ANNUAL REPORT 2018

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WASCAL
West African
Science Service Centre on
Climate Change
and Adapted Land Use

Combating Climate Change. Improving Livelihoods

SPONSORED BY THE
Federal Ministry
of Education
and Research

CONTENTS

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OUR VISION

WASCAL seeks to become one of Africa's leading institutions in the provision of climate services in and for West Africa.

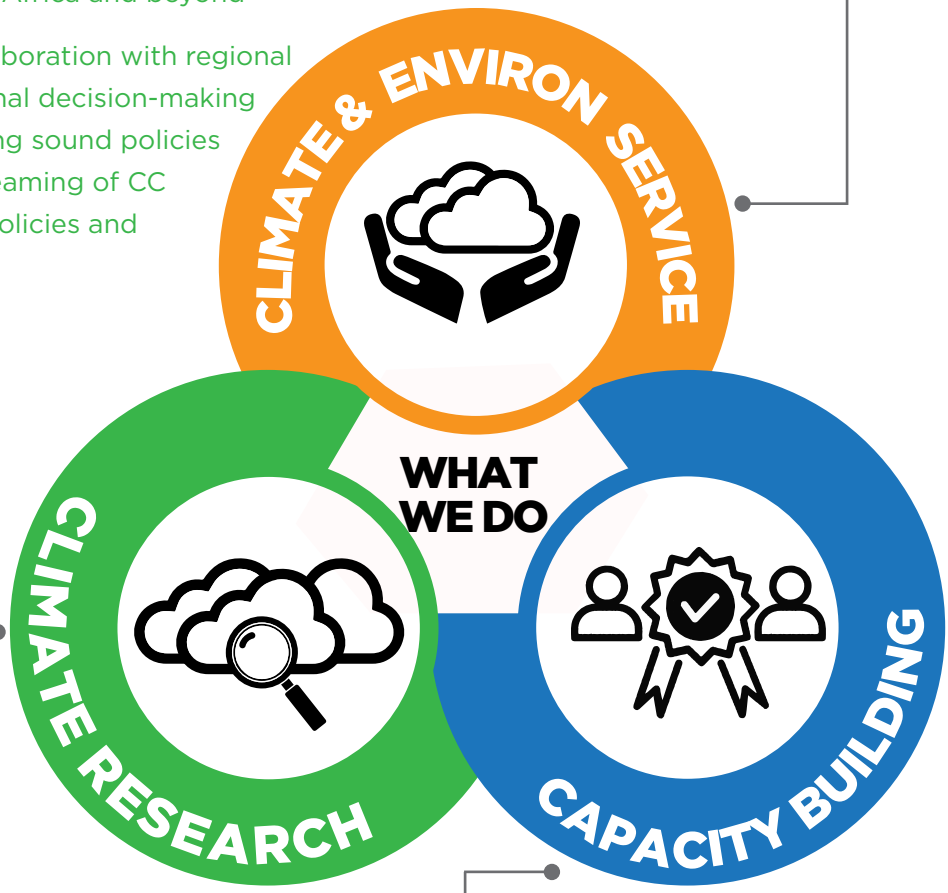
OUR MISSION

WASCAL seeks to provide information and knowledge at the local, national and regional levels to its West African member countries to cope with the adverse impacts of climate change. We do this through Capacity Building support to young West African Scholars in fields of natural and social sciences and by strengthening West African universities and climate service departments in WASCAL member countries.

OUR MEMBER COUNTRIES

- Connecting regional partners in data gathering networks and providing them with the infrastructure and the expertise to analyse the impact of climate change (CC) and develop management strategies and policies;
- Translating the scientific-based outputs of WASCAL scientists, partners and others into adequate formats to support policy and decision-making in the region
- Fostering outreach, communication and networking within West Africa and beyond
- Fostering scientific collaboration with regional organizations and national decision-making institutions to formulating sound policies that enable the mainstreaming of CC issues in development policies and programmes.

Providing climate services to West African governments, regional economic bodies and basin authorities amongst other to feed into the development of climate change mitigation and adaptation strategies. This is achieved through data collection and dissemination, capacity building, translation of climate related data and scientific information from monitoring systems and models into customized products such as projections, forecasts, information, trends, economic analysis, assessments and guidelines on best practices.



Comprising the Graduate Studies Programme, which helps educate the next generation of scientists attain an intimate knowledge of different climate related issues in order to help the region develop suitable management strategies. This is done through the awarding of full scholarship to the Doctoral and Masters Students in all the lead Universities with comprehensive training and research support. The German partner universities collaborate with the Doctoral and Master's Programmes in the areas of curriculum development, visiting Lecturers and co-supervision of graduate students.

The department also runs the In-Service Training Programme which strengthens the existing human capacity of member countries to allow them to participate in the on-going global discourse on climate change and respond to current and future adaptation or mitigation challenges.

DONOR'S REMARKS

Prof. René Haak
Head of Division Global Change, Climate and Biodiversity

Our shared institution WASCAL has grown to a regional reference in West Africa when it comes to the fight against the impacts of Climate Change on the livelihoods of millions of citizens in the partner countries. We, the German Federal Ministry of Education and Research, as currently single funding partner, are very proud of the achievements throughout the past ten years and we have shown this through our commitment on how best international cooperation can help in mitigating specific problems in the wWorld. The commitment of the Germany is its contribution to the implication of the sustainable Development Goals decided by the entire World to improve the living conditions in the developing countries.

With the launch of the second rResearch Programme, WRAP 2.0, the recruitment of the fourth batch of students for the Graduate Study Programme, and the launch of the Alumni Programme, and the restructuration restructuring of the Competence Centre, WASCAL is now set for good progress in the next years because it can count on the financial commitment of the German partner for in a total around of around twenty five millions Euros. Our motivation is based on the fact that we clearly see the real contribution of our Graduates from the current ten mMasters and doctoral programmes the better future of the African continent. The Research Programmme will now tackle the new fields of challenges Africa is facingactually facing actually and propose applicable solutions to the stakeholders and in particular to the political decision makers in our partner countries.

Beside our engagement, it seems very important that the African partners themselves insure a bright future for the institution by contributing actively in the definition of the scientific needs, in the implementation of research results and in particular by making to the institution the necessary financial resources available to enable continuity of its mission.

On behalf of the Federal Ministry of Education and Research, of all German scientists and institutions involved in the development of WASCAL, I congratulate WASCAL for the work done and for the perspectives borne borne through our fruitful collaboration over the last decade. We will stay on the side of WASCAL, even if it is in another redefined role to make sure our common objectives are reached for the best of the West African Region and for the entire continent.

We wish WASCAL and the sister organization SASSCAL in the southern part of Africa all the best.

GOVERNING BOARD CHAIR MESSAGE

Mr Peter Justice Dery
Board Chairman

It has been an eventful year, and as the chair of the board, I look back from January with a mixed feeling of accomplishments and more challenges to conquer ahead. Climate change continues to be one of the challenges Africa is faced with in this century. The situation demands a critical need to develop innovative and proactive measures to deal with the problem. To do these researches is fundamental. The purpose of scientific research is to inform action by contributing to knowledge and progress, this we do at WASCAL.

The importance of WASCAL's role in the fight against climate change cannot be over emphasized in the glaring manifestations of the impacts of Climate Change on key sectors of the economies in West Africa. Food security is threatened and freshwater bodies our source of life are drying up and getting depleted. Prolong droughts are making the tilling of land difficult for peasant farmers and animals are starving as they cannot have a place to graze. I can go on and on. Climate research and capacity building is even more crucial at this point as we strive to achieve the Sustainable Development Goals and the Paris Agreement.

WASCAL has grown to be a major player within the space of climate science and research excellence in the sub-region. The last 5 years has seen us chalk tremendous success in the area of Capacity Building. We have so far produced a total of 258 graduates in PhD and Masters level in 10 schools across various countries in West Africa who are serving in different capacities both within the region and outside. Most of them in research institutions, international Banks and in Ministries, Departments and Agencies in the region and beyond.

We have been able to support national institutions with observatory equipment including automated weather stations to Ghana, Gambia, Nigeria, Mali, Togo and Senegal. More are on the way to other countries. The core research programme is picking up with the completion of WRAP 2.0 and

Our scientists have contributed to knowledge in diverse areas on climate change. Through international competitive processes we continue to hire high caliber staff to steer the affairs of WASCAL. Key highlights of the year included the honoris causa award conferred on Dr. Wilfried Kraus by Universities of Lome and Cheikh Anta Diop University; the maiden edition of the WASCAL Science Symposium as well as the WASCAL Alumni Homecoming all of which established us a climate solution centre with lots of success stories to share.

We look forward to achieving the expected heights for WASCAL as we strive to do more than we have done. The countries must demonstrate more commitment and ownership of this noble institution. We need to diversify funding to WASCAL to be sustainable and financially robust. We must strengthen our relations and cooperation with partners within and outside the Africa region. We need to complete the process of getting the remaining five (5) countries Guinea, Guinea Bissau, Liberia, Sierra Leone and Cape Verde on Board WASCAL to make it truly an ECOWAS programme.

Let me show appreciation to members of the Governing Board, the BMBF, PT-DLR and the hardworking staff of WASCAL for their hardwork and commitment. I further call on governments, all development partners, the private sector, fellow Africans in and out of the continent and the international community at large to support the growth of our noble organization for a win-win benefit and cooperation.

God bless you all

MESSAGE FROM THE EXECUTIVE DIRECTOR

Dr. Moumini Savadogo
Executive Director

I would first of all like to, on behalf of the Governing Board and Management WASCAL, pay tribute to our first board chair, Professor Modibo Haidara, who passed away in Frankfurt, Germany,while returning from the 13th extraordinary board meeting. Until his demise, Prof Haidara was a member of the governing board where he served as chairman of the Fundraising Steering Committee.

The year 2018 was a year of great transition. All players worked tirelessly to ensure the vision and relevance of WASCAL are kept alive. Even more especially with its sustainability. The beginning of the year welcomed my appointment as the new Executive Director. Following my assumption of duty, I took stock of the situation and subsequently set specific goals for the year.

As an international organization dedicated to becoming one of Africa's leading institutions in the provision of climate services, capacity building and research, in and for West Africa, there was the need to identify and maximize trending and potential partnerships towards the realization of our objectives.
The organization positioned itself towards embracing the challenges that lay ahead through the Long- term Sustainability Workshop held to lay the foundation for the creation of a platform for strategic planning and actions for future stability. It was a momentous time, considering the team that was gathered to deliberate, discuss and step forward with ideas regarding the drafting and implementation of a Resource Mobilization Strategy.

This report provides a concised documentation of what has transpired within the year under review at the level of the executive management and other department.

It is worth noting that strides have been made towards the sustainability of WASCAL. Examples are the expert workshops, the first WASCAL Science Symposium, the Renewable Energy workshops and the conferring of honoris causa on Dr. Wilfried Kraus in Togo and Senegal, the finalization of the research agenda for the next 4 years and associated call documents, the business plan (2019-2022) and scientific results. These events and documents holistically spell out practical ways of moving WASCAL forward.

WASCAL has maintained excellent collaborations with the universities hosting the10 graduate schools in West Africa and with German academic institutions. All the students at the master's research programmes have graduated while those in the doctorate research programs are on good track. WASCAL has a strong alumni in public and private sectors contributing to creating conditions for climate-resilience in West Africa. Additionally, WASCAL is ready to recruit the 4th batch of students (at least 110 for DRPs and 22 for MRPs) that will be open to fee-paying students for 10 DRPS (the former 4 MRPs being upgraded) and the 2 new MRPS (climate change and marine science in Mindelo, Cabo Verde and Geoinformatics in Ouagadougou, Burkina Faso).

