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Space Technology and Applications for Monitoring and Protecting Biodiversity and Ecosystems: A New Thematic Priority of the United Nations Programme on Space Applications

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Overview

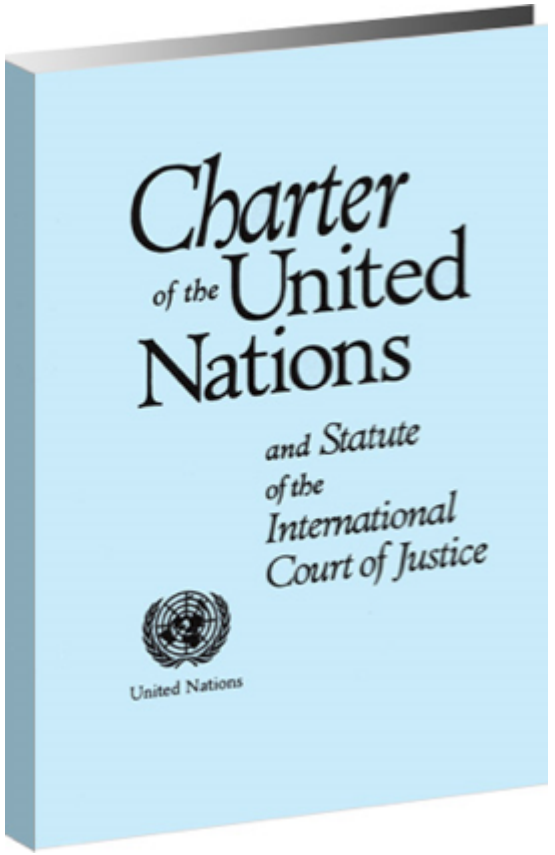
I. UN Programme on Space Applications
II. State of Biodiversity and Ecosystems
III. Space Solutions for Biodiversity and Ecosystems
IV. UN/Kenya Conference
V. Conclusions

Note: United Nations documents quoted in this paper are available from the website of the Office for Outer Space Affairs at www.unoosa.org and from the Official Document System of the United Nations at documents.un.org.

Disclaimer: The views expressed in this paper are purely those of the author and do not necessarily reflect the position of the United Nations and its Office for Outer Space Affairs.

United Nations and Outer Space

- Article 1
  - *Maintain international peace and security*;
  - *Develop friendly relations among nations* ... and to take other appropriate measures to strengthen universal peace;
  - *Achieve international co-operation in solving international problems of an economic, social, cultural, or humanitarian character* ...; and
  - *Be a centre for harmonizing the actions of nations* in the attainment of these common ends.
- Article 56
  - Take *joint and separate action in cooperation* with the Organization for the achievement of these purposes ...



As cited in para. 35 of the report of the Ad Hoc COPUOS meeting (A/4141)

Office for Outer Space Affairs

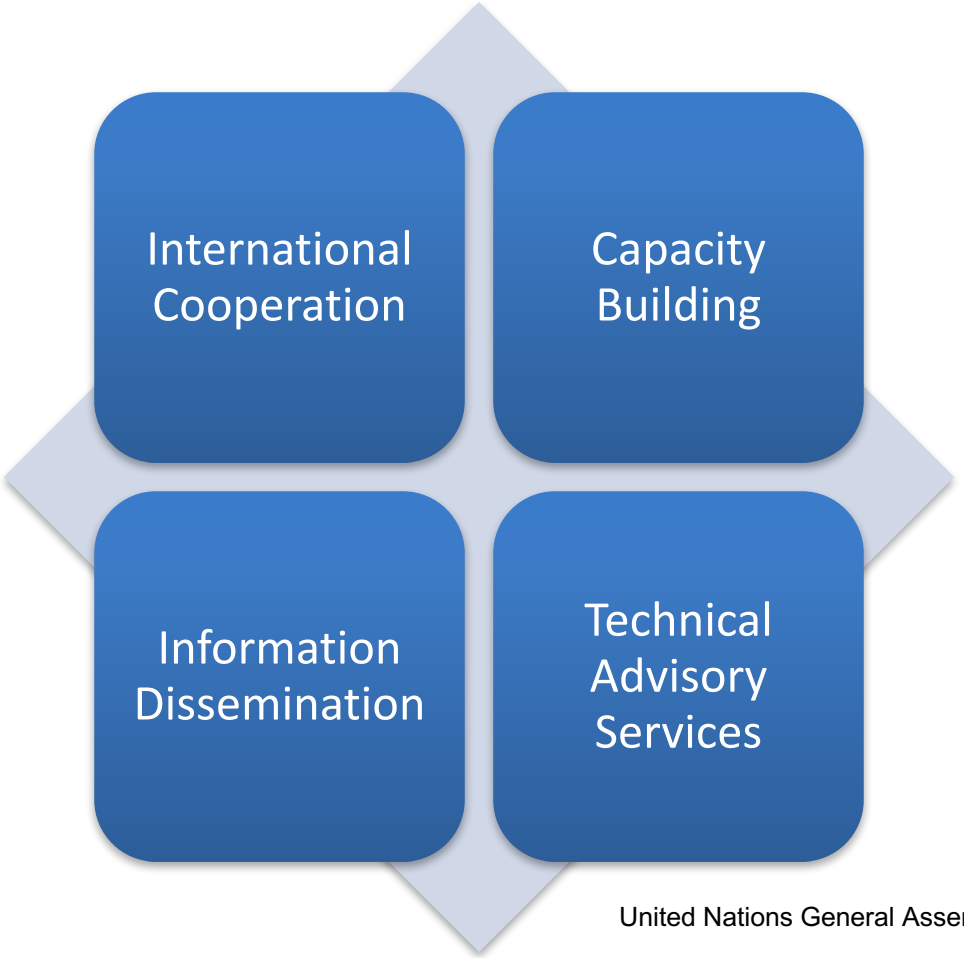
- Originated as a small expert unit in the UN Secretariat to service the Ad Hoc COPUOS meeting
- 25 staff members (scientists, lawyers, political scientists), plus several seconded staff and interns

The United Nations Office for Outer Space Affairs (OOSA) is responsible for promoting international cooperation in the peaceful uses of outer space and for assisting Member States, in particular the developing countries, in using space science, technology and its applications

