

REPUBLIC OF RWANDA



RWANDA WATER AND FORESTRY AUTHORITY

SURFACE WATER QUANTITY MONITORING REPORT

2018-2019

1. INTRODUCTION

Water monitoring is done with the purpose of gathering hydrological data that show the status of our water bodies around the country, during surface water monitoring data collected are: water levels, flow rates and sediments quantity monitoring which started this year 2019. These data are collected with the help of manual (staff gauges), automatic (divers) and telemetry stations (real time stations i.e. those which send data as they collect them in the server room). Collecting these data is done for the purpose of quantifying the changes of the natural surface water systems hence, providing the overall status of national water bodies to stakeholders and decision makers thus, they are helped by those information in planning for water resources.

In this ending fiscal year 2018-2019, flow measurement was done on 34 hydrological stations and data collection was done on 10 lakes around the country as well as downloading data from divers and barometers on some stations. All works done during this fiscal year are discussed briefly in this report.

1. objective of the report

The objective of the report is to describe briefly all monitoring works as they were done in 2018-2019

2. Activities of 2018-2019

During this fiscal year activities of surface water monitoring that were done are included in the table below

No	Activities	Comments
1	3 Flow measurements Campaigns	This was done based on 3 seasons; As it is expected to have variations in rivers when it raining or when it is not raining. Data (Water Levels and Discharges) collected during these campaign are found on Aquarius as it is the data base use to manage hydrological data in RWFA.
2	Updating Hydrological Network	10 hydro station were rehabilitated under RWFA, during three weeks after a visit that also took 3 weeks. 3 hydro stations were also constructed under NBI and the handover to RWFA was done.

3	Trainings	Trainings on: HECHMS,HECRAS, Sediments monitoring Using information on Maproom from Meteo.
4	Sediments Monitoring Campaign	This was done after being trained information collected were processed by water quality officer
5	Sediments Removal	This was done with the purpose of reactivating all divers that were stack in mud and unlocking padlocks that were filled with sand The whole process would be found in December 2018 report.
6	Installation of Divers and downloading already installed divers	Three more divers were installed on Rte Butare Ngozi, Nyagisozi and Akagera Outlet. For now we have 8 divers on field. Data from those divers can be found on Water Portal.
7	Small Scale catchment modelling.	After Being trained On Hecras And Hechms, some practical modelling were done on Mpazi. For now a model of Mpazi is available which needs some corrections and validations.
8	Uploading data on Aquarius and updating rating curves	All hydrological data are found on Aquarius database and time series from those rating curves are also uploaded on Aquarius. Curves are found on the annex on the latest page.
9	Contribution on hydrological network establishment.	The supervision of 10 stations rehabilitation was done which ended

		with a report. Also identification of new 8 stations around the country, was done in joint with LAFREC and METEO-RWANDA. Also reports are available.
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2.1. Current status of Hydrological stations

Below is the table showing status of hydrological stations as they were found during May 2019 flow measurement campaign; illustrated ones are those found with problems.

Hydrological stations	Current status	Solution
Ngaru-Nyabarongo	Padlock locked and the structure has an under scouring	To be rehabilitated
Rubyiro	This staff gauge doesn't reach water during dry season	Need to reinstall another staff gauge
Ururumanza	Water doesn't reach staff gauge during dry season.	Need to reinstall another staff gauge
Ngaru-Mukungwa	The structure on which the staff gauge stands has an under scouring	Need to install other staff gauge.
Warufu Nyagahanga	Staff gauge washed away	Need to be rehabilitated
Mbirurume	Sediments accumulated in steeling tube	Need to be reshaped
Nyabisindu	Staff gauge not accessible	Need relocation
Muhazi-Outlet	Padlock locked and herbs growing on staff gauge	Need to be rehabilitated
Akanyaru-Upper	Countries cooperation issues, for now two flow measurement campaign didn't take a flow the river in the area	Only waiting
Nemba	Regular accumulation of sediments	Need to change the type of telemetry to be installed there.

4. Conclusion and Recommendation

In order to increase the performance of surface water monitoring activities and to raise the quality of data collected, some recommendations were made and provided below:

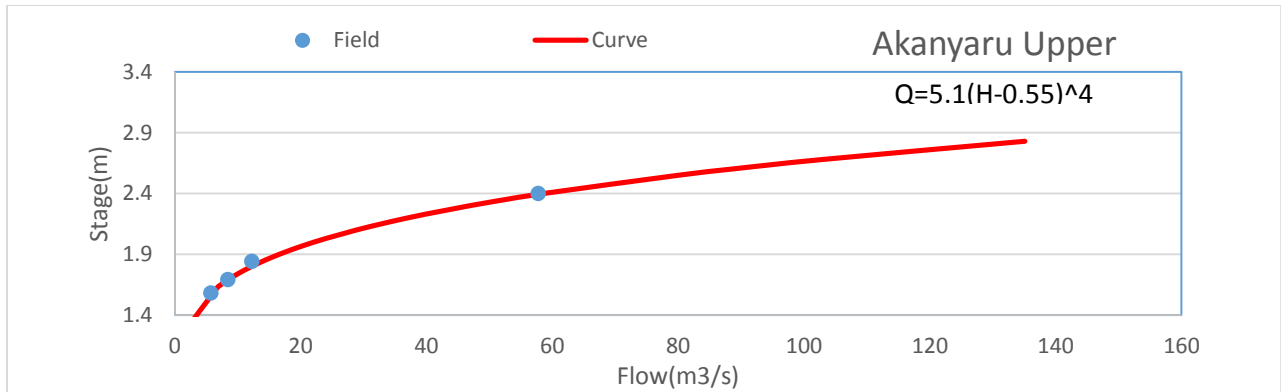
- The observers should be hired and trained to ensure the continuous data collection and the quality of water levels collected as well as checking if the contractor is paying their salaries.
- The training program on a boat should be considered to facilitate the collection of data on wide rivers.
- The Seasonal surface water monitoring campaigns should be maintained to have effective insight of Rwanda water resources behavior and prospective changes due to anthropogenic activities.
- On different station, number of staff gauges installed is confusing; there should be correction or renaming of staff gauges plates all over the country so that every observer reads correctly.
- In Karongi and Nyaruguru, there are many rivers that should need the installation of hydrological stations for regular collection of data.
- Flow measurement should be extended to 4 weeks as number of hydro stations has increased.

