



**REGIONAL CENTRE FOR
MAPPING OF RESOURCES
FOR DEVELOPMENT**

RCMRD International Conference

Space Science Touches Lives

27 to 29 September 2017

Nairobi, Kenya

RIC 2017 REPORT

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Table of Contents

Acknowledgment	3
Acronyms	4
Executive summary	5
Conference Objective	6
RIC 2017 Report structure	6
RIC2017 opening session	6
PART 1. Daily Discussions on Key conference target areas	7
Day 1 – 27 th September 2017	7
Plenary Session summary – Science and Policy Exchange	7
Information on daily Thematic presentations	9
Day 2 – 28 th September 2017	9
Plenary Session summary on Capacity Development and Geospatial Standards	9
Day 3 – 29 th September, 2017	11
Plenary Session summary – Role of Universities in Geospatial Technology Development	11
PART 2. Summary of post conference evaluation	13
PART 3. RIC2017 resolution	16
Annex 1: Participation summary per country and thematic presentation/abstracts	17
Annex 2: Agenda	18

Acknowledgment

RCMRD would like to thank all the delegates for attending its first international conference and for making it a great success. Sincere gratitude to the conference sponsor (USAID, NASA and Airbus) for the support you accorded the centre during planning and after the conference. We do appreciate your support. The Centre would also like to thank the keynote speakers (Prof Swaib Luwasa of Makerere University, Athina Trakas of OGC, Mark De Blois of Upande Ltd and Prof Mulaku of University of Nairobi) for the work well done, and the Universities who took part in the reviewing the abstracts, we do value your association. Finally thanks to the RCMRD staff for planning and making sure that the conference achieved its main objective.

We look forward to having you in RIC 2018.

Acronyms

AU	-	African Union
EO	-	Earth Observation
GIS	-	Geographic Information System
GMES	-	Global Monitoring for Environment and Security
GPS	-	Global Positioning System
ICIPE	-	International Centre for Insect Physiology and Ecology
ICPAC	-	IGAD Climate and Prediction Centre
M & E	-	Monitoring & Evaluation
NASA	-	National Aeronautics and Space Administration
NDMA	-	National Disaster and Management Authority
NDVI	-	Normalized Difference Vegetation Index
NIR	-	Near Infrared
OAU	-	Organization of African Unity
OGC	-	Open Geospatial Consortium
RCMRD	-	Regional Centre for Mapping of Resources for Development
RIC	-	RCMRD International Conference.
SEI	-	Stockholm Environment Institute
SVM	-	Support Vector Machine
UN	-	United Nations
UNDP	-	United Nations Development Programme
UNECA	-	United Nations Economic Commission for Africa
USAID	-	United States Agency for International Development
VIR	-	Visible Infrared
WRMA	-	Water Resource Management Authority

Executive summary

This report provides information on RCMRD International Conference (RIC2017) that took place on 27th to 29th of September 2017 at RCMRD premises. The Conference focused on enhancing science-policy interactions, providing a platform for innovation updates and linking industry players with the academia. A total of 385 delegates from RCMRD member states and beyond, (comprising 81 institutions, see annex I), participated in the three-day conference hosted by RCMRD in Nairobi Kenya. The delegates from various user community namely policy makers, implementing institutions, geospatial industry players and the academia discussed key issues enabling and inhibiting the flow of information in enhancing policy change, capacity development and role of universities in geospatial technology development.

A total of 74 thematic abstracts falling under land use land cover, agriculture and food security, land surveying and management, weather and climate, water resources and hydroclimatic disasters and finally cross-cutting themes were presented at the conference for the purposes of sharing information. Institutions and researchers always generate information that should be shared to enable informed decision-making. However, few initiatives exist in the region to harness these. This platform was therefore, designed to address the disconnect. Research institutions need to meet more often with implementing and policy formulation institutions with the aim of bringing technology to the user. The conference activities included: Plenary Sessions, exhibitions, thematic paper presentations, and technical sessions; all geared towards building networks, individuals, community, government, and building capacity for uptake and use of Geoinformation in decision making.

Science policy interaction remains to be a gray area in most of our institutions. The basic concepts of policy analysis, policy formulation and policy implementation should be understood in respects to policy cycle. It is key to involve all actors in the policy dialogue at every participation level as this is ideal and the best way to ensuring that our institutions understand the interactions between policy and science. It is also important to break from the narrow study of political institutions and structures and incorporate other fields, example sociology and economics, into policy cycle processes. Indigenous knowledge being key in finding solutions to societal problems needs to be embraced in science and policy cycles.

RIC will be an annual event where more interaction between industry players and the academia within RCMRD member states and beyond converge to share ideas and link in terms of information flow.

“All problems are location based, all solutions are location specific” Prof. Onywere 2017

Conference Objective

The objective of this Conference was to spur exchange of ideas on fast-tracking application of earth observation and geospatial technologies in development decision making. The key question is how can we use earth observation data and information to effectively address mundane problems that impact livelihoods in Africa? Take for instance: a community in the Kenyan Northern Rangelands grappling with the problem of invasive species affecting fragile ecosystems or a farmer in Kericho, Kenya losing his/her tea crop due to frequent frost occurrences or an urban planner in Kigali, Rwanda tasked with the duty of human resettlement from hazard prone areas or a resident of Kasese, Uganda waking up to the reality of floods destroying his/her livelihood or a Maasai lady in Tanzania struggling to empower herself economically and socially through improved access to education, healthcare, reliable and safe drinking water in the face of a changing climate or even a drought ravaged Horn of Africa where lack of water and pasture precipitates conflicts and loss of lives.

From the above scenarios, the fundamental issue is how science can contribute towards empowering societies and communities mitigate against and effectively adapt to climate change that continues to adversely affect biodiversity, ecosystems as well as livelihoods. RIC 2017 therefore, provides a platform for science policy exchange and user engagement between the geospatial world and various information users.

The theme for RIC 2017 was **“Space Science Touches Lives”** which aimed at inspiring presentation of innovative and creative ideas on the use of earth observation information in addressing societal problems.

The post-conference evaluation aims at capturing various areas of improvement (from conference planning and preparation to conference content and sessions). It also acts as a conference feedback mechanism.

RIC 2017 Report structure

This report has been structured into three parts.

Part 1 contains the details on various sessions that transpired in the three days of the conference (27th 28th and 29th of September 2017). It contains the discussions, outcomes, and recommendations of the daily plenary sessions and various parallel thematic presentations (land use land cover and ecosystem, agriculture and food security, weather and climate, water resources and hydro-climatic disasters, land surveying and management, and finally cross-cutting issues).

Part 2 contains the conference post evaluation summary and finally part 3, which contains the conference resolutions based on the post-conference evaluation and face to face discussion with conference delegates.

