



Community Based Environmental Biomonitoring in Kakamega and East Usambara Mountain Forests

Wilber Lwande, Mary Gikungu, Joseph Gitau, Carol Muriuki, Nixon Onyimbo, James Ligare
International Centre of Insect Physiology and Ecology (*icipe*)
wlwande@icipe.org

INTRODUCTION

Forests provide goods and services that are vital to human health and livelihood that modern technologies cannot replace; thus deterioration of these services impacts on production systems. The overall goal of the Project is to improve on livelihoods, environmental health, ecosystem services, and food security for natural resource-dependent communities. The implementation of the project is a partnership between *icipe*, National Museums of Kenya, Kakamega Environmental Education Programme (KEEP), and Muliru Farmers Conservation Group, supported by Biovision.

METHODS

The sampling of macroinvertebrates is done using kitchen strainers, and the specimens are sorted out in white trays and later identified using identification keys from South Africa for calculating the scoring index.



Scoring is done using the (South African Scoring System) **SASS 5** to determine the river/stream health. This is a low technology, scientifically reliable, and robust technique to monitor water quality that was developed in the mid 1990s.

Scoring Chart

GROUPS	SENSITIVITY SCORES
Flat worms	3
Worm	3
Leeches	2
Crabs or Shrimps	7
Stone flies	14
Minor mayflies	6
Other mayflies	13
Damselflies	4
Dragonflies	7
Bugs or Beetles	6
Caddisflies	9
True flies	2
Snails	4
TOTAL SCORE	
NUMBER OF GROUPS	
AVERAGE SCORE (Divide 'Total' by 'Number of groups')	

RESULTS



OBJECTIVES

- To empower the local community with biomonitoring knowledge using macroinvertebrates as indicator species.
- To create public awareness on the use of macroinvertebrates as indicators of water quality.

Why use macro invertebrates as indicators?

- They are sensitive to pollutants, and therefore, respond to any change in their environment. A chemical test does not identify pollution in water after it has been washed away downstream but the water macro invertebrates' composition is known to change.

RESULTS

- Results of the ongoing biomonitoring work show that the macro invertebrate groups collected in Kakamega and East Usambara rivers are similar to those found in US, EU, and South Africa for rapid assessment of rivers and other water bodies.
- Scores for the sites sampled are medium to good, as the main activity in the study sites is agricultural with low land use intensity. The main crops are maize, tea, and sugarcane, which do not require plenty of fertiliser or pesticides.
- A checklist of 99 families representing 9 orders of aquatic macroinvertebrates that we collected and identified has been developed.



Images of common Macroinvertebrates sampled

- Sampling sessions (30) have been undertaken together with community members.
- Community members (7300) sensitised on environmental monitoring and ways of mitigating detrimental agricultural practices to water quality and local biodiversity.

IMPACT

- Community members adjacent to Kakamega and East Usambara forests are empowered to monitor status of their environment by observing and identifying macroinvertebrates in the streams/rivers.
- The local authorities are involved through information dissemination in public gatherings. They also help to enforce rules and regulations regarding the project results. In addition, the local authorities provide advice and guidance on government requirements and policies. The local authorities may also use some of the project activities and results as case studies in policy formulation.
- Change of attitude towards sustainable water utilisation practices is envisaged in this project.

CONCLUSION

- Improved water quality will improve human health, reduce sickness, and infections that can be detrimental to sustaining income and life.
- Data collected can also be used as a basis for decision-making in protection of river banks and watersheds in East Africa.