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Revealing Success Stories and Constraints of North – South Mobility Education Programmes

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Abstract

Mobility programmes in higher education plays an important role in providing high quality education, movement of skills, technologies, knowledge, research funds and laboratory facilities for practical purposes. They offer sound, strategic investments in higher education, research and lay the foundation for development of countries' intellectual resources. However, the implementation of mobility education programmes faces a number of shortcomings and shortfalls. This policy brief summarizes the success stories and constraints of mobility programmes with reference to the UNESCO Chair on Ecohydrology and Transboundary Water Management hosted at Sokoine University of Agriculture, Tanzania. To date, the UNESCO chair has established North-South cooperation with the University of Algarve (Portugal); Martin Luther University (Germany); University of Lodz (Poland) and University of Bonn (Germany). Activities done so far under this mobility cooperation includes international training on Ecohydrology; students exchange programmes under the Erasmus Mundus+; staff exchange programmes under the Polish Fellowship and Erasmus Mundus Programme; and research funds for recession farming donated by the Germany Government under the Germany Research Foundation. Despite these positive effects of North-South partnerships, there are a number of challenges facing these mobility programmes. They includes outbreak of COVID 19 pandemic which hindered movement of technical skills and funds; delayed signing of MOUs and difficulties in finding a corresponding partner in higher learning intuitions from the North. The North – South mobility programmes is crucial and potential for exchange of skills, technical expertise and financial resources. However, it is crucial to deal with problems hindering the smooth running of these mobility programmes.

UNESCO Chair: UNESCO Chair on Ecohydrology and Transboundary Water Management, Tanzania

Acronyms

DFG	German Research Foundation
Kg/ha	Kilograms per hectare
MORUWASA	Morogoro Urban Water and Sewerage Authority
MOU	Memorandum of Understanding
SD	Standard Deviation
SUA	Sokoine University of Agriculture
UNESCO	United Nations Educational, Scientific and Cultural Organization
URT	United Republic of Tanzania
WRBWB	Wami Ruvu Basin Water Board

Introduction

Higher education institutions plays an important role in providing high quality education and ensuring evidence-based policies and practices. These are key ingredients for the structural transformation required to achieve the United Nations' 2030 Agenda for Sustainable Development. Generally, majority of higher education institutions in the South are faced with inadequate learning infrastructures and poor research facilities to produce high-quality graduates, inadequate funds for high quality research and problems associated with less inclusive higher education (Tiessen and Grantham, 2017).

A sound, strategic investments in higher education and research lay the foundation for development of countries' intellectual resources, competent workforce and researchers. Therefore, mobility eductation programmes with emphasize in partnerships between Northern and Southern researchers are a powerful tool for studying research problems and for shaping development policies (Michel et al., 2013). International mobility programmes offers higher learning institutions prestige and a competitive edge in national and global arena.

Background of the UNESCO Chair and partnerships

The UNESCO chair on Ecohydrology and Transboundary Water Management of Sokoine University of Agriculture (SUA) Tanzania was approved way back in 2018 and become operational on 2019. The long term objective of this UNESCO chair being "***To Improve and Up-Scale Knowledge on Ecohydrology and Transboundary Water Management in the Eastern, Central and Southern Africa Region".***

To date the UNESCO has conducted two international trainings: (1) The 1st International Training on Ecohydrology in Tanzania: From solution to real implementation; and (2) The 2nd Intenational Training on Ecohydrology in Tanzania: "Tackling water scarcity through Ecohydrology". The chair is planning the 3rd training on applied Ecohydrology scheduled to take place around May, 2022.

Benefits of mobility programmes between the UNESCO chair and universities from the North

S/n	Institution	Country	Type of cooperation	Level of partnership
1	University of Algarve	Algarve	Students exchange programme	Erasmus Mundus+
2	Martin Luther	Germany	Staff exchange Programme	Erasmus Mundus+
3	University of Lodz	Poland	Student and staff exchange Programme	Polish Aid / Fellowship
4	University of Bonn	Germany	Funding for MSc students	German Research Foundation (DFG)

Success stories of the mobility programmes under North – South cooperation

- **Ecohydrology as Tool for River Basin and Riparian Vegetation Management**

This study aimed to ascertain the potential for Ecohydrology to the river ecosystem by examining riparian vegetation species and their distribution, anthropogenic activities

conducted within the riparian zone and their associated impacts both to riparian vegetation and the entire river ecosystem. It was found that Ecohyrology (nature based solution) plays a decisive role in the restoration of degraded river banks along Ngerengere river in Morogoro Municipality Tanzania. Documented riparian vegetation are found in Table 1.

Table 1: Major riparian vegetation along Ngerengere river

Category	Common name	Scientific name	Abundnce (%)
Grasses	Phragmites	*Phragmites mauritianus*	25
	Elephant grasses	*Pennisetum purpureum*	22
	Reeds	*Phragmites australis*	22
	Sedges	*Cyperus rotundus*	08
	Bulrush	*Typha domingensis*	03
Shrubs	Sesbania	*Sesbania sesban*	14
Trees	Ficus	*Ficus sycomorus*	06

As summarized in Table 1, riparian vegetation species ranging from grass type, shrubs and some higher trees. Ecohyrology is a nature based solution which is enhnancing retaining of these riverine plants along river Banks. Main athropogenic activities threatening the river and these plants includes agricultura, livestock keeping, sand and stone quarrying, ton ame just a few.

