



# A DECADE OF PROVIDING CLIMATE SOLUTIONS TO WEST AFRICA



Germany



Benin



Burkina Faso



Cape Verde



Cote d'Ivoire



Gambia



Ghana



Mali



Niger



Nigeria



Senegal



Togo



ECOWAS

# Our past and present leadership

## BMBF Representatives



Dr. Henk Van Liempt  
2009 - 2011



Dr. Rainer Müssner  
2011- 2012



Mrs. Katrin Nostadt  
2012 - 2014



Dr. Wilfried Kraus  
2014 - 2018



Prof. René Haak  
2018 - 2021



Dr. Karsten Hess  
2021 till now



Dr. Christoph Rovekamp

## Board Chairs



Prof. Modibo Haïdara  
2012 - 2015



Mr. Peter Dery  
2016 - 2020



Prof. Mouhamadou Hassirou  
2021 till now



Prof. Jimmy Adegoke  
2017 - 2018



Dr. Arona Diedhiou  
2018 - 2021



Prof. Brice Sinsin  
2021 till now

## SAC Chairs

## Executive Directors



Prof. Paul Vlek  
2012 - 2014



Dr. Laurent Sedogo  
2014 - 2017



Prof. Jimmy Adegoke  
2017



Dr. Moumini Savadogo  
2018 till now

## Directors of Finance



Mr. Rainer Pruess  
2012 - 2016



Mrs. Agnes Oti-Mensah  
2017 - 2019

## Directors of Research



Dr. Boubacar Barry  
2009 - 2016



Dr. Jérôme Tondoh  
2016 - 2018



Prof. Kehinde Ogunjobi  
2020 till now

## Directors of Capacity Building



Dr. Mamadou Ouattara  
2009 - 2015



Prof. Janet Adelegan  
2015 - 2018



Dr. Daouda Kone  
2020 till now

#wascaldecade



## CELEBRATING 10 YEARS OF

Combating Climate Change and Improving Livelihoods



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Federal Ministry  
of Education  
and Research

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 WABES  
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 GREEN-BUILDERS  
 RAMSIS II  
 FSP-AGRICORA  
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Partnerships  
 Key Partners



# Remarks by the Chair of the Ministerial Council

**Prof. Amadou Keïta**

I am delighted to witness the great milestones of WASCAL over the past years together with BMBF. I must say a big thank you to the German Federal Ministry of Education and Research for the tremendous partnership which keeps growing in leaps and bounds. This is a great opportunity for all West Africans to embrace and to ensure that it has been maximized to the fullest.

The groundbreaking ceremony to commence the scientific centre of excellence - the WASCAL Competence Centre - is an indication of BMBF's sustainable partnership commitment. I am convinced that when it is done, it shall not only be a reference point for West Africa, but also globally.

Again, the Green Hydrogen agreement signed to explore the prospects of renewable energy in West Africa is another milestone worth celebrating in the sub-region. The Capacity Programme and the Graduate Studies Programme specifically which has churned out hundreds of young scientists in West Africa remains one of the success stories we share together as a sub-region and Germany.

Optimistically, I will do everything possible in my capacity as the chair of the WASCAL Ministerial Council to rally my colleagues along so that together we can work as a team, embrace WASCAL with a strong sense of ownership so as to enable us improve livelihoods in our quest to meet the UN Sustainable Development Goal 13 on Climate action.



# Remarks by the Chair of the Governing Board

**Prof. Hassirou Mouhamadou**

It gives me much pleasure to witness this day. I must say today is the results of 10 years ago, when it all started between West Africa and the Federal Republic of Germany.

I take this opportunity to congratulate everyone who have played pivotal roles in bringing this noble institution this far. WASCAL can boast of 11 countries, 12 Partner Universities in West Africa, over 300 beneficiaries of our scholarship programme, more than 700 research publications. The list is endless.

To the Federal Republic of Germany through the Ministry of Education and Research (BMBF), WASCAL is grateful for all the scientific and technical support you have given it, right from Day one. The relationship between West Africa and Germany continues to be stronger each passing year. Thank you to Dr. Wilfried Kraus, Prof. Rene and Haak, and Dr. Karsten Hess for your quality leadership in championing the cause of combating Climate Change and improving livelihoods in West Africa.

Let me also acknowledge all the countries who have headed our Ministerial Council over the years: Togo, Benin, Niger and Mali. The sense of ownership during your tenure of office and in pushing the agenda of WASCAL on the doorsteps of policy makers have been phenomenal.

To all past and present Board members and Scientific Advisory Committee members, we acknowledge your strong governance and dedication.

To those who have steered the affairs of this institution- the Executive Directors, from Prof Paul Vlek, to Dr. Laurent Sedogo, Prof Jimmy Adegoke, and currently Dr. Moumini Savadogo. Your leadership and commitment to this cause has been amazing. Congratulations

To all the institutions who have partnered us over the years, we are appreciative of your support. The likes of AGRA and UNU-INRA who hosted us in their offices when we just toddling, we cannot celebrate this day without mentioning your name. To IWMI, CSIR and the Volta Basin in Ouagadougou. We are here today to appreciate your support.

Let me also thank our German partners, especially ZEF, Julich, KfW and particularly PT-DLR for the strong collaboration over the years.

The list of people and institutions to be acknowledged is endless. So let me end here. But we shall surely continue with our appreciation from here. But let me finally thank the task force who worked tirelessly with concept notes, and several meetings to bring the concept of WASCAL into fruition. Thank you all.

The last 10 years has presented a lot of reasons to be thankful for. Our mandate as a West African Centre of Excellence in combating climate change, land use and promoting sustainable green hydrogen has progressed across the various pillars on which we operate, including, the provision of climate services, research, and capacity building. Our presence in West Africa, and particularly working with governments and policy makers, has accelerated our climate action for sustainable development in the sub-region.

Today, the WASCAL brand has become synonymous to climate change and renewable energy within the sub-region, and beyond. The writings of our successes are boldly written on the walls as a leading actor in combating climate change and improving livelihoods, thanks to the government of Germany through the Federal Ministry of Education and Research (BMBF), for their financial and technical support since the inception of this organization”.

Since its establishment in 2012, WASCAL has drawn its strength from the members, comprising of eleven West African countries, and its German partners to pursue its vision of becoming one of Africa’s leading science-based institutions in the provision of climate services in and for West Africa. This, it has done successfully by the providing 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 and devise integrated mid and long-term options to build up resilient and productive socio-ecological landscapes, through its three main arms: climate change and environmental services, capacity building and renewable energy projects.

We are proud of what we have achieved as an organization, with the contributions of our various partners in the region and internationally, mark a decade of great stories of sustainable development, improving livelihoods and promoting a green future. We are confident of the next decade as we anticipate greater milestones and accomplishments. Our partnerships with regional and international institutions and platforms and with other over the years go a long to deepen the depth of our contributions to climate change and green hydrogen in Africa. While celebrating the successes, we are also guided by the challenges that we are faced along the way, and we are even more determined to traverse the road to the next decade stronger. We believe that success is not an event. It is a journey, and we shall continue to traverse the road towards our destination of combating climate change, improving livelihoods and promoting green future.

Let me conclude by thanking the Republic of Togo for their relentless support. 10 years ago, you hosted us. 10 years down the line, you are hosting us. WASCAL is eternally grateful to the President, Prime Minister and people of Togo, including the University of Lomé, for providing our scholars with the international standard of higher education in Climate Change.

Finally help me congratulate the management and staff of WASCAL across West Africa for their hard work and ensuring the day to day running of the organization. They deserve all the congratulatory messages for their commitment and professionalism. Thank you all. And for those I did not mention, it is not because I intentionally did it. We are still congratulating, and we shall congratulate you soon. You are too precious to be forgotten.



# Remarks from BMBF

Dr. Karsten Hess

The year 2022 marks the 10th anniversary of the founding of WASCAL; an important milestone on our joint path towards strengthening the capacities of the Western African region for climate resilient development. WASCAL has become a highly appreciated and internationally recognised centre for its exceptionally long-term vision and significant contributions to building climate research and capacity development structures in the region. On behalf the Federal Ministry of Education and Research, I would like to congratulate WASCAL on its 10th anniversary.

WASCAL was founded with the understanding that all member countries are equally affected by climate change and that none of the countries can meet these challenges on its own. In order to successfully address these challenges, WASCAL has established close cooperation between numerous Western African and German partners. It has helped to improve the information about impacts of climate change and enable valid decision-making, for example on sustainable land use, water supply and food security. The research and data centre “WASCAL Data Infrastructure” with its comprehensive observation and data infrastructure is a centrepiece for the transfer of scientific findings into practice and policy. The aim is to create new opportunities for climate research. This is the basis for better management strategies for sustainable land and water management, risk analyses and forecasts for extreme events such as droughts and floods, as well as assessments of other climate change impacts associated with, for example, biodiversity conservation or marine resource management.

With our new partnership to develop green hydrogen, we have expanded our collaboration in the field of climate change mitigation and energy transition. There are enormous opportunities in this,

because the establishment of a sustainable energy system with new value chains can unleash a positive development and growth dynamics.

Furthermore, a total of sixteen graduate programmes have been established to address critical topics for sustainable and climate resilient development. Currently, 332 students are enrolled and 271 students have already successfully completed their studies. The graduates are now pursuing careers in the academic or private sector, in administrations or as experts for international organisations or regional development banks. Our sixteen graduate schools have opened their doors to students across the region and have become another great success story for regional integration through WASCAL.

I would like to take this opportunity to thank the members of the Ministerial Council of WASCAL for their wisdom in guiding and supporting the development of WASCAL in the region. I would like to thank all who have been or are representing their countries in the Governing Board for their dedication and expertise in taking WASCAL forward. And I would like to express my appreciation to the Executive Director of WASCAL and to the entire staff of WASCAL and thank for their engagement and commitment! I am pleased that the international network is growing and the cooperation between Germany and West Africa is ever increasing.

I am confident that WASCAL, with its unique regional integration, will play an important role in addressing the growing social, economic and environmental challenges that climate change will bring in the future.

In this sense, I wish WASCAL every success for the future.



# Remarks by the Executive Director

**Dr. Moumini Savadogo**

**T**he last 10 years has presented a lot of reasons to be thankful for. Our mandate as a West African Centre of Excellence in combating climate change, land use and promoting sustainable green hydrogen has progressed across the various pillars on which we operate, including, the provision of climate services, research, and capacity building. Our presence in West Africa, and particularly working with governments and policy makers, has accelerated our climate action for sustainable development in the sub-region.

Today, the WASCAL brand has become synonymous to climate change and renewable energy within the sub-region, and beyond. The writings of our successes are boldly written on the walls as a leading actor in combating climate change and improving livelihoods, thanks to the government of Germany through the Federal Ministry of Education and Research (BMBF), for their financial and technical support since the inception of this organization.

To mark the decade of Climate Change and renewable energy excellence, series

of activities have been earmarked across the national, regional international levels to engage all partners and stakeholders to celebrate the milestone. We are proud of what we have achieved as an organization, with the contributions of our various partners in the

region and internationally, mark a decade of great stories of sustainable development, improving livelihoods and promoting a green future. We are confident of the next decade as we anticipate greater milestones and accomplishments. Our partnerships with regional and international institutions and platforms and with other over the years go a long to deepen the depth of our contributions to climate change and green hydrogen in Africa.

While celebrating the successes, we are also guided by the challenges that we are faced along the way, and we are even more determined to traverse the road to the next decade stronger We believe that success is not an event. It is a journey, and we shall continue to traverse the road towards our destination of combating climate change, improving livelihoods and promoting green future.

# OUR MISSION & VISION

## 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 VISION

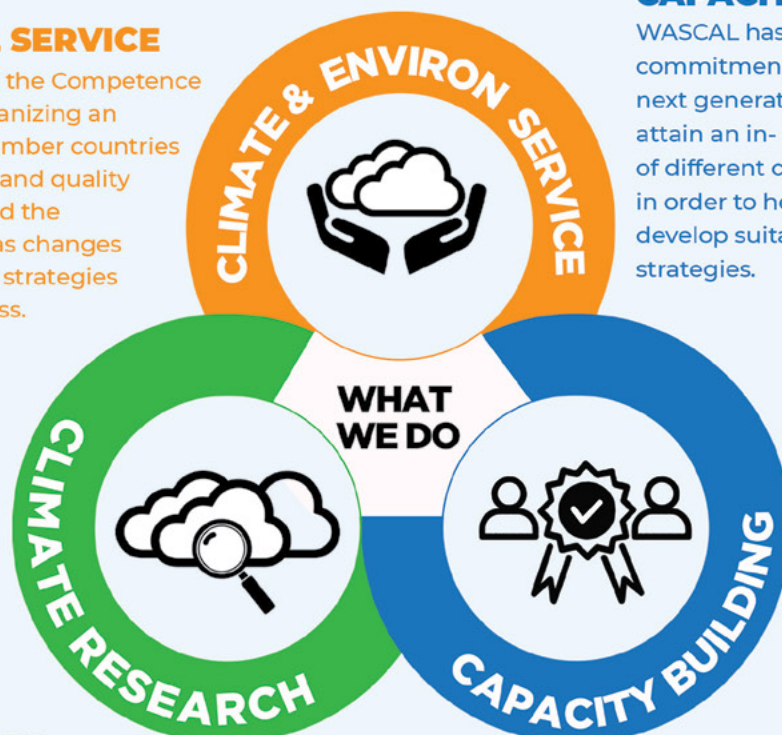
WASCAL seeks to become one of Africa's leading institutions in the provision of climate services in and for West Africa.

## CLIMATE & ENVIRONMENTAL SERVICE

The Climate Service unit at the Competence Centre is charged with organizing an observation network in member countries that will lead to consistent and quality information on weather and the hydrological cycle, as well as changes in land use, human coping strategies and biodiversity shifts or loss.

## CAPACITY BUILDING

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.



## CLIMATE RESEARCH

The research programme represents the scientific activities of the Competence Centre, and is implemented by the scientific staff of WASCAL in collaboration with West African and German research institutes. The WASCAL research programme brings together a German research consortium and an equivalent consortium on the West African side that together have designed a joint research program on adapted land use and management of land under changing climatic conditions.

# INTRODUCTION

WASCAL has been guided by the use of unique approach in tackling climate change and promoting renewable energies, using transgenerational approach, driven by sustainability and long-term solutions

We are proud of what we have achieved as an organization, with the contributions of our various partners in the region and internationally, mark a decade of great stories of sustainable development, improving livelihoods and promoting a green future. We are confident of the next decade as we anticipate greater milestones and accomplishments. Our partnerships with regional and international institutions and platforms and with other over the years go a long to deepen the depth of our contributions to climate change and green hydrogen in Africa. While celebrating the successes, we are also guided by the challenges that we are faced along the way, and we are even more determined to traverse the road to the next decade stronger We believe that success is not an event. It is a journey, and we shall continue to traverse the road towards our destination of combating climate change, improving livelihoods and promoting green future.

WASCAL is funded by BMBF, multilateral and bilateral partners and its 11 West African member countries, namely: Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Ghana, The Gambia, Mali, Niger, Nigeria, Senegal and Togo. WASCAL's mission is to provide information and knowledge services at the local, national, and regional levels to 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 climate, natural and social sciences and by delivering climate and environmental services in member countries.

WASCAL was established to fill the gaps within the scientific capacities of West Africa in Climate and e-Services under the umbrella of ECOWAS and in the framework of the international commitment through the UNFCCC and the Sustainable Development Goals. It is a large-scale research-focused climate service provider, and capacity building institution mandated to enhance the resilience of human and environmental systems to Climate Change and increased variability.