RIC2017 opening session

The RCMRD international conference was officially launched by Prof Jacob Kaimenyi (Cabinet Secretary Ministry of Lands and Housing, Kenya) who was represented in the opening ceremony by Ambassador Kandie, The chief guest in his speech emphasized on the need to work together, institutional partnerships and collaboration as a way of improving public-private service delivery. Present during the opening ceremony was Her Excellency Mrs Agrina Mussa, Malawian High commissioner representing the government of Malawi as one of Regional Centre for Mapping of Resources for Development (RCMRD) member states who in her speech stressed on the need for scientist to work together with policymakers to find holistic solutions to problems in Africa. Other guest included Brad Arsenault, the Deputy Director for East Africa and Operations, Environment Office CEO representing USAID KEA and Bett Judah the CEO for ESRI Eastern African. USAID KEA highlighted milestones made possible through USAID, NASA, and RCMRD partnership in the SERVIR project which utilizes Earth Observation (EO) technology to change lives of people. The mission is aligning itself to the regional needs of regional institutions.

The session was followed by keynote address on science policy exchange where various institutions and the delegates discussed best practices in regards to science and policy interaction.

PART I. Daily Discussions on Key conference target areas

Day I – 27th September 2017

Plenary Session summary – Science and Policy Exchange

Key Note Speaker I: science policy exchange - Prof Swaib Luwasa – Makerere University

This session started with the keynote speaker Prof Swaib Luwasa, setting the base for science policy exchange. The basic concepts of policy analysis (definition), policy formulation cycle and implementation were outlined in this session (see figure 1 for the policy cycle). It was noted that public policy has three distinct characteristics, it should be multi-disciplinary problem solving and finally normative. Multi-disciplinary characteristics ensure that policies break from the narrow study of political institutions and structures and embrace the work and findings of other fields like sociology, economics law, etc. The problem-solving elements make sure that the policy adheres to a strict canon of relevance and orienting itself towards solving real-world problems. The normative elements ensure that the policy is not cloaked in the guise of scientific objectivity but recognizes the impossibility of separating goals and means.

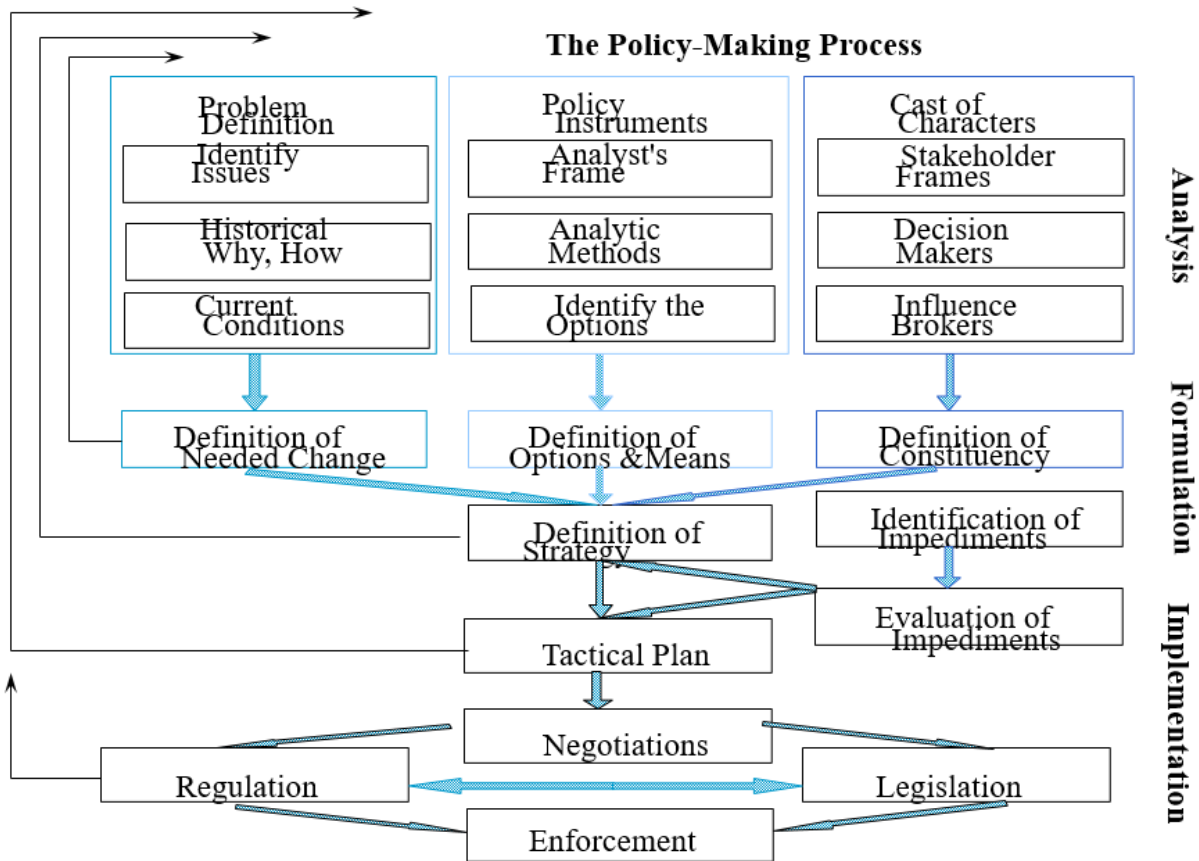


Figure 1: Policy cycle

In order to achieve science and policy exchange and interaction, all actors' participation is key. The actors should, therefore, develop a common vision and integrate the available knowledge in implementing the policy/common vision. These actors should include various asymmetrical levels of policy analysis, formulation, and implementation namely, Macro (state/provincial), Meso (divisions), Micro (neighborhood, household) scale levels. See figure 2 for the ideal

science policy framework. Co-design and co-production frameworks have to be developed by various actors building on the multi-disciplinary nature of public policy. Factors inhibiting and enabling policy cycle process were also mentioned, they include funding structure in developing countries, data access and sharing, knowledge generation frameworks and stakeholder engagements.



Figure 2 for the ideal science policy framework. (sourced from Cowell et al, 2013)

The institutions that took part in the plenary discussion were as follows.

- Stockholm Environment Institute
- Land Development and Governance Institute (LDGI)
- International Centre for Insect Physiology and Ecology (ICIPE)
- UN-Habitat
- Airbus
- RCMRD.

Speakers from the above-listed organizations highlighting how they are involved in policy formulation and implementation within the policy cycle. Their highlights are as follows:

- UN-Habitat: The institution works on policies at national level. UN-Habitat contributes to city extension policies and encourages the use of GIS in city planning.
- RCMRD implements projects across the member states. The organization develops policy briefs and is involved in participatory mapping especially through user engagement and stakeholder participation.
- Airbus provides very high-resolution satellite images. It operates a four-constellation satellite system. The images captured are available in the cloud for users to develop their own applications and therefore provide information to be used for informed policy briefs.
- Land Development and Governance Institute (LDGI): The institute ensures that policymakers understand how users/consumers are affected by these policies. They majorly communicate through graphics for easier understanding. Their work is featured in a report they have generated.
- Stockholm Environment Institute, involved in structuring science-related policies, observed that good

policy formulation, especially in research, require: incentives, partnerships, capacity development and effective communication.

- ICIPE evaluates policies at different levels. Their observation was that there is a need to use Earth Observation data to facilitate policy formulation and implementation. Additionally, it is their view that people need to understand that a map is an intervention tool that informs on what is happening.

