial extension providers assist farmers by linking them to markets, then markets search and providing market intelligence. Farmer groups bulk their produce, thus increasing their bargaining power for better market prices. Training is provided on how to benefit from seasonal commodity price variations.
- *Savings promotion mobilization*- Through their pooled contribution, farmers can access loans for inputs that are collectively guaranteed, while some providers supplement members' contributions to enable more members to access loans.
- *Collaboration with other stakeholders in extension*- This is helpful in avoiding conflicts and duplication. Public extension experts work as resource persons for non-commercial extension providers in a cost sharing arrangement.

Although this program targets both men and women, it depicts key success factors discussed above that can inform an engendered extension approach.

The shifting Focal Area Approach (FAA) revealed some implementation constraints as follows:

- Private commercial extension providers concentrate their efforts in agricultural high potential areas and target relatively affluent farmers because they are motivated by profits.
- Non-commercial extension limited coverage that targets enterprises that yield quick results. The project duration tended to be too short to have an impact and sustainability beyond the project period is uncertain.

- Private provider activities are constrained by non-commercial providers who offer farm inputs for free.
- Unpredictable government interference with distribution of farm inputs impedes activities.
- Poor physical infrastructure increases operational costs and sometimes forces the extension provider to reduce coverage area.

Ojango, J.N.K, A. Ahuya, A.M. Keyo and J.E.O Rege. 2010. *FARM- Africa Dairy Goats Improvement Project In Kenya: A Case Study*. International Livestock Research Institute.

In this paper, the farmer groups approach is discussed which is associated with the following impact.

- The individual farmer is able to own assets, experience increased income and improved value of stock owned as well as improvement in the nutrition of the family.
- At the group level, collective access for better services for their farming enterprises, jobs created, market access, capacity of community in livestock management enhanced; improved social economic status and cohesion among farmers.

The approach targets both men and women but it is not sustainable because it is donor driven.

Gautam, Madhur. 1999. "Agricultural Extension: The Kenya Experience." World Bank Operations Evaluation Department. Report No. 19523, June 30.

This paper analyses the train & visit (T&V) system of agricultural extension and reveals some implementation challenges including the following: despite the heavy investment, few attempts were made to rigorously measure the impact of its project. The document postulates that the Kenyan system lacks a focus on farmer empowerment, as it is based on a traditional top-down, supply-driven approach that provides little or no voice to the farmer. It reveals the positive return to the expenditures is disconnected from extension approaches. The approach targeted men more generally, especially those with large farms, though women made up one-third of the farmer population and were mostly smallholders.

Some of the constraints associated with this approach include: low literacy levels, distance from the information center, complexity in using ICT-based communication tools, other mass media, and TV, and the relatively high cost of newspapers.

Although this approach improved the agricultural system's coverage, research-extension linkages, and the skills of extension staff, it was found to be inefficient, ineffective, and unstable. It is evident from the evaluation that extension services must be efficiently targeted to focus on the areas and groups where the marginal impact is likely to be greater. For improved information systems, farmer demands must be identified and extension services tailored to suit local technological and economic circumstances. A strategy that exploits low-cost communication methods, such as radio and demonstrations, might be more effective. It is also evident that the focus should be to empower farmers by giving them a voice in the extension delivery system.

Adolwa, Ivan S., P.F. Okot., R.M. Mulwa, A.O. Esilaba, F.S. Mairura and E. Nambiro. 2012. "Analysis of Communication and Dissemination channels influencing the adoption of integrated soil fertility management (ISFM) in western Kenya." *Journal of Agricultural Education and Extension* 18 (1): 71-86.