## OUR MEMBER COUNTRIES



# WASCAL SO FAR



# 01

# Establishment & Development

## Continuous expansion of partnerships and networks

The German Government has been very supportive in the enhancement of this fight together with its partners against Climate change and Land Degradation. The new partnership agreements were signed in 2019 and 2020. In Cabo Verde, WASCAL is partnering with GEOMAR and the University of Atlantic for the running and operationalization of the MSc. Programme in Marine Sciences in Mindelo. The same goes for the University Pr Joseph Ki-Zerbo of Ouagadougou on the MSc programme in Informatics for Climate Change. WASCAL's networks in Germany have been enlarged, with the University of Wurzburg selected for the coordination of strategic stakeholders and partners with universities and research centres involved in the implementation of a cooperation project in GIS and remote sensing data management.

A cooperation agreement with Julich Centre for the development and running of the WASCAL Renewable Energy graduate school, particularly the hydrogen graduate programmes, as well as joint research, exchange of students and involvement of scientists in teaching courses and supervision of students and other Renewable Energy projects. An Atlas is developed on the West African country's potential on Green Hydrogen and 15 post-doc (each per country) were accepted to do a three-months training in Germany in September 2021. In the area of climate services provision, WASCAL has signed an agreement to collaborate with the Climate service Centre of Germany (GERICS) based in Hamburg. In West Africa, our partnership with ECOWAS has been strengthened through a new agreement with its specialized Centre for Renewable Energy and Energy Efficiency (ECREEE) to facilitate the wide dissemination of Green Hydrogen throughout the ECOWAS region, targeting the policy levels (Ministers of Energy in the region) as well as the ECOWAS Commission. The expansion of our working relations with all the basin authorities through the consultations for the installation and operationalization of the 60 automated hydro-sensors. A specific agreement is negotiated with Niger river basin authority on the implementation of a training programme for stakeholders.

Partnership with the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL) to provide a framework of cooperation and understanding and to facilitate collaboration to further the mission of the two institutions was renewed.

## Continuous Strategic Development

Ensuring its impact and visibility, several meetings were organized to interact on common topic related to the operationalization of MoU or having a new partnership for joint proposal writing, join collaboration. Strengthening the collaboration with graduate schools, a meeting was organized to interact with vice chancellors of the Lead Universities to share with them the impact stories of WASCAL and to hear from them on strengthening collaboration for sustainability. In 2019, the 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. They 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. to date, BMBF has invested more than Euro30 million for various projects in WASCAL countries for the next 3 years.

The lighthouse project is the development of the atlas of Green Hydrogen potentials in the 15 ECOWAS countries by end of 2020. This is coupled with the implementation of a new MSc. Programme in Green Hydrogen which will start this year in partnership with six (06) graduate schools as first step before fully operating a new graduate school in Green Hydrogen. Meanwhile technologies hubs are co-designed with German partners and will be implemented in different graduate schools and at the new building of the Competence Centre in Ouagadougou (an innovation campus) as demonstrators of different sustainable Renewable Energy solutions.

## Stronger Relations with Member Countries and ECOWAS

WASCAL's mission is geared towards serving the member countries and ECOWAS. The challenge is to permanently maintain good relationships with the countries and ECOWAS through the Governing Bodies. Although this is well done it appears the

need for streamlining the relationships towards more contribution of the institution to the governments' plans. This requires some constitutional reforms to better link the representative at the Governing Board to the line ministers on one hand, and on another hand, connections to the ECOWAS governing bodies (Head of states and governments).

WASCAL target is to serve all the ECOWAS member countries. We are therefore working towards the effective integration of the 4 remaining countries: Guinea, Guinea Bissau, Liberia and Sierra Leone. Meanwhile We have started involving these countries in our Green Hydrogen initiative. In each of these countries, like all the 11 WASCAL member countries, a team of 5 members is established to help collect data necessary for the development of the Atlas of potentials for Green Hydrogen production in West Africa. We also intend to give them opportunity to their students to participate to the first Green Hydrogen Master programme.

### **More Visible Services to Member Countries**

WASCAL as a science service centre is committed to intensifying and making more visible the expected services to countries. After the first core research programme and 4 batches of students, we have now enough background data, knowledge and experience we will leverage on to accelerate the delivery of key services pertaining to improve the resilience of the different development sectors to Climate Change. To this end, WASCAL has already kick-started three major programmes.

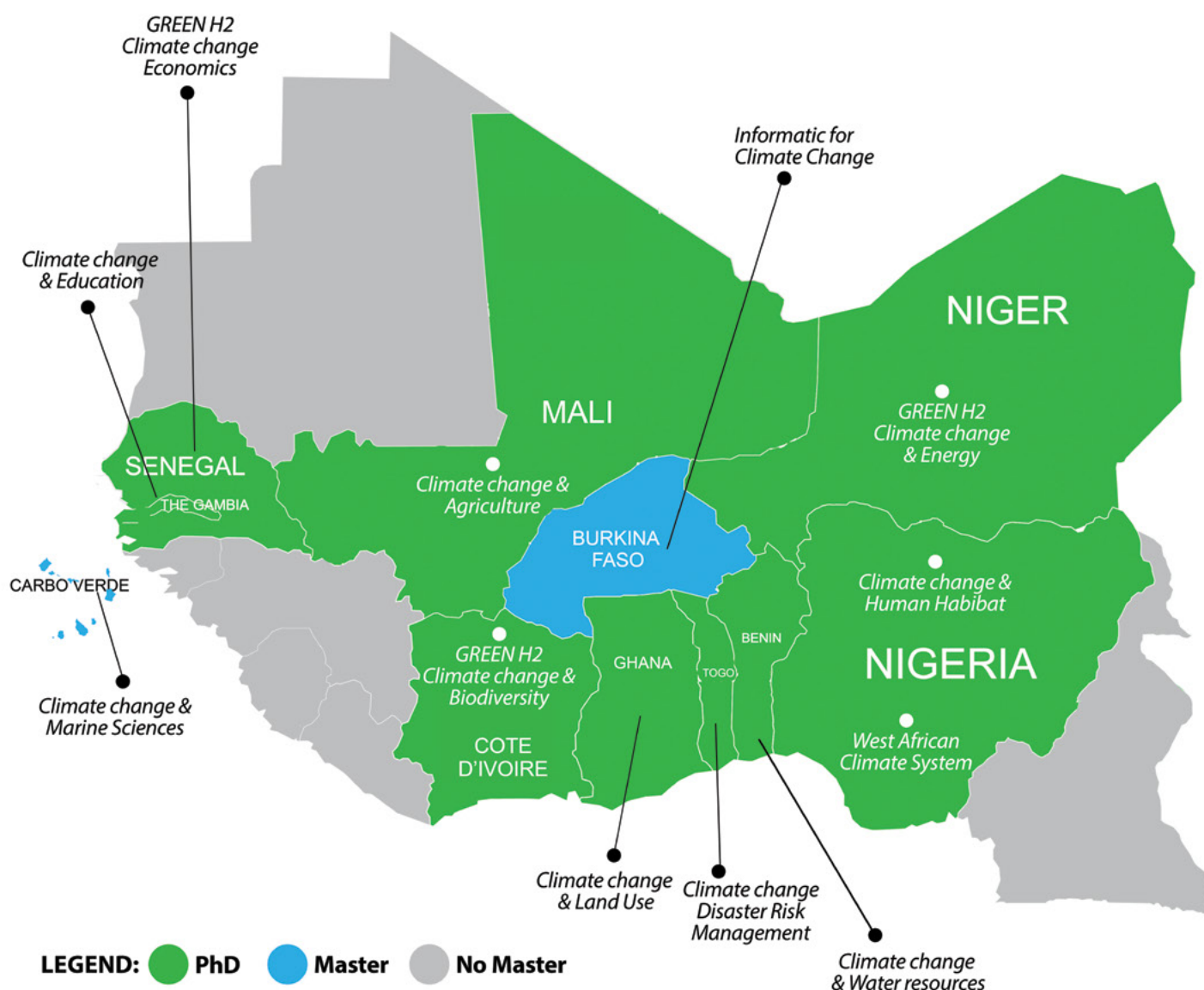
To enhance WASCAL visibility, the communication department also produced several documents to improve WASCAL visibility such as Newsletters, Factsheets, Annual report, among others.

WASCAL continues to demonstrate maturity as an institution. The various administrative procedures adopted and carefully implemented have significantly increased the quality and credibility of management and continue to effectively address the needs and challenges of West Africa's resilience to climate change and land use. Milestones have been achieved and need to be consolidated and scaled up for greater impact in the region and in the countries. This requires a proactive approach that we are undertaking. With the knowledge gained since its inception, WASCAL's management is ready to take up these challenges and move forward to establish a sustainable and reference scientific institution for climate change resilience in West Africa.

# EDUCATION AND RESEARCH IN WASCAL GRADUATE SCHOOLS

*Educate the next generation of climate experts for Africa in different climate related issues for more resilience of the communities using suitable and sustainable management strategies.*

*Strengthen in relevant areas 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 /mitigation challenges.*



**Graduate Studies  
Programme (GSP)**

**Seminars Short Course  
Training (SCT)**

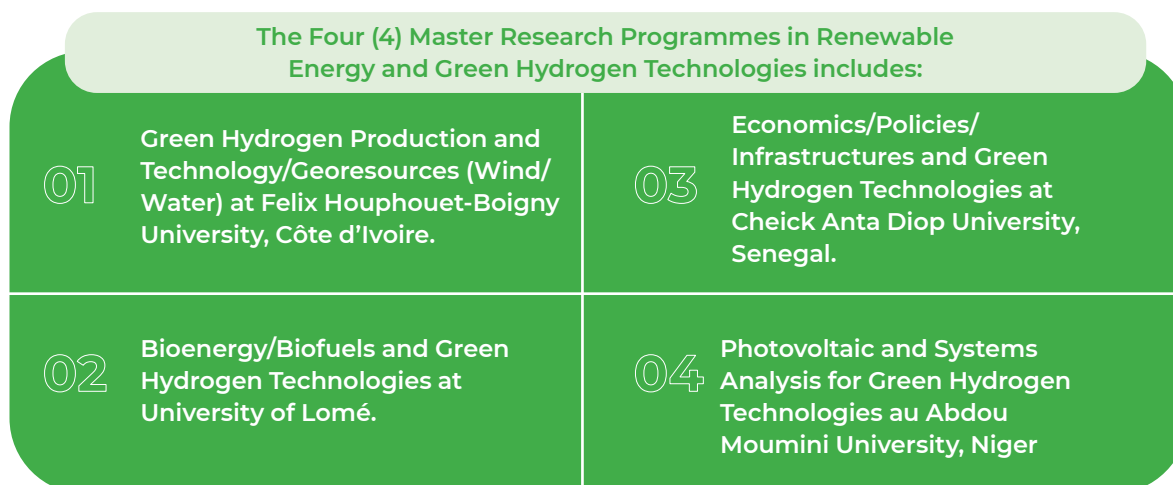
**Visiting Scholars Programme (VSP)  
Service Training**

## I- EDUCATION

The Capacity Building Department was established by the German Federal Ministry of Education and Research (BMBF) in collaboration with West African countries under the umbrella of ECOWAS in the view of educating more well-trained climate Experts. The target is to have thousand (1000) experts in thematic areas currently hosted by 12 Lead Universities in 11 West African Countries including 2 in Nigeria and one (1) each in Togo, Benin, Ghana, Mali, Niger, Senegal, The Gambia, Burkina-Faso, Côte d'Ivoire and Cabo Verde respectively. The Department is coordinated from the Headquarter of WASCAL in Accra by a Director assisted by a Senior Executive Assistant, a Finance officer, and a Repository officer. The training of the climate experts initially started in 2012 with the recruitment of PhD and Masters students from Ten (10) West African countries (Ghana, Togo, Benin, Mali, Niger, Nigeria, Senegal, The Gambia, Burkina-Faso, Côte d'Ivoire) that signed the host country agreement of WASCAL to host 4 master programmes in Climate Change and Education in the Gambia, Climate Change and Adapted Land Use in FUTMINNA – Nigeria, Climate Change and Energy in Niamey Niger, Climate Change and Human Security in Togo, Lomé, and 6 Doctoral (PhD) programmes in Climate Change and Water Resources in Benin, Climate Change and Biodiversity in Cote d'Ivoire, Climate Change and Land Use in Kumasi-Ghana, Climate Change and Agriculture in Mali, West African Climate Systems and Climate Change Economics.

In 2018 after an evaluation, the 4 Masters programmes have been upgraded to PhDs increasing the number of PhD programmes to 10. In 2019 however, Cabo Verde and Burkina Faso joined WASCAL with two new Master Programmes. In October 2021, four (4) Master specialties was introduced under the International Master Programmes in Renewable Energy and Green Hydrogen with 15 students across the 15 West African countries.

It is a 24-month programme, to be run in collaboration with Forschungszentrum Jülich GmbH and RWTH Aachen University and hosted by 4 West African Lead Universities competitively selected to implement this first cohort.

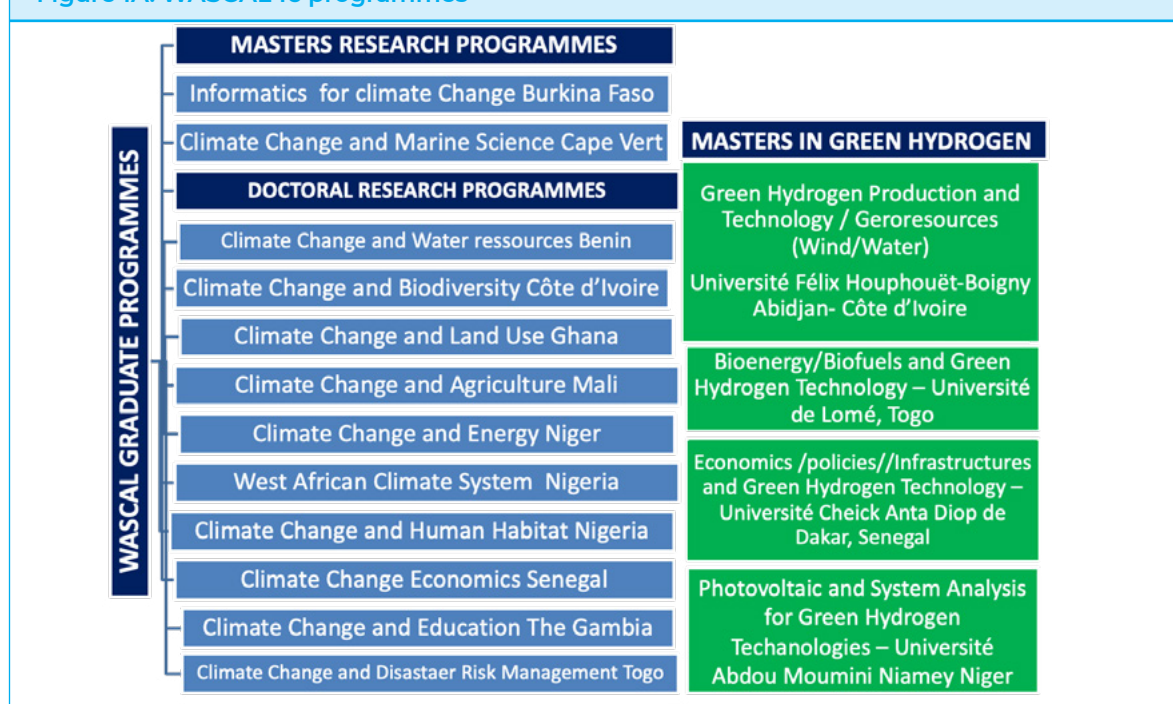


The programme will provide training on state-of-the-art tools used in renewable energy, green hydrogen technology and policy with the view of training adequate human resources to boost the sector of energy technology with new technology and guide policy formulation across West Africa to support the achievement of African Union Agenda in the energy sector faced with global change.

