ADOPT-A-RIVER INITIATIVE

Mobilizing and Empowering Youths to Champion Monitoring and Restoration of Rivers and other Wetlands within Nairobi River Basin

Project Document

1.0 Introduction

The water-food-energy nexus is one of the most fundamental relationships and challenges to society today. Its importance was re-emphasized in June 2012 at the UN Conference on Sustainable Development (Rio +20). The Rio +20 outcome document, "The Future We Want" notes that: *"We recognize the key role that ecosystems play in maintaining water quantity and quality and support actions within respective national boundaries to protect and sustainably manage these ecosystems".* Wetlands are at the heart of this nexus and are therefore paramount to meeting the Millennium Development Goals (MDGs) and the future Sustainable Development Goals (SDGs). In addition, the outcome document recognized the core role played by water and sanitation in the achievement of sustainable development (paragraphs 119 – 124).

Wetlands are crucial to maintenance of the water cycle and provision of water-related ecosystem services. These include clean drinking water, water for agricultural services, cooling water in the energy sector and water quantity regulation during flood control. They also contribute to land formation and resilience to storms through such processes as sediment transport and soil erosion control. Therefore, wetlands directly and indirectly power myriad sectors including agriculture, tourism and fisheries among others. However, despite their importance, wetlands continue to be degraded and lost in some instances. This is due to the effects of irrigation, intensive agricultural production, urbanization, increased water extraction for domestic and industrial use, pollution and industrial and infrastructure development.

Since 1990 the world has lost around 50% of its wetlands, with 60% loss in Europe and 54% loss since the 18th century in the USA (TEEB, 2013; UNWWAP, 2003). Recently,

there has been a 5% loss of both inland and coastal wetlands (Dahl, 2006). Natural inland wetland decreased in area by 33% between 1978 and 2008 in China while 31% of the coastal wetlands were lost. Incidentally, over the same period, artificial inland wetlands increased by 122%. Losses of coastal wetlands in East Asia over 50 years to 2005 have been high; 51% in China, 40% in the Republic of Korea and more than 70% in Singapore. Wetland ecosystems in Africa are estimated to cover more than 131 million hectares and are amongst the most biologically diverse ecosystems. Though information on wetland loss in Africa is lacking and/or highly variable and inconsistent, it is estimated that 66% of all listed wetlands in Africa are used for agriculture, greatly affecting the biodiversity. Unsurprisingly, wetland-dependent species have also followed the same declining trend. Overall, wetlands continue to face severe pressures despite the many benefits they provide, and the many successive local, national and global conservation/restoration efforts. Currently, a comprehensive assessment of the state of the world's remaining wetlands lacks. However, many are recognized as having deteriorated in status and to be currently degraded.

According to the Ramsar Convention on Wetlands, the 168 contracting parties (member states) to the convention have committed to the *"conservation and wise use of all wetlands through local and national actions, and international coorperation, as a contribution towards achieving sustainable development throughout the world'*. Currently, 30% of Ramsar Contracting Parties report that the condition of their Ramsar Sites has improved in recent years while 17% report deteriorating status. Kenya is party to the convention and currently boasts 6 Ramsar sites covering a total area of 265,449 Ha.

2.0 Statement of the Problem

Wetlands are the most undervalued ecosystems (Kenya State of the Environment Outlook Report, 2010). This is despite the fact that they provide a range of vital services including hosting numerous floral and faunal species, providing food, filtering water to make it safe for drinking, and fostering inter-community unity. Therefore, due to the immense significance of wetlands, their sustainable use is indispensable in improving the welfare of Kenyans'. This is the overarching goal of Vision 2030.

Urban wetlands are among the most threatened in Kenya. This is due to their direct conversion into built up areas (either planned or unplanned). This has led to acute pollution related problems including uncontrolled domestic and industrial discharges; and irresponsible dumping of commercial, municipal and institutional wastes. There have also been drainage concerns; direct biodiversity habitat loss; overexploitation of wetland plant and animal species; and increased prevalence of invasive alien species. In this situation, irreversible damages to and/ or loss of aquatic biodiversity, altered ecosystems' productive systems and adverse effects to human health and safety are inevitable challenges. It's therefore against this backdrop that conservation of urban wetlands in Kenya is important.