The team at the competence centre published important scientific results and delivered essential

climate services to stakeholders.

I am happy to announce that in 2018, WASCAL strengthened its visibility efforts through the intensification of institutional partnerships with similar organizations in a bid to work collaboratively to champion the cause of mitigating and adapting to the challenges of climate change.

The core objectives for the year were to align and sustain the past achievements of the institution by strengthening the executive management system with a focus on the development plans, support to the governing bodies, required reforms, preparatory work for the construction of the new competence centre, building and extending membership to non-WASCAL countries.

Despite several institutional constraints, we managed to chalk some great strides, for instance, we enhanced our corporate governance by successfully providing support to the governing bodies for effective operations. Two strategic meetings were held as well as the 12th Governing Board Meeting in Banjul, The Gambia conveyed by BMBF on the sustainability of the institution.

Another stride was the coordination of the strategic plan completed by the business plan following recommendations of the Board and with the support of BMBF; the climate and environmental services plan (WASCLIMES 1.0); 4th batch recruitment of the graduate research.

Again reporting procedures, processes and schedules have been drastically improved upon, compared to 2017.

Also, to reinforce staff security, CCTV cameras were installed at the headquarters as well as a digital thumbprint recorder for staff attendance.

WASCAL has maintained excellent collaborations with the universities hosting the 10 graduate schools in West Africa and with German academic institutions. All the students at the master's research programmes have graduated while those in the doctorate research programs are on good track.

For me, my first year in office, I must say has been a learning curve. We are even poised to fly higher in 2019 as we work hard to build stronger partnerships with all stakeholders while making new ones. Thank you.

01

2018 IN RETROSPECT

WASCAL SUPPORTS THE SCIENTIFIC PILLAR OF THE ALLIANCE SAHEL

THE Executive Director of WASCAL, Dr. Moumini Savadago co-signed the declaration of Ouagadougou to build the foundation of the scientific pillar of the Alliance Sahel. The groundbreaking event was held together with 11 other scientific organizations active in the Sahel region. The declaration contained eight Research Priority Areas proposed as follows. The declaration seeks to support territorial development through foresight analyzes, strengthening local participatory approaches, developing action frameworks in favor of inclusive innovation while building ecological intensification of all sectors through agro-ecological management of crop systems, agriculture-livestock integration, reduction of post-harvest losses, development of food processing and markets.

PARTICIPATION AT KATOWICE- COP24

COP24·KATOWICE 2018
UNITED NATIONS CLIMATE CHANGE CONFERENCE

Representation of WASCAL at the side-event organised by the French Institute of Research for Development (IRD) and other partners at the 24th COP of UNFCCC, on the theme “Tracking progress on Nationally Determined Contributions (NDCs): Gaps and needs on national and regional policy and research strategy”, where a scientist from the research cluster deliver a speak on “Taking into account science in West African States’ NDCs and NAMAs: baselines and contribution of the WASCAL Competence Centre”.

WASCAL SCIENTIST SELECTED AS AN IPCC ASSESSMENT REPORT AUTHOR

SENIOR scientist in climate modeling and climate change and Director of Research at WASCAL Competence Centre, Dr. Mouhamadou Bamba Sylla was selected as an author in connection with the preparation of the next Intergovernmental Panel on Climate Change (IPCC) Assessment Report 6 (AR6).

By this appointment, he will be one of the lead authors for the chapter 12 “Climate Change information for regional impact and for risk assessment” of the Working Group 1 (WG1) contribution due in 2021. Together with his co-authors, they will work on integrating both quantitative and qualitative climate change information from multiple lines of evidence on changing hazards for the present day, the near-term and the long-term.

The IPCC was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) and endorsed by UN assembly. The role of the IPCC is to comprehensively and objectively assess y the scientific, technical and socio-economic information relevant to understanding climate change, its potential impacts and options for adaptation and mitigation. Every 5 to 7 years, IPCC releases an assessment report written by hundreds of scientists in a very collaborative and collegial way. This report constitutes the current state of knowledge on climate change and informs international policy and negotiations on climate-related issues.

Working Group 1 (WG1) deals with The Physical Science Basis. Each of the chapters is led by a group of Lead Authors and Coordinating Lead Authors that are world-leading climate scientists who represent a broad range of opinion, expertise, gender, and geographical representation. They come from academia, research facilities, industry, government, and non-governmental organizations.

PILOTING SUSTAINABLE RENEWABLE ENERGY IN GHANA AND TOGO

WITH the financial support of BMBF, WASCAL, in collaboration with the partner universities of Lomé (Togo) and the Council for Scientific and Industrial Research (CSIR-Ghana) carried out feasibility studies on renewable energies. The maiden Renewable Energy workshops were held in Lomé and Accra in April. They were part of BMBF's strategy to develop and implement a year-long pilot project on Renewable Energies in Ghana and Togo and subsequently across West Africa. Follow up desk study meetings were held in Accra in August and in Lomé in October to enable the growth and sustainability of the renewable energy project. These platforms contributed to raising awareness at policy level, evaluate the renewable energies potentials (Solar, Biomass, hydro-power and hybrids), analyse the institutional framework, the impact of climate change on the resource base and the best options for effective greening of the economy in rural areas. These analyses have given evidence-based information to the countries on the ongoing development of sustainable renewable energy programs in these countries.

BMBF TO SUPPORT THE GAMBIA IN CLIMATE CHANGE AND RENEWABLE ENERGY

BMBF held a groundbreaking workshop in the Gambia to kickstart the Climate Change and Renewable energy project it seeks to embark on within West Africa.
The Vice President of the Republic of the Gambia, His Excellency Ousainou Darboe was present and affirmed that the project was in line with the national development policies,and so they were willing to support all efforts geared towards reducing the impact of climate change. The Vice President reminded that the seminar serves as an important step towards implementing The Gambia's commitments on the 21st conference of parties of UN conference on climate change held in Paris in 2015" he stated. The sector minister, Honorrable Badara Joof, challenged participantsto go beyond the seminar and generate issues of climate change and the environmental impact that it has.

WASCAL PARTICPATES IN NDCS DISCOURSE AT THE 7TH CONFERENCE ON CLIMATE CHANGE

WASCAL at the just ended 7th Conference on Climate Change and Development in Africa (CCDVII), which took place in Kenya's capital, Nairobi.

As a member of the panel discussion on Climate Information Services in support to the senior scientist at WASCAL, Dr. Sylla advocated for a stronger continental political leadership for the generation of knowledge about the climate change impacts of 1.5oC and 2oC global warming on development sectors of Africa; the strengthening of the National Meteorological Services for a free and open access data culture as well as the development of robust climate information at different timescales for supporting the NDCs implementation. CCDVII was under the theme "Supporting the Implementation of the Paris Agreement in Africa: From Policies to Action". The three-day conference brought together stakeholders from governmental, scientific and academic divides such as the universities, regional climate centres and research centers; civil societies, development partners and private sectors, to examine Africa's Nationally Determined Contributions (NDCs) and to define actionable climate interventions.

The Conference on Climate Change and Development in Africa was organized by the United Nations Economic Commission (UNECA) for Africa in partnership with the Pan-African Climate Justice Alliance (PACJA).

WASCAL & AMMA-2050 SET ROADMAP TO ACTIVATE SCIENCE-POLICY LINKS IN WEST AFRICA

WASCAL and the African Monsoon Multidisciplinary Analysis 2050 (AMMA-2050) came together with city, national and regional decision makers to develop a roadmap to strengthen linkages between researchers and policymakers in West Africa. The workshop took place at the WASCAL Competence Centre in Ouagadougou, Burkina Faso. Focus was on strengthening resilience to climate-related risks within the disaster risk reduction and agricultural sectors across West Africa. Participants identified researchers' capacities, technical support to policy makers, and resources for strengthened science-policy-practice engagements as key opportunity areas.

WASCAL LEADS CONSORTIUM IN RENEWABLE ENERGY PROJECT BY BMBF IN GHANA

BMBF in partnership with WASCAL, has set aside funds worth EUROS 230,000 for feasibility studies on renewable energies development, for a Pilot Project implementation in Ghana.

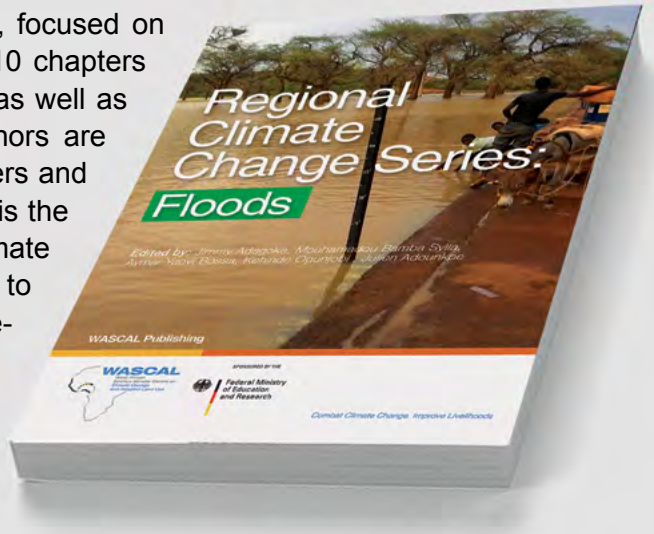
Dr Christoph Rövekamp, the Head of Division 722 Basic Energy Research at the German Federal Ministry of Education and Research (BMBF), announced this at the opening section of a regional stakeholders' consultation workshop held in Accra-Ghana in, July. He said funding from the BMBF would support a joint scientific team of experts from research institutions in Ghana and Germany to seek inputs from, and to collaborate with industry and civil society in the energy sector, including the Energy Commission, Electricity Company of Ghana, GRIDCo, the Kumasi Institute of Technology Energy and Environment (KITE), the

Council for Scientific and Industrial Research (CSIR), the Centre for Climate Change and Gender Studies of the University of Energy and Natural Resources at Sunyani, the Department of Agricultural and Biosystems Engineering at KNUST, the Institute of Statistical, Social and Economic Research, University of Ghana Legon, and a research institution based in Germany.

RESEARCH DEPARTMENT

FIRST WASCAL PUBLISHING TO INFORM POLICY-MAKERS

WASCAL published its first regional climate change series, focused on Floods, which was initiated in 2017. The book comprises 10 chapters dealing with physical science basis of the climate hazards as well as vulnerability of communities and response strategies. Authors are mainly WASCAL scientists, regional and international partners and alumni from the graduate studies program. This publication is the first volume of an annual series of books on challenges of climate and land use that WASCAL and partners intend to release to assert its contribution to support ECOWAS countries in science-based decision-making process and for the achievement of the sustainable development goals. The next edition will focus on the climate services provision in west Africa.



CHALLENGING WASCAL ALUMNI TO DEVELOP THE SPIRIT OF ENTREPRENEURSHIP

GRADUANDS of WASCAL's Masters Programme at the Université Abdou Moumouni de Niamey in Niger were charged by the Executive Director of WASCAL to develop a resilient spirit of entrepreneurship, think outside the box and never wait for an employer before moving into action.