There is a new ADCP which is not working, it needs rehabilitation.

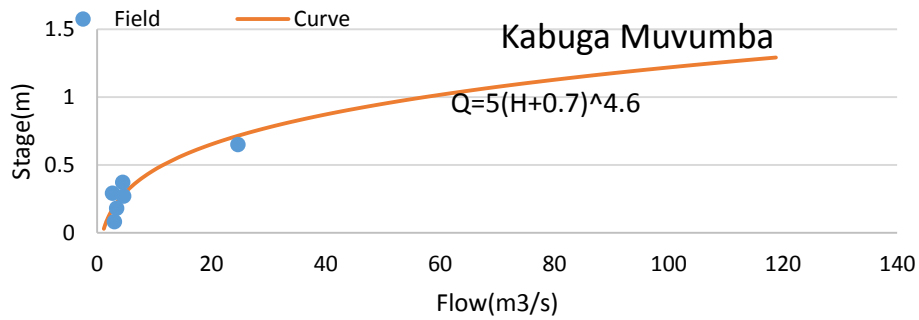
3. Appendix

3.1. Updated rating Curves

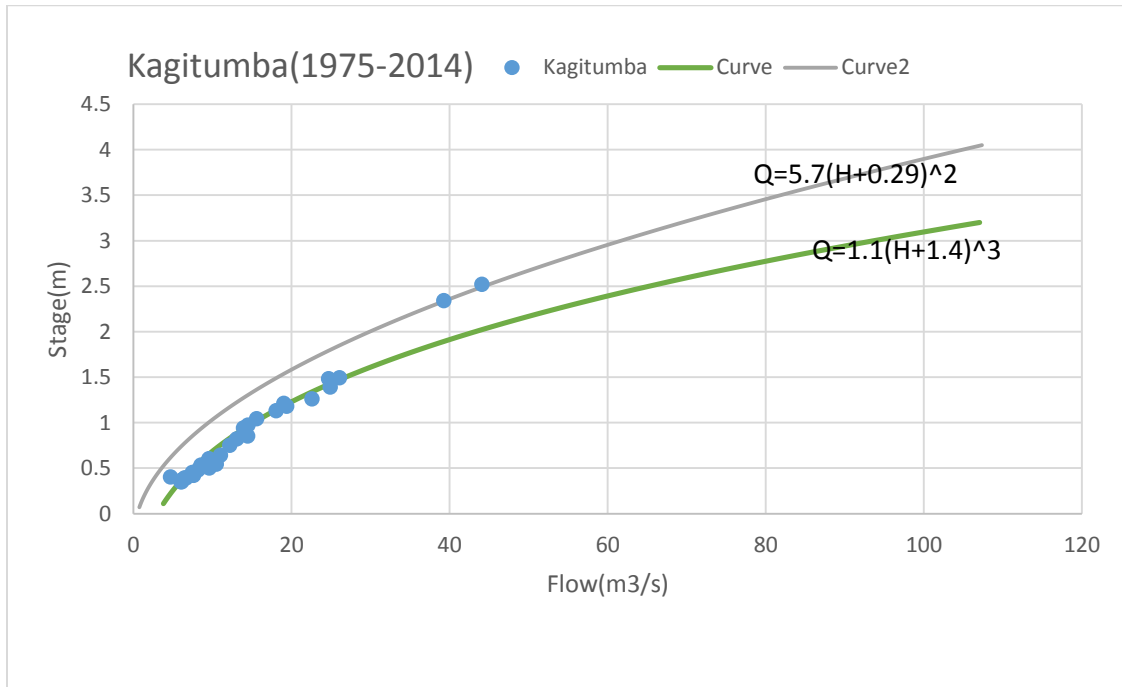
3.1.1. Akanyaru-Upper



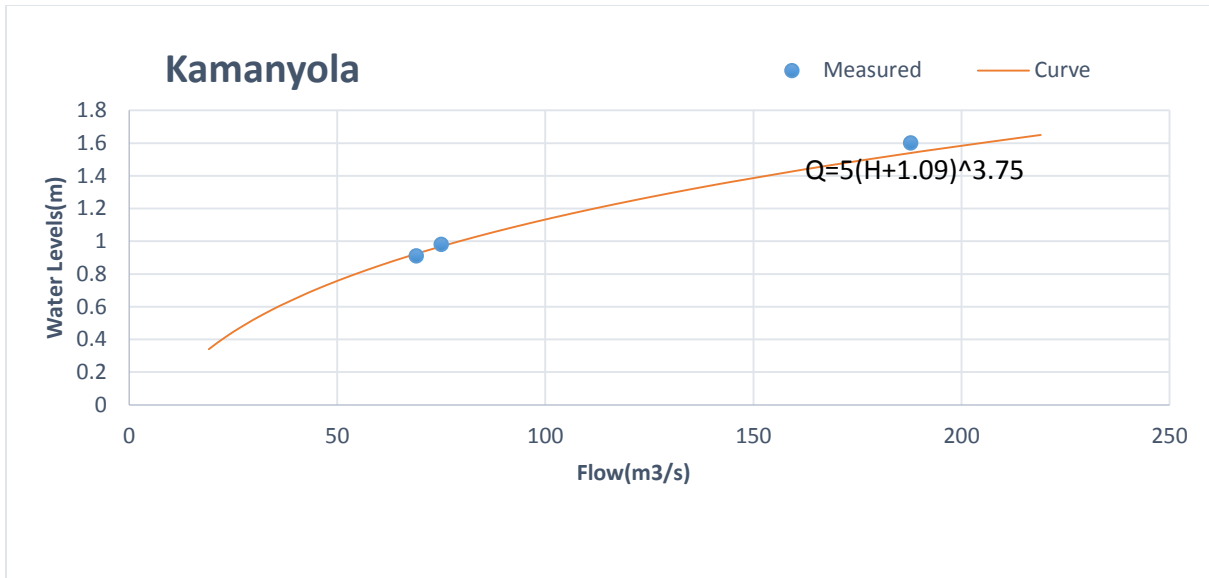
3.1.2. Kabuga Muvumba



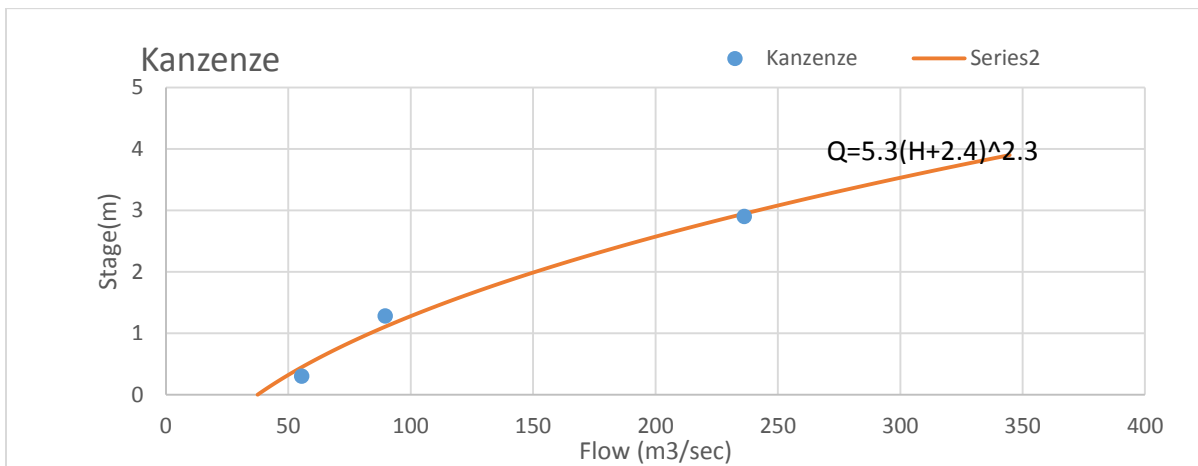
3.1.3. Kagitumba Muvumba



