

RCMRD and CODATA ATG

Regional Centre for Mapping of Resources for Development (RCMRD) is Member of the CODATA Agricultural Task Group (ATG). RCMRD is represented to the ATG by Dr. Kenneth Mubea and Byron Anangwe. Dr. Kenneth Mubea is in-charge of the Capacity Development at RCMRD.

RCMRD-SERVIR E&SA engagement with universities

RCMRD-SERVIR E&SA has been able to engage universities in Eastern and Southern Africa from June 2016. This in line with RCMRD mission of promoting sustainable development using earth observation. In addition, RCMRD runs the SERVIR Eastern and Southern Africa project which has similar goals with RCMRD but in addition promoting resilience to climate change using earth observation. RCMRD appreciate the universities and view them as an important stakeholder. Education plays key role in the national economies and is addressed in the Sustainable Development Goals (SDGs), more specifically SDG four, which is on quality education. The capacity assessment of universities is important and will help in remedial measures. Thus, improved capacity of universities will enable them to apply geospatial technologies, in order to improve their resilience and adaptation to the impacts of climate change and thus sustainable development. This will be a great achievement in solving the 17 SDG goals and agenda 2030. The academic fraternity will be empowered to conduct further research in geo-information and this will turn promote science and innovation.

RCMRD sees the opportunity of connecting the universities with earth observation data and science. In addition, there are opportunities of leveraging on the synergies from the SERVIR Applied Science Team (AST) projects and RCMRD partners such as GLOBE, TAHMO, 4hkenya and GODAN. This will feed into service planning framework on *RCMRD strategic Partnership, Outreach and Awareness*. RCMRD has visited sixteen universities, three in Rwanda, three in Tanzania and ten in Kenya. There are plans to visit more universities in the RCMRD member states. This outreach has seen some universities receive automatic weather stations (AWS) namely: Jaramogi Odinga Oginga, Moi University, Dedan Kimathi University of Technology (DeKUT), Pwani University, and Ardhi university.



Figure 1: RCMRD engagement with Karatina University, 10th November 2016



Figure 2: RCMRD engagement with CGIS, 16th November 2016



Figure 3: RCMRD engagement with Sokoine University of Agriculture

Key findings

In order to protect the privacy of participants, this report provides only summary results of the capacity assessment. The results in this section are a summary of the opinions, suggestions, and ratings of the respondents. Recommendations from the assessment team are provided in the way forward section.

- The goal of the universities is in capacity building and offer academic programs in geospatial technology, environment, and agriculture. In addition, other goals include research and development.
- Most of the universities offers services in training, research, collaboration with partners, consultancy and outreach.
- The universities serve several clients including other universities, government and private sector, secondary schools.
- The geospatial data needs of the universities include the need for satellite Images, survey data, aerial photographs, socio-economic data and GIS data.
- The current state of skills of members of staff is somewhat low with responses categorised in terms of personnel with skills in GIS applications, spatial database and

web services.

- The use of earth observation data is relative good with most respondents at weekly. The types for earth observation data required is satellite imageries, aerial maps, administrative and boundary data, forest coverage, infrastructure maps.
- Most of the universities use the earth observation data in teaching, research, training, and consultancies.
- The access to earth observation data is through national mapping agencies (Survey of Kenya), regional institutions and projects (e.g. RCMRD, DRSRS, NEMA) and internet. The data from private institutions is very costly and most universities cannot afford.
- The software used in earth observation is mostly open source such as QGIS and ILWIS. Some universities have acquired commercial software through memorandum of understanding (MoU) and donations through projects such as Esri, ERDAS, IDRISI and Ecognition. RCMRD currently has an MoU with Esri Eastern Africa and can partner in this education outreach.
- There exits data gaps. These include lack of access to satellite images in various resolutions, aerial photos, GIS data Vector data e.g. topography, soil, climate data, and Digital Elevation Models (DEM).
- Most of the data is stored in digital format in servers and other computers and back up in hard disks. In addition, back up are made on CD and DVD's. Furthermore some of the data is in hard copy such as paper maps.
- In most universities, access to data is through memorandum of understanding (MoU), letter of requests, and published articles.
- Some of the universities do not include metadata information. Nevertheless, some universities used Federal Geographic Data Committee (FGDC) metadata format such as Kenyatta University.
- Some of the universities share data with other organisation. This is done through MoU and letter of request.
- The level of ICT Infrastructure is average in terms of computation/processing capacity, data storage capacity, internet connectivity, network reliability. However, there are challenges in internet connectivity and there no data portals in place. Jaramogi Oginga Odinga University of Science and Technology obtained the SERVIR Small Grants in

2014 and was helped by RCMRD to set up a data portal.

