PROGRESS REPORT, QRT 1, 2025

MULTIDISCIPLINARY AND MULTI-INSTITUTIONAL RESEARCH

TITLE OF RESEARCH:

RAPID ENVIRONMENTAL ASSESSMENT OF RESIDUAL PESTICIDES ON SELECTED WETLAND ECOSYSTEMS, KENYA

Dated: 21/03/2025

RESEARCH PROJECT PERIOD: 2018 TO DATE

Researchers

1. Dr. Shadrack Mule (PI)
2. Dr. Mary Wosyanju – Researcher
3. Dr. Phanice Wangila – Researcher
4. Prof. Charles Nguta – Researcher
5. Mr. Noah Angwenyi – Researcher
6. Mrs. Asenath Nyantika – Researcher

Others

1. Research Assistants (Data Collection) – 22 (2 each in the 11 counties of interest in LVB)
2. Msc - 3 (All at University of Kabianga with 2 already graduated)
3. PhD students – 2 (University of Kabianga and University of Eldoret)

Institutions Involved

1. University of Kabianga – Lead Institution
2. University of Eastern Africa, Baraton

3. Laikipia University

Objective of the Project

This research is taking the challenge of carrying out a rapid environmental assessment of residual pesticides in selected wetlands within Lake Victoria Basin, to determine the attenuation capacities and retention rates for pesticide pollutants alongside establishing their public health and socio-economic effects of such pollutants in the local communities within Lake Victoria Basin.

FINANCIAL STATUS AS AT 5/5/2025

AMOUNT RECEIVED FROM NRF							
DATE	**RECEIPT NO.**	**AMOUNT**					
Friday, January 26, 2018	157925	9,555,000.00					
Friday, May 10, 2019	201450	5,733,000.00					
TOTAL		**15,288,000.00**					
AMOUNT SPENT(ACCOUNTED) AS AT 05/05/2025							

AMOUNT SPENT(ACCOUNTED) AS AT 21 MARCH 2025							
DATE	**DOC. NO.**	**TYPE/SOURCE**	**PAYER/VENDOR**	**REFERENCE**	**DEBIT**	**CREDIT**	**BALANCE**
16 Nov 2018	IMP4376	Payment	Mr. Shadrack Munyao Mule	029133	1,206,500.00		1,206,500.00
03 Apr 2019	IMP4719	Payment	Mr. Shadrack Munyao Mule	030234	1,301,500.00		2,508,000.00
24 Jun 2019	IMP4970	Payment	Mr. Shadrack Munyao Mule	031670	951,500.00		3,459,500.00
31 Oct 2019	IMP5240	Payment	Mr. Shadrack Munyao Mule	032938	1,000,000.00		4,459,500.00
18 Feb 2020	VIN12868	Supplier Invoice	SAMEKH SCIENTIFIC (E.A) LTD	0055	1,026,000.00		5,485,500.00

25 Feb 2020	IMP5566	Payment	Mr. Shadrack Munyao Mule	034144	711,500.00		6,197,000.00
01 Mar 2021	IMP5880	Payment	Mr. Shadrack Munyao Mule	036060	1,125,000.00		7,322,000.00
11 Jun 2021	IMP6174	Payment	Mr. Shadrack Munyao Mule	037079	1,125,000.00		8,447,000.00
19 Nov 2021	IMP6337	Payment	Mr. Shadrack Munyao Mule	038018	1,148,000.00		9,595,000.00
09 Jun 2022	IMP6816	Payment	Dr. Shadrack Munyao Mule	039468	1,630,000.00		11,225,000.00
25 Oct 2022	IMP7329	Payment	Dr. Shadrack Munyao Mule	041012	1,024,000.00		12,249,000.00
14 Dec 2022	IMP7609	Payment	Dr. Shadrack Munyao Mule	042150	1,057,000.00		13,306,000.00
28 Apr 2023	IMP7695	Payment	Dr. Shadrack Munyao Mule	042589	862,000.00		14,168,000.00
31 Jul 2023	IMP8232	Payment	Dr. Shadrack Munyao Mule	042890	1,120,000.00		15,288,000.00
AMOUNT RECEIVED	15,288,000.00						
AMOUNT SPENT	15,288,000.00						
BALANCE	**-**						

