Assessment of Data Management for Monitoring and Evaluation on Performance of Smallholder Tea Farming Project in Nyamira County; Kenya

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Abstract:- **The study sought to examine the relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects. Pearson correlation coefficient was used to test the relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects, this was done at 95% level of confidence. To test the extent of the relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects; several characteristics of Data management for M&Eand Performance of Smallholders' Tea farming projects were analyzed based on the following hypothesis: There is no significant relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects. The corresponding mathematical model for the hypothesis was identified as follows: Performance of Smallholders' Tea farming projects = f (Data management for M&E). The correlation results indicated that all constructs of Data management for M&Ehad their P-values under significant 2-tailed being significant since the P-values <0.05. Statement 1 (*Data management for M&E is essential on performance of smallholder tea farming projects*;r=0.184, P-value=0.000<0.05),Statement 2;(*Most of the smallholder tea farming projects fail due to poor data management for M&E* r=0.209, P-value=0.000<0.05), Statement 3;(*None biased data collection methods for M&E leads to successful performance of smallholder tea farming project*;r=0.410, P-value=0.000<0.05) ,Statement 4;(*Proper analysis techniques enhance good communication platform for M&E thus promoting performance of smallholder tea farming projects*; r=0.155, P-value=0.000<0.05), Statement 5; (Dissemination of M&E results motivates the smallholders thus promoting performance ;r=0.173, P-value=0.001 < 0.05), Statement 6; (Data security for M&E leads performance of smallholder tea farming projects;r=0.186, P-value=0.000<0.05)and Statement 7; (Data management for M&E modern tea processing, use of digital machines reduce logistics and time wastage thus inducing performance r=0.370, P-value=0.000<0.05). The overall correlation coefficient for Data management for M&Eand Performance of Smallholders' Tea farming projects was found to be 0.552 with a P-value of 0.000 < 0.05 ,implying that there is a significant relationship between Data management for M&E and Performance of Smallholders' Tea farming projects leading to rejection of the null hypothesis (H_0 : There is no significant relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects) and acceptance of the alternative hypothesis, and hence the research findings conclude that there is a significant relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects.**

Key Words: **Assessment, Data management, Data security and Performance of smallholder tea farming projects**

I. INTRODUCTION

Data management universally serves a big role on the performance of smallholder tea farming projects. However, declining crop yield among smallholder tea farmers is probably because the improved production technology and innovations are not reaching the farmers or that they are not being adopted. According to (Owuor *et al.*2008). This is linked to limited access of information related to such innovations. There is therefore a major challenge to increase adoption of improved technologies so as to close the gap between research and actual farm yields

In relation to tea data management and technology in use by the smallholder tea farming projects, Koskei (2012) citing Kinyili (2003); Daberkow and McBride (2003); Sudath (2008); Banmeke and Ajayi, (2008) connoted that access to information is a potential avenue for improving yield among the small holder tea farmers. The farmer's access to information helps them to know about improved technologies and enhance the adoption of new innovations and that agricultural innovation diffusion is largely affected by information available on the innovation. Utilization of relevant, accurate and up-to-date information would therefore ensure increased productivity and performance of smallholder tea farming projects.

Smallholder tea farming projects gets greatly affected by the way information is disseminated. Mass media includes electronic such as radio, television and internet and print like newspapers, magazines, posters and extension brochures (Abubakar, 2007). Mass media plays a great role in provision of agricultural information in shortest possible time over a large area (Tadesse, 2008). Djojomartono and Pertini (1998) found out that radio and television are more appropriate for one-way communication, reaching a lot of people quickly with fairly simple ideas. (FAO, 2001). States that Radio has

been acknowledged as the most important medium for communicating with the rural populations of Sub-Saharan African countries

Lwoga (2010) proposed that the advancements in the ICTs as an opportunity for developing countries to harness and utilize information and knowledge so as to improve productivity in agriculture. Technological constraints however, such as unstable supply of electricity and the lack of adequate technical support may limit the use of electronics (Melkote and Steeves, 2001). In addition, adopting relevant technologies lays a clear long-term market diversification strategy would also be beneficial to consider at the processing level, to defend the industry against market fluctuations and leverage investments in more sophisticated technology and to play to the strengths of Kenya's quality tea products (Kagira et al., 2012).

According to UNIDO (2017) best technology should be embraced if at all cost's changes are to be made in terms of performance of tea farming projects. Tea producers should consider switching to alternative renewable energy sources, such as, solar and wind, although these technologies are still expensive and may not be affordable, particularly for small-scale producers. Solar air heating technology can be used for tea drying in place of inefficient fixed bed coal fired furnace and air heater (Dutta, 2015). Claims Biomass gasification derived producer gas has been quite successfully used for boilers in some tea growing regions

In line with data management for M&E and performance of smallholder projects, NRPPD (2016) reports that there is a major shifts in the very approach to tea cultivation under the aegis of British colonialism, it is important to redress the lacuna in research on the historical aspects of tea data management not only because of the prominent place that tea had in the colonial enterprise but also because of the fact that tea gave multiple room for role of technology and data management - from the clearing of forests to the packing of the teas. Tea estates, on the one hand, were an agricultural enterprise as signified by the plantations, and on the other, were also industries as signified by the factory in the close vicinity of the plantation itself. It was in the latter domain that much of the early technology was introduced. Advanced technology provides a good basis for performance of tea farming projects.

