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## **Editorial comment**

This special issue is a compilation of papers written by researchers and graduate students from the Okavango Research Institute, University of Botswana, Maun. The Institute conducts applied research spreading across five research domains or programmes that are multi-disciplinary in approach, and transcending traditional academic boundaries. The programmes include the following:

1. *The Ecosystem Dynamics* programme, which comprises eco-hydrology, vegetation, fauna, ecosystem ecology, and human ecology sub-themes, aims to advance scientific understanding of wetland and dryland ecosystems and their interdependence by developing statistical and dynamic models. It also aims at improving management capacity through the implementation of ecosystem models and engagement of managers and policy makers in scenario-testing.

2. *The Ecosystem Services (ES)* programme aims to advance scientific understanding of four specific areas: the dynamics of change in ES in order to develop sustainable management tools; the economic value of ES in order to contribute to their sustainable management; the inter-linkages between ES and human well-being in order to formulate appropriate policies and strategies for poverty alleviation; and the ES governance by developing appropriate institutions.

3. *The Water Resources Management (WRM)* programme addresses research on the drivers of change in, and the state of, water resources in Botswana, southern Africa and beyond. The WRM programme focuses on water resources governance which includes water privatisation, planning, development and distribution amidst competing demands at various spatial scales. The WRM programme specifically places an emphasis on the management of risk, security and adaptation to climate variability and change as well the ecological health and sustainability of water use whilst safeguarding the functions and services for humans and the environment. The WRM programme is also involved in the development and adoption of technologies for water use, reuse, recycling, sanitation and health that interface effectively with cultural and indigenous knowledge systems.

4. *The Sustainable Tourism* programme conducts tourism research on the economic impacts of tourism; the socio-cultural aspects of tourism; the archaeological and heritage aspects of tourism; the environmental impacts of tourism as well as the business and marketing of tourism; hospitality and interpretation; and recreation, leisure and sports tourism.

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5. *The Climate Change* programme objectives are to contribute to climate change science through studies of palaeo-climate variability and its drivers based on palaeo-climatic and hydro-climatic analyses; produce updated, locally and regionally relevant information on climate trends and climate conditions in the future (at various temporal and spatial scales); advance the understanding of hydrological and ecological processes in the Okavango Delta and other wetlands that determine the magnitude and extent of climate change impacts by developing and running quantitative impact models; contribute to the understanding of vulnerabilities of people to climate change and the nature of institutions for governance; systematize knowledge on indigenous coping strategies in order to inform adaptation actions and policies and assist in the formulation of management strategies.

The papers presented in this special issue align to three main sub-themes, namely *Natural Environment*; *Tourism and Environment*; and *Contemporary Socio-economic and Cultural Issues* as follows:

The *Natural Environment* subtheme with three articles, one describes the characteristics of heat waves in Botswana, another water balance and quality across the Okavango Delta and the third population structure of riparian tree species in the Delta. The current natural environment in the Delta, compared to other wetlands, is in a relatively pristine condition despite emerging human pressure on its natural resources, especially water. The emerging pressure on the ecosystem may be exacerbated by climate change which may, in turn, directly affect both the quantity and quality of the water coming into the Okavango Delta.

Increasing temperatures due to climate change, Oliver Moses's paper, may likely affect various aspects of development in the country, including human and animal health, agriculture, and the functioning of the Delta ecosystem, which is currently a lucrative tourist attraction. Predictions indicate that less water will be flowing into the Delta in the future due to climate change.

With increasing temperatures the Delta water will be subjected to higher evapotranspiration. Gondwe and colleagues monitored the quantity and quality of the water across the Delta in order to generate baseline understanding of some ecosystem processes under "pristine" conditions amid predictions of harsh climate change and increasing pressure on natural resources, especially water, as the human population in the upper Okavango basin (Angola and Namibia) continues to grow rapidly.

Similarly, Tsheboeng and colleagues indicate in their paper that there is need to understand the characteristics of the riparian tree species in the Delta which perform an important role of purifying the surface water of salts through transpiration. The paper concludes that most of the tree species studied show stable population structures, which confirms the pristine condition of the Delta. Efforts to manage and conserve the woodland tree species in the Delta should aim at maintaining the status quo, which is the best known functioning condition for the ecosystem.

Wildlife and nature based tourism in the Okavango Delta and surrounding areas continues to play a very important role in the national economy of Botswana, contributing an estimated 7.6% of the country's GDP. The first article under the *Tourism and Environment* subtheme written by Stone and her team reviews the development of the tourism industry in Botswana since independence in 1966. The article highlights several benefits the industry has provided to the host communities and the country at large. These include job opportunities, local economic development, poverty alleviation and others. To enhance further development of the tourism sector, the paper beckons on the industry to address the challenges it faces, including tourism product diversification.

Despite the rapid development of the tourism industry which has benefited many people in the

area socio-economically and culturally, Thakadu and colleagues indicate in their paper that the distribution of important information on some various issues remains a challenge for many communities in and around the Okavango Delta. While access to flood risk information in the Okavango Delta communities has been described as adequate, Thakadu and colleagues opine that there are still concerns on message timing and exaggerated early warnings that raise false alarms, with the potential of defeating future risk communications. They also indicate that social media presents an additional channel to target young people in disseminating risk/disaster information in the area.

Rutina and colleagues observe in their article that inappropriate use of agrochemicals by farmers (due to poor access to information) poses a serious threat to vultures and other animal species in the region. Their paper further indicates that poachers have been reported to deliberately use illegally obtained agrochemicals to kill vultures because they reveal poaching activities by congregating at wildlife carcasses left by the poachers.

Another challenging issue in the Delta region is the provision of safe water to communities. According to Ramolefhe and her team, many farming households in the region still have little or no access to safe water leading to frequent outbreaks of waterborne diseases, especially diarrhoea which mainly affects children. The human health issue of malaria is addressed in the paper by Maphane and colleagues. They observe that malaria is a persistent disease in the Delta region which may be associated with poor application of local knowledge to curb the spread of the disease. They opine that the use of local knowledge may help community people to avoid livelihood activities which may increase their exposure to *Anopheles* mosquitoes, the vector of the malaria parasite. The article concludes that because most of their respondents perceived water-dependent livelihood activities such as fishing to be riskier for malarial exposure, malaria prevention programmes should promote other less risky livelihood activities in all communities in and around the Delta area.

Articles covering the *Contemporary Socio-economic and Cultural Issues* subtheme address the contemporary issues of unemployment, transactional sex relations and marital misconduct which may be associated with recent development (or lack of it) in the area/region. Despite the boom in tourism facilities which have benefited many people in the area, as revealed by Kolawole and colleagues, Kemiso and Kolawole's paper in its assessment of job opportunities has revealed high unemployment rates among youth in and around the Delta, mainly due to their low level of education, poor entrepreneurial skills and access to information. In a similar vein, the paper by Selepe and co-authors indicate that as many households are still inadequately providing for their children, especially girls, transactional sex relations (TSR) seem to be increasing in tertiary education centres in Maun. The TSR phenomenon and its driving factors are currently poorly understood making it difficult to design appropriate and effective interventions to address the issue.

Lastly, Jankey and colleagues' paper argues that as access to mobile telecommunication networks has become a necessity rather than a luxury, the boom of transactional sex relations in all age groups fuelled by cell phone use has probably increased marital misconducts, especially intimate partner violence (IPV) and gender based violence (GBV), in the Delta area and Botswana as a whole. Jankey and colleagues conclude that there is an urgent need for public awareness on proper use of cell phones in order to address IPV and GBV issues in the country.