He also asked them not to be dissuaded into deserting their certificates on their shelves to take on a different profession.

Dr Savadogo further challenged them to live up to expectation and reciprocate the efforts of German Federal Ministry of Education and Research (BMBF). The Director of Climate Change and Energy programme, Dr. Rabani Adamou also congratulated the graduands and admonished them to go out there and surmount the challenges with head high and confidence, in order to make WASCAL proud.

The graduands presented findings and results of their various projects works to the entire invited guests

at the event, before they were presented with their certificates. In all ten (10) students from various countries within West Africa graduated.

The event was graced by the Nigerien Minister of Higher Education, Research and Innovation, the ambassador of the Federal Republic of Germany to Niger, the vice chancellor of the University of Abdou Moumini and other university dignitaries.

WASCAL ALUMNI SHARE IMPACT STORIES WITH BMBF

Students and alumni of WASCAL had a two-hour session to interact and share their impact stories with BMBF, donors of the Graduate Studies Programme of WASCAL,. The memorable occasion had students taking their turns to to share their WASCAL success stories. Amongst the recommendations they shared included the need for WASCAL to integrate an entrepreneurship module in its course for self -empowerment and climate change job creation through the scientific and research knowledge acquired from the WASCAL Graduate Programmes.

GHANA MINISTER OF ENVIRONMENT, SCIENCE, TECHNOLOGY AND INNOVATION IS POSITIVE ABOUT RENEWABLE ENERGY GENERATION

HONOURABLE Professor Kwabena Frimpong Boateng, Ghana's Minister of Environment, Science, Technology and Innovation in his key note address cited hands-on ways of generating renewable energies in Ghana, and assured participants that the Government of Ghana will be monitoring the progress of the workshops and project because of its interest in it. The workshop which brought together various expertise from within the energy sector in Ghana was to establish bilateral engagement with Ghana will help in identifying a successful way of carrying out the project.

BMBF TO CONTINUE SUPPORTING WASCAL FOR THE NEXT DECADE

BMBF, pledged to continue supporting WASCAL for the next decade, and challenged the organization to intensify its innovative strategies to attract more partnerships for its sustainability, while overseeing the financial contributions of member countries as a way of getting countries to own and drive WASCAL as a West African organization. This was contained in the remarks of Dr. Wilfried Kraus of BMBF in an interaction with the management, staff, students and alumni of WASCAL at its headquarters in Accra.

Dr. Kraus also assured of his Ministry's intended increase in the number of student intake in subsequent admissions by the Capacity Building Programme. He further admonished alumni to continue striving hard to use their expertise from the Capacity Programmes for the benefit of their respective countries and West Africa as a whole. He also tasked the Executive Management to ensure that the remaining five ECOWAS countries be brought on board to complete the vison of WASCAL. He said they should develop creative ideas in the areas Climate Change and Sustainable Land Use, and Renewable Energy Options. Prof. Renee Haak, responsible for the implementation of WASCAL at BMBF challenged the alumni to continuously develop their creative engagements and build strong networks to develop relevant research projects for future considerations.

DEEPENING AFRICAN-GERMAN PARTNERSHIP TO COMBAT CLIMATE CHANGE

THE Head of Division "Global Change" at the BMBF Prof. Rene Haak stated that one of the key aims of the international cooperation between Germany and Africa is to strengthen the science base in Africa by supporting local capacities and developing and combining their respective scientific joint efforts.

He said this at the inaugural edition of the WASCAL Science Symposium (WASS) in Accra. Prof. Haak acknowledged that WASCAL had provided a great supporting role by setting up and coordinating new integrated regional research activities in the area of sustainable land use, water resource management, Biodiversity, renewable Energy, agriculture, human security, climate systems and economics with the latest focus on data management and Marine research.

He further emphasized BMBF's immense contribution towards the success of WASCAL and its sister organization, SASSCAL. "As BMBF, we try to support our partners from Africa in building up scientific structures and educational and research capacities in a variety of ways. The two Climate Competence Centres - WASCAL and SASSCAL – are cornerstones of our collaboration in the areas of academic education, research cooperation and research infrastructure."

DEEPENING TIES WITH THE GOVERNMENT BURKINA FASO

WASCAL expressed its deepest gratitude to the Government and people of Burkina Faso for the tremendous support it has given the institution over the past years. WASCAL also congratulated the country for its up-to-date payment of their country contribution.

The Board Chair of WASCAL, Mr. Peter Dery was interacting with His Excellency S.E.M Pingrenoma Zagré, the Burkina Faso Ambassador to Ghana, together with the Executive Director, Dr. Moumini Savadogo when they paid a courtesy call on the minister in his office as part of strengthening WASCAL's partnership with the country. The meeting also set the tone for the commencement of one of WASCAL's newly introduced master's programme in informatic and climate change.

Dr. Moumini Savadogo, the Executive Director of WASCAL also thanked the people of Burkina Faso and called on the ambassador to leverage on his mandate to project the great bilateral relationship between their country and WASCAL, and also the success stories of WASCAL amongst his counterparts. He also used the opportunity to brief the ambassador on the proposed commencement of the construction of the Competence Centre building scheduled to kick start soon.

APPOINTMENT OF DR. MOUMINI SAVADOGO AS NEW EXECUTIVE DIRECTOR

WASCAL appointed Dr. Moumini Savadogo as the new substantive Executive Director effective 1st January 2018. He took over from Prof. Jimmy Adegoke who was the Interim Executive Director for nine months.

Dr. Savadogo joined WASCAL with very rich experience of more than 25 years as a Scientist and Project & Programme Manager in Environment and Sustainable Development in Africa, including 15 years at senior management level. He now leads wsthe overall administrative and strategic directions of the organization. He is also responsible for overseeing the efficient and effective day-to-day operations of the organization.

Dr. Savadogo has a PhD in Animal Sciences/ Sustainable Land Use in crop/livestock systems, Wageningen University, The Netherlands. He also has expertise in Programme development and management (Fundraising, Implementation, Procurement, Monitoring and Evaluation, Budget Management, Human Resources Management and Reporting) and negotiations.

Until his appointment as WASCAL Executive Director, Dr. Savadogo worked as Head of Burkina Faso office of the International Union for Conservation of Nature and natural resources (IUCN) West and Central Africa Program (PACO). He also worked as Scientist for the national Institute of Environment and Agricultural Research (INERA), the Joint Sahelian Progamme of Wageningen University and the University of Ouagadougou in Burkina Faso, the Regional coordinator of the W-Arly-Pendjari Programme development (Benin, Burkina Faso, Niger), as well as consultant for several international and national organizations.

He has an excellent knowledge of national and regional policies and strategies on energy, agriculture, ecosystem management, poverty reduction and sustainable development, climate change as well as international agreements on environment. The new Executive Director possesses rich working experience in several West African countries and very familiar with multicultural and multidisciplinary team work.

12TH GOVERNING BOARD MEETING

The 12th Governing Board Meeting was held in March in Banjul, the Gambia to review organizational activities, adopt all policy manuals and WRAP 2.0 document, examine strategies including the performance evaluation of scientific staff, scientific issues, clear roles of the Competence Centre (CoC), new organogram among others. The 13th Board Meeting was held August, in Kardinal Schulte Haus Bensberg, Germany to discuss the WASCAL Strategy 2019 -2022.

NINTH MEETING OF THE SCIENTIFIC AND ADVISORY COMMITTEE

THE Scientific Advisory Committee held its 9th Scientific Meeting in Hamburg, Germany to deliberate on the organization's scientific issues. The two-day meeting generated deliberations, including the review of the WASCAL Research Action Plan (WRAP 2.0) and the reporting period of the research component. These deliberations were examined and approved by the Governing Board.

TWO WEST AFRICAN UNIVERSITIES CONFER HONORIS CAUSA AWARD ON BMBF'S DR. WILFRIED KRAUS

THE Faculty of Economics and Management and the Law Faculty of the Cheikh Anta DIOP University of Dakar, (UCAD) Senegal and the University of Lome, Togo have conferred the honoris causa award on Dr. Wilfried Kraus of the Federal Ministry of Education and Research.

The meritorious award was in recognition of the contribution of BMBF in the fight against climate change in West Africa under the leadership of Dr. Wilfried Kraus, which has been evident in the establishment of 10 Graduate Schools within West Africa that build the capacity of post-graduate students in helping combat climate change.

Since its inception, Dr. Kraus has played a quality leadership role towards the achievement of this vision. In Senegal, the presence of WASCAL is very strong, with the establishment of Centre for Climate Change and Economics at the Cheikh Anta DIOP University of Dakar. The centre's mandate is to train Doctoral Students in the area of climate change and economics with the focus on applying economic rationality to analyze adaptation and mitigation strategies related to climate change.

ORGANIZATIONAL FINETUNING AND REFORMS

SEVERAL reforms were, in the year under review initiated to strengthen the corporate efficiency, including the Graduate Studies Programme,

The vision of the CoC was revisited to fit the strategic role of WASCAL in climate service provision. It is expected that this will lead to a restructuration of the centre in 2019 .To allow for top speed and efficiency of the internet services, there was an upgrade of the internet connection which made work easier and faster amongst staff, in meeting deadlines and doing successful research Administratively, , investments were made to help facilitate the smooth running of operations through in good internet connection, software renewal and upgrade of the accounting and human resource management software to a cloud based system (SAGE X3)These have tremendously helped speed-up the internal controls, approbation, computing and reporting processes, which in turn will create the conditions for efficiency and international fiduciary standards compliance for sustainable funding was acquired. .

WASCAL LOSES FORMER BOARD CHAIR

THE Board and management of WASCAL lost its first governing board chair, Professor Modibo Haidara. Until his demise, Prof Haidara was a member of the governing board after serving as the first board chair of WASCAL. He was the chairman of the WASCAL Fundraising Steering Committee of the Board.

02

RESEARCH

The WASCAL Research Action Plan Phase two (WRAP 2.0.) was successfully developed in collaboration with the Scientific Advisory Committee (SAC), the Directorate of Research (DoR), the research scientists and the executive management team.

Four Priority Research Themes (PRTs) have been identified and further elaborated. They are:

PRIORITY RESEARCH THEME 1: Land use and Cover/Land Degradation/Climate Change Nexus

Generating an updated and higher resolution West African time-variant LULC database (land units, plant functional types) along with their thermal and physical parameters in order to improve the representation of surface conditions in climate models and ultimately contribute to the development of a tailored dynamical vegetation model in the region

PRIORITY RESEARCH THEME 2: Risks and Vulnerability to Climate Extremes

Harmonizing and mainstreaming information on climate extreme events (with a focus on flood), vulnerability, potential risks as well as strategies to alleviate their effects. Intended tools and metrics to be developed to understand, quantify and mitigate present-day and future flood risks associated to intense precipitation events.

PRIORITY RESEARCH THEME 3: Sustainable rural-urban and cross border migration in West Africa

Obtaining more insight into the unprecedented and unregulated rural exodus especially towards major urban agglomerations and across national borders. It will specifically investigate the direction of causation in the link between population growth, land degradation, livelihood opportunities, climate change and migration.

PRIORITY RESEARCH THEME 4: Sustainable Agriculture/Climate Smart Landscapes Nexus.

Improving food and nutrition security and livelihoods through sustainable intensification of agriculture while contributing to GHG mitigation efforts

For each of these themes, scientific background and rationale, alignment with regional and global initiatives, objectives and activities as well deliverables have been provided. Calls for proposals have been prepared for this for publication.

