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Evaluation of the Performance of County Forest Conservancies against their Performance Contracts Targets as Indicated in Their AWP&B in Kenya

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Abstract:

Annual Workplan and Budget (AWP&B) are prepared annually by public organizations as required by the government policy for funds allocation by the treasury, which presents a focused role and a determined direction that estimates organization finances against her activities in a financial year. This study analyzed the effect of AWP&B on the performance of County Forest Conservancies (CFCs) in Kenya. Specifically, the study evaluated the performance of CFCs against their PC targets as indicated in their AWP&B. Descriptive research design was employed to analyze the AWP&B on the performance of CFCs. The result of the evaluation of performance showed that the observed calculated Chi-square (χ^2) test statistics (79.81) was greater than the critical value (5.99) at 95% ($\alpha = 0.05$). The test result was found to be significant, showing that the performance of CFCs did not support the full realization of their PC targets as indicated in their AWP&B. In conclusion, AWP&B indicated a significant impact on the performance of CFCs, showing that the planned target was not achieved fully as expected. The reason established for under achievement was that the CFCs do not receive adequate fund to enable them run their activities effectively. The study, therefore, recommended that the management implement a co-financing/cost-sharing model in AWP&B by exploring, securing and harnessing diversified funding sources, including private stakeholders, public-private partnerships and international grants to enable the organization to attain the overarching goal of increasing forest and tree cover in the country.

Keywords: AWP&B, conformity, evaluation, formulation, fund allocation, linear programming and performance

1. Introduction

Globally, forestry is crucial to the lives of millions of people, especially the poorest of society, who most critically depend on forest resources for their well-being and survival (FAO, 2016). In Kenya, the forest sector plays a critical role in the national economy, contributing 3.6% to the Gross Domestic Product (GDP) worth Kenya shillings 7 billion (FAO, 2016).

According to GOK (2018), it employs over 50,000 people directly and another 300,000 indirectly. Kottut et al. (2019) observed that forest resources have a significant role in alleviating household poverty, and as such, organizations have the responsibility to formulate good governance structures and policies that enhance the effective and efficient delivery of services.

Savingnon et al. (2019) noted that the public budgeting would offer organization the opportunity to promote consistency and reconciliation of budget allocation in the plan and policy priorities.

However, public organizations that desire to transform their budgeting systems need to consider their perceptions regarding the planning and budgeting process (Aliabadi et al., 2019). Annual Work Plan and Budget (AWP&B) implemented by organizations therefore present a focus, role and a clearly determined direction to enhance the work performance. In Kenya, Kenya Forest Service (KFS) prepares its AWP&B as required by the treasury guideline as stipulated in the Medium Term Budget (MTB) process for funds allocation from the exchequer. According to GOK, the 2023 work planning structure supports MTB's negotiation of funds anchored on the Medium-Term Plan (MTP) of Vision 2030. As the first step towards accessing the funds, County Forest Conservancies (CFCs), who are the beneficiaries, prepare their AWP&B in line with the amalgamated AWP&B of KFS. However, the ultimate fund allocated to CFCs usually does not normally meet the threshold of their AWP&B implementation due to less money given to KFS.

1.1. Problem Statement

CFCs have not been able to implement all planned activities as stipulated in their committed PC targets. Over the last 10 years, the budgetary requirement for the KFS strategic plan was Kshs 91.539 billion to realize the activities'

implementation effectively. Based on the approved budget, the amount available was only Kshs 56.849 billion, leaving a deficit of Kshs 34.751 billion. The factor that has prevented the full implementation of planned activities is less money because of the absence of a strong enabling amalgamated AWP&B structure of KFS to negotiate for more funds from the exchequer. The study intends to resolve the problem by investigating the AWP&B on performance delivery with a view to improving it for adequate fund allocation.

1.2. Research Objective

To evaluate the performance of County Forest Conservancies against their Performance Contracts targets as indicated in their AWP&B in Kenya.

1.3. Scope of the Study

The setting of the study was the CFCs since they are state actors implementing the AWP&B.

2. Research Methodology

2.1. Study Area

The study was carried out in seventeen CFCs in Kenya. Figure 1 below is a map of the Country of Kenya showing the boundary of the 47 CFCs and the study area.