Programme on Space Applications

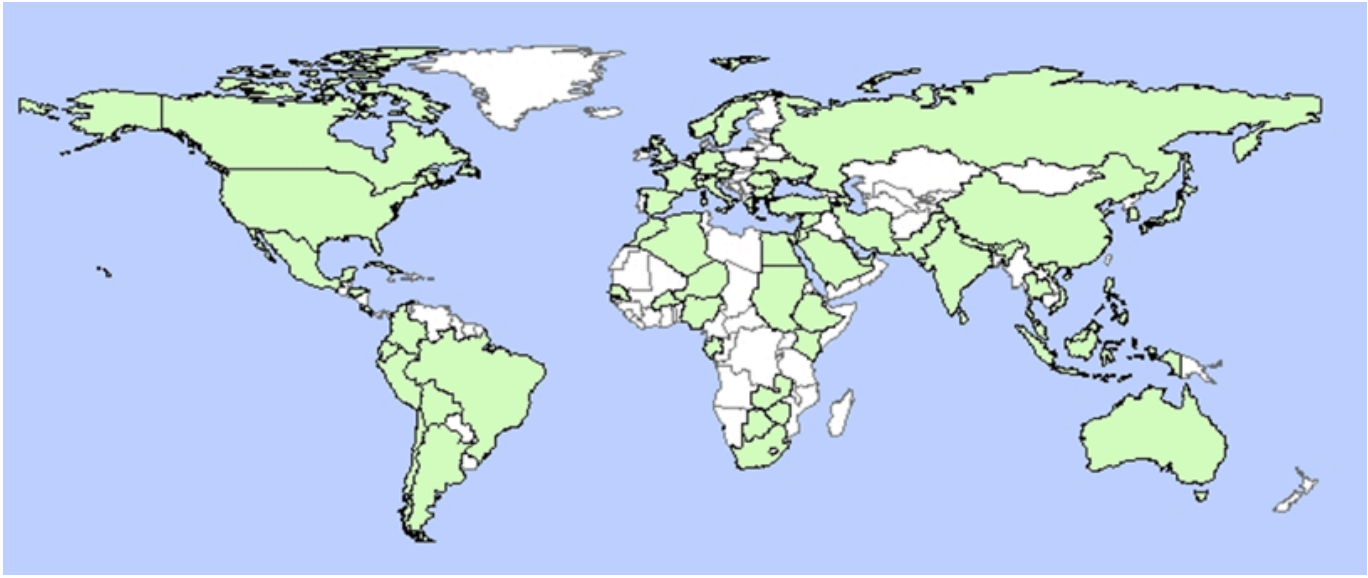
- Supports capacity building in space science, technology and its applications
- Established in response to recommendations of the first UNISPACE conference in 1968
- Operational from 1971 and implemented by UNOOSA
- Strengthened mandates as a result of the discussions at the UNISPACE conferences held in 1982 and 1999

Programme Mandate



United Nations General Assembly Resolution 37/90, para. 7

Programme Activities 1971-2014



- 305 Expert Meetings/Seminars/Workshops/Conferences
- 75 countries, more than 21000 participants
- Topics covered: Biodiversity/Ecosystems (new), Climate Change, Disaster Management, Environmental Monitoring and Natural Resource Management, Global Health, Global Navigation Satellite Systems, Satellite Communications, Basic Space Science Initiative (BSSI), Basic Space Technology Initiative (BSTI), Human Space Technology Initiative (HSTI)

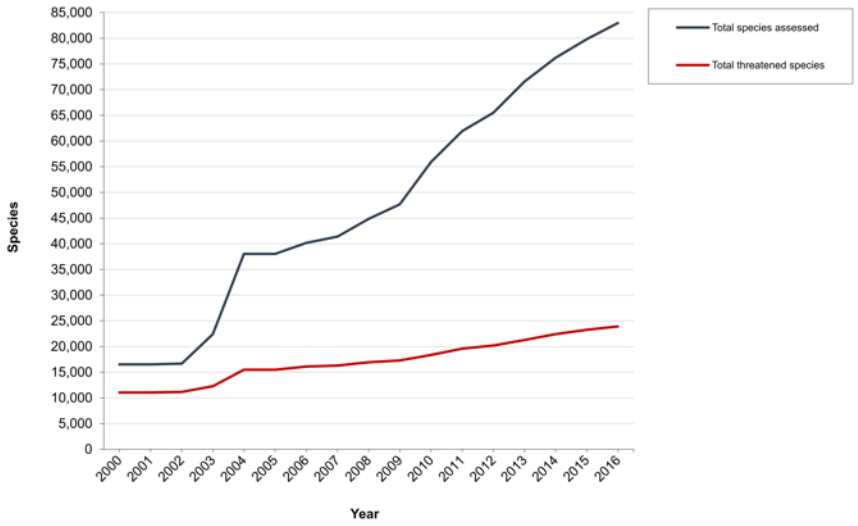
Biodiversity and Ecosystems

- Biodiversity is the variation of life within and across species and ecosystems
- Biodiversity contributes to the functioning of ecosystems and raises their performance in valuable ways
- Ecosystem services provide, regulate, support, and have a cultural function

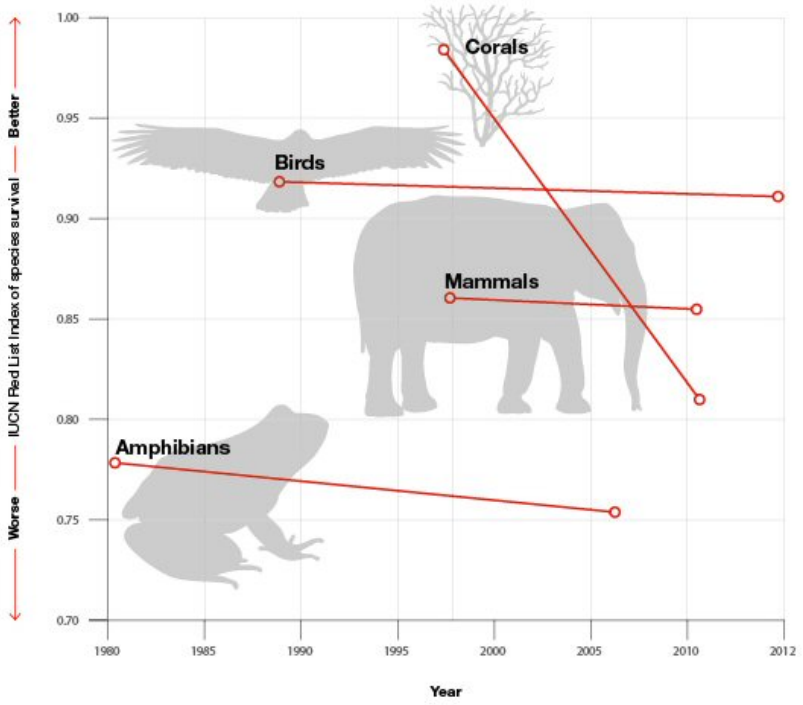
Transforming our world: 2030 Agenda For Sustainable Development

