

ANNUAL REPORT 2019



VISION

WASCAL seeks to become one of Africa's leading institutions in the provision of climate and environmental 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. We combat climate change and improve livelihoods.

OUR MEMBER COUNTRIES



Germany



Benin



Burkina Faso



Cape Verde



Cote d'Ivoire



Gambia



Ghana



Mali



Niger



Nigeria



Senegal



Togo



ECOWAS

FRONT COVER

Field visit to Sekoukou, for meteorological Data collection from WASCAL installation



ZEF, WASCAL and PAUWES workshops on Renewable energy, Practical activity.



WASCAL Doctoral Graduate in Climate Change and Land Use from Kwame Nkrumah University of Science and Technology, Kumasi, Ghana



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GOVERNING BOARD



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representing ECOWAS)
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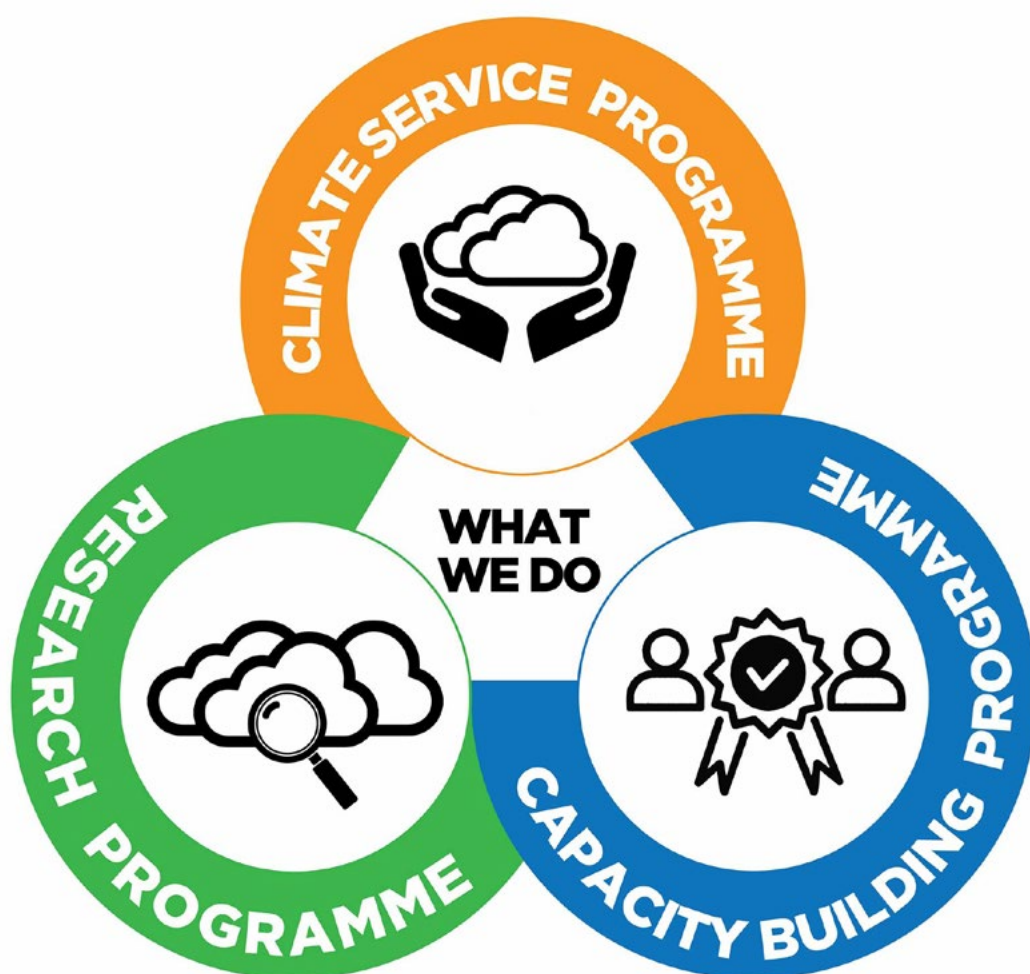


Dr. Arona Diedhiou
SAC REPRESENTATIVE

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Member
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Member



We are guided by the UN Sustainable Development Goal 13 in our quest to Combat Climate Change and Improve Livelihoods

EXECUTIVE DIRECTOR'S MESSAGE



Dr. Moumini Savadogo
Executive Director

The issue of Climate Change currently remains one of the global challenges and it has become climate emergency. Events, programmes and decisions at the policy levels across the world were testaments of the strict measures being taken to fight the global menace.

According to a joint analysis by UNDP and UNFCCC, most governments around the world are now prioritizing one of two complementary approaches in addressing Climate Change issues going into 2020.

The UNFCCC indicated that almost all parties - 184 out of 197 countries - have already submitted their first plans, which typically set goals to curb Green House Gas (GHG) emissions by 2025 or 2030 and may also include measures to make economies and populations more resilient to the impacts of Climate Change

WASCAL spent the year 2019 working with various partners ranging from West African governments, policy makers, research outfits, universities, ECOWAS, German institutions and scientists across the world in its efforts 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, hence em-

barking on various activities and efforts to ensure the realization of its annual objectives. For instance, there was institutional restructuring implementation based on the governing board and BMBF during the 14th and 15th board meeting resolutions.

WASCAL also had a successful launch of the Call for Proposal for its Research Action Plan (WRAP2.0). Advertisements were placed in local and international media platforms in June. It gained international attention, and 15 eligible proposals were short-listed while looking forward to the final deliberation from the jury.

Again, we successfully commenced two new MRP schools, namely, MRP in Informatics for Climate Change in Burkina Faso and MRP in Climate Change and Marine sciences in Cabo Verde. Four programmes were upgraded from master's to doctoral, namely; Niger (Climate Change and Energy), Togo (Disaster Risk Management), Nigeria a (Climate Change and Human Habitats) and The Gambia (Climate Change and Education).

On the international cooperation front, various events, activities and campaigns enhanced the visibility of WASCAL as an international brand combatting Climate Change and improving livelihoods. Key amongst the activities included; the 3rd WASCAL Ministerial Council Meeting held in Accra in July. The meeting, which attracted international media attention, and various ministers from West Africa and Germany, a strategic moment for WASCAL. Decisions reached at the meeting have brought about new insights and new orientation of actions towards 2020-2022. Time and resources invested into this meeting were, indeed, worth the effort.

Major strides have so far been made towards the sustainability of WASCAL. Some include; a new management team on board; DLR/PT and Würzburg University which subsequently replaced KFW and GITEC; and the recruitment of the Fourth batch of students, just to mention a few.

Amongst other highlights during the year, this report also underlines the financials as of the end of December 2019.

MESSAGE FROM BMBF



Prof. René Haak
Head of Division, Global Change
& Climate Research

Science and research are critical for sustainable development and therefore play an increasingly important role in shaping international relations between Germany and its African cooperation countries. The year 2019 yielded another step towards the sustainable realization of our common dream to improve the scientific capacities of West Africa in climate change and land use. As ever, I therefore proudly look at the robust visibility created by WASCAL's ambitious projects and programmes over the past years through the generous funding of my Ministry.

Climate change is affecting the lives of millions of people in all parts of the world and in West Africa in particular. Current projections on future developments indicate that there is an urgent need to develop successful mitigation concepts to face those challenges. Science and research offer proactive approaches to deal with the current and the expected changes to come. In this regard, the role of science is to be considered a benefit to those societies that are most severely affected by climate change and to provide decision-makers and users with evidence-based results and advice.

The German Federal Ministry of Education and Research is very proud to support and to enhance this fight against climate change

together with its partners. It is a global phenomenon worth fighting collectively.

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I can confidently say that 2019 was a very successful year. Cooperating with all 11 West African countries to pursue the climate change agenda gives us a great sense of fulfilment knowing that our impact in the sub-region continues to grow.

The year under review was witness to some very historic moments in the bilateral relationship between West Africa and Germany. The 3rd WASCAL Ministerial Conference Meeting was a success. The essence of the meeting was designed to deepen the international relations amongst West African countries and between Germany.

It was also an occasion to highlight strategic solutions by West African policy makers in ensuring a sustainable fight against the climate change challenge in the sub-region and to pave the way for a sustainable development of the WASCAL institution. During the meeting, German Federal Minister of Education and Research Anja Karliczek underlined the necessity for West African ministers to show commitment by providing their financial contributions. She also stressed the urgency of making every political effort to ensure the sustainability of WASCAL in tandem with the efforts of the German government.

At BMBF, we still stand by our pledge to deepen partnerships between German and West African policy makers in order to realize Sustainable Development Goal 13 on climate action. We were delighted to have Cabo Verde join the WASCAL community, bringing its number to 11. For us, this is a great achievement, considering the fact that the first batch of students pursuing the master's programme in marine sciences has already begun. We are also happy to have Burkina Faso kick-start its first batch of students in the master's programme in climate change and informatics. These are clear testimonials of the impact we continue to make on a broad scale within the sub-region.