After 4 months language courses the students moved for the curricula implementation in Africa for 3 semesters. The last semester will be done in Germany.

With the 4 additional programmes in renewable energy, green hydrogen technology and policy, the capacity building department is currently operating in 12 Lead Universities in 11 countries with 16 programmes as in Figure 1: below.

**Figure 1A: WASCAL 16 programmes**



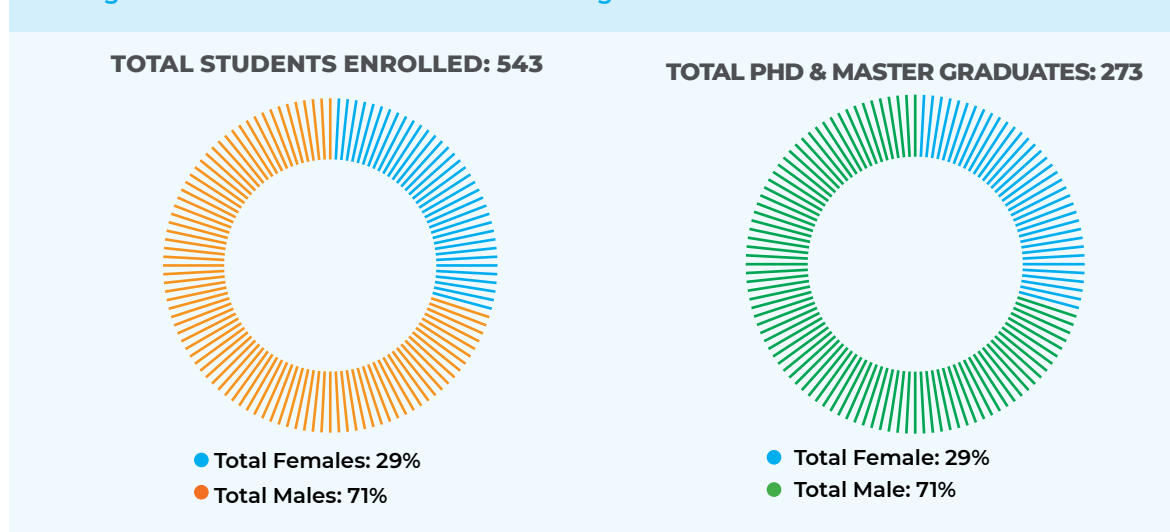
The different schools have been coordinated by 3 Directors since inception. GSPs are running in collaboration with The German Universities and the University of Würzburg in charge of facilitation of the involvement of German partners across the various graduate schools.

WASCAL is very fortunate to have such strong and experienced partners in West Africa and Germany. WASCAL's expertise and the combined knowledge of Forschungszentrum Jülich and RWTH Aachen University guarantee successful programmes.

## Achievement of WASCAL Graduate Studies Programme

Since inception three (3) batches composed of 259 students have been selected. Out of the 6 Doctoral Programmes and 4 Master Programmes, 251 (99 Masters and 152 PhD) students have graduated. 28 to 30 % were females, and 69 to 71% were males.

Figure 3- Students enrolled for PhD and Figure 4: Graduate in Master and PhD Master

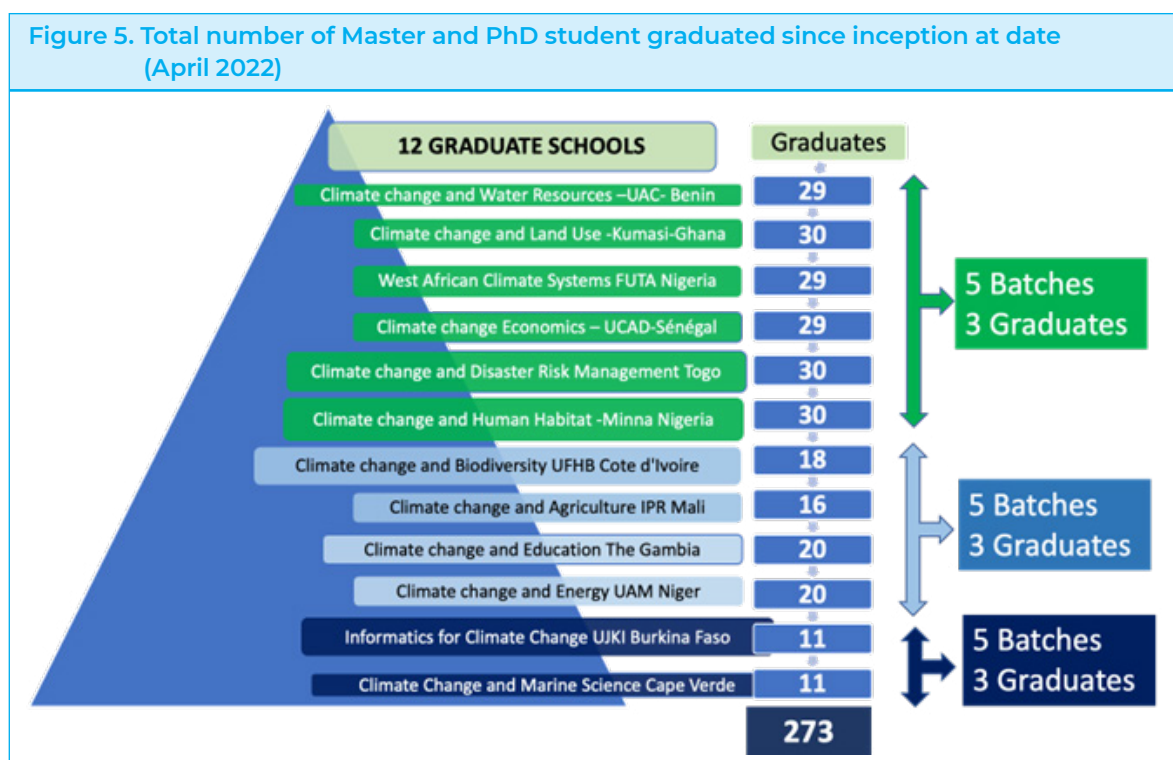


As of 2019, the fourth batch consisted of 132 new candidates selected for two 2 master research programmes and 10 PhD programmes. The implementation of the curricula started in January 2020 with lecturers in the classroom. Due to COVID pandemic, online lecturing was introduced from March 2020 during imposed lockdown imposed by Covid 19 pandemic across the world. WASCAL was able to adapt with online courses and by using MOOCS based on existing facilities in the graduate schools. After the courses online, the student's proposals have been defended successfully in each school with the collaboration of advisory board members. The students received their research budget and are in their respective countries collecting data. Since March 2020, all the meeting with Directors, BMBF, Vice-Chancellors are going on remotely.

Despite the COVID pandemic, 22 candidates have been selected for the 2 Masters programmes at Ouagadougou and Mindelo in 2020. The 22 candidates followed the language courses from their respective countries online.

In the year 2021, the fifth batch composed of 132 students have been selected. After a Kick-off in December 2021, the students travelled to their respective schools and are currently taking the courses in the graduate schools.

The total number of students enrolled is 543 (160 females and 383 Males) in Figure



3 and 273 (80 females and 193 males) have been graduated (Figure 4 and 5).

The Total number of Master (figure 6) and PhD (figure 7) students enrolled as well as the graduates for the same level are presented in Figure 5.

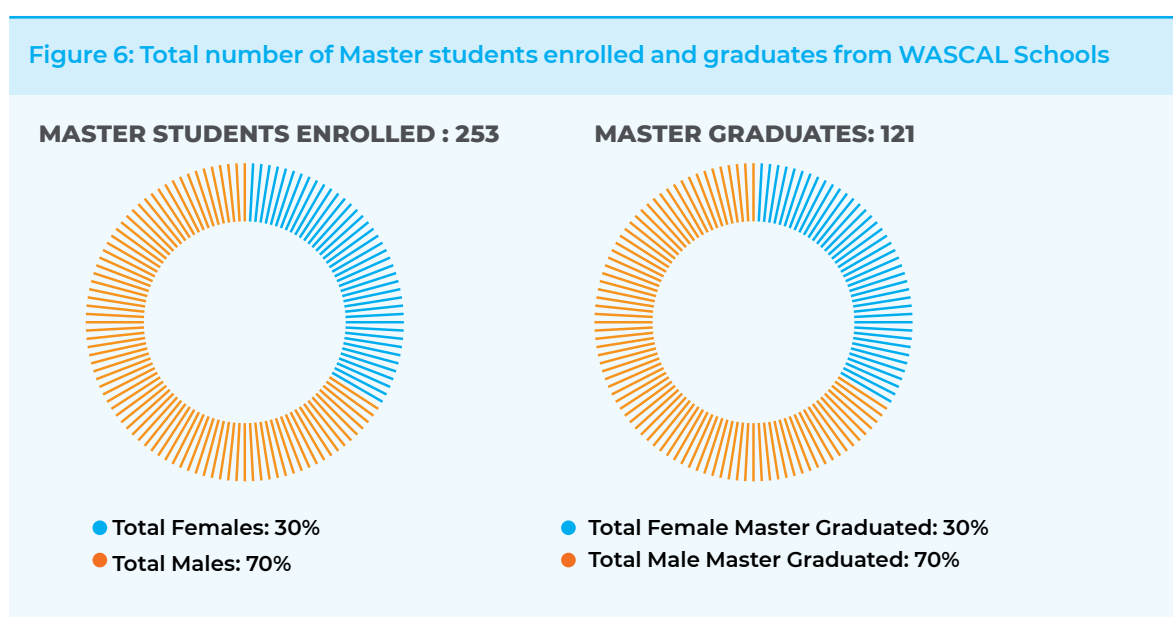
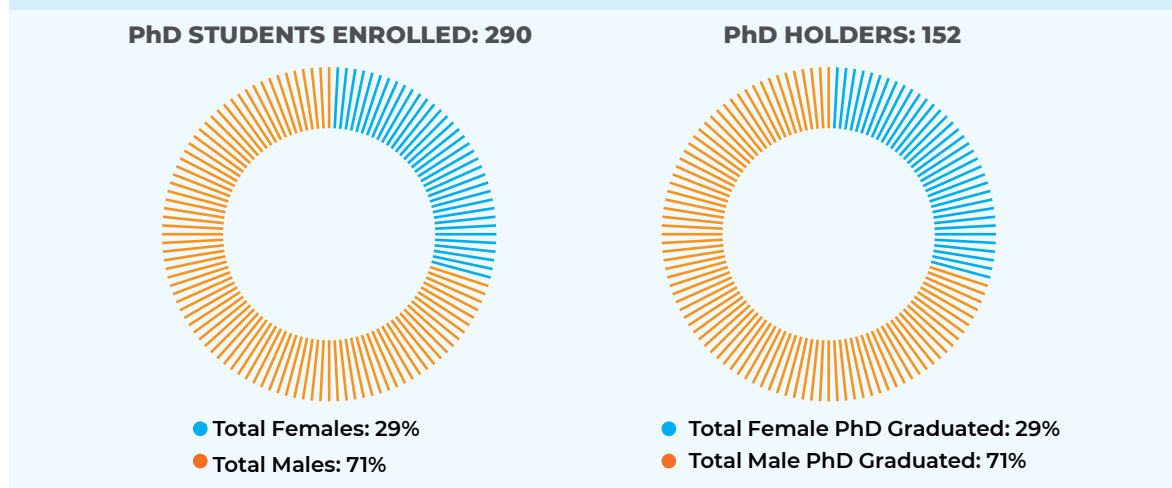


Figure 7: Total number of PhD students enrolled and graduates from WASCAL schools



## II. COLLABORATION WITH PARTNERS

During the implementation of the curricula, lecturers are invited from diverse Universities and Academic Institutions from Africa, Europe, America and German Institutions to share their knowledge with the students and provide them relevant information for topic development information. The lecturers also shared their experiences with the university community in specific topic through scientific and advisory activities. During the six months courses of batch 4, 224 lecturers have been invited in the 12 graduate schools. This is a very strong collaboration and shows how WASCAL is also giving opportunity to the lecturers to firstly share their knowledge and secondly expand their teaching network.

## III. EVENTS ORGANIZED

### Webinars

- The Capacity Building organized events such as Webinars to bring experts together for more interaction around specific thematic areas. The Director also participated as keynote speaker during these Webinars.
- In 2021, three webinars have been organized. Two out of the 3 were organized jointly with IFPRI on the topic related to food security and food nutrition where the issue of striga, the most parasitic plant causing several losses in cereal production was discussed and the issues of climate change impacting food security.
- In February 2022 the following topic were used for the webinar. 'Acting On Cop-26 Goals and Outcomes: Building Capacities for Mitigation, Adaptation, and Resilience to Climate Change in West Africa.
- The webinar brought panellists from Burkina Faso, Nigeria, The Gambia, WASCAL Executive Director and The Head of Capacity Strengthening at IFPRI

to do more WARNESS on the impact of Climate Change on food security and how urgent we need to take action and support the country to implement their National Adaptation Plan.

### **Meetings with Vice-Chancellors**

A ground-breaking meeting with Vice-Chancellors of Leads Universities was held, and a committee was formed to develop ways to strengthening the collaboration with BMBF and the sustainability of the graduate schools.

### **Science Symposium (Wurzburg)**

The department participated to a Symposium in Germany dubbed: Research and Capacity Development in West Africa- WASCAL and German Partners at Würzburg in Germany. The symposium was organized to create opportunities for more collaborations of German academic institution in WASCAL programmes. The 12 directors followed the meeting. Among them six were present (FUTA, FUTMINNA, Senegal, The Gambia, Côte d'Ivoire, Cabo Verde) and the others followed the meeting online.

## **IV. INFRASTRUCTURES AND FACILITIES**

WASCAL has a building in each of the 12 Universities across West Africa to host its students. It also has experts in both in class and in filed works to facilitate knowledge dissemination and a basic state-of-art research equipment. The GSPs also have vehicles to convey students to-and-for their schools and fields of work. For alumni not to be left out, an online registration form has been created on the website to have easy accessibility to journals and publications as well as links to online theses for these alumni since the recruitment of repository officer in 2021.

## **V. HUMAN CAPITAL DEVELOPMENT**

### **Repository Activities**

The WASCAL E-library Systems consists of WASCAL Academia and the WASCAL Library. The WASCAL Academia is an online repository centre for collecting, preserving, sharing and disseminating the intellectual output of the different components of WASCAL in a digital form. The WASCAL Library on the other hand is a software built to handle the primary housekeeping functions of the library.

### **Training on Intercultural Competence**

An intercultural workshop on Intercultural Competence – Communication with the German Research Landscape for the students was organized to get familiar with how to interact with German partners and how things work in Germany.

### **Short courses**

An In-service training in Accra to elaborate on using theoretical and practical tools was organized

WASCAL Capacity Building Department collaborated with universities in their summer school's activities in bringing the batch 4 female students to be mentors of 54 female candidates holding Bsc for the training. WASCAL provided 10 female students of batch 4 for the mentoring.

## **VI. PROJECT IMPLEMENTATION**

### **Project ADAPCOOP**

ADAPCOOP "Strengthening the resilience of cocoa cooperatives in the face of climate change in Côte d'Ivoire", is an applied research project which has the ultimate objective of increasing the resilience of cocoa cooperatives and member families faced with climate change. This project is being implemented by WASCAL through the GSP Climate Change and Biodiversity and the GSP Climate Change Economics. Three alumni of WASCAL are part of the implementation of this project in Côte d'Ivoire.

### **Project artificial intelligence for development (AI4D)**

The innovative project consists of RUFORUM (The Regional Universities Forum for Capacity Building in Agriculture) and AKADEMIYA 2063 with WASCAL as a lead institution. The constitution of "A Hub for Responsible Artificial Intelligence for Climate Action Innovation Research Network in Africa" is very innovative and will support the deployment of Artificial intelligence in the thematic area.