In addition to the summary above, the universities have some challenges, which include:

- Human resources and capacity building. There is shortage of skilled staff. Moreover, the current staff lack sufficient skills in geospatial technology.
- Lack of data, products and information availability and access. Access to geospatial data is very expensive. Further there are issues with incompatible data formats.
- Low availability and access to data processing, management and modelling tools. This is terms of data precision, high cost of commercial GIS and remote sensing software, lack of skills to process data, and lack of capacity to store data.

As a follow up of the recommendation, SERVIR has conducted:

- Data sensitisation seminar in Jaramogi Oginga Odinga University of Science and Technology (Kenya) on 16 February 2017. The report is available on this [link](#).
- Online Discussion forum for RCMRD-Universities RCMRD GIT team developed the link: <http://discussion.rcmr.org/>
- The attachment school program. RCMRD management suggested that SERVIR-ESA include universities within RCMRD member states. However, the cost implication will have to be discussed.
- Through this initiative of education outreach, some universities presented at the RCMRD International Conference (27 – 29 September 2017).
- Some universities applied for the SERVIR Small Grants (deadline of 21st July 2017). In addition, the RCMRD Research and Development Committee can source for funds and offer grants similar to SERVIR Small Grants.

The engagement with universities in collaboration with RCMRD partners has yielded some results such as:

- new partnership with 4hkenya and GODAN to help advance sustainable agriculture such as the use of open data and open source software. There will be a workshop in collaboration with university of Egerton sometime in November 2017 so as to show case developments in sustainable agriculture.
- GLOBE (Courtesy of Charles Maina) has installed an automatic weather station (AWS) on [5 June 2017](#) and this was the world environment day. The measurements can be

observed <http://3d-kenya.chordsrt.com/instruments/8>. TAHMO will install automatic weather station (AWS) at RCMRD in July 2017. This will be part of TAHMO weather stations as part of school2school program <https://school2school.net>. This will be used for capacity building at RCMRD and for careers and open days as part of SERVIR service *RCMRD strategic Partnership, Outreach and Awareness*.



Figure 4: RCMRD received an automatic weather station from GLOBE

- TAHMO weather stations can be viewed using this [link](#). Red and Green is where TAHMO have installed, blue is where TAHMO have confirmed to install, gray is where TAHMO is looking for a site, and BLACK is the universities RCMRD proposed TAHMO to install.
- This outreach has seen four universities receive automatic weather stations (AWS) from TAHMO partnership with RCMRD in July 2017 namely: Jaramogi Odinga Oginga, Moi University, Dedan Kimathi University of Technology (DeKUT) and Pwani University.
- RCMRD plans to introduce space challenges and hackathons (twice per year) to promote the use of climate data and build capacity in coping with climate. This will be in parallel to [RCMRD space Challenge](#) which targets high school students (similar to K12 student programs).
- RCMRD plans to extend its RCMRD Research and Development Committee to include

the universities and work on joint research.

- The universities can join the YouthMapper chapters: <http://www.youthmappers.org/> and the students will be able to leverage open data from various sites including RCMRD open data <http://opendata.rcmrd.org/>
- RCMRD has participated in joint workshops with universities such as University of Nairobi, School of Agriculture on open data training on 4 – 5 October 2017, strengthening food security workshop with University of Nairobi (Department of Geospatial) on 26 – 30 Nov 2017.

List of Participants

Table 1: List of Participants from Kenya

S/N	NAME	ORGANIZATION	GENDER	E-MAIL
1	Prof. Simon Onywere	Kenyatta University	M	onywere.simon@ku.ac.ke
2	Dr. Patroba Odera	Jomo Kenyatta University of Agriculture and Technology	M	patroba.odera@uct.ac.za
3	Dr. Patrick O. Hayombe	Jaramogi Oginga Odinga University of Science and Technology	M	
4	Dr. Ben Muok	Jaramogi Oginga Odinga University of Science and Technology	M	bmuok@yahoo.com
5	Dr. Michael Oloko	Jaramogi Oginga Odinga University of Science and Technology	M	moloko@jooust.ac.ke
6	Dr. Moses Otieno Kola	Maseno University	M	mosesotienokola@gmail.com
7	Mathenge Mwehe	Maseno University	M	mathengemwehe@gmail.com
8	Prof. Peter Simatei	Moi University	M	tpsimatei@hotmail.com
9	William Kiplagat	Moi University	M	williamkiplagat@gmail.com