The session also looked at experiences from different organizations in policy undertakings, which were highlighted by different speakers. RCMRD mentioned that with the start of the monitoring and evaluation program, it is possible to relate project implementation to outcomes. This is important in actualizing what is being generated scientifically by making its impact on people's lives. RCMRD has, therefore, changed its strategy in implementing projects from working for the clients to working with the user, this entails on job training and co-development.

The need to focus on sustainability of projects for continuous information flow especially by building on existing initiatives, private sectors involvement in policy cycle, e.g. policies on use of Earth Observation in providing a platform for problem identification, for developing policy implementation and for evaluation and review of policies were also part of the discussions. The need to include institutions of higher learning in policy formulation was also highlighted as key in bringing out the aspect of research development. One of the agreed ways of solving the aforementioned problem is by making data freely available to higher learning institutions.

Various concerns were also raised in regards to the best possible ways of implementing policies, the timing of policies and the need to build capacity on policy formulation cycle. As part of the recommendations, institutions were urged to use easy and simple tools in communicating their findings to governments. It is also important that when dealing with different departments handling inter-related issues, institutions have to find ways of breaking the walls that may be existing between them.

Information on daily Thematic presentations

Parallel sessions on various thematic areas namely: land use land cover and ecosystem, agriculture and food security, weather and climate, water resources and hydro-climatic disasters, land surveying and management, and finally cross-cutting issues were conducted, where various authors presented on their research findings. Refer to the abstract session in the handbook (<http://www.rcmrd.org/media-item/publications/conference-proceedings?download=148:ric-2017-conference-handbook>) for the daily thematic presentations (27th to 29th September 2017) and annex 2 for the presentation titles .

Day 2 – 28th September 2017

Plenary Session summary on Capacity Development and Geospatial Standards

Key Note Speaker 2: Capacity Development and Geospatial Standards - Athina Trakas - Open Geospatial Consortium

The presentation was designed into three areas of focus namely standards and interoperability, the open geospatial consortium and example of Open Geospatial standards (OGC) in use. 'One of the benefits of the standards make it possible to access, fuse and apply diverse data sources which is key in situational awareness in along cross boundary information sharing' Athina Trakas. The Open Geospatial Standards also bring together the human system, natural system, and the physical infrastructure. OGC makes it possible to incorporate various geospatial data sets drawn from diverse sources and have outputs which are easily utilized such as hazard predictions and early warning information within this system." See figure 3 for the systems interaction diagram. The standards are established by consensus and approved by OGC membership, that provides rule and guidelines aimed at the optimum degree of

interoperability.

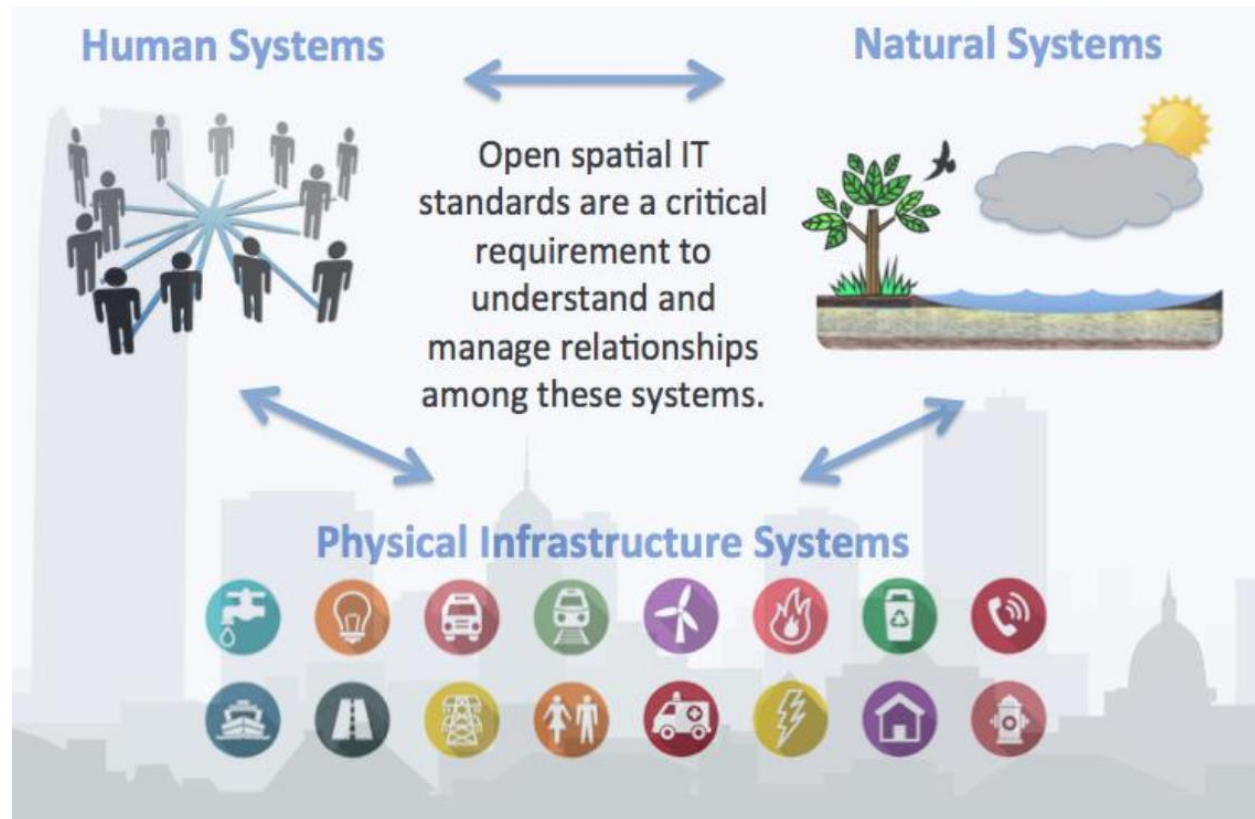


Figure 3 for the systems interaction diagram.

The standards are open to all users and freely available to the public, no license fees are required and finally they are vendor neutral. Example included the Web feature server, web coverage and web map services standards. In summary the standards play an important role in integrating geospatial information and applications of all types for improved situational awareness, business intelligence and decision making.

Key Note Speaker 3: Capacity Development in the Use of Drones in Mapping of Natural Resources - Mark de Blois – Upande Ltd

“With regards to the use of drones, security is still a big question especially in Kenya. The use of drones serves not only to reduce the cost, effectiveness and time taken in the administration of certain interventions regardless of the component but also prevent losses of revenue, resources and impending hunger.” Mark De Blois

This session was followed by panel discussions (by the institutions listed below) highlighting the link between capacity development and Geospatial standards.

- East Africa Land Administration Network
- Global Land Tool Network
- ESRI East Africa
- RECTAS

- GLNT
- RCMRD

The panelist agreed that Capacity development enable utilization of tools and application of the said tools and the benefits therein in the adoption of the tools. i.e. It was clear that from the beginning to the end of tool development is where the Geospatial standards come into play example Standards of a utility within the web-based server, sharing of the tools/data. In essence, geospatial standards are applicable from the start of a project to finish and since they are cyclic in nature and their results need to be checked regularly, these standards apply continuously.