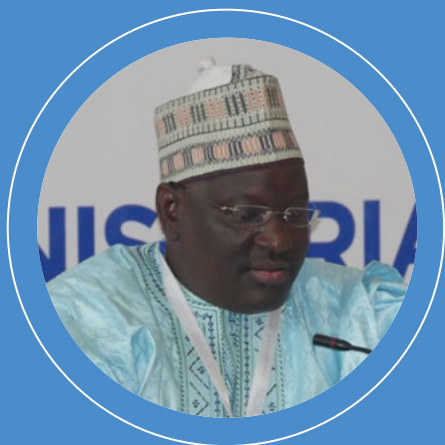
8 Let me also mention the various project partnerships on sustainable renewable energies in West Africa. We consider renewable energies to be very crucial in the development of Africa and the world at large. Our commitment to ensure that affordable and sustainable energy is produced will go a long way in solving the energy problem in West Africa. I am confident about renewable energies in West Africa.

In conclusion, let me make a special mention of the great leadership of the Chairman of the

WASCAL Ministerial Council, the Honourable Sadissou Yahouza, and the WASCAL Governing Board Chair, Mr. Peter Dery. They once again demonstrated their loyalty to the institution in 2019 and helped it evolve into its current status as West Africa's centre of excellence in climate change.

I would like to congratulate WASCAL once again for its steady expansion and the continuous impact it makes. We are proud of our collaboration over the years and looking forward to achieving more together in the future.

MESSAGE FROM WASCAL MINISTERIAL COUNCIL CHAIR



Mr. Yahouza Sadissou
Chair of the WASCAL
Ministerial Council

I am delighted to work closely with my colleague ministers, and the German Federal Ministry of Education and Research (BMBF) towards the achievement of WASCAL's mandate to provide unique solutions to West Africa's climate problems. I believe that the existence of WASCAL is a testament to West Africa's commitment to combating climate change and improving the livelihoods of West Africans.

Since I took over the position of the WASCAL Ministerial Council Chair in July 2019, I have had the opportunity to engage my and interact with some of my colleague

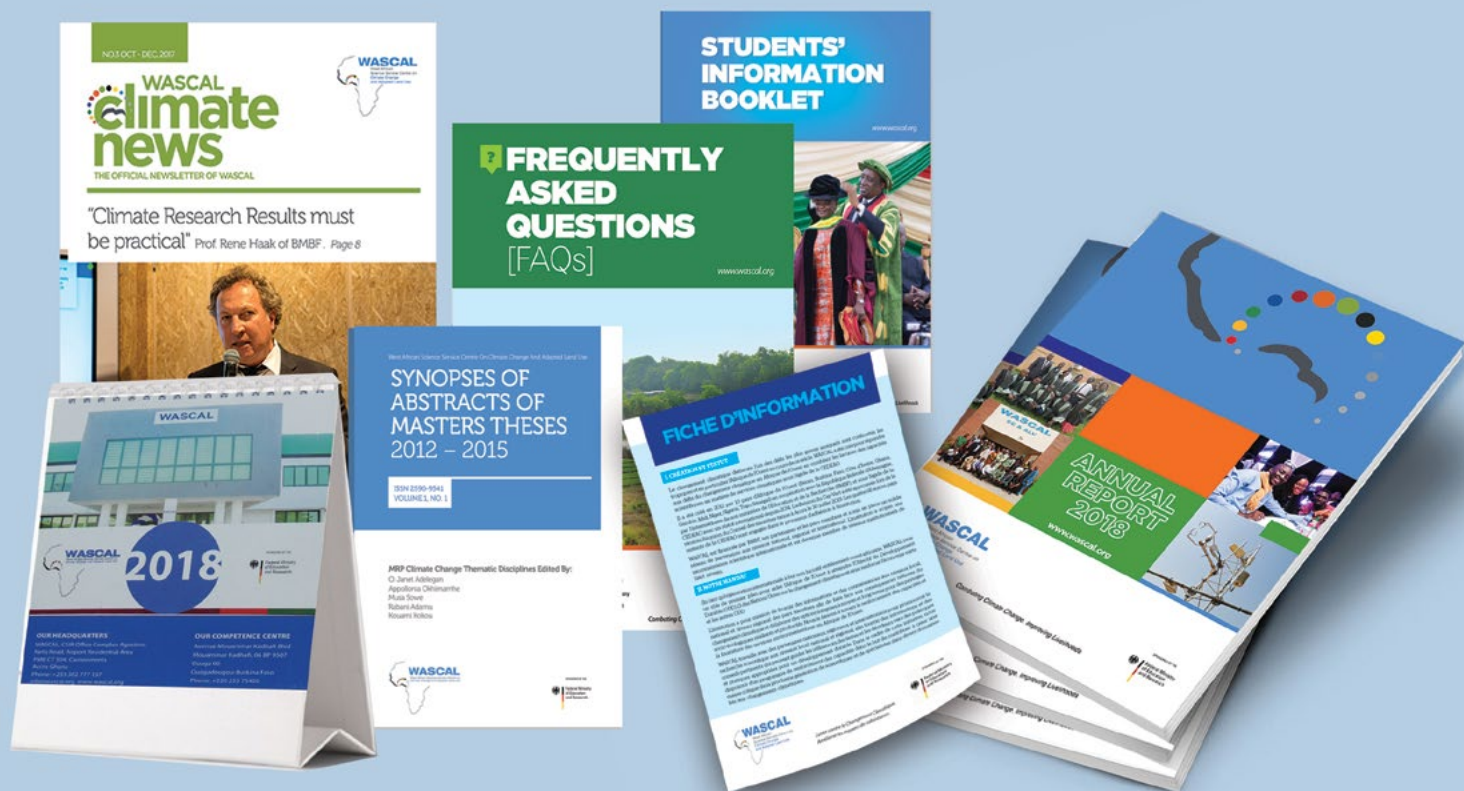
ministers in the various countries to follow up on the fruitful discussions we had at the 3rd WASCAL ministerial council meeting held in Accra.

In my visit to these countries, we have shared very valuable ideas and strategic measures we anticipate putting in place to ensure the sustainability of WASCAL. Principal amongst them is how each country can fulfil its pledge toward the financial contribution of WASCAL as enshrined in the cooperation agreement signed by the various countries. There is no gainsaying that the mandate of WASCAL has been tremendous. Providing quality scientific data on climate change and training more than 300 scientists in diverse areas of climate change is worth commending.

Every policy maker in West Africa should see the existence of WASCAL in the sub region as a very fortunate one and a strong complimentary effort to all that the various governments have been doing to achieve their NDCs.

I am determined to lead the WASCAL team to winning the hearts of both current and potential partners to come on board as we work towards the United Nation's Sustainable Development Goal 13 on Climate Action on Climate Action.

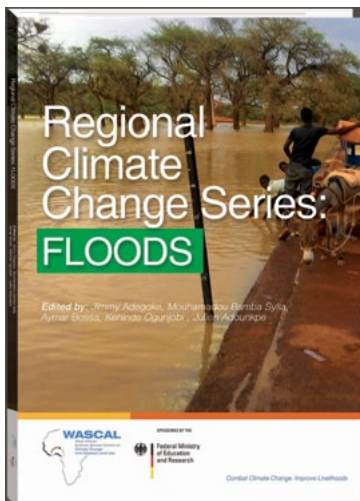
Thank you.



HIGHLIGHTS OF 2019

RESEARCH

WASCAL OUTDOORS BOOK ON CLIMATE CHANGE & FLOODS



WASCAL has released the first of its “Regional Climate Change Series” book, with focus on floods.

Prof. René Haak from the office of Global Change of the Federal Ministry of Education and Research, Germany (BMBF) recognized this important milestone towards creating more visibility for WASCAL as a preferred

choice for climate solution Centre in West Africa. He also expressed delight at WASCAL’s contributions to the resilient development of West Africa, and this will be expanded through the implementation of WASCAL Research and Action Plan, phase 2 (WRAP2.- 2019-2022)

It is worth noting that this publication is the first volume of 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 book, funded by BMBF, is edited by scientists from WASCAL Competence Centre in Burkina Faso and Graduate School Programmes of Nigeria and Benin. The authors are scientists from West Africa, Germany and other international partner institutes.

GLOBAL WARMING IN AFRICA: “IT’S TIME TO PROPOSE SOLUTIONS DEVELOPED BY AFRICANS”

By Dr. Arona Diedhiou,
WASCAL Chair, Scientific Advisory
Committee

What impacts will global warming of 1.5°C have on the

African continent? Over the past fifty years, we have already observed warming of approximately 0.5°C throughout the entire continent, accompanied by a change in the characteristics of extreme climatic events. Compared to the pre-industrial period, anthropogenic global warming has reached 1.1°C, or between 0.8°C and 1.2°C locally and is continuing at a rate of 0.2°C per decade. If nothing is done, this will reach 1.5°C between 2030 and 2052. However, this climate change is not uniform, even across the African continent.

In Western Sahel, and especially in Senegal, periods of drought are expected to be increasingly long. In Central Sahel, most models predict an increase in heavy rainfall with increased flood risks in urban areas. On the southern coast of West Africa, heavy rains could cause landslides that would affect populations living in makeshift dwellings.





WASCAL OFFERS FULL CLIMATE CHANGE SCHOLARSHIPS TO 132 WEST AFRICAN PhD STUDENTS



WASCAL has admitted 132 Doctoral students to its 4th Batch academic year. The students, from 11 West African countries, benefit full scholarship from WASCAL's Graduate Studies Programmes (GSPs).