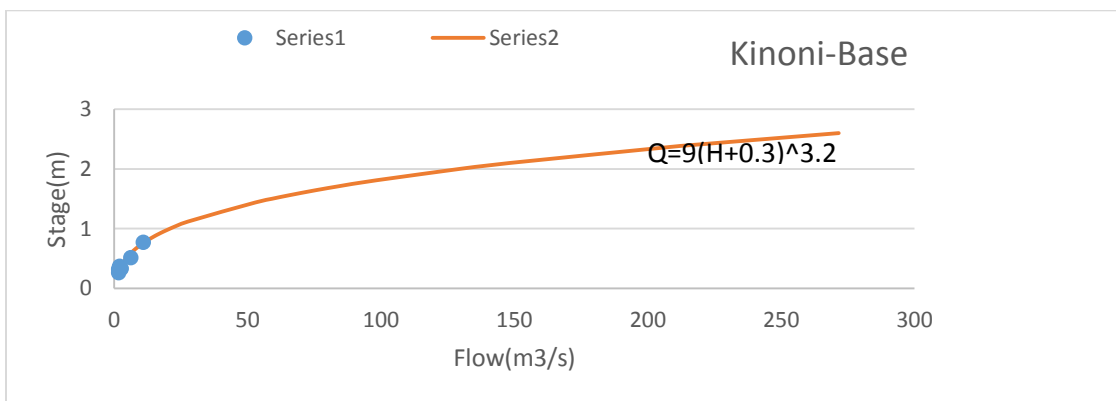
3.1.4. Kamanyola



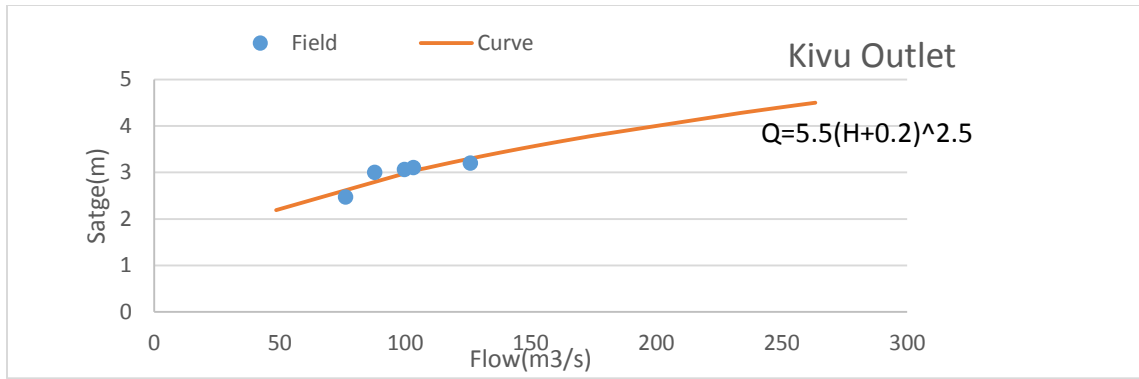
3.1.5. Kanzenze



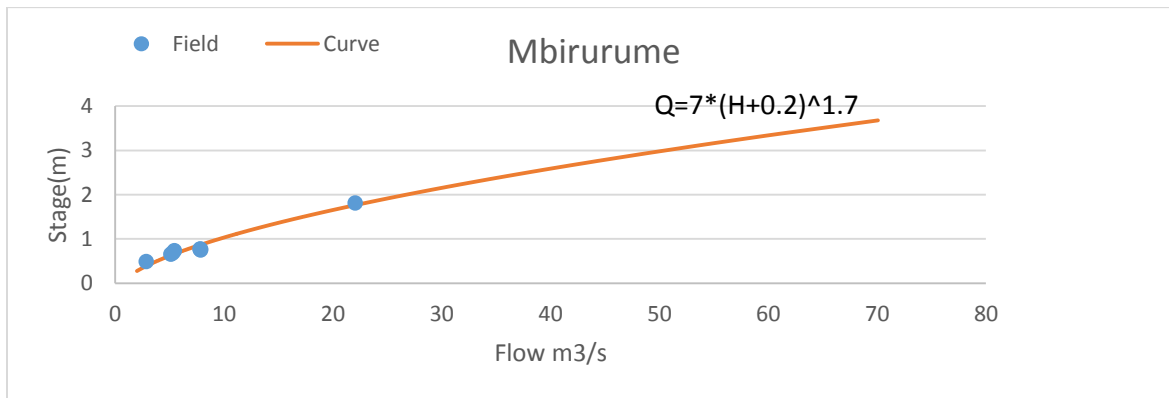
3.1.6. Kinoni-Base



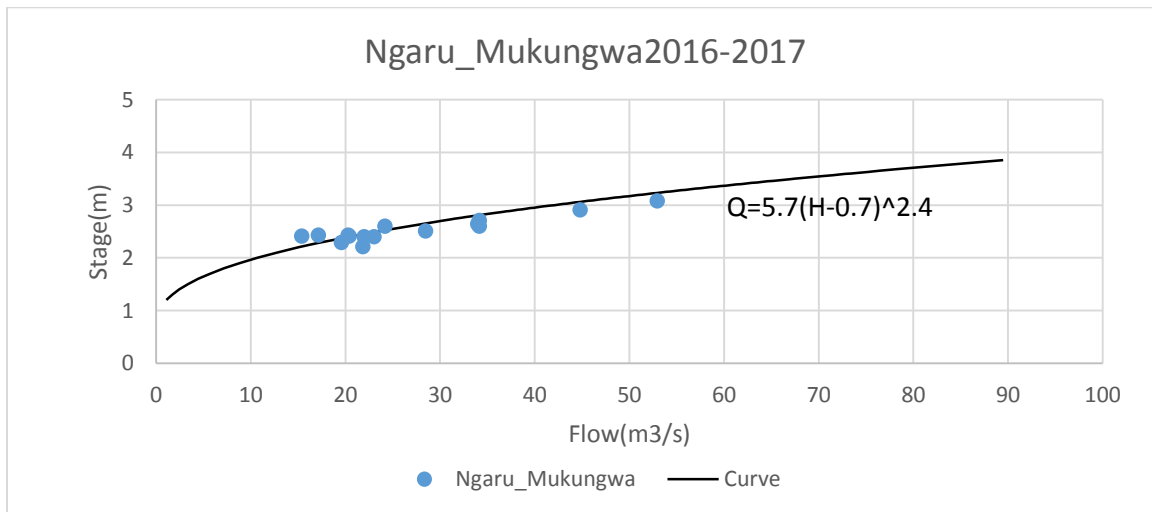
3.1.7. Kivu-Outlet



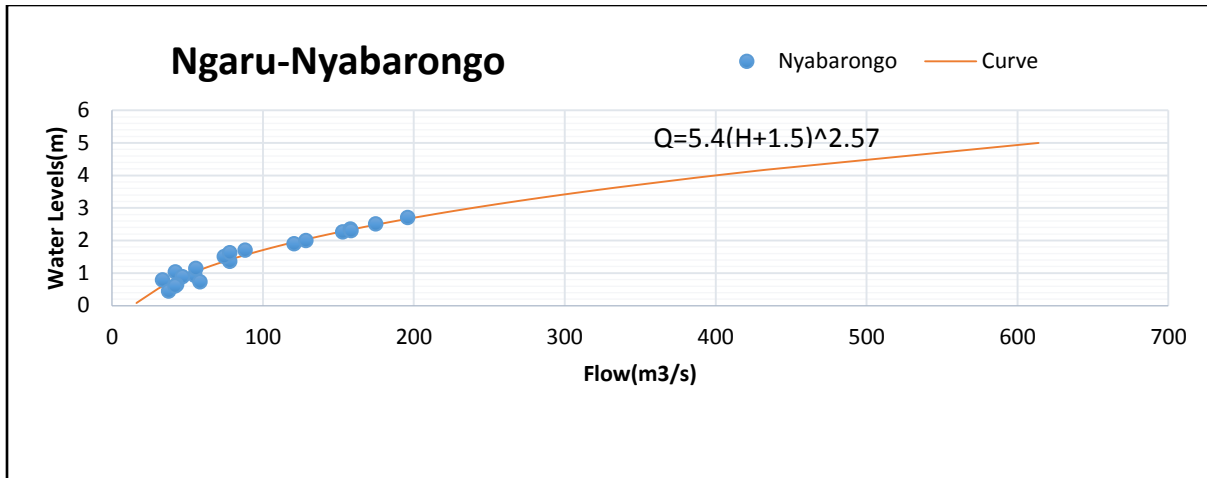
3.1.8. Mbirurume



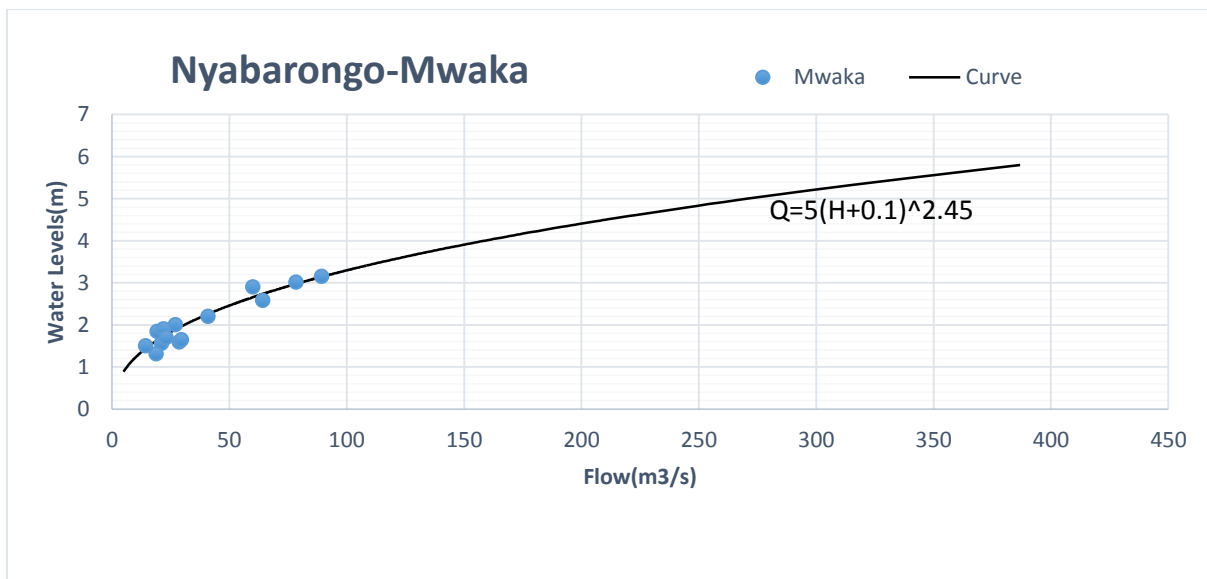
3.1.9. Ngaru-Mukungwa