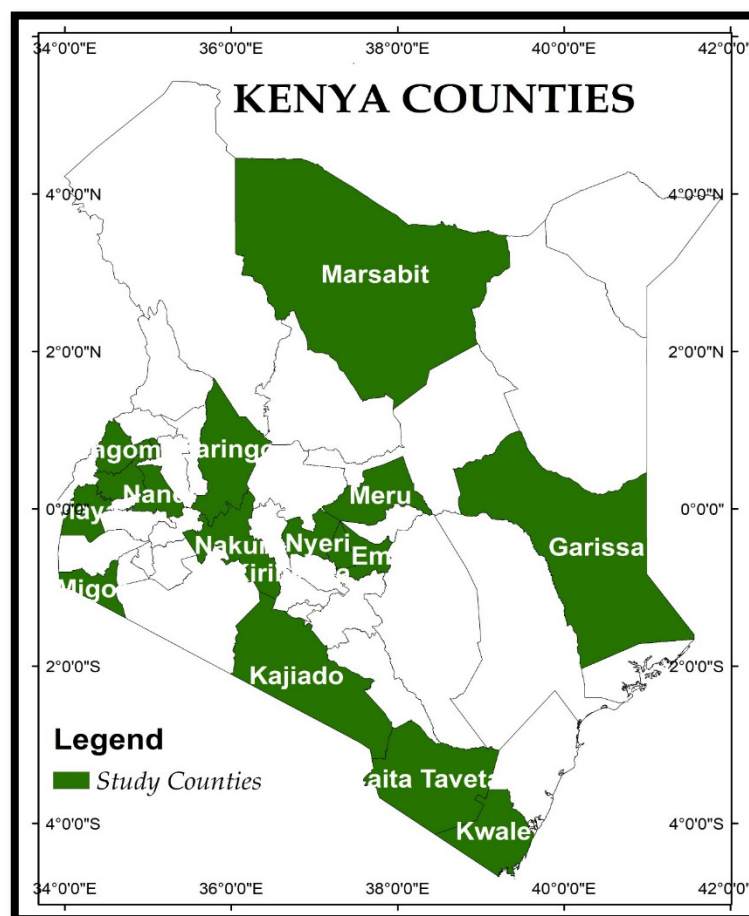


Figure 1: The Study Area of Seventeen CFCs in Kenya

2.2. Research Design

This study employed descriptive statistical research to provide answers to the questions associated with the research problem statement.

2.3. Population and Sample

The population and sample size were determined by the number of CFCs in Kenya, where AWP&B activities are implemented in line with KFS mandate, functions, and government policy directions. According to First Schedule Article 6 (1) GOK, 2010, there are 47 counties in the country. The total number of counties formed the population of the study area considered for research, and seventeen counties were selected and formed the sample size.

2.4. Sampling Technique and Sample Size

Subject to a sample of the population determination, the study displayed all 47 characteristics of the population in order to be truly representative. Mugenda (2008) argued that for high-precision pilot studies, 10 percent of the sample

should constitute the pilot test size. Meanwhile, Mugenda and Mugenda (2003), on quantitative and qualitative stationary approaches, considered a threshold of 10-36 per cent sample size adequate for a descriptive study to respond to the evaluation of the performance of the CFCs against their PCs targets as indicated in their AWP&B. The study adopted the upper threshold for better results, according to Mugenda & Mugenda (2003), and calculated the area to be sampled as follows:

100% = 47 Counties, therefore 36% = $(36 \times 47) - 100 = 17$ Counties (Area sampled).

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	X	X	X

Table 1: Sampling Units Area Showing the Digits of 47 Counties

Table 1 above shows the characters of the digits of the sampling unit area of the 47 CFCs in Kenya. The 17 sampling unit areas of CFCs determined from the above calculation were further stratified according to ten Regional Forest Conservancies (RFCs), namely Nyanza, Central Highlands, Nairobi, Coast, Western, North Eastern, Eastern, North Rift, Mau and Ewaso North. Two counties were selected in each of the RFCs with the biggest number of counties, and one county was selected in each of the RFCs with the smallest number of counties, as shown in table 2 below:

Regional Forest Conservancy	Counties	Sampled Counties
1. Nyanza	1. Kisii	
	2. Migori	1. Migori
	3. Siaya	2. Siaya
	4. Kisumu	
	5. Nyamira	
	6. Homabay	
2. Central Highland	7. Laikipia	
	8. Kiambu	
	9. Murang'a	
	10. Kirinyaga	3. Kirinyaga
	11. Nyandarua	
	12. Nyeri	4. Nyeri
3. Nairobi	13. Nairobi	
	14. Kajiado	5. Kajiado
4.Coast	15. Kwale	6. Kwale
	16. Lamu	
	17. Mombasa	
	18. Tana River	
	19. Taita Taveta	7. Taita Taveta
	20. Kilifi	
5.Western	21. Bungoma	8. Bungoma
	22. Kakamega	9. Kakamega
	23. Vihiga	
	24. Busia	
6.North Eastern	25. Garissa	10. Garissa
	26. Wajir	
	27. Mandera	
7.Eastern	28. Embu	11. Embu
	29. Meru	12. Meru
	30. Tharaka Nithi	
	31. Machakos	
	32. Makueni	
	33. Kitui	
8. North Rift	34. Nandi	13. Nandi
	35. Trans Nzoia	14. Trans Nzoia
	36. Uasin Gishu	
	37. West Pokot	
	38. Turkana	
	39. Elgeyo Marakwet	

Regional Forest Conservancy	Counties	Sampled Counties
9.Mau	40. Baringo	15. Baringo
	41. Nakuru	16. Nakuru
	42. Narok	
	43. Kericho	
	44. Bomet	
10.Ewaso North	45. Marsabit	17. Marsabit
	46. Samburu	
	47. Isiolo	

Table 2: Sampled counties in the Regional Forest Conservancy

17 sampling units were selected out of a total population of 47 and considered as a representative sample for the study (Mugenda & Mugenda, 2003). The selected characters of the counties of the sampling unit areas were *Kakamega, Garissa, Marsabit, Nakuru, Baringo, Nyeri, Taita/Taveta, Kwale, Embu, Kirinyaga, Bungoma, Kajiado, Trans Nzoia, Migori, Siaya, Nandi* and *Meru*.

2.5. Data Collection

Primary data was sourced from a structured questionnaire containing 12 major activities implemented by CFCs towards the realization of the KFS strategic plan, and secondary data was sourced from Government policy documents, circulars, reports, returns books, and journal publications.