10	Dr. Moses Ngigi	Dedan Kimathi University of Technology	M	murimi.ngigi@dkut.ac.ke
11	Dr. Mugo Mware	Karatina University	M	jmware@karu.ac.ke
12	Dr. Albert Mwangi	Karatina University	M	amwangi@karu.ac.ke
13	Dr. Hellen Kamiri	Karatina University	F	hwangechi@gmail.com
14	Dr. Samuel Musyoka	University of Nairobi	M	muleimusyoka@gmail.com
15	Dr. Faith Karanja	University of Nairobi	F	faithkaranja@uonbi.ac.ke
16	Dr. Shadrack Yonge	Technical University of Mombasa	M	Shadrackyongez@yahoo.co.uk
17	Dr. Susan Mwango Bosire	Technical University of Mombasa	F	sue.bosire@gmail.com
18	Dr. Cosmas Nzaka Munga	Technical University of Mombasa	M	ckamunga2014@tum.ac.ke
19	Dr. Josiah Ochieng Odalo	Technical University of Mombasa	M	joodalo@tum.ac.ke
20	Dr. Maarifa Ali	Pwani University	M	maarifaali@yahoo.com
21	Prof. Muniru Khamis Tsanuo	Pwani University	M	m.tsanuo@pu.ac.ke
22	Julius Kimani	Pwani University	M	
23	Arthur Ndegwa	Taita Taveta University	M	aandegwa@hotmail.com
24	Prof. Christine Akoth Onyango	Taita Taveta University	F	cakoth2002@gmail.com
25	Prof. Kiptanui J. A Too	Taita Taveta University	M	araptoojkt@gmail.com

Table 2: List of Participants from Rwanda

S/N	NAME	ORGANIZATION	GENDER	E-MAIL
1	Dr. Karambizi Sylvestre	Kigali Independent University	M	karambizis@ulk.ac.rw

2	Dominique Mvunabandi	Kigali Independent University	M	dmvunabandi2020@gmail.com
3	Dr. Jean Pierre Bizimana	University of Rwanda	M	jpbizimana@nur.ac.rw
4	Dr. Gaspard Rwanyiziri	University of Rwanda	M	g.rwanyiziri@ur.ac.rw
5	Rev. Fr. Dr. Fabien Hagenimana	Institute of Applied Sciences, INES Ruhengeri	M	hagena2002@yahoo.fr

Table 3: List of Participants from Tanzania

S/N	NAME	ORGANIZATION	GENDER	E-MAIL
1	Dr. Prosper Ulotu	Ardhi University (ARU)	M	pepulutu@gmail.com
2	Dr. Beatrice Christopher	ARU	F	betarimo@gmail.com
3	Mr. Zakaria Ngereja	ARU	M	ngereja@gmail.com
4	Ghati Marwa	ARU- STUDENT	F	gatty.daud@gmail.com
5	Neema Kileo	ARU- STUDENT	F	kileoneema64@gmail.com
6	Dr. Francis Mwakapuja	ARU	M	mwakapuja@gmail.com
7	Annastazia D. Msusa	ARU	F	anndn56@gmail.com
8	Regina Valerian	ARU	F	reginavalerian249@gmail.com
9	Elly G. Ngailo	ARU	M	egenga2000@yahoo.co.uk
10	Iriael J. Mlay	ARU	M	iriaelmly@gmail.com
11	Khaji M. Komba	ARU- STUDENT	M	khajikomba@gmail.com
12	Gadiel E. Mchau	ARU	M	gadymchau@gmail.com
13	Ally Mgelwa A.	ARU- STUDENT	M	mgelwally@gmail.com
14	Higombeye E. Chubwa	ARU- STUDENT	M	higoedward@gmail.com
15	Stephen M. Peter	ARU- STUDENT	M	mwastevie@gmail.com
16	Mendo Amosi	ARU- STUDENT	M	amoszabron2013@gmail.com