The students will be studying in 12 West African leading universities in various Climate Change Thematic Areas, under the sponsorship of the Federal Ministry of Education and Research, German

ny (BMBF) through WASCAL. The scholarship also forms part of WASCAL's commitment to training and building the capacity of the next generation of African scientists to champion the fight against climate change, while influencing governments and policy makers. The graduate programme also aimed at designing strategies to adapt to threats, opportunities and uncertainties of Climate Change within the region.

The 132 students, comprising 110 Doctoral Research Programme and 22 Master's Research Programme Students were drawn from Ghana, Nigeria, Niger, Mali, Togo, Benin, The Gambia, Senegal, Burkina-Faso, Cote d'Ivoire and Cape Verde. They will be moving into their various universities, depending on the Climate Change Thematic Courses they are pursuing.

GERMAN FEDERAL MINISTER FOR EDUCATION AND RESEARCH VISITS WASCAL

The German Federal Minister of Education and Research, Her Excellency, Mrs. Anja Karliczek has paid a 2-day visit to WASCAL in Accra.

During her stay, she participated in the 3rd WASCAL Ministerial Council Meeting which brought together 11 West African Ministers responsible for Climate Change

Action in West Africa.

Mrs. Karliczek expressed the importance of a German - African collaboration in the areas of science and education.

"The African continent is of great importance to our international cooperation. Science and research play a growing role in shaping international relations between Germany and its African cooperation countries. And the two sister initiatives, WASCAL and SASSCAL, are among the most visible and ambitious projects in our joint responsibility." She said.



FEDERAL UNIVERSITY OF TECHNOLOGY AKURE, NIGERIA, HONOURS GABIN ANANOU



The Federal University of Technology, Akure in the

Federal Republic of Nigeria, awarded Mr. Gabin Kouévi Ananou, a Doctor Degree honoris causa in Sciences (Climate Change and Meteorology) for his meritorious achievements in the fight against Climate Change in Africa.

The colourful event, held during the 31st convocation ceremony of the university, presented a citation to Dr. Ananou, to acknowledge his tremendous contribution in the fight against Climate Change through the training of African scientists in various Climate Change thematic areas as well as the provision of climate services.

Dr. Ananou has been involved in the successful implementation of all decisions regarding funding from BMBF since 2009. He negotiated with the funding authority for the provision of resources in terms of infrastructure and programmes for WASCAL”

CLIMAPAFRICA PROJECT TO DEVELOP CLIMATE CHANGE CAPACITIES IN AFRICA LAUNCHED

WASCAL, SASSCAL and the German Academic Exchange Service (DAAD) have committed themselves in a tripartite agreement to collaborate in the Climate Research Alumni and Post Doctorate in Africa (CLIMAPAFRICA) Project.

The area focus of the collab-

oration covers three cardinal areas, namely: communication, infrastructure and calls for application.

The CLIMAPAFRICA project seeks to bring high -potential African researchers in Climate Change research and protection together with African alumni of German funding initiatives. It seeks to speed up uptake and use of research outputs through vibrant, highly connected network to facilitate the development of regional solutions.

It is also geared towards opening opportunities in research and professional development for postdocs and alumni in Africa and especially in WASCAL and SASSCAL.



CABO VERDE OFFICIALLY INTEGRATED INTO WASCAL COMMUNITY

The official integration of Cabo Verde as the latest member country to join WASCAL took place at the 3rd WASCAL Ministerial Council meeting.

With the integration, Cabo Verde has begun running Master's Research Pro-

gramme in Climate Change and Marine Sciences at the University of Cabo Verde in close cooperation with the GEOMAR Helmholtz Centre for Ocean Research Kiel, the University of Kiel and the Thünen Institute, as German partner institutions and with the National Institute for Fishery Development (INDP) as the Cabo Verdean partner institution.

The Programme will adequately prepare West African students for subsequent post-graduate studies or professional careers as managers or experts in industry, consultancy, governmental agencies etc.



3RD ZEF-WASCAL-PAUWES WORKSHOP ON STUDENTS' CAPACITY BUILDING

WASCAL, ZEF and PAUWES have built the capacities of West African students to complement the efforts of building capacity and research in the field of Water, Energy and Climate Change in Africa, thanks to the ZEF-WASCAL- PAUWES Cooperation project.



The aim of this collaboration is to strengthen African institutions through capacity

building in the above areas and to increase the effectiveness of German support on the African continents. It is in this context that the 3rd ZEF-WASCAL-PAUWES workshop was held in Niamey (Niger) from 24th September to 5th October 2019. Twenty students from different nationalities pursuing Ener-

gy Policy and Engineering options at PAUWES and the host institution (Abdou Moumouni) at the WASCAL Graduate Research Programme on Climate Change and Energy, attended the workshop. The workshop was facilitated by lecturers and scientists from the WASCAL region and partner countries.



GERMAN PARLIAMENTARIANS INTERACT WITH WASCAL ALUMNI



The committee on Education, Research and Technology Assessment of the Federal Republic of German Parliament paid a working visit to WASCAL at its headquarters in Accra to familiarize themselves with the operations of the

German funded organization.

The committee engaged a cross section of WASCAL alumni who showcased their experiences and milestones as scholars of WASCAL

Among the key highlights of the discussions were how WASCAL's success stories can be cascaded to grassroots stakeholders like farmers as well as how policy makers will make maximum use of data collected by the organization's unique approach to mitigating and adapting to climate change within the sub-region.

GERMAN- WEST AFRICAN MINISTERS DELIBERATE ON CLIMATE CHANGE

WASCAL has held its 3rd West African Ministerial Council Meeting in Ghana. The essence of this year's meeting was designed to showcase strategic solutions by West African policy makers in ensur-

ing a sustainable fight against climate change challenge in the sub-region.

The meeting, under the theme, "deepening partnerships between German and West-African Policy Makers towards the realization of Sustainable Development Goal 13 On Climate Action." brought together West African ministers responsible for climate change and the Federal Ministry of Education and Research, Germany (BMBF) headed by the Federal Minister, Mrs Anja Karliczek.



The Meeting was part of the periodic gathering of sector ministers within the WASCAL member states. Per the constitution, the Ministerial Council is the highest organ of the

institution and its meeting is geared towards deepening the relationships among the country members on one side and between them and the German partner at the policy making levels.

WASCAL TALK AGRICULTURE AND CLIMATE CHALLENGE AT COP25 IN MADRID



The Executive Director of WASCAL, Dr. Moumini Savadogo outlined the intensified measures WASCAL continues to put in place as part of its efforts to assess the challenges Climate Change is posing for agriculture and in the process finding solution for adaptation in sub-Saharan Africa.

Dr. Savadogo also said WASCAL was strengthening scientific capacities in West Africa by partnering with key universities in West Africa to provide students and future scientists the necessary academic and professional knowhow to equip them knowledgably enough to access the situation. This is to enable them come up with interrelated courses to train knowledgeable scientists to access the problems and provide solutions.

He was speaking at a side event at the European Union Pavilion under the topic “Challenges and solutions for agricultural adaptation planning in sub-saharan africa.”

Dr. Savadogo also stated that identifying the challenges climate change poses to agriculture and finding solutions demands planning, which involved proper assessment, and identifying the key elements to cope with complex challenges that come with the phenomenon.

WASCAL- DLR-PT SIGN GRANT AGREEMENT ON BEHALF OF BMBF



The DLR PT Director Klaus Uckel signed the corresponding grant agreement on behalf of the The Federal Ministry of Research and Education, Germany, BMBF, which gives the African partners financial security until 2023. There is a new role for the project-executing agency.

Her Excellency Mrs Anja Karliczek, the Federal Minister of Education and Research, met with representatives of the 11

West African member states. The talks did not only focus on sustainable economic models, but also on the presentation of the new WASCAL Research Agenda Plan (WRAP 2.0) research programme and the fourth WASCAL academic year, the financing of which was signed at the end of June by Klaus Uckel, Head of the DLR Project Management Organisation (DLR-PT) on behalf of the Federal Ministry of Research and Education (BMBF).

DLR-PT in cooperation with the BMBF has succeeded in establishing a multilateral network of West African and German institutions and companies.

BMBF & WASCAL EN- GAGE WEST AFRICAN MEDIA ON CLIMATE CHANGE



BMBF, represented by the Head of Division Global Change, Climate and Biodiversity. Prof. Dr. René Haak, and WASCAL held an interaction session with Ghanaian media to elaborate on the essence and mandate of the establishment of WASCAL.,

He further expressed the adverse impact of Climate Change globally and the role of the German Government in tackling it.

Prof. Haak indicated that there was the urgent need to develop concepts on how to adapt to these challenges in due course. Science and research offer proactive approaches to deal with the current and the expected changes. In this regard, the role of science is to be understood as a service to those societies that are most severely affected by Climate Change and to provide decision-makers with evidence-based results and advice. BMBF is very supportive

to enhance this fight together with its partners.”

WASCAL AND BMBF INTERACT WITH PRESIDENT OF CABO VERDE



WASCAL team and delegates from BMBF led by Prof Rene' Haak met with the President

of the Republic of Cabo Verde, His Excellency Jorge Carlos Almeida Fonseca as part of efforts to deepen the international cooperation agreement among the West African countries where WASCAL operates through its Graduate Studies Programmes. The president was delighted about WASCAL's unique contribution towards climate change in West Africa.

