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Socio-cultural participatory monitoring and evaluation indicators used in adopting improved cassavas by Western Kenya communities

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Cassava production is critical to household food security in Kuria and Migori Districts. The adoption of improved cassava varieties has been low largely due to non-participatory extension approaches (GOK, 2006). Participatory monitoring and evaluation (PM&E) at the community level is a relatively new approach and there has been considerable lack of emphasis on community-based monitoring and evaluation indicators during the development of technologies in Kenya. This study investigated the socio-cultural monitoring and evaluation indicators used by the Kuria and Luo communities in adopting improved cassava varieties in the two districts. A structured questionnaire was used to collect data from farmers. Socio-cultural community-based participatory monitoring and evaluation indicators for selection and adoption of cassava varieties in the two districts were identified. The study found significant and non-significant differences in some of the socio-cultural indicators. The adoption of improved cassava varieties was found to be low in the two districts. The identified community-based participatory monitoring and evaluation indicators would help in enhancing cassava technology development, packaging and dissemination strategies by researchers, extension agents and farmers. The study recommends incorporation of local indicators during development and dissemination of technologies by research institutions as this would help in enhancing the uptake of new technologies developed.

Key words: Socio-cultural, participatory monitoring and evaluation, indicators, cassava.

INTRODUCTION

Participatory monitoring and evaluation (PM&E) at a community level is a relatively new subject area in most development spheres and it only began to be popular in the early 1990s (Kadzikano and Chishawa, 2001). The aim of community level participatory monitoring and evaluation systems is to assist stakeholders to discuss debate and develop actions on issues related to their work performance and expected outputs. Participatory monitoring and evaluation also assists development facilitators in monitoring progress and assessing impact of the programme. In participatory monitoring and evaluation, stakeholders are involved in defining what will be evaluated, who will be involved, what will take place, the participatory methods to be used for collecting information and how data is to be analyzed and consolidated. Ownership and control of a project depends to a large extent on participation, which implies maximum involvement of the community forming the target group, in the process of planning, monitoring and evaluation of project initiatives. According to Guijt (1999), PM&E involves the assessment of change through processes that involve many people or groups each of whom is affecting or affected by the impact being assessed. MacGillivray and Zadek (1995) in their study found that indicators for PM&E are necessary to guide in the collection of information needed for monitoring and evaluation and that the identification of PM&E indicators that will work and practiced by farmers, is not easy.

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According to Mureithi et al. (2002), there has been lack of emphasis put on community-based monitoring and evaluation indicators during the development of technologies in Kenya.

One of the agricultural technologies, which was introduced to smallholder farmers in both Kuria and Migori districts by the Kenya Agricultural Research Institute, were two improved cassava varieties namely SS4 and Mygerya. The reason for their introduction was the high importance placed on the cassava crop by farmers and the low yield of the local cassava varieties attributed to the high incidence of Cassava Mosaic Virus Disease (CMVD) (GOK, 2001). Kuria and Migori are among the 12 districts in Nyanza Province and are mainly inhabited by Kuria and Luo communities. These two communities differ greatly in their culture, traditions and perceptions on cassava technologies. This means that there may be a difference or similarities of M&E on indicators across the differentiated types of households between the two communities, based on their socio-cultural and economic status, educational status and gender. Mygerya and SS4 are improved cassava varieties which were introduced by KARI in Kuria and Migori districts as a food security measure to complement the local varieties that are low yielding and highly susceptible to Cassava Mosaic Virus Disease (CMVD) (GOK, 2001, 2002). On the basis of yield and resistance to CMVD, adoption of Mygera and SS4 cassava varieties was found important to these communities as they were better than their existing varieties. As individual or group, farmers have certain expectations on technology advancement based on their socio-cultural conditions. Individually or collectively, they use socio-cultural based indicators to monitor and evaluate these technologies for adoption. These local indicators are generally not emphasized during technology development. Consequently, they are not clearly understood and it is not known how they are used by farmers in a participatory manner to monitor and evaluate technologies for their own adoption. This was the case with respect to adoption of both Mygerya and SS4 cassava varieties in Kuria and Migori Districts.