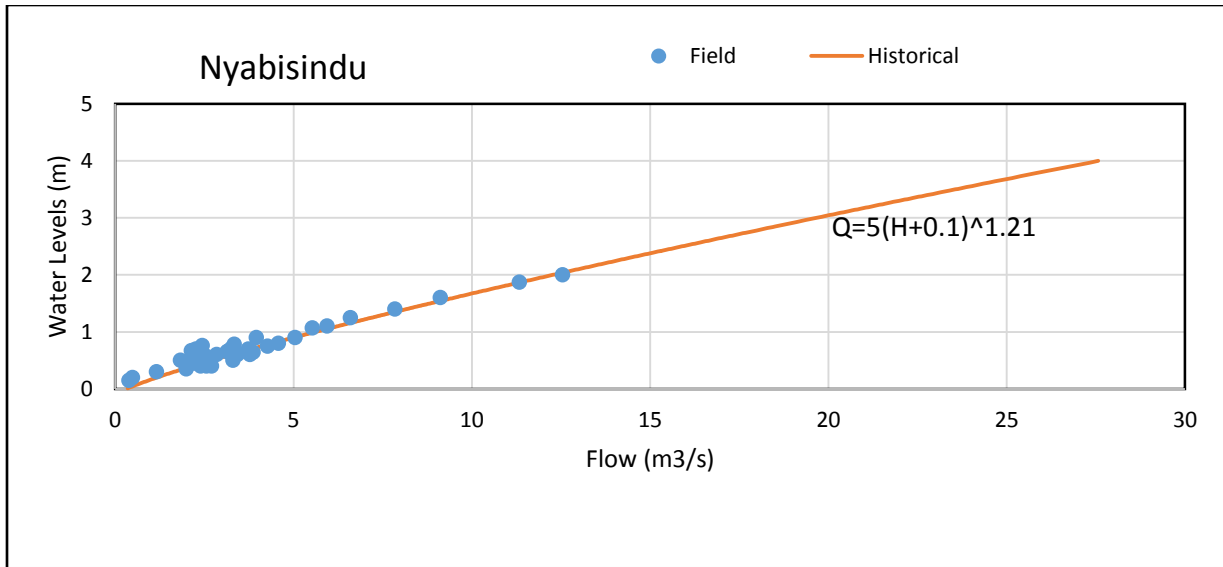
3.1.10. Ngaru-Nyabarongo



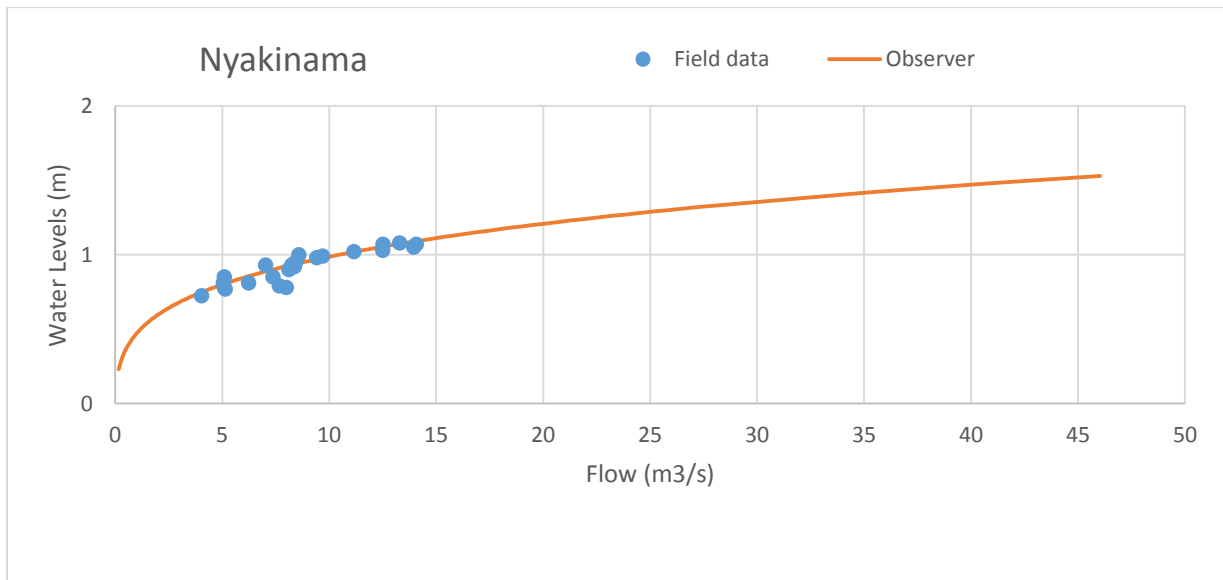
3.1.11. Nyabarongo-Mwaka



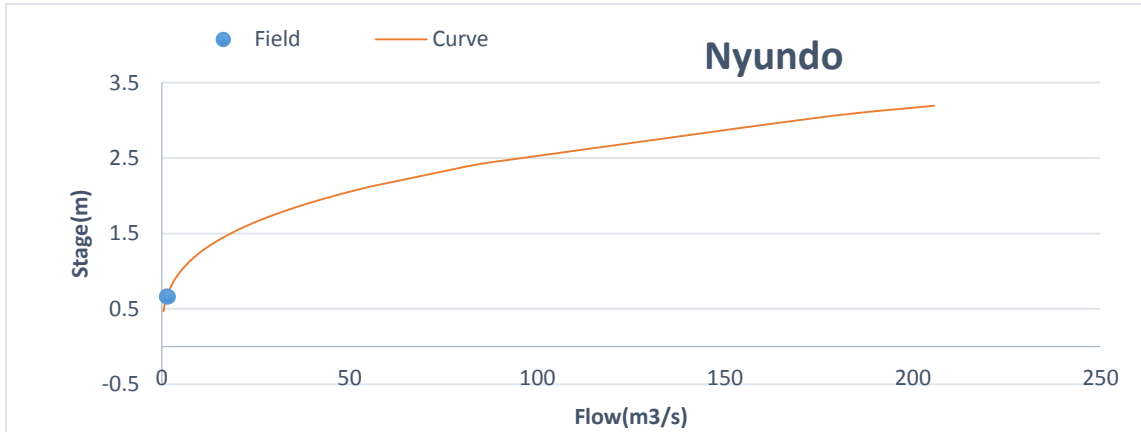
3.1.12. Nyabisindu



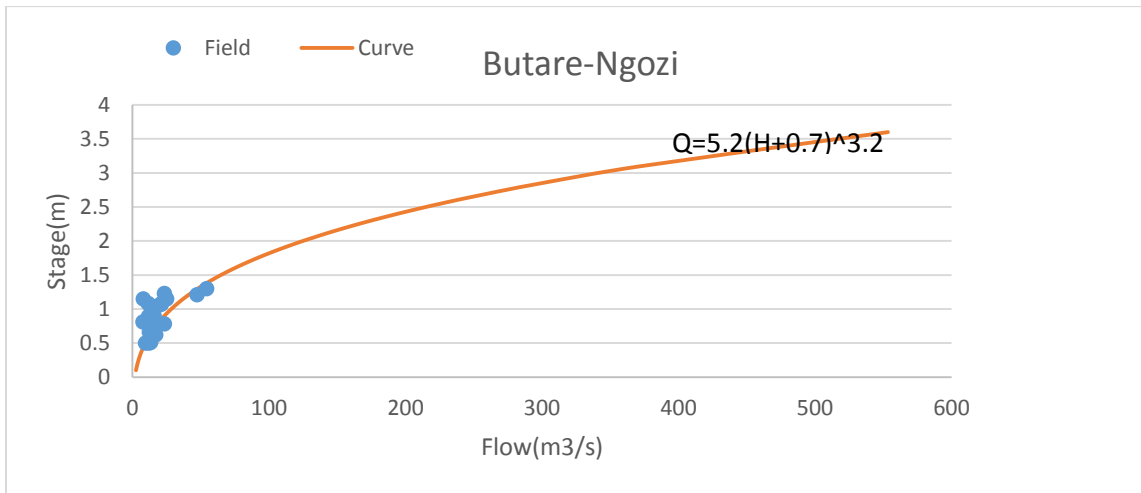
3.1.13. Nyakinama



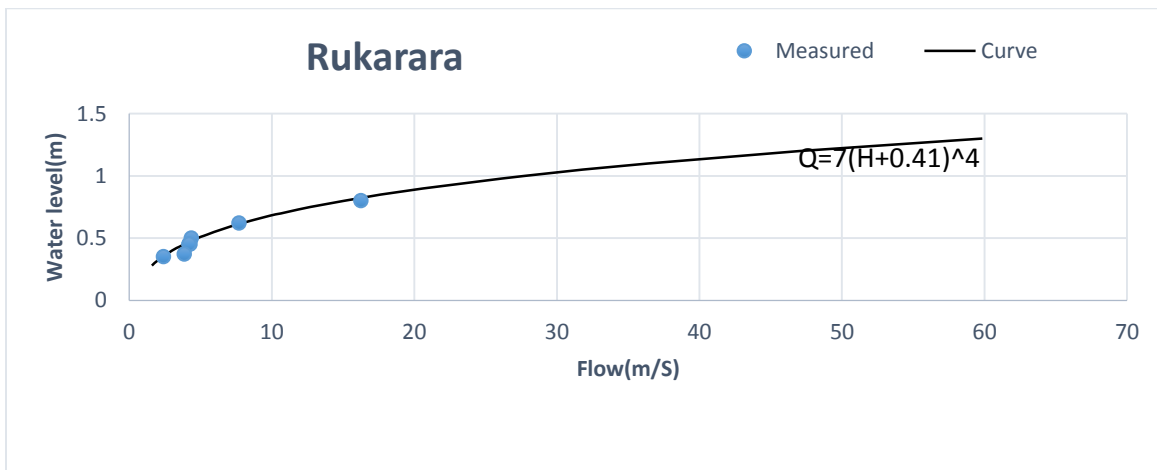
3.1.14. Nyundo



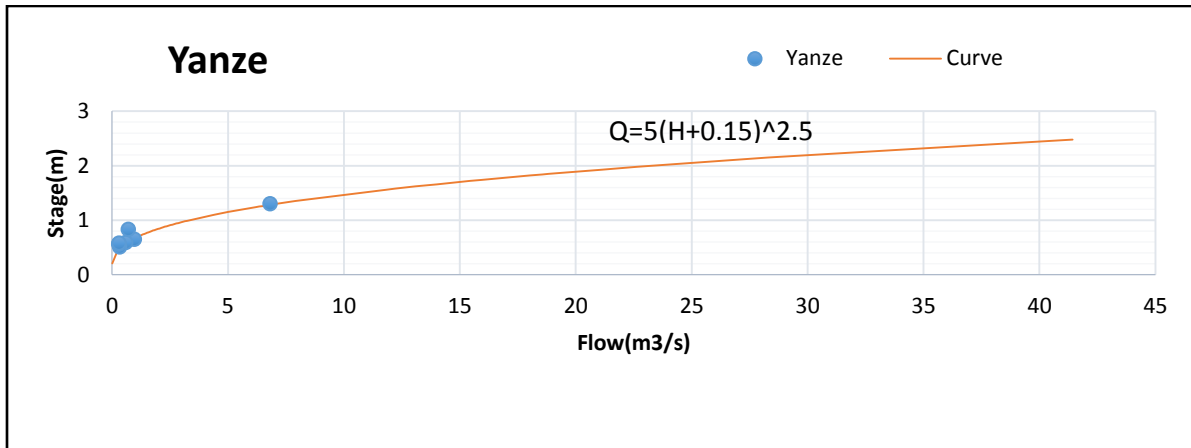