Cabo Verde was integrated into the WASCAL community earlier in the year where newly introduced WASCAL Master's Research Programme on Climate Change & Marine Science is now being run at the University of Cabo Verde.



CORONAVIRUS PREVENTION



WASH HANDS



HAND SANITIZER



USE MASK



DISINFECTION



AVOID HANDSHAKE



SOCIAL DISTANCING



SELF QUARANTINE



RESEARCH & CLIMATE SERVICES

WASCAL has re-focused its research programme through a large consultation process to make it more development- and impact-oriented. This is to help address the main challenges faced by policy-makers, stakeholders, and end-users in connection with Climate Change and Climate Variability (CC&CV) and generate quick wins in terms of climate and environmental services provision within the next few years. This new research programme known as WASCAL Research Action Plan 2019-2022 (WRAP 2.0) was approved by the Governing Board in 2018 and the call for proposals disseminated in 2019.

WASCAL RESEARCH ACTION PLAN WRAP 2.0 PROJECT

The preliminary shortlist of applications was presented by DLR-PT at the ultimate board meeting of the year. The following process was approved:

- The Executive Director worked closely with DLR-PT to constitute a panel of experts with a global representation.
- The constitution of a bigger panel which carried out the final selections for award of grants should be made up of three Governing Board members, - two SAC members, a representative from DLR-PT and BMBF and one independent expert.
- The board agreed with the administrative process proposed by DLR-PT to manage the WRAP 2.0 .

WASCAL and DLR-PT met between September 19th-20th, to evaluate the process, followed by two virtual meetings. The main outcomes were:

- Establishment of a joint technical committee to conduct the process chaired by the Executive Director. Each partner nominated the members to the committee. The WASCAL Technical Committee was com-

posed of representatives from WASCAL-DLR-PT and WASCAL, with support from BMBF. A total of 34 WRAP 2.0 proposals were received through online platforms. WASCAL received 14 proposals while DLR-PT received 20 proposals. Out of these, 15 proposals qualified for quality review by an international expert panel. Panelist focused on the following to cover the following disciplines: (i) climate science, (ii) remote sensing, (iii) environmental modelling, (iv) agronomy, (v) hydrology, (vi) socio-economy, (vi) ecology, (vii) policy and (ix) soil science.

SUCCESS STORIES

Salient messages from the various research projects and activities conducted at the Competence Centre (CoC) during the year are highlighted below.

- The projected Climate Change for the dry savannah in Northern Benin will likely reduce water- and N-use efficiencies as well as grain yields of maize and sorghum considerably.
- Site-adapted tillage practices combined with residue incorporation are crucial for sustainable soil fertility management and crop productivity under maize-cotton rotation in smallholder production systems in West Africa.
- Calibration of local crop cultivars in the DS-SAT cropping systems model was completed and preliminary simulations of yields in the Dano Basin done for 2017 and 2018 years with complete weather data.
- Landscape diversity decreases from Sahelian zone (Ouahigouya) to South Sudanian zone (Bouroum-Bouroum) and Multi-woody species agroforestry parklands profile in Ouahigouya appeared to be the

more resilient to climate variability and change.

- The trade-off between agroforestry parkland tree conservation and crop production was investigated in three climatic zones (Sahelian, North Sudanian and South Sudanian). It was concluded that the trade-off varies across climatic zones as it increases from low rainfall zone to high rainfall zone (109kg/ha, 247kg/ha and 252 kg/ha) and represented 60%, 136% and 140% of yearly cereal need per person respectively in Sahelian, North Sudanian and South Sudanian climatic zones.
- Potential carbon stocks in three climatic zones of Burkina Faso (Sahelian, North Sudanian and South Sudanian zones) were established. It was revealed that carbon stock decreases from high rainfall zone to low rainfall zone meaning that agroforestry parklands in South Sudanian climatic zone displayed the most promising capacity to sequester carbon ($33.86 \pm 5.84 \text{ tCO}_2\text{ha}^{-1}$) than North Sudanian climatic zone ($28.35 \pm 5.84 \text{ tCO}_2\text{ha}^{-1}$) and South Sahelian climatic zone ($24.71 \pm 5.84 \text{ tCO}_2\text{ha}^{-1}$).
- Better collection, recycling and repurpose of organic solid and liquid waste to benefit Urban and Peri-Urban Agriculture and Green Urban Spaces has been investigated. It was established that the repurposed waste is a good organic manure that can be used with promising results in peri-urban vegetables production as well as in seedling production in nurseries.
- New risks in Sudanian agricultural lowlands was investigated through a case study in Burkina Faso. It was established that changing landscape with collective hydraulic development actions mitigate the drought hazard except at the beginning of the season. The current prevailing climatic change conditions exacerbate the vagaries of the water regime, limiting yields and requiring innovations in the technical and organizational aspects, considering social and environmental functions of lowlands.
- Hydro-climatic risks and their implications for rice production have been studied. 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.
- The study of Hydrological and hydraulic functioning of Bankandi's redeveloped lowland was achieved in 2019. The results indicate that Bankandi's channel slopes range from 0.12% to 1.00%, while the permeability of soil samples ranges from $7.0 \pm 0.1 \text{ mm/h}$ to $94.1 \pm 0.4 \text{ mm/h}$ from upstream to downstream.
- Disaster risk reduction research and capacity building to support ECOWAS member countries has been implemented. Spatial and non-spatial data were analyzed to derive flood hazard and risk hotspot maps at the scale of ECOWAS. About 20% of the area of ECOWAS was found to be high flood hazard zones (historical 50-year return period). Five countries have more than 50% of their land mass falling in very high or high flood hazard zones. The risk mapping showed that 51% of population, 70% of built-up areas and 51% of cropland area (rainfed and irrigated) are exposed to high levels of flood hazard. Projected 50-year return period exhibited more alarming figures. Overall, six recommendations have been made to guide the development of a new policy framework for managing floods in the ECOWAS region.
- From WASCAL Observation Networks,

100% of the data has been collected, quality checked and archived at Competence Centre: climate data, flow measurement, piezometers and luminometers (water level probes), erosion plots, household income, willingness to pay (e.g. off-grid electricity & water pumping for irrigation, customized climate information), household income health & education survey datasets, pluviometric extremes (e.g. false onset, heavy rain, extreme dry spells).

- One hundred and twenty households are connected on the off-grid mini solar systems in Sekoukou for electricity consumption. They are willing to pay for the systems to be sustainable. A community management committee is put in place to handle the mini PV-plant. In total, 36 demonstration sites climate-smart practices (site-specific climate information, biodigestors & Green-house-gas recycling, compost pits/pills, pilot farms & enumerators collecting survey data).
- From the science-policy dialogue, many stakeholders such as SONABEL, ANEREE, Ministry of Energy, ONEA in Burkina Faso and Water & Energy Commission, Volta Basin authority have decided to integrate climate information into their plans considering all aspect related to Climate Change impacts. In Ghana & Burkina Faso, decision makers of many high-level staff of stakeholders were interviewed in order to raise awareness to the integration of climate information into decision making. At least 56 more farmers are linked to climate service e.g. AgInfo package delivery and trained during 3 Agroclimatic fields schools in 2019.
- The trade-off between agroforestry parkland tree conservation and crop production across climatic zones established.
- Carbon sequestration potential and marketable carbon value of smallholder agro-

forestry parklands across climatic zones of Burkina Faso evaluated.

- Land use land cover dynamics and farmland intensity analysis in West Africa analysed and described.

DATA MANAGEMENT

All datasets expected from the three research catchments of WASCAL (Bolgatanga, Dano, Tangueta) were collected. At the current date, 100% of the data has been collected, quality checked and archived at CoC: climate data, flow measurement, piezometers and luminometers (water level probes), erosion plots, household income, willingness to pay (e.g. off-grid electricity & water pumping for irrigation, customized climate information), household income health & education survey datasets, pluviometric extremes (e.g. false onset, heavy rain, extreme dry spells). Four Stand-alone Automatic Rain gauges (SARS) were installed in Burkina Faso and the monitoring of the network of 50 Automatics Weather Stations was successfully conducted.

In between March and April, two workshops were organized, both at the CoC, following the delivery of 60 automatic hydrological sensors (AHS) including 10 water quality sensors and 50 water level gauges. The first workshop was held to train technicians of WASCAL in the new technology and the installation of the sensors by a WAGTECH the supplier of the AHS. The second was held to provide a distribution dashboard for the AHS in WASCAL member countries. This workshop was attended by all regional water basin authorities (ABN, ABV, OMVS, OMBG, OVB, etc.), and DGRE of Burkina Faso. The output of this workshop was submitted to WASCAL ED's office for the attention and approval by of the WASCAL SAC and Governing Board.

A framework of 26 technicians of the renewable energy sector, coming from Burkina Faso, Ghana, Niger and Togo, were provided

advanced skills on modelling tools such as WEAP/LEAP/REVUB training workshop for stakeholders in Accra/Ouagadougou.