The purpose of the study was to investigate the socio-cultural and economic based monitoring and evaluation indicators used in adoption of improved cassava varieties by Kuria farmers in Kuria District and Luo farmers in Migori District, in order to enhance adoption and improvement of food security in the two districts of study. The specific objectives of the study were to determine the level of adoption of improved cassava varieties by smallholder farmers, the importance placed on improved cassava varieties by smallholder farmers and the socio-cultural participatory monitoring and evaluation indicators by smallholder farmers in the selection and adoption of cassava varieties in Kuria and Migori districts.

MATERIALS AND METHODS

The study used a cross-sectional survey design to collect data from the study population. The design involves data collection in only one survey round (Casely and Kumar, 1988). It involves collection of information from a sample that has been drawn from a predetermined population at one point in time (Fraenkel and Wallen, 2000). The study was carried out in three Locations of Mabera Division in Kuria District and Suba west Division in Migori District respectively. These locations were chosen for the study owing to their similarities in cassava cultivation among households, agro-ecological zones and farmer characteristic (educational status, socio-economic status, and culture) among others. The Kuria and Luo communities inhabit Mabera and Suba-west Divisions respectively. Mabera division in Kuria District had 3,995 households distributed in 9 locations while Suba west in Migori District had 11,703 households distributed in 6 locations (GoK, 2001). There were a total of 20 farmer groups in Mabera (GoK, 2002) while Suba west had 25 farmer groups (GoK, 2001).

Three locations were randomly selected from each division of the study. The sampling frame was a list of farmer groups. One farmer group from each division was randomly picked for focused group discussions to generate list of indicators which they use for improved cassava adoption. The members of the Farmer Group chosen comprised community opinion leaders, leaders of CBOs and Women Groups totalling up to 10. Casely and Kumar (1988), recommends 8 to 10 people to be used for discussion. A checklist guided the discussion during farmer focused group discussion exercise. 184 farmers (92 from each District) were randomly sampled from the two districts for inclusion in the study and from whom data was obtained using a structured questionnaire. 20 farmer groups who grow cassava were purposively selected in Suba West Division.

Socio-cultural PM&E indicators were generated during a preliminary survey with one focus group in each district away from the study area using pair wise ranking. These indicators were incorporated in a structured questionnaire which was used to gather primary data for the study.

The study focused mainly on household heads for interviews to cater for uniformity of data collected. The final data collection was done from sampled individual cassava growing farmers in the two study areas. Data was analyzed using both descriptive and inferential statistics. The statistical package for social sciences (SPSS) version 11.5 was used to process and analyze data. Frequency means, and standard deviation was used for descriptive statistics to summarize and describe the data while rank order correlation and t-test was used for inferential statistics at the 5% level of significance. Rank order correlation was to determine the extent of the correlation between the rankings of the indicators used by farmers while the independent sample t-test was used to capture the differences in the use and importance placed on the participatory monitoring and evaluation indicators and cassava varieties by the two communities.

RESULTS AND DISCUSSION

Age of respondents

The mean age of the farmers interviewed in Migori was 50.70 while that of Kuria was 47.4 years as indicated in Table 1. These age means fall within the age bracket when most farmers are active and have adequate experience in farming and are therefore in suitable position of deciding whether or not to adopt a new technology for is the case of the new improved cassava varieties in the two districts. FAO (2002) found that the older and more experienced farmers were more likely than younger colleagues to recognize soil problems, but

are less likely than their younger colleagues to address the problems once recognized. The older farmers have participated in cassava farming for a longer period and are therefore more experienced than the younger ones hence better placed to identify the most effective or critical monitoring and evaluation indicators for adoption.

Gender of respondents

In both districts, the females had slightly higher representation than males, 51.1 and 59.8% for Kuria and Migori district, respectively. In the entire sample, the females constituted 55.4% while males were 44.6% (Table 1). According to the 1999 Population and Housing Censors, the number of males and females are 73,989 and 77,898 in Kuria and 247,131 and 267,766 in Migori, respectively. The gender of the farmer has been found to influence their selection and adoption of technology. Orodho (1996) found that the zero property rights of women work against their capacity to apply any knowledge they gain from agricultural extension. In this study, both men and women were involved in both districts in the identification of the socio-cultural participatory monitoring and evaluation indicators used for selection and adoption of the improved cassava varieties. In reference to this study, gender may influence the choice and adoption of varieties through their prioritization and importance or value attached by the farmers on the indicators for adoption. Men have been found to always dominate women in everything including decision making of the farm productivity.