2.6. Data Analysis and Presentation

The study evaluated the performance of CFCs against their PC targets as indicated in their AWP&B to determine how robust the system support realization of KFS plans, strategies and policies was. This study was undertaken using a rating indicator of the performance of selected CFCs in Kenya as very satisfied '3', satisfied '2' and not satisfied '1' with scoring percentages of "80-100, 50-79 and 0-49" respectively, for the planned activities target against their PCs targets achievement as indicated in their AWP&B. The study undertook a descriptive statistical data analysis to evaluate the performance of CFCs against their PC targets as indicated in their AWP&B by applying Chi-square (χ^2) to test for the deviations of observed frequencies from expected frequencies on the categorical variables in the population on performance given by the equation 3.1 below;

Equation 3.1: $\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$ where χ^2 = Chi-square statistics, f_e = expected frequency and f_o = observed frequency. When χ^2 value = 0, it is said to be significant, but when $\chi^2 > 1$, it is said to be insignificant. The results were presented using tables and figures.

3. Results and Discussion

Eight activities were subjected to descriptive data analysis, measuring the discrepancy between expected and observed frequency of performance, as indicated in the tables below. (Note: Four activities had minimal return.) The following were the results of Key Performance Indicators implemented (KPI) by CFCs.

No.	CFCs Office	No. of KFS Nurseries	No. of Stakeholder Nurseries	AWP&B Target seedlings '000	KFS Achievement '000"	Stakeholders' Achievement '000"	Total AWP&B Achievement '000"	Satisfaction on Performance Indicator (3, 2 or 1)
1	Kakamega	7	132	6,080	1,060	5,020	6,080	3
2	Garissa	2	0	25	28	0	28	3
3	Marsabit	5	0	60	59	0	59	3
4	Nakuru	6	239	7,900	1,070	5,730	6,800	3
5	Baringo	11	40	6,600	2,400	4,200	6,600	3
6	Nyeri	12	128	4,200	1,700	2,500	4,200	3
7	Taita. Taveta	5	88	2,100	313	981	1,294	2
8	Kwale	5	43	220	55.6	226.39	282	3
9	Embu	3	55	1,500	200	469	669	1
10	Kirinyaga	5	60	4,800	1,300	3,000	4,300	3
11	Bungoma	5	20	1,400	325	1,000	1,325	3
12	Kajiado	2	90	2,000	500	1500	2,000	3

No.	CFCs Office	No. of KFS Nurseries	No. of Stakeholder Nurseries	AWP&B Target seedlings '000	KFS Achievement "000"	Stakeholders' Achievement "000"	Total AWP&B Achievement "000"	Satisfaction on Performance Indicator (3, 2 or 1)
13	Trans Nzoia	8	69	6,000	2,331	3,369	5,700	3
14	Migori	6	94	2,000	148	1,451	1,599	3
15	Siaya	2	96	2,800	300	2,500	2,800	3
16	Nandi	7	70	8,100	2,000	6,000	8,000	3
17	Meru	10	34	2,870	1,870	2,000	3,870	3
	Total	94	1,258	58,655	15,660	39,946	55,606	3

Table 3: Tree Seedlings Production

The result from table 3 above shows that:

- KFS produced about 25% of the seedlings, while the stakeholders produced about 75%. Insufficient funding and inadequate staff were found to be the causes of the low seedling production in KFS nurseries.
- Seedling tubes, in many cases, have been bought by the saw millers where there is timber exploitation (Nyeri, Baringo, Nakuru and Kirinyaga).
- Most of the CFCs did not receive an allocation for seedling production for major programmes as planned in AWP&B. Where there was availability of funds, they were inadequate.
- Where there were no natural streams, water was a major problem (Siaya, Baringo)
- High potential areas recorded higher seedling production rates than the low potential areas (Nakuru, Baringo, Nyeri, Kakamega, Nandi, Kirinyaga, Trans Nzoia), indicating favourable environment conditions for the attainment of optimal results.
- CFCs implemented the activity of seedling production to enhance the provision of tree seedlings for tree planting, indicating the implementers' focused social responsibility.

Figure 2 below shows tree seedling production performance indicators by CFCs. From observation, the performance indicator of most CFCs is in level 3 (Very satisfied", apart from two Counties, Taita Taveta and Embu, whose performance indicators are in levels 2 (Satisfied) and 1 (Not satisfied).

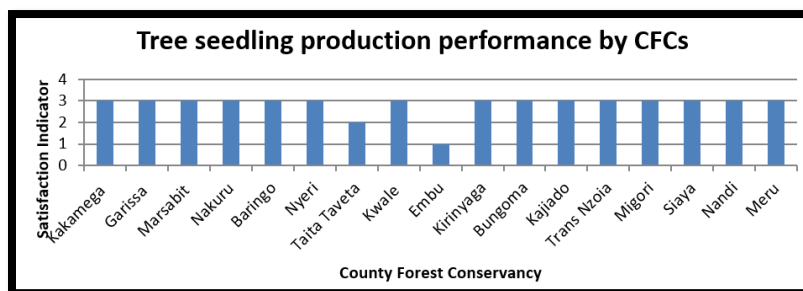


Figure 2: Tree Seedlings Production Performance by CFCs

No.	CFCs Office	AWP&B Target Area (Ha)	AWP&B Achievement (Ha)	Satisfaction on Performance Indicator (3, 2 or 1)
1	Nyeri	440	378	3
2	Kajiado	100	100	3
3	Trans Nzoia	1300	1300	3
4	Nandi	480	480	3
5	Baringo	2500	1000	1
6	Kwale	50	60	3
7	Bungoma	220	390	3
8	Kirinyaga	31	19	2
9	Meru	800	527	2
10	Embu	40	70	3
11	Migori	10	19	3
12	Kakamega	527	200	1
	Total	6,498	4,543	2

Table 4: Plantation Establishment

The result from table 4 above shows that:

- Plantation establishment achieved 70%. The Counties' achievement was accomplished mostly with resources provided by stakeholders as there was inadequate or no fund allocation for plantation establishment in the Counties.
- The previously established plantations were not surveyed, and therefore, there was no entry into the compartment registers across the stations, indicating a lack of attainable planned activity targets for the set goals and objectives.
- A low survival rate of plantation establishment was observed during the field inspection.
- CFAs and Saw millers were providing most of the inputs needed to produce seedlings for plantation establishment, including labour, indicating sound socio-economic status benefits of the enterprise to the local community.