The objective is to create an innovative research network to implement climate action in Africa through the responsible development and deployment of artificial intelligence innovations.

The Project is supported by the Canadian's International Development Research Centre (IDRC) and the Swedish International Development Agency (SIDA) for a 3-year period.

## Publications

**273** MASTER & PhD  
THESES REPORTS



**700**

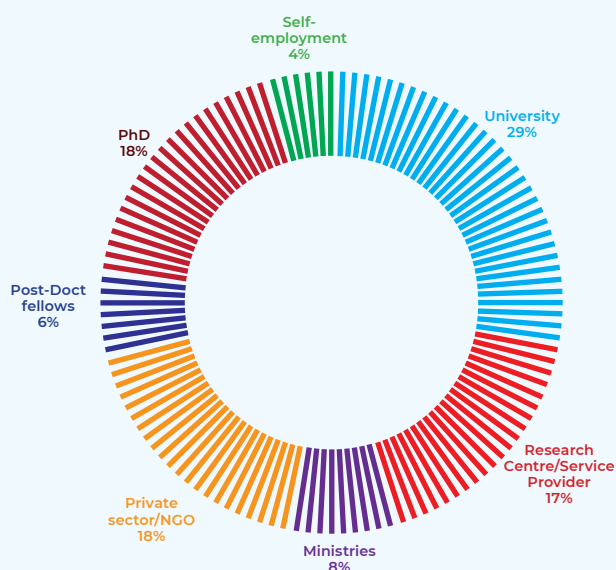
**PUBLICATIONS IN  
PEER JOURNALS,  
BOOKS &  
PROCEEDINGS**  
(Book on Climate Change  
and Food security in 2021).

## Alumni Impact

WASCAL Alumni are working in the International institutions

**Figure 6 : Institutions where WASCAL alumni work**

### WHERE WASCAL ALUMNI ARE OPERATING



ICRISAT,  
CCAF  
IER Mali  
Principal Environmental Scientist  
with the National Oil Spill  
Detection and Response Agency,  
NOSDRA (climate Change and  
Land Use)  
National Institute for Legislative  
and Democratic Studies (NILDS)  
Abuja (climate Change  
Economics)  
Center for Development  
Research  
Team Leader, Islamic  
Development Bank, Jedda, UAE  
Post Doc  
ClimapAfrica Post-doctoral  
Researcher,

A total of 65 teachers including 30% of women of primary school were trained in group of 15 persons on the nutritional and socio-economic importance of trees species (*Adansonia digitata*, *Tamarindus indica*, *Moringa oleifera*, *Parkia biglobosa*) in Mali (Mopti and Sikasso region)

Nigerian, alumni were involved in Community Based Adaptation Projects through Education and information at lower school levels and religious gathering. The training involved the use of C-ROADS software to simulate World Climate Change

Negotiations as a means of replication of the activities of Conference of Parties during negotiations under the UNFCCC. A similar training and activity were conducted for members of the Association

### **Develop diversified market opportunities for tree products with high nutritional and economic value for men and livestock**

122 producers including 48 nurserymen were trained in the processing and marketing of agroforestry products in Koutiala under the project SmAT-Scaling. In addition,

A total of 15 innovation platforms of multi-stakeholder have been set up in Mali around the five priority (Adansonia digitata: Baobab; Ziziphus mauritiana: Jujubier; Balanites aegyptiaca: Dattier du désert; Tamarindus indica: Tamarinier, and Moringa oleifera: Moringa) value chains

### **Joint Publication and Grant**

- Dr. Akinseye ([https://www.researchgate.net/profile/Folorunso\\_Akinseye/publications](https://www.researchgate.net/profile/Folorunso_Akinseye/publications)) who also had a successful grant award through partnership for organizing international Summer School on Modelling approaches for climate risk and adaptation in the context of agricultural sustainable intensification basically of West Africa researchers. CMRA 2021 Website.
- Dr David Awolala (<https://tdri.or.th/en/affp-adaptation-finance/AuthorDetails>), Dr Mahmoud Ibrahim M. (<https://doi.org/10.1177/1940082917709274>, DOI: <https://doi.org/10.1017/S0030605318000881>, <https://doi.org/10.1093/biosci/biy009>)

### **Collaboration with Decision and Policy makers**

WASCAL has collaborated under ICRISAT partnership at the National level. One of the alumni is a member of the African Group of Negotiators Expert Support (AGNES) - Active voice on the financial policies of Nigeria where he evaluates the performance of the economy and makes economic suggestions to the Federal Government of Nigeria through different interviews on the Nigeria Television Authority (NTA) (<https://www.youtube.com/watch?v=miXkGz65Cg4>) and other private stations.

## **VII. PUBLICATIONS**

(books, journal, communication, technical paper, policy brief)

- Master and PhD Theses reports: 273
- More than 100 policies brief with 30 Policy Briefs have been uploaded unto the WASCAL

## VIII - PARTNERSHIPS



Lancaster  
University



## IX- CLIMATE-RENEWABLE ENERGIES AND GREEN HYDROGEN TECHNOLOGY NEXUS

### H2 Atlas Project

- H2-Power-Africa- Atlas of green hydrogen generation potential in Africa.
- Countries involved: 15 West African countries.

### Scientific-technical Results and other significant events

Third-party research results that are relevant to the achievement of the project includes;

- The ongoing green hydrogen research by the German Embassy in Ghana Renewable energy and energy efficiency in the public sector in Ghana <https://www.giz.de/en/worldwide/83817.html>
- energy solutions – made in Germany - with the Project Development Programme (PDP) <https://www.giz.de/en/worldwide/68867.html>
- Market Entry into Renewable Energy and Energy Efficiency for the Productive Sector and TVET <https://www.giz.de/en/worldwide/83964.html>
- 50 MW solar energy from Bui Power in Ghana <https://buipower.com/about-us/>

### Go Green Go Africa Coordination of Renewable Energy Programme in WASCAL

#### C- International Master Programme in Renewable Energy and Green Hydrogen

WASCAL selected among more than 900 hundred applicants, the first cohort of 60 West African students in the international Master of Renewable Energy and Green Hydrogen fully funded by the Federal Ministry of Education and Research, Germany (BMBF).

The programme started in October 2021, and currently operating in Niger for the first and second semesters. The students will continue to their respective schools in Togo, Senegal and Ivory Coast for the specialized programme.

**IN 2015:** Prof. Alassane ABDOULAYE, The Director of WASCAL Graduate School in Niger which was at this moment a Master Research Programme on Climate Change and Energy.

**IN 2017:** Dr. Moussa SOWE, The first Director of WASCAL Graduate Study Programme, Climate Change and Education in The Gambia.

**IN 2017:** Prof. Abdourahamane Konaré, Former Board Member

**IN 2018:** Prof. Modibo Haïdara, The first WASCAL Board Chair

**IN 2021:** Prof. Fatou GUEYE, The second Director of WASCAL Graduate Study Programme Climate Change Economics in Senegal

**IN 2022:** Dr. Ebrima NJIË, The Deputy-Director of WASCAL Graduate Study Programme Climate Change and Education in The Gambia



WASCAL's Competence Centre, based in Ouagadougou, Burkina Faso serves as a reference point for climate change research, climate and environmental services provision. The centre has significantly improved the climate change research infrastructure and capacity, formulated, and carried out demand-driven research with development-oriented outcomes and generated sound, evidence-based knowledge across the sub-region. It has also donated and fixed ultra-modern Automatic Weather Stations and automatic hydrological sensors with governments of West Africa to enable them operate a more contemporary weather forecasting.

## INVESTMENT AND CONSTRUCTION OF THE NEW COC BUILDING IN OUAGADOUGOU

The ground-breaking ceremony of the new Competence Centre building was held on July 22nd, 2021, during the 4th Ministerial council Meeting at LANCASTER Hotel in Ouagadougou, Burkina Faso. This Competence Centre will be built on a 4-hectare plot of land donated by the Burkinabe State to WASCAL. The building will house the Competence Centre, a graduate school on climate change and informatics, offices, a geographical data management Centre and applications.

The ambition of building a Competence Centre in Ouagadougou will enable WASCAL to become one of the top research institutions in the region and Africa. It will offer top-level research results and environmental and climate services as well as research management with visible impact to decision-makers and with the broadened portfolio of new technologies for climate friendly energy supply.

The head of the division of Renewable Energy and Green hydrogen technologies, Christoph Rövekamp, said that the decision to fund WASCAL and the construction of the Competence Centre in particular, was motivated by the fact that Germany is aware of the dangers of Climate Change as it is also a victim. "We in Germany are experiencing the effects of Climate Change every day. This proves to us that the

effects of Climate Change are a reality in the world. It is in this context that we have decided to finance this centre in West Africa,” he suggested.

Dr. Christoph Rövekamp, echoed the fact that the Federal Ministry of Education and Research of the Republic of Germany provides financing of 7 million Euro for the building which will lead to physical transformation and modernization of the Competence Centre, materializing therefore Germany’s commitment to a long-lasting collaboration with West Africa and WASCAL.

The Minister of Higher Education, Scientific Research and Innovation of Burkina Faso, Professor Alkassoum Maiga said the Competence Centre will contribute to quality research programmes that will be provided by the Centre. According to him, investing in the new building is very important for Burkina Faso as it will contribute to building the capacity of young generation and by extension develop national economies.

WASCAL signed a financing agreement with KfW on November 25, 2021 for the construction of the new competence Centre in Ouagadougou. The signing ceremony took place in the premises of the Competence Centre in Ouagadougou.

The signing of this contract was a historical moment, for it is an important prerequisite for the construction of the building. The Financing Agreement, amounting to 7 million Euros is funded by the German Federal Ministry of Education and Research (BMBF). The new building symbolizes the will of the Federal Republic of Germany and the West African countries to build a solid and sustainable partnership.





## PROJECTS AT COMPETENCE CENTRE

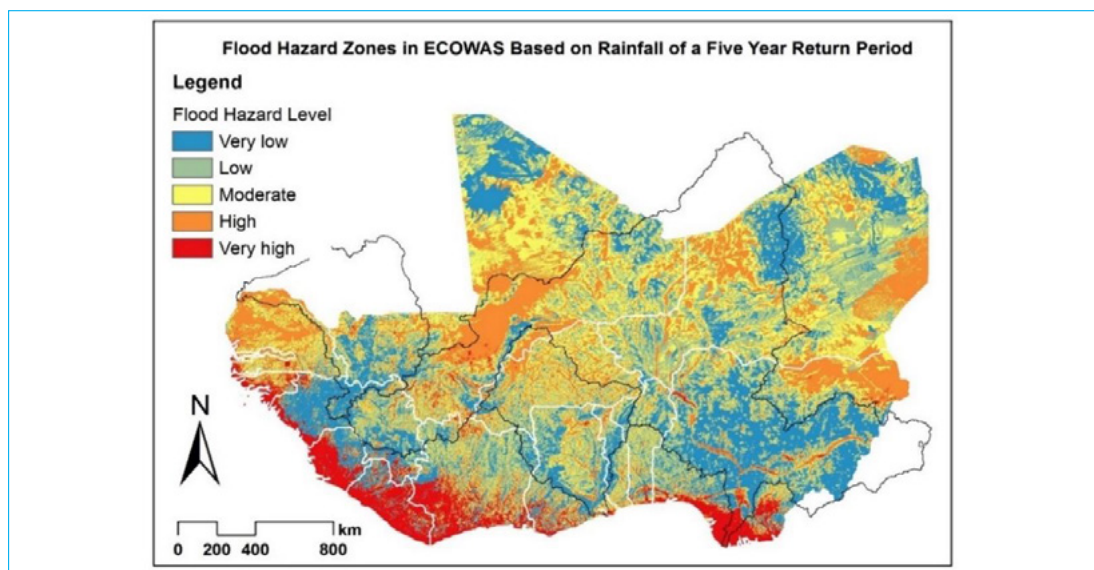
### A. DISASTER RISK REDUCTION PRACTICE RESEARCH AND CAPACITY BUILDING SUPPORT TO ECOWAS

The overall objective of this project was to contribute to disaster risk management related research and policy advice in support of ECOWAS as well as capacity enhancement interventions to benefit ECOWAS member states and key stakeholders like media, academia, civil society organizations, NGOs and the private sector to better contribute to the implementation of Disaster Risk Reduction (DRR) activities in West Africa. More specifically, the had three main objectives a) to provide policy research related to flood and disaster management in the ECOWAS region; b) to provide a pre-feasibility study for regional flood forecasting, early warning, and open data management c) to facilitate training and capacity enhancement for ECOWAS secretariat and experts from member states related disaster risk management.

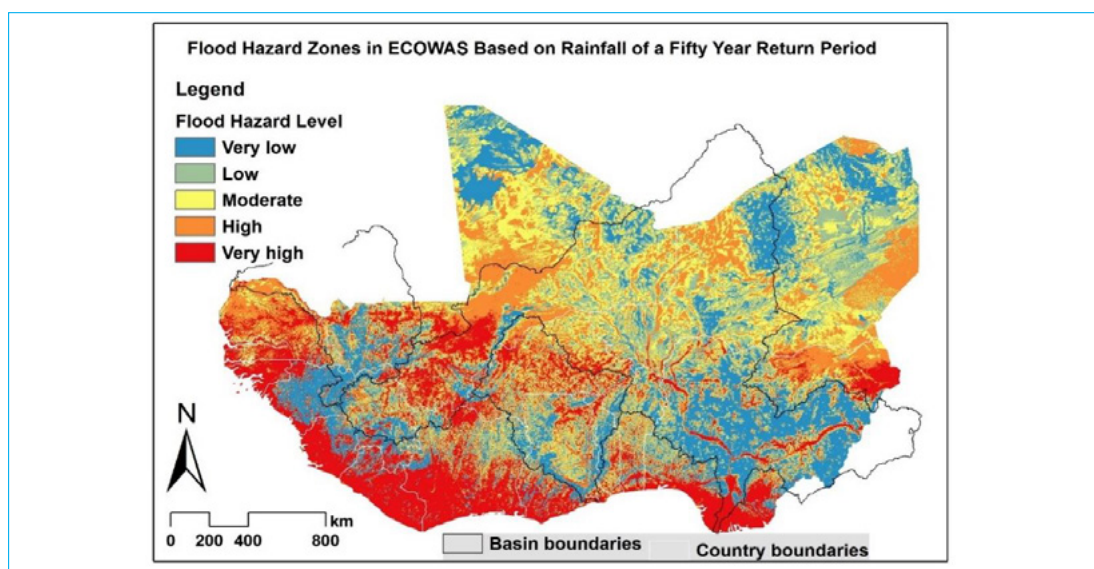
#### Project Outcome:

- i. Four (4) regional capacity development activities are implemented for all fifteen (15) ECOWAS member countries and their national institutions dealing with DRR, Hydromet Meteorology and GIT applications. The capacity development are related to regional awareness and implementation of Flood Forecasting and Early Warning Systems as well as use of GIS and Remote Sensing (RS) technology to strengthen ECOWAS countries capacity building.

- ii. Forty-two (42) participants obtain either participation or a completion certificate.
- iii. At the end of the training, the average level of participants skills was raised from 2.7 to 4 on a scale from 1 to 5
- iv. Flood hazard, vulnerability and risk hotspot maps at the scale of ECOWAS were derived from open-source information for return periods of 5 years and 50 years
- v. Flood Exposure Maps were also generated. Three exposure factors/elements were considered – population, cropland and built-up area extent.