Level of education of respondents

According to Table 1, the trend of education in the study area is such that 10.9% of the farmers or respondents in Kuria and 19.6% in Migori are illiterate. In the two districts, the highest proportion of farmers had only primary level of education. In Kuria, 27.2% of the farmers had secondary level of education compared to only 17.4% with the same level of education in Migori. The study found that 6.5% of the farmers in Kuria and 0.0% in Migori have college level of education. This indicates that higher proportion of farmers in Migori have high school dropout rate which could be attributed to high peddling of gold in the district. Table 1 show that higher proportion of farmers who are engaged in cassava farming in the two districts had low level of education. The low level of education among farmers in both districts could have implications on the adoption of the introduced improved cassava varieties and also on the identification of the socio-cultural and economic PM&E indicators for the selection and adoption of the improved cassava varieties. According to Amri et al. (2003), extension education has a significant influence on adoption of technologies and that low adoption amongst farmers may be due to high levels of illiteracy.

Land size per household

Table 1 show that 33.7% of farmers in Kuria and 54.3% of those in Migori own up to ten acres of land while in Kuria 47.8% of the farmers own less than 5 acres of land compared to 33.7% who own the same size in Migori. Only 2.2 and 1.1% own more than 20 acres of land in Kuria and Migori, respectively. Subsistence agriculture does not provide sufficient motivation to try innovations. Ochola (2006) found that adoption of new technologies may be affected by the land sizes used by the farmers for agricultural purposes. Studies on adoption have found that farm size positively correlates with the adoption of a technology introduced (FAO, 2002). Farm size is a socio-economic factor and could also be an indicator of farmers' social status and an influence in the Community (Ntege-Nanyeenya et al., 1997).

Variation in household size

Majority of farmers in Kuria and Migori had a household size of less than 7, 46.7 and 58.7%, respectively. Farmers with a house hold size of between 10 and 12 were only 19.6 and 10.9% in Kuria and Migori, respectively. This is shown in Table 1. With a small household, the size of land put under agriculture would be small due to the high labour demand required to manage the land and would therefore affect adoption of a given technology. Mafuru et al. (1999) found that in relation to the provision of the labour requirement, larger households have a higher probability of adopting technologies.

Land ownership of respondents

Table 1 indicates that a higher proportion of farmers in Kuria and Migori own land without title deeds, 51.1 and 81.5%, respectively. A small proportion of farmers in Kuria and Migori own land with title deed, 31.5 and 18.5%, respectively. Communal land tenure system no longer exists in Migori while 17.4% of farmers in Kuria still own land communally. This communal land ownership in Kuria is attributed to the large number of animals owned by the community who have set aside some land for communal grazing ((GoK, 2006). Farmers would invest more on land that they have secure rights over than in cases where land is communally owned and of lesser entitlement (Mose et al., 2000). Similarly, Kormawa et al. (2003) showed that farmers when assured of their land holdings are willing to invest in that given land hence can adopt a given technology with ease.

Households source of income

Table 1, indicates that a higher proportion of the farmers in Kuria and Migori are taking farming as the main source of income, 64.1 and 96.7%, respectively. Only 3.3 and 1.1% of the farmers in Kuria and Migori, respectively are engaged in full time employment. These groups of farmers are not taking agriculture seriously. Farmers who are engaged in fulltime farming are the group most likely to adopt new agricultural technologies introduced to help improve their level of income. In contrast Oywaya-Nkurumwa and Kathuri (2006) showed that those farmers who are engaged in off-farm employment are likely to have more income than those who rely entirely on farming and may therefore be better placed to afford the adoption of agricultural innovations.

Cassava production in Kuria and Migori district

Cassava is ranked 3rd most important food crop in Migori District after maize and sorghum and it occupies about 8800 ha with yields being estimated at 12 t/ha. The popular local variety was attacked by the Cassava Mosaic virus Disease (CMD) in the mid-90s (GoK, 2006). The disease incidence is going down due to the decline in the population of the whiteflies that largely helps in the spread of the CMD. The decline of the disease is attributed to the decline in cassava acreage which made the vector to starve and die (Ministry of Agriculture, 2006).