Ondieki (2017) citing NRPPD (2016) asserted that technology is key in performance of smallholder tea farming projects and in that has been adopted in the various factory processes that have over the years opened themselves to increasing mechanization. Once the tea leaves are harvested from the field, the first step in the processing is the 'withering' whereby the leaves are transferred into troughs and spread in appropriate ways for reduction of their moisture content. Next the leaves are subject to the process of 'rolling'. This involves gentle rolling of the leaves so that their cells are exposed and rendered ready for the process of oxidation [generally referred to as 'fermentation'] by which the tea acquires it brownish colour when spread out and exposed to appropriate humidity and temperature. ['Green tea' is that which is obtained if the rolled leaves are not subjected to this process of oxidation]. After this comes the drying process through which the material gets its dry texture.

Furthermore, Ondieki explains that after oxidation technology leads to the 'sifting' and 'grading' processes through which different grades of tea are separated based on their size and nature. This style of manufacture of tea (with whatever level of mechanization) is referred to as the 'orthodox' method and it was the main method until 'CTC' machinery was invented in the 1930s and became more commonly used from the 1960s. CTC stands for 'cutting, tearing and curling' processes that replace the process of gentle rolling in the orthodox method. (Ondieki, 2017). Says Though CTC dominates today, Orthodox tea continues to have its own niche market, customers and connoisseurs.

On the same note, India National Tea Report (2013) alluded that among other impacts of the new machinery, even at that time, there were concerns and considerations of energy efficiency and fuel use again citing comparisons with the Chinese methods. The Chinese method of firing the leaf over charcoal was deemed to be very slow and costly. It took about eight pounds of good-quality wood turned into charcoal to dry a pound of tea, whereas, the Jackson drying machine produced the same results with anything that could be burned or with just one-quarter pound of Assam coal, per pound of finished dry tea. Therefore, technology is paramount in the farming, processing and performance of smallholder tea farming projects.

Data management for M&E is an integral practice that ensures that both raw information and full processes information is channeled through the, data collection, data analysis techniques, determination of M&E results, utilization of M&E result and data security for M&E thus resulting to performance of smallholder tea farming projects

1.2 Theoretical framework

The study was anchored on the premise of the Theory of Constraints as discussed below.

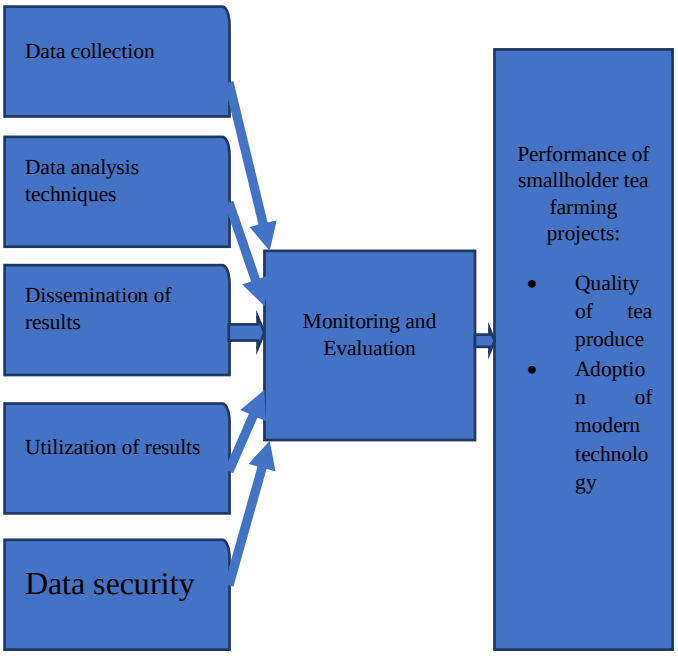
1.2.1 Theory of Constraints

The theory of constraints (TOC) can be used to demonstrate how managers can effectively manage organizations based on the assumption of system thinking and constraint management (Kohli & Gupta, 2010). TOC-based management philosophy focuses on change at three levels; mind-set of the organization, measures that drive the organization, and methods employed within the organization as stated by (Gupta and Boyd, 2008).

According Jacob and McClelland (2001), most projects are difficult to manage because they involve uncertainty, and involve three different and opposing commitments i.e. due date, budget, and content. Triple constraints criteria (time,

scope and cost) in project management have been accepted as a measure of project success. Venture supervisors see triple limitations as key to a venture's prerequisites and achievement. Streamlining these three elements learn extend quality and auspicious finish. Every one of the three limitations of tasks scope (a measure of value), cost and time have their individual impacts on ventures' execution yet since these components have some relationship, one imperative bear an impact on the other two, in the long run influencing ventures expectations to a more prominent degree (Hamid et al; 2012).

II. CONCEPTUAL FRAMEWORK



Source: Researcher 2021

Figure 1: Conceptual framework showing interrelationship between variables

2.1 Performance of Smallholder Tea Farming Projects

Project performance is currently an extremely relevant concept worldwide. It refers to the continuation of a Projects goals, principles, and efforts to achieve desired outcomes (Paul 2005; Simon, (1986). The efficient and informed utilization of project M&E practices greatly affects project outcomes and therefore it is important to analyze their utilization in various projects. This in turn informs both project managers and stakeholders on areas of improvement for achievement of better outcomes and management.

According to Sustainable Development Conference (2015) the challenges facing smallholder farmers are well known. Rural families living off the sale of cash crops have very little material savings and the little they have can be wiped out in a single bad harvest. Smallholder farmers living in remote areas face difficulties accessing both input and output markets. The generations old techniques, inputs and equipment employed by smallholder farmers are relatively inefficient, and often produce low yields. The vast majority have no titles to the land on which they work, basic market information or any form of training.