TELLING THE IMPACT STORIES FROM THE FIELD OF WASCAL RESEARCH

Climate change and climate variability

Within the year under review, 22 experiments from a set of Regional Climate Models have been made available. The first topic was related to projected heat stress and related health disorders as well as population proportion under threat.

Heat and discomfort indices were applied to the multimodel ensemble mean of COordinated Regional climate Downscaling EXperiment Africa (CORDEX-Africa) regional climate model projections to investigate future changes in heat stress and the proportion of human population at risk under 1.5 °C and 2 °C global warming scenarios over West Africa. The results show that heat stress of category Extreme Caution is projected to extend spatially (up to 25%) over most of the Gulf of Guinea, Sahel, and Sahara Desert areas, with different regional coverage during the various seasons. Similarly, the projected seasonal proportion of human population at discomfort substantially increases to more than 50% over most of the region. In particular, in June–August over the Sahel and the western Sahara Desert, new areas (15% of West Africa) where most of the population is at risk emerge.

This indicates that from 50% to almost everyone over most of the Sahel countries and part of the western

Sahara Desert is at risk of possible heat cramp, heat exhaustion, and heat stroke in future climate scenarios. These conditions become more frequent and are accompanied by the emergence of days with dangerous heat stress category during which everyone feels discomfort and is vulnerable to a likely heat cramp and heat exhaustion. In general, all the above features are more extended and more frequent in the 2 °C than in the 1.5 °C scenario. Protective measures are thus required for outdoor workers, occupational settings in hot environments, and people engaged in strenuous activities.

The other topic is related to climate change information needed for water resources in view of irrigation opportunities. In fact, West Africa is in general limited to rainfed agriculture. It lacks irrigation opportunities and technologies that are applied in many economically developed nations. A warming climate along with an increasing population and wealth has the potential to further strain the region's potential to meet future food needs. In this study, we investigate West Africa's hydrological potential to increase agricultural productivity through the implementation of large-scale water storage and irrigation. A 23-member ensemble of Regional Climate Models is applied to assess changes in hydrologically relevant variables under 2 °C and 1.5 °C global warming scenarios according to the UNFCCC 2015 Conference of Parties (COP 21) agreement.

Changes in crop water demand, irrigation water need, water availability and the difference between water availability and irrigation water needs, here referred as basin potential, are presented for ten major river basins covering entire West Africa. Under the 2 °C scenario, crop water demand and irrigation water needs are projected to substantially increase with the largest changes in the Sahel and Gulf of Guinea respectively. At the same time, irrigation potential, which is directly controlled by the climate, is projected to decrease even in regions where water availability increases. This indicates that West African river basins will likely face severe freshwater shortages thus limiting sustainable agriculture. We conclude a general decline in the basin-scale irrigation potential in the event of large-scale irrigation development under 2 °C global warming. Reducing the warming to 1.5 °C decreases these impacts by as much as 50%, suggesting that the region of West Africa clearly benefits from efforts of enhanced mitigation.

Water Resources and Climate Change

WASCAL achieved scientific results on quantification, characterization and mapping of water-related ecosystem services. A multi-model approach has been analysed for water balance and water-related ecosystem services in the Ouriyori catchment, Benin. Predicting and supplying freshwater resources in West Africa remains a major concern and challenging, basically due to: lack of operational governance frameworks, socio-economic factors, poor resources at political/decision-making levels, lack of reliable hydro-meteorological observations, etc. Under this investigation, WaSiM (Water flow and balance Simulation Model) and SWAT (Soil and Water Assessment Tool) were applied to analyse water balance components in the Ouriyori watershed, a meso headwater catchment (14.51 km2) of the Sudanian North-Eastern Volta Basin in Benin. In addition, assessment of the hydrological ecosystem services (HES) in line with the ecosystem accounting framework was conducted to identify changes in the capacity of the catchment ecosystems to provide services such as crop water and household water supply.

The Hydrological Ecosystem Service-service capacity-was found to be in general higher than the HES-service flow for crop water supply, surface water supply (SW) and groundwater (GW) supply with a general annual decrease in service capacity of both SW and GW. These results are useful and provide relevant information on hydrological ecosystems services and support for the short and long-term planning in terms of water resource development project and suitable decision-making.
Agricultural expansion-induced infiltration rate change in a west African tropical catchment has also been examined. Land use and land cover in the Dano catchment is characterized by a rapid conversion from semi-natural vegetation (fallow) to agriculture (cropland). The study compares both the saturated (Ks) and the unsaturated (Kh) hydraulic conductivities under cropland and fallow in the catchment to gain insights on the effect of the current land use on soil water dynamics. The results showed that Ks was significantly higher (1.16-fold on average) under fallow compared to cropland. The results further show that the observed differences of Ks under cropland and fallow were caused by land use and not pre-existing difference in texture. These results suggest an increasing risk of erosion, soil fertility reduction and flood in the catchment because of agricultural land expansion.

Moreover, how to manage new risks and opportunities of agricultural development of African floodplains are investigated for identifying hydro-climatic risks and implications for rice production. Harnessing floodplains for rice intensification face numerous technical, social and economic constraints, and new risks linked to climate change, characterized by increased irregularities in rainfall, timing of floods and long-lasting droughts. This investigation assessed the hydro-climatic risks and implications for floodplain rice production in south-western Burkina Faso, in order to participate in policy discussion and co-construction of new adaptation options. Statistical methods combined with rainfall runoff modelling were used to analyse the hydroclimatic condition of the study area. The results reveal an increasing delay of the onset of the rainy season (decreasing pre-humid season duration) and a difficulty to predict it due to temporal variability of rainfall in the studied region. Additional results suggest that special attention must be given to water structure design to ensure their sustainability and avoid other new risks such as erosion. Although existing flexible water structures such as bunds with watering/drainage channels may have scientifically sound adaptation potentials to the prevailing hydro-climatic conditions, they still need to be associated with participatory water management tools.

Results were also achieved for Socio-economic characterization and transferability mechanism of water related ecosystem services.

Finally, a set of geospatial and statistics analytical techniques to identify representative spaces (cells 'grid') that can support the extrapolation and regionalization of local data to decision-making scales were developed and applied. The investigation involved

- ***a spatial sampling that was achieved by applying PCA***

- ***biophysical and socio-economic data collection and characterization, and***

- ***multiple linear regression analysis approach to estimate models of prediction of biophysical and socio-economic characteristics for their regionalization.***

The results indicate among others that

- ***the Latin hypercube conditioned based on variables or Auxiliary Satellites have been able to calculate a network of cell grids characteristic and representative of the agro-ecosystem of the study environment,***

- ***the validated regression models are able to estimate crop yield based on satellite data.***

Land Use and Sustainable Development

Modelling the sensitivity of juvenile multi-species afforestation to climate change in Semi-arid Benin was dealt with. Climate control during the early growth of trees, the most critical stage of plant development, as well as best climate metrics of the early growth sensitivity are key for assessing future adaptation strategies of young forests to climate change. Using a combination of field experiment and modelling approaches as alternative approach to traditional dendrochronology, we assessed the climate sensitivity of two promising afforestation species, Jatropha curcas L. and Moringa oleifera Lam, by analysing their predicted climate–growth relationships in the first two years after planting on a degraded cropland in semi-arid zone of Benin. The Water, Nutrient, and Light Capture in Agroforestry Systems (WaNuLCAS) model was used to simulate aboveground biomass growth under past climate conditions (1981–2016). Linear mixed models related the annual biomass growth to climate indicators, and climate sensitivity indices quantified climate–growth relationships. Drought was the dominant constraint as evidenced by negative climate–growth relationships with the most influential rainfall metrics (i.e., annual water deficit [AWD], length of dry season [LDS], and length of dry spells [LDSP]). In year one, plant growth was most sensitive to rainfall distribution, expressed by the LDSP. Simulated rooting depths greater than those in the experiments enhanced biomass growth under extreme dry conditions and reduced sapling sensitivity to drought. Projected increases in aridity and the number of days between rainfall implied significant growth reduction, but tree adaptations via deeper root systems would reduce sensitivity to climate variability in young multi-species plantations. Details can be found in a paper titled 'Climate change sensitivity of multi-species afforestation in semi-arid Benin' was published in journal of Sustainability.

Intercropping Systems in West Africa is also modelled. However, the work is not completed due to challenges in calibrating an intercropping model. Results are therefore presented of only the calibration effort. We have compared simulated and measured aboveground biomass of local millet and sorghum planted at 100% and 50% of the recommended sowing density (RD), maize cv. EVDT, local runner type cowpea and an

improved erect type cowpea cultivar IT84D. For all crops, the model predicts fairly well the aboveground biomass. The under-prediction on day of year (DOY) 253 and 266 for maize might be due to the insufficient oven drying of the plant material. The low biomass recorded for the local cowpea at final harvest may be due to losses caused by delayed harvesting. For the intercropping systems, the model predicts fairly well the major millet crop in millet intercropping systems but tended to under-predict sorghum in sorghum intercropping systems. Sorghum as a minor crop tended to be under-predicted. Generally, the model captures sole crops biomass and grain yield at final harvest accurately. The model also predicts accurately the aboveground biomass at final harvest of the intercropping systems but tended to over-predict grain yield of the main crop.

Finally the potential of rain water harvesting for supplementary irrigation to mitigate climate variability was evaluated. Maize grain yield was significantly always higher with supplementary irrigation compared to only rainfed on all planting dates. The results also show that under rainfed only, yields are lower in May than in June and July when the rains have stabilized. The results also show that with supplementary irrigation, productivity of maize can be highest in May, when most farmers in the Vea catchment will not sow maize. The results also show that under rainfed conditions, crop responses to nitrogen fertilization are minimal even at doses of 90 kg N ha-1. With supplementary irrigation, significantly higher maize yields can be achieved (3.5 – 4 t ha-1) compared to rainfed maize.
Research reports and publications are produced as an outcome of these activities (see list of publications as per KPIs and beyond KPIs).

Ecosystem Change and Ecosystem Services

Different results have been achieved for this research cluster. Regarding the impact of climate variability and change on woody plant species diversity in West Africa, achieved results in 2018 include: (1) Completion of vegetation and soil data collection in the Eastern Region of Burkina Faso where data collection was achieved in six (6) grids with a total of 37 inventory plots installed; (2) Production of one draft paper entitled “Using Publicly Available High-Resolution Multi-Sensor Data for Mapping Above Ground Biomass: An Example from West Africa’s Dryland Forest” submitted for publication in the special issue on Earth Observation for the Sustainable Development Goals in Remote Sensing of Environment; (3) development of a draft paper entitled “Vegetation structure and dominance pattern in Sudanian savanna, West Africa” that will be submitted for publication in Journal of Forestry Research.

Farmers’ perceptions of ecosystem service provision have also been addressed. Regarding this second activity, data collected in fringe communities of the Nazinga Game Ranch (NGR) in Burkina Faso and the Pendjari Biosphere Reserve (PBR) in Benin were analysed for stakeholders’ perceptions of ecosystem services provision and social drivers of degradation in these two protected areas. The key findings were presented as poster at WASCAL Science Symposium 2018 and an article has been drafted for submission to “International Journal of Biodiversity Science, Ecosystem Services & Management”.