It is mandatory to ascertain key components of capacity development. It was noted that sustainability cannot be achieved without enhanced capacity development. The latter requires collaborations and partnerships at various levels. The panelists discussed ways in which they were involved and actively contributing to capacity development as well as looking into how the data sets and services they were offering answers to the needs of the common man whether through policy generation and implementation or the day to day activities. Leveraging of geospatial technologies for clients through needs assessment and tailor-made training has ensured successful implementation of projects through the available technologies. The convening of developers and experts in the geospatial fields in conferences held by various organizations represented by the panelists has been very successful.

The securing of political goodwill cannot be forgotten if the range of available technologies should be successfully carried out and their recommendations put to work and projects based on these technologies implemented. It was also discussed that successful awareness creation is solely depended on the level of understanding of the target group

Recommendation/Comments/Way forward

With regard to capacity development of students or graduate, all organizations represented by the panelist plans to incorporate graduate trainees once. There is a need to clearly differentiate Open Geospatial Standards, Open Data, and Open Source software.

Day 3 – 29th September, 2017

Plenary Session summary – Role of Universities in Geospatial Technology Development

Key Note Speaker 4: Role of Universities in Geospatial Technology Development: Galcano Mulaku -University of Nairobi

The discussions were based on how far the universities have come and the areas in which geospatial technology is being utilized. The importance of geospatial tools and skill delivery in institutions of higher learning is not only an important but critical to the development of wholesome graduates. Indeed there is a strong traction of organizations towards Africa with regard to advancing knowledge of geospatial technology. The missing link however lies in addressing societal problems and sustainability of such technology. Universities continue to play its role in the society through teaching, research and linking with industry and community amidst challenges like inadequate facilities, low research funds, and limited to exposure to cutting edge developments.

The universities represented in the discussion include:

- Kenyatta University
- Makerere University
- Nairobi University
- University of Kwazulu Natal
- University of Rwanda
- University of Malawi

- RCMRD

The institutional collaborations in areas where the action matters which is in the community was agreed upon as being key. There is a dire need for capacity and infrastructural development towards geospatial technology in the universities. The role of a university as a custodian of data both generated and collection is paramount to ensure linkage between Universities and technology industry players. The University should also seek to develop geospatial field by opening up to more collaborations.

Universities have been on the forefront in bridging the gap between professionals and students utilizing the geospatial technology through securing of licenses for softwares which all universities in Kenya can utilize. It was also noted that the existence of an MOU between industry players and universities on training courses is prerequisite in boosting the capacity of students in the practical expertise. Several collaborations and student exchange programs have increased awareness, use and utilization of the geospatial technology. However, there is need for increased platform that engages more students to where the action takes place.

Attachment being a key concern, private firms highlighted that they have prioritised attachments and internships on need basis. RCMRD has also collaborated with all the universities represented by the panelists to promote attachment programmes. The panelist pointed out the need for student exchange programmes for a short duration of time through events like conferences which are rare opportunities for the convergence of significant actors to meet and brainstorm on solutions that are not only problem solving but also offer long-term sustainability. It is the responsibility of all, since problem solving requires effort from all facets not only government or scientist in exclusion of academia or the community. The key is that the knowledge to act on the problems is in all stakeholders.

Recommendation/Comments/Way forward

- All organizations represented by the panelists have several collaborations with regard to the enhancement of geospatial technology
- More MOU to be drawn by RCMRD with other institutions such as the one with KU
- ESRI organization of Annual World GIS days to integrate conservation
- Inclusion of the element of OGC in all the projects whether in learning institutions or beyond within Kenya.
- Training of students on SDI within the learning institutions
- There is need to avoid monoculture hence more collaborations are encouraged
- As much as training of software and its application is done, more is needed to teach on problem solving skills and enhance the practical application of the said technology
- There is need for total implementation of the research life cycle
- While publication of results is a key output, it should not be the final chapter, rather how the research has presented solutions for solving societal problems
- With regard to the challenges in infrastructure in the institutions, joint effort is needed
- There is need to have a common system for students in the country across the board to enable them have access to all technology whether in attachment or internship in collaboration with the industries
- In terms of certification, experience is key with inclusion of actual training
- Students need to be taught on how to diversify their areas of specialization to answer problems with sustainability as the core of their proposals
- Improvement of access to the infrastructure within the learning institutions for the ease of access of students such as laboratories is a managerial facet
- Students need to be more innovative and develop a niche for themselves that sets them apart from the crowd such as self-learning in programming, ANDELA or jungle girls

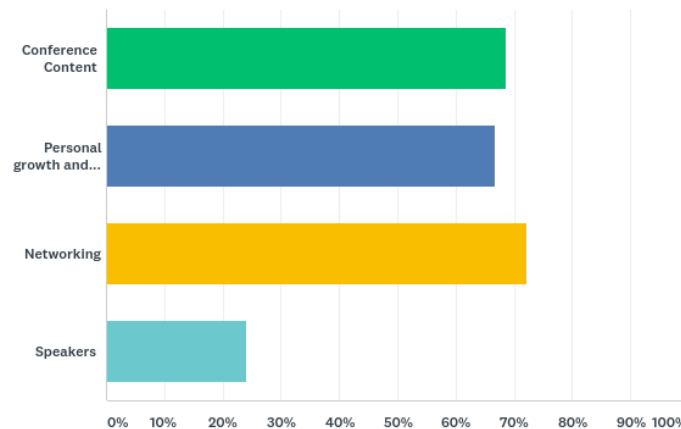
PART 2. Summary of post conference evaluation.

The post-conference evaluation was conducted using three different questionnaire targeting participants who are RCMRD Staff, Non-RCMRD staff, and students.

EVALUATION ANALYSIS FOR NON-RCMRD PARTICIPANTS

The open-ended questionnaire was sent to 113 participants of which 76 responded translating to 67% response rate. Analysis by gender shows 73% were males while 27% were females. Analysis by Nationality, 57 responded as follows Kenyans (40), Uganda (5), Tanzania (2), Ethiopia (2), Lesotho (1), Netherland (1), Malawi (1), Zimbabwe (1), Mauritian (1), Nigeria (1) and Senegal (1). Analysis by designation of the respondents indicates the following: policy/decision maker (2%), Technical expert (46%) and Research/Academician (50%).

Main objectives for attending the conference included conference content, personal growth, networking and to listen to various speakers both keynote and thematic presentations. See graph 1 for the main objectives and response percentages.



Graph 1 for the main objectives and response percentages.

The key area with the highest level of satisfaction was “Relevance to your work for the information that you acquired” while there was 55% average for all the key areas. In summary majority of respondents were either very satisfied or somewhat satisfied in the key areas. However, there is need to strengthen areas that include; Science and Policy Exchange, Capacity Development & Geospatial Standards, Role of Universities in Geospatial Technology Development, Presentation during parallel sessions, Conference Venue & Facilities, Food and Beverages. Of those who responded 90% indicated yes while 10% indicated the conference partially met their objectives, see table 1 for level of satisfaction.