The study was carried out to evaluate existing ISFM communication and dissemination channels with a view to analyze their advantages or disadvantages. It also attempts to determine how a farmer's socio-economic characteristic influenced information access, utilization, and eventual implementation of ISFM practices. The extension methods analyzed in this paper aim at information/knowledge dissemination and adoption of the ISFM technologies. These include:

- Use of demonstrations
- Farmer field schools
- Farmer-to-farmer interactions
- Field days
- The use of media tools (use of TVs and radio, newspapers)
- Public gatherings

Out of all these methods, demonstrations were found to be the most accessible and give opportunity for feedback. Community-based channels were the most appropriate communication channels for most farmers (field days, on-farm demonstrations, and workshops gave farmers an opportunity to interact with each other as well as with stakeholders).

The farmer field days and radio were deemed advantageous by most farmers. The use of community radio was highlighted as the most suitable tool for conveying ISFM information and knowledge to farmers. This is because the majority of families have the capacity to own one, unlike TVs, which are affordable to few Kenyans. The use of radio was confirmed as accessible, favorable, reliable and informative. Although community-based channels are very important to farmers, use of multiple extension methods yields better results.

This study generalized both men and women but brings out interesting findings on the preferences of extension methods by rural farmers.

Kiara, Japhet K. 2009. "Focal area approach: A Participatory community planning approach to agricultural extension and market development in Kenya." *International Journal of Agricultural Sustainability* 9 (1): 248-257.

The focal area approach (FAA) as a participatory community planning approach discussed in this study is an embedded learning outcome of the NALEP program. The public agricultural extension in Kenya developed and applied the study to harness the comparative advantages of various players for the overall development of rural areas. The approach goes beyond providing information on general agriculture technologies to mobilize rural communities to realize their potential in developing themselves and their areas.

This approach targeted a special group of women and youth, which are poor and vulnerable groups, with very positive impacts with implications for rural woman. These are summarized as follows:

- The participation by women and youth in generating information and solutions to address food security and other rural needs has been impressive.
- Promotion of equity: the knowledge gained from the interaction has contributed in influencing policy change and research priorities.
- Due to increased knowledge, productivity and demand for produce, smallholder farmers have formed common interest groups, which have enabled them to move from subsistence to business farming.
- Adoption of new technologies, which eventually led to creation of rural employment.
- The approach led to formation of different interest and steering groups.

The participatory processes, like focal area approach, provide a learning platform for gender specialists because they have been institutionalized in public extension and have brought new meaning to both extension and understanding of rural development.

Kabutha, Charity and M. Okumbo, eds. 2013. "Agricultural Sector Gender Policy." Republic of Kenya (RoK), January.

This is being a policy document; it does not address the questions of the study directly. However, there are lessons that can inform relevant extension gender approaches in Kenya more generally. A few lessons are described below.

- Extension and business development services and credit access target men and tend to discriminate against women because of gender disparities in asset ownership, literacy, and exposure.
- Research and technology: engineering designs tend to focus on technical dimensions and do not take into account the social dimension and gender-based needs of the target users.
- Scale: women face more severe legal, regulatory and administrative barriers to starting and running agribusinesses than men. Consequently, their businesses tend to be smaller, are less likely to grow, and have less capital investments.

Such context based gender dynamics should aim at influencing policies that would enhance extension approaches that are pro-rural women.

“A Gender Analysis of NASEP (National Agriculture Sector Extension Policy). 2009. CGD policy brief. April.

This being a policy document, it does not address the questions of the study directly, rather it makes a contribution to creation of gender responsive environment in extension. The policy objective purports to be gender neutral, arguing that delivery of extension under NASEP is rights-based, needs-based, and encourages the right to choice and therefore higher participation and stakeholder policy ownership. The policy indicates that strategies will be devised to influence development and dissemination of gender-sensitive technologies and interventions. Although these strategies are not elaborated upon, they provide a roadmap and an opportunity for women to access services that are specifically designed to meet their needs.

IFPRI (undated). “Agricultural Extension and Advisory Services Worldwide: Facilitated by Extension and Advisory Services in Kenya.” www.worldwide-extension.org. Accessed Feb 2013.