Figure 3 below shows plantation establishment performance indicators by CFCs. From observation, the performance indicator of most CFCs is in level 3 (Very satisfied), apart from two Counties, namely Kirinyaga and Meru, whose performance indicators are in level 2 (Satisfied) and Baringo and Kakamega in level 1 (Not satisfied).

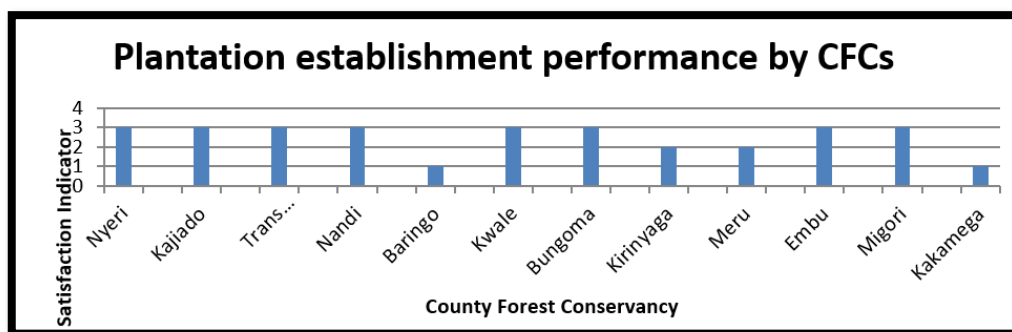


Figure 3: Plantation Establishment Performance by CFCs

No.	CFCs Office	AWP&B Target Area (Ha)	AWP&B Achievement (Ha)	Satisfaction on Performance Indicator (3, 2 or 1)
1	Kajiado	67	60	3
2	Marsabit	200	120	2
3	Garissa	1	0	1
4	Bungoma	12	50	3
5	Kirinyaga	130	130	3
6	Meru	110	131	3
7	Siaya	30	1	1
8	Nandi	43	50	3
9	Trans Nzoia	100	96	3
10	Kakamega	85	85	3
	Total	778	723	

Table 5: Natural Forest Rehabilitation through Enrichment Planting

The results from table 5 above show that:

- The overall target for the Counties was 778 Ha for natural forest rehabilitation through enrichment planting, and the actual achievements on the ground were 723 ha. The results showed an achievement of 93%, which qualified for an indicator of "3".
- However, it was noted that all the counties had identified degraded areas but had not zoned and mapped them for rehabilitation.

Figure 4 shows the natural forest rehabilitation performance indicator by CFCs. From observation, the performance indicator of most CFCs is in level 3 (Very satisfied), apart from three Counties: Marsabit, whose performance indicator is in level 2 (Satisfied), and Garissa and Siaya, in level 1 (Not satisfied).

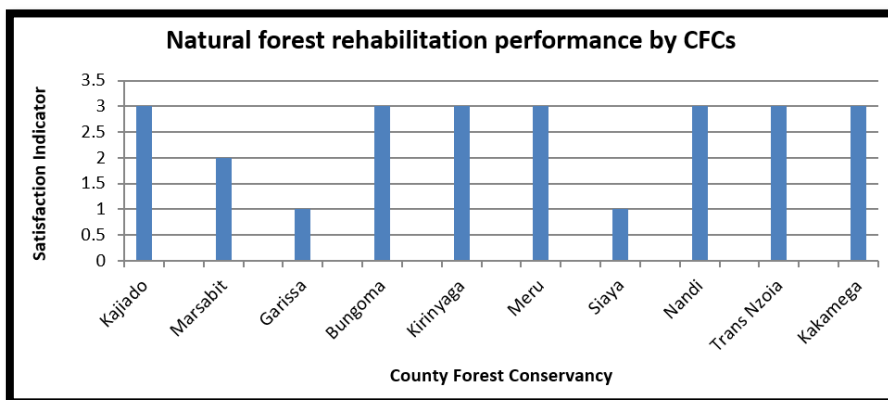


Figure 4: Natural Forest Rehabilitation Performance by CFCs

No.	CFCs Office	Area (Ha)	No. of Nurseries	No. of Seedlings	AWP&B Target (Ha)	AWP&B Achievement	Satisfaction on Performance Indicator (3, 2 or 1)
1	Siaya	25,000	170	1,523,220	300	80	1
2	Marsabit	-	8	35,000	50	30	2
3	Kirinyaga	-	-	-	500	406	3
4	Nandi	225,000	106	6,328,040	500	0	1
5	Meru	-	24	471,888	300	0	1
6	Embu	-	58	129,750	50	50	3
7	Kakamega	-	-	-	750	0	1
8	Garissa	629	-	-	-	-	-
9	Trans Nzoia	77,176	-	-	-	-	-
10	Baringo	1,030,300	-	-	-	-	-
11	Migori	107.54	-	-	-	-	-

Table 6: Commercial Farm Forests Establishment

The results from table 6 above shows:

- Overall satisfaction with the performance indicator was "1" despite having an area to carry out the activity and enough seedlings to be planted.
- Garissa, Trans Nzoia, Baringo, and Migori show no report on the number of nurseries, seedlings, target area, and achievement despite having areas to carry out the activity. This indicates that KFS has no direct control of the activity outside Gazetted forests.
- Accessibility of the locality of the site to carry out the activity is lacking.
- A good state of activity with a guidance process for implementation is lacking in most counties, resulting in either failure to implement the planned activity or lack of reporting what has been achieved.