Agenda 2030 & Sustainable Development Goals

Global Status of Biodiversity



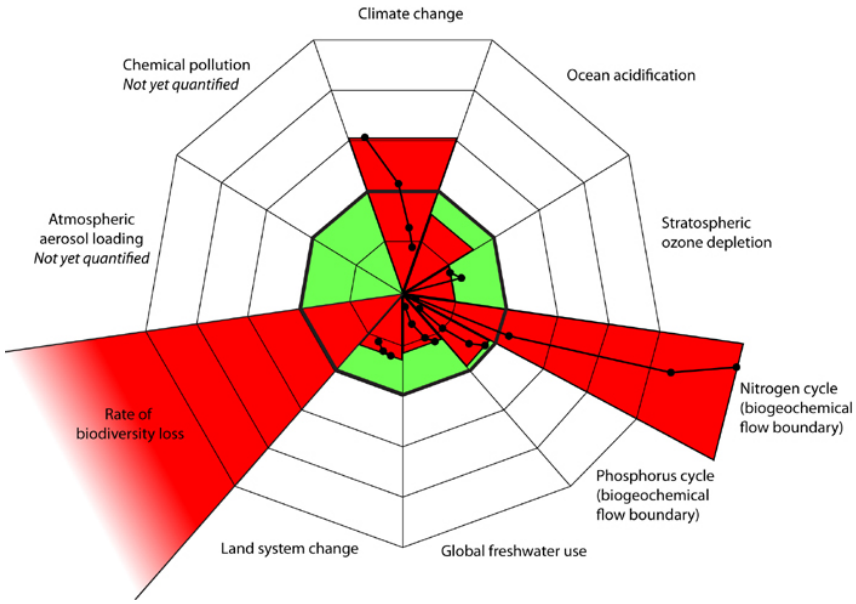
Number of species assessed and number of species threatened (2000–2016) (Source IUCN red list 2016)



Extinction risk of various species (Source IUCN red list 2016)

Alarming State of Affairs

- Planetary boundaries
- **Boundary:** Annual species extinction rate no more than 10 per million per year
- **Current level:** At least 100 per million per year
- **Diagnosis:** Boundary far exceeded
- Sixth great extinction



Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin, III, E. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. Schellnhuber, B. Nykvist, C. A. De Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. Foley. 2009. Planetary boundaries:exploring the safe operating space for humanity. Ecology and Society 14(2): 32

Major Reasons for Biodiversity Loss

Encroachment & Deforestation

Source: http://blog.worldagroforestry.org/wp-content/uploads/2012/12/oil-palm-plantation-klum1.jpg

Demand Driven Poaching and Illegal Trade

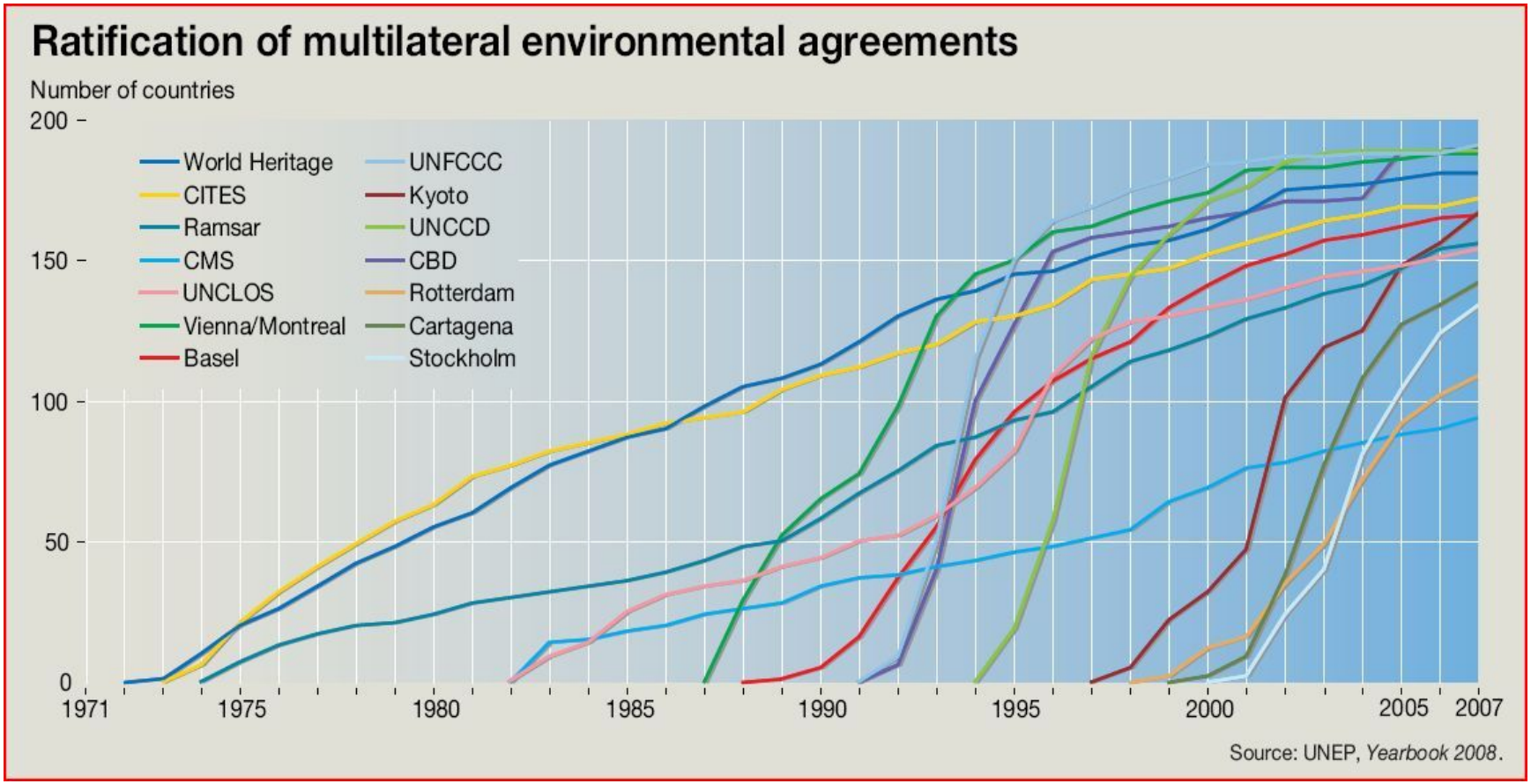
Source: CNN

Demand Driven Poaching

- "Last year, 1175 rhinos were poached in South Africa, up from just 13 in 2007."
- "In 2014, the United Nations estimated the illegal wildlife trade to be worth between $50 billion and $150 billion annually."
- "Black rhino numbers have shrunk by 96 % due to poaching."