PROGRESS REPORT AS AT 21st March, 2025

Narrative Summary	Measurable Indicators	Means of Verification	Achievement	Yet to be done
Objective # 1: To establish compliance of national integrated pest management framework and other relevant national policies on pest management by all stakeholders.	Integrated pest management framework and other relevant policies on pest management.	- **Documentation of relevant national policies related to pesticide industry in Kenya.** **- Documentation on established gaps on the national policies related to pesticide products**	Integrated pest management framework REAPER SOFTWARE (2023). Pilot of REAPER Software	

		manufacturing, importation, registration, transportation, storage, use by end farmer, counterfeits, disposal of obsolete products etc	completed (2024) Established gaps on IPM National policies in Kenya.	
Purpose: To provide information of the implementation and compliance of integrated pest management framework and other relevant policies by all stakeholders	Improved awareness of integrated pest management framework and other relevant policies by all stakeholders Improved water quality	• Research reports • Papers in Journals	Published a paper on IPM awareness by farmers in LVB region, 2022 with Journal of African Multidisciplinary Research and Development (JAFRED)	
Outputs: **1.1** Awareness of pest management framework and policies by researchers	Established frameworks and policies	• Research Report on policy frameworks	Presented a paper on IPM policies in Kenya and the Gaps present during 3rd International Multidisciplinary Conference at University of Kabianga, 2023	

1.2 Procedures of importation and registration of pesticide products by Ministry of Agriculture, Livestock and Fisheries and Pest Control Board of Kenya	Procedures of importation and registration of pesticide products established.	Research Report on importation procedures, registration of pest products in Kenya	Documented	
1.3 Level of awareness by all stakeholders on relevant pest management procedures	Established level of awareness by all stakeholders on pest management policies	• Research Report • Video clips • Pictures	Documented	
Objective # 2: To establish land uses contributing to pesticide pollution in the selected wetland ecosystems	Land uses established	**Land uses established within the LVB which are relevant to usage of pesticides, ongoing work is to classify the "most at risk" land uses within the LVB. This will be done through the REAPER WEBBASED SOFTWARE**	REAPER SOFTWARE classification of counties are at risk done.	Development of a real time mobile application for farmers on Land uses, use of pesticides and any health effects experienced.
Purpose: To provide information on the land uses contributing to pesticide pollution	Land uses contributing residual pesticides on wetland	• Research Report • Video Clips	Land uses in LVB documented and presented during a	

in the selected wetland ecosystems	ecosystems established	• Pictures	conference in Laikipia University, 2023.	
Output: **2.1** Land uses established	A map showing agricultural land uses established	• Research Report • Pictures		
Objective # 3: To establish rapid environmental assessment on wetland ecosystems	A map showing sources, pathways and receptors of residual pesticides in established	**Sampled Wetlands already covered and assessed for their quality**	Documentation of each selected wetland water quality done, 2020 - 2024. Map under initial stages of development in 2024- 2025 Development of water purification filter targeting pesticide residue molecules (initial stages)	**Map to be finalized by the end of the project showing the prominent sources, pathways and receptors of residual pesticides in LVB.** Final Development of water purification filter targeting pesticide residue molecules (testing, IP Protection)
Purpose:	Awareness on sources, pathways and receptors of	• Research Reports		

To provide information on the sources, pathways and receptors of residual pesticides in the selected wetland systems.	residual pesticides established. Good health of communities	• Pictures • Video Clips		
Output 3.1 Established sources of residual pesticides in selected wetland ecosystems. 3.2 Established Pathways of residual pesticides in selected wetland ecosystems 3.3 Established receptors of residual pesticides in selected wetland ecosystems	Established sources Established pathways Established receptors	• Research Reports • Pictures • Video Clips	Journal paper on sources, pathways and receptors of residual pesticides done and published.	**A book on sources, pathways and receptors of RP under development.**
Objective # 4 To establish levels of chemical and physical parameters responsible for water	Documented values of pH, Temperatures, BOD, COD, Dissolved		**Physical and chemical Parameters of River Nzoia, River Yala, and River**	**Journal paper on precipitation levels of LVB over**