Consequently, FAO (2011) cited in SDC (2015) distinctively states that smallholder farmers are often at the mercy of middlemen, known by predatory names in many cultures around the globe, such as coyotes in Central America or pisteurs (trackers) in West Africa. Compounding these difficulties, as weather patterns become more unpredictable and global food prices more volatile, smallholder farmers are increasingly vulnerable. Despite this bleak picture, there are reasons to remain optimistic: the adoption of good farming practices throughout the production process alone can have a lasting impact on yields.

In addition, performance of smallholder tea farming projects is triggered by many innovative products and services that can substantially raise the productivity and incomes of smallholder farmers. For example, the use of higher quality seeds alone can improve crop yields by 50%. Cross breeding of local cows with hybrid species can lead to stronger and healthier livestock that produces 2-3 times more milk. Most smallholder farmers rely solely on rainwater for their crops, while basic irrigation systems could double a field's productivity. Yet, companies and organizations that strive to introduce these best practices and technologies often struggle to ensure widespread access, adoption and use among smallholder farmers. The latter often say they do not have the cash at hand and need a financing solution adapted to their situation. Possibly a more fundamental reason is a lack of trust, that investing in these products or services will effectively bring them the expected benefits. In many cases, they simply cannot afford to fail.

A study by Oluoko (2009) conducted in Kericho established that the Tea Research Foundation based in Kericho has been responsible for a large number of studies concerning agronomic characteristics of tea production with special attention being paid on the improvement of tea clones used for vegetative propagation thus initiating performance of smallholder tea farmers too. Further, different researchers in Kenya have also tried to address both ecological and socioeconomic factors. However, the present literature review has established that many gaps exist in dealing with socio-economic issues as compared to ecological ones. This, as will be stated later, is one of the justifications for the current study.

Fertility, proper farm input, quality seedling, weeding and plucking best procedures are great complements for performance of smallholder tea farming projects. On the same note, the soils on mountains, high-level structural plains and volcanic foot-ridges are well drained, shallow to very deep, dark reddish brown, friable, humic, rocky, and clay loams. According to (Ondieki, 2016), the soils on piedmont plains, lacustrine plains, bottom lands, and flood plains are imperfectly drained, very deep, cracking, gravelly clay to

clay, with calcareous deep sub-soils. These soils are variable in terms of their fertility, varying from moderately low to high fertility. Tea production is found in well-drained soils (volcanic foot-ridges) which are acidic in nature, with pH below 5.6, within the study area, and which are not susceptible to water logging greatly attributes to performance too.

Field visits validate the results reported by programmes and projects (Pfohl, 1986). In support of this, Amponsah (2012) notes that critical success and failure factors for projects include planning and field visits, and should be planned for and carried out at appropriate times so as to ensure that the staff is well aware of the project areas to enable them to easily carry out Monitoring & Evaluation. Other issues that are likely to affect Monitoring & Evaluation include budgeting and resource allocation. These need to be planned for to ensure that Monitoring &Evaluation of community projects are implemented effectively.

The Kenya Plant Health and Inspectorate Service are specifically mandated to facilitate improvement in the farming sector. Its impact, however, has not been felt in the areas where agricultural activities are mainly carried out, especially because there is little collaboration and coordination with the Ministry of Agriculture officials, even in Nyamira Sub County Agricultural Office Nyamira South, 2015). On the other hand, the role of KARI is to undertake research, whereas KEPHIS is the policy enforcement agency. KEPHIS faces challenges since its officers cover expansive areas and limitation of staff in terms of capacity and numbers.

Therefore, other than following up on payment of licensing fee, they might not be very effective in enforcing standards, collaborating and coordinating with agriculture officials ((Nyamira South Sub County Agriculture Office, 2017).

III. METHODOLOGY

The study adopted a descriptive survey design and Correlation research design to analyze data that was collected. Descriptive survey research design and correlation research design utilized were informed by the type of data collected in this study, data collection was to draw both descriptive and inferential data that required the use of descriptive and inferential analysis. Saunders, Lewis and Thornhill (2007) explained that quantitative and qualitative designs are important in analysing both descriptive and quantitative data. Quantitative design enables the researcher to arithmetically analyse data and the researcher intends to exercise some control over variables (Kothari, 2004).The study used a descriptive survey research design since it provided a quick access of the target population's information at a single point in time (Owen, 2002; Zikmund, 2003). According to Njuguna, Munyoki and Kibera (2014) the descriptive cross-sectional survey enables the study to test study hypotheses. Studies by Waithaka, Muathe, Mburu, and Korir, (2013); Njuguna, Munyoki and Kibera (2014) used similar research design and provided that this design gives a clear focus on the data collection hence leading to achievement of the aim of the scientific enquiry.

3.1 Target Population

The study targeted 24,000 smallholder tea farmers in Nyamira County undertaking tea farming projects as per KTDA (2017). Nyamira County comprises four Constituencies namely: North Mugirango, West Mugirango, Borabu and Kitutu Masaba. In nutshell, North Mugirango has 9, 000 smallholders' tea farming projects; Borabu has 7,500 tea planting project small holders; West Mugirango has 4,650 smallholder's tea farming projects; While Kitutu Masaba has 2,850 smallholder's tea farming projects. A total of 24000 smallholder tea farmers in Nyamira County undertaking tea farming projects who were targeted for the study are indicated in Table1

Table 1: Target population

Projects	Constituency	Number of smallholders
Tea Farming projects	North Mugirango	9,000
	Borabu	7,500
	West Mugirango	4,650
	Kitutu Masaba	2,850
	Total	24,000

Source: KTDA (2017)

3.2 Sample Size and Sampling Procedure

This section describes the sample size and the sampling procedure that was used in selecting the sample size.