17	Gideon T. Marandu	ARU	M	gidese04@gmail.com
18	Lenis Lwehumbiza	ARU- STUDENT	M	lenisleonidas@gmail.com
19	Masunga Emmanuel J.	ARU	M	masungaej@gmail.com
20	Michael H. Nkotagu	ARU	M	mnkotagu@gmail.com
21	Dr. Dorothea Deus	ARU	F	dorothd@gmail.com
22	Dr. Job A. Chaula	ARU	M	jobchaula@gmail.com
23	Siwatu A. Kimbanga	ARU	F	asiwatu@gmail.com
24	Prof. Bonface Mbilinyi	Sokoine University of Agriculture (SUA)	M	Mbly_sua@yahoo.com
25	Dr. Winfred Mbungu	SUA	M	winfredm@gmail.com
26	Dr. Sixbert Mourice	SUA	M	sixbert.mourice@suanet.ac.tz
27	Prof. Henry Mahoo	SUA	M	mahoohenry@yahoo.com
28	Prof. Salome Misana	UDSM	F	salome.misana@googlemail.com
29	Dr. Zahor	UDSM	M	zahor81@yahoosmail.co.uk

RCMRD-SERVIR E&SA engagement with universities

S/N	University	Departments	Country	Engagement	Professors	RCMRD services	Target	Progress
1.	Kenyatta University	Geography	Kenya	7th June 2016	Simon Onywere	Climate, ecosystems	MoU	MoU exists GIS day collaboration
2.	Jomo Kenyatta University of Agriculture and Technology (JKUAT)	Geomatics	Kenya	16th June 2016	Felix Mutua, Benson Kenduiywo, Mercy Mwaniki, Mark Boit	agriculture, ecosystems, climate, water and disasters	MoU	MoU needs update
3.	Jaramogi Oginga Odinga University of Science and Technology (JOOUST)	Geography, Climate	Kenya	28th September 2016	Maurice Nyadawa, Michael Oloo, Ben Muok	ecosystems, climate, water and disasters	MoU	Draft MoU
4.	Maseno university	Urban planning, GIS	Kenya	29th September 2016	Moses Kola, Kapiyo,	ecosystems,	MoU	Draft MoU
5.	Moi University	Geography	Kenya	30th September 2016	Joel Kibiiy, Lawrence Omai	ecosystems, climate	MoU	Draft MoU
6.	Karatina University	Geography	Kenya	10th November 2016	Hellen Kamiri, Albert Mwangi, Mugo Mware	ecosystems, climate, agriculture	MoU	Draft MoU

7.	Dedan Kimathi University of Technology (DeKUT)	Geomatics	Kenya	11th November 2016	Moses Murimi, Charles Mundia, Arthur Sichangi, Godfrey Makokha	ecosystems, climate	MoU	Draft MoU
8.	Kigali Independent University	Geography	Rwanda	15th November 2016	Karambizi Sylvestre, Dominique Mvunabandi	ecosystems, climate,	MoU	Draft MoU
9.	University of Rwanda (UR)	Geography	Rwanda	16th November 2016	Jean Pierre Bizimana, Gaspard Rwanyiziri,	ecosystems, climate,	MoU	MoU done
10.	Institute of Applied Sciences, INES Ruhengeri	Geography	Rwanda	17th November 2016	Fabien Hagenimana,	ecosystems, climate,	MoU	MoU done
11.	University of Nairobi	Geography	Kenya	7th February 2017	Faith Karanja, Samuel Musyoka, Galcano Mulaku	Land cover and ecosystems, agriculture	MoU	MoU exists, GIS day collaboration
12.	Technical University of Mombasa	Environment	Kenya	24th May 2017	Cosmas Nzaka Munga,	Weather and climate	MoU	No Mou
13.	Taita Taveta University	Mining, Agriculture	Kenya	25th May 2017	Arthur Ndegwa,	Land cover and	MoU	No Mou

					Christine Onyango,	ecosystems, agriculture		
14.	Pwani University	Environment	Kenya	27th May 2017	Maarifa Ali Mwakumanya,	Weather and climate	MoU	MoU done
15.	Ardhi University	Geospatial	Tanzania	28th June 2017	Beatrice Tamiro	Land cover	MoU	MoU done
16.	Sokoine University of Agriculture	Agriculture	Tanzania	29th June 2017	Boniface Mbilinyi, Winfred Mbungu	Agriculture and Food security	MoU	No MoU
17.	University of Dar es Salaam	Geography	Tanzania	30th June 2017	Salome Misana, Zahor	Land cover and ecosystems	MoU	No MoU