- **The economics and costs of water provision for watershed management**

This research estimated the economic value of Mindu Dam by providing public water in Morogoro Municipality in Tanzania. The study found that water treatment and supply is the main responsibility of Morogoro Urban Water and Sewerage Authority (MORUWASA). Due to the increasing population in Morogoro Municipality (URT, 2012, 2016) over the original estimates, its storage capacity has been declining and its catchment threatened by anthropogenic influences (MORUWASA and WRBWB, 2019). To make water suitable for consumption, MORUWASA initially installed a major treatment plant at Mafiga and Tumbaku booster station that operated until 2014 when Mambogo treatment plant started operation due to the increase in population and water demand. The operation profile and production capacities of the available water treatment devices are detailed in Table 2.

Table 2: Production capacities of MORUWASA water treatment plants

Plant	Daily water volume (m^3)	Daily volume (Litres)	Yearly volume (Litres)
Mafiga	27,000	27,000,000	9,882,000,000
Mambogo	6,000	6,000,000	2,196,000,000
Other sources	2,000	2,000,000	732,000,000
Total	**35,000**	**35,000,000**	**12,810,000,000**

As of 2020, 71.56% of the municipality population is under metered connection with a total coverage of 81% of established networks. This necessitates a quick water treatment. The biophysical treatment involves various devices (Table 3).

Table 3: Characterization of water treatment devices

Device	Reagent used	Purpose
Al Hypocride dozing pump	Aluminium Hypocride	Settling dissolved and suspended particles
$CaSO_4$ dozing pump	Calcium sulphate	Killing germs and bacteria in raw water
Algae dozing pump	Algae or lime	Quick settling and pH regulation

MORUWASA is also responsible water treatment cost, the initial, operating and maintenance costs. For instance the initial costs include equipment's purchasing and installation as shown in Table 4.

Table 4: Initial costs of water treatment

Device	Qty.	Unit price	Purchasing costs*	Installation cost*
Al Hypocride pump	2	70,000,0000	140,000,000	56,000,000.3
$CaSO_4$ dozing pump	2	60,000,000	120,000,000	48,000,000
Algae dozing pump	2	90,000,000	180,000,000	72,000,000
Total	**6**	**220,000,000**	**440,000,000**	**176,000,000**

- **Recession farming productivity in relation to hydro-climatic risk reduction**

This study analysed the productivity of recession farming in relation to hydro-climatic risk reduction in Kilombero Valley, Morogoro Tanzania. It focused on yield comparisons between recession farming practices and rain-fed agriculture and water variation in the valley. It was found that the total yield (maize and rice) in recession farming (2098.811 Kg/ha) is less than the total yield (maize and rice) in rain-fed agriculture (3224.782 Kg/ha) (Table 5). This is supported by high standard deviations in rain-fed agriculture (except in Mkula village).

Table 5: Average yields of maize and rice in Kilombero Valley, Morogoro Tanzania

Village	Crop Yield	Recession agriculture, Kg/ha, (Mean ± SD)	Rain-fed agriculture, Kg/ha, (Mean ± SD)
Mbingu	Maize	1045.5 ± 896.546	70.839 ± 240.502
	Rice	0.0000 ± 0.0000	1926.67 ±1966.08
Idete	Maize	835.839 ± 667.4574	175.661 ± 500.1
	Rice	40.0000 ± 184.951	1496.67 ± 1391.72
Minepa	Maize	306.0000 ± 743.563	147.339 ± 486.465
	Rice	1913.33 ± 2124.039	2416.67 ± 3567.292
Mkula	Maize	320.739 ± 605.234	88.4 ± 465.295
	Rice	826.67 ± 519.903	943.33 ± 485.431
Njage	Maize	573.461 ± 351.414	170 ± 456
	Rice	203.33 ± 390.829	1238.33 ± 911.392

- **Characterization on water flow along Kilombero River Sub-Basin**

This study characterised annual water flow variation and mean monthly water flow at four gagging stations along Kilombero River Sub-Basin (Figure 1). The water flows for both stations (except Lwipa station) indicated a slight decreasing trend as indicated by negative slopes.