3.1.15. Butare Ngozi



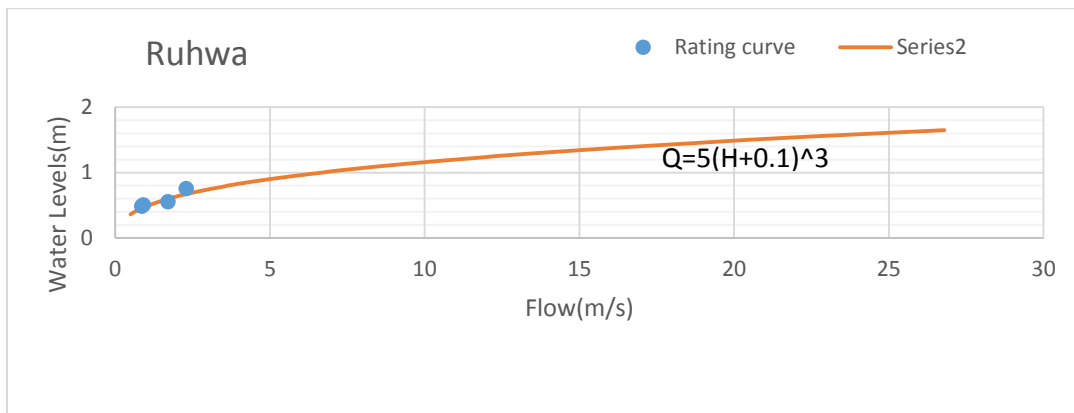
3.1.16. Rukarara



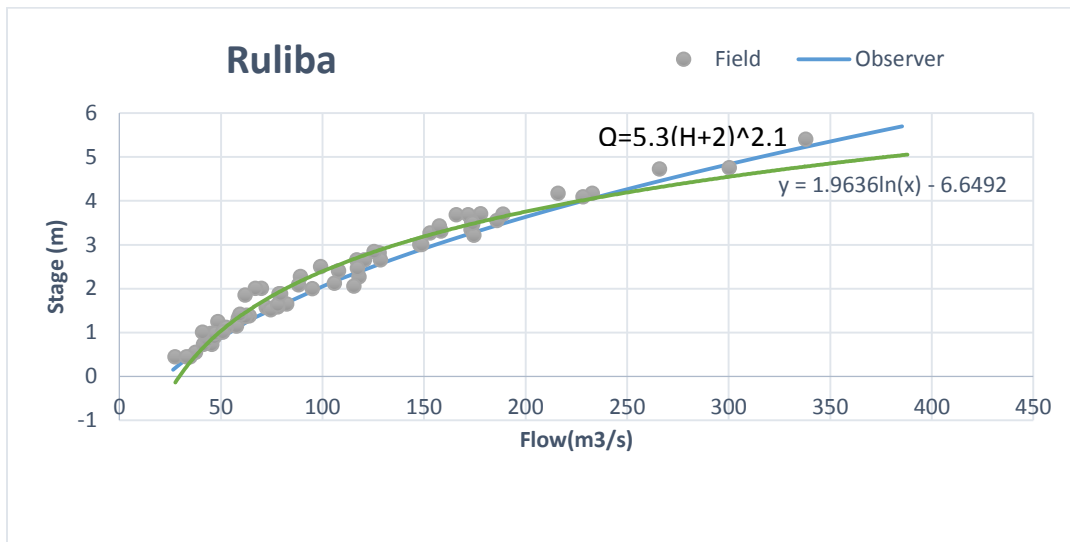
3.1.17. Yanze



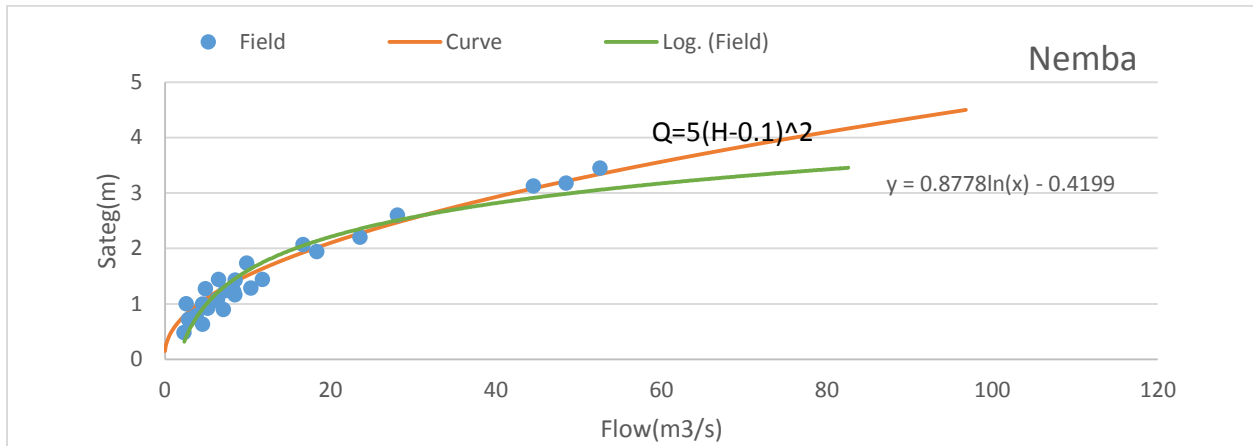
3.1.18. Ruhwa



3.1.19. Ruliba



3.1.20. Nemba



3.2. River Flow Monitoring Programs Schedules

Monitoring Catchments	River Flow Measurements Campaign	2017 IWRMD YR4	2018 IWRMD YR5	2019 IWRMD YR6	2020 IWRMD YR7
Nyabarongo Upper Catchment	Short wet season	<i>c</i>	C	T	U
	Long wet season	C	C	C	
	Long dry season	C	C	T	
Nyabarongo Lower Catchment	Short wet season		C	T	U
	Long wet season	C	C	C	
	Long dry season	C	C	T	
Akagera Upper Catchment	Short wet season	<i>c</i>	C	T	U
	Long wet season	C	C	C	
	Long dry season	C	C	T	
Akagera Lower Catchment	Short wet season	<i>c</i>	C	T	U
	Long wet season	C	C	C	
	Long dry season	C	C	T	
Akanyaru Catchment	Short wet season	T	C	T	U
	Long wet season	C	C	C	
	Long dry season	C	C	T	
Mukungwa Catchment	Short wet season	<i>c</i>	C	T	U
	Long wet season	C	C	C	
	Long dry season	C	C	T	
Kivu Catchment	Short wet season	<i>c</i>	C	T	U
	Long wet season	C	C	C	
	Long dry season	C	C	T	

U =Program to be undertaken/initiated in identified year

T =Program proposed to be undertaken in identified year (pending approval)

C =Program completed for the year

X =Program started, but encountered operational or hydrological delays

O = Program never started

PF =All field work for this catchment is complete. No further field work is planned.