The paper analyses approaches whereby Kenya’s smallholder farmers had traditionally benefited from three major types of extension systems:

- a) Government extension system focusing on food crops with which methods and approaches used include:
 - Progressives/model farmer approach
 - Integrated agricultural rural development approach- farm management, training and visits (T&V), attachment of officers to organizations
 - Farming systems approaches
 - Farmer field schools (FFS)
- b) Commodity-based extension systems run by government parastatals, out-grower companies and cooperatives dealing mainly but not exclusively with commercial crops such as coffee, tea, pyrethrum and sisal. These extension services are deliberately motivated by profits and tend to work well when both the firm and farmers clearly benefit from the extension expenditure.
- c) Privatized agricultural extension initiatives provided by private companies, non-governmental organizations (NGOs), community-based organizations (CBOs) and faith-based organizations (FBOs). The methods used here include:
 - Farmer-to-farmer using community groups: farmers learn a particular innovation and share with others. Farmers are generally enthusiastic to share their skills with other farmers.
 - ICT tools used to disseminate agricultural knowledge and technology include email, internet, phone, radio, TV, and print. An illustration of a potentially beneficial application of new technologies is the mobile telephone. The SMS-based services offer farmers a timely source of information. Examples of cell phones extension services include: 1) Kenya Agricultural Commodity Exchange (KACE) using the SMS-based information service that enables them to receive market prices in various market centers around the country through their mobile phones. 2) Infonet biovision: a web-based information platform offering trainers, extension workers and farmer in East Africa quick access to up-to-date and locally relevant information in order to optimize their livelihoods in a safer, effective, sustainable, and ecologically sound way.

These approaches are not specific to women, but target both men and women as members of the community. The potential for ICT to become an important pro-women extension tool in Kenya is high; according to 2009 World Bank statistics report, 48.7 % of the population of Kenya own and operate a mobile phone.

Republic of Kenya (RoK). 2010. “Gender Responsiveness of Extension Methodologies and Approaches Study Report.” Ministry of Agriculture. June.

This report highlights a number of information/learning and transfer-based approaches that target women as any other member of the community despite their unique needs. These include:

- Field days
- Group approaches
- Radio programs
- Farm demonstrations

- Shows and exhibitions
- Individual farm visits
- Residential courses and seminars
- Farmers tours and visits
- Farmer-to-farmer extension
- ICT services

The success factors associated with these approaches include:

- Nature of the enterprises in which the farmers are involved, .e.g., some enterprises are unique and pegged on different levels of value chains
- Time availed by farmers
- The gender needs of a particular group
- Resources available
- Identification of cultural barriers
- Literacy levels (ICT likely to be applicable to those who are literate)

The report also exposes challenges of extension provision to different gender groups that are pertinent in designing pro-women extension approaches:

- **Male clients** - majority are not implementers of the innovations, while some of them are impatient.
- **Female clients** – though they are main implementers of innovations, they lack resources and are limited in making decisions on their own. In some cases, they lack confidence to act promptly.
- **Youth clients** – majority lack interest in farming. Do not own resources such as land and sometimes are neglected by parents and extension staff.
- **Vulnerable clients** - farmers with disabilities and orphans shy away from seeking extension services.

Thus, socio-cultural and socio-economic status of male and female farmers impacts their ability to access, and more specifically their preferences for extension services. This notwithstanding, the study recommends that:

- Extension approaches should purposely target specific categories of farmers like women and vulnerable groups. For instance, they should aim at group and individual follow-ups.
- Though not necessarily cost-effective, a combination of accessible approaches such as group and field day approaches need to be combined with more frequent farm visits
- Basic mentorship/coaching skills, for various categories of farmers so that they may gain confidence to demand for extension services based on their specific needs.

NALEP. 2009. "Particular Assets and Vulnerabilities of Rural Women within the Agricultural Sector in Kenya. Final Report. August. 135.