	Very satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Very dissatisfied	Total
Conference Contents	68%	28%	4%	0%	0%	57
Presentation from key Speakers	68%	30%	2%	0%	0%	56
Science and Policy Exchange	42%	43%	13%	2%	0%	53

Capacity Development and Geospatial Standards	48%	41%	11%	0%	0%	56
Role of Universities in Geospatial Technology Development	46%	41%	9%	4%	0%	56
Presentation during parallel sessions	48%	43%	7%	2%	0%	56
Relevance to your work for the information that you acquired	75%	23%	2%	0%	0%	57
Management of Conference	61%	36%	2%	2%	0%	56
Conference Venue and Facilities	43%	54%	4%	0%	0%	56
Food and Beverages	48%	41%	7%	2%	2%	56

Table 1 for level of satisfaction.

EVALUATION ANALYSIS FOR RCMRD STAFF

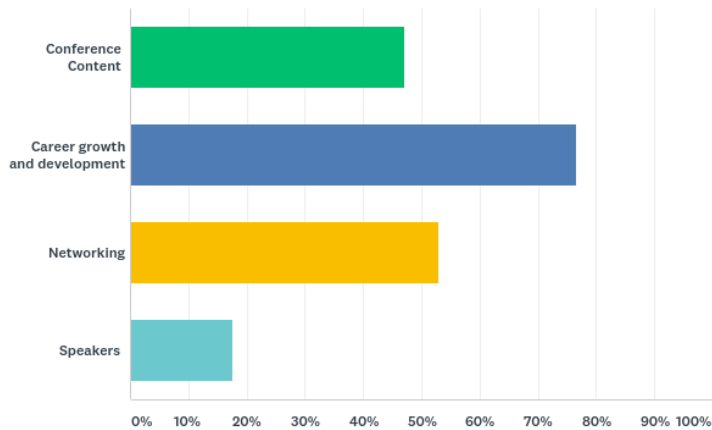
The open-ended questionnaire was sent to 63 staff members and 31 responded, translating to 49% response rate. The key areas that had the highest level of satisfaction were the conference content and Capacity Development and Geospatial standards while the Role of Universities in Geospatial Technology Development had the lowest level of “very satisfied”. Overall, all the key areas combined had an average of 61% level of “very satisfied”. See table 2 for level of satisfaction as responded by RCMRD staff.

	Very satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Very dissatisfied	Total
Conference Contents	70%	27%	3%	0%	0%	30
Management of Conference	65%	35%	0%	0%	0%	31
Presentation from key Speakers	63%	37%	0%	0%	0%	30
Science and Policy Exchange	59%	28%	14%	0%	0%	29
Capacity Development and Geospatial Standards	70%	23%	7%	0%	0%	30
Role of Universities in Geospatial Technology Development	50%	40%	10%	0%	0%	30
Presentation during parallel sessions	57%	37%	7%	0%	0%	30
Conference Venue and Facilities	58%	39%	3%	0%	0%	31
Food and Beverages	58%	32%	10%	0%	0%	31

Table 2 for level of satisfaction as responded by RCMRD staff.

EVALUATION ANALYSIS FOR STUDENTS

The open-ended questionnaire was sent to 37 students, of which 28 responded, translating to 76% response rate. The survey had 12 questions, eight that had choice options while four were open-ended. Analysis by gender accounts for Male 54% and Females 46% and analysis by University/College accounts for Kenyatta University (65%), University of Nairobi (29%), and University of KwaZulu-Natal (1%). The highest percentage of respondents indicate that their objective of attending the Conference was for career growth and development. About 76% of the respondents indicated that the conference met their objectives while 24% indicated that they the conference met their objectives partially See graph 2 for the reason for attending the conference and percentage response.



See graph 2 for the reason for attending the conference

The area with highest level of satisfaction was Conference contents and Management of Conference while the topic on Role of Universities in Geospatial Technology Development was rated with the lowest satisfaction. Overall, all the key areas combined had an average of 60% level of “very satisfied”. See table 3 for level of satisfaction as responded by academic institutions.

	Very satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Very dissatisfied	Total
Conference Contents	71%	18%	12%	0%	0%	17
Presentation from key Speakers	76%	18%	6%	0%	0%	17
Science and Policy Exchange	53%	29%	18%	0%	0%	17
Capacity Development and Geospatial Standards	59%	29%	12%	0%	0%	17
Role of Universities in Geospatial Technology Development	41%	53%	6%	0%	0%	17
Presentation during parallel sessions	59%	35%	6%	0%	0%	17
Relevance to your career for the information that you acquired	65%	35%	0%	0%	0%	17
Management of Conference	71%	18%	12%	0%	0%	17
Conference Venue and Facilities	47%	47%	6%	0%	0%	17

See table 3 for level of satisfaction as responded by academic institutions.

PART 3. RIC2017 resolution.

The RCMRD international conference (RIC) will be held annually, with key plenaries on science policy interaction, capacity development experiences from industry players, and finally on industry academia interaction. Science policy interaction was noted has been a grey area in most of the institutions present during the conference and therefore it was recommended that RCMRD to foster this engagement within its member states and beyond by strengthening this platform, bringing together all stakeholders involved in the policy cycle. It was also noted that most of the delegates were from Kenya the hosting country and therefore, the need to have the conference hosted in other countries (RCMRD member states) for equal participation. This is should follow the sequence of RCMRD Governing council and county of host.

Other resolutions included:

- More industry representations with exhibition booths
- More posters from the universities with display of their research and applications
- Display of applications of geospatial technologies with events such as hurricanes
- More elements of modelling of scenarios with inclusion of the students in the applications
- More collaborations yielding results which will be on display
- More representation of policy think-tanks and decision makers such as KIPRA, IPRA, County and National Governments

Annex I: Participation summary per country and thematic presentation/abstracts

Summary of RIC2017 participation for the three days

Country	Participants	Institutions
KENYA	354	58
BURUNDI	1	1
ETHIOPIA	3	2
TANZANIA	7	6
UGANDA	6	3
GERMANY	1	1
NETHERLANDS	1	1
MALAWI	2	1
CANADA	1	1
LESOTHO	1	1
MAURITIUS	1	1
SOUTH AFRICA	3	1
RWANDA	1	1
SOUTH SUDAN	1	1
SUDAN	1	1
SENEGAL	1	1
TOTAL	385	81

Sessions	Institutions	No of abstracts
Science -Policy plenary	6	0
geospatial standards and capacity development plenary	5	0
Role of Universities in geospatial technology development plenary	6	0
Land use land cover and ecosystem	17	21
Agriculture and Food security	13	16
Weather and climate, water resource and hydro-climatic disasters	15	18
Cross cutting, land surveying and management	16	19
Total	78	74

N/B

103 industry players and 251 University/college students.

Included in the 103 are 24 RCMRD staff members.

