

SCHOOLS GREEN INITIATIVE CHALLENGE (GIC) PILOT PROJECT FINAL REPORT



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1.0 INTRODUCTION:

KenGen actively contributes towards environmental conservation initiatives such as mitigation of the effects of climate change particularly for communities whose livelihoods are heavily dependent on rainfall, conservation of biodiversity, and promotion of environmental awareness. One of the ways is through afforestation under our Environmental Pillar.

One of the flagship project under the Environmental Pillar is the **Green Initiative Challenge** (**GIC**), launched in November 2013 that targets school students/pupils and aims to spread a culture of tree growing and conservation of natural resources.

1.1 **THE GREEN INITIATIVE CHALLENGE (GIC) PILOT PROJECT** The Green Initiative Challenge (GIC) Pilot project aimed at addressing massive deforestation in the semi-arid areas of Machakos and Embu Counties, through a rural schools-led initiative. The pilot project promoted environmental awareness through participation of students and the wider school community in planting tree seedlings and nurturing them, by developing woodlots in their institutions for environmental and commercial benefits.

The project was designed as a challenge. Each of the 81 participating schools received multipurpose *Cassia siamea* and *Melia volkensii* tree seedlings for their 0.5acre school plot. *Cassia siamea* is a fast growing tree that provides almost immediate benefits. It is also good for timber production (furniture and turnery work). *Melia volkensii* gives highly commercially valuable timber which can be harvested, processed and marketed in bulk. Prizes are awarded based on the highest survival rate of seedlings and use of innovation techniques to overcome social and environmental challenges. The GIC pilot which ends on 17th November 2015, constitutes Phase 1 of the Green Initiative Challenge Project.

The GIC Schools programme was designed to bring about whole-school development by encouraging whole-school action for the environment and development. KenGen partnered with KenGen Foundation, Better Globe Forestry, Energy Regulatory Commission, National Environment Management Authority, Kenya Forest Service and Ministry of Education to raise environmental awareness as well as improve the environmental performance, alleviate poverty in the schools around Eastern hydro's and the community at large.

The KenGen GIC Schools programme was a strategy that applied five key components namely; Environmental policy, cross-curriculum teaching and learning, micro-project, school-community partnership and networking.

1.2 Objectives of the schools GIC programme were:

- 1.0 Bring about sustainable development in schools and communities.
- 2.0 Promote environmental education and action in a way that links to most, if not curriculum subjects.
- 3.0 Enhance democratic and participatory strategy that provides an excellent opportunity for school and community to enhance relations.
- 4.0 Have an award scheme that will raise the profile of the schools in the wider community, nationally and internationally.



5.0 Have a holistic process that will work by involving the whole school community, which is the students, teachers and other staff, together with members of local community; parents, local notable experts, local business, local authority, and the media.

6.0 Encourage teamwork and enhance the environmental sustainability.

2. Project Implementation

2.1 Selection criteria

The selection criterion was that:-

- 1. All schools in the areas of operation were invited for the competition.
- 2. The qualifying schools were formally registered as competitors in the challenge.
- 3. KenGen provided seedlings to all the schools registered in the challenge.
- 4. Each qualifying schools was required to have a designated plot of not less than half an acre for tree planting.

GIC project was commissioned on 6th November 2013 at Machang'a primary.



GIC Project launching at Machang'a primary.



2.2 Capacity building

During the project implementation, capacity building workshops were conducted. Two of the capacity building workshops were conducted on 6th May 2014 and 31st March 2015. The workshops brought together patrons of participating schools, KenGen foundation representatives, KenGen Environment officer Eastern Hydro's, NEMA CDE Embu, NEMA CDE Machakos, KFS officer Mbeere South, Education Officer from Mbeere South, Mbeere North and Masinga sub county.

The objectives were:

- 1.0 To enable school Environment patrons share the challenges facing GIC projects and possible solutions.
- 2.0 To enable school Environment patrons relate the GIC project and the sustainable management of the environment.
- 3.0 To enable share practical experiences by schools participating in the GIC project.

2.3 Monitoring and Evaluation

Four successive monitoring and evaluation exercises were conducted since the launch of the project. The first and the second monitoring and evaluation exercises were focusing on the survival rates and innovativeness of the participants in curbing the challenges associated with establishing forests in ASALs. These two evaluation exercises targeted all the 81 schools. However, the third monitoring and evaluation exercises carried out between 10th September to 21st September 2015 concentrated on the top 20 schools out of the 81 schools and was based on the second monitoring and evaluation results. After the third monitoring and evaluation exercise of the 20 schools, based on survival rates the top 6 schools were selected for final evaluation which was conducted on 30th September and 1st October, 2015. The final evaluation considered the survival rate, innovativeness and critical assessment of the performance of trees in terms of height, Diameter at Breast height (DBH), form of the stem, the crown form, occurrences of diseases and insect pests' infestation, for awarding purposes.