In terms of capacity building, a master student from the MRP Climate Change and Human Security, University of Lomé, Togo, has been co-supervised by a scientist of the research cluster. His dissertation theme was entitled “Ecological Vulnerability Assessment of the Afram Headwaters Forest Reserve in Ghana” and he successfully defended his thesis with a grade A corresponding to a mark of 90/100 or 18/20. The co-supervision of another PhD Student of the GRP Climate Change and Land Use, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana, continued during the year 2018. He completed data collection and analysis and produced four draft papers two of which were accepted for publication. One bachelor student and one PhD student were trained in species distribution modelling techniques. Finally, several master students of the WABES project were assisted in getting 6 weeks internship at different national and regional institutions, as part of their training.

During the year 2018, scientists of the research cluster have authored and co-authored a number of papers, many of which are beyond the KPIs. (see list of publications as per KPIs and beyond KPIs).

The second workshop of the project was successfully organized in Accra, Ghana. Sixty-six (66) Biodiversity and Ecosystem Services (BES) experts from 14 ECOWAS countries and 6 other African and European countries participated in the workshop. This regional meeting contributed substantially towards achieving the main goals of the project. A workshop report on “Report

of the second WABES West African Experts Workshop: Uptake of the IPBES Assessment - regional and national views from the West African experts' network. June 2018, Accra, Ghana" has been made available to strategic stakeholders. Additionally, the WABES project website and platform was launched to create more visibility and communicate the success stories of the project in West Africa Region and.. Alongside this, a WABES Newsletter "Le projet WABES : : Renforcer la participation de l'Afrique de l'Ouest a l'IPBES par le réseautage et la formation » »has also been launched and was submitted to the Organisation International de la Francophonie.

Finally, the establishment of a complete plant distribution database for West Africa has been initiated. Species distribution data from GBIF consisting of more than 20,000 collection points for several vascular plant species were compiled and processed. Several environmental information (i.e., climate and other land cover data) to be used as predictors were processed. The analysis and draft manuscript are still ongoing.

Observation Networks and Seasonal Forecasting

Ihe team embarked on various field trips within and outside WASCAL watersheds in support of data collection for research. Eddy covariance, climate and hydrological stations, piezometers, moisture probes, erosion stations, agronomic plots within Sissili/vea, Dano and Dassari basins were visited. The basins are visited on monthly and quarterly bases. All categories of data were successfully downloaded and post-processed. Many datasets are uploaded and shared with the CoC through Dropbox links and/or manually (e.g. via copies on USB drive). The 2018 data collection has been completed, pre-processed and ready to be uploaded to the WASCAL portal.

The online data collection from the automatic weather network (AWS) installed in WASCAL member countries has suffered some intermittence. Online data tables and data files were archived on our server from inception up to date in Benin, Ghana, Burkina Faso, Niger and Nigeria. However, in Côte d'Ivoire, Mali and Togo, our AWS network was off-line from July to December 2018 due to lack of operational megabytes for the modem requirement in internet connectivity.

An experimental working station has been established in Burkina Faso, precisely in Ouagadougou (Boansa station) to testing the treatments of "Climate-smart practices". Hence, the 2018 intensive and extensive agroclimatic experimentations are carried out in Boansa station and Bolgatenga in Ghana.. The objective of those treatments is to assess the effects of waterlogging on maize growth, development and production. Delving through multiple sources of observational uncertainties, WASCAL ONs/SF Unit has defined scales and thresholds for operational monitoring of rainfall extremes over West Africa.

The Unit developed an "operational scheme to deliver 1-week & 2-week lead time forecasts" of rainfall extremes (false onset, extreme dry spells ≥ 10 days, heavy rain events). The Unit also designed a site-specific algorithm for "operational forecast verification" and for developing an application for android devices around the AgInfo package.

The data analyses have led to the publication of 04 ISI-standard papers, 01 conference paper, 01 working paper, 02 internship reports and 02 drafts paper under review. (see list of publications as per KPIs and beyond KPIs)

Data Management and Information Technology

With the takeover of WADI server from German partners effective April 2018, unit proceeded to enhance the server's security with the installation of a firewall (software-based) and has setup a secure redirection from http to https.

Updating the WASCAL Data Portal to align it to the FAIR concept (Findable, Accessible, Interoperable and Reusable) recently developed by the EU commission and adopted by the WDS certification programme. Currently, WADI completely fulfils the FAR (Findable, Accessible, Reusable) qualifications, but not all datasets are Interoperable, i.e. automatically reachable and readable by another data system (also known as machine readable qualification) through web services. The development of a WADI 2.0 version is initiated to meet this new requirement. See https://wascal-dataportal.org/2.0/.

- Installation on the cloud server of pro-report system and hand-over to WASCAL IT
- IT-side configuration and monitoring of about 40 Automatic weather stations
- Development/installation of 03 specific project-related websites/apps on the cloud-server (https://projects.wascal.org/wb, https://projects.wascal.org/wedatamind, https://wascal-dataportal.org/2.0)
- Configuration, Monitoring and administration of 06 servers (GIS Server, Local file Server, Local AWS data collection server, WASCAL Website, cloud-based data backup and app server, WADI server).

GIS and Remote Sensing Unit

The earth observation applications unit (EOAU) successfully completed two local scale agricultural land use maps at watershed (Vea and Dano) scale and one regional scale land use and land cover map covering about eight West African countries. The local scale maps were developed based on high resolution open access Sentinel data from the European Space Agency and is a useful input to biophysical models (e.g. hydrological, crop models) and decision making. The regional scale map could be an important input to the envisaged development of an earth system model for West Africa by WASCAL.

The unit also developed a high-resolution regional scale (Sudanian Savanna) map of above ground biomass (convertible to carbon) using data from Sentinel-1 and 2. Ground data for this mapping was collected in a field campaign conducted in 2017 in the three WASCAL watersheds. The developed map, and subsequent ones to be developed based on the proposed methodology, is beneficial for monitoring progress on certain key UN sustainable development goals (e.g. SDG 13, 15) and other international programs such as REDD.

In the year under review, the unit reviewed the data received through the EUMETCast antenna installed at the Competence Centre and prepared a report on it. Although the original objective was to conduct an analysis to determine the suitability of these data for WASCAL's envisaged climate and environmental services (CES), this aspect could not be achieved due to uncertainty regarding the exact CESs to be provided by WASCAL. Members of the unit contributed to successful fund raising efforts and published three articles in peer-reviewed journals.

DELIVERY OF CLIMATE SERVICES TO DIFFERENT STAKEHOLDERS

Climate change information based on Paris Agreement warming scenarios

The climate change and climate variability research cluster has developed 1.5 and 2.0 degrees Celsius global warming data scenarios based on the COP21 agreement and generated experiments from an ensemble of 22 regional climate models. Daily and monthly data for each regional climate model experiment and multi-model ensemble mean are available for the West African domain. Two research articles describing the methodology and applying these data to investigate water availability of the major West African river basins and to examine increased risks of heat stress, related health problems and population at risk are published in Nature Scientific Reports and Earth's Future respectively. A 3rd paper dealing with agro-climate information is ongoing. This information will be used for the development of climate change profile for ECOWAS countries.

Hydroclimate data made available to stakeholders

Hydroclimate data has been processed and uploaded on WADI. Information generated to be delivered by the water resources and climate change research cluster essentially consists of an assessment of inland valleys potential in the South west of Burkina Faso. Advantages and constraints associated with the use of inland valleys, flaws to be avoided in inland valleys development, as well as the impact of climate change on inland valleys agricultural development were also catalogued. Finally, the WAG-CAD-Bas-fond tool was validated for the Loafing inland valley. These results

have been consolidated as papers and technical reports.

Weather forecasts

The Observation Network and Seasonal Forecast Unit has monitored the Sissili/Vea, Dano and Dassari basins by undertaking routine and advance maintenance, quality control and post processing of 2017 datasets, downloading/uploading for 2018, assistance to field excursions and other events organized by the CoC and the Capacity Building department in the headquarter in Accra. In addition, an "operational scheme has been developed to deliver 1-week & 2-week lead time forecasts" of pluviometric extremes (false onset, extreme dry spells ≥ 10 days, heavy rain events) to a network of about120 farmers in the Sissili/vea basin (Northern Ghana), in the Dano basin (South-western), in Ouahigouya (Northern Burkina Faso). A framework of "agroclimatic field schools" including 60 "demonstration farms" (i.e. 2x30 treatments), and 30 control farms was established to enhance the use of sub-seasonal-to-seasonal climate information & climate- smart practices against pluviometric extremes. The framework of farmers is also used to design a site-specific "operational forecast verification" scheme.

Supporting Climate smart initiatives

The team co-organised a stakeholder workshop on climate information for integrated renewable electricity generation in Niamey and established 8 new pilot sites across Burkina Faso, Niger and Mali, procured 11 standalone automatic raingauges, installed 30 manual raingauges, identified 26 compost pits and 6 biodigestor sites to support climate-smart tested activities in the framework of the implementation of projects. The team also organised a workshop that aimed to facilitate acquaintance between stakeholders, mutual understanding of different perspectives, a collaboration toward a multi-stakeholder platform, and data collection in order to better understand the value network of organic waste. During the workshop, all stakeholders were able to draw their maps and analyse the issues in their landscapes, identify the stakeholders of their landscapes and classify them. The team began discussions with city council authorities (letters and emails to the mayor, phone and WhatsApp calls to the technical advisers) so that the project team might be able to display results of the workshop in the learning centre of the city council.

The team was also able to update existing and missing GIS data (maps, shapefiles) and collect new GIS data for official and uncontrolled landfills, garbage collection and sorting centre, UPA, and GUS. GIS maps of Ouagadougou (Burkina Faso) and Tamale (Ghana) are available showing GUS, including plant nurseries, UPA, and centres for waste collection and recycling. The staff of the Unit also elaborated the technical specifications, participated in tender evaluation report for the acquisition of 50 automated water level gauges and 10 automated water quality sensors for WASCAL countries. Finally, the unit supported the West African Climate Outlook forum (PRESASS 2018) and the extension of seasonal forecast results to farmers in Burkina Faso, Ghana, Niger, and trained students.

03

CAPACITY BUILDING PROGRAMME

BUILIDNG WEST AFRICA'S CAPACITY TO COMBAT CLIMATE CHANGE

DOCTORAL AND MASTER'S PROGRAMMES

DOCTORAL PROGRAMMES

WASCAL has a strong commitment to help educate the next generation of scientists to attain an in-depth knowledge of different climate related issues in order to help the region develop suitable management strategies.

The Capacity Building Department of WASCAL operates on two platforms; The GSP and In-service Training.

The Capacity Building Programme facilitates academic education amongst 11 West African universities in collaboration with German institutions through the Graduate Studies Programme (GSP). The Graduate Studies Programme handle helps educate the next generation of scientists attain an intimate knowledge of different climate related issues in order to help the region develop suitable management strategies. change and respond to current and future adaptation / mitigation challenges. Two other demand driven GSP with thematic focus on Climate Change and Informatics and Climate Change and Marine Sciences are about to commence in Burkina Faso and Cape Verde respectively.

The department, through its In-service training program handle, strengthens in relevant areas the existing human capacity of member countries to allow them to participate in the on-going global discourse on climate. In-service and on the job training of government scientists has also commenced since February 2017.