Figure 5 below shows the performance of commercial farm forest establishments by CFCs. From observation, the performance indicators of most CFCs are generally at level 1 (Not satisfied).

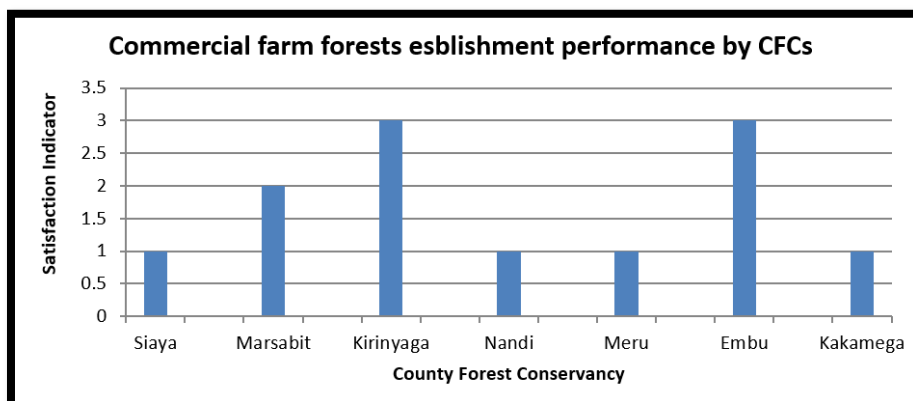


Figure 5: Commercial Farm Forests Establishment Performance by CFCs

No.	CFCs Office	No. of Nurseries	No. of Seedlings Production	Remarks	Satisfaction on Performance Indicator (3, 2 or 1)
1	Siaya	1	150	-	2
2	Nyeri	1	100	-	2
3	Trans Nzoia	1	1,142	-	3
4	Nakuru	1	2,500	<i>Dendrocalmus spp,</i> <i>Yushania alpina</i>	3
5	Nandi	1	3,000	Seedlings sourced from private nurseries	3
6	Kirinyaga	1	1,530	-	3
7	Taita Taveta	1	550	Produced 550 seedlings and sold 500 to Ngoloki Secondary School	2
8	Kwale	1	0	All seedlings dried up,	1
9	Meru	1	1000	-	3
10	Kakamega	1	2,000	-	3
11	Bungoma	1	50	-	1
12	Embu	1	1,400	-	3
	Total	12	13,422	-	3

Table 7: Bamboo Seedlings Production

The results from table 7 above show that:

- The bamboo establishment was being promoted in most of the counties visited, and observations indicated that satisfaction with performance was overall “3.”
- Taita Taveta County produced and sold 91% of its bamboo seedling stock, indicating a readily available market for the produced seedlings and positive sound socio-economic status benefits of the bamboo production enterprise to local schools.
- The 100% bamboo seedlings raised by Kwale County dried up in the nursery, indicating a lack of favourable environmental conditions for the attainment of optimal results.

Figure 6 below shows bamboo seedling production performance by CFCs. From observation, the performance indicator of most CFCs is in level 3 (*Very satisfied*), with the rest falling in level 2 (*Satisfied*) and 1 (*Not satisfied*).

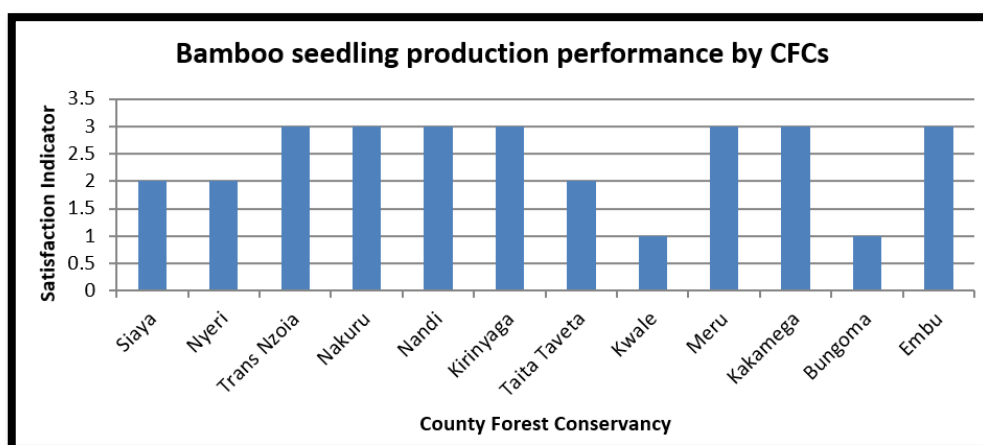


Figure 6: Bamboo Seedling Production Performance by CFCs

No.	CFCs Office	AWP&B Target Area (Km) for Roads Grading	AWP&B Achievement (Km) for Roads Grading	Satisfaction on Performance Indicator (3, 2 or 1)
1	Nyeri	74	30	1
2	Kajiado	43	16	1
3	Trans Nzoia	70	26	1
4	Nandi	62	24	1
5	Baringo	57	22	1
6	Kwale	40	14	1
7	Bungoma	45	20	1
8	Kirinyaga	52	23	1
9	Meru	62	27	1
10	Embu	42	14	1
11	Migori	32	12	1
12	Kakamega	48	22	1
	Total	627	250	1

Table 8: Rehabilitation and Maintenance of Forest Roads

The main road grading activity from table 8 above shows a very low-key rehabilitation and maintenance of forest roads on the ground, with a generated descriptive of satisfaction on performance indicator "1" and scoring percentage below 50%.