2.4 **Evaluation**

The final GIC evaluation team consisted of:

- Mr. A. Mbutu Environment Officer KENGEN Eastern Hydros
- > Mr. A . Igecha -Senior Programme Officer KENGEN Foundation
- > Dr. H. Ali- County Director For Environment NEMA Embu county
- Mr. P. Kariuki- KFS Forester Mbeere south
- Madam P. Mbaluka Education Officer Masinga Sub-county
- Madam G. Mutero- Education officer Mbeere South Sub-county
- Mr. Samuel Nakhone- Forester Better Globe Forestry
- Mr. P. Nderitu- Environment Foreman KENGEN
- Mr. J. Mwanyalo- GIC M&E Officer
- Mr. J. Mwaniki GIC M&E Officer

team



Figure 1: A photo showing evaluation team at Kaewa Secondary school.

2.5 Final Evaluation criteria

Survival count was allocated **60%** while the remaining **40%** was allocated to management operations. The out 60% was predetermined from the 3^{rd} monitoring and evaluation exercise results, while 40% was awarded independently by each of the evaluation team. An average of marks awarded was calculated for each school then added to the predetermined % out of 60% and ranking done as tabulated below:

Name of School	Location	Survival Rate (60%)	Management Operations (40%)	Total (100%)
1. Kaewa Secondary school	Masinga	52.2	34.7	86.9
2. Mwea Primary school	Mbeere South	38.4	39	77.4
3. Makutano DEB Primary school	Mbeere South	47.4	28.9	76.3
4. Kithoni Secondary school	Masinga	47.4	26	73.4
5. Karangare Primary school	Mbeere North	38.4	26.1	64.5
6. Kitunene Primary school	Masinga	36	28.1	64.1

Table 1:The results of the top six schools assessed.

3.0 TOP SIX SCHOOLS



3.1 KAEWA SECONDARY SCHOOL



Figure 2: A photo showing Melia volkensii at Kaewa secondary school.

The leading school according to the evaluation has shown dedication in sustaining their woodlot. The Agriculture teacher played a key role in the management of the establishment. There stakeholder involvement was proper where the teachers, parents, students and board of management all contributed in one way or another in the management of the woodlots, and all have embraced the culture of tree planting. Site preparation was well done, spacing was properly done to avoid competition and intercropping was also employed. The school had also dug a water pan for water harvesting. The trees were enclosed to prevent damage from animals, humans in the initial stages

and social fencing where the school sensitized the community on importance of trees. Pruning was done on their woodlot using secateurs. The trees had an average height of 2.5m and an average DBH of 4cm.

Challenges of human destruction on the woodlot especially near the play ground were evident. A few trees were over pruned and others poorly formed due to poor genetic traits e.g. whorled trees.

3.2 MWEA PRIMARY SCHOOL

The school ranked second showed innovativeness in organization, where the 4K club was mandated with management of the woodlot. Each club member was allocated two trees to take care. There was involvement of the teachers and parents through provision of financial assistance and manure. The surrounding community was very supportive and donated fencing posts and barbed wire. Aspect of intercropping was employed, weeding was done and drip irrigation practiced. The trees had an average height of 2m and an average DBH of 2cm

There was a challenge of pigs foraging on the seedlings that led to fencing of the plot. Failure to sterilize the pruning equipments led to the spread of Gummosis (a fungal infection caused by *Fusarium spps*) from one tree to the other. The spacing was poorly done i.e. close



Figure 3

Figure 4

Figure 3:The chairman of the 4K club briefing the evaluation team at Mwea Primary school.

Figure 4: An example of dead Melia after infection by *Amillaria melea* causing root rot in Mwea primary school.

3.3 MAKUTANO D.E.B PRIMARY SCHOOL.

The third ranked school showed an excellent survival rate of 47.4% out of 60%. The school employed the aspect of intercropping, practiced drip irrigation. Pruning was done though there was an aspect of over pruning, the problem of double leaders and poor quality trees i.e. whorled trees was evident though this was caused by poor genetic traits from the mother plants. Close spacing was evident which affected the growing trees i.e. weak trees due to competition for resources of light, moisture and nutrients. *Cassia siamea* was attacked by borers killing the leading shoot. The trees natural to the site were not cleared causing the effect of shading, this trees over dominated the young trees making them frail. The trees had an average height of 3m and an average DBH of 1.5cm.



Figure 4 & 5: A photo showing the effect of shading caused by dominant trees and another photo showing poorly formed and over pruned Melia volkensii respectively at Makutano DEB primary school.