3.2.1 Sample Size

The sample size of this study was 379 smallholder tea farmers drawn from a target population of 24,000 tea farmers using Krejcie and Morgan (1970) table of sampling theory. There is also a sample of 12 board of management of Tea farmers constituting nine members from each of the constituencies of which three board members are purposely sampled giving a total of 12 board members.

Table 2: Board of management of tea in the constituencies

Designation	Constituency	sample
Chairperson	1	4
Secretary	1	4
Treasurer	1	4
Total	3	12

Source: Researcher (2021)

3.2.2 Sampling Procedure

Sampling is the act, process or technique of selecting a suitable smaller size of representative part of a population for the purpose of determining parameters or characteristics of the whole population (Kombo and Tromp, 2006). The study adopted cluster sampling method where the four

constituencies were the desired clusters and samples were obtained from the clusters using simple random sampling techniques depending on the population size. This mean that using this technique, 45 respondents from Kitutu Masaba constituency, 73 respondents from West Mugirango constituency, 119 respondents from Borabu Constituency and 142 respondents from North Mugirango giving a total of 379 respondents. The sampling was none biased because it proportionately featured evenly the entire population.

Table 3: Sampling procedures

Projects	Constituency	No. of smallholders	Sample size
Tea farming projects	North Mugirango	9000	142
	Borabu	7500	119
	West Mugirango	4650	73
	Kitutu Masaba	2850	45
	Total	24,000	379

3.3 Data Analysis Techniques

Data analysis seeks to provide answers to research questions. The choice of analysis procedure depends on how best the techniques are suited to the study objectives and scales of measurement of the variables (Hauser, 2013). This study used both qualitative and quantitative approaches to analyse and interpret the data. Data was first edited, numbered and coded, and then cleaned by the researcher to ensure the data is clear and precise. Descriptive and inferential analysis were used to analyse the data.

3.3.1 Quantitative Data Analysis

The quantitative data was analysed using descriptive statistics such as measures of central tendencies through arithmetic means, measures of dispersion through standard deviation, percentages and frequency distribution which are suitable to analyze non-parametric data.

3.3.2 Qualitative Data Analysis

Qualitative data was obtained through interview guide, identifying themes on which the data were based in a narrative statement for triangulation of quantitative data.

3.3.3 Inferential analysis

Multiple linear regression model was used to establish the simultaneous Influence data management for M&E on performance of smallholder tea farming projects.

Model 1

Hypothesis: $H0_1$: There is no significant relationship between Data Management for M&E and Performance of smallholder tea farming projects Nyamira County.

Performance of smallholder tea farming projects Nyamira County = f (Data Management for M&E, random error)

$$Y_j=\beta_{0+}\beta_4 X_{4+}\varepsilon_i$$

Where β_0- Population's regression constant, X_4 _Data Management for M&E, β_i the regression coefficient of Data Management for M&E and ε -is the Model error variable.

IV. RESULTS

The study results were discussed based on thematic and sub-thematic areas. The thematic areas include: Questionnaires return rate, demographic characteristics of the participants, Data management for M&E on performance of smallholder tea farming projects in Nyamira County, Kenya. Descriptive, inferential and qualitative statistical analysis were carried out and discussed simultaneously in a cross-sectional manner. Descriptive analysis was first done by use of the percentage frequencies, arithmetic means and the standard deviations followed by inferential analysis by use of correlation analysis and multiple regression analysis to test the significance relationship under study; whereas qualitative analysis involved content analysis from the interview guide as data collection instruments developed by the researcher.

4.1 Questionnaire Return Rate

Out of the 379 questionnaires administered to the participants undertaking smallholder tea farming projects from the four Constituencies in Nyamira County (North Mugirango, Borabu, West Mugirango and Kitutu Masaba), 371 were dully filled giving a return rate of 97.89%. The high rate was attained because the researcher visited the sampled respondents during data collection and administered the instruments to each respondent in person. The high return rate of 97.89% facilitated gathering of sufficient data that could be generalized to determine the influence of data management on performance of smallholder tea farming projects in Nyamira County, Kenya. The Questionnaire return rate was considered adequate as per Saunders (2003) and Gay (2003) who claim that a Questionnaire return rate that is beyond 50% is acceptable in research. Similarly, Mugenda and Mugenda (2013) and Kothari (2004) recommend that a questionnaire return rate of more than 50% to be satisfactoryand contributes towards gathering of sufficient data that could be generalized to represent the opinions of participants about the study problem in the target population. Table 4.1 shows the Questionnaire Return Rate for the participants undertaking smallholder tea farming projects from the four Constituencies (North Mugirango, Borabu, West Mugirango and Kitutu Masaba).

Table 4: Questionnaire Return Rate

Constituency	**Sampled**	**Returned**	**Return Rate**
North Mugirango	142	139	97.89
Borabu	119	117	98.32
West Mugirango	73	72	98.63
Kitutu Masaba	45	43	95.56
Total	**379**	**371**	**97.89**

Source: Researcher's analysis (2021)

4.2 Demographic characteristics of the Respondents

In order to understand the characteristics of participants the researcher was dealing with in the study, their background information was necessary. The study sought information from the participants on distribution by; gender, age and educational level. The participants were asked to provide the demographic information. The results are presented in Tables 5, 6 and 7 respectively and are further discussed in the following subsequent sub themes.