The installation of two demonstrators in Bonkougou & Sékougou (Niger) were completed. One hundred and twenty households are connected on the off-grid mini solar systems in Sekougou for electricity consumption. They are willing to pay for the systems to be sustainable. A community management committee is put in place to handle the mini PV-plant. Surveys & field dimensioning for the installation of one hybrid demonstrator in Gbandidi (Togo) were conducted. New experimental approach for testing the impacts of pluviometric extremes on cropping systems were conducted at Boassa (Burkina Faso). Support was provided to the training and supervising of students from the PAUWES programme. Two Narrative reports and two Financial Reports submitted for CIREG & UPSCALERS project were submitted and external financial audit and monitoring/evaluation of UPSCALERS project were conducted.

It is worth noting that six workshops were organized and co-organized to increase awareness of various stakeholders to integrate climate services into their routine work. A total of eight young scientists were mentored during their doctoral, masters and undergraduate theses .

WASCAL PUBLICATIONS

During the year under review, WASCAL scientists authored or co-authored at least 29 Peer Review Papers and more than 20 technical reports and book chapters.

An e-Course was contributed by the Observation Network's (ON) Unit to the RARSUS Water and Energy Online Summer School. An EGU2020 session was accepted and will be convened by the ONs unit on behalf of WASCAL .

The ONs Unit began co-editing a book in French language with IRD on "Services Climatiques, Risques et aléas en Agriculture".

WASCAL REGIONAL CLIMATE SERIES ON FLOODS

Climate Change is unequivocal. The increase of global temperature since the pre-industrial period has not only intensified the extremes events but also increased their frequency of occurrences. Such events are often translated into climate hazards. These climate hazards have resulted in major disasters with losses of infrastructures, economy, natural resources and human lives. Between 1970 and 2014, a total of 11,985 disasters have been reported by the UN-ESCAP with storms and floods sharing 64% representing thus an acute increasing trend. However, the magnitudes of the climate hazards and subsequent disasters are not uniformly distributed across the world. The highest death toll, losses and damages are concentrated in developing countries.

In West Africa, floods and droughts are the major climate hazards that cause disasters. In fact, often these climate hazards overcome easily local response capacity of the countries and substantially affect the social and economic development. This is particularly true for the year 2017 flagged as the year of climate extremes in West Africa with disasters hitting communities across the region. The frequency of storms and subsequent floods have substantially increased since 1982 and the year 2017 has seen an unprecedented number of flood events occurring "simultaneously" in many West African countries' capital cities. For example, on July 2017 Greater Accra, Central Region, Western Region and Eastern Region of Ghana were declared as "flood emergency" areas.

On August 2017, Sierra Leone floods kill thousands as mudslides bury houses near Freetown. In Cote d'Ivoire, heavy rainfall in the southwestern areas (i.e. around San Pedro)

have flooded the region threatening the cocoa plantations. In Nigeria, many people were reported dead after intense storms hit Lagos and Port Harcourt occasioning massive floods that washed houses away. Also, on August 2017, continuous heavy rainfall in Niger resulted in extensive flooding, destruction of houses and loss of household belongings in several areas including Niamey. Other examples include Republic of Guinea and Mali.

In response to such an increase of disaster occurrences, the international community has agreed on a number climate goals to address this issue. Among them are the Paris Agreement, the Sustainable Development Goals and the Sendai Framework on Disaster Risk Reduction. The Sendai Framework aims at developing actions that prevent new and reduce existing disaster risks. In this regard, many West African countries are implementing their national plan for disaster risk management by strengthening the institutional and political coordination at all levels. The objective is to build functional early warning system and response strategy to be able to face climate hazards such as those that occurred in 2017.

In this context, WASCAL together with its partners initiated this book entitled “Regional Climate Change Series:

Floods” to lay ground for such actions. The book comprises of 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 programme.

This publication is the first volume of an annual series of books on challenges of climate and land use that WASCAL and partners intends 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.

CLIMATE SERVICES PROVISION

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During the year the research team supported the development of the ECOWAS Disaster Risk management strategy. Several other services related to information on extreme events, energy under changing climate and scenarios for sustainable agriculture were co-developed with partners.

In view of the limitation experienced in the climate services provided in the year 2019, It is therefore paramount to develop and deliver climate services that will promote resilience to Climate Change and Variability at the National and regional levels in West Africa. The CoC will deliver a “Customized and Integrated Climate Services that will address user-needs and the new challenges posed by the regional perspectives in the new year plan of 2020. Most of these services are at the co-development or initial phases.



The overall objective of the proposed new services will be to provide information, services, guidance and knowledge to support resilience, sustainable development, and to improve livelihoods in West African states. The services will be developed and delivered in order to bring together human skills and expertise, financial investments, information resources, tools, and training to help risk prone nations’ adaptive capacity and resilience to global warming and Climate Change.

Climate Services Rendered in 2019

Status	Grant Type	Project Name	Source of Grant	Duration End Date	Other Partners
1	BMBF	EnerSHelF	BMBF/Client II	3 years May 2022	International Centre for Sustainable Development (IZNE)
2	BMBF	AgRIAN	BMBF/Client II	3 years	DLR, University of Augsburg, IN-TEWA, UBIMET, WASCAL
3	C&S Project	WABES	BMUB & IKI	5 years January 2022	ZEF
4	R&I Project	UPSCALERS	AUC/EUC	36 months January 2021	INRES, KIT, INSAH, ILRI, WASCAL
5	R&I Project	CIREG	Belmont Foundation (EU H2020)	3 years January 2021	PIK, WASCAL & 11 others
6	R&D Project	Green-Builders	ICSU-NASAC-ISSC	2 years October 2020	University of Development Studies, Tamale Municipality
7	World Bank Contract 7188309	Disaster Risk Reduction Practice Research and Capacity Building Support to ECOWAS	World Bank	18 months August 2020	HKV, WRI, FUTA, UNITAR
8	World Bank Contract 7191987	Capacity Building in support of weather, water and climate services in Mali and Niger	World Bank	18 months June 2020	INE, CCFS, FUTA, Two Consultant
9	R&D Project	RAMSES-II	Leap-Agri	3 years February 2021	CIRAD, INERA... etc.



WASCAL DIALOGUES ON NDCS AT AFRICA CLIMATE WEEK

Over two hundred (200), scientists, academicians, policymakers, students and consultants participated in WASCAL's side event at the UNFCCC organized Africa Climate Week in Accra. The engaging session under the theme "The Paris agreement: from science to policy for the Nationally Determined Contributions (NDCs) implementation" was led by WASCAL scientists, Dr. Gerald Forkuor and Dr. Bamba Sylla.

The engaging three-day event exposed stakeholders to WASCAL's interventions in fighting Climate Change through capacity building, research and climate services. Various communication materials like video documen-

taries, factsheets, banners, frequently asked questions, and one-on-one sessions, helped to enhance the interactions and query sessions about WASCAL.





CAPACITY BUILDING PROGRAMME

The year under review was a very eventful and remarkable one. It saw the approval and release of funds by the BMBF for the commencement of the 4th batch of Graduate Studies Programme students; the introduction and launching of the two new programmes in Informatics and Marine Science from Burkina Faso and Cabo Verde respectively, as well as the upgrade of six Master's Programmes to Doctoral levels. The year also saw the appointment of a new substantial Director of Capacity Building Department (CBD) to start work in January 2020. It was a year in preparation towards a new dawn at the CBD.

THE GRADUATE STUDIES PROGRAMME

With an obligatory reform which was recommended in 2017 for the sustainability of the Graduate Studies Programme, stakeholders' meeting was held in Accra between November and December same year to deliberate on the agenda. Follow-up committee meetings were held in March and June 2018 to finalise discussions. The fourth batch proposals, including revised rules and regulations were approved by the governing board on its 15th meeting on 18 June 2018. This paved the way for the implementation of the proposal in 2019.

3rd batch of WASCAL students graduate

Another great stride was recorded during the year under review. Three out of six (6) WASCAL's Doctoral Research Programmes (DRPs) successfully graduated their third batch of students between September and December. The programmes were Climate Change and Land Use, KNUST - Ghana; Climate Change and Economics, UCAD - Senegal and West African Climate Systems, FUTA - Nigeria. Those from FUTA are experts in modeling and early warning system on weather pattern.



The new graduates from KNUST have now increased the number of experts in sustainable land use and management in the face of Climate Change.



Graduates of UCAD will be an additional response to the need of experts for the African economy in the face of climate change.



The remaining 3 schools: Climate Change and Biodiversity, Cote d'Ivoire; Climate Change and Agriculture, Mali Climate Change and Water Resources, Benin will graduate all the students in the coming months. As of the year ending, the number of graduates stands at 234. This is made up of master's graduates (42%) and PhD graduates (58%).

The GSP in Climate Change and Biodiversity has become a World Bank Centre of Excellence in Climate Change Biodiversity and Sustainable Agriculture. In 2019 the Centre was identified to receive students from: Partnership for Skills in Applied Sciences, Engineering and Technology (PASET) through its Regional Scholarship and Innovation Fund (RSIF). Eight students have so far benefitted from PASET. This year the school on Climate Change and Biodiversity received eight (8) students from PASET.

The WASCAL curricula on Climate Change and Biodiversity of Felix Houphouët-Boigny have been accredited internationally by HCERES in 2019.