Source: Foreign Policy 09/10 2016, p. 37, "Do you Have Any Tigers to Declare"

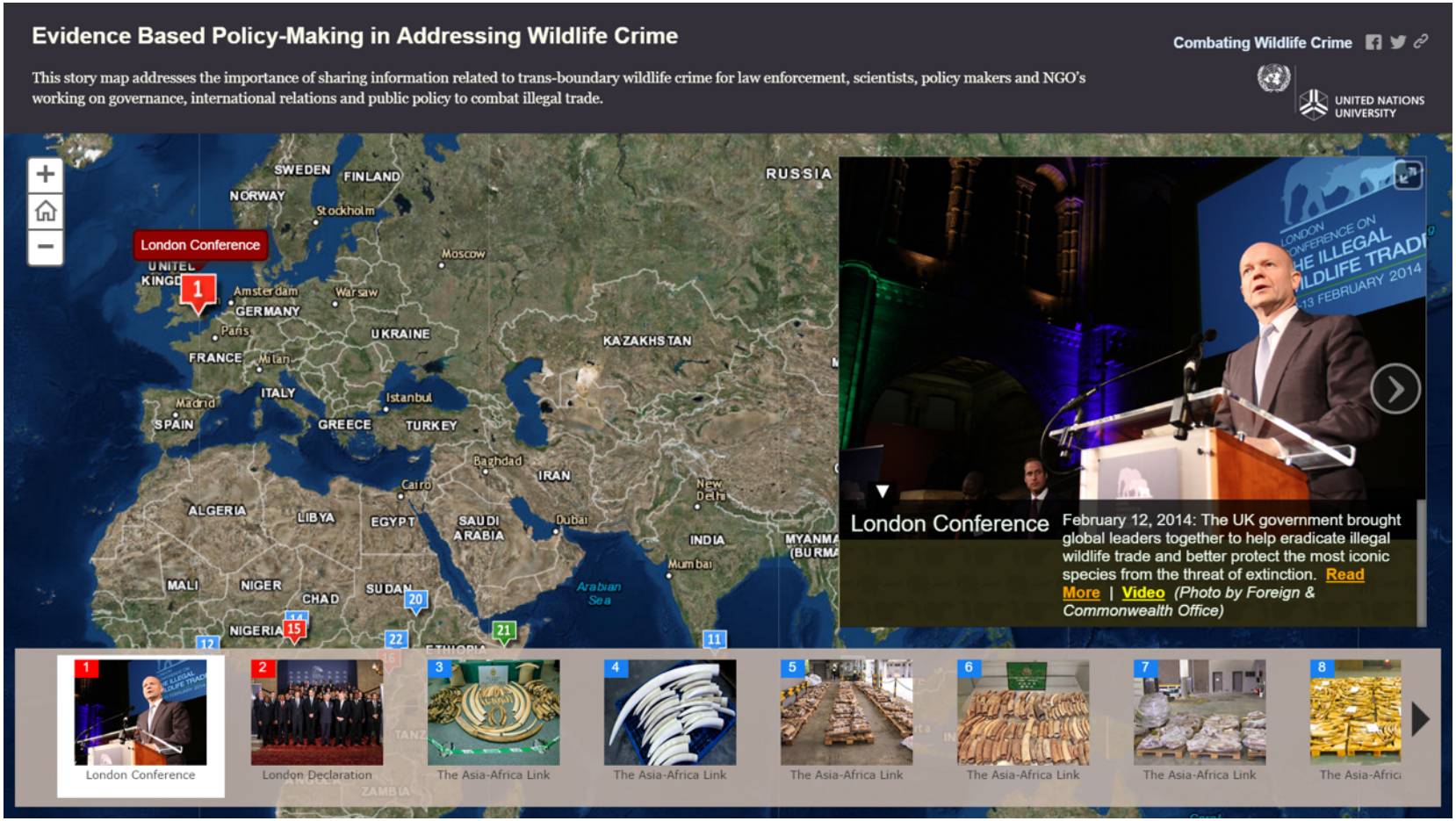
Multilateral Treaties



Action Requires Evidence-based Policies

- Case 1 – No evidence and no policy – Information doesn't exist for formulating policies
- Case 2 – Policy based evidence – Information exists but is not used for decision making
- Case 3 – Evidence based policy – Decision based on scientific evidence
- Need for accurate geospatial data and technology for real time monitoring!

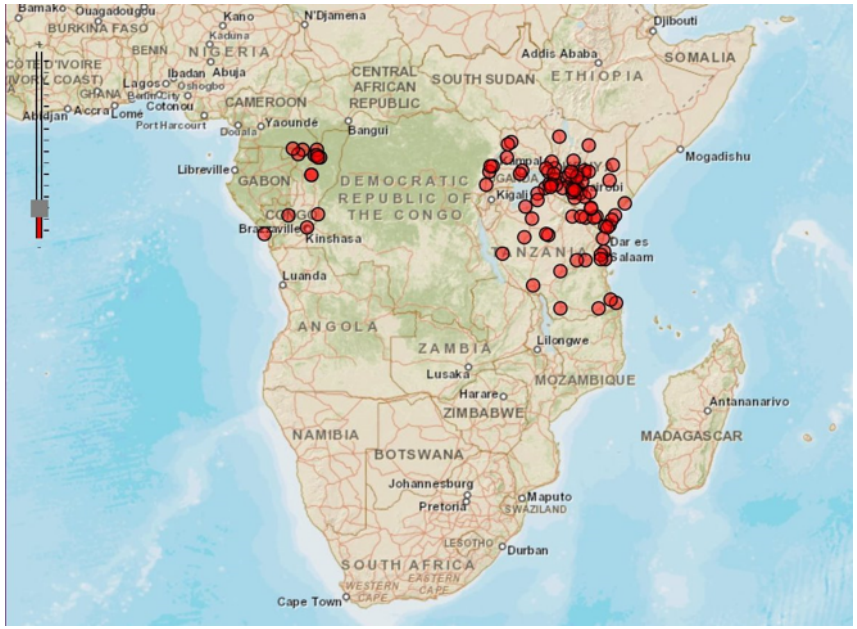
Action Requires Evidence-based Policies



2030 Agenda: Relevance of Space Technology

UNOOSA-UNU Discussions

- In 2010 United Nations University (UNU) implemented the Wildlife Enforcement Monitoring System (WEMS) project in Africa to address information gaps on illegal trade of wild flora and fauna in Africa.
- UNOOSA to provide expert advise on the use of spatial information for enforcement support.
- Discussions between UNOOSA and UNU identified the need for bringing together multiple stakeholders working on addressing wildlife crime including Governments, International Agencies, NGO's and Industries in Asia and Africa.