4.3 Distribution of respondents by Gender

It was imperative to investigate the respondents' gender to establish gender parity in management of smallholder tea farming projects. The information sought on gender will be significance to the government for policy decision making. The respondents were therefore asked to state their gender and the results are presented in Table 5.

Table 5: Distribution of Respondents by Gender

Gender	Frequency	Percent
Females	193	52.0
Males	178	48.0
Total	**371**	**100**

Source: Researcher analysis (2021)

Table 5, shows that over 50% of the respondents at 193(52%) were females while their male counterparts were 178(48%). The findings indicated that Female tea farmers outnumbered their male counterparts by relatively smaller margin, implying that there was still gender parity in smallholder tea farming projects.

4.4 Distribution of the Respondents by Age

Research participants were also asked to provide their age to ascertain whether they were distributed normally in terms of age group. Age representation across the age brackets were used to ensure that the results represent views across all the age groups. The findings were analyzed to show respondents' distribution by age category in terms of frequency and percentage as provided in Table 6.

Table 6: Distribution of Respondents by Age Group

Age group	Frequency	Percent
Below 25 years	2	0.5
25-30 years	8	2.2
30-35 years	33	8.
35-40 years	74	19.9
40-45 years	79	21.3
45-50 years	83	22.4
50 and above years	92	24.8
Total	**371**	**100**

Source: Researcher analysis (2021)

Table 6, indicates that majority of participants were aged between 35 years and above as shown by 328(88.4%) of the respondents, compared to a minority 43(11.6%) aged below 35 years. The findings on respondent's distribution by age was significant to this study as majority of the respondents were relatively mature enough to give adequate information on the influence of data management on performance of smallholder tea farming projects in Nyamira County, Kenya.

4.5 Distribution of respondent by level of Education

The respondents were also asked to indicate their level of education. The level of Educational of the respondent was significant in providing knowledge for understanding the influence of data management on performance of smallholder tea farming projects in Nyamira County, Kenya. Table 7 provides the respondents' distribution by level of education.

Table 7: Distribution of Respondents by level of Education

Level of Education	Frequency	Percent
Primary	110	29.6
Secondary	138	37.2
University	96	25.9
Others	7	1.9
Total	**371**	**100**

Source: Researcher analysis (2021)

The study findings indicated that 110(29.6%) of the respondents had primary level of education, 138(37.2%) had secondary level of education, 96(25.9%) had University level of education and finally 7(1.9%) had other level of education. The implication of this findings to the study is that majority totaling to 248(66.8%) of the participants had secondary level of education and below whereas123 (33.2%) had tertiary level of education and above. Although majority of participants had lower level of academic qualification, this could not compromise their effective participation and understanding the nature of the study problem since smallholder tea farmers projects does not really require one to have a higher educational background in order to effectively perform tasks in the tea farming projects and hence the participants could still provide the study with reliable information on the influence of data management on performance of smallholder tea farming projects in Nyamira County, Kenya

Data management for M&E refers to an integral practice that ensures that both raw information and full processes information is channeled through the, data collection, data analysis techniques, determination of M&E results, utilization of M&E result and data security for M&E thus resulting to performance of smallholder tea farming projects This was the fourth objective that the study sought to achieve.; therefore, the participants were requested to give their opinions on their level of agreements or disagreements with the seven statements of Data management for M&E on a Likert scale of 1-5 where Strongly agree(SA)=5, Agree(A)=4 Neutral(N)=3, Disagree(D)=2and Strongly disagree. (SD)=1. The results

were analyzed and presented to show frequency and percentage for each response in each item. The items mean as well as the standard deviation were also computed and presented alongside as provided in Table 8

Table 8: Data management for M&Eand Performance of Smallholder Tea Farming Projects

ITEMS	SA	A	N	D	SD	Mean	Std. dev
1. Data management for M&E is essential on performance of smallholder tea farming projects	252 (67.9%)	107 (28.8 %)	10 (2.7 %)	1 (0.3 %)	1 (0.3 %)	4.64	0.587
2. Most of the smallholder tea farming projects fail due to poor data management for M&E	163 (43.9%)	156 (42%)	50 (13.5 %)	1 (0.3 %)	1 (0.3 %)	4.29	0.7364
3. None biased data collection methods for M&E leads to successful performance of smallholder tea farming project	200 (53.9%)	154 (41.5 %)	13 (3.5 %)	4 (1.1 %)	0 (0.0 %)	4.48	0.6250
4. Proper analysis techniques enhance good communication platform for M&E thus promoting performance of smallholder tea farming projects	181 (48.8 %)	172 (46.4 %)	17 (4.6 %)	1 (0.3 %)	0 (0.0 %)	4.44	0.603
5. Dissemination of M&E results motivates the smallholders thus promoting performance	203 (54.7 %)	152 (41%)	15 (4.0 %)	1 (0.3 %)	0 (0.0 %)	4.50	1.279
6. Data security for M&E leads performance of smallholder tea farming projects	197 (12.4 %)	139 (37.5 %)	30 (8.1 %)	1 (0.3 %)	4 (1.1 %)	4.41	0.7422
7. Data management for M&E modern tea processing, use of digital machines reduce logistics and time wastage thus inducing performance	169 (45.6 %)	166 (44.7 %)	31 (8.4 %)	4 (1.1 %)	1 (0.3 %)	4.4	0.7019
Composite mean	**195 (52.6 %)**	**149 (40.1 %)**	**24 (6.5 %)**	**2 (0.5 %)**	**1 (0.3 %)**	**4.44**	
Composite standard deviation							**0.2934**

Seven statements were developed to measure the extent to which Data management for M&E influence Performance of Smallholder tea farming projects.

