

**INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION
ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)**

**Geneva, Switzerland
7-8 November 2019**

Contribution by Botswana

to the CSTD 2019-2020 priority theme on “Exploring space technologies for sustainable development and the benefits of international research collaboration in this context

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UNCTAD Request for inputs for CSTD 2019-20 Priority Theme 2: "Exploring Space Technologies for Sustainable Development and the Benefits of International Research Collaboration in this Context"

1. Can you give examples of projects/policies in your country aimed at using space technologies for sustainable development? What are the main challenges confronted while trying to implement these projects/policies in your country or region?

Botswana uses spatial technologies in different projects covering areas such as land cover; land use; infrastructure development; wildlife; earthquakes and tremors studies, mineral exploration, vegetation and water measurements, etc.

In **agriculture** for example, severity of drought can be predicted or established using space technologies. Space technologies are also used to predict crop harvest and changes agricultural patterns.

Space technologies are also used for **mining and safety** like mineral prospecting and disaster management e.g. detecting earth tremors and giving caution to those in affected areas.

Making and revising maps in Botswana use space technologies.

Environmental management uses space technologies to monitor natural resources distribution, use, and those conserved to inform decision making.

For Climate Change:

- a) using remote sensing rainfall data at 1km grid for climate change projections and also climate change downscaling to scales relevant for policy decisions. These projections and downscaling are also used as input for scenario analysis.
- b) yield mapping from satellite
- c) range monitoring, using NDVI and other vegetable condition indices.
- d) rainfall forecast using cloud top temperature obtained from satellite.

Challenges

- There are few people who are well trained space technology.
- The space technology field needs specialised infrastructure which is lacking in the country, and

- Experts are needed to interpret analysed data but they are inadequate.

2. Can you provide examples of policies/projects/initiatives aimed at promoting international research collaboration in the area of space technologies for sustainable development? What are the main challenges confronted in implementing these projects?

Botswana is collaborating with a number of countries, either bilaterally, as part of SADC region or in some cases, as part of a few countries from SADC. Below are examples

- Botswana through the African Union collaborates with Global Monitoring for Environment and Security (GMES) under Africa - EU partnership in **capacity building on space technologies**.
- Through the **AVN & SKA**, for receiving space science data.
- Botswana also participates in the **SADC Space Technology**.
- **AU**: review Africa Space Tech strategy
- RCMRD in Kenya (mapping centre): collaboration of east and southern Africa on **Space Technologies and Remote Sensing (RS)**
- Botswana also in GIS & RS (UB – Environmental Science; Faculty of Science; BGI, Surveys and Mapping; Botswana Association of Geomatics) learning from India on **engaging communities for traditional ecological knowledge** as well as igniting space science interest in secondary school students.
- ERDAS – Hexagon and ARC GIS – ESRI (USA): helping Botswana with **free software to teach ST and GIS** at children at a tender age.

3. What are the actions that the international community, including the CSTD, can take to leverage the potential of space technologies for sustainable development, including through international research collaboration in this context? Can you give any success stories in this regard from your country or region?

i) **SASSCAL** (under SADC): Master's degree courses on ST offered in these countries: Namibia – National University of Science & Technology; Botswana - UB, Zambia – University of Zambia and South Africa – Cape Peninsula University of Technology.

- Under SASSCAL 2: the Master's courses are planned to be introduced at the following universities: University of Venda and University of North West (South Africa) and University of Eduardo Do Santos (Angola).
- Continuous land cover analysis for all countries is conducted as well as other countries to learn from South Africa sustainable commercial farming and to learn good land management practices (equitable land tenure) from Botswana.
- The other countries to learn wildlife farming, conservation and tourism from Namibia.

ii) **WEMAST** (under SADC) – through EU – AU partnership: Zambia, Angola, South Africa, Zimbabwe and Botswana collaborating on sustainable use of shared waters.

- learning from India (and Australia): involving communities in treatment of brown water to recharge underground water as well as train communities on **simplified data collection** (crowd sourcing) **using mobile phones** GPS e.g. to report earth tremors.
- **Underground water recharge**– countries under this partnership need underground water refill (currently water running off before ground water recharge due to heavy rains or flood received) therefore, partners working on strategies to check dams for percolation to take place
- Botswana (UB – Environmental Science) working with Cyprus, Australia, India, UK and USA on **prevention of water pollution**.

4. Could you suggest some contact persons of the nodal agency responsible for projects/policies, related space technologies for sustainable development and international research collaboration in this context as well as any experts (from academia, private sector, civil society or government) dealing with projects in this area? We might contact them directly for further inputs or invite some of them as speakers for the CSTD inter-sessional panel and annual session.

- ❖ Pofessor O. Dube, Department of Environmental Science, Faculty of Science University of Botswana
- ❖ Dr Joyce Maphanyane (UB) – overseer of space technologies in Botswana who works with teams in different projects.
- ✚ Dr Kelebogile Mfundisi (ORI): sustainable use of shared waters & flooding (underground water recharge); ground water recharge.
- ✚ Mr Abednigo Maphuru (Surveys & Mapping): Africa Space Technology Strategy & SADC Strategy, RCMRD, map revision, land cover changes, land management - LAPCAS, land management administration with Land Boards
- ✚ Mrs Lesego Peter (Botswana Geo-Science Institute): Africa Space Technology Strategy & SADC Strategy, RCMRD, map revision, land cover changes, land management - LAPCAS, land management administration with Land Boards
- ✚ Dr Tshiamo Motshegwa (UB Comp Sc): ground water recharge, high performance computing (infrastructure) for big data
- ✚ Prof N. Batisani- BITRI- Climate Change

5. Do you have any documentation, references, or reports on the specific examples on the priority theme in your country or region?

>Report of Botswana Space Science Strategy

>Botswana National Spatial Data Infrastructure – (Government white paper)