Cassava is considered a staple food in Kuria and occupies 600 ha with yields being estimated at 6 t/ha for local varieties (GOK, 2002). Cassava is the most important traditional crop in terms of food security in Kuria District and since it is drought tolerant crop and still yield substantially even in adverse condition, it comes in handy as an insurance crop for the district. As for the improved varieties, the yields are estimated at 16 t/ha. The steady decline in the production on this crop from 2002 to 2005 was mainly due to the outbreak of African Cassava Mosaic Virus Disease (ACMVD) as from 2003, (GoK, 2007). Cassava Mosaic Virus Disease was the major cause for the low crop yield and the attack on the local varieties was estimated at 70% in the year 2004. Interventions by introduction of ACMVD tolerant varieties by KARI Kakamega in the district from 2002, adoption of tolerant varieties in Kuria was low as the disease was not severe and production not substantially affected then. The improved varieties were introduced in Kuria in 2005 to remedy farmers from the CMVD attack (GoK, 2006).

All the farmers sampled from Migori District grow cassava while 96.7% of the subject selected from Kuria districts all the sampled farmers grow the local variety of cassava while only a few have adopted the improved varieties as a second option. It is evident from the study that the improved cassava varieties are still not popular with the farmers in the two districts. Farmers in the two districts obtain their cassava planting materials (cuttings) from a variety of sources. In Migori, the adoption level of SS4 is higher than in Kuria. This could be attributed to farmer's preference to the Migyera variety. There are slight differences in the source of planting materials between the two districts.

In both districts, 88% of the farmers use their own seed, while none of the farmers in Migori district source their material from KARI. The use of neighbouring farmers as sources of planting materials is more common in Migori than Kuria (12 compared to 2.2% respectively). The situation indicates prevalence of the use of none certified cassava planting materials. While all farmers in Migori obtain their seeds locally, only 9.8% of Kuria farmer's source their cassava planting materials of improved cassava varieties from KARI. KARI produces by bulking the certified improved cassava variety planting materials for distribution to farmers. The decline in the production of cassava in the districts is therefore associated with the prevalent use of the local planting materials that are not tolerant to Cassava Mosaic Virus Disease.

Differences in adoption of cassava varieties in Migori and Kuria

Adoption levels of Migyera remains low in both Kuria and Migori districts, however, the mean acreage under Migyera is higher in Kuria (2 acres) than in Migori (1.25 acres). There is an indication that farmers in Kuria have a liking for the Migyera variety than farmers in Migori. This could be attributed to the high attachment of the farmers to their local variety. It could also be attributed to the number of bulking sites in the two districts which could have been low to enable enough supply of the planting materials (GoK, 2006). There were only 11 bulking sites of 1 acre each in Migori and the same number in Kuria which was supposed to supply 5 and 4 divisions in Migori and Kuria, respectively and which could be attributed to the low adoption. The low number of extension personnel to help in the dissemination of the technology could be another reason for the low adoption. The current extension - farmer ratio in the two districts is 1:1200, extension to farmer, respectively (GoK, 2006). Coupled with the weak research-extension-farmer linkage, this could be a strong attribute to the current low adoption of the improved cassava varieties. The low adoption could also be attributed to the fact that the varieties that were introduced may not have been in line with their socio-cultural indicators for selection and adoption of the cassava crop the two communities grew. Some indicators like, multipurpose uses, knowledge of crop husbandry, early maturity, long chips storage, are indicators which may have been missing in the varieties introduced and could have led to the low adoption of the technologies.

The mean acreage of land put under Migyera is higher than the mean acreage of land under SS4 in Migori. The number of farmers adopting Migyera and SS4 in Migori is

Table 1. Demographic characteristics of the interviewed farmers (N=184: 92 in each district)