Statement (1) that '.*Data management for M&E is essential on performance of smallholder tea farming projects'* had a mean of 4.64 and a standard deviation of 0.578. These results indicate that out of 371 study participants, 252(67.9%) strongly agreed, 107(28.8%) agreed, 10(2.7%) were neutral, 1(0.3%) disagreed and 1(0.3%) strongly disagreed that data management for M&E is essential on performance of smallholder tea farming projects. This result shows that the line statement mean score of 4.64 and a standard deviation of 0.578 were above the composite mean score of 4.44 and standard deviation of 0.286; The implication of this result to the study is that data management for M&E is essential on performance of smallholder tea farming projects. The study results support/contradicts finding by Soler, Ort and Steckel (2016) who found out that data management for M&E positively influence performance of smallholder tea farming projects. During the interview session with the Tea Factory Board of Managements Members (BOMM). The Board of Managements Members had this to say;

> *"Data management for M&Ehas enhanced good communication platforms. Data security and management for M&E in Smallholder tea farming projects thereby enhancing Performance of Smallholder tea farming projects" -BOMM.*

Statement (2) that '.*Most of the smallholder tea farming projects fail due to poor data management for M&E'* had a mean of 4.29 and a standard deviation of 0.725. This results indicate that out of 371 study participants,163(43.9%) strongly agreed, 156(42%) agreed, 50(13.5%) were neutral, 1(0.3%) disagreed and 1(0.3%) strongly disagreed that most of the smallholder tea farming projects fail due to poor data management for M&E. This results shows that the line statement mean score of 4.29 and a standard deviation of 0.725were below the composite mean score of 4.44 and standard deviation of 0.286. The implication of this result to the study is that poor data management for M&E negatively influence performance of smallholder tea farmers. The study results support/contradicts finding by Nieschullze (2016) who found out that poor data management for M&E negatively influence performance of smallholder tea farming projects.

Statement (3) that '*None biased data collection methods for M&E leads to successful performance of smallholder tea farming project'* had a mean of 4.48 and a standard deviation of 0.621. This results indicate that out of 371 study participants, 200(53.9%) strongly agreed, 154(41.5%) agreed, 13(3.5%) were neutral, 4(1.1%) disagreed and 0(0.0%) strongly disagreed that none biased data collection methods for M&E leads to successful performance of smallholder tea farming project. This results shows that the line statement mean score of 4.48 and a standard deviation of 0.621 were above the composite mean score of 4.44 and standard deviation of 0.286; The implication of this result to the study is that none biased data collection methods for M&E leads to successful performance of smallholder tea farming project. The study results support/contradicts finding by Kabir (2016) who found out that none biased data collection methods for M&E leads to successful performance of smallholder tea farming projects.

Statement (4) that 'Proper analysis techniques enhance good communication platform for M&E thus promoting performance of smallholder tea farming projects' had a mean of 4.44 and a standard deviation of 0.596. These results indicate that out of 371 study participants, 181(48.8%) strongly agreed, 172(46.4%) agreed, 17(4.6%) were neutral, 1(0.3%) disagreed and 0(0.0%) strongly disagreed that proper analysis techniques enhance good communication platform for M&E thus promoting performance of smallholder tea farming projects. This result shows that the line statement mean score of 4.48 and a standard deviation of 0.621 were above the composite mean score of 4.44 and standard deviation of 0.286; The implication of this result to the study is that proper analysis techniques enhance good communication platform for M&E thus promoting performance of smallholder tea farming projects. The study results support/contradicts finding by Kawulich (2004) who found out that proper analysis techniques enhance good communication platform for M&E thus promoting performance of smallholder tea farming projects.

Statement (5) that 'Dissemination of M&E results motivates the smallholders' tea farmers thus promoting performance of smallholder tea farming projects' had a mean of 4.50 and a standard deviation of 0.590. These results indicate that out of 371 study participants, 203(54.7%) strongly agreed, 152(41%) agreed, 15(4.0%) were neutral, 1(0.3%) disagreed and 0(0.0%) strongly disagreed that dissemination of M&E results motivates the smallholders' tea farmers thus promoting performance of smallholder tea farming projects.This result shows that the line statement mean score of 4.50 and a standard deviation of 0.590. were above the composite mean score of 4.44 and standard deviation of 0.286; The implication of this result to the study is that there is need to ensure dissemination of M&E results to smallholder's tea farmers in order toenhance performance of smallholder tea farming projects. The study results support/contradicts finding by Kawulich (2004) who found out that dissemination of M&E results motivates the smallholders' tea farmers thus promoting performance of smallholder tea farming projects.

Statement (6) that '*Data security for M&E leads performance of smallholder tea farming projects'* had a mean of 4.41 and a standard deviation of 0.742. These results indicate that out of 371 study participants, 197(53.1%) strongly agreed, 139(37.5%) agreed, 30(8.1%) were neutral, 1(0.3%) disagreed and 4(1.1%) strongly disagreed that data security for M&E leads performance of smallholder tea farming projects. This result shows that the line statement mean score of 4.41 and a standard deviation of 0.742 were slightly below the composite mean score of 4.44 and standard deviation of 0.286; The implication of this result to the study is that data security for M&E leads performance of smallholder tea farming projects. The study results support/contradicts finding by Rajagopalan (2014) who found out that data security for M&E leads performance of smallholder tea farming projects.