Annex 2: Agenda

Wednesday 27 th , September 2017			
Science Policy Exchange			
Time	Agenda Item	Moderator	Venue
8:00 – 9:00	Registration	Stella Masese	Plenary Tent
9:00 – 9:45	OPENING CEREMONY Welcome notes <ul style="list-style-type: none"> ▪ ESRI East Africa ▪ National Aeronautics and Space Administration (NASA- USA) ▪ USAID Kenya ▪ Director General RCMRD ▪ Ambassadors from RCMRD Member States ▪ Chief Guest - RCMRD Governing Council ▪ Government of Kenya 	Byron Anangwe/ J.B. Kiema	Plenary Tent
9.45 – 10.30	Key Note Speaker I: Science policy exchange <ul style="list-style-type: none"> ▪ Shuiab Lwasa - Makerere University 	Byron Anangwe	Plenary Tent
10:30 – 10:35	LAUNCH OF RCMRD NEW WEBSITE	Byron Anangwe	Plenary Tent
10:35 – 11:30	TEA BREAK & EXHIBITION/ POSTERS	Booth Attendants	Exhibition Booth
11:30 – 13:00	PLENARY SESSION: Science policy exchange <ul style="list-style-type: none"> ▪ Stockholm Environment Institute (SEI) ▪ Kenya Institute for Public Policy Research and Analysis (KIPPRA) ▪ Institute of Policy Analysis and Research Rwanda (IPAR) ▪ Land Development Governance Institute (LDGI) ▪ International Centre for Insect Physiology and Ecology (ICIPE) 	Shuiab Lwasa Rapporteurs:	Plenary Tent

	<ul style="list-style-type: none"> ▪ UN Habitat ▪ Airbus ▪ RCMRD – J.B. Kiema 	Anthony Ndubi and Rose Waswa	
13:00 – 14:00	LUNCH BREAK		
14:00 – 16:30	PARALLEL SESSIONS - PRESENTATIONS	Facilitator	James Wanjohi
	<p>Agriculture and Food Security</p> <ul style="list-style-type: none"> • Geospatial data analysis for assessment and characterization of Ensete in Ethiopia - <i>Meron Awoke, Binyam Tesfaw Hailu and Sebsebe Demissew</i> • Impact of internal conflict on agriculture and food security in South Sudan - <i>Ms. Santa J. Justin Ali</i> • Use of Earth Observation Data to inform Food Security Assessment and Decision Making - <i>Antony Ndubi</i> • Akorion – ICT for Agriculture – <i>William Luyinda</i> • Mapping leaf nitrogen and carbon concentrations of intact and fragmented indigenous forest ecosystems using empirical modeling techniques and worldview-2 data - <i>Galal Omer, Onesimo Mutanga, Elfatih M. Abdel-Rahman, Kabir Peerbhay and Elhadi Adam</i> 	<p>Moderator:</p> <p>Boitt/ Degelo Sendabo</p> <p>Rapporteurs:</p> <p>Anthony Ndubi and Rose Waswa</p>	<p>Venue:</p> <p>GIS Training Lab</p> <p>Assistant</p> <p>Steve Firsake</p>
	<p>Land Use Land Cover and Ecosystems</p> <ul style="list-style-type: none"> ▪ Assessing Spatio-temporal Land-Cover Changes in Gatumba Mining Area in Rwanda - <i>Jean Pierre Bizimana, Gilbert Nduwayezu and Celse Gabineza</i> ▪ Delimitation and zoning of the Comoros national parks (marine and terrestrial) - <i>Nair Aboubacar, Moumadjadi Inrfane, Houssoyni Housseni and Ben Anthoy Moussa</i> ▪ Land degradation assessment in IGAD region using earth observation data - <i>Eunice W. Mwangi</i> ▪ Beyond Biodiversity - Using Geo-Information to drive conservation and development decision making - <i>Steve Peedell, Lucy Bastin and Bastian Bertzky</i> 	<p>Moderator:</p> <p>Clifford Okembo/ Charles Muya</p> <p>Rapporteurs:</p> <p>Pauline Ogola and Josphat Makanga</p>	<p>Venue:</p> <p>Conference Room</p> <p>Assistant</p> <p>Allan Oware</p>

	<ul style="list-style-type: none"> Application of GIS and Remote Sensing Techniques in analysis of Land Use and Land Cover Changes threats to River Njoro Ecosystem - <i>Moses Kamau Thiong'o</i> 		
	<p>Weather, Climate, Water and Hydro Climatic Disasters</p> <ul style="list-style-type: none"> An Assessment of the Impacts of Weather and Climate Patterns on Water Resources - <i>Bertha Othoche</i> Assessing gullies development on hilly urban areas using cadastral maintenance data and erosion modeling - <i>Erick Ndahigwa and Jean Pierre Bizimana</i> Participatory Hazard Mapping Risk Assessment and Analysis in in Six Sub counties of Kenya - <i>Degelo Sendabo</i> Assessing bias in satellite rainfall products and their impact in water balance closure at the Zambezi headwaters - <i>Omondi, C.K, Rientjes T.H.M, Maathuis B.H.P and Gumindoga W.</i> 	<p>Moderator:</p> <p>Oludhe/ Robinson Mugo</p> <p>Rapporteurs:</p> <p>Grace Koech and Abdi Gedi</p>	<p>Venue:</p> <p>Remote Sensing Training Lab</p> <p>Assistant</p> <p>Daniel Kipkemei</p>
	<p>Cross Cutting and Land Surveying & Management</p> <ul style="list-style-type: none"> GIS in Grid Management and Extension - <i>Victor Kazibwe</i> Eastern Africa Forest Observatory – <i>Esther Mwangi and Laura Mukhwana</i> Communicating climate change by linking space and village - <i>Nesoba Dorah</i> GIS Location-allocation model in improving accessibility to health care facilities - <i>Tom Kemboi Kiptenai and Edward Hunja Waithaka</i> Fine resolution modelling of malaria risk factors and potential malaria risk prediction - <i>Kasera Kenneth</i> 	<p>Moderator:</p> <p>Amos Tabilla/ Lawrence Okello</p> <p>Rapporteurs:</p> <p>Patrick Kabatha and Ian Asige</p>	<p>Venue:</p> <p>Plenary Tent</p> <p>Assistant</p> <p>Daniel Mordecai</p>
16:30 – 17:00	TEA BREAK & EXHIBITION/ POSTERS	Booth Attendants	Exhibition Booth

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Thursday 28 th , September 2017			
Capacity Development and Geospatial Standards			
Time	Agenda Item	Moderator	Venue
9:00 – 9:30	<p>Key Note Speaker 2: Capacity Development and Geospatial Standards</p> <ul style="list-style-type: none"> ▪ Athina Trakas - Open Geospatial Consortium <p>Key Note Speaker 3: Capacity Development in the Use of Drones in Mapping of Natural Resources</p> <ul style="list-style-type: none"> ▪ Mark de Blois – Upande Ltd 	Kenneth Mubea	Plenary Tent
9:30 – 10:30	<p>PLENARY SESSION: Capacity Development and Geospatial Standards</p> <ul style="list-style-type: none"> ▪ East Africa Land Administration Network ▪ Global Land Tool Network ▪ ESRI East Africa ▪ RECTAS ▪ RCMRD – Leonard Sweta 	<p>Athina Trakas</p> <p>Rapporteurs:</p> <p>Anthony Ndubi, Rose Waswa and Abdi Gedi</p>	Plenary Tent
10:30 – 10:50	OAKAR SERVICES	Kenneth Mubea	Plenary Tent
10:50 – 11:30	TEA BREAK & EXHIBITION/ POSTERS	Booth Attendants	Exhibition Booth
11:30 – 13:00	PARALLEL SESSIONS - PRESENTATIONS	Facilitator	James Mumina
	Agriculture and Food Security	<p>Moderator:</p> <p>Boitt/ Degelo Sendabo</p>	<p>Venue:</p> <p>GIS Training Lab</p>