3.4 KITHONI SECONDARY SCHOOL

The school exhibited a good survival rate of 47.4% out of 60%, however the trees were frail. There was participation of teachers and students; the students had formed an environment club which



tended the trees, teachers had also adopted seedlings. There was a change of attitude about tree planting among the students and the neighboring community thus embracing the culture of tree planting even in their homes. Water harvesting and storage was practiced. Drip irrigation was practiced though poorly done.

The soils are of poor structures i.e. highly eroded, rocky and shallow soils which led to stunted growth of trees. Aphids had attacked *Melia volkensii* leading to forking of the trees. Close spacing was evident which led to poor growth. The aspect of over pruning was also evident. The average height was 1.5m and an average DBH of 1cm



Figure 6.

Figure 7.

Figure 6: A sample of drip irrigation at Kithoni secondary.

Figure 7:Shallow rocky soils which hindered root development.

3.5 KARANGARE PRIMARY SCHOOL

The school showed a survival rate of 38.4% out of the possible 60% and an overall 64.5%. The school had a better chance of performing excellently compared to other schools; there was permanent water supply via a canal, however the school management was not supportive of the project so there was conflicts on management of the woodlot. Weeding and cleaning were poorly done. Over pruning was evident. The *Cassia siamea* had shoot infections. The school has limited land for the expansion programme. The average height was 3.5m and an average DBH of 3.5cm.



Figure 8

Figure 9

Figure 8& 9: A photo showing *Cassia siamea trees* growing at poorly cleaned site and a *Melia volkensii*_plant with double leaders respectively at Karangare primary.

3.6 KITUNENE PRIMARY SCHOOL

There was support from all the stakeholders, the pupils had embraced the culture of tree planting and a community group has established a tree nursery near after being imparted a positive attitude by the GIC project. They had dug micro-catchments for water conservation, pruning and weeding was done. However, it was noted that *Melia volkensii* performed well at site compared to *Cassia siamea*. There was a decline in both the survival and health of the trees on the upper side of the slope due to erosion on upper side and deposition on the low side.

The adjacent community has established a community nursery in the school premises, an indication that the project has had a positive impact on the community. The average height was 1.8m and an average DBH of 3cm.



Figure 10.

figure 11.

Figure 10&11: A photo showing a community nursery established near the school, and another photo showing sturdy form of Mukau trees on lower slope of the plot at Kitunene primary respectively.





Table2:A	nalysis of	the	3 rd monitoria	ng and	evaluation	exercis
NAME OF THE SCHOOL	SEEDLINGS ISSUED	REPLACEMENT	1ST SURVIVAL MONITORING	% SURVIVAL	2ND MONITORING SURVIVAL %	
1. Kaewa Sec School	300	20	300	93.75	88.75	
2. Kithoni Sec. School	300	0	257	85.6666667	80.78947	
3. Makutano D.E.B	300	8	291	94.4805195	80.6	
4. Kitunene pri. School	300	34	227	97.008547	78.8	
5. Karangare Primary	300	50	159	79.4285714	77.33333	
6. Mwea Primary	300	10	305	83.3870968	73.54893	
7. Riandu primary	300	60	300	98.3333333	73.23529	
8. colonel Kiluta	200	100	190	63.3333333	60.66667	
9. Kigwambiti Primary	300	50	290	82.8571429	66.33333	
10. Kithuia Primary	300	0	145	48.3333333	45.333333	
11. Utithini Primary School	200	0	180	90	65	
12. Masaku primary	300	50	270	77.1428571	64.013	
13. Gatururi primary School	300	100	240	60	58.28571	
14. Mutembeku Primary	200	0	180	90	58	
15. Vondeni pri. School	200	100	210	57.1	56	
16. Kivaa Primary School	300	100	250	62.5	54.666667	
17. Ngukemwe Sec. School	300	100	300	75	54	
18. Kanduku Pri	192	60	246	97.6190476	53.33333	
19. liani Sec School	300	100	225	56.25	52.75	
20. Kitangani	300	0	250	83.3333333	52.66667	



The top 20 schools showed moderate survival rate, whereby they had an average survival rate of 78.78 % after the 1st Monitoring exercise and 64.7% average survival rate after the second monitoring exercise.

Graph 1: A graph showing declining average survival rate





4.0 Project challenges

The evident decline in the survival rate could be attributed to:

Chart 1: a chart showing the magnitude of challenges affecting the participating schools.



4.1 Drought

Due to the prolonged droughts experienced in ASALs, water scarcity is a major hindrance to afforestation and reforestation programme. Drought affected 100% of the participants. However, some schools came up with mechanisms for water harvesting, moisture conservation and watering to promote the survival of seedlings. This was evident especially in the best performing schools e.g. Kaewa secondary, Kitunene primary, Mwea Primary. In some school drought caused 100% mortality e.g. Seven Forks Primary School, Mutuobare Primary, Kithyoko Secondary, Siakago Secondary, Unguni primary and Kyondoni secondary.