Statement (7) that 'Data management for M&E modern tea processing, use of digital machines reduce logistics and time wastage thus inducing performance of smallholder tea farming projects' had a mean of 4.34 and a standard deviation of 0.700. These results indicate that out of 371 study participants, 169(45.6%) strongly agreed, 16645.6%) agreed, 31(8.4%) were neutral, 4(1.1%) disagreed and 1(0.3%) strongly disagreed that data management for M&E modern tea processing, use of digital machines reduce logistics and time wastage thus inducing performance of smallholder tea farming projects. This results shows that the line statement mean score of 4.34 and a standard deviation of 0.700 were slightly below the composite mean score of 4.44 and standard deviation of 0.286; The implication of this result to the study is that there is need to ensure data management for M&E modern tea processing, use of digital machines reduce logistics and time wastage in order to induce performance of smallholder tea farming projects. The study results support finding by Koskei (2012) who found out that technology if well adopted enhances easiness in terms of data management logistics, monitoring and Evaluation of smallholder tea farming projects thereby leading to performance of smallholder tea farming projects

The composite mean and composite deviation for the capacity building for M&E were 4.11 and 0.340 respectively; implying that using the Likert scale the participants agreed (mean=4.11) that Participatory M&Einfluence Performance of smallholders' tea farming projects positively.

4.6 Correlation analysis on Data management for M&E and Performance of Smallholders' Tea farming projects

The study sought to examine the relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects. Pearson correlation coefficient was used to test the relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects, this was done at 95% level of confidence. To test the extent of the relationship between Data management for M&Eand

Performance of Smallholders' Tea farming projects; several characteristics of Data management for M&Eand Performance of Smallholders' Tea farming projects were analyzed based on the following hypothesis; H_{04}: There is no significant relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects. The corresponding mathematical model for the hypothesis was identified as follows: Performance of Smallholders' Tea farming projects = f (Data management for M&E). The correlation results presented in Table 4.26 indicated that all constructs of Data management for M&Ehad their P-values under significant 2-tailed being significant since the P-values <0.05. Statement 1 **(***Data management for M&E is essential on performance of smallholder tea farming projects*;r=0.184, P-value=0.000<0.05),Statement 2;(*Most of the smallholder tea farming projects fail due to poor data management for M&E* r=0.209, P-value=0.000<0.05), Statement 3;(*None biased data collection methods for M&E leads to successful performance of smallholder tea farming project*;r=0.410, P-value=0.000<0.05) ,Statement 4;(*Proper analysis techniques enhance good communication platform for M&E thus promoting performance of smallholder tea farming projects*; r=0.155, P-value=0.000<0.05), Statement 5; (Dissemination of M&E results motivates the smallholders thus promoting performance ;r=0.173, P-value=0.001 < 0.05), Statement 6; (Data security for M&E leads performance of smallholder tea farming projects;r=0.186, P-value=0.000<0.05)and Statement 7; (Data management for M&E modern tea processing, use of digital machines reduce logistics and time wastage thus inducing performance r=0.370, P-value=0.000<0.05)

Similarly the overall correlation coefficient for Data management for M&Eand Performance of Smallholders' Tea farming projects was found to be 0.552 with a P-value of 0.000 < 0.05 ,implying that there is a significant relationship between Data management for M&E and Performance of Smallholders' Tea farming projects leading to rejection of the null hypothesis (H_{04} : There is no significant relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects) and acceptance of the alternative hypothesis, and hence the research findings conclude that there is a significant relationship between Data management for M&Eand Performance of Smallholders' Tea farming projects. *This finding is in agreement with findings by Soler (2016)study that found out that there is a significant relationship between* Data management for M&E*and Performance of Smallholders' Tea farming projects*.

The correlations results obtained are shown in Table 9

Table 9: Correlations of Data management for M&Eand Performance of Smallholders' Tea farming projects

Data management for M&E statements		**Performance of Smallholders' Tea farming projects**
1Data management for M&E is essential on performance of smallholder tea farming projects	Pearson correlation	0.184*
	sig. (2-tailed)	0.000
2Most of the smallholder tea farming projects fail due to poor data management for M&E	Pearson correlation	0.209*
	sig. (2-tailed)	0.000
3None biased data collection methods for M&E leads to successful performance of smallholder tea farming project	Pearson correlation	0.410*
	sig. (2-tailed)	0.000
4. Proper analysis techniques enhance good communication platform for M&E thus promoting performance of smallholder tea farming projects	Pearson correlation	0.155*
	sig. (2-tailed)	0.000
5. Dissemination of M&E results motivates the smallholders thus promoting performance	Pearson correlation	0.173*
	sig. (2-tailed)	0.001
6. Data security for M&E leads performance of smallholder tea farming projects	Pearson correlation	0.186*
	sig. (2-tailed)	0.000
7 Data management for M&E modern tea processing, use of digital machines reduce logistics and time wastage thus inducingperformance	Pearson correlation	0.370
	sig. (2-tailed)	0.000
Data management for M&E (overall correlation)	**Pearson correlation Sig.(2-tailed)**	**0 .552* 0.000**

(n=371); *Correlation is significant at 0.05 level (2-tailed)

Regression Analysis of Data management for M&Eon Performance of Smallholders' Tea farming projects

Simple linear regression was adopted to investigate how data management for M&E influence the Performance of Smallholders' Tea farming projects. It was necessary to get the views of the participants on the influence of data management for M&E on Performance of Smallholders' Tea farming projects. The rational of using the simple regression model was to establish how data management for M&E as a predictor significantly or insignificantly predicted the Performance of Smallholders' Tea farming projects.