Figure 7 below shows the rehabilitation and maintenance of forest road performance by CFCs. From observation, the performance indicators of all CFCs are in level 1 (*Not satisfied*).

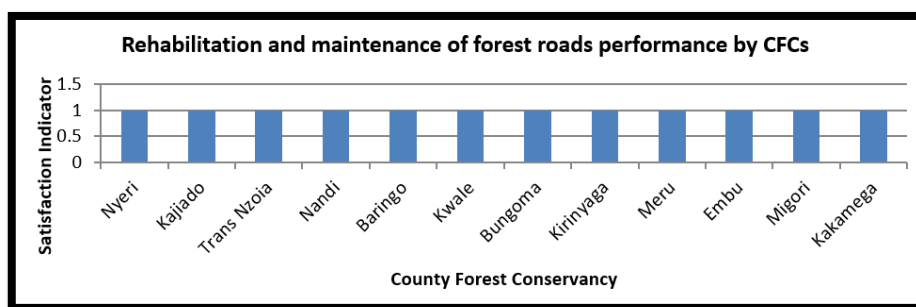


Figure 7: Rehabilitation and Maintenance of Forest Roads Performance by CFCs

No.	CFCs Office	AWP&B Target (Ha)	AWP&B Achievement (Ha)	Satisfaction on Performance Indicator (3, 2 or 1)
1	Vihiga	36 (Pruning)	0	1
		86 (Thinning)	0	
2	Bungoma	18.5 (Pruning)	18.5	3
3	Migori	6.9 (Pruning)	6.9	3
		14.4 (Thinning)	14.4	
4	Nandi	226 (Pruning)	194.25	3
5	Trans Nzoia	496.28 (Pruning)	205.6	1
6	Kakamega	613 (Pruning)	205.6	2
		68 (Thinning)	48	

Table 9: Pruning and Thinning Operation in Plantations

Silvicultural treatment on plantations aimed to improve the quality of timber produced. These operations were documented and entered into the compartment registers to provide the history of management of each of the plantations. However, the observed result from table 9 above shows that:

- There were delayed pruning and thinning across many of the field stations visited because most of these treatments, in all the forest areas, were carried out by stakeholders, mainly the CFAs.
- There was a lack of attainable planned activities and targets for the set goals and objectives of the implementation.

Figure 8 below shows the pruning and thinning operations in plantations' performance by CFCs. From observation, the performance indicator of CFCs falls in level 3 (*Very satisfied*), level 2 (*Satisfied*) and level 1 (*Not satisfied*).

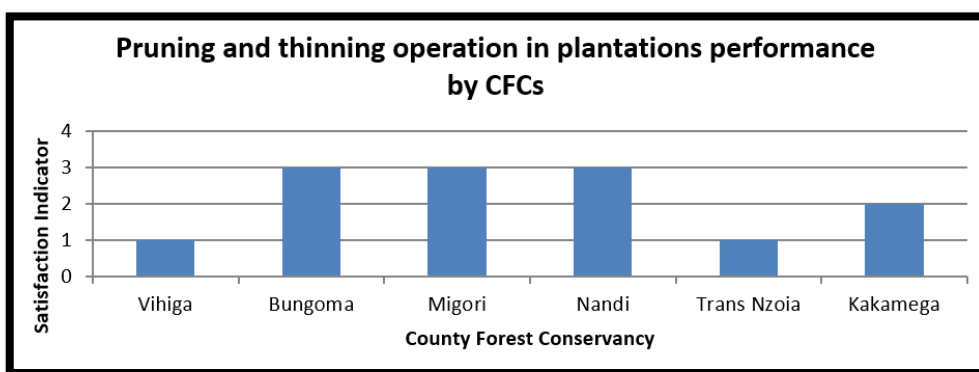


Figure 8: Pruning and Thinning Operation in Plantations Performance by CFCs

No.	CFCs Office	AWP&B Target (Million Kshs)	AWP&B Achievement (Million Kshs)	Satisfaction on Performance Indicator (3, 2 or 1)
1	Kajiado	19.00	17.00	3
2	Marsabit	1.40	1.00	3
3	Garissa	1.00	1.40	3
4	Kirinyaga	35.00	31.00	3
5	Meru	130.00	123.00	3
6	Siaya	0.20	0.14	2
7	Embu	10.00	9.00	3
8	Migori	4.00	2.70	2
9	Nandi	52.00	42.00	3
10	Trans Nzoia	11.57	15.17	3
11	Kakamega	59.00	58.00	3
	Total	311.6	300.41	3

Table 10: Revenue Collection

The results from table 10 above show that the planned target for revenue collection from the counties was Kshs 311.6 million, out of which Kshs 300.4 million was realized. This was an achievement of 96%, giving satisfaction on performance indicator of “3.”