Bridging Stakeholders in Asia and Africa
-Tokyo Conference on Combating Wildlife Crime – 3rd March 2014

Tokyo Conference on Combating Wildlife Crime

Linking Space & Wildlife Community

Supporting in Space technology, geo-spatial laws and policies

Identifying champions

Engaging Policy makers, technocrats and funding agencies

Integrating spatial technology for enforcement purposes

Policy level accommodation

*International Consortium for Combating Wildlife Crime (ICCWC) is a consortium comprising of UNODC, WCO, INTERPOL, CITES Secretariat and World Bank

United Nations/Kenya Conference on Space Technology and Applications for Wildlife Management and Protecting Biodiversity

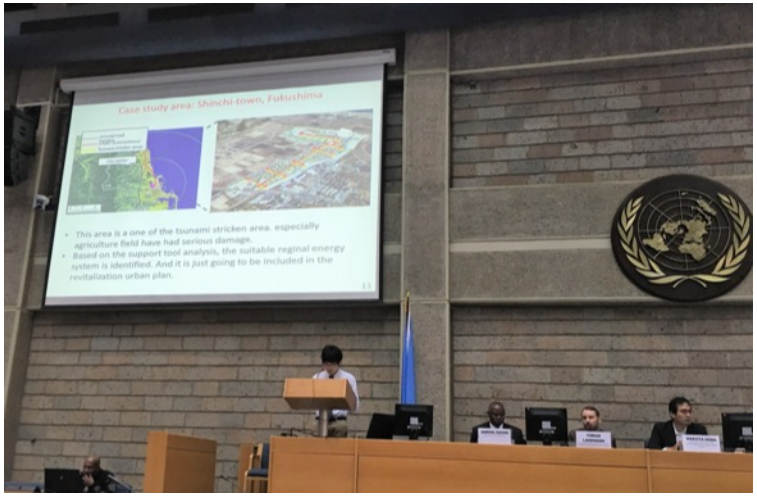
27-30 JUNE 2016, UNITED NATIONS OFFICE AT NAIROBI, NAIROBI, KENYA

Organized by the United Nations Office for Outer Space Affairs
and the Government of the Republic of Kenya
supported by the European Space Agency
and hosted by the United Nations Environment Programme (UNEP)

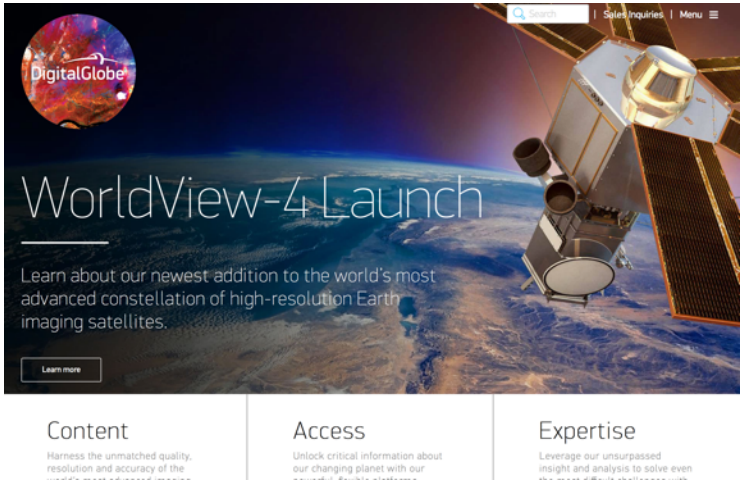
UNEP UNODC United Nations Office on Drugs and Crime NACOSTI esa DigitalGlobe LUSAKA AGREEMENT TASK FORCE

United Nations/Kenya Conference

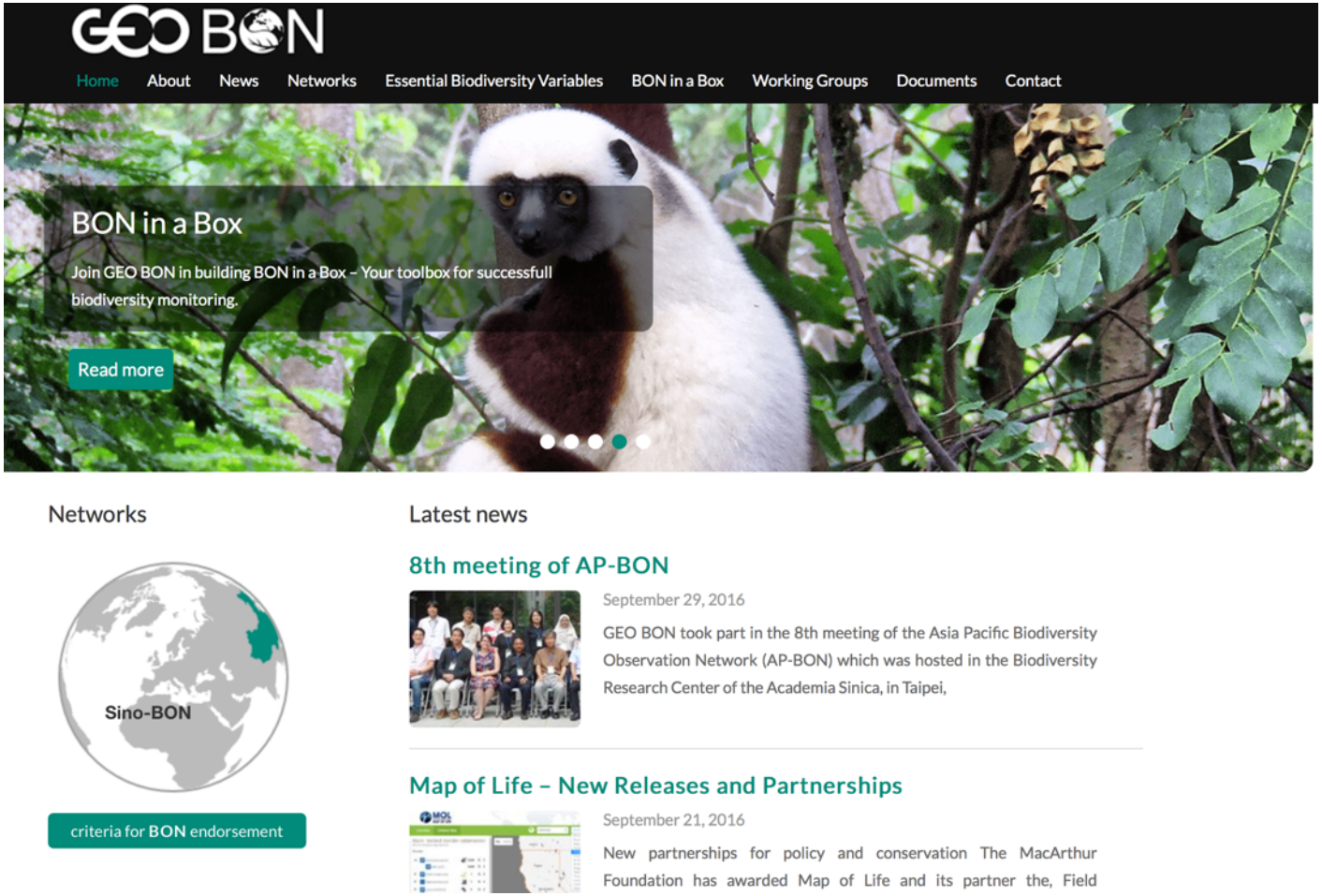
- UN/Kenya Conference on Space Technology and Applications for Wildlife Management and Protecting Biodiversity, 27-30 June, 2016 at UNEP in Nairobi
- 300 delegates from 29 countries: scientists, policy makers, industrial representatives and NGOs
- ESA, UNEP, UNODC, UNOOSA, UNDP, INTERPOL, CITES, World Bank
- Lusaka Agreement Task Force and ASEAN representatives