Figure 12: Effects of drought at Kaunyweni Primary school

4.2 Lack of support from the school management and community This was evident in most of the participating schools where the project was not well embraced by all the stakeholders; this may have been caused by lack of involvement, which led to conflict of interests. This was a big blow to the project since the core objective of schools is to deliver academic knowledge and so the GIC project was the opportunity cost, since it was not viewed as a synergy to the school curriculum. All the poorly performing school like Unguni primary , Siakago Primary, Kithyoko secondary, Mutuobare primary, Milaaani Secondary and Kianjeru secondary among others(recorded a survival rate <5%) were affected by poor management support as well as some of the top schools like Karangare primary.

4.3 Lack of technical expertise in planting and tending of seedlings

This affected all the participating schools which was depicted by lack of site preparation where some of the seedlings were planted in bushy sites e.g Kivaa Secondary, Seven forks primary, Kivaa Primary, Karangare primary among others.

Poor spacing which led to competition for resources of nutrients, light and moisture was evident in a majority of the participant's e.g. Kithoni secondary, Mwea primary, Makutano DEB e.t.c.

Sub- standard pit size i.e. shallow pits affected the growth of *Melia volkensii* as was evident in Kithoni secondary, Seven forks Primary, Kaseve Secondary, Malikini Secondary, Nzukini Secondary, Kamunyu primary among others.

Lack of proper cleaning, weeding affected many participants because the seedlings were not able to compete with some the invasive shrubs like *Lantana camara* and trees like acacia which were dominating some of the sites. Pruning tools used were pangas which caused debarking of the stems and caused uneven 'wound' surfaces which took much time in healing. Over pruning was also evident in most of the schools and this affected the girth (circumference) growth rate. Failure to sterilize the pruning tools with hydrogen peroxide 10% concentration from one tree to the other led to the spread of gummosis in Melia trees in Mwea primary school.

4.4 Diseases and Insect Pests

Occurrence of diseases was evident in some of the schools namely Mwea primary school where gummosis, resinosis and root rot had infected Melia volkensii, in Karangare primary school there was occurrence of Die-bark in Cassia siamea. Lyctus beetles (borers) affected Cassia siamea in Makutano DEB killing the leading shoots. Cassia siamea in Kaewa secondary School was affected by spider mites, though it didn't cause any mortality. Ants and termites were harbored by the mulch spread to conserve moisture but had no adverse effects on the growth of the two species which are termite resistant.



4.5 **Destruction** by animals and man

ASALs are potential areas as rangelands hence are characterized by rampant livestock keeping practice, where large numbers of herds are kept exceeding the carrying capacity. The seedlings were trampled by grazing animals as was evident in Kianjeru Primary, Ngiiri Primary, St. Luke Kanthenge primsry, Ciangera primary, Mwea primary school and Kithoni Secondary School. Melia volkensii is palatable hence was vulnerable to browsing and debarking by goats. Hares also feed on the foliage thus retarding the growth . There were also cases of human destruction on seedling evident in Mwea primary school. To overcome this challenge schools fenced off their plots to protect the seedlings.

INNOVATIONS 5

Table : A table showing a breakdown of innovativeness employed by schools

INNOVATION	NO OF SCHOOL	%	
Fencing	20	20	
Drip Irrigation	15	15	
Assigning individuals	27	27	
seedling			
Mulching	2	2	
Application of	9	9	
manure			Trenches and sub cat
Intercropping	12	12	
Trenches and sub	17	17	
catchment			Interc

Application of I

Μ

Assigning individuals s

Drip Iri

Graph 2 : A graph showing rates innovations employed.

5.1 Fencing

To keep off animals and protect against human destruction. Practiced by 20 schools i.e. 25% of total Schools. Examples: Kathuri primary, Kathukini



primary and Iiani primary. The schools exhibited a meaningful seedling survival rate i.e. 80%, 66.7%, 75% respectivel**y**

5.2 Drip Irrigation

To offset the effect of drought, drip irrigation was employed by 15 schools. This is 18% of the total Schools, e.g. Ikatini primary, Kaewa secondary, Makutano DEB primary, Masaku primary. The innovation enhanced a good seedling survival rate of 66.67%, 93.75%, and 94% 90% respectively.

5.3 Mulching

This is a cultural method of water conservation and increasing soil organic matter. This was applied by one primary and one secondary schools i.e. Gatothia primary and Kaunyweni secondary. It had some moderate positive impact to survival rate of seedlings in Schools that practiced it like Gatothia With 66.67%& Kaunyweni secondary with 66.67% survival rate.