	<ul style="list-style-type: none"> ▪ Seasonal Crop Type Inventory Mapping from multitemporal TerraSAR; a case study of Kitale - <i>Benson Kipkemboi Kenduiywo</i> ▪ Understanding seasonality of browse herbage in Karamoja region, Uganda - <i>Benon B. Nabaasa and Shuaib Lwasa</i> ▪ FROST Mapping and Forecasting – <i>James Wanjohi</i> ▪ Malawi 2018 Census Mapping – <i>Julius Buyengo</i> 	<p>Rapporteurs:</p> <p>Anthony Ndubi, Rose Waswa and Abdi Gedi</p>	<p>Assistant</p> <p>Steve Firsake</p>
	<p>Land Use Land Cover and Ecosystems</p> <ul style="list-style-type: none"> ▪ Land degradation assessment in IGAD region using earth observation data - <i>Eunice W. Mwangi</i> ▪ Delimitation and zoning of the Comoros national parks (marine and terrestrial) - <i>Nair Aboubacar, Moumadjadi Inrfane, Houssoyni Housseni and Ben Anthoy Moussa</i> ▪ Estimation of Tree Distribution and Canopy Heights in Ifakara, Tanzania Using Unmanned Aerial System (UAS) Stereo Imagery - <i>Ian Asige Mweresa, Patroba Achola Odera and David Ndegwa Kuria</i> ▪ Evaluating the Red Edge channel for improving C3 (Festuca SPP) and other co-occurring c3/c4 grass species discrimination based on high resolution multi spectral satellite image data - <i>Charles Otunga, Onesimo Mutanga, John Odindi and Clement Adjorlolo</i> ▪ Exploring the utility of Auto-sklearn and remotely sensed Sentinel-2 image data for mapping Parthenium weed in a heterogeneous landscape - <i>Serge Kiala, Onesimo Mutanga and John Odindi</i> ▪ Invasive species mapping - <i>Edward Ouko</i> 	<p>Moderator:</p> <p>Clifford Okembo/ Charles Muya</p> <p>Rapporteurs:</p> <p>Eunice Wangui and Josphat Makanga</p>	<p>Venue:</p> <p>Conference Room</p> <p>Assistant</p> <p>Allan Oware</p>
	<p>Weather, Climate, Water and Hydro Climatic Disasters</p> <ul style="list-style-type: none"> ▪ Estimation Of Evapotranspiration For Crop Water Requirement Using Satellite Imagery - <i>R.O. Gawala and O.S. Aboyeji</i> ▪ GIS and Remote sensing based Assessment of water quality changes in Lake Malawi - <i>Charles Chisha Kapachika</i> 	<p>Moderator:</p> <p>Oludhe/ Robinson Mugo</p>	<p>Venue:</p> <p>Remote Sensing Training Lab</p>

	<ul style="list-style-type: none"> ▪ Mapping Soil Moisture Content using Senstinel-1 and Sentinel-2 Case Studies from Kenya - <i>Degelo Sendabo</i> ▪ Stream Flow monitoring – <i>Faith Mitheu</i> ▪ Water Resources Integration Development Initiative Tanzania (WARIDI) – <i>Erneus Kaijage</i> ▪ Climate change vulnerability assessment in the northern rangelands – <i>Grace Koech</i> 	<p>Rapporteurs:</p> <p>Grace Koech and Stephen Sande</p>	<p>Assistant</p> <p>Daniel Kipkemei</p>
	<p>Cross Cutting and Land Surveying & Management</p> <ul style="list-style-type: none"> ▪ Improved Cheetah Analysis - <i>Mutoro Noreen, Schaab Gertrud and Wykstra Mary</i> ▪ The role of planning support systems in National Policy Transfer and Policy translation in secondary cities - <i>Benson Mutuku, Luc Boerboom and Mafalda Madureira</i> ▪ On-line spatial data mining a catalyst for national, continental and global initiatives - <i>Peter Kinyua Njagi</i> ▪ Establishment of a Common and Modern African Geodetic Reference System (AFREF) – <i>Charles Muya</i> 	<p>Moderator:</p> <p>Amos Tabilla/ Lawrence Okello</p> <p>Rapporteurs:</p> <p>Patrick Kabatha and Ian Asige</p>	<p>Venue:</p> <p>Plenary Tent</p> <p>Assistant</p> <p>Daniel Mordecai</p>
13:00 – 14:00	LUNCH BREAK		
14:00 – 16:30	PARALLEL SESSIONS - PRESENTATIONS	Facilitator	Eunice King'ori
	<p>Agriculture and Food Security</p> <ul style="list-style-type: none"> ▪ Use of Sentinel 2 data to estimate agricultural areas by speculation - <i>Gayane Faye, Fallou Seck, Mamadou Adama Sarr, Thierno Ngamb and Souleye Wade</i> ▪ Using new earth observation (EO) tools for monitoring crop and rangeland productivity constraints in the context of safeguarding livelihoods in rural Africa - <i>Tobias Landmann, Elfatih Abdel-Rahman and Richard Kyalo</i> ▪ Towards the development of a web based rangeland assessment and monitoring tool – <i>Anthony Ndubi</i> 	<p>Moderator:</p> <p>Boitt/ Degelo Sendabo</p> <p>Rapporteurs:</p> <p>Anthony Ndubi, Rose Waswa and Abdi Gedi</p>	<p>Venue:</p> <p>GIS Training Lab</p> <p>Assistant</p> <p>Steve Firsake</p>

	<p>Land Use Land Cover and Ecosystems</p> <ul style="list-style-type: none"> ▪ GIS and Remote sensing based assessment of land use-land cover changes in the Coastal City of Lagos Nigeria - <i>Temitope Ezekiel Idowu and Rose Malot Waswa</i> ▪ GIS application on socio-economic effect of road infrastructure development and sustainable development- case of Nairobi bypasses - <i>S. Mwenda, F. Orina and T. Gacoki</i> ▪ Land use and Land cover data changes in Indian Ocean Islands Case study of Unguja in Zanzibar Island - <i>Sizah Mwalusepo, Eliud Muli, Elfatih M. Abdel-Rahman I, Tobias Landmann, Asha Fakih and Suresh Raina</i> ▪ Savanna vegetation structure mapping using Synthetic Aperture Radar and Terrestrial Laser Scanning in Kruger National Park, South Africa - <i>Odipo, Berger and Schmillius</i> ▪ Enabling Annual Land Cover Mapping Across East Africa – <i>Phoebe Oduor</i> 	<p>Moderator: Clifford Okembo/ Charles Muya</p> <p>Rapporteurs: Eunice Wangui and Josphat Makanga</p>	<p>Venue: Conference Room</p> <p>Assistant Allan Oware</p>
	<p>Weather, Climate, Water and Hydro Climatic Disasters</p> <ul style="list-style-type: none"> ▪ Sedimentation dynamics of mudi dam using an unmanned aerial vehicle - <i>Robert S.B.G. Suya and Charles C. Kapachika</i> ▪ Synthetic Aperture Radar for Vegetation and Soil Moisture Monitoring in Masai Mara - <i>David Ongo, Rogier Van der Velde and Zoltan Verkedy</i> ▪ Determining extreme heat vulnerability of Harare Metropolitan City using multispectral remote sensing and socio-economic data - <i>Terence Mushore, Onesimo Mutanga, John Odindi and Timothy Dube</i> ▪ Water Quality Monitoring – <i>James Wanjohi</i> 	<p>Moderator: Oludhe/ Robinson Mugo</p> <p>Rapporteurs: Grace Koech and Stephen Sande</p>	<p>Venue: Remote Sensing Training Lab</p> <p>Assistant Daniel Kipkemei</p>
	<p>Cross Cutting and Land Surveying & Management</p>	<p>Moderator:</p>	<p>Venue: Plenary Tent</p>