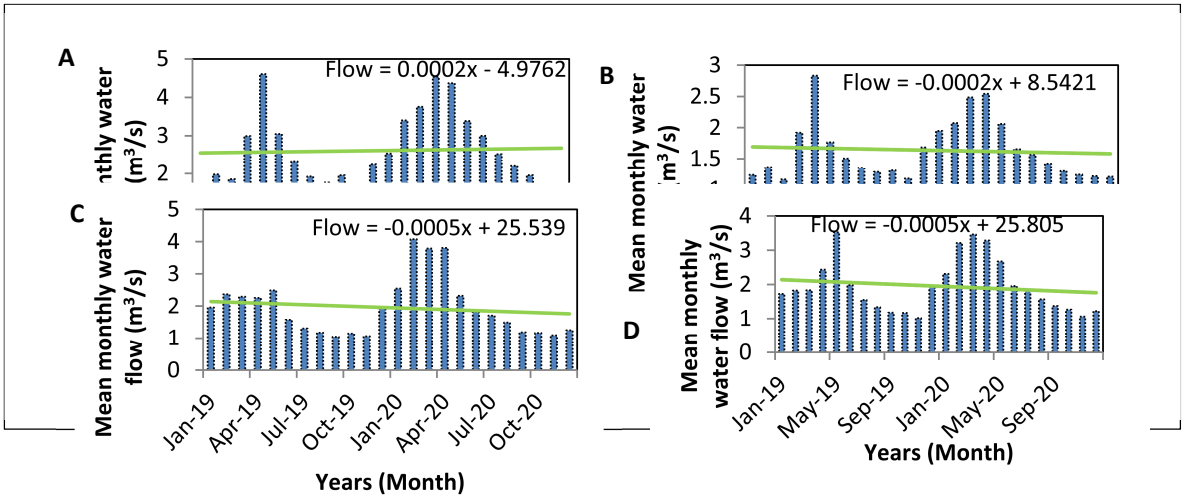

Figure 1: Trend in mean monthly water flow at **A:** Lwipa river; **B:** Mgugwe river; **C:** Mnyere river; and **D:** Mpanga river gagging stations

Furthermore, this study that the peak flow occurs during the long rains (March and April) while low flows are experienced during the dry period, July to November (Figure 2).

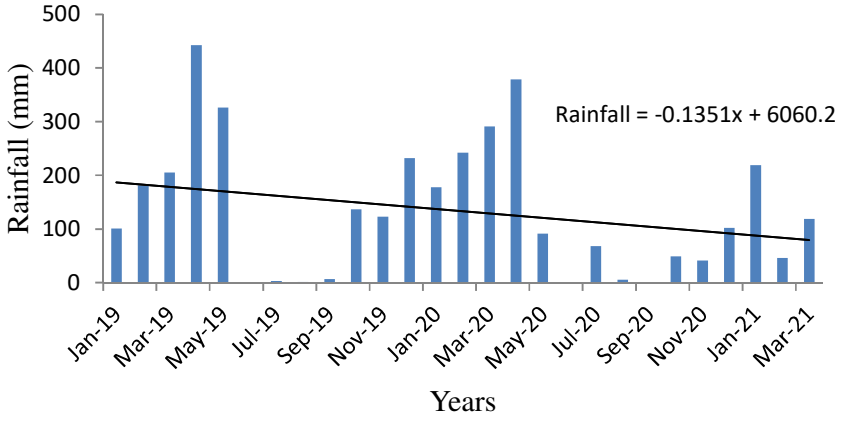

Figure 2: Monthly sum rainfall in the Kilombero Valley flood plain

Challenges facing mobility programmes

- COVID 19 has restricted significantly movements of scholars from the North to South and vice versa. Similarly, the global pandemic has reduced funding and sponsorship from the North towards the South

- Delayed formal procedures for signing cooperation between different higher learning institutions. Signing memorundum of understanding (MOU) takes too long thereby denying some of the opportunities including project funds.

- Difficulties in finding a corresponding partner from the North. One of the challenges facing many higher learning instititutions in the South is lack of access to formal guidelines or policies of identifying potential partners. It also includes lack of in-person contact, inadequate financial resources for travel and applied projects.

Conclusion

The current policy brief is an indicator about how the global North and South complement each other. While the North is endowed with financial, technical and well -trained manpower for research and capacity development, the South is blassed with vast land and alot of environmental problems for research opportunities.

Recommendations

- Mobility programmes should focus on ensuring the effectiveness of the theory of comperative advantage. It is from this link where the mutual relationship between the North and South will be realised

- Research fund is still a problem in the South. Therefore, any partnership between the North and South should focus on long term plans for solving this financial inequality by pumping in financial resources aimed at solving practical problems

- Under this North –South cooperation áreas for research are dictated by insitutions in the North. Therefore, higher leansing institutions in the South should be given opportunities to identify relevant problems existing in the global South

Policy Implications

- Mobility programmes, students and staff exchange programmes enables movements of skills, knoweldge and funds from the North to the South. In turn the theory of comperative advance is therefore maximized.

- Working with researchers from areas where problems are severely experienced enables a comprehensive and grounded perspective of development challenges. Therefore, mobility programmes enhances intelectuals from the North and their counterparts from the South to conduct meaningful research on environmental, social and economic problems .

- Cooperation through mobility programmes are crucial due to the differences in terms of natural endowments between the two blocks (i.e. the North and South).

- Mobility programmes enable North and South experts to pool their resources together and benefit from knowledge of diverse perspectives.

- Partnerships between institutions from the North and those from the South enables movement of funds from one side to the other and ultimately reducing the magnitude of the impacts of environmental, social and economic problems.

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