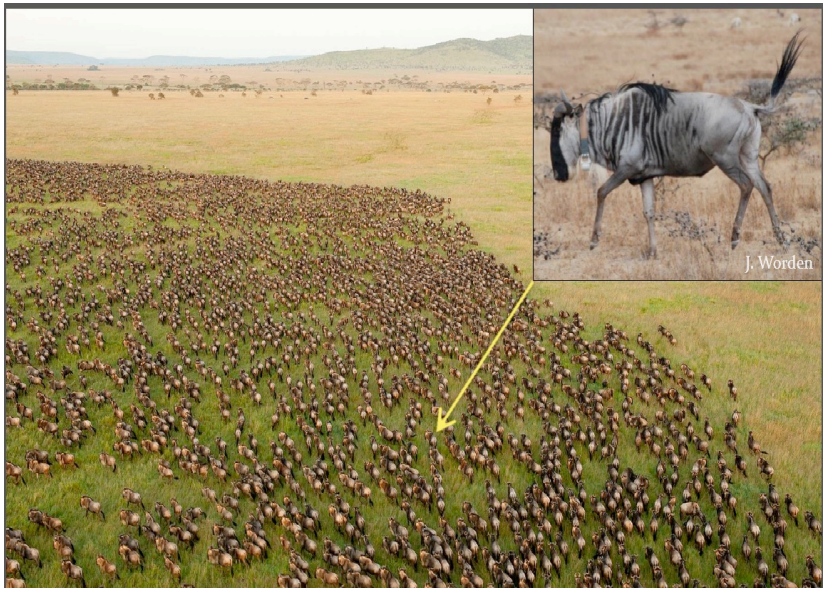
Space for Biodiversity/Ecosystems

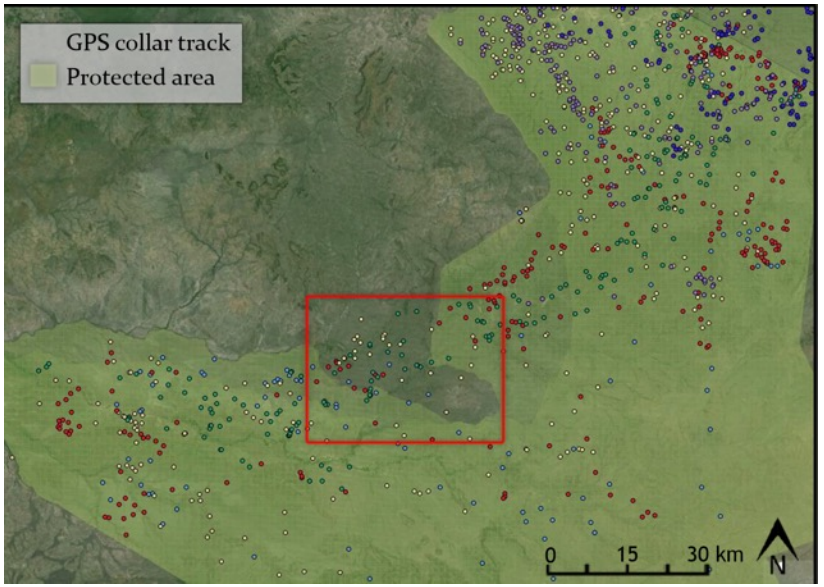


GEO BON – Essential Biodiversity Variables



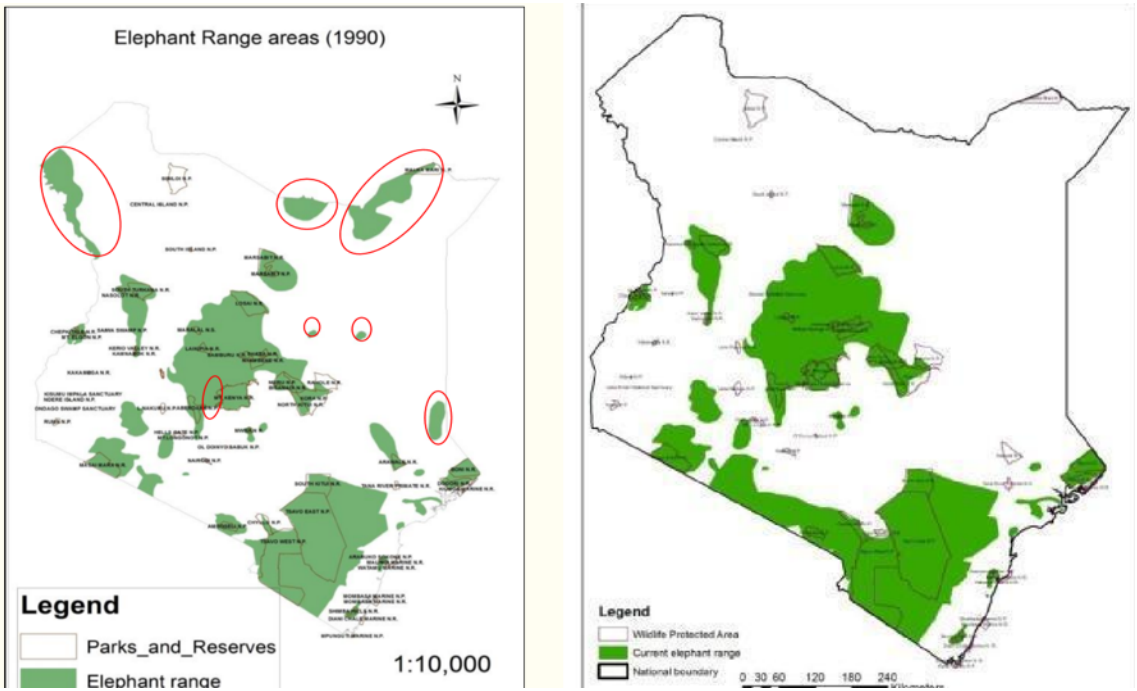
GPS tracking of animals in Serengeti National Park