Variable	District		Total (%)
	Kuria (%)	Migori (%)	
Age (Mean years)	47.4 (12.7)*	50.7 (8.8) *	49.0% (11.0) *
Gender			
Female	51.1	59.8	55.4
Male	48.9	40.2	
Level of education			
(a) None	10.9	19.6	15.2
(b) Primary	55.4	63.0	59.2
(c) Secondary	27.2	17.4	22.3
(d) College	6.5	0.0	3.3
Land size in acres			
< 5	47.8	33.7	40.8
6-10	33.7	54.3	44.0
11-15	5.4	10.9	8.2
16-20	10.	0.0	5.4
> 20	2.2	1.1	1.6
Household size			
< 7	46.7	58.7	52.7
7-9	33.7	30.4	32.1
10-12	19.6	10.9	15.2
Land ownership			
With title deed	31.5	18.5	25.0
Communal	17.4	0.0	8.7
Without title deed	51.1	81.5	66.3
Source of income			
Full time farming	64.1	96.7	80.4
Part time farming	22.8	2.2	12.5
Full time employment	3.3	1.1	2.2
Others	9.8	0.0	4.9

*Numbers in parenthesis represents standard deviation.

similar. The reason for the low adoption of the two improved varieties in Migori could be attributed to the fact that in Kuria cassava is their staple food and therefore the community would try any variety of cassava introduced (GoK, 2006). Migori farmers prefer boiling cassava for eating while in Kuria; cassava is processed then ground into flour. Mygerya has a slight bitter taste as opposed to SS4. The other reason for the low adoption could be that the variety does not meet socio-cultural and economic indicators (distribution of benefits, gender equity, household food security, poverty alleviation, funeral festivals and wedding festivals) earlier identified in the study.

Kuria district seems to be having higher mean acreage under cassava than Migori. In Migori there is pre-occupation of other livelihood including artisanal mining and peddling of gold, which they find more lucrative than cassava production (GoK, 2006). Farmers in Migori seem to rank the three varieties (Mygerya, SS4 and Local) grown higher than farmers in Kuria which is contrary to the differences in the level of adoption of the same varieties.

Differences in importance of socio-cultural participatory monitoring and evaluation indicators

Selected socio-cultural indicators were presented as

Table 2. Descriptive statistics of mean ratings of selected socio-cultural issues in selecting cassava varieties in Kuria and Migori districts

	District	Mean	Std. deviation
Distribution of benefits	Migori	2.78	1.230
	Kuria	2.15	0.949
Gender equity	Migori	3.45	0.856
	Kuria	2.20	0.997
Household food security	Migori	1.22	0.0440
	Kuria	1.21	0.655
Poverty alleviation	Migori	1.63	0.569
	Kuria	1.36	0.735
Funeral festivals	Migori	3.53	1.305
	Kuria	1.71	0.859
Wedding festivals	Migori	2.07	0.947
	Kuria	1.58	0.667

criteria for selecting and adopting improved cassava varieties in the two districts. This was based on a five point scale ranging between 1 and 5 (where, very important = 1, important = 2, moderately important = 3, less important = 4 and not important = 5). Mean responses were calculated and used to present the relative rating of the criteria. The mean differences between the socio-cultural indicators of the two districts were tested using independent sample t-test and the results are presented in Table 2.

Farmers in Kuria and Migori districts rate household food security as a very important, 1.21 and 1.22, respectively, socio-cultural indicator in selecting cassava varieties. On the same note farmers in Kuria and Migori rate wedding festivals as important, 1.58 and 2.07, respectively.

On the other hand, farmers in Kuria and Migori differ in the level of importance attached to the following indicators. Distribution of benefits is rated as moderately important in Migori (2.78) and important in Kuria (2.15). Similarly, gender equity was rated moderately important in Migori (3.45) and important (2.20) in Kuria. Funeral festivals indicated a sharp difference in mean ratings of importance attached to the selection of improves cassava varieties. Funeral festivals was rated important (1.71) in Kuria and less important (3.53) in Migori. Farmers in Kuria also rated poverty alleviation as very important (1.36) while in Migori it was rated important (1.63).

The differences in ratings that occurred could be attributed to the high attachment to culture in Kuria as opposed to Migori where culture is seriously eroded. Erosion of culture in Migori results from marrying women who come from areas where communities are more exposed and have less cultural attachments and its proximity to Migori town where people intermix and are not tied to culture; and the high influx of foreigners who have bought land and stay amongst the community and who have less regard for the local culture.

Test of hypothesis on socio-cultural indicators

Analysis by independent sample t-test results presented in Table 3 revealed that all the selected socio-cultural participatory monitoring and evaluation indicators for adoption of improved cassava varieties in the two districts were significantly different except for household food security that was not significantly different.