Figure 9 below shows the revenue collection performance by CFCs. From observation, the performance indicators of most CFCs are in level 3 (*Very satisfied*), apart from two Counties, Siaya and Migori, whose performance indicators are in level 2 (*Satisfied*).

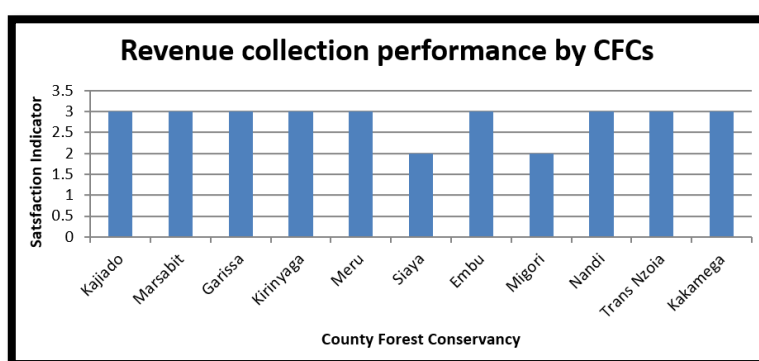


Figure 9: Revenue Collection Performance by CFCs

Statistical analysis was applied to activities in tables 3, 4, 5, 6, 7, 8, 9 and 10 to analyze data variances to measure the CFC's ability to satisfy work performance. Descriptive answers were classified into three categories "*very satisfied (3), satisfied (2) and not satisfied (1)*" providing the degrees of freedom of assessment to two (2), i.e., 3-1 with the scoring percentage of "80-100, 50-79 and 0-49" respectively for the planned activities and achievement of the AWP&B given by;

$$\alpha = 0.05$$

$$V = k - 1$$

Where V is the degree of freedom;

k is the number of categories in the satisfaction response assessment.

Table 11 below shows the results of the impact of the assessment with frequency of expected (*target*) and observed (*achievement*) on eight activities.

Category of Activity	Frequency (F)	Very Satisfied (3)	Satisfied (2)	Not Satisfied (1)	n
Seedling production	F _o	15	1	1	17
	F _e	88.0	6.0	6.0	100
Plantation establishment	F _o	8	2	2	12
	F _e	66.6	16.7	16.7	100
Natural forest rehabilitation	F _o	7	1	2	10
	F _e	70	10	20	100
Farm and dryland forestry	F _o	2	1	4	7
	F _e	29	14	57	100
Bamboo establishment	F _o	7	3	2	12
	F _e	58	25	17	100
Rehabilitation and maintenance of forest roads	F _o	0	0	12	12
	F _e	0	0	100	100
Silvicultural and treatment activities	F _o	3	1	2	6
	F _e	50	17	33	100
Revenue collection	F _o	9	2	0	11
	F _e	82	18	0	100

Table 11: AWP&B Performance Satisfaction

The study applied Chi-square (χ^2) analysis to check if two categorical variables are related or independent to help understand if the data differs significantly from the expected data. The chi-square (χ^2) test statistic was computed and compared to a critical value. The Critical value for the Chi-square statistic was determined by the level of significance (0.05) and the degrees of freedom (2).

3.1. Assumptions of the Chi-square

- The data in the cells should be frequencies or counts of cases rather than percentages or some other transformation of the data.
- The levels (or categories) of the variables are mutually exclusive.
- Each subject may contribute data to one and only one cell in the χ^2 .

The analysis of the descriptive data measuring discrepancy between expected and obtained frequencies of performance of the CFCs given by equation:

$$\chi^2 = \sum [(f_o - f_e)^2 / f_e]$$

Where χ^2 = Chi-square test of independence

f_e = expected value of categorical variable

f_o = observed value of the categorical variable

The tests of categorical variables revealed the following activity results on performance:

a) Seedling production

Degrees of freedom = v = k-1 = 3-1 = 2

$$\text{Thus } \chi^2 = [(15 - 88)^2 / 88 + [(1 - 6)^2] / 6 + [(1 - 6)^2] / 6$$

$$= 60.56 + 4.17 + 4.17 = 68.90 \dots\dots\dots (i)$$

b) Plantation establishment

Degrees of freedom = v = k-1 = 3-1 = 2

$$\text{Thus } \chi^2 = [(8 - 66.6)^2] / 66.6 + [(2 - 16.7)^2] / 16.7 + [(2 - 16.7)^2] / 16.7$$

$$= 51.560 + 12.9395 + 12.9395 = 77.44 \dots\dots\dots (ii)$$

c) Natural forest rehabilitation

Degrees of freedom = v = k-1 = 3-1 = 2

$$\text{Thus } \chi^2 = [(7 - 70)^2] / 70 + [(1 - 10)^2] / 10 + [(1 - 20)^2] / 20$$

$$= 56.7 + 8.1 + 18.05 = 82.85 \dots\dots\dots (iii)$$

d) Farm and dryland forestry

Degrees of freedom = v = k-1 = 3-1 = 2

$$\text{Thus } \chi^2 = [(2 - 29)^2] / 29 + [(1 - 14)^2] / 14 + [(4 - 57)^2] / 57$$

$$= 25.1379 + 12.0714 + 49.2807 = 86.49 \dots\dots\dots (iv)$$

e) Bamboo establishment

Degrees of freedom = v = k-1 = 3-1 = 2

$$\text{Thus } \chi^2 = [(7 - 58)^2] / 58 + [(3 - 25)^2] / 25 + [(2 - 17)^2] / 17$$