quality in the selected wetland ecosystems	Oxygen, turbidity, and flow rate. Documented levels of rainfall within Lake Victoria Basin during the period of study.		**Sondu documented.** **Precipitation level of LVB over 10 years (2014 – 2024) documented.**	**10 years under development**
Purpose: To provide information of the levels of chemical and physical parameters of the selected wetlands	Documented wetland chemical parameters Documented wetland physical parameters	• Research Reports		
Outputs: 4.1 Established rainfall amounts of Lake Victoria basin 4.2 Established chemical parameters (BOD, COD, Dissolved Oxygen) of the selected wetland ecosystems 4.3 Established physical parameters (pH, temperature,	Increased awareness of the chemical and physical parameters of selected wetlands Increased knowledge of chemical and physical parameters of	Research Reports Financial Reports	Poster developed and presented at a conference in Kisii University, 2024.	**Continuous assessment of physical and chemical parameters ongoing.**

turbidity, flow rate) of the selected wetland ecosystems	tropical wetland ecosystems			
Objective # 5 To establish the attenuation capacity and retention rates of natural wetlands for residual pesticides in selected wetlands.	• Attenuation capacities and retention rates of selected wetlands on specific residual pesticides • Improved awareness by public on the pollution status of wetland ecosystems	• Research Report	**Study reports done documenting the attenuation capacity of Kabianga wetland, Kericho and Kigwal/Kimondi wetland in Nandi.**	Attenuation capacities of other selected wetlands ongoing (Yala, Kericho/Bomet boundary wetland and
Purpose To provide awareness to the public of the possible effects of pesticide pollution in the wetlands	• Improved water quality downstream selected natural wetlands • Increased awareness on good pesticide application practices	▪ Research Reports ▪ Papers in journals		

Outputs: **5.1** A map showing the extent of pesticide pollution in selected wetlands in the Lake Victoria Basin. **5.2** Wetland Attenuation capacities and retention rates for selected halogenated and non-halogenated pesticides established **5.3** Dominant compound species of the residual pesticides found in selected wetland systems established **5.4** Projected pesticide pollution levels in the selected wetland systems established	A map showing spatial variation of pesticide levels in selected wetlands Documented figures of wetland attenuation capacities and retention rates for selected residual pesticides Documented names of major residual pesticides found in selected wetland systems A map showing future pesticide pollution levels in selected wetlands if no action is done	1.Working document 2. Financial document	Map on extend of pesticide pollution Dominant pesticide molecules identified and documented (Potential area of future interest as the some of the molecules are cancer causing.)	Development of a real time mobile application for farmers on Land uses, use of pesticides and any health effects experienced.

5.5 Continual awareness by public on the pollution status of wetlands				
Objective # 6 To establish the health effects of the local communities due to pesticide pollution in the wetland systems.	Improved health of local communities		**REAPER SOFTWARE delivers Public Health data at LVB.**	Retrieval of information from health facilities on going.
Purpose To document the health effects of the local communities due to pesticide pollution in the wetland systems.	Documented health conditions associated with pesticide molecules A map showing prominent health diseases.	**Public Health report** **Financial Report**		Under investigation
Output Documented dominant health conditions associated with pesticide molecules in the selected wetland areas	Documented health conditions associated with pesticide molecules.	• Financial Reports		Development of a real time mobile application for farmers on Land uses, use of pesticides and any health

	A map showing prominent health diseases.			effects experienced.
Objective # 7: To establish socio-economic impact of pesticide contamination in the selected wetland areas.	Improved socio-economic status of the local community	**Questionnaires** **Observation reports**	Administered socio-economic questionnaires results documented	Results under statistical analysis
Purpose To document socio-economic impact of pesticide contamination in the selected wetland areas	Improved socio-economic status of the local community	• Financial Reports		
Output Socio-economic status of communities within the selected wetland ecosystems	Documented socio-economic status	• Financial Reports	Book Chapter on Socio Economic Impact of the use of Pesticides in Lake Victoria under development.	Statistical analysis of data.

APPROVAL

DR. SHADRACK MULE (PI) **21/3/2025**