	<ul style="list-style-type: none"> ▪ A tool for ensuring policy- Impacting research results - <i>John Kalisa</i> ▪ Solid Waste Disposal Site Selection Using GIS, Gombato Bongwe Ward, Kwale - <i>Brian Wanyama and Maureen Muthui Katee</i> ▪ Spatio-temporal patterns of malaria hotspots in Kigali City - <i>Jean Pierre Bizimana and Gilbert Nduwayezu</i> ▪ Hydropower Resources Atlas of Kenya with Emphasis on Small Hydropower Resources - <i>Daniel K. Theuri and Samuel Ng'ang'a</i> ▪ Geo-Information Training – <i>Leonard Sweta</i> 	<p>Amos Tabilla/ Lawrence Okello</p> <p>Rapporteurs: Patrick Kabatha and Ian Asige</p>	<p>Assistant Daniel Mordecai</p>
16:30 – 17:00	TEA BREAK & EXHIBITION/ POSTERS	Booth Attendants	Exhibition Booth

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Friday 29 th , September 2017			
Role of Universities in Geospatial Technology Development			
Time	Agenda Item	Moderator	Venue
9:00 – 9:30	<p>Key Note Speaker 4: Role of Universities in Geospatial Technology Development</p> <ul style="list-style-type: none"> ▪ Galcano Mulaku -University of Nairobi 	Kenneth Mubea	Plenary Tent
9:30 – 10:30	<p>PLENARY SESSION: Role of Universities in Geospatial Technology development</p> <ul style="list-style-type: none"> ▪ Kenyatta University ▪ Makerere University ▪ Nairobi University ▪ University of Kwazulu Natal ▪ University of Rwanda ▪ RCMRD – Julius Gichohi 	<p>Moderator Kenneth Mubea</p> <p>Rapporteurs: Anthony Ndubi and Rose Waswa</p>	Plenary Tent

10:30 – 11:30	TEA BREAK & EXHIBITION/ POSTERS	Booth Attendants	Exhibition Booth
11:30 – 13:00	PARRALLEL SESSIONS - PRESENTATIONS	Facilitator	James Wanjohi
	Agriculture and Food Security <ul style="list-style-type: none"> ▪ Evaluation of remote sensing vegetation indices for monitoring maize crop condition and yields in Tanzania - <i>I. B. Yonah, S. Tumbo, B. Mbilinyi, J. Dempewolf and M. S Maurice</i> ▪ Using radar images for analysis of small and large scale crop production in Endebess sub county - <i>Bartholomew Thiong’o Kuria</i> ▪ Improving the capacity of Institutions on geospatial technologies for societal benefit – <i>Joseph Murage</i> 	Moderator: Boitt/ Degelo Sendabo Rapporteurs: Anthony Ndubi, Rose Waswa and Abdi Gedi	Venue: GIS Training Lab Assistant Steve Firsake
	Land Use Land Cover and Ecosystems <ul style="list-style-type: none"> ▪ Application of GIS and Remote Sensing Techniques in analysis of Land Use and Land Cover Changes threats to River Njoro Ecosystem - <i>Moses Kamau Thiong’o</i> ▪ Urbanization in Lilongwe a spatial metrics analysis - <i>Kondwani Godwin Munthali</i> ▪ Use of geospatial technology to map the distribution of vervet monkeys in urban areas - <i>Rhoda R. Chai, Dorcas Yole, Gordon Wayumba and Samson Ayugi</i> ▪ Use of GIS in Assessing the Appropriateness of an Existing Dumpsite and the Suitability of Future Landfill Sites for Nairobi - <i>Justin Kimani</i> ▪ Mapping Land use and Land Cover Change and its influence on Soil Erosion in the Upper Ruvu Watershed, Tanzania - <i>Winfred Mbungu</i> ▪ MESA Early Warning Applied to Protected Areas – <i>Kenneth Mwangi</i> ▪ Evaluation of Supervised Classifiers for Forest Resource and Land Cover Mapping based on 	Moderator: Clifford Okembo/ Charles Muya Rapporteurs: Pauline Ogola and Josphat Makanga	Venue: Conference Room Assistant Allan Oware

	Combination of SAR and Optical Remote Sensing data - <i>Dorothea Deus</i>		
	<p>Weather, Climate, Water and Hydro Climatic Disasters</p> <ul style="list-style-type: none"> ▪ Seasonal variability of herbage biomass resources for grazers in Karamoja sub region - <i>Buyinza Ambrose and Shuaib Lwasa</i> ▪ Eastern and Southern Africa Fire Information System (ESAFIS): Supporting Fire Response & Management. – <i>James Mumina</i> ▪ Vulnerability of Groundwater to Pollution: Locating Pollution Hot Spots in the Lake Nakuru Drainage Basin - <i>Simon M. Onywere</i> 	<p>Moderator: Oludhe/ Robinson Mugo</p> <p>Rapporteurs: Grace Koech and Stephen Sande</p>	<p>Venue: Remote Sensing Training Lab</p> <p>Assistant Daniel Kipkemei</p>
	<p>Cross Cutting and Land Surveying & Management</p> <ul style="list-style-type: none"> ▪ The Geo Information Applications in Decision Making In Umeme - <i>Stella Namulondo</i> ▪ Unravelling kobo toolbox and kobo collect smartphone geospatial technology - <i>Nyangueso S. O., Hayombe P.O. and Were J.</i> ▪ Urban tree species classification on pixel and object level - <i>Lucy C., Dr. W. Bijker and V. Tolpekin</i> ▪ Why spatial intelligence is critical to business models - <i>Nashon Adero and James Shikwati</i> 	<p>Moderator: Amos Tabilla/ Lawrence Okello</p> <p>Rapporteurs: Patrick Kabatha and Ian Asige</p>	<p>Venue: Plenary Tent</p> <p>Assistant Daniel Mordecai</p>
13:00 – 14:00	LUNCH BREAK		
14:00 – 15:00	CLOSING CEROMONY	<p>Moderator: Byron Anangwe</p>	<p>Venue: Plenary Tent</p>
	<ul style="list-style-type: none"> ▪ Director Technical Service RCMRD ▪ USAID Kenya ▪ Director General RCMRD ▪ Kenya Government ▪ Chief Guest – RCMRD Governing Council 		