The socio-cultural indicators including distribution of benefits, gender equity, poverty alleviation, funeral festivals and wedding festivals were found to be different in the two districts, while household food security was similar in the two districts. This difference could be attributed to the difference in the socio-cultural settings between the communities which is in line with the findings of Abbot (1996), Rocheleau et al. (1998), and Kaul (1998) who all noted that negotiating indicators is critical because of social differentiation. They further noted that highly differentiated patterns of the use of natural environment are documented according to factors such as the culture, wealth status, age, gender and length of residency of the individual. Pannell (2003) found that farmers do monitor a range of indicators, sometimes very intensely: e.g prices, annual profit and interest rates.

Table 3. Independent sample t-test results of differences in selected socio-cultural issues in selecting cassava varieties between farmers in Kuria and Migori districts.

Indicator	t-Test for equality of means			
	t	Sig. (2-tailed)	Mean difference	Std. error difference
Distribution of benefits	3.893	0.000	0.630	0.162
Gender equity	9.122	0.000	1.250	0.137
Household food security	0.132	0.895	0.011	0.082
Poverty alleviation	2.805	0.006	0.272	0.097
Funeral festivals	11.215	0.000	1.826	0.163
Wedding festivals	4.051	0.000	0.489	0.121

Pannell (2003) also found that sustainability indicators, like the ones in this study, to be routinely monitored by farmers in the long term, they must be directly relevant to, and useful in, important management decisions like the decisions by farmers to select and adopt the improved varieties. This therefore means that during the development and dissemination of cassava technologies, socio-cultural issues should be taken into consideration for the sake of enhancing adoption of improved cassava technologies among different communities.

Conclusions

Adoption level of the improved cassava varieties in the two districts is still low even after the introduction of the improved varieties tolerant to Cassava Mosaic Virus Disease. Socio-cultural indicators for selection and adoption of the various cassava varieties which included distribution of benefits, gender equity, poverty alleviation, funeral festivals and wedding festivals, were significantly different. Kuria farmers prefer short varieties of cassava as they cannot be used as hideouts by cattle rustlers.

Recommendations

Technology developers should, during the development of technologies, involve farmers from the beginning to capture the farmer requirements /indicators in a technology for reasons of enhancing the adoption for the developed technology. Research - extension farmer linkages should be enhanced and improved to enable proper dissemination of technologies so as to help in improving the level and rate of technology adoption among target groups. Identification of local community based sustainability indicators by research institutions should be encouraged before introduction of a new technology to enable saving of funds and adoption enhancement. Farmers should never be provided with free seed as no value is attached to things given free.

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REFERENCES

Abbit JIO (1996). Rural Subsistence and Protected Areas: Community Use of the Miombo Woodland of Lake Malawi National Park. PhD Thesis, University College London.

Amri MSA, Ngaido T, Voalkoun J (2003). Policy and Education Reform Needs for Conservation of Dryland Biodiversity. J. Arid Environ.,54: 5-13.

Casley JD, Kumar K (1988): The Collection, Analysis, and Use of Monitoring and Evaluation Data. A World Bank Publication. Washington D. C. USA.

Food and Agriculture Organisation (2002). The Economics of Conservation Agriculture British Columbia Canada Simon fraser University, (online) http://www/fao/o rg/Doc RED/ 004/ Y2781/ html (accessed 10/8/04).

Fraenkel JR, Wallen WE (2000): How to Design and Evaluate Research in Education (4th ed) Library of Congress: McGraw-Hill Inc.

Government of Kenya (2000): National Agriculture and Livestock Extension Programme - implementation framework. MOARD, Nairobi.

Government of Kenya (2001): Ministry of Agriculture and Rural Development. District Agriculture and Livestock Extension office. Annual report, Migori District.

Government of Kenya (2001): Ministry of Planning and National Development. The 1999 Population and Housing Census. Counting our People for Development. Nairobi, Kenya, Vol. 1.

Government of Kenya (2002): Ministry of Agriculture and Rural Development. District Agriculture and Livestock Extension office. Annual report, Kuria District.

Government of Kenya (2006): Ministry of Agriculture and Rural Development. District Agriculture and Livestock Extension office. Annual report, Kuria District.