3.0 Intervention: Adopt –a- River Initiative

In response to the challenge outlined in section 2.0 above, the National Environment Management Authority (NEMA) and World Student Community for Sustainable Development Kenya (WSCSD – Kenya) with the support of various stakeholders have partnered to implement the *'Adopt-a-River Initiative'*. This is a 'people-driven' wetlands monitoring and restoration project that is being piloted within Nairobi River Basin before upscaling to other parts of the country. The project entails adoption of a nearby river by university/college student groups, community youth groups and other interested institutions. The groups are expected to subsequently monitor the adopted river over time, identify sources of its pollution and take local action towards its restoration and conservation. The project is being implemented with technical backstopping from University of Nairobi (UoN), School of Biological Sciences.

4.0 Overall Project Objective

The aim of the project is to **strengthen the link between the curricula and addressing real sustainability challenges in Kenya**. This is by mobilizing students in universities, colleges and secondary schools to collaborate with community youth groups to champion for clean and healthy river ecosystems and other wetlands. This will be achieved through regular monitoring of the health of the rivers coupled with various conservation and restoration efforts.

5.0 Specific Objectives

Specifically the project seeks to;

i. Strengthen monitoring of the Nairobi River Basin streams by local stakeholders
ii. Steer restoration of polluted streams within the Nairobi River Basin to make them more clean and healthy
iii. Make learning of biology, especially the dichotomous key more interesting and hands-on for secondary school students
iv. Enhance knowledge on and spur interest in community led ecosystem conservation among youths.

6.0 Partners

The project partners include;

1. NEMA
2. WSCSD – Kenya
3. UoN
4. National Museums of Kenya (NMK)
5. Wildlife Clubs of Kenya (WCK)
6. African Fund for Endangered Wildlife (AFEW – K)
7. Kenya National Commission for UNESCO (KNATCOM)
8. Kenya Institute of Curriculum Development (KICD)
9. Universities and colleges
10. Secondary schools
11. Community youth groups

7.0 Project Activities

7.1. River Health Monitoring

7.1.1 Mini Stream Assessment Scoring System (miniSASS)

The health of the rivers and general quality of their waters will be measured using Mini Stream Assessment Scoring System (miniSASS) Version 2.0. This is a simple, user-friendly community river health bio-monitoring tool. It uses the composition of macro-invertebrates (small animals) in the river and is based on the sensitivity of the various animals to water

quality. These animals are organized into groups, with each group having a specific sensitivity score.

7.1.2 Procedure

Two river types are recognized by miniSASS i.e. rocky and sandy types. The best sampling sites are those with rocks in moving water (rocky river types). Nevertheless, sampling can also be carried out in the sandy river types. The method used is as follows;

i. Disturb the stones, vegetation, sand e.t.c. with your feet or hands while holding the net in the current
ii. You can also lift stones out of the current and pick insects off gently with your fingers or forceps
iii. Do this for about 5 minutes while ranging across the river to different habitats (biotopes)
iv. Rinse the net and turn the contents into a plastic tray
v. Identify each group using the identification guide (chat showing different organisms inhabiting water bodies) given prior to the exercise. This can be used in combination with the dichotomous key.
vi. Mark the identified insects off on the identification guide
vii. Fill in the site information (Table 1) and add up the sensitivity scores to determine the average score on the scoring sheet (Table 2). To get the average sensitivity score from a sampling point, the sensitivity scores of the identified groups are summed up. The total sensitivity score is then divided by the number of groups identified.
viii. Wash hands when done

Table 1: Site information table

Site Information Table		
Date (dd/mm/yr)		
Collectors Name		
Rivers Name		
Site description		
GPS co-ordinate*	**S**	**E**

Comments/notes	

* Coordinates as Longitudes/Latitudes OR as decimal degrees

Table 2: Scoring Sheet

Groups	**Sensitivity score**
Flat worms	3
Worms	2
Leeches	2
Crabs or shrimps	6
Stoneflies	17
Minnow mayflies	5
Other mayflies	11
Damselflies	4
Dragonflies	6
Bugs or beetles	5
Caddisflies (cased & uncased)	9
True flies	2
Snails	4
Total score	
Number of groups	
Average score	
Average Score = Total Score ÷ Number of groups	

Appendix I shows the list of materials and equipments needed to successfully carryout the exercise

7.1.3 Interpretation of the miniSASS score

An ideal sampling site has rocky, sandy and vegetation habitats. However, not all habitats are present at any one given site. If a river lacks rocky habitats, the sandy type category is used to interpret the scores instead.