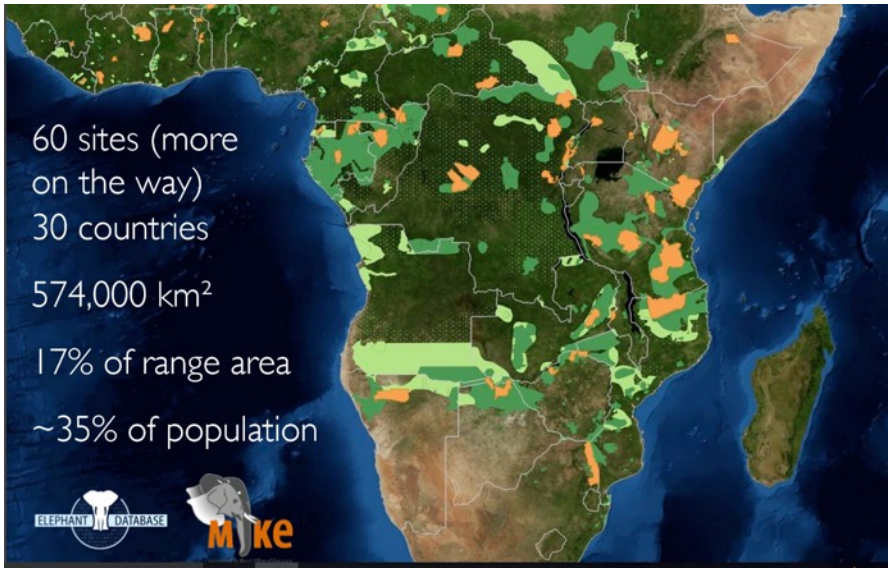
- Source: Lacey Hughey Douglas McCauley University of California, Santa Barbara, *The gnu frontier: Advancing behavioural ecology with remote sensing ,* presented at the Kenya/United Nations conference on Space technology and application for wildlife Management; 27-30 June 2016

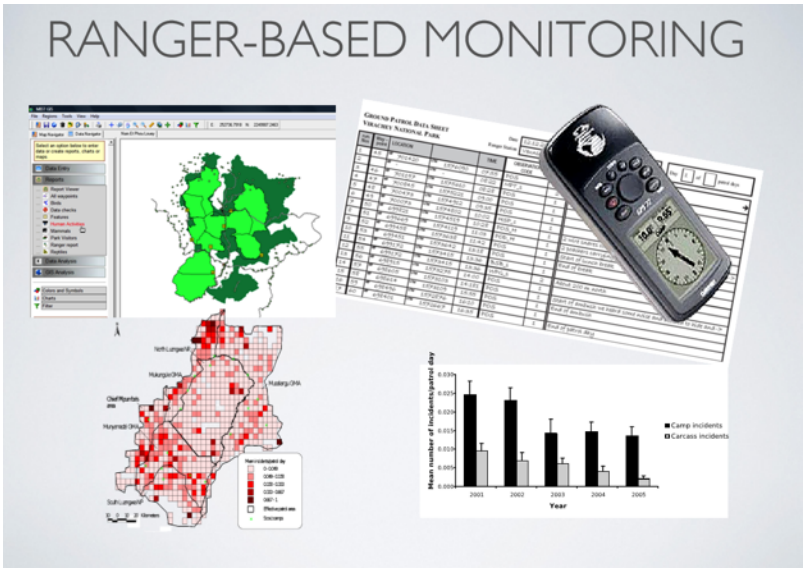
Changes in elephant range areas (1990-2015)



- Source: Sospeter Kiambi (2016) *Population status for elephants in Kenya*, presented at the Kenya/United Nations conference on Space technology and application for wildlife Management; 27-30 June 2016

Monitoring of Illegal Killing of Elephants (MIKE)

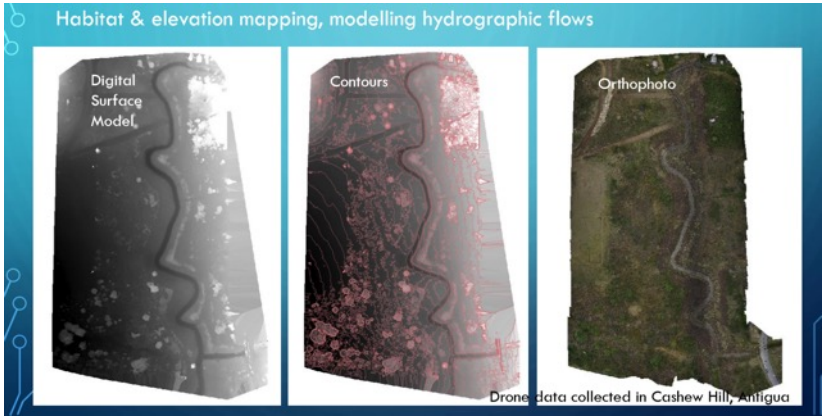




- Source: Julian Blanc (2016) *Monitoring the Illegal Killing of Elephants (MIKE) and the Elephant Trade Information System (ETIS)* presented at the Kenya/United Nations conference on Space technology and application for wildlife Management; 27-30 June 2016

Use of Drones in Conservation

Carried out by the Department of Environment, Government of Antigua and Barbuda.



- RUTH SPENCER (2016), Drones for Conservation presented at the Kenya/United Nations conference on Space technology and application for wildlife Management; 27-30 June 2016