5.4 Assigning individuals seedling

Good Method to bring up responsible Pupils. This is also another popular innovation exercised by 27 schools, amounting to 31% Schools. Schools such as Gatothia primary, Gatururi primary, Karura primary. It yielded meaningful results in most of the practiced it. Schools like Gathothia primary with 66.67%, Gatururi primary with 73.33% survival rate.

5.5 Manure application

To increase Soil Organic matter. The innovation was rarely used. Only 9 Schools employed it. This is a minimal 3.23% of total Schools. The two schools Karangare and Kigwambiti primary schools had 79.20% and 82.86% respectively. It had promising results as seen in the two schools.

5.6 Intercropping and weeding.

Weeding to reduce weeds competing with seedling for resources (light,moisture, Nutrients). Weeding was applied by 12 schools; e.g. Kaewa secondary school,Cieria primary and Makutano DEB primary, which is 4.23% of the Schools. This innovation assisted Makutano DEB primary to achieve 94% survival rate though Cieria primary attained 43.30% survival rate due to influence of other factors.



Figure 13: Inter cropping at Kaewa Secondary school

5.7 Trenches and micro-catchments

Trenches for Soil conservation and water catchment during rainy season.14 schools dug trenches this is 11.9% of total Schools. Schools like Kamunyu primary, Kiturere primary, Mwea primary and Vondeni primary.

This innovation produced positive results, some Schools that practiced it like Kitunene primary attained an excellent survival rate of 97.01%, Mwea primary 88%.

6.0 Conclusion:

GIC project has imparted a positive attitude to the participants and especially the top performing schools where it was taken positively by the school community. This is evident since the top schools that embraced the project positively have shown excellent performance. There was no proper stakeholder involvement and this affected the implementation of the project since conflicts arose during the project implementation e.g. In Kithoni Secondary school, there was a conflict where parents were using adjacent Kithoni primary school compound as a grazing ground. This could have been avoided if the parents were involved at the planning and implementation stages of the project. In Karangare Primary school the school management was not supportive of the project which was a major setback to the implementation of the project, the parents were also not involved and this has led to the project having less impact on the attitude of tree planting among the pupils and the community.

Lack of technical expertise in planting and tending of seedlings could have contributed in the declining survival rates. The issue of close spacing was noted in all the schools except Kaewa Secondary School where the agriculture teacher offered technical assistance. Over pruning was evident in all the schools. Only Kaewa secondary school used secateurs in pruning. All the schools were not well sensitized about practice of hygiene while handling pruning tools i.e. sterilizing their pruning equipments and this led to the spread of gummosis in Mwea primary school.

Some of the traits phenotypically exhibited by the trees was as a result of the genetic makeup



of the seedlings and can only be avoided if seedlings are sourced from certified source. i.e. an example is whorling a trait noted on some of *Melia spps* trees. Forking of *Melia* trees was noted in all the school but was rampant in Kithoni Secondary school, this will affect the quality of timber.

7. Recommendations

- Stratification of schools depending on available resources is necessary i.e. Secondary schools and primary schools.
- > All stakeholders' involvement at the school level i.e. parents, teachers, provincial administration.
- > Sensitizing on the formation of environment clubs in the schools.
- Sensitizing on the long-term benefits that could accrue from the planted trees other than the short term benefits i.e. Awards.
- > The plot boundaries should be clearly demarcated for ease of monitoring and evaluation.
- > Uproot all the infected trees of *Melia volkensii* at Mwea primary.
- Sensitize the participants on adhering to hygienic practices when handling seedlings i.e. sterilize the pruning equipments to avoid spreading pathogen.
- > Ensure schools are committed to the project by signing the forms availed to them by monitoring and evaluation officers in the expansion project.
- Ensure the monitoring and evaluation officers visit the planting sites to approve the sites before issuing seedlings.



APPENDIX 1: SCHOOLS ENROLLED FOR GIC PROJECT PHASE I MASINGA

1. Kithyoko Secondary School
2. Endei Primary School
3. Miangeni Primary School
4. Thatha Secondary School
5. Kaunyweni Secondary School
6. Kyondoni Secondary School
7. Kyondoni Primary School
8. Iiani Secondary School
9. Mutembuku Primary School
10. Kamunyu Secondary School
11. Kamunyu Primary School
12. Kithuia Primary School
13. Kivaa Secondary School
14. Kivaa Primary School
15. Kithoni Secondary School
16. Vondeni Primary School
17. Masaku Primary School
18. Kanguu Primary School
19. Kaewa Secondary School
20. Mikuyuni Secondary School
21. Utithini Primary School
22. Kitangani Secondary School
23. Masinga Boys School
24. Kituneni Primary School
25. Katulye Primary School