Table 3: miniSASS score interpretation to give the ecological category/condition

Ecological category (condition)	River category	
	Sandy Type	**Rocky Type**
Unmodified (NATURAL condition)	> 6.9	> 7.9
Largely natural/few modifications (GOOD condition)	5.8 to 6.9	6.8 to 7.9
Moderately modified (FAIR condition)	4.9 to 5.8	6.1 to 6.8
Largely modified (POOR condition)	4.3 to 4.9	5.1 to 6.1
Seriously/critically modified (VERY POOR condition)	< 4.3	< 5.1

The results will be uploaded on miniSASS google map based platform. The platform can tell the health of a river once findings by the participating groups have been uploaded. This is by indicating a clean river as a *'green frog'* and a polluted one as a *'red frog'*.

NB: miniSASS does NOT measure the contamination of the water by bacteria and viruses and thus does not determine if the river water is fit to drink or not.

7.2 Project Implementation

The project's pilot phase will be implemented in Nairobi River Basin for six (6) months (from January – June 2015). This is before upscaling to other river basins across the country. Appendix III indicates the project work plan.

7.2.1 Identification of universities/colleges, secondary schools and community groups

This will be carried out by WSCSD – Kenya in collaboration with UoN and NMK. Given its niche in the Kenyan institutions of higher learning, WSCSD – Kenya will help mobilize university students through its affiliate student groups.

7.2.2 Procurement and distribution of equipments

The list of all equipments required for the project and their specifications will be provided by the UoN, School of Biological Sciences. NEMA will then procure the equipments and distribute them with the other partners to participating institutions once training is done.

7.2.3: Training of participants

A trainer of trainer (ToT) capacity building will be conducted by NEMA, WSCSD – Kenya, UoN, KNATCOM, WCK, NMK, KICD and African Fund for Endangered Wildlife (AFEW – K). The trainers will then train all participating student and youth groups on site. The training will entail both theoretical and practical use of miniSASS and the dichotomous key.

7.2.4: River monitoring

Extensive research shows that animals tolerate different levels of pollution. Some inhabit polluted waters while others can only survive in fresh water. Using the methodology outlined in Section7.1.2 above, participants will visit rivers and other water bodies nearest to them, sample organisms in water at a designated point, identify them with the help of a chart provided prior and upload the type of organisms identified and their counts to the miniSASS website. The website will provide a response immediately through change of frog colour, indicating the level of pollution of the rivers overtime.

7.2.5 Continuous guidance and monitoring of progress

Throughout the project, the technical team comprising of all partners will be available to offer support and clarify any issues that may arise. This will entail visits to the sampling sites to ensure that everything is done accurately.

7.2.6: Ecological restoration

The participating institutions will spearhead corrective action once the collected data is uploaded on miniSASS. This is to make sure that the colour of the frog on the website remain green, indicating a health river devoid of pollution. They will also work closely with NEMA to identify the sources of pollution and the necessary corrective measures. This will help NEMA undertake enforcement action immediately. The participants, in collaboration with partner institutions will plan and execute local initiatives to restore and sustain the health of adopted rivers.

8.0 Conclusion

The ***'Adopt-a-River Initiative'*** exemplifies how key curricula components can be used to solve real sustainability challenges. It is also a perfect model of how the public, especially youths can be mobilized to manage rivers and other wetlands around them. Through identification of polluted river ecosystems within Nairobi River Basin, the project is expected to result in enhanced enforcement of environmental and other related regulations to ensure healthy wetlands. It is therefore in line with Kenya's commitment to the Ramsar Convention and numerous national commitments. Overall, it helps conserve aquatic biodiversity and implicitly contributes towards achieving Kenya's Vision 2030 objectives. Key among these objectives is poverty alleviation and improved general welfare of the citizenry.