Conference Outcomes

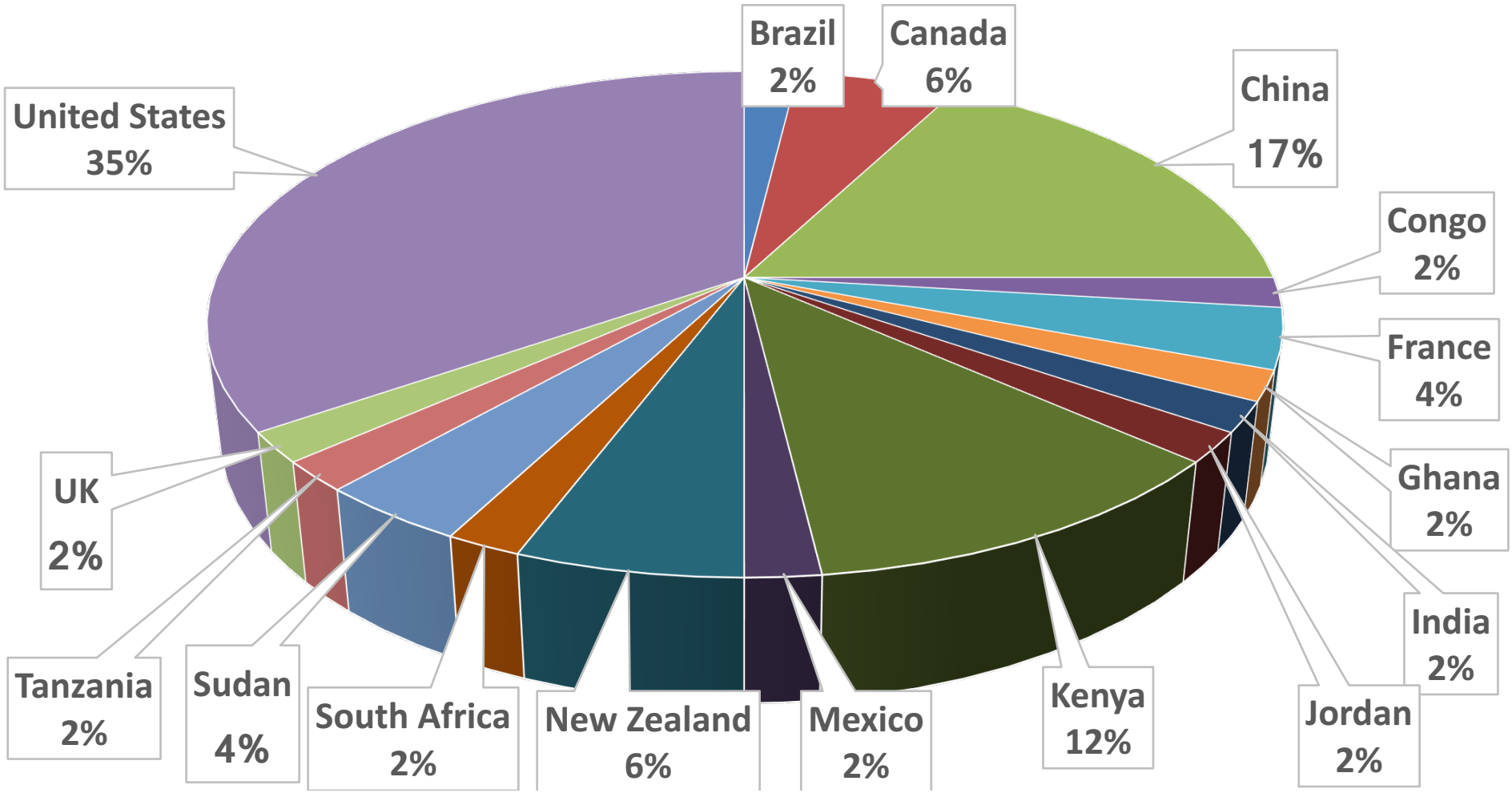
- Brought together space representatives, policy makers and wildlife managers to address wildlife and ecosystem monitoring
- Case studies demonstrated the wide field of operational applications
- Opportunities and challenges, particularly in the Africa region, were highlighted and possible solutions to address the problems were discussed

Conference Outcomes

- National Commission of Space Technology (NACOSTI) of Kenya and Remote Sensing Technology Center of Japan (RESTEC) signed an MoU for capacity development. (Asia-Africa cooperation)
- Industrial partners agreed to support the capacity of African institutions. (linkage between Industry, Academia and Government)
- A UN General Assembly Report on the Conference will be prepared

- The Government of Kenya will organize a national follow-up meeting to act on the Conference's observations and recommendations

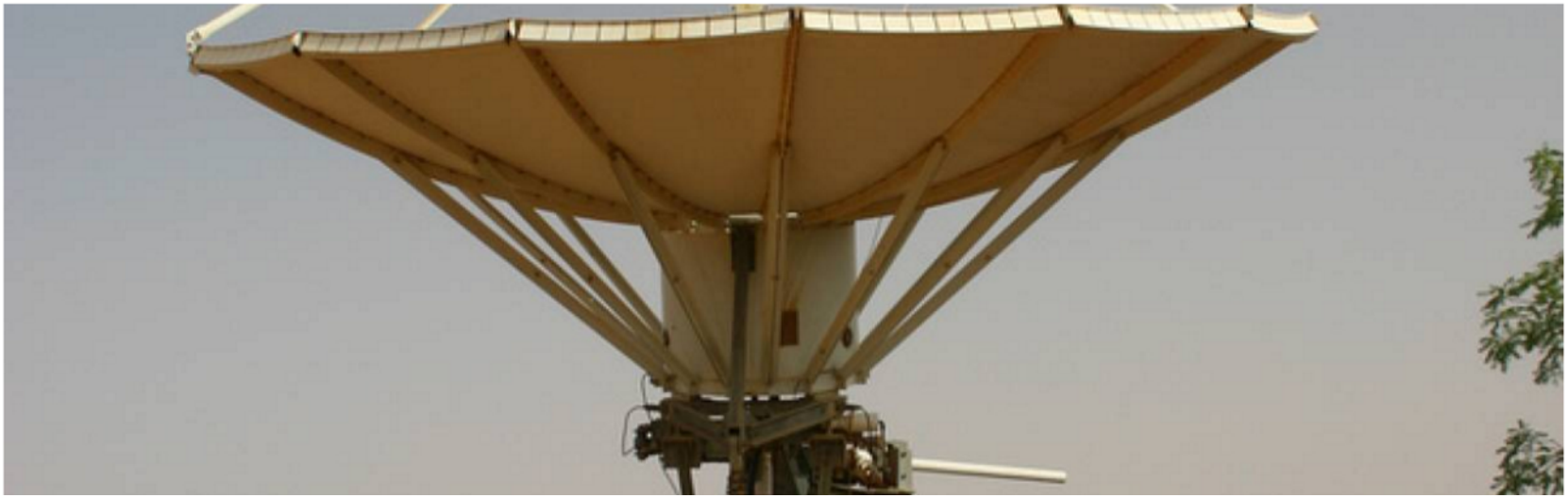
Media Coverage



Space tech could spur biodiversity management in Africa

by SciDev.Net Sub-Saharan Africa- Gilbert Nakweya | @scidevnet | SciDev

Thursday, 28 July 2016 10:32 GMT



UNISPACE+50

Thematic Priorities

1. ***Global partnership in space exploration and innovation***
2. ***Legal regime of outer space and global space governance: current and future perspectives***
3. ***Enhanced information exchange on space objects and events***
4. ***International framework for space weather services***
5. ***Strengthened space cooperation for global health***
6. ***International cooperation towards low-emission and resilient societies***
7. ***Capacity-building for the 21st Century***

Conclusions

- The UN/Kenya Conference demonstrated the wide range of space applications for biodiversity and ecosystem monitoring
- It built a bridge between representatives of the space community, policy- and decision makers and wildlife managers
- It identified the need for further capacity building, in particular in the field of geospatial applications
- UNOOSA will further pursue capacity building activities under the thematic priority biodiversity and ecosystems of the United Nations Programme on Space Applications
- Follow-up conferences are planned to be held in the Asia-Pacific and in the Latin America and Caribbean regions

For further details please visit the Conference Webpage at
http://www.unoosa.org/oosa/en/ourwork/psa/schedule/2016/conference_kenya_biodiversity.html


Thank you for your attention!

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