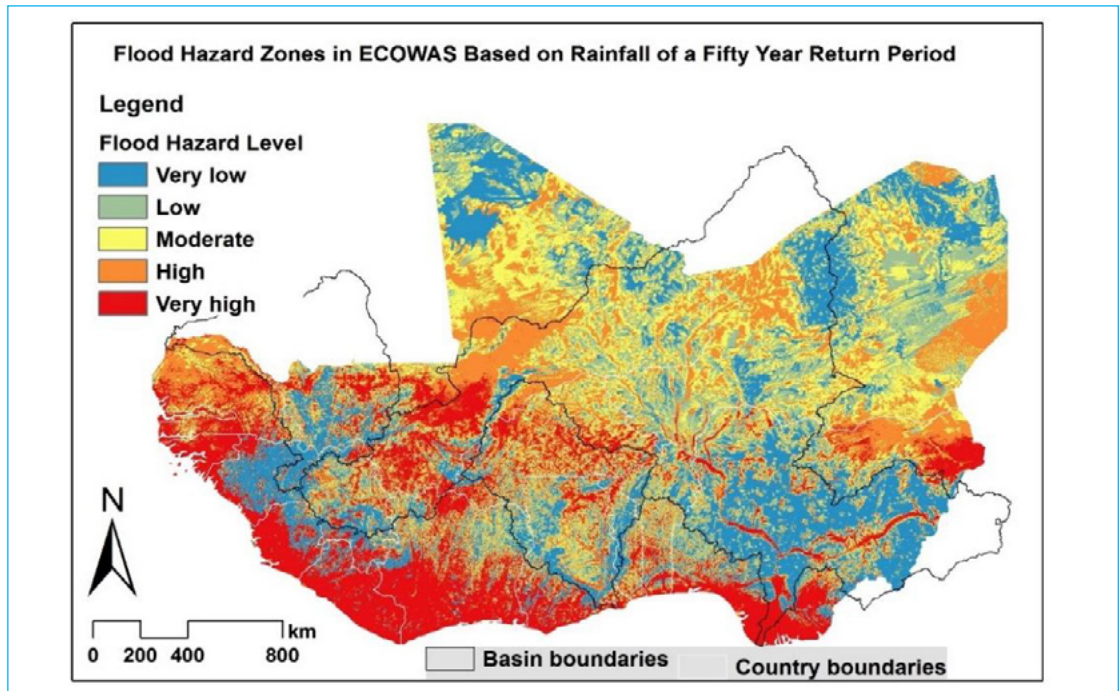


Flood hazard maps for return periods of 5 years

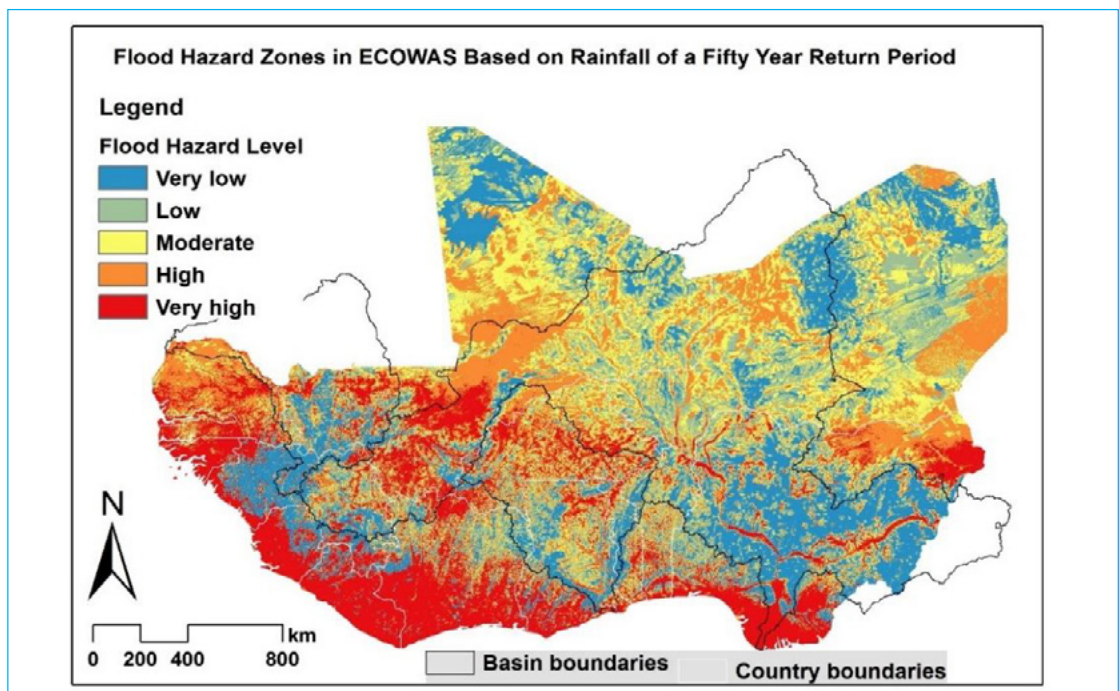


Flood hazard map for return period of 50 years

Flood exposure map overlaid with population distribution in West Africa for 5-year return



Flood exposure map overlaid with population distribution in West Africa for 50-year return



**Mitigation to climate change:** methods of disaster risk reduction practice research in Ecowas region were identified:

- (i) Stakeholder consultation and validation meetings,
- (ii) GIS mapping using open data,
- (iii) Feedback loops and evaluations.

## **Adaptation Technology:**

- i. Flood forecasting mechanism in the ECOWAS region developed for ECOWAS.
- ii. Benin, Côte d'Ivoire, Gambia, Mali, Niger, Nigeria and Togo have been able to implement early warning/flood forecasting systems and flood event databases in Cape Verde, Côte d'Ivoire, Gambia, Guinea Bissau, Niger, Nigeria with the support of funding agencies such as the World Bank and UN agencies - UNDP, etc.
- iii. one (1) Policy Note on Strengthening the Academic Network for Disaster Risk Reduction in West Africa developed.

## **B. AGRICA**

### **Objective:**

The project provides comprehensive climate risk analyses for the agricultural sector in selected countries in sub-Saharan Africa. The findings are meant to inform national and sub-national adaptation planning including NDC and NAP development and review processes but will also provide useful information and evidence to decision makers at other planning and implementation levels. The main research objectives of the ARCs are 1) a climate risk analysis with estimates of current and projected climate and weather-related impacts on water resources, crop and livestock production, and 2) an assessment of the costs and benefits of selected adaptation strategies versus no action. These two components are reflected in an impact dimension and an action dimension of the study. The impact dimension examines the interaction between climate change, water availability and agriculture and livestock, while the action dimension goes further by assessing the selected adaptation strategies using biophysical analysis, cost-benefit analysis and socio-economic analysis. Uncertainty related to the results will be critically debated and recommendations will be made to decision-makers.

### **Project Outcome:**

Generate Climate Risk Profiles of Burkina Faso and Niger in which climate impact assessment.

### Adaptation Technology:

Adaptation technologies in Irrigation, Cultural practices, Climatic information, were identified and developed for crop and livestock farmers in Burkina Faso and Niger.

## C. WABES

### Objectives:

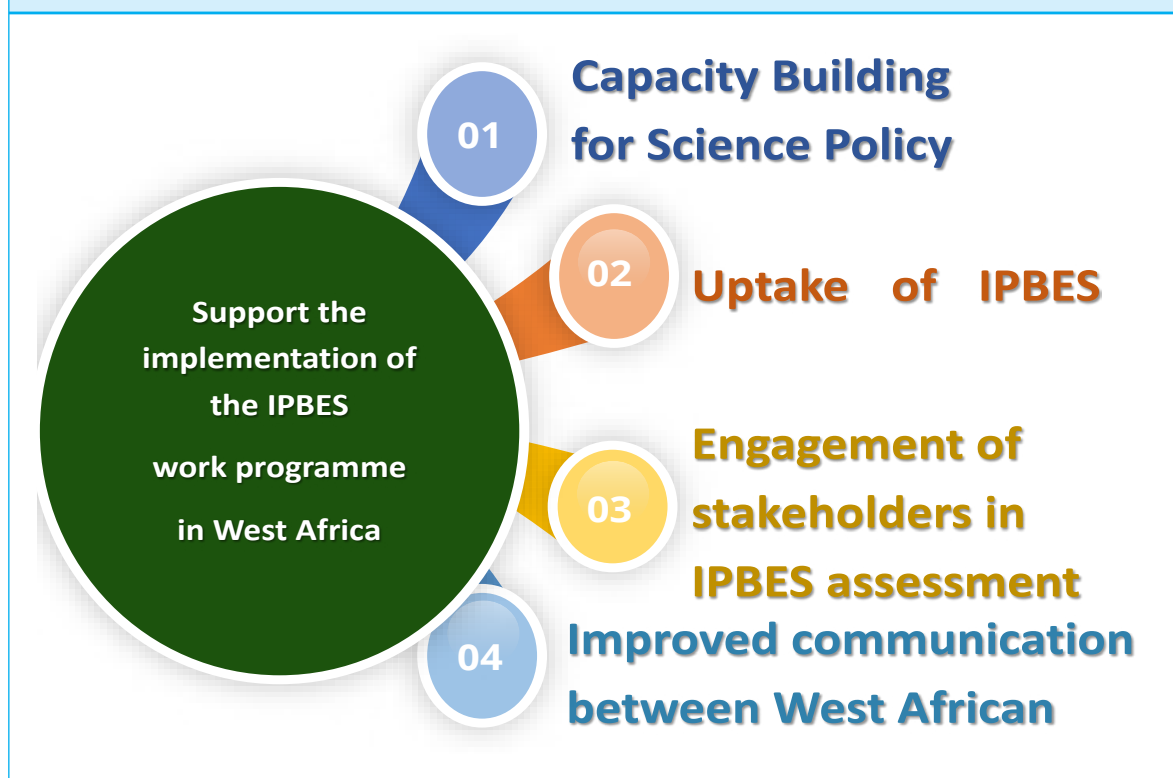
The West African Biodiversity and Ecosystem Services (WABES) is an initiative with the aim of facilitating networking and capacity-building across West Africa to support the scientific assessments of Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). It is made up of a consortium of partner institutions across West Africa (including WASCAL) and Europe, is funded by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). Thus, WABES is a pioneer in strengthening the Biodiversity and Ecosystem Services (BES) sub-regional pool of experts in West Africa to support and disseminate IPBES assessments.

### Project Outcome:

- Regional West African experts in the fields of biodiversity and ecosystem services exchanged experiences on IPBES developments with their colleagues at international level (external speakers) during annual workshops.
- Thirty students (two from each of the ECOWAS member countries) have benefitted from the full scholarship SPIBES MSc programme offered by WABES.



Figure 1. Support for the implementation of IPBES work in West Africa



## D. UPSCALLER

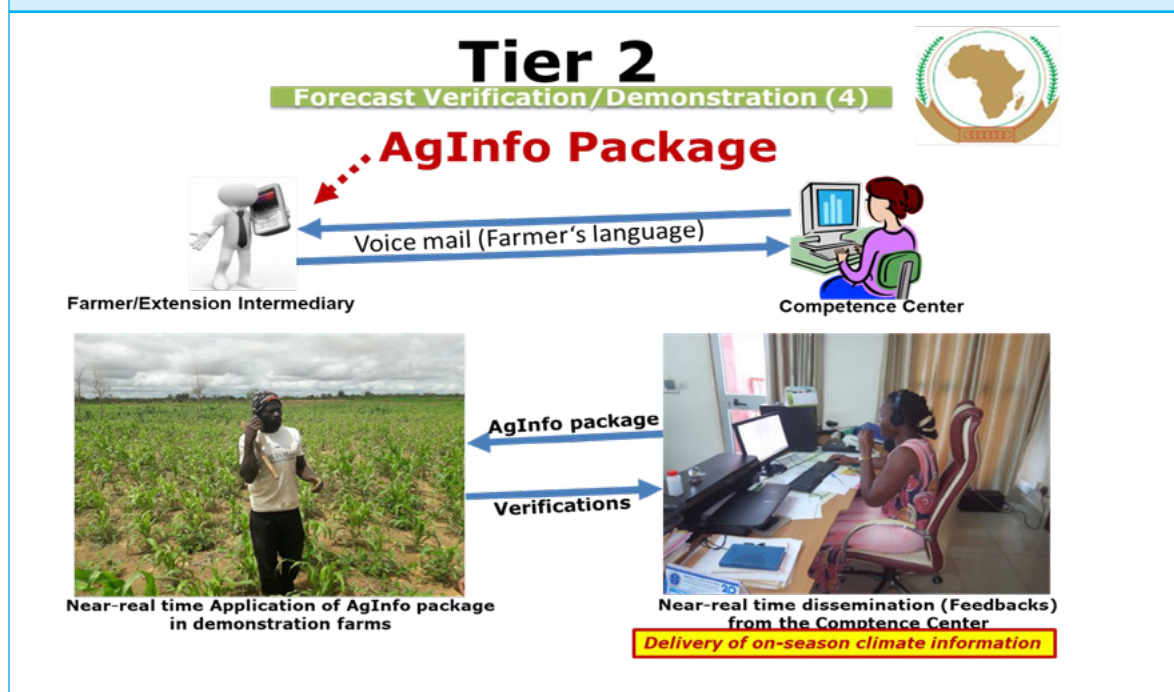
### Objectives:

The Upscaling Site-Specific Climate-smart Agriculture and Land use practices to Enhance Regional Production Systems in West-Africa (UPSCALERS) project is an innovative research-for-development project aimed at integrating climate, crop, and livestock systems to achieve the maximum benefits.

### Project Outcome:

- Developing a Web App to deliver agroclimatic information services to a network of 200+ farmers & 10 extension intermediaries across Burkina Faso, Ghana, Niger & Mali (i.e. The AgInfo package)
- installed 8 biodigesters and 36 compost pits to support crop-livestock circular bioeconomy of 120 farmers Burkina Faso, Ghana, Niger,
- supporting the African Union Research-Innovation congress in the participative observations/modelling with farmers, extension intermediaries for the Africa We Want Agenda 2063.

Figure 2 Web App to deliver agroclimatic information services to a network of 200+ farmers and extension workers



### Mitigation to climate change:

Production, dissemination, out scaling and upscaling climate information services (total rainfall days, onset/cessation of rain, flood, heatwave and other compound event), climate smart practices for crop-livestock farming in the region.

#### Adaptation Technology:

Biogas production improves life conditions, especially for women and children, by reducing kitchen smoke and producing clean light for work for 12 households in Burkina Faso and Niger.

## E. CIREG

### Objectives:

Deliver demand-driven climate services to support renewable energy planning, implementation, and investment decisions, aligned with SDGs and Nationally Determined Contributions (NDCs). Support decisions towards sustainable electricity generation mixes with a high share of renewables (including hybrid solutions based on solar, wind, and large to micro hydro power). Provide information on risks and opportunities for renewable electricity sources under climate change and variability. Develop a framework for the systematic identification and valuation of renewable electricity generation potentials aligned with SDGs for national, regional, and international investors.

### Project Outcome:

Off-grid renewable solutions and mixes of solar, hydro & wind powers in West Africa.

### Mitigation to Climate change:

- i. Transboundary power sharing, mixes and complementarity between hydro, solar & wind energy in support of the West Africa Power Pool (WAPP).
- ii. 3 sets of community Business models set-up in Togo
- iii. Installation of a hybrid Hydropower-solar power generation in Gbandidi (Togo) to provide electricity to the local community business centers.
- iv. 120 households get access to electricity for the first time,
- v. 60 households get access to clean water from borehole for the first time

### Adaptation Technology:

- Installation of an off-grid photo-voltaic (PV) power plant and a centralized PV-based borehole water pumping system in Niger to provide access to clean water for consumption and micro-irrigation of the villagers.
- Installation of a hybrid solar-hydropower warehouse to Gbandidi community in Southern Togo.