Government of Kenya (2006): Ministry of Agriculture and Rural Development. District Agriculture and Livestock Extension office. Annual report, Migori District.

Government of Kenya (2007): Ministry of Agriculture and Rural Development. District Agriculture and Livestock Extension office. Annual Cassava Report, Kuria District.

Guijt I (1999): Participatory Monitoring and Evaluation for Natural Resources Management and Research, Socio-economic Methodologies for Natural Resource Institute. Chatham, UK. National Resource Institute.

Kadzikano G, Chishawa A (2001): Sharing our Experience on CBNRM:

Developing Community Level Participatory Monitoring and Evaluation Systems. Zimbabwe.
Kaul SM (1998). 'Salt and Spices': Addressing Gender Issues in Participatory Program Implementation in AKRSP, India. In: I. Guijt and M. Kaul Shah. The Myths of Community: Gender Issues in Participatory Development. Intermediate Technology Publications, London.
Kormawa P, Okike I, Okechukwu R, Akande SO (2003). African Food Crisis – The Nigerian Case Study. African project. International Institute of Tropical Agriculture. Nigeria.
MacGillivray, Zadek (1995). Accounting for Change: Indicators for Sustainable Development. New Economics Foundation, London.
Mafuru J, Kileo R, Verkuijl H, Mwangi W, Anandajayasekeram P, Moshi A (1999). Adoption of Maize Production Technologies in the Lake Zone of Tanzania. Mexico, D.F.: International Maize and Wheat Improvement Centre (CIMMYT), the United Republic Of Tanzania, and the Southern Africa Centre for Cooperation in Agricultural Research (SACCAR).
Mose LO, Onyango R, Rono S, Kute C, Ruto CK (2000). Factors Influencing the Adoption of Organic and Inorganic Fertilizers in Maize and Kale in North Rift Valley Region of Kenya. In J.G. Mureithi, C.K.K. Gachene, F.N. Muyekho M. Onyango, Moses L, Magenya O (Eds). Participatory Technology Development for Soil Management by Smallholders in Kenya. Proceedings of the Second Scientific Conference of the Soil Management and Legume Research Network Projects, June 2000, Mombasa, Kenya: KARI.
Mureithi JG, Mureithi FM, Asiabaka CC, Wamuongo JW, Moses L, Mweri B (2002). Methodology Development for Participatory Monitoring and Evaluation of Farmer Field School Approach for Scaling up the Adaption of Agricultural Technologies. Participatory Monitoring and Evaluation Methodology Workshop. Kisumu, 17-24 March.
Ntege-Nanyeenya W, Mugisa-Mutetikka M, Mwangi W, Verkuijl H (1997). An Assessment of Factors Affecting Adoption of Maize Production Technologies in Iganga District, Uganda. Addis Ababa, Ethiopia: National Agricultural Research Organization and International Maize and Wheat Improvement Centre.
Ochola WA, (2006). The Relationship between Specific Research-Extension-Farmer Linkage Factors and Adoption of Technologies of On-Farm Trials: A Case of KARI-Kisii Regional Research Centre. Unpublished M.Sc. Thesis, Njoro, Kenya: Egerton University.
Orodho JA (1996). Environmental Education, Children and Women on Focus of Sustainable Development in Kenya. Bureau of Education Research, Kenyatta University. Kenya. J. Educ., 6(1): 60-67.
Oywaya-Nkurumwa AM, Kathuri NJ (2006): Socio-Economic Factors that Influence Women Farmers' Participation in Agricultural Extension Programmes in Mulala Division of Makueni District, Kenya. Egerton University J.: Humanities, Social Sciences and Education Volume VI, Number 2&3, 2006. ISSN 1021-1128.
Pannell DJ (2003). What is the Value of a Sustainability Indicator? Economic Issues in Monitoring and Management of Sustainability. In, Austr. J. Exp. Agric., 33: 239-243.
Rocheleau D, Ross L, Morrobel J, Hernandez R (1998). Gendered Landscapes, Gendered Lives in Zambrana-Chachuey, Dominican Republic. In: I. Guijt and M. Kaul Shah. The Myths of Community: Gender Issues in Participatory Development. Intermediate Technology Publications, London.