<u>()</u>	(1)	arc	Sette,				
KenGen K	CenGen Foundation	ergy Regulatory Commission	Forestry Prosperity With Purpose				
26. Ngukemwe Secor	ndary School						
27. Ngukemwe Prima	ary School						
28. Nzukini Secondar	ry School						
29. Kakuku Primary S	School						
30. Kwawanzilu Prim	nary School						
31. Ikatini Primary So	chool						
32. Colonel Kiluta Pr	imary School						
33. Mutwamwaki Sec	condary School						
34. Gacebe Secondar	y School						
35. Kathukimi Primar	ry School						
36. Milaani Secondar	36. Milaani Secondary School						
37. Kikule Secondary School							
38. Kathiani Primary	School						
39. Katothya Primary	' School						
40. Mukusu Secondar	ry School						

sette.

MBERE NORTH

41. Kiambere Complex School
42. Ngini Primary School
43. Gatothia Primary School
44. Karui Primary School
45. Genia Primary School
46. Kigwabiti Primary School
47. Kyenire Primary School
48. Kanyuombora Primary School
49. Kavengero Secondary School
50. Kamarandi Secondary School
51. Siakago Primary School
52. St Anthony Secondary School
53. Gwakaithi Primary School
54. Gangera Primary School
55. Karangare Primary School
56. Kianjeru Primary School
57. Kaungu Primary School
58. Gitii Secondary School
59. Gathiga Gaceru Secondary School
60. Riandu Primary School

MBERE SOUTH

61. Mutuombare Secondary School
62. Gatete Primary School
63. Karura Secondary School
64. Karura Primary School
65. Gatururi Primary School
66. Kabuguri Secondary School
67. Kabuguri Primary School
68. Rurii Primary School

() (i) oro Setter
KenGen Foundation Energy Regulatory Commission Touching lives, encoding communities
69. Kanduku Primary School
70. Machanga Primary School
71. Karuke Primary School
72. Kanyonga Primary School
73. Mwea Primary School
74. Unguni Primary School
75. Njeru Primary School
76. Malikini Primary School
77. Malikini Secondary School
78. St Stephen Kisilu School
79. DEB Makutano School
80. Kanthenge Primary School
81. Seven Forks Primary School





APPENDIX 2: PERFORMANCE ANALYSIS FOR ALL SCHOOLS

						NO. OF	
		NO.O F	NO. OF			SEE DLI	
		SEED	SEED			NGS	
		ISSUE	LINGS REPL		KEY	VIVI	SURVIVA
NAME OF THE SCHOOL	LOCATION	D	ACED	KEY CHALLENGES	INNOVATIONS	NG	L %
1. RIANDU PRIMARY	RIANDU	300	10	None	Drip Irrigation	305	98.39%
					Water		
					conservation,		
					adopting a tree		
2. KITUNENE PRIMARSY	MASINGA	200	34	Drought	Digging trenches	227	97.01%
					drip irrigation,		
					pupil to a		
					seedling, cultural		
3. KANDUKU PRIMARY	GICHICHE	192	60	drought, animal destruction	practices	246	96%
4. MAKUTANO DEB	KADADA	200	0		Weeding, drip	001	0.40/
	KARABA	300	8	Drought, pests attack		291	94%
5. KAEWA SECONDARY	KIVAA	300	20	Mites	Irrigation	300	93.75%
					Allocating each		
6. MASAKU PRIMARY	KIVAA	300	50	Drought, domestic animals	tree to a pupil	270	90%
					assigning each		
					pupil to a		
7. MUTEM BUKU PRIMARY	KIVAA	200	0	Drought, animal destruction	seedling	180	90%
8. UTITHINI PRIMARY	KIVAA	200	0	animal destruction, termites	Fencing	180	90.00%
					Dig trenches		
	MAKIMA	300	60	buman destruction	to a pupils	300	88%
	1417 7171 1417 7	000	00	inuman acon action	to a pupilo,	500	0070