Commencement of 4th batch of students

One hundred and thirty two students were recruited by the international boards of the different schools under the supervision of WASCAL and enrolled at the language proficiency centres in University of Cape Coast, Ghana for English and University of Lomé, Togo for French in September. One student from Guinea Conakry got support from MAVA to join the WASCAL programme in Cabo Verde as a fee-paying student. Also, eight (8) PhD students were selected by PASET for the DRP in Côte d'Ivoire

Director of DLR - PT, Klaus Uckel in June, signed the grant agreement on behalf of the BMBF with WASCAL, which gave some financial security until 2023. This agreement enables the effective start of the 4th Batch which

kick-started in September.

In preparing for the fourth batch of students, The memoranda of understanding for the establishment of the two new MRPs at the University of Prof, Joseph Ki-Zerbo in Burkina Faso in Climate Change Informatics and at the University of Cabo Verde in Climate Change and Marine Sciences were signed. Gladly, the first batch of students have been admitted. Students from Cabo Verde, however, recorded a low patronage in applications. This was largely due to the language barrier.

Induction ceremonies were organised in October. Students were introduced to rules and regulations of the GSP. With support from the communications department, a students' handbook has been produced for them to facilitate their appropriation. It is scheduled that by mid-January, 2020, all the students will be at their respective host universities to continue their programmes as planned.

A Readiness Workshop was organised in Abidjan in November for all directors and their accountants to set common goals, internalise the rules and regulations and plan for more visibility and sustainability of the different programmes. There was a review of the state of readiness of each school on academic, human resources and infrastructural sides. All of the programmes shall be ready by mid-January 2020.

Participants appreciated colleagues who left the programme recently in the persons of Prof. Samuel Nii Odai from KNUST, Prof. Kokou Kouami and Dr. Afagla Ruben from the University of Lomé and welcomed the new directors and staff from the KNUST and the University of Lomé.

Building stronger ties through WASCAL Alumni Programmes

WASCAL Alumni Network is well established with national nodes in all the member coun-



tries. As part of the commitment to strengthen the network, the BMBF funded Climate Research Alumni and Postdocs in Africa, (CLIMAPAFRICA) programme through DAAD in partnerships with WASCAL and SASSCAL, which was launched in Accra .

Building capacities at WASCAL Centre of Excellence.

WASCAL Climate Change Centre of Excellence, the CoC at Ouagadougou, in the course of the years supervised co-supervised and mentored of Masters and PhD students, lectured at partner universities, hosted PAUWES students and delivered training to various partners and project beneficiaries.

Overall, 15 students were mentored by scientists of the CoC on their PhD, Masters, and undergraduate theses. The scientists of the also contributed to lecturing at partner universities such as the Master of Science (MSc) in “Managing the Science-Policy Interface on Biodiversity and Ecosystem Services for Sustainable Development in West Africa - SPIBES” hosted by Felix Houphouët Boigny University of Abidjan, the Professional Master in Pastoralism and the Master in Climate Change and Sustainable Development of AGRHYMET in Niamey.

- Two training workshops were successfully organized in Accra and Ouagadougou

for 26 stakeholders mainly technicians of the renewable energy sector from Burkina Faso, Ghana, Niger and Togo. The aim of the training was to build advanced skills in modelling tools such as WEAP/ LEAP and REVUB. Again, that respect, many stakeholders such as WASCAL organized and co-organized four different trainings on how stakeholders can integrate information as a strategic tool in their operations. Some of the beneficiary stakeholders include: SONABEL, ANEREE, Ministry of Energy, ONEA in Burkina Faso and Water and Energy Commission, Volta Basin authority have been trained on how to integrate climate information into their plans considering all aspect related to Climate Change impacts.

- There were two consultation workshops organized in Mali and Niger to demonstrate a shared understanding of capacity assessment, capacity building and stock taking of National Meteorological and Hydrological Services, including the conceptualization of capacity building, detailed work plan, preliminary desk review of relevant documents. It is also worth noting that at least 56 more farmers were linked to climate service. For example, . AgInfo package delivery and trained during 3 Agroclimatic fields schools in 2019.
- Also a regional awareness training on ‘Flood Forecasting and Early Warning Systems’ was co-organized by WASCAL and ECOWAS in Lomé, Togo from 26-28 August. The training was organized within the framework of the ACP-EU project, dedicated to strengthening the capacities of Regional Economic Communities in coordination, planning and policy advisory capacity for disaster risk reduction.
- Hydro-Meteorologists in Niger and Mali were also trained under the World Bank project .



STRATEGIC PARTNERSHIPS & COOPERATIONS

The 3rd WASCAL Ministerial Council Meeting placed emphasis on deepening the relationship between West Africa and the Federal Republic of Germany. Her Excellency Mrs. Karliczek expressed the importance of a German African collaboration in the areas of science and education, citing the global effect of Climate Change on the African continent.

She also challenged the West African Ministers to show commitment to compliment the efforts by the German government in order to build a sustainable organisation.

The WASCAL member countries made strong commitment towards the cause of WASCAL

The following were some of the decisions that were made at the Meeting of Council of Ministers:

- Membership of Cabo Verde was approved as a member country of WASCAL to enjoy every right and fulfil its obligations in article seven (7) of the WASCAL constitution being among others, to support WASCAL achieve its aims and objectives.
- The WASCAL Response document to the intention of the ministers was approved as a reference document showcasing WASCAL's institutional success and the flagship achievements.



- The Business Plan detailing WASCAL activities and strategy for the next 4-5 years was approved. The document was renamed as WASCAL Mid-term Strategic Plan.
- The West African Ministers committed to pay 50% of the arrears of their financial contributions by the end of 2019; 25% in 2020 and 25% in 2021. This is in addition to the yearly contributions.
- The ministerial council directed the EMT to visit the member countries with the assistance of the chairperson of the Ministerial Council. Discussions should be held with the ministers of finance of the various countries for the fulfillment of their financial contributions.
- The ministerial council tasked the EMT to source funding from other sources such as the Green Climate Funds, the Global Environment Facilities, Adaptation Funds, African Development Bank, Climate Change Funds, etc. The Executive Director was tasked to develop an economic model for the sustainability of WASCAL.
- The council recommended that each member country support the expenses of their delegates to attend WASCAL Ministerial Council Meetings.
- The Government of Germany re-affirmed its commitment to build the CoC based on the new concept approved by the board.
- The Minister of Higher Education, Research and Innovation, Niger, His Excellency .E. Yahouza Sadissou was made the new Chairperson of the WASCAL Council of Ministers for the next two years.
- The next Ministerial Council Meeting was scheduled for July 2021 in Niamey, Niger.

Implementation of decisions of the Ministerial Council



The chairmen of the Council of Ministers, and the Governing Board together with the executive Director held a meeting on the follow-up of the implementation of the different decisions. A roadmap of the Chairman on the follow-up on the financial commitment of the member countries and the adhesion of the remaining ECOWAS countries to WASCAL was agreed upon. The road map led to the following activities:

- **Membership of Cabo Verde:** The authorities of the country were officially informed and the administrative documents and templates have been adjusted to integrate the country's flag. Major official documents are now translated into Portuguese.
- **Countries Financial Contribution:** Decisions of the ministers at meeting have been disseminated to all the member countries with reminders and invoices on the arrears as agreed. In furtherance of this, the chairman of the Council of Ministers and the executive director paid a courtesy call to the new Nigerian Federal Minister of Environment and to the ECOWAS Commissioner of Agriculture-Environment and Water Resources. On behalf of the chairman of

the ministerial council, the executive director paid a courtesy call to the ministers in charge of WASCAL in Cote d'Ivoire and Senegal. The ministers renewed their commitments. They committed themselves to supporting WASCAL to be fully recognized as the scientific arm of ECOWAS in climate change and sustainable development.

- Adhesion of the remaining ECOWAS countries: The Executive Director paid courtesy calls to the Ministers of Higher Education and Research of the Republic of Guinea and Liberia to support in the acceleration of the process of adhesion to WASCAL. The two ministers have expressed high interest of their respective countries in WASCAL and are willing to follow through, the process leading to ratification of their countries.
- Fundraising: Aside the advocacy for the effective payment of financial contribution by member countries, the donor conference concept (cf. appendix) was revised. The necessary documentation for the accreditation to the climate funds (the GEF and GCF) are currently at the drafting phase. The initiatives on renewable energy started in 2018. They have since been extended to more countries and to a large project on hydrogen (go green Africa) as promised by the federal minister of BMBF during the ministers meeting. Also, several applications were submitted to competitive.

BMBF MINISTER INTERACTS WITH WASCAL STAFF

The BMBF Minister paid a working visit to the headquarters of WASCAL where she interacted with staff and management of the German funded organization to understand the day to day operations of the organization. She ex-



pressed delight and satisfaction at the work of staff in ensuring the successful running of the organizations and was quick to say that she will return to Germany with lots of memories about West Africa and WASCAL.

PARTNERSHIPS



New partnership agreements were signed between WASCAL and the following institutions:

- GEOMAR for the establishment and operationalization of the MSc. programme in Marine Sciences in Mindelo, Cabo Verde;
- University of Wurzburg for transfer of BMBF funds and implementation of a co-operation project in GIS and remote sensing data management.
- DAAD for the implementation of the alumni programme (Climafrika);
- Universities of Cabo Verde and Ouagadougou for hosting the MSc. programmes in Marine Science and Informatics, respectively.