## CAPACITY BUILDING IN SUPPORT OF WEATHER, WATER AND CLIMATE SERVICES IN MALI AND NIGER

### Project Outcome:

Identification of critical human capacity gaps and training needs for the modernization of the national hydro meteorological services in Mali and Niger. Providing a guidance note for developing concepts of operations based on global best practices. Development of training curriculum.

### Mitigation to Climate change:

- i. Training of 18 staff members of the meteorological, hydrological and climatological services in Mali and Niger
- ii. Produce of two (2) analytical report on the technical capacity of climate services providers
- iii. Training 18 staff of the meteorological, hydrological and climatological services in Mali and Niger on Public-Private Partnership Model

### Adaptation Technology:

Providing one (1) - guidance report to the World Bank for strengthening technical and human capacity of all relevant stakeholders in Mali and Niger

## F. ENERSELF

EnerSHelF is a German-Ghanaian joint project in which experts from science and industry of the various disciplines work together on both technical and politico-economic questions to improve and disseminate marketable PV-based energy solutions for health facilities in Ghana. The overall objective of the project is to simultaneously improve access to health services (SDG 3) and sustainable energy (SDG 7) in Ghana.

The project will contribute to sustainable economic, environmental, and social development through an accelerated diffusion of integrative and reliable PV solutions to support an increase in the market share of renewable energy and thus strengthen the sustainability of the national energy system. In addition, improved energy access and reduced energy costs will allow for improved healthcare.

### Project Outcome:

- i. Increasing Ghana's weather/Climate observation network by installation 3 AWS at Kologo Health Center, SMH-Pramso Kumas, SDH-Akwatia.
- ii. Installed PV modules, St. Dominic's Hospital Akwatia, Ghana to gain an integrative understanding of the interplay between the institutional and technological transition in the health-energy nexus.
- iii. Increase access to electricity to 3- rural communities.
- iv. Ten enumerators conducted the survey at 200 health facilities for the EnerSHelF project.

### Mitigation to Climate change:

Off-grid solution of Solar energy to small community assets (two hospitals) in rural Ghana to support reduction in the use of fossil fuel and access to clean energy.

## SOCIOECONOMIC CHALLENGES AND CROSS BORDER MIGRATION

### GREEN-BUILDERS

#### Objectives:

The GREEN BUILDERS project, jointly coordinated and implemented by WASCAL and UDS investigated how to better collect, recycle, and repurpose organic solid and liquid waste to benefit Urban and Peri Urban Agriculture and Green Urban Spaces for the urban and peri-urban Ouagadougou and Tamale. The project developed and facilitated multi-stakeholder platforms (MSPs) for learning and knowledge creation and integration of proper waste disposal, recycling, and repurposing strategies.

#### Project Outcome:

- i. Green Builder offers Multistakeholder Platforms (MSPs) consolidated relationship among 500 stakeholders (Municipalities, Plant nurseries owners, market gardeners, waste collector, waste composter).
- ii. It provides different possibilities for addressing and solving the issues related to waste management in cities across Burkina Faso and Ghana.

#### Mitigation to Climate change:

Multistakeholder Platforms (MSPs) offered different possibilities to 120 stakeholders in addressing and solving the issues related to waste management in cities

#### Adaptation Technology:

- i. Multistakeholder Platforms (MSPs) consolidated relationship among municipalities, plant nurseries owners, market gardeners, waste collector, waste composter.
- ii. Technology for liquid and solid organic waste developed
- iii. Value of bio waste for compost making available for gardeners, plant nursery owners, waste collectors, municipalities, Ministry of Energy (ANEERE) in Burkina Faso

### RAMSIS II

#### Objectives:

The Roles of Agroforestry in sustainable intensification of small farms and food Security of Societies in West Africa (RAMSES II) project is an international cooperation initiative based on inter and transdisciplinary research for development (R4D) activities. The RAMSES II project is coordinated by IRD and jointly implemented by WASCAL, CIRAD, WUR, ISRA, INERA, WASCAL and, (APAF, Bird Life International, Global Shea Alliance). The overall objective of RAMSES II is to assess where, when, and how domestication, regeneration

and densification of woody species in the traditional agroforestry parklands may contribute to sustainable ecological intensification of agriculture in West Africa. RAMSES II will provide scenarios of intensification of multifunctional agroforestry parklands, valuing both ecological processes and contextual adaptive practices along a diversity of ecological, technical and socio-economic conditions, knowledge and agricultural models to sustainably increase food, income, and environmental security.

### **Project Outcome:**

Scenarios of parkland management intensification

- i. Three Scenario in 4 transects : 2 in Burkina Faso (kamboinse-Yilou in the Plateau Central Region, and Koumbia-Dano in the Western Region. 2 in Senegal (Niakhar –Bambey and Thies –Bambey):

- ii. Through the bio-economic modelling, we tested 3 scenarios

**Scenario 1:** Intensification scenario (more trees)

**Scenario 2:** Migration and labor

**Scenario 3:** Market (agriculture & agroforestry products prices)

### **Mitigation to Climate change:**

Innovative stakeholder Platforms on agroforestry developed

2 platforms: 1 in each country (Burkina Faso, Senegal) for agroforestry transition, tradeoffs and food security in each country.

### **Adaptation Technology:**

Agroforestry parkland intensification.

The adaptation strategy is agroforestry (more trees basically the Shee tree in Burkina Faso and Senegal)

## **CLIMATE SMART AGRICULTURE AND LANDSCAPES**

### **FSP-AGRICORA**

#### **Objectives:**

The main objective of FSP AGRICORA is to contribute to the development of effective tools for managing climate risk by co-constructing innovative strategies based on research results with networks of researchers and actors directly involved in supporting of farming. To do this, it mobilizes research-action in partnership to produce knowledge and tools adapted to better document and, if possible, reduce uncertainty in decision-making and will strengthen the research and expertise capacities of the beneficiary countries.

## **Project Outcome:**

### **Mitigation to Climate change:**

- i. agro climatic information (heat stress, rainfall totals, Onset/cessation of rain) delivered
- ii. climate smart practices against heavy rains developed
- iii. Operational delivery of “1-week & 2-week lead time forecasts” of pluviometric extremes (i.e. False onset for cropping seasons, heavy rain events, soil waterlogging to a network of 120+ farmers based in Northern Ghana & Burkina Faso
- iv. 50-Farmers and extension intermediaries in the region in Northern Ghana and Burkina Faso are immediate beneficiaries.

### **Adaptation Technology:**

12 villages benefited at the pilot sites in the distribution of climate smart toolkits to farmers in Northern Ghana and Burkina Faso.

## **CLIMATE - RENEWABLE ENERGIES AND GREEN HYDROGEN TECHNOLOGY NEXUS**

- i. Hybrid Waste-to-Energy (W2E) Pilot Project in the Ashanti Region, Ghana: The overall aim of the project is to through research and development and capacity development, develop concepts for waste segregation and the conversion of various fractions into energy by using biogas, pyrolysis and solar PV plants. Additionally, the project also seeks to create business models to successfully replicate and propagate this model in 10 different regions in Ghana. The project team brings one of its kind research and technologies combinations to Ghana in supporting and enhancing the sustainable waste management.
- ii. The H2ATLAS-AFRICA project: is focused on assessing the potential of generating hydrogen in sub-Saharan Africa from the renewable energy resources in the region. It will focus on detailed technological, environmental, economic and social feasibility assessment taking present and future local energy demands into consideration.
- iii. It will assess the availability and suitability of land and water resources while taking into account land use for agriculture and local demand for water.

## CLIMATE AND ENVIRONMENTAL SERVICES

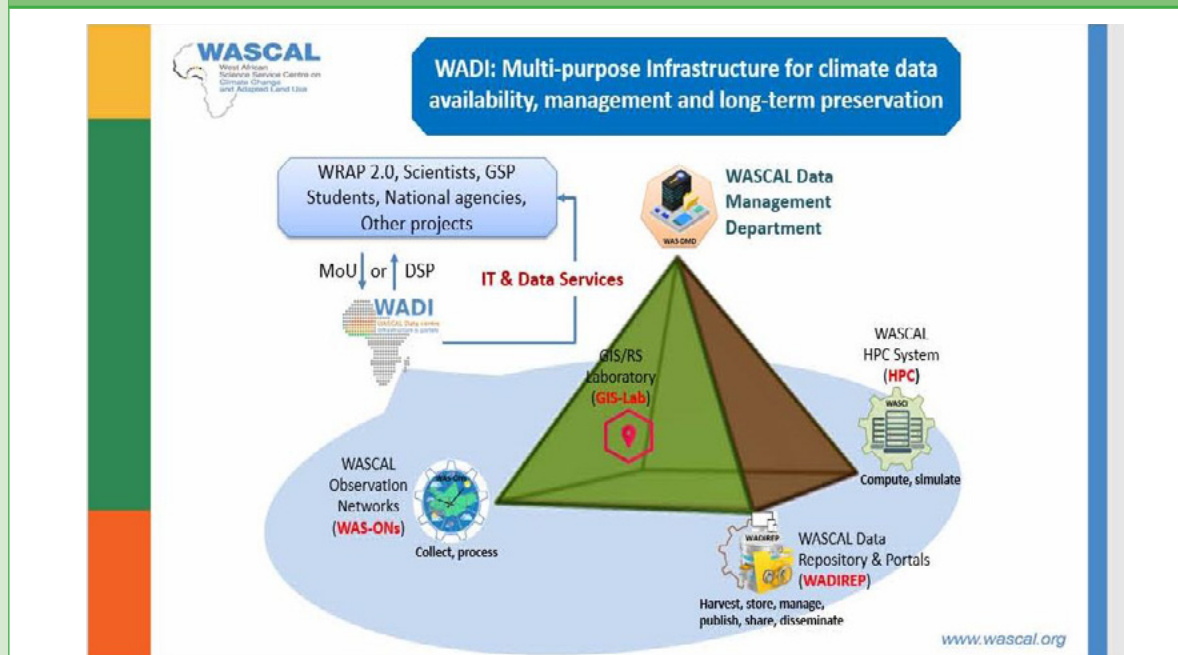
- i. Disaster Risk Reduction Practice Research and Capacity Building Support to ECOWAS: Four (4) regional capacity development activities implemented for all fifteen (15) ECOWAS member countries and their national institutions dealing with DRR, Hydromet Meteorology and GIT applications. Disaster forecasting, and early warning system developed for ECOWAS.
- ii. UPSCALLERS : Development of 1-web application called AgInfo package for large-scale farmer use in Burkina Faso and Niger. More than 120 farmers are presently using this tool.
- iii. CIREG : Establishment of community led Business management models (LEAP and SWIM models) for the of off-grid & centralized PV-based water pumping system.

Figure 3. Policy brief (in English and French) on Smart mixes of solar, wind and hydropower in West Africa developed.



- iv. 1-Policy brief (in English and French) on Smart mixes of solar, wind and hydropower in West Africa developed.
- vi. Installation of a hybrid Hydropower-solar power generation in Gbandidi (Togo) to provide electricity to the local community business centers.
- vii. AGRICA : 5-Adaptation strategies on the feasibility, social acceptance and uptake of adaptation measures among farmers and stakeholders developed for farmers of Burkina Faso and Niger
- viii. WADI: (i) Regional data sharing and dissemination service with 600+ metadata records of datasets published online for download (directly or upon request) or citation/dissemination (ii) Regional automatic (hourly) climatic data collection services from the 50 Automatic Weather Stations (AWS) distributed to member countries.

Figure 3. Policy brief (in English and French) on Smart mixes of solar, wind and hydropower in West Africa developed.



## OBSERVATORY NETWORKS (AWS, AHS AND RIVER BASINS )

### 3 Cross-border Research Stations (Fully equipped)

- Across Benin-BurkinaFaso-Ghana
- 6 Categories of devices, 100s of sensors, 27 essential variables per day

### 50 Automatic Weather stations (AWS)

- Installed for & shared with 10 Weather-Services of WASCAL Countries
- 60 Automatic Water level & Water quality sensors
- On going installation and training of technical staff

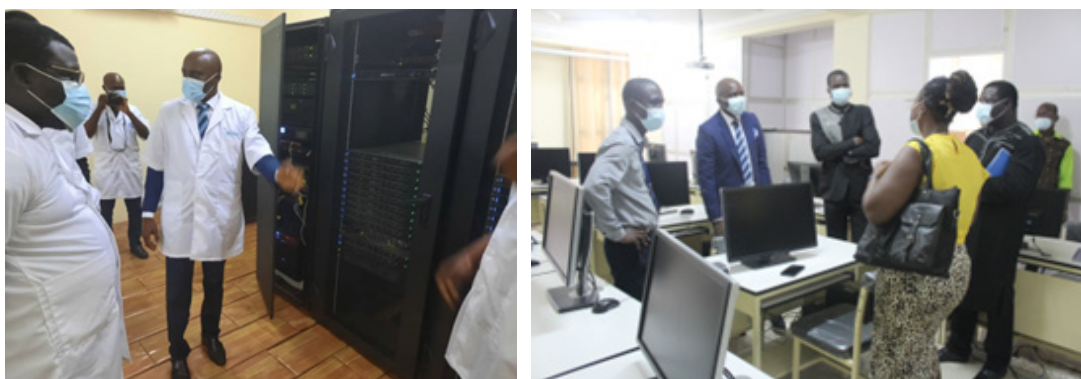
### 1-Satellite receiving platform

#### GPRS/GSM transmissin of Data

- Measurement frequency- every 10minutes
- File archeiving frequency – 1hr

## DATA MANAGEMENT AND PROVISION

WADI: Multi-purpose infrastructure of hardware, software, network resources and Information Technology (IT) services set up by WASCAL to enable the collection, storage, management, discovery, access, sharing, and dissemination of primary and secondary research data related to environment and climate change within the West African region.



## CONTRIBUTION TO IPBES AND IPCC

- i. The IPBES project is conducted in the 15 West African countries.
- ii. Thirty (30) students trained at MSc programme on Managing Science Policy Interfaces / IPBES
- iii. Training workshops: conducts more than 8 workshops, with over 300 participants across 21 African Countries

## ECOWAS COUNTRIES

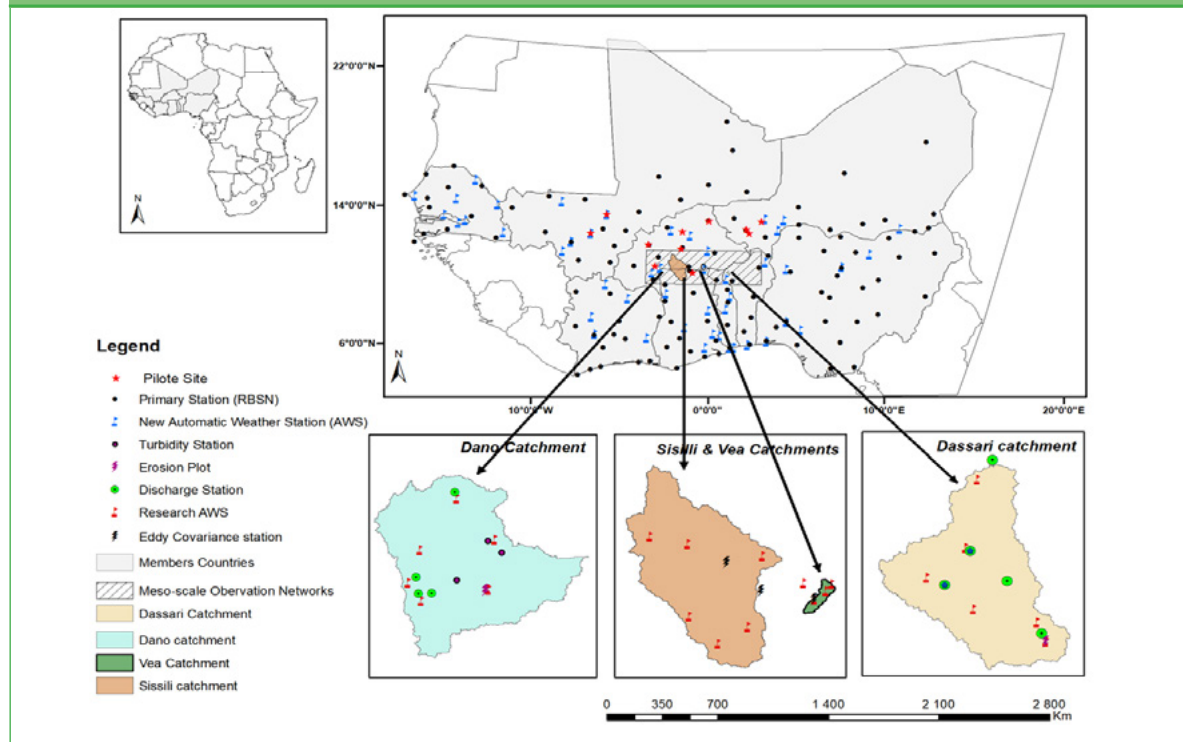
### CONTRIBUTION TO ECOWAS

- i. Impact of climate change and adaptation cost on agriculture, water sector and coastal zones in West Africa.
- ii. The International Advanced Training Programme on Climate Change Mitigation and Adaptation" (ITP 2020-2021). The objective of the seminar was to build capacities of twenty five (25) participants from Burkina Faso, Mali and Niger in climate change adaptation and mitigation strategies to the benefit of their respective countries.
- iii. A regional technical meeting for the elaboration of the report on the state of the environment in the regional space.
- iv. Development of a Regional Climate Strategy for ECOWAS
- v. Collaborate with ECOWAS on the training of regional negotiators that partook in the COP26, Glasgow, UK.