	a search of the				fencing		
10. MIKUYUNI SECONDARY	KANGONDE	300	0	Drought	Dripping	263	87.70%
11. KITHONI SECONDARY	KIVAA	300	0	drought, animal destruction	drip irrigation, assigning each pupil to a seedling	257	85.67%
12. KITANGANI SECONDARY	КІТНҮОКО	300	0	Salty water	Introduce a club to man the trees	250	83.30%
13. KIGWAM BITI PRIMARY	KANYUOMBO RA	300	50	Goats	Manure application, drip	290	82.86%
14.KATHURI PRIMARY	MAVURIA	300	0	drought ,animal destruction	Fencing	240	80.00%
15. KARANGARE PRIMARY	ISHIARA	200	50	Animals	Manure application	159	79.20%
16. KIVAA SECONDARY	KIVAA	300	50	Drought	None	275	79%
17.IIANI SECONDARY	KIVAA	300	100	Drought, diseases	Fencing	225	75.00%
18. NGUKEM WE SECONDARY	MASINGA	300	100	Drought	assigning a tree to a pupil	300	75.00%
19.KARURA PRIMARY	MUTUOMBAR E	300	0	Drought	assigning a tree to a pupil	220	73.33%
20. KATHUKINI PRIMARY	NDITHINI	300	0	Drought	Fencing	200	66.70%
21.KAUNGO PRIMARY	RIANDU	300	0	water shortage	Student adopting trees	200	66.70%
22.ST ANTOHNY SECONDARY	NTHAWA	300	0	Drought	Student adopting trees	200	66.70%
23.GATOTHIA PRIMARY	MUTITO	300	0	Drought, animal destruction	assigning a tree to a pupil, mulching	200	66.67%
24.IKATINI PRIMARY	IKATINI	200	100	Destruction by animals, drought	Fencing	200	66.67%
25. IKATINI PRIMARY	IKATINI	200	100	Destruction by animals,	fencing ,Irrigation	200	66.67%





				Drought			
26. KIVAA PRIMARY	KIVAA	300	100	Drought, domestic animals	Drip irrigation	250	63%
27. COLONEL KILUTA PRIMARY	IKATINI	200	100	Drought	Fencing	180	60.00%
28.GATURURI PRIMARY	GICHICHE	300	100	Animal Destruction, poor soil	Assigning seedling to individual pupil	240	60.00%
29. THATHA SECONDARY	КІТНҮОКО	300	0	Drought, animal destruction	Dripping	170	56.70%
30. ENDEI SECONDARY	КІТНҮОКО	300	0	Destruction by animals	trees	150	50%
31.KARUKI PRIMARY	MAVURIA	300	0	Drought, domestic animals	Fencing	150	50.00%
32. KYENIRE PRIMARY	EVURORE	300	100	Goats	Fencing	150	50%
33. MIANGENI PRIMARY	КІТНҮОКО	300	100	None	None	200	50.00%
	KANYUAMBO						
34.GWAKAITHI PRIMARY	RA	300	0	Drought	None	150	50.00%
35. MUKUSU SECONDARY	MASINGA	300	0	Drought, domestic animals, inadequate management support	None	150	50%
36. NGUKEMWE PRIMARY	MASINGA	300	0	Drought, animal destruction	irrigation	150	50.00%
37.VONDENI PRIMARY	KIVAA	200	100	Termites	assigning a tree to a pupils, fencing, drip	150	50%
38. KITHUIA PRIMARY	KIVAA	300	0	Drought	Fencing	145	48.33%
39. CIERIA PRIMARY	MUTITU	300	0	Domestic animals, disease	Irrigation, weeding	130	43.30%





	KANYUOMBO			inadequate management			
40. KANYUOM BORA PRIMARY	RA	300	0	support	None	116	38.70%
					dig trenches, assigning a tree to a pupils.		
41. KAM UNYU PRIMARY	KIVAA	200	60	Drought	fencing, drip,	100	38.46%
	KANYsUAMB			Drought, inadequate			
42.GITII PRIMARY	ORA	300	0	management support	None	100	33.33%
43.MACHANGA PRIMARY	MAVURIA	300	100	Drought, domestic animals	None	100	33.3%
				Animals, drought			
44 KAMARANDI SECONDARY	EVURORE	300	0	support	None	100	33.30%
45. ST STEPHEN KISILU	Lionon	000	Ŭ		110110	100	00.0070
SECONDRY	RIAKANAU	300	0	Drought	Fencing	100	33.30%
46 KATOTHVA DDIMADV	MASINGA	300	0	drought, temperature inadequate management	NONE	91	30 33%
		000		Drought, Low temperatures,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	00.0070
47. M UTUAM W AKI				inadequate management			
SECONDARY	MASINGA	300	100	support	None	100	25.00%
48.KANGUU PRIMARY	KIVAA	200	100	Drought	Fencing	70	23.33%
49. MASINGA BOYS SECONDARY	MASINGA	300	0	Drought, domestic animals, inadequate management support	None	70	23%
50. MALIKINI PRIMARY	RIAKANAU	300	100	Drought	Fencing	80	20%
51. KATULYE PRIMARY	MASINGA	200	100	Drought	None	60	20.00%
	MUTUTO	200			Fencing, assigning	60	0.0%
52. KAVUI PRIMARY	MUTUIO	300	U	Drought, domestic animals	Sindents seeding	00	20%