9.0 Appendices

Appendix I: Materials and Equipments

S/no	Item	Specifications	Quantity per site/school
1.	Pond Net	Rectangular aquatic nets, fine mesh net	2
2.	Sweep net	For catching insects, lighter than pond net	2
3.	Cool Box	12 litres	1
4.	White Trays	Plastic trays (small, medium and large)	5
5.	Dissecting Kits	Secondary schools types	3
6.	Hand lenses		10
7.	Dissecting microscope	Basic stereo-scope microscope	2
8.	Gum boots	Heavy duty	5 pairs; different numbers
9.	Wader Boots		2 pairs
10.	Dettol Soap		5
11.	Sanitizers		5
12.	Specimen Vials	50 ml, plastic with supporting base	2 bag 50 pieces
13.	Large specimen bottles	500 ml and 1 litre	10
14.	Adhesive labels		5 packets
15.	Pencils	HB, 2HB	10 per site
16.	Masking tape (small)		5
17.	Masking Tape (large)		5
18.	Cell tape (small)		5
19.	Cell tape (medium)		5

20.	Cell tape (large)		5
21.	Plastic basket	L=1.5ft; W= 1ft, H=1ft; Available in supermarkets	2
22.	Metal Boxes (Aluminium)	L=3ft; W= 2ft, H=2.5ft	1
23.	Padlocks		2
24.	Knife		2
25.	Panga		2
26.	First Aid Kit		1
27.	Gloves (small, medium and Large)		6 packets
28.	Buckets	10litres, 15litres, 20 litres	3
29.	Jericans (5, 10 litres)	5 litres, 10 litres)	2
30.	Alcohol	70% laboratory in bottles 2.5litres	10 litres
31.	Plastic Forceps	Pointed forceps (ten pieces per school)	50
32.	Water sampling bottle	Globac types, 300 ml, Glass type	10
33.	Water sampling bottles (for other parameters)	Sterlin for Bacteriological water samples, Plastic type	10
34.	T-Shirts		
35.	Tooth brush	normal ones	10
36.	Painting brush	small size	10
37.	GPS		1
38.	Stop watch		
39.	Preserving fluid		

Appendix II: Institutions/Schools/ Youth Groups to be Involved in Data Collection

S/no	Name
Universities/Colleges	
1.	University of Nairobi, Kikuyu Campus
2.	University of Nairobi, College of Physical and Biological Sciences
3.	University of Nairobi, Institute of Development Studies
4.	Visions School of Professional Studies
5.	Kenya Institute of Social Works
6.	Riara University
7.	Kenya Institute of Mass Communication (KIMC)
8.	Utalii College
9.	Cooperative college
Secondary Schools	
10.	Alliance High School
11.	Loreto Convent Msongari school
12.	Strathmore School
13.	Consolata School
14.	Ngara Girls High School
15.	Lenana School
16.	St. Teresa's Girls High School
17.	Kenya High School
18.	Nairobi School
19.	Kianda High School
20.	Karengata Academy
21.	Ngaimurunya
22.	Mbagathi View Academy

Partner Institutions	
23.	National Museums of Kenya
24.	African Fund for Endangered Wildlife (AFEW – K)
Youth Groups	
25.	Tbc
26.	Tbc

Appendix III: Work plan/schedule

	Project Work Plan/Schedule

Activity/sub-activity	Month/Week																							
	January				February				March				April				May				June			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Drafting project proposal																								
Review of draft proposal																								
Mobilization of participating institutions and youth groups																								
• Institutions proposed and discussed																								
• Project introduction in all institutions																								
Identification of sampling points																								
• Sampling points proposed and discussed																								
• Mapping of sampling points																								
List of equipments and materials																								
• Submission and confirmation of list																								
• Procurement																								
• Distribution to participating institutions																								
Curriculum Development																								
• Draft circulated																								
• Review by the team																								
• Finalization and development of training materials																								
Training																								
• Training of Trainers (ToT's)																								
• Onsite training of participating																								

institutions and youth groups																								
River monitoring and uploading of data																								
Reporting on findings																								
Restoration activities – clean-ups, tree planting e.t.c																								
Enforcement based on findings																								
Awareness creation																								