## CONTRIBUTION TO HYDROMET SERVICES

- i. 3-Cross-border Research Stations (Fully equipped) :Across Benin-Burkina Faso-Ghana
- ii. 6- Categories of devices, 100s of sensors, 27 essential variables per day
- iii. 60-Automatic Water level & Water quality sensors :On going installation and training of technical staff

Figure 5. showing the three WASCAL river basins with state-of-art facility



## SCIENCE-POLICY INTERFACES

Regional online workshop on Overview of the collaboration between WASCAL and the National Meteorological Services and Agencies (NMSAs): Status quo and way forward

## ADVISORY SERVICES TO FAMERS

- i. agro climatic information, & climate smart practices against heavy rains
- ii. Operational delivery of "1-week & 2-week lead time forecasts" of pluviometric extremes (i.e. False onset for cropping seasons, heavy rain events, soil waterlogging to a network of 120+ farmers based in Northern Ghana & Burkina Faso
- iii. Development of web application of AgInfo package for large-scale use.
- iv. Adaptation strategies on the feasibility, social acceptance and uptake of adaptation measures among farmers and stakeholders

## AT NATIONAL LEVEL

### Research and innovation

#### UPSCALERS:

Upscaling Site-Specific Climate-smart Agriculture and Land use practices to Enhance Regional Production Systems in West-Africa

Objectives: The Upscaling Site-Specific Climate-smart Agriculture and Land use practices to Enhance Regional Production Systems in West-Africa (UPSCALERS) project is an innovative research-for-development project aimed at integrating climate, crop, and livestock systems to achieve the maximum benefits.

#### Project Outcome:

- Developing a Web App to deliver agroclimatic information services to a network of 200+ farmers & 10 extension intermediaries across Burkina Faso, Ghana, Niger & Mali (i.e. The AgInfo package),
- Installed 8 biodigesters and 36 compost pits to support crop-livestock circular bioeconomy of 120 farmers Burkina Faso, Ghana, Niger,
- Supporting the African Union Research-Innovation congress in the participative observations/modelling with farmers, extension intermediaries for the Africa We Want Agenda 2063.



#### Mitigation to climate change:

Production, dissemination, out scaling and upscaling climate information services (total rainfall days, onset/cessation of rain, flood, heatwave and other compound event), climate smart practices for crop-livestock farming in the region.

#### Adaptation Technology:

Biogas production improves life conditions, especially for women and children, by reducing kitchen smoke and producing clean light for work for 12 households in Burkina Faso and Niger.

## CIREG: Climate Information for Integrated Renewable Electricity Generation

### Objectives:

Deliver demand-driven climate services to support renewable energy planning, implementation, and investment decisions, aligned with SDGs and Nationally Determined Contributions (NDCs). Support decisions towards sustainable electricity generation mixes with a high share of renewables (including hybrid solutions based on solar, wind, and large to micro hydro power). Provide information on risks and opportunities for renewable electricity sources under climate change and variability. Develop a framework for the systematic identification and valuation of renewable electricity generation potentials aligned with SDGs for national, regional, and international investors.

### Project Outcome:

Off-grid renewable solutions and mixes of solar, hydro & wind powers in West Africa.

### Mitigation to Climate change:

- i. Transboundary power sharing, mixes and complementarity between hydro, solar & wind energy in support of the West Africa Power Pool (WAPP).
- ii. 3 sets of community Business models set-up in Togo
- iii. Installation of a hybrid Hydropower-solar power generation in Gbandidi (Togo) to provide electricity to the local community business centers.
- iv. 120 households get access to electricity for the first time,
- v. 60 households get access to clean water from borehole for the first time

### Adaptation Technology:

- i. Installation of an off-grid photo-voltaic (PV) power plant and a centralized PV-based borehole water pumping system in Niger to provide access to clean water for consumption and micro-irrigation of the villagers.
- ii. Installation of a hybrid solar-hydropower warehouse to Gbandidi community in Southern Togo.

## Disaster Risk Reduction Practice Research and Capacity Building Support to ECOWAS

### Disaster Risk Reduction Practice Research and Capacity Building Support to ECOWAS

### Objectives:

The overall objective of this project was to contribute to disaster risk management

related research and policy advice in support of ECOWAS as well as capacity enhancement interventions to benefit ECOWAS member states and key stakeholders like media, academia, civil society organizations, NGOs and the private sector to better contribute to the implementation of Disaster Risk Reduction (DRR) activities in West Africa. More specifically, the had three main objectives a) to provide policy research related to flood and disaster management in the ECOWAS region; b) to provide a pre-feasibility study for regional flood forecasting, early warning, and open data management c) to facilitate training and capacity enhancement for ECOWAS secretariat and experts from member states related disaster risk management.

### **Project Outcome:**

- Four (4) regional capacity development activities are implemented for all fifteen (15) ECOWAS member countries and their national institutions dealing with DRR, Hydromet Meteorology and GIT applications. The capacity development are related to regional awareness and implementation of Flood Forecasting and Early Warning Systems as well as use of GIS and Remote Sensing (RS) technology to strengthen ECOWAS countries capacity building.
- Forty-two (42) participants obtain either participation or a completion certificate.
- At the end of the training, the average level of participants skills was raised from 2.7 to 4 on a scale from 1 to 5
- Flood hazard, vulnerability and risk hotspot maps at the scale of ECOWAS were derived from open-source information for return periods of 5 years and 50 years

### **i-change:** Individual Change of HABits Needed for Green European transition

The objective of the I-CHANGE project is to raise of environmental awareness through citizen science and understanding of the science behind climate change and its effects Empowerment of citizens and consumers with tools to monitor their impact and give targeted advices Improvement of data availability, interoperability and usability at a broad scale Enhancement of the level of civic engagement in climate issues for developing sustainable lifestyles consumption patterns Examples for effectiveness behavioural changes and good social practices based on robust scientific methodology.

**Expected impacts of Project:** The development or strengthening of citizen science initiatives to engage citizens in the active collection of environmental and socio-economic data through individual new or improved devices The provision of personalized information to citizens and consumers about their environmental impact Better monitoring of the environment (land, sea, air, etc.). Behavioural change processes on the part of citizens, consumers and communities

**Mitigation to climate change:** Improve climate change awareness by promoting the knowledge of science and the understanding of physical, socio-economic and cultural processes, to bring citizens to be engaged in the actions toward climate neutrality. Through the active participation in the data collection and processing, citizens will be equipped with novel or improved practical and concrete tools to improve their knowledge about environment and climate, and to enhance the adaptation of personal behaviour and consumptions in view of positive climate action, sustainable development and environmental protection

**Adaptation technology:** Increase the preparedness and facilitate resilience of local communities to climate extreme events by offering Customized Climate information service; bins for sorting waste from home have been available for households involved in the LLWA; Installation and basic maintenance of bioenergy sources (biodigesters, ) is mastered among community; young entrepreneurs are trained for elaboration of sustainability business models on land-based circular economy

**Capacity building:** Sustainable capacity building will be undertaken in the communities with women's cooperatives, young entrepreneurs, market gardeners/ tree nursery, and policy makers on environment and climate issues

## **Precision Pest and Disease Management System based on Multidimensional big data (PPeDMaS)**

The project – led by WASCAL and implemented in collaboration with the Ministry of Agriculture, Hydro-Agricultural Dev't & Mechanisation (Burkina Faso) and Afrique Geosciences (Ouagadougou) – aims to provide a compelling set of digital solutions that will encourage and propel the integration of science and technology into West African agriculture leading to a sustainable increase in agricultural productivity in the region. PPeDMaS will deliver a web-based pests and diseases data platform, an early warning web application, an expert advisory system for managing pest and diseases during the first year, and a mobile application that will provide immediate solutions to farmers on pests and diseases after the first year.

Mitigation to climate change: PPeDMaS delivers an early warning web-application that will help farmers institute measures against upcoming climate-related pest and disease outbreaks

Adaptation technology: PPeDMaS delivers a mobile application that provides immediate solutions to farmers on prevailing pests and diseases

Capacity building: Training of 1 Post-doctoral scientist and 7 master/bachelor students

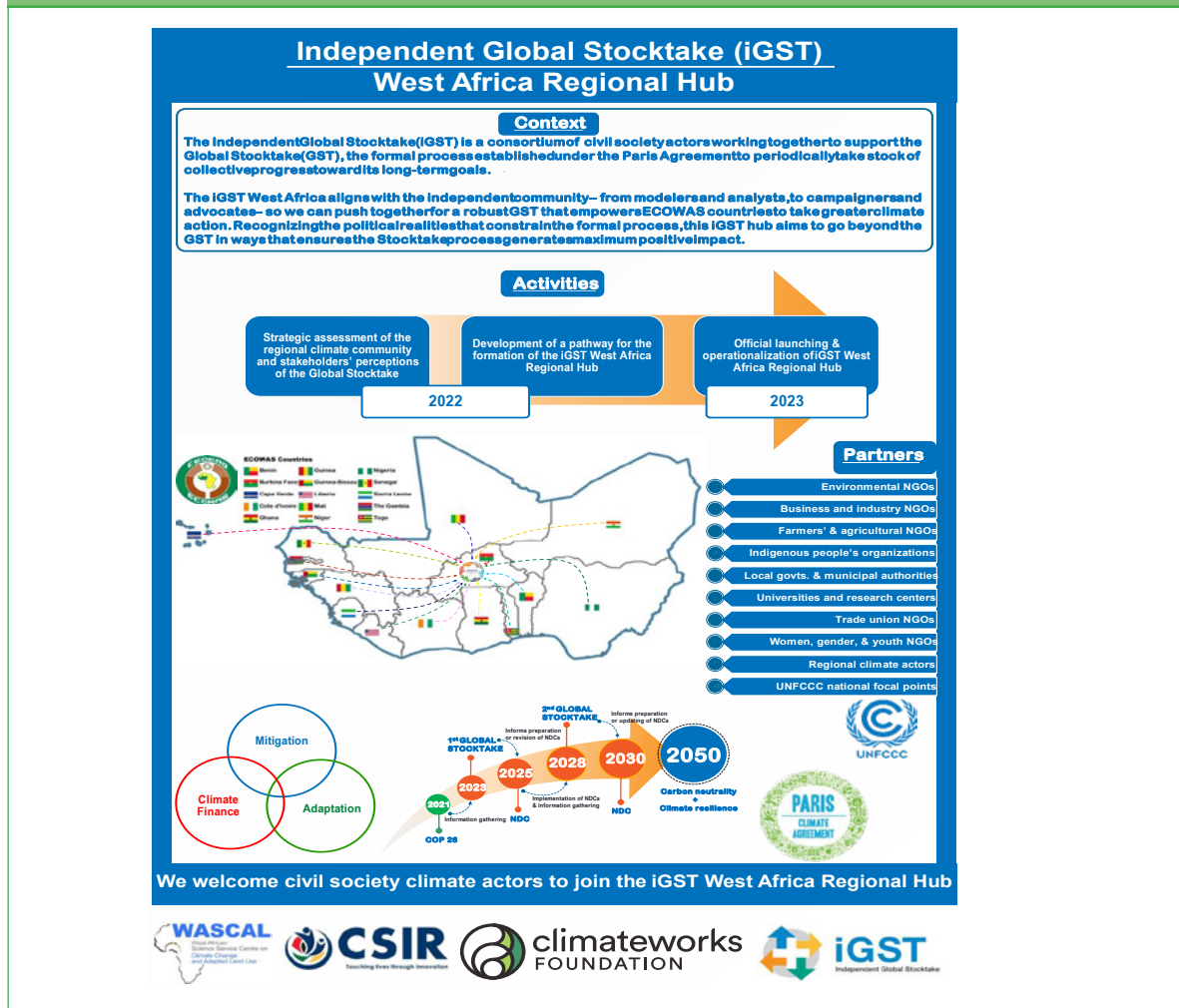
Figure 6. Precision pest and disease management system based on multidimensional big data



## Independent Global Stocktake (iGST)

The iGST West Africa Regional Hub project, led by WASCAL and implemented in collaboration with CSIR (South Africa), aims to lead advocacy on climate change ambition and to provide support to the GST process in West Africa. The Hub is being created through a consultative and participatory process and will be a platform that brings together climate advocates including climate modellers and other climate civil society actors. Although the region is among the lowest GHG emission regions of the world, Hub project presents an opportunity for climate civil society stakeholders in the region to contribute to the different components of the GST, especially adaptation.

Figure 7. WSACAL as Independent Global Stocktake (iGST) West Africa Regional Hub



**Outcomes of Project:** Report on key perspectives of civil society climate actors on GST of the West African countries, report on the roadmap for the establishment and operation of iGST Hub of West Africa, functional regional iGST Hub of West Africa

**Mitigation to climate change:** The regional hub will contribute to climate change mitigation in West Africa by providing advocacy at the international level through the iGST

**Adaptation technology:** The regional hub will contribute to climate change adaptation in West Africa by providing advocacy at the international level through the iGST

**Capacity building:** A regional workshop on the global stocktake process will be organized for climate change civil society actors in West Africa

## AGRICA

### **Objective:**

The project provides comprehensive climate risk analyses for the agricultural sector in selected countries in sub-Saharan Africa. The findings are meant to inform national and sub-national adaptation planning including NDC and NAP development and review processes but will also provide useful information and evidence to decision makers at other planning and implementation levels. The main research objectives of the ARCs are 1) a climate risk analysis with estimates of current and projected climate and weather-related impacts on water resources, crop and livestock production, and 2) an assessment of the costs and benefits of selected adaptation strategies versus no action. These two components are reflected in an impact dimension and an action dimension of the study. The impact dimension examines the interaction between climate change, water availability and agriculture and livestock, while the action dimension goes further by assessing the selected adaptation strategies using biophysical analysis, cost-benefit analysis and socio-economic analysis. Uncertainty related to the results will be critically debated and recommendations will be made to decision-makers.