	i auching av	endoring commi	unities	Drought, inadequate			
53. RURII PRIMARY	GICHICHE	300	100	management support	None	70	17.50%
54. KIAM BERE SCHOOL				Lack of cooperation between			
COMPLEX	MUTITU	300	0	secondary & primary school	Fencing	50	17%
					Allocating each		
EE NCIDI DDIMADY	MUTTITU	300	0	Domestic onimals	tree to a student	50	170/
55. NGIKI PRIMARI	WOTTO	300	0			30	1770
	MUTUOMBAR						
56. ST LUKE KATHENGE	Е	300	0	Drought, Animals	Fencing	50	17%
	KANYUOMBO						
57. CIANGERA PRIMARY	RA	300	0	Drought, animals	Fencing	50	16.70%
58 KASEVE SECONDARY	NDITHINI	300	0	Drought and termites	Pesticides	50	16 70%
JO. NASEVE SECONDARI		000	U	Diought and termites	resticides	00	10.7070
				Drought, inadequate			
59. MALIKINI SECONDARY	RIAKANAU	300	0	management support	None	50	16.70%
				Drought, Low temperature,			
60. GATHIGA GACHERU			-	inadequate management			
PRIMARY	MURINGARI	300	0	support	None	50	16.67%
				drought, poor soil,			
				inadequate management			
61 KADUGUDI SEGONDADY	CICUICUE	200	40	support	Nono	40	12 220/
61. KABUGURI SECONDARI	GICHICHE	300	40	drought to provide a	None	40	13.3370
				temperature inadequate			
62 NZUVINI SECONDADY	FKALAKALA	300	0	management support	None	40	13 33%
02. NZORIMI SECONDARI		000	U		none	10	10.0070
				Drought, inadequate			
63. SEVENFOLKS PRIMARY	GICHICHE	300	0	management support	None	40	13.33%
					Fining livestock		
					owners through		
				drought, poor soil, high level	replacement of		
64. KYONDONI PRIMARY	KIVAA	300	0	of chlorine	the seedlings	40	13%
65. KATIANI PRIMARY	MASINGA	300	100	drought, ants, poor soil	None	50	12.50%





	Touching list	es, enabling commu	mities	Frosperity with Furpose	l	I	1
					Allocating each		
66. KAKUKU PRIMARY	EKALAKALA	300	0	Poor soil, domestic animals	tree to a student	30	10%
				drought, animal destruction,			
				inadequate management			
67. KANYONGA PRIMARY	MAKIMA	200	0	support	None	20	10.00%
					Tuning tion monto		
	NETTIINI	200	0	Discoss to marite days also	inigation, pests	01	70/
68. KIKULE SECONDARY	NDITHINI	300	0	Disease termite, drought	Control	21	1%
				Drought, domestic animals,			
			0	inadequate management		2.0	
69. KW AW ANZILU PRIM ARY	IKATINI	300	0	support	None	20	7%
				drought, temperature			
			0	inadequate management		2.0	c c 7 0/
70.NJERU PRIMARY	MAKIMA	300	0	support	None	20	6.67%
				Drought inadequate			
71.KABUGURI SECONDARY	GICHICHE	300	0	management support	Fencing	10	3.33%
				Drought inadequate			
72.KABUGURI PRIMARY	GICHICHE	300	0	management support	Fencing	10	3.33%
	MUTUOMBAR			Drought inadequate			
73. KARURA SECONDARY	E	300	0	management support	None	10	3%
				Destruction by animals,			
				attack by white ants,	fencing,		
				inadequate management	mulching, drip		
74. KAUNYW ENI SECONDARY	КІТНҮОКО	300	100	support	irrigation	10	2.50%
				drought, animals ,inadequate			
75. KIANJERU PRIMARY	ISHIARA	300	0	management support	None	5	1.70%
				Drought, goats destruction,			
				inadequate management			
76. MILAANI SECONDARY	NDITHINI	300	0	support	Fencing	5	1.70%
				Drought			
		200		Drought inadequate	Neree	0	0 6 6 9 /
77. MUTUOM BARE PRIMARY	Ľ	300	0	management support	none	2	0.00%
	VITUNOVO	200		inacequate management	Nava		00/
78. KITHYOKO SECONDARY	KITHYOKO	300	U	support	None	0	0%
				water shortage, inadequate			
79. SIAKAGO PRIMARY	NTHAWA	300	0	management support	None	0	0%
80. UNGUNI PRIMARY	MAKIMA	300	0	drought, temperature	None		0%

	KenGen Foundation Tauchine lives, speking commandia								
				inadequate management		0			
				support					
				Drought, inadequate					
81. KYONDONI SECONDARY	KIVAA	300	0	management support	None	0	0%		
		22,392	2,192			13,644	55.5%		