GRP West African Climate System, Federal University of Technology, Akure, Nigeria

The Doctoral Programme West African Climate System focuses on educating doctoral students in the fields of meteorology and climatology, providing theoretical and practical training needed for the task of developing effective and sustainable adaptation and mitigation strategies to cope with the effects of climate change. The goal is to produce, through a multi-disciplinary approach, climate scientists with expertise regarding the West African climate system. Academic capital and potential of the region is to be developed to address the impacts of climate change and variability as they would impact vital economic sectors such as agriculture, weather forecasting services, water resources, transport industry, energy, the environment and natural disaster management efforts.

GRP Climate Change and Water Resources, Université D'Abomey-Calavi, Benin

The need to understand climate change as well as climate variability and their impacts on water resources cannot be overemphasized in West Africa. The region has arid, semi-arid and tropical climates and the impacts of climate change and climate variability on water resources vary in time, space, and intensity. Providing adequate water for people, for food production, and for sanitation are some of the challenges governments are facing. Economic growth, efforts to reduce poverty and enhance social change drive demands for water and the respective infrastructures to support food productions, generate energy and provide goods and services. Such developments have a significant impact on water resources and managing these is increasingly complex. The curriculum of the Doctoral Programme Climate Change and Water Resources combines basic courses including applied mathematics and statistics, applied physics, meteorology and climatology and specialized courses in Hydrology.

Climate Change and Economics, Université Cheikh Anta Diop De Dakar, Senegal

The West Africa faces an urgent need to develop effective adaptation and mitigation strategies related to climate change through the design of appropriate science-based policies. In this context, the Doctoral Programme Climate Change Economics (CCEcon),

led by the Cheikh Anta Diop University of Dakar (UCAD), focuses on applying economic rationality to analyze adaptation and mitigation strategies related to climate change. To ensure an interdisciplinary and comprehensive approach to climate related analysis and policy the programme develops strong synergies with other universities involved in the WASCAL Graduate Studies Programme (GSP).

Climate Change and Land Use, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana

The Doctoral Programme in Climate Change and Land Use (CCLU) is focusing on capacity building at the doctoral level to help develop the knowledge necessary for sustainable land use and management in the face of climate change. The programme trains participants in data acquisition, analysis and interpretation of spatial data focusing on the use of remote sensing, geographic information systems (GIS) and empirical and mathematical modeling tools related to climate change and land use in partnership with German institutions. This is contributing to strengthening human capacity in West Africa for developing appropriate adaptation strategies to manage the impact of climate change on land and to develop resilient land use systems.

MRP Climate Change and Human Security, Université de Lomé, Togo

Climate change and human security is a new concept of integrated and interdisciplinary education, combining domains such as meteorology, geosciences, social, health and economic factors as well as institutions such as law and policies. The approach focuses on the integrated management of areas, resources, and societies affected by climate change. Students are trained in the development of strategies and concepts to reduce peoples' vulnerability and increase their coping capacity and to successfully manage climate disaster and risk. The Master's Research Programme "Climate Change and Human Security" educates students to understand the threats and risks associated with climate change, to get familiar with the design of early warning systems and to know means to improve the resilience and coping capacity of affected social-ecological systems. Students will be exposed to interdisciplinary and transdisciplinary approaches to assessing threats and to work in multidisciplinary teams with affected groups in harnessing their inherent resilience to hazards.

Climate Change and Adapted Land Use, Federal University of Technology, Minna, Nigeria

WASCAL CC & ALU focuses on climate change and adapted land use using state of the art techniques and tools, which include remote sensing, GIS, modelling and statistical analysis. Changing climatic conditions as well as human activities such as agricultural intensification lead to changing land cover patterns like deforestation, desertification but also regeneration or reforestation. To better understand the impact of climate change on land cover and the social –ecological system, students are trained in the use of state-of-the-art modeling tools for the analysis of environmental and socio-economic datasets. They produce quantitative results for scenario development and the assessment of the impacts of climate change on land cover and the environment with the aim of proffering the most suitable adaptation measures to minimize these impacts.

Climate Change And Energy, Université Abdou Moumouni De Niamey, Niger

West Africa's high vulnerability to climate change is exacerbated by endemic poverty, economic and institutional weakness, and limited access to infrastructure, technology and energy. For its ongoing development, the region needs more energy despite its vulnerability to changing climate. More than 80% of energy consumed world-wide derives from fossil fuels, a finite resource unevenly distributed beneath the Earth's surface. Reserves of fossil fuels are progressively decreasing and their continued use produces harmful pollutants and greenhouse gases associated with global warming and climate change. But energy is a basic necessity for human activity and economic and social development. Thus, one challenge for West Africa is to develop strategies reconciling rising energy demand with sustainable resource management.

MRP Climate Change and Education, University of the Gambia, Serrekunda, The Gambia

The two years Master's Research Programmes Climate Change and Education aims to build the climate change expertise of students from ten West African countries in an inspiring, interdisciplinary and intercultural learning environment. Each year, ten to twenty students are admitted to the program. A special focus is laid on

the capacity development of skills in communication, education and public relations. These skills are highly relevant for policy-advice, public awareness building on climate change, for the development of climate services, as well as for the implementation of adaptation programs. After the program, the graduates are well prepared to work as educational experts and communication officers for national and international agencies, the media, as well as for civil society and donor organizations. Some of them will continue their academic career in Education or Communication Sciences.

Climate Change And Biodiversity, Université Felix Houphouet Boigny, Cocody, Abidjan, Cote D'Ivoire

The Doctoral Programme, Climate Change and Biodiversity (CCB), trains doctoral students as experts to understand and protect species richness, genetic diversity, ecosystems and ecosystem services for the next generations. The understanding of strategies developed by living organisms and ecosystems in the face of climate change can make a substantial contribution towards the adaptation of humanity to these changes and towards the conservation of biodiversity sunder future conditions.

Climate Change and Agriculture, IPR-IFRA, UCC, USTTB, Katibougou, Mali:

The Climate Change and Agriculture (CCA) Doctoral Research Programme (DRP) focused on improving of research methodology in Climate Change and Agriculture, on adapted agriculture production systems to Climate change, on agriculture value chains and policies as well as on modeling of agro-ecosystem, Innovation systems in agricultural production.

MASTERS PROGRAMMES

MRP Informatics for Climate Change, University Ouagadougou, Ouagadougou, Burkina Faso

The two years Master's Research Programmes Climate Change and Education aims to build the climate change expertise of students from ten West African countries in an inspiring, interdisciplinary and intercultural learning environment. Each year, ten to twenty students are admitted to the program. A special focus is laid on the capacity development of skills in communication, education and public relations. These skills are highly relevant for policy-advice, public awareness building on climate change, for the development of climate services, as well as for the implementation of adaptation programs. After the program, the graduates are well prepared to work as educational experts and communication officers for national and international agencies, the media, as well as for civil society and donor organizations. Some of them will continue their academic career in Education or Communication Sciences.

Climate change and marine sciences, university of Cabo Verde

The new Master of Science programme in 'Climate Change and Marine Sciences' is implemented by the University of Cabo Verde in close cooperation with the Ocean Science Centre Mindelo (OSCM), the GEOMAR Helmholtz Centre for Ocean Research Kiel, the University of Kiel and the Thünen Institute as the German partner institutions, and with National Institute for Fishery Development (INDP) as Cabo Verdean institution partner. The programme adequately prepares West African students for subsequent post-graduate studies or professional careers as managers or experts in industry, consultancy, governmental agencies etc. In the long-term, the outcome of the MRP-CCMS will provide a direct and sustained contribution to the implementation of SDGs 13 and 14.

OBJECTIVES OF THE PROGRAMME

• To create the critical mass of human capacity in the fields of Climate Change and Marine Sciences and Ocean Management in West Africa.

• To promote acquisition of interdisciplinary knowledge and develop technical skills to better understand coastal and open-ocean ecosystems and their interconnectivity within the West African region.

• To boost the development of solution-orientated projects in marine sciences and management in a climate change context.

GSP MEETINGS

April 5-6, Accra
A task force committee was set-up at the GSP review workshop to access the extent of implementation of the resolutions regarding the reforms of the Capacity Building Programme. The committee had a meeting between in Accra.

May 28-31, Dakar and June 12-14
Bonn- Two GSP sustainability meetings were held to deliberate of the long term strategy of the Graduate Studies Programme

June 22, Accra-
Meeting of the Directors was held with the WASCAL Science Symposium on to discuss issues relating to financial management of the GSP and to give update on the reforms accompanying the implementation of the fourth batch of students among others.

December 18
A virtual meeting of the GSP Director was held on April 20, 2018 to update the Directors on the decisions at the taskforce meeting, including curriculum review as well as the status of upgrade of MRP to DRP by the four GSP concerned and the general readiness for the next batch of students.

VISITING SCHOLAR PROGRAMME

This Visiting Scholars Programme allows qualified scholars the opportunity to work on research topics related to Climate Change Adaptation and Mitigation issues, to distill a publishable journal article from their recent research or to visit a laboratory abroad for data analysis. They spend 2-3 months in an institution or laboratory abroad to prepare one or more paper for publication on line in the WASCAL Capacity building working paper series. The Visiting Scholar Programme, was organized again in 2018. Six (6) scholars were selected to participant in the programme but only three of them could travel for scientific visits to laboratories and Universities in Germany and WASCAL Competence Centre.

IN-SERVICE TRAINING

As part of its mandate to strengthen the existing human capacity of member countries to allow them to participate in the on-going global discourse on climate change and respond to current and future adaptation and mitigation challenges, the second In-Service training was successfully organized. The five day training brought together 35 mid-level scientists and policy analysts from various West African countries for intensive capacity building sessions in climate change mitigation and adaptation. The training was handled by some of the top-notched West African experienced lecturers. Each participant was awarded with a certificate of participation. As WASCAL Alumni, they also continue to create strong visibility for WASCAL in their respective fields of work.

INFRASTRUCTURE & REFORMS

The Gambia and Mali have put up new edifices to further enhance and accommodate its graduate students. The building will also serve several other purposes like Library, study room and administrative work. Beginning next batch, all programmes currently running will be upgraded to Doctoral Programmes. Two new Master's programmes in Informatics for Climate Change and Climate Change and Marine Sciences will be introduced in Burkina Faso and Cape Verde respectfully with the support of their International advisory boards. The host Universities and WASCAL continue to build stronger bilateral partnerships in-kind and in-cash to ensure the sustainability of the programme and to promote a sense of affirm ownership.

WASCAL ALUMNI HOMECOMING - A TESTIMONY OF WASCAL'S IMPACT

THE maiden edition of the Alumni Homecoming brought together over 50 alumni from the Graduate Studies Programme in all ten West African lead Universities ton Accra, organized towards achieving the Sustainable Development Goals (SDGs) within the sub-Region. The participants formed part of the 195 trained graduates under the WASCAL's Graduate Studies Programme (GSP).

The two-day conference was a testimony of WASCAL's impact in providing sustainable climate solutions through capacity building was used to share knowledge, build partnerships, and ensure participation in fund raising, quality assurance, capacity building and scaling up Climate Change Adaptation solutions.
The conference was under the theme: "Towards Achieving Sustainable Development Goals in West Africa: The Footprints of WASCAL." It also emphasized paths taken by the organization to ensure Climate Change adaptation and mitigation strategies in West Africa.

Dr Moumini Savadogo, the Executive Director, was grateful to the BMBF for its continuous provision of financial support, capacity development, and other key interventions towards achieving the SDGs.