$$= 44.8448 + 19.36 + 13.2353 = 77.44 \dots\dots\dots (v)$$

f) Rehabilitation and Maintenance of Forest Roads

Degrees of freedom = v = k-1 = 3-1 = 2

$$\text{Thus } \chi^2 = [(0 - 0)^2] / 0 + [(0 - 0)^2] / 0 + [(12 - 100)^2] / 100$$

$$= 0.00 + 0.00 + 77.44 = 77.44 \dots\dots\dots (vi)$$

g) Silvicultural treatments

Degrees of freedom = $v = k - 1 = 3 - 1 = 2$

$$\text{Thus } \chi^2 = [(3 - 50)^2]^{-50} + [(1 - 17)^2]^{-17} + [(2 - 33)^2]^{-33} \\ = 44.18 + 15.0588 + 29.1212 = 88.36 \dots\dots\dots (vii)$$

h) Revenue collection

Degrees of freedom = $v = k - 1 = 3 - 1 = 2$

The statistics are given by equation $\chi^2 = [(f_o - f_e)^2]^{-f_e}$, where χ^2 = Chi-square statistics, f_e = expected frequency, and f_o = observed frequency.

$$\text{Thus } \chi^2 = [(9 - 82)^2]^{-82} + (2 - 18)^2]^{-18} + [(0 - 0)^2]^{-0} \\ = 64.9878 + 14.2222 + 0.00 = 79.21 \dots\dots\dots (viii)$$

The Chi-Square (χ^2) calculated value statistics i, ii, iii ...viii above were 68.90, 77.44, 82.85, 86.49, 77.44, 77.44, 88.36 and 79.21 respectively. From "Appendix A" on critical values of the Chi-Square (χ^2) distribution table, a critical value of the Chi-Square (χ^2) distribution of 5.99 having probabilities of occurrences reflected:

$$P(\chi^2 \geq 5.99) = 0.05$$

$$0.025 < P < 0.05,$$

The result of the evaluation of performance showed that the observed calculated Chi-square (χ^2) test statistics (79.78) was greater than the critical value (5.99) at 95% ($\alpha = 0.05$).

The test result was found to be significant, showing that the performance of CFCs did not support the full realization of their PC targets as indicated in their AWP&B.

The discrepancy equation was given as: $\chi^2 = [(f_o - f_e)^2]^{-f_e}$

Where χ^2 = Chi-square test of independence, f_e = expected and f_o = observed value of the categorical variable.

Calculated statistics i, ii, iii....viii of 68.90, 77.44, 82.85, 86.85, 77.44, 77.44, 88.36 and 79.21 with critical value of the χ^2 distribution of 5.99 having probabilities of occurrences reflected:

$$P(\chi^2 \geq 5.99) = \alpha = 0.05$$

$$0.025 < P < 0.05,$$

The result showed that the calculated Chi-square (χ^2) test statistics (79.81) was greater than the critical value (5.99) at 95% ($\alpha = 0.05$).

The test result was found to be significant, showing that the performance of CFCs did not support the full realization of their committed PC targets as indicated in their AWP&B.

The study on evaluating performance towards implementation of the AWP&B system seemed to suggest that the system needs to be enhanced to realize improvement in work performance and achieve the strategic plan targets of the FFY. However, the absence of a strong enabling framework to negotiate for adequate funds from the exchequer contributed to the underperformance of the CFCs in fully implementing their AWP&B.

4. Conclusion

The descriptive analysis investigating the evaluation of the performance of CFCs against their PC targets as indicated in their AWP&B indicated a significant impact, showing that the performance of CFC's PC targets was not fully achieved as expected. The performance of CFCs did not support the full realization of their PC targets as indicated in their AWP&B. The reason for the underachievement established was that the CFCs did not receive adequate funds over the years to enable them to run their activities efficiently and effectively. The inadequacy of funds reflected sizeable financial woes in the county in realizing the expected results of planned activities' implementation.

5. Recommendation

To implement a co-financing/cost-sharing model in AWP&B by exploring, securing, and harnessing diversified funding sources, including private stakeholders, public-private partnerships, and international grants, to enable the organization to attain the overarching goal of increasing forest and tree cover in the country.

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Appendix A

Degree of Freedom	Significance level			Degree of Freedom	Significance level		
	0.10	0.05	0.1		0.10	0.05	0.1
1	2.71	3.84	6.63	16	23.54	26.3	32.00
2	4.61	5.99	9.21	17	24.77	27.59	33.41
3	6.25	7.81	11.34	18	25.99	28.87	34.81
4	7.78	9.49	13.28	19	27.20	30.14	36.19
5	9.24	11.07	15.09	20	28.41	31.41	37.57
6	10.64	12.59	16.81	21	29.62	32.67	38.93
7	12.02	14.07	18.48	22	30.81	33.92	40.29
8	13.36	15.51	20.09	23	32.01	35.17	41.64
9	14.68	16.92	21.67	24	33.20	36.42	42.98
10	15.99	18.31	23.21	25	34.38	37.65	44.31
11	17.28	19.68	24.72	26	35.56	38.89	45.64
12	18.55	21.03	26.22	27	36.74	40.11	46.96
13	19.81	22.36	27.69	28	37.92	41.34	48.28
14	21.06	23.68	29.14	29	39.09	42.56	49.59
15	22.31	25.00	30.58	30	40.26	43.77	50.89

Table 12: Critical Values of Chi-Square (χ^2) Distribution