The model summary table suggest that there is a positive correlation(R=0.552) between data management for M&Eand the Performance of Smallholders' Tea farming projects and those predicted by the regression model. In addition, 30.5% of the variation in the Performance of Smallholders' Tea farming projects was explained by data management for M&E. *The results are consistent with the findings of a study of Nieschullze (2016) who recommended that* data management for M&E*predicted the Performance of Smallholders' Tea farming projects*. The regression model summary is presented in Table 10

Table 10: Regression Model Summary table of data management for M&Eand Performance of Smallholders' Tea farming projects

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.552[a]	0.305	0.303	0.402
a. Predictors: (Constant), **data management for M&E**				

The study sought to establish if the regression model is best fit for predicting Performance of Smallholders' Tea farming projects after use of data management for M&E. The ANOVA results indicated that (F-statistics (1,369) =161.649 is significant at P value 0.000< 0.05 implying that the predictor co-efficient is at least not equal to zero. and hence the regression model results in significantly better prediction of Performance of Smallholders' Tea farming projects. The regression ANOVA output statistics results are shown in Table 11

Table 11: An ANOVA of the Regression of data management for M&Eand Performance of Smallholders' Tea farming projects

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	26.138	1	26.138	160.649	0.000[b]
	Residual	59.666	369	0.162		
	Total	85.803	370			
a. Dependent Variable: Performance of Smallholders' Tea farming projects						
b. Predictors: (Constant), **data management for M&E**						

The study sought to establish whether there was influence of data management for M&E and Performance of Smallholders' Tea farming project. The simple linear regression coefficients result indicated that there was significant influence of data management for M&E on Performance of Smallholders' Tea farming project. The coefficient of the constant term (β_0 =0.101; p >0.05) was not statistically significant whereas the coefficient of data management for M&E (β_4 = 0.930; p < 0.05) was statistically significant. The regression model for data management for M&E was y=0.101 + 0.930X_4 implying that for each unit of data management for M&E, Performance of Smallholders' Tea farming projects marginally changed by 0.930 units. It was therefore concluded that data management for M&E and Performance of Smallholders' Tea farming project were positively and linearly related.

The regression coefficients results are in Table 12

Table 12: Coefficients for the Regression of data management for M&E and Performance of Smallholders' Tea farming projects

Coefficients[a]						
Model		**Unstandardized Coefficients**	**Standardized Coefficients**	**t**	**Sig.**	
		B	**Std. Error**	**Beta**		
1	(Constant)	0.101	0.326		0.310	0.754
	Data Management for M&E	0930	0.073	0.552	12.714	0.000

a. Dependent Variable: Performance of Smallholders' Tea farming projects

V. CONCLUSION

5.1 Data Management for M&E and Performance of Smallholders' Tea farming projects

The Data Management for M&E influence Performance of Smallholders' Tea farming projects. The composite mean and composite deviation for the Participatory M&E were 3.50 and 0.615 respectively; implying that using the Likert scale, the respondents agreed that Data Management for M&E Influence Performance of Smallholders' Tea farming projects in Nyamira County. The overall correlation coefficient for Data Management for M&E and Performance of Smallholders' Tea farming projects in Nyamira County was found to be 0.562 with a p-value of 0.000 < α=0.05 implying that from the views of participants in the study the results indicated that there was a significant relationship between Data Management for M&E and Performance of Smallholders' Tea farming projects in Nyamira County; leading to rejection of the null hypothesis (H_{04}:There is no significant relationship between Data Management for M&E and Performance of Smallholders' Tea farming projects in Nyamira County) and acceptance of the alternative hypothesis. The ANOVA results from the study participants views indicated that the regression model for Data Management for M&E results in significantly better prediction of Performance of Smallholders' Tea farming projects in Nyamira County (1,369) =146.046 and *p-value*=0.00<0.05). The simple linear regression coefficients result indicated that the test of $\beta_{2=}$0.416 (coefficient of Data Management for M&E) statistics revealed that there was sufficient evidence that Data Management for M&E was linearly related to Performance of Smallholders' Tea farming projects in Nyamira County (Value of test statistics: t=12.085; *p-value* =0.000).

The Fourth research objective was to examine the extent to which data management for M&E influence Performance of Smallholders' Tea farming projects. The simple linear regression coefficients as well as the Pearson correlation results indicated that there was significant (P-Value 0.000<0.05) influence of data management for M&E on Performance of Smallholders' Tea farming projects. The

small p-values (0.000<0.05); implied that there is a significant influence of data management for M&E on Performance of Smallholders' Tea farming projects.; leading to rejection of the null hypothesis $H0_4$: that there is no significance influence of data management for M&E on Performance of Smallholders' Tea farming projects and so it was concluded that there is significance influence of data management for M&E on Performance of Smallholders' Tea farming projects.

VI. RECOMMENDATION

Most of the tea farming projects should be integrated in Monitoring and Evaluation data management systems for sharing data among different departments in the tea farming sector, and properly serviced and update Data management gadgets to enhance its effectiveness in making periodic reports for making decisions to enable the smallholder tea farmers to achieve their goal. There should be commitment in higher data management and assigning responsibility to all smallholder tea farmerswith sharing overall activities, including managing, capacity building, budget allocation and participatory staff development in tea factories. These M & E practices will enhance good data management implementation in smallholder tea farming sector.

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