The support of BMBF has created the platform for scientists and researchers to play critical roles in combating climate change in West Africa. and urged the beneficiaries to continue to maximise the opportunities created for them, to influence their societies, impact their communities, and make the most of the knowledge acquired to effect positive change in the Region.

Climate Change entrepreneurship was one of the key discussions at the conference. Workshop sessions on essentials of Bankable Proposal was facilitated by the Group Head,Credit Risk Management of Key Stone Bank, Nigeria and Agriculture Expert from Islamic Development Bank, Saudi Arabia among other presentations. There was also a presentation on German research landscape and funding opportunities by DAAD Director for Ghana,. There was also the official launch of the WASCAL Connect Alumni Newsletter

The conference was chaired by HE Sander, the Deputy Head of Mission from the German Embassy Accra, with keynote address delivery by Prof Belay Begashaw, the Director General of Sustainable Development Goal Center for Africa in Rwanda.

Recognizing Achievements of Alumni

- **Alumni Enterpreneur award:** Nagalé dit Mahamadou SANOGO, from Mali, graduate of second batch MRP Climate Change and Human Security.
- **Alumni Innovative in CC Adaptation award:** Dr Siaka DEMBELE from Mali, graduate of first batch DRP Climate Change and Agriculture, Mali.
- **Alumni Community Impactful Award:** ALUMNI Third Batch of MRP Climate Change and Adapted Land Use, FUT Minna, Nigeria.

ESTABLISHMENT OF ALUMNI NETWORK

The Alumni Network has been established with leaders, elected at the Alumni Homecoming. Social media networks have been created to enhance communication amongst members. Strong efforts are being exerted to ensure increase in membership, and to promote more programmes and projects that will enhance great networking. It is hoped that it will be strengthened and well-coordinated in 2019

PAUWES PROGRAMME

The ZEF-WASCAL-PAUWES KICK-OFF WORKSHOP was held in Accra, Ghana from Sept 17-18, to discuss matters surrounding water and energy on a sustainable basis. The meeting was attended by representatives of WASCAL, PAUWES and ZEF as well as representatives from new partner institutions: African Centre of Excellence on Energy, Sustainable Development (ACE-ESD), RWANDA and 2iE, from Burkina Faso.

ALUMNI INTERNSHIP

Seven (7) alumni were supported with monthly stipend during the period of the alumni internship programme which started from August 1 to October 31. This allowed the alumni to work within ministries in their home country and supporting the ministry with expertise in the area of training and putting into practice research findings on climate change adaptation.

As at December 2018, there were 62 doctoral research programme (DRP) students in the pipeline, that are expected to graduate by September 2019. The DRP students in the pipeline are either undergoing fieldwork or on scientific visits.

PRESENT SITUATION OF STUDENTS

Presently, there are no students in all the four MRP graduate schools. There were 40 students admitted into the master programme.

MASTERS PROGRAMME
Total cumulative number of master students = 100
Graduate master students = 99
Dropped out from CC Education = 1

GRADUATE STUDIES PROGRAMME BY NUMBERS

- **Total cumulative number of doctoral students = 158**

62
Current Doctoral Students

96 GRADUATED DOCTORAL STUDENTS

- 19 at DRP West African Climate System (FUTA)
- 19 at DRP Climate Change and Water Resources (UAC)
- 19 at DRP Climate Change Economics (UCAD)
- 20 at DRP Climate Change and Land Use (KNUST)
- 9 at DRP Climate Change and Biodiversity (UFHB),
- 10 at DRP Climate Change and Agriculture (IPR-IFRA).

PUBLICATIONS SO FAR

- More than 140 journal publications, articles and book chapters
- 39 Master's thesis
- 34 policy briefs produced,
- 196 research thesis and book of abstracts.

04

FUNDRAISING AND PARTNERSHIPS

WASCAL-ECOWAS IN JOINT AGREEMENT

THE first joint advisory committee meeting for the implementation of the MoU between ECOWAS and WASCAL was successfully organized in the year under. This resulted in the identification of eighteen (18) joint actions for 2018-2020 which will form the basis for joint fundraising and coordinated provision of climate services. The same approach is being undertaken with the West African Development Bank (BOAD).

In addition to the existing MoUs, new MoUs were signed with key strategic partners in the region including CILSS/ AGRHYMET (the regional centre for WMO) for cooperation in weather forecasting, data sharing, joint proposals actions in the sub-region. Similarly, a MoU has been signed with the International Union for Conservation of Nature (IUCN) as environmental services provider to jointly promote climate and environmental services in the sub-region.

STRATEGIC MEETING WITH THE REPUBLIC OF LIBERIA AND SIERRA LEONE

There was a high delegate meeting between WASCAL and two of the West African countries that are yet to join the WASCAL countries: Sierra Leone and Liberia The courtesy calls were made to the ambassador of Liberia and the High Commissioner of Sierra Leone in Ghana, the headquarters of WASCAL.

The focus of the courtesy calls were to continue the long standing courting process with these countries on the prospects of receiving them as members of WASCAL's international climate change conglomerate.
The excitement to see Liberia, Sierra Leone, Guinea and Guinea Bissau join the rest of the member countries in West Africa is a very much anticipated one as WASCAL collaboratively work hard to ensure that climate change is combatted and livelihoods improved.

INAUGURAL WASCAL SCIENCE SYMPOSIUM

The organization of the first science symposium on climate services June was held at Tang Palace Hotel, Accra, Ghana on the theme: “Climate and environmental services to reduce vulnerability and improve livelihoods in West Africa: from theory to actions”.

The event was attended by about 150 participants from 15 countries and three continents.The 3- Day successful symposium:

- Showcased the major achievements of WASCAL,
- Launched WASCAL’s new research and action plan (WRAP 2.0) for the period 2019-2022
- Provided a platform for various stakeholders to discuss the state of art of climate and environmental service delivery in West Africa. Participants of the symposium,, having appreciated the participation and presentations made by various institutions, made these recommendations:

COMMUNICATING AND ENHANCING WASCAL'S VISIBILITY

- Effective provision of publicity and visibility strategy was developed for various flagship events organised within the year such as the WASCAL Science Symposium (WASS) and Alumni Homecoming (WASAHC).

- Over 30 media coverages and reports as well as quarterly WASCAL newsletters were produced as part of measures to adequately communicate the activities of the organization to its various partners.
  Niine short video documentaries were produced.

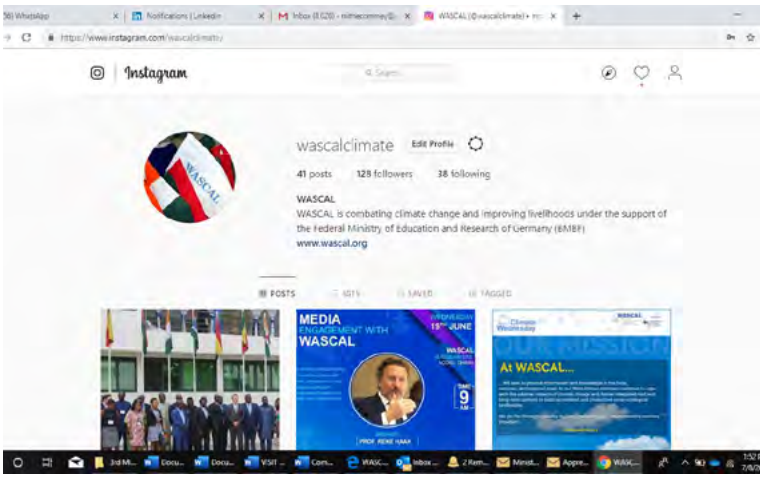
- Active online communication platforms like corporate social media handles trending, reaching out to stakeholders

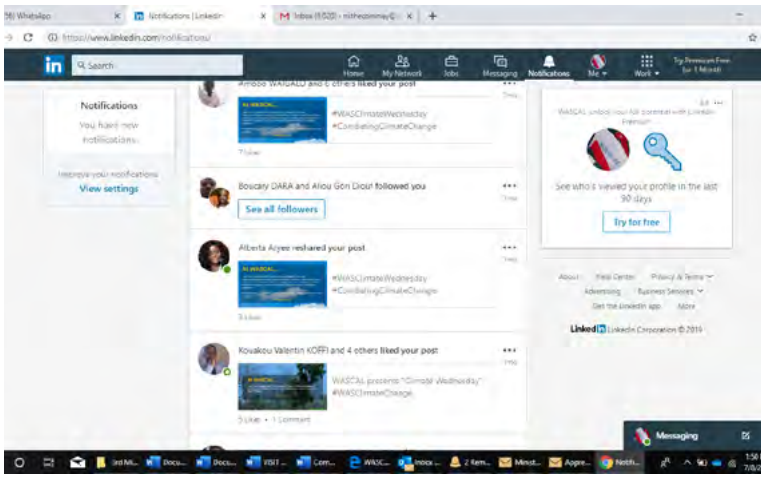
- Strategic Communication materials like Frequently Asked Questions to inform stakeholders about WASCAL, 2017 Annual Report, e- folder on WASCAL branded flash drives, all produced and periodically made available for visibility and outreach enhancement

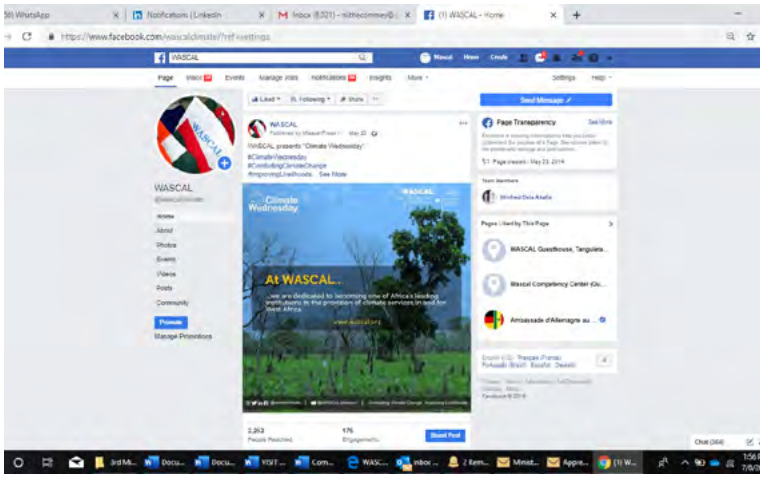
- As part of the active online communication a new website has been constructed and currently under test. It is expected to be fully functioning by the end of the first quarter of 2019. WASCAL's Online Communication Plan commenced latter part of December 2018.

- Corporate Brand Manual Guide was drafted and adopted. The 56 paged document is designed to streamline and harmonize communication within all WASCAL countries. Brand identity is focused on the overall vision of WASCAL and the scope of the orgnaization's vision is reflected in the brand content.

- A strategic Communication Plan spanning 2018-2021 was drafted to give guidance and deeibrate efforts of WASCAL's communication and marketing needs.