Cooperation with German Partners



In 2019, requests were received to identify potential German partners for the following schools: CC-WR (Benin), CC-IT (Burkina Faso), and CC-HH (Nigeria). To contact potential German partners, the following were conducted: (i) Setting-up an information letter to address institutions and persons with a dedicated research interest (topic and/or region of West Africa) via email; (ii) Contacting potential partner directly via phone calls, and email letters, to reach out to potential partners was not very efficient

Presentations at relevant workshops and conferences, however, were considered as the most effective way to reach out potential partners. Several potential partners in Germany were contacted, particularly for the schools. Few of the contacted German institutions/scientists have expressed interest in further cooperation with the GSPs. The table 4.2 gives an overview on new potential partnerships.

For the GSP CC-WR in Benin, the search for new partners will continue in 2020. For instance, contacts were made with researchers from the University of Bonn. This will continue in the coming year.

As proposed by (DLR-PT, there was a meeting with potential partners from the International

Centre for Water Resources and Global Change (a UNESCO category two water centre) in Koblenz. They expressed interest in supervising students from the GSP and in general cooperation with WASCAL and SASSCAL.

Additionally, partnerships with existing German partner institutions was strengthened. Some of the organizations include: United Nations University (Dr. Yvonne Walz), GEOMAR (Dr. Björn Fiedler), University of Rostock (Prof. Stefan Porembski), and University of Bonn (Dr. Thomas Gaiser).

STRATEGIC FUNDRAISING

The year brought about great signals of diverse grants and projects.

A proposal for the recruitment of the 4th Batch of students was successfully submitted to BMBF for funding. When approved, DLR-PT Director Klaus Uckel signed the grant agreement with WASCAL on behalf of the BMBF in June, which gives WASCAL financial security until 2023. This agreement included the upgrade of four MSc programmes to PhD programmes and the introduction of two new MSc. Programmes in Informatics, University Pr Joseph Ki-Zerbo, Ouagadougou- Burkina Faso) and Marine Sciences at the University of Cape Verde, Mindelo). The total budget of the grant is €10,983,863.48.

During the year partnership with BMBF was extended to its division of energy with a view to sustainable renewable energy provision to West Africa and mitigating climate change. Several projects have been developed and concluded and will be implemented by our graduate schools and coordinated from the headquarters. This is a first step towards the establishment of a renewable energy priority research theme in WASCAL.

WASCAL Scientists actively engaged in fundraising during the year. They were involved in the development of the following proposals and activities

- Contribution to the development of the full project proposal of INCLISE, submitted to the EUH2020 programme for funding.
- Contribution to the development of the successful proposals of AgRAIN, TOPRAIN-CELL, MONSOON, FuturDAMS. Contracts under these projects are yet to be signed;
- Coordination of the development of the full proposal titled 'Enabling Green Growth in Africa - EGGiA' submitted to the Africa Climate Change Fund (ACCF) of the African Development Bank.
- Intensification of agricultural production through upscaling of innovative adapted irrigation practices and technologies (IR-RINN). (Year: 2020 - 2024, Location: Burkina Faso, Funder: European Union through DeSIRA Initiative);
- Capacity building in support of weather, water and climate services in Mali and Niger. (Year: 2019-2020, Location: Mali and Niger, Funder: World Bank);
- Participatory assessment of flood-related disaster prevention and development of an adapted coping system in Ghana (Second Phase). (Year: 2019 - 2022, Location: Ghana, Funder: German Ministry of Education & research through IKARIM "Disaster and Risk Management" call).

Three other proposals described below were successfully submitted during the year. These were:

Ongoing Projects

Project Name	Source of Grant	Duration	Partners
Capacity building in support of weather, water and climate services in Mali and Niger	World Bank	18 months	INE, CCFS, FUTA, Two Consultant
RAMSES-II	Leap-Agri	3 years	CIRAD, INERA...etc.
PARADeS	BMBF/IKARIM	4 years	UniBonn, NADMO



OPERATIONS

The EMT ensured the supervision of the development of the three pillars of the institution through participatory planning, monitoring, evaluation, reporting and learning. The 2018 annual narrative and financial reports, and the 2019 annual workplan and budget were approved by the governing board in February 2019 at the 14th Meeting.

New key programmatic developments were:

- WASCAL mid-term strategic plan (2019-2022) was adopted by the ministerial council on 30th July; The approved roadmap for the recruitment of the 4th batch of students for 12 schools and in the 11 member countries; the call for proposals for the new research Agenda (WRAP2.0) was launched earlier in 2019 and applications were short-listed for funding.
- Launch of the Alumni Programme for Africa (CLIMAPFRICA) funded by BMBF and implemented by DAAD in partnership with WASCAL and SASSCAL.

BUILDING STRONG CORPORATE VISIBILITY



WASCAL enjoyed an extensive publicity, with strong communication strategies and executions across various key events and activities. The communication team continued to har-



monize the various countries in its bid to have one WASCAL voice. The situation had been the scattered voices from various countries in terms on communicating WASCAL, what it stands for and its impact stories. Within the year under review the communications team worked in the areas below:

- **Online Communication**
- **Event Communication**
- **Public Relations**
- **Media Relations**

PERSONNEL

Much of the human resources work focus was on delivering efficiencies, rolling out WASCAL's reforms and ensuring that WASCAL receives value for money. In often demanding circumstances, Human Resource have helped implement policies that have put WASCAL's administrations on a more robust state's in financial and human resources management.

WASCAL welcomes Directors

The Director of Research and Director of Capacity Building in October 2019 and the following people were identified as suitable candidates for the positions:



Prof. Kehinde Olufunso Ogunjobi as Director of Research to be based at the WASCAL Competence Centre in Ouagadougou, Burkina Faso. He is scheduled to assume duty on 3rd February 2020.



Prof. Daouda Kone as Director of Capacity Building. The position is based at the WASCAL Headquarters in Accra, Ghana. He is scheduled to assumed duty on 6th of January 2020.

The position of Director of Finance and Administration has been scrapped and Mr. Daniel Ofori has been appointed as Senior Finance Manager. Mr. Ofori formally assumed the position of Senior Finance Manager on 1st of December 2019.

WASCAL embarked on restructuring exercise in view of the new strategic direction as well as its budgetary constraints. The restructuring exercise is expected to help reduce the staff cost in due course. The executive management met with staff at the WASCAL CoC where the bulk of staff will be affected by the restructuring exercise. The meeting was held on 9th December 2019. The meeting was to explain the reasons for the exercise and answer any concerns the staff might have. The affected staff members were given six months' notice. It is anticipated that with the implementation of WRAP 2.0 and other sub-projects under the

supervision of WASCAL, some of the affected staff members may have the opportunity to continue to work in WASCAL though as a project staff.

Recruitment of Regional Thematic Coordinators

In view of the implementation of the new strategic plan of WASCAL, the following people have been recruited as Regional Thematic Coordinators (RTCs) for the implementation of WRAP 2.0. They will assume duty by March 2020. Other positions will be advertised as and when they become necessary.

During the interviews, the panel also identified one person for the GIS Technician position which has been vacant since the incumbent resigned.

Personnel Movement

- Ms Angela Nartey was moved back to the finance department as part of the strengthening processes at the Finance Department at the WASCAL headquarters.
- Ms Alberta Aryee, recruited as Project Officer for the Renewal Energy Project. Ms Aryee has been working on the ZEF PAU-WES project as Project Assistant since December 2018. She is a WASCAL Alumnus from the University of Lomé. She holds a Master of Research in Climate Change and Human Security. She will assume the position on 1st of January, 2020.

WASCAL staff build capacity in Climate Change Events Management

Selected staff and management at the headquarters in Accra had their capacities built in the areas of international events management and protocol services to equip them deliver at the highest level during international events.

The two-day training was facilitated by the German Federal Ministry of Education and Research (BMBF) through its representative Mr. Gabin Ananou of PT-DLR.

It was designed to refresh staff and to expose them to modern trends in global events managements and protocol services.

Training Facilitator, Dr. Gabin Ananou pointed out the new trends in the global space and reiterated that staff must be prepared for the task ahead as WASCAL organizes several events and also participates in events that are meant to bring stakeholders together in the Climate Change space.



"We have already supported around 280 young scientists in the previous 10 graduate schools! Let me put this into perspective. When the WASCAL Graduate Schools were launched, the World Bank estimated the number of climate researchers in West Africa at less than 500, with a population of 375 million."

H.E. MRS. ANJA KARLICZEK

Federal Minister of Education and Research, Germany.