This document does not respond directly to the questions of the study, but its findings provide useful background information that could inform the programming and planning for extension services targeting rural women.

The common interest groups approach is analyzed, but both women and men are targeted. It reveals some key findings relevant for informing a pro-women extension approach:

- The assets that women possess are mainly low-income generating and based on social capital such as savings from poultry, dairy goats, firewood, and charcoal, and from social groups like merry-go-rounds (also known as Chamas).
- Men own valuable assets and skills like land, tools of production including credit, education, and farming technologies.
- Some challenges faced by women in the agriculture sector include inadequate access to credit facilities, traditional and cultural beliefs, inadequate control of assets and decision making, constraints in access to farming technologies, education, information, and time, among others.

- Rural women are found to be responsible for domestic and productive farming activities. This has negatively impacted their ability to dedicate sufficient time for agricultural productivity, especially in enterprise farming.

Pro-women extension approaches can benefit from the multi-sectoral approach of problem identification and vulnerabilities analysis displayed in Participatory Poverty and Livelihood Dynamics (PAPOLD), which helped in the design of localized and responsive interventions with potential for sustainability.

Republic of Kenya (RoK). 2008. "Engendering the Provision of Agriculture and Livestock Extension Services: Extension Services in Policy, Kenya Republic." 1-38.

This report describes a wide range of extension approaches targeted at both women and men:

- Focal area
- Farmer Field School (FFS)
- Face-to-face on farm demonstrations
- Shows
- Field days
- Film shows
- Adaptive on-farm trials
- Mobile training units (mainly for pastoralists)

It also points out some social and cultural constraints that hinder effective extension. For instance, indigenous knowledge is often not considered in the course of providing extension services.

Republic of Kenya (RoK). 2007. "Gender Needs Assessment Report: Organizational and Client Level." Final Report: Gender Section, Ministry of Agriculture. June. 53.

The approaches that targeted no particular gender group include:

- Barazas
- Field days
- CIG trainings
- Monthly trainings

This report reveals some important contextual social, cultural, economic, technical, environmental and infrastructural constraints that have to be taken into consideration in designing engendered extension methods and approaches. Some retrogressive practices include:

- Low adoption of orphaned/traditional crops considered to be food for the poor as opposed to preferred purportedly superior exotic crops. These exotic crops do not perform as well as the environmentally adapted traditional crops.
- Practice of and belief in witchcraft instilling fear that curtails advancement in the agricultural sector.
- Certain cultural beliefs: for example, certain crops can only be planted by men and not women, and no bereaved woman/wife can undertake productive farming for 40 days of mourning and during other occasions like the initiation period.

Ministry of Agriculture. RoK. 2010. Gender Mainstreaming Strategy. March.

One of the strategic issues in the gender mainstreaming strategy is adequate gender responsiveness in research, extension and market linkages in agriculture. The study identifies strategies for integrating gender needs through active participation in all research and extension processes such as:

- Facilitating availability and access appropriate gender-responsive technologies
- Strengthening gender equity in research and extension – farmer linkages
- Adoption and up scaling of gender responsive extension approaches and methodologies

National Agriculture and Livestock Extension Program (NALEP). 2011. "A Guide to Effective Extension Methods for Different Situations." 14.

Although this document does not focus on gender, it gives an evidence-based summary of extension methods and preferences based on the experiences in implementing the NALEP in different parts of Kenya.

It reveals the importance of context in the choice of extension methodologies for the rural farmers and that there is no blueprint extension approach that can be adopted by rural communities.

The methods and approaches described in view of localities and farmers preference include:

- Field days
- Demonstrations
- Individual farm visits
- Courses
- Barazas
- On farm trials
- Educational tours
- Farmer field schools
- Mass media
- ICT
- Group visits

Overall, approaches geared towards transferring of skills, technology, and expertise are more dominant among farmers. It also notes that ICT-based methods have a huge potential but have been underutilized in Kenya.