05

FINANCIAL OVERVIEW

STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER

		2017	2016	2017	2016
		EUR	EUR	EUR	EUR
ASSETS	Note				
Current assets					
Cash and cash equivalents	10	1,190,184	1,844,953	1,190,184	1,844,953
Accounts receivable	11	1,928,423	1,696,456	1,928,423	1,696,456
		3,118,607	3,541,409	3,118,607	3,541,409
Non-current assets					
Property and equipment	8	1,130,092	1,280,467	1,130,092	1,280,467
Total assets		4,248,699	4,821,876	4,248,699	4,821,876
LIABILITIES AND EQUITY					
Non-current liabilities					
Accounts payable	12	2,161,501	1,690,876	2,161,501	1,690,876
Long-term employee benefit obligations	13	123,969	113,583	123,969	113,583
Deferred Income	14	835,952	1,659,024	835,952	1,659,024
Total Liabilities		3,121,422	3,463,483	3,121,422	3,463,483
Equity					
Accumulated fund		1,127,277	1,358,393	1,127,277	1,358,393
Total liabilities and equity		4,248,699	4,821,876	4,248,699	4,821,876

STATEMENT OF COMPREHENSIVE INCOME AND ACCUMULATED FUND

				12 months to 31/12/2015	9 months to 31/12/2014
		2017	2016	2015	2014
		EUR	EUR	EUR	EUR
Income	Note				
Other income	3	6,039,530	5,674,980	5,253,952	2,842,690
Project receipts	4	15,019	131,148	64,628	2,058,462
	5	568,465	256,606	47,701	
Total income		6,623,014	6,062,734	5,366,281	4,901,152
Salaries and Benefits	6	(2,466,305)	(2,516,177)	(1,845,407)	(1,243,862)
Depreciation	8	(150,375)	(280,009)	(306,942)	(223,044)
General and Administrative Expenses	7a	(1,213,289)	(1,457,901)	(1,510,682)	(1,279,769)
Graduate Student Programme Operations	7b	(2,402,649)	(2,071,992)	(1,238,314)	(845,203)
Project Expenses	9	(621,512)	(118,678)	(33,790)	
Total Expenses		(6,854,130)	(6,444,757)	(4,935,139)	(3,591,878)
Suplus / deficit for the year		(231,116)	(382,023)	431,142	1,309,274
Accumulated fund at start of year		1,358,393	1,740,416	1,309,274	
Accumulated fund at end of year		1,127,277	1,358,393	1,740,416	1,309,274

STATEMENT OF CASH FLOWS

	Note	2017 EUR	2016 EUR	12 months to 31/12/2015 2015 EUR	9 months to 31/12/2014 2014 EUR
Cash flows from opperating activities					
Deficit / Surplus for the year		(231,116)	(382,023)	431,142	1,309,274
Adjustment for:					
Depreciation	8	150,375	280,009	306,942	223,044
		(80,741)	(102,014)		
Pre- incorporation property and equipment	4				(2,315,263)
Pre- incorporation accumulated depreciation	4				409,082
				738,084	(373,863)
Changes in:					
Accounts receivable	11	(231,967)	(622,599)	(298,750)	(775,107)
Accounts payable	12	470,625	463,626	463,625	763,625
Long-term employee benefit payable	13	10,368	47,532	41,071	24,980
Deferred income	14	(823,072)	1,213,204	(698,654)	1,144,474
Net cash(used in)/from operating activities		(654,796)	999,749	245,376	784,109
Cash flow from investin activities					
Purchase of property and equpment	8		(1,562)	(61,763)	(120,956)
Net cash used in investing activities			(1,562)	(61,763)	(120,956)
Net(decrease)/increase in cash and cash equivalents		(654,769)	998,187	183,613	663,153
Cash and cash equivalent at 1 January	10	1,844,953	846,766	663,153	
Cash and cash equivalent at 31 December		1,190,184	1,844,953	846,766	663,153

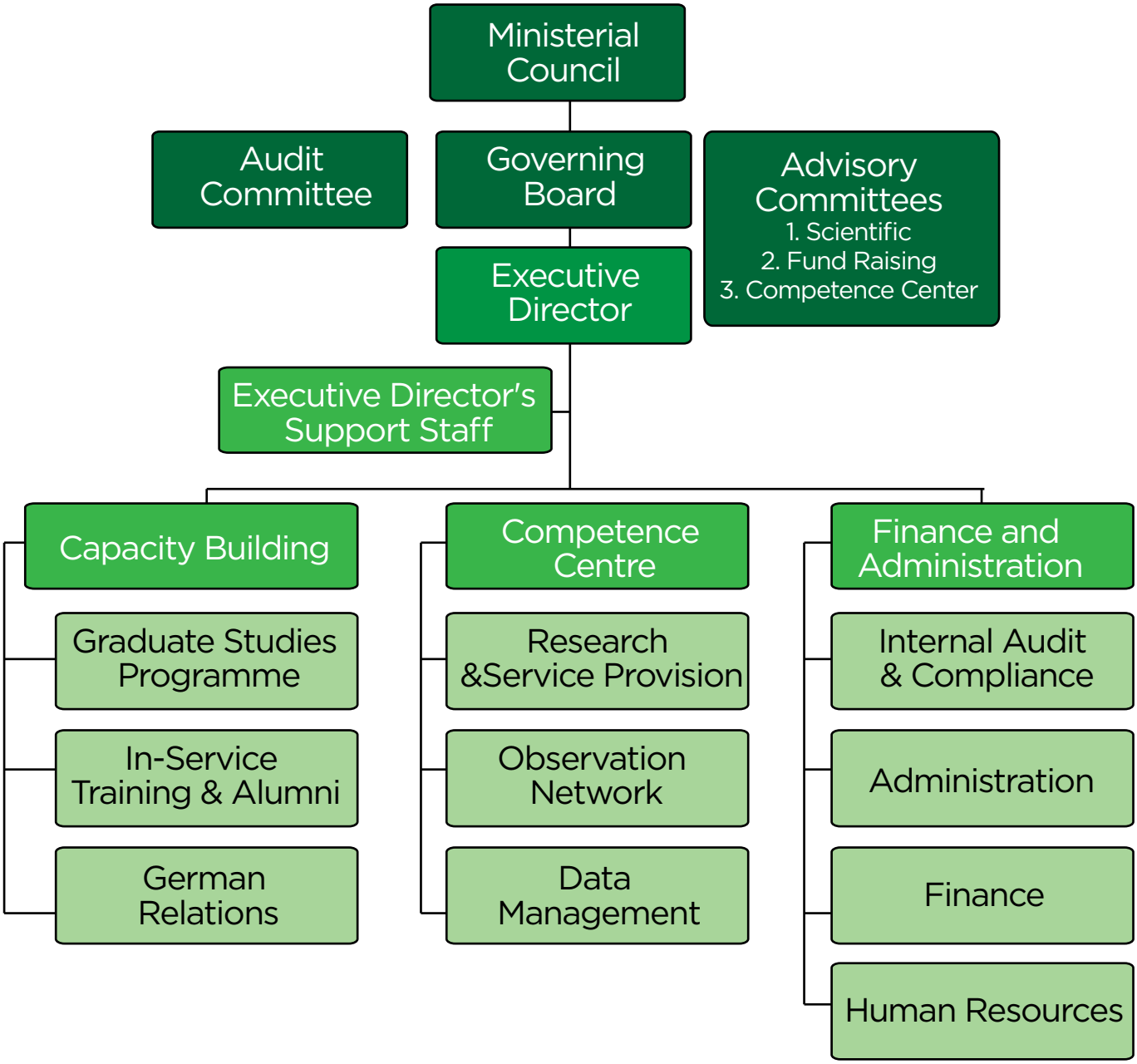
These financial statements were approved by the Governing Board on ……2018

MR. PETER DERY
BOARD CHAIRMAN

DR. MOUMINI SAVADOGO
EXECUTIVE DIRECTOR (WASCAL)

06

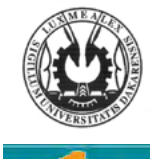
HUMAN RESOURCES


Ministerial Council
Audit Committee
Governing Board
Advisory Committees
1. Scientific
2. Fund Raising
3. Competence Center
Executive Director
Executive Director's Support Staff
Capacity Building
Graduate Studies Programme
In-Service Training & Alumni
German Relations
Competence Centre
Research &Service Provision
Observation Network
Data Management
Finance and Administration
Internal Audit & Compliance
Administration
Finance
Human Resources

ACRONYMS & ABBREVIATIONS

AfDB - African Development Bank
AGB - Aboveground Biomass
AGRICORA – Agriculture et Gestion des RIsques Climatiques: Outils et Recherches en Afrique
AWS - Automatic Weather Stations
BMBF - German Federal Ministry of Education and Research
BON – Biodiversity Observation Network
CIREG - Climate information to support integrated renewable electricity generation
CMIP5 - Coupled Model Inter-comparison Project phase 5
CoC – Competence Centre
COP – Conference of Parties
CORDEX - Coordinated Regional Climate Downscaling Experiment
CORDEX – Coordinated Regional Climate Downscaling EXperiment
COSPAR – Committee on Space Research
DBH - Diameter at Breast Height
DLR-PT – Project Management Agency, German Aerospace Center
DRP - DOCTORAL GRADUATE RESEARCH PROGRAMME
ECOS - Ecosystem Change and Services
ERA4CS – European Research Area for Climate Service
ESMs – Earth System Models
FUT MINNA - Federal University of Technology, Minna
FUTA- Federal University of Technology, Akure
GCM - Global Circulation Mode
GITEC – GITEC Consult GMBH
GSP –Graduate Studies Programme
GTS - Global Transmission System
HPC - High-Performance Computing
HYREM – Hydrology and Water Resources Management
IMARA - Impact Analyses and Risks Assessment
IPCC - Intergovernmental Panel on Climate Change
IPR-IFRA- Institut Polytechnique Rural de Formation et de Recherche Apliquée,
KfW – Kreditanstalt für Wiederaufbau
KNUST- Kwame Nkrumah University of Science and Technology
MCSs - Mesoscale Convective Systems
MiFMASS - Multi-scale Flood Monitoring and Assessment Services
MPI-ESM-MR - Max-Planck Institute Earth System Model for Medium Resolution
MRP –Masters in Research Programme
NDAs - National Designated Authorities
PAUWES – Pan African University - Institute of Water and Energy Sciences
RC – Research Cluster
RCM – Regional Climate Models
ReCON – Regional Collaboration Network
ReHON - Regional Hydrology Observation network
REOF – Rotated Empirical Orthogonal Function
ReSON -Regional Socio- economics Observation Network
RSON - Remote Sensing Observation Network
RSON - Remote Sensing Observation Network
SAC –Scientific Advisory Committee
SEACRIFOG - Supporting EU-African Cooperation on Research Infrastructures for Food Security and Greenhouse Gas Observations
TCBF - Tiger Capacity Building Facility
TCS - Total Carbon Stock
UAC- Université d'Abomey-Calavi
UAM- Université Abdou Moumouni de Niamey
UCAD- Université Cheikh Anta Diop de Dakar
UENR - University of Energy and Natural Resources
UFHB- Université Felix Houphouët Boigny
UL- University of Lome
USPCALERS - Upscaling Site-Specifc Climate-smart Agriculture and Land use practices to Enhance Regional production Systems
UTG - University of the Gambia
WABES - West Africa Biodiversity and Ecosystem Services
WADI – WASCAL Data Portal Infrastructure
WMO - World Meteorological Organization
WP - Water Productivity
WRAP – WASCAL Research Action Plan

KEY PARTNERS



UNIVERSITY OF LOME CONFERS HONORIS CAUSA AWARD ON DR. WILFRIED KRAUS

...AND CHEIKH ANTA DIOP UNIVERSITY OF DAKAR TOO

ALUMNI HOMECOMING







WASCAL SCIENCE SYMPOSIUM


WASCAL ALUMNI HOMECOMING

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