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Combating Climate Change. Improving Livelihoods





FINANCES

STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 2019

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		2019 EUR	2018 EUR	2017 EUR	2016 EUR
ASSETS	Note				
Current assets					
Cash and cash equivalents	10	1,677,479	1,815,164	1,190,184	1,844,953
Accounts receivable	11	2,434,866	1,826,384	1,928,423	1,696,456
		4,112,345	3,641,548	3,118,607	3,541,409
Non-current assets					
Property and equipment	8	927,243	996,652	1,130,092	1,280,467
Total assets		5,039,588	4,640,159	4,248,699	4,821,876
LIABILITIES AND EQUITY					
Non-current liabilities					
Accounts payable	12	24,946	2,338,484	2,161,501	1,690,876
Long-term employee benefit obligations	13	113,668	115,670	123,969	113,583
Deferred Income	14	3,582,062	1,015,760	835,952	1,659,024
Total Liabilities		3,720,676	3,469,914	3,121,422	3,463,483
Equity					
Accumulated fund		1,318,912	1,170,245	1,127,277	1,358,393
Total liabilities and equity		5,039,588	4,640,159	4,248,699	4,821,876

STATEMENT OF COMPREHENSIVE INCOME AND ACCUMULATED FUND

		2019	2018	2017	2016
		EUR	EUR	EUR	EUR
Income	Note				
Other income	3	3,558,620	5,097,227.00	6,039,530	5,674,980
Project receipts	4	887,239	69,332.00	15,019	131,148
	5	1,522,267	1,164,299.00	568,465	256,606
Total income		5,968,126	6,330,858.00	6,623,014	6,062,734
Salaries and Benefits	6	(1,481,535)	(1,792,649.00)	-2,466,305	-2,516,177
Depreciation	8	(70,846)	(252,908.00)	-150,375	-280,009
General and Administrative Expenses	7a	(1,098,586)	(1,376,898.00)	-1,213,289	-1,457,901
Graduate Student Programme Operations	7b	(1,759,539)	(1,701,136.00)	-2,402,649	-2,071,992
Project Expenses	9	(1,408,953)	(1,164,299.00)	-621,512	-118,678
Total Expenses		(5,819,459)	(6,287,890.00)	-6,854,130	-6,444,757
Suplus / deficit for the year		148,667	42,968	-231,116	-382,023
Accumulated fund at start of year		1,170,245	1,127,277	1,358,393	1,740,416
Accumulated fund at end of year		1,318,912	1,170,245	1,127,277	1,358,393

STATEMENT OF CASH FLOWS

		2019 EUR	2018 EUR	2017 EUR	2016 EUR
Cash flows from operating activities	Note				
Deficit / Surplus for the year		148,667	42,968	-231,116	-382,023
Adjustment for:					
Depreciation	8	70,846	252,908	150,375	280,009
		219,513	295,876	-80,741	-102,014
Pre- incorporation property and equipment	4				
Pre- incorporation accumulated depreciation	4				
Changes in:					
Accounts receivable	11	(606,523)	8,244	-231,967	-622,599
Accounts payable	12	4,588	176,983	470,625	463,626
Long-term employee benefit payable	13	2,002	(8,299)	10,368	47,532
Deferred income	14	248,176	179,808	-823,072	1,213,204
Net cash(used in)/from operating activities		136,248	744,448	-654,796	999,749
Cash flow from investin activities					
Purchase of property and equipment	8	-1437			-1,562
Net cash used in investing activities					-1,562
Net(decrease)/increase in cash and cash equivalents		(137,685)	(119,468)	-654,769	998,187
Cash and cash equivalent at 1 January	10	1,815,164	1,190,184	1,844,953	846,766
Cash and cash equivalent at 31 December		1,677,479	1,815,164	1,190,184	1,844,953

These financial statements were approved by the Governing Board on 2019


MR. PETER DERY
BOARD CHAIRMAN


DR. MOUMINI SAVADOGO
EXECUTIVE DIRECTOR

List of signed MoUs, projects and grants as of December 2019

Name of Institution	Date of Engagement	End of Contract	Status
International Union for Conservation of Nature & WASCAL (UICN)	15/1/2019	22/1/2024	To put in place a scientific partnership between the two institutions
The National Federation OF NAAM Groups & WASCAL	10/1/2019		Specifying the modalities of collaboration and financing of the activities of the pilot sites of Ouahigouya (Sector 4 of Ouahigouya, Bembela and Aoréma) through the research-innovation project hereinafter referred to as "UPSCALERS".
Water and Sanitation for Africa & WASCAL	05/02/2019	31/04/2019	To strengthen partnership agreement in the provision of universal access to water services and food security.
Burkina Faso National Biodigester Program - PNB-Bf & WASCAL grant	07/2/2019	01/01/2021	To achieve biodigesters and organic production activities for the benefit of agro-pastoral producers participating in the UPSCALERS project of WASCAL in Ghana, Burkina Faso, Mali & Niger
National Agency for Civil Aviation and Meteorology Senegal & WASCAL	4/3/2019	31/12/2024	To build and strengthen partnership agreements in the provision of universal access to water services and food security in Africa
DR Agriculture Sahel (Sahel Regional Department of Agriculture)	03/2019	01/2021	Collaboration and funding for pilot site activities in the province of Sahel

United Kingdom Research and Innovation, Centre for Ecology & Hydrology (CEH) & WASCAL	8/4/2019	31/12/2024	To strengthen and promote their coordination through research collaboration for their mutual interests.
WASCAL - CORAF MoU	3/5/2019		To strengthen and promote their coordination through research collaboration for their mutual interests.
WASCAL - SASSCAL & DAAD	6/6/2019		To collaborate on Climate Research Alumni and Postdocs in Africa - Funding and Networking for Future Leaders in Climate Research and Protection
University of Cabo Verde & WASCAL	14 /8/ 2019	31/12/2024	To implement and host the Master programme in Marine Sciences & Climate
WASCAL & Village du Benin	9 - 2019	9 - 2024	Language courses in French
The Environmental GIS and Remote Sensing Center, Korea University	10/19	10/2024	To facilitate collaboration in the following areas : <ul style="list-style-type: none"> • Climate change adaptation and mitigation • Forest and Landscape restoration, Ecosystem resilience, training and capacity building

ACRONYMS & ABBREVIATIONS

ACP-EU	African, Caribbean and Pacific Group of States	IKARIM	International Disaster and Risk Management
AGRA	Alliance for a Green Revolution in Africa	INERA	Institute of Environment and Agricultural Research
AHS	Automatic Hydrological Sensors	JTC	Joint Technical committee
ANEREE	Agence Nationale des Énergies Renouvelables et de l'Efficacité Energétique (National Agency for Renewable Energy and Energy Efficiency)	KFW	Kreditanstalt für Wiederaufbau
		KNUST	Kwame Nkrumah University of Science and Technology
BMBF	German Federal Ministry of Education and Research	LEAP-Agri	Long Term EU-Africa research and Innovation Partnership on food and nutrition security and sustainable Agriculture
CBD	Capacity Building Department	MRP	Master Research Programme
CC	Climate Change	MoU	Memorandum of Understanding
CCE	Climate Change and Economics	MSc	Master of Science
CCFS	Central Committee for Food Standards	NADMO	National Disaster Management Organization
CC-HH	Climate Change and Human Habitat	NDCs	Nationally Determined Contributions
CILSS/AGRHYMET	Interstates Committee for Drought Control in the Sahel/Regional Centre for Agro-hydro-meteorology	NUE	Nitrogen Use Efficiency
		NU	Nitrogen Uptake
CC-IT	Climate Change and Informatics	ONEA	Office National de l'Eau et de l'Assainissement (National Water and Sanitation Office)
CIRAD	The French Agricultural Research Centre for International Development	PARADeS	Participatory assessment of flood-related disaster prevention and development of an adapted coping system in Ghana
CLIMAfrica	Climate Alumni Programme for Africa	PASET/RSIF	The Partnership for skills in Applied Sciences, Engineering and Technology/ Regional Scholarship and Innovation Fund
CoC	Competence Centre		
COP	Conference of Parties	ONs	Observative Networks
CC-WR	Climate Change and Water Resources	PRT	Priority Research Theme
DAAD	German Academic Exchange Service	RAMSES II	Role of Agroforestry in sustainable intensification of small farMS and food Security for Societies in West Africa
DLR-PT	Project management agency of the German Aerospace Centre	RSIF	Regional Scholarship and Innovation Fund
DRP	Doctoral Research Programme	RTCs	Regional Thematic Coordinators
DSSAT	Decision Support System for Agrotechnology Transfer	SAC	Scientific Advisory Committee
ED	Executive Director	SASSCAL	The Southern African Science Service Centre for Climate Change and Adaptive Land Management
ECOWAS	Economic Community of West African States		
EMT	Executive Management Team	START	START International
FUTA	Federal University of Technology - Akure	UJKZ	University Joseph Ki-Zerbo
GCF	Green Climate Fund	UCAD	University Cheick Anta Diop de Dakar
GEF	The Global Environment Facility	UEMOA	West African Monetary and Economic Union
GEOMAR	Helmholtz Centre for Ocean Research Kiel		
GHG	Green House Gas	UNDP	United Nations Development Programme
GIS	Geographic Information Systems	UNFCCC	United Nations Framework Convention on Climate Change
GITEC	Greater Taichung International Expo Centre	UNIBONN	University of Bonn
GSP	Graduate Studies Programme	WASCAL	West African Science Service Centre on Climate Change and Adapted Land Use
HCERES	The French High Council for Evaluation of Research and Higher Education		
HQ	Headquarters	WRAP 2.0	WASCAL Research Plan
		WACS	WASCAL Climate Systems

KEY PARTNERS



Federal Ministry
of Education
and Research



ipcc
INTERGOVERNMENTAL PANEL ON
climate change









DLR Projektträger









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