### **Project Outcome:**

Generate Climate Risk Profiles of Burkina Faso and Niger in which climate impact assessment.

### **Adaptation Technology:**

Adaptation technologies in Irrigation, Cultural practices, Climatic information, were identified and developed for crop and livestock farmers in Burkina Faso and Niger.

## Greenbuilder

### **Green-Builders**

### **Objectives:**

The GREEN BUILDERS project, jointly coordinated and implemented by WASCAL and UDS investigated how to better collect, recycle, and repurpose organic solid and liquid waste to benefit Urban and Peri Urban Agriculture and Green Urban Spaces for the urban and peri-urban Ouagadougou and Tamale. The project developed and facilitated multi-stakeholder platforms (MSPs) for learning and knowledge creation and integration of proper waste disposal, recycling, and repurposing strategies.

### **Project Outcome:**

- Green Builder offers Multistakeholder Platforms (MSPs) consolidated relationship among 500 stakeholders (Municipalities, Plant nurseries owners, market gardeners, waste collector, waste composter).
- It provides different possibilities for addressing and solving the issues related to waste management in cities across Burkina Faso and Ghana.

### **Mitigation to Climate change:**

Multistakeholder Platforms (MSPs) offered different possibilities to 120 stakeholders in addressing and solving the issues related to waste management in cities

### **Adaptation Technology:**

- Multistakeholder Platforms (MSPs) consolidated relationship among municipalities, plant nurseries owners, market gardeners, waste collector, waste composter.
- Technology for liquid and solid organic waste developed
- value of bio waste for compost making available for gardeners, plant nursery owners, waste collectors, municipalities, Ministry of Energy (ANEERE) in Burkina Faso

## **Renewable Energy project- Project**

Over the years, the cooperation that exists between Germany and West Africa has given rise to several initiatives such as the launch of the Go Green Go Africa Hydrogen Initiative by the Federal Ministry of Education and Research (BMBF). The initiative has received a favorable echo in the whole West African region evidenced by the Energize Africa Initiative, Waste2Energy Project, the green hydrogen Atlas project, the RepGam project in The Gambia, the biogas lab project in Togo among others in West Africa.

To improve efficiency and the utilization of the financial resources and regarding the prospects of new projects related to hydrogen coming up, a coordination team is established to manage and coordinate all renewable energy projects. The renewable energy coordination project oversees all renewable energy projects managed in West Africa and ensure information sharing between them to WASCAL. WASCAL is involved in all the renewable energy projects sponsored by BMBF within West Africa. The project facilitates the transfer of know-how from German technologies to West Africa. In this perspective, it offers an opportunity for young and upcoming scientists to gain knowledge in the domain of green hydrogen energy locally on the African continent.

## MITRA\_WA: Migration and Translocality in West Africa

The overall goal of this project is to contribute to a better understanding of the phenomenon of West African rural migration towards urban agglomerations and across national borders, and in particular to focus on the interlinkages between population dynamics, environmental change and translocal livelihoods.

## MIGRAWARE

**Rural-urban and cross-border MIGRAtion in West-Africa – an integrated assessment framework of drivers, processes and sustainable REsponses**

The goal of MIGRAWARE is to deliver a scientific-technological framework for assessing the processes, drivers, and factors of rural-urban and cross-border migration in West Africa. MI-GRAWARE will suggest governance instruments suitable to alleviate migration needs, improve local livelihoods, and sustain human-environmental interactions. The project intends to reveal the typical pathways and (hi)stories of migration that include the movement from poor hinterlands to urban conglomerations and other places so that governance instruments can be tailored for the local, national, and intergovernmental (cross-boundary) level.

## FLURIFLOOD

**Current and future risks of urban and rural flooding in West Africa – An integrated analysis and ecosystem-based solutions**

The overarching goal of FURIFLOOD is an improved quantification of current and future extreme precipitation and flood risk in West Africa to underpin science-based decision making. FURIFLOOD will further internationalize the WASCAL graduate schools, establish WASCAL as a leading climate and environmental science-based service center, and support the WASCAL countries in implementing and monitoring the Sendai Framework for Disaster Risk Reduction.

## LANDSURF

**Land surface processes as a determinant of climate change in Africa – scenarios, high-resolution modeling and development of a stakeholder data portal.**

The goal of this research project is to develop a high regional resolution Earth System model for West Africa (WESM) coupled to an ocean model and including

a new fully interactive and surface scheme. The LANDSURF project is being led by Prof. Dr. Heiko Paeth from the Institute of Geography and Geology of the University of Würzburg in Germany with support from the following experts.

## CONCERT

### **West Africa: Greenhouse gas emissions and mitigation options under climate-and land use change in West Africa: A concerted regional modeling and observation assessment**

The aim of CONCERT is to identify emission mitigation options for the major greenhouse gases carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), in parallel with improving food security. This will be tackled through (a) the extension of WASCAL's current flux observation network, b) estimation and projection of GHG emission budgets for the region, using a fully coupled regional climate-hydrology-dynamic vegetation model (Earth System Model, ESM), specifically adapted to the WASCAL region, and c) identification of LU options suitable for mitigating GHG emissions, increasing soil C stocks and improving food security for the West African Sudan savanna. This will be achieved by a unique concerted and intertwined observation and modeling strategy in CONCERT. The results will be jointly developed and iterated with stakeholders and communicated to policymakers of the Economic Community of West African States (ECOWAS) for implementation.

## GREENGADE

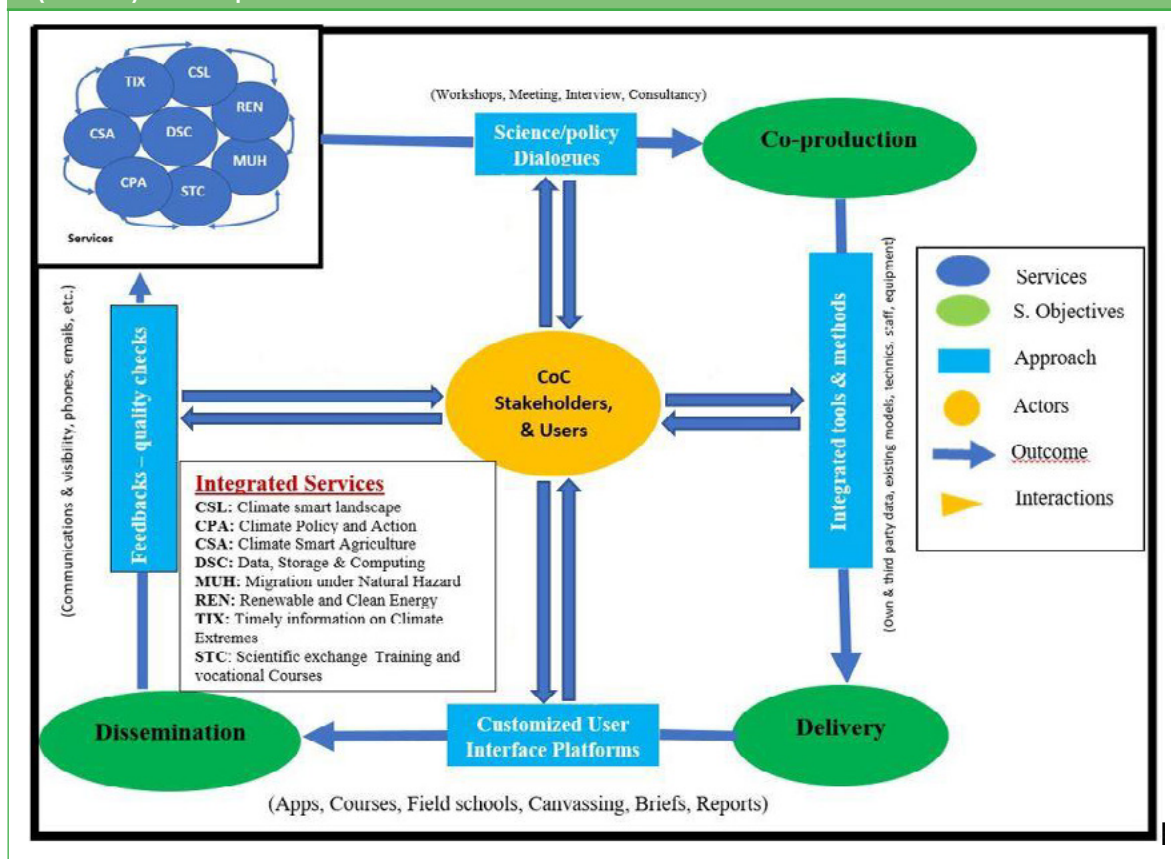
### **Greenhouse Gas Determination in West Africa's Agricultural Landscapes**

The project GreenGaDe "Greenhouse Gas Determination in West Africa's Agricultural Landscapes" aims to provide baseline data and predict the evolution of greenhouse gas (GHG) emissions and carbon stocks in the agricultural sector in West Africa. A consortium including four West African and three German institutions with specialists in agronomy, forestry, modelling, environmental chemistry, sociology and GHG inventories will use a multidisciplinary approach to build a consistent database at the local and regional level.

## CLIMATE AND ENVIRONMENTAL SERVICES PROVISION

- i. Development of web application of AgInfo package for large-scale use
- ii. Disaster forecasting and early warning system developed
- iii. Development of climate and environmental services for regional benefit through CICLES.
- iv. Creating contents for CES from WRAP2.0 projects and other projects at the Coc.

Figure 8 : Conceptual framework of customized and integrated climate services (CICLES) at Competence Centre



## PUBLICATIONS (BOOKS, JOURNAL, COMMUNICATION, POLICY BRIEF)

### Publications

Figures 9 and 10 show the graphical representation of the publications at the Competence centre from 2020- present. A total of 61 journal publications were published in reputable journals with high impact factor. The average impact factor of the publications from the Coc is put at 5.26.

Figure 9: Publications for 2020, 2021 and 2022 by scientists at the Competence centre

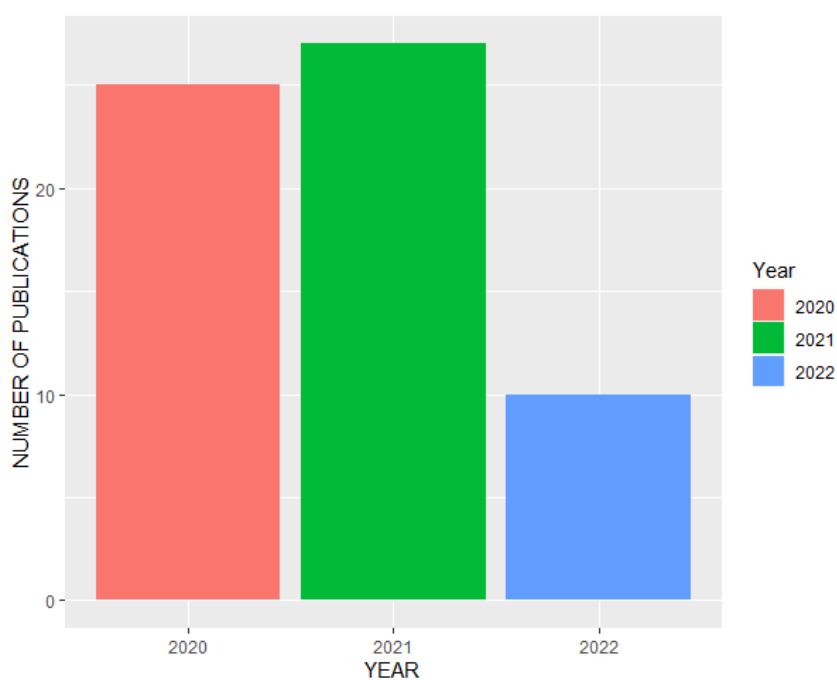
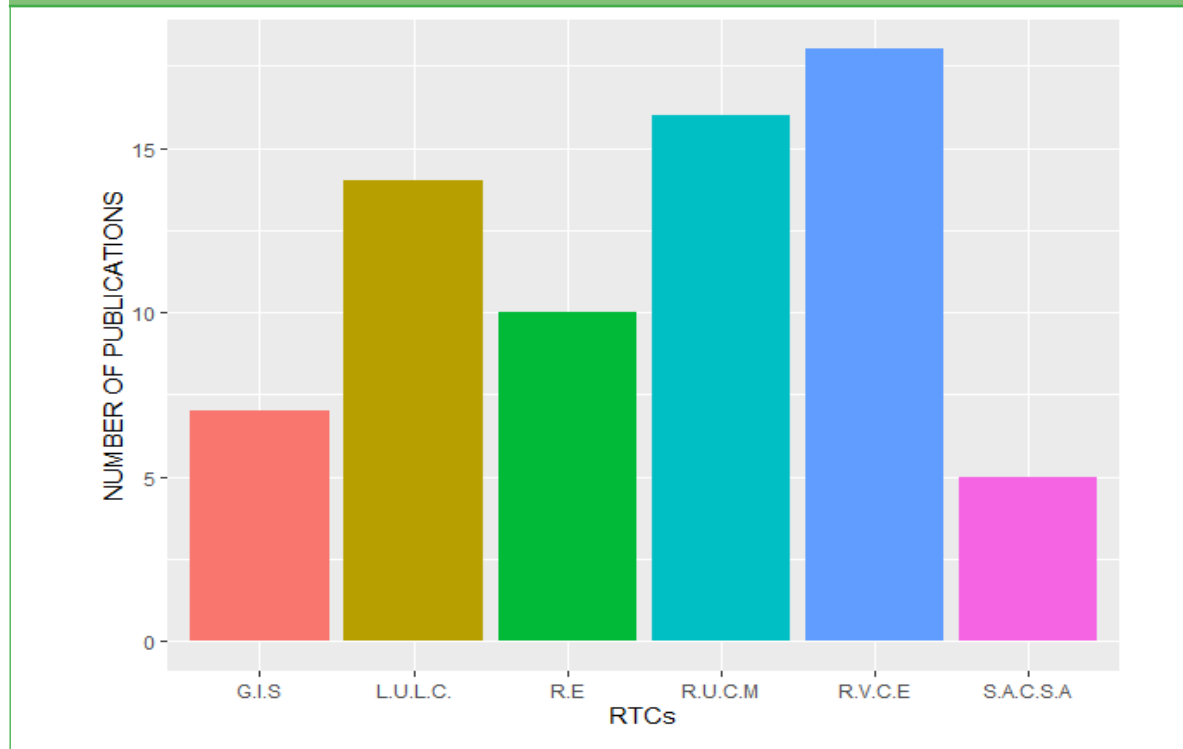


Figure 10. shows publication according to the different Priority Research Themes at the Competence Centre (GiS, Land use land Cover Nexus, Renewable Energy, Rural urban cross border migration, Risk and Vulnerability to climate extreme, Sustainable Agriculture and climate smart Agriculture.)



### Book:

- Sultan B., Bossa A. Y., Salack S., Sanon M. (2020) Risques climatiques et agriculture en Afrique de l'Ouest. Edition de l'Institut de la Recherche pour le Development (1st Edition). 362 p. <https://www.editions.ird.fr/produit/576/9782709928229/risques-climatiques-et-agriculture-en-afrique-de-l-ouest>

### Book chapters:

- Saley I. A., A. Ganaba, N. Z. Lawson, S. Salack (2020) Vérification de la qualité d'un service climatique pour l'agriculture In: Sultan B., Bossa A. Y., Salack S., Sanon M. (2020) Risques climatiques et agriculture en Afrique de l'Ouest. Edition de l'Institut de la Recherche pour le Development (1st Edition), p19-30.
- Salack S., K. Hien, N. Z. Lawson, I. A. Saley, J.-E. Paturel, M. Waongo (2020) Prévisibilité des faux-départs de saison agricole au Sahel In: Risques climatiques et agriculture en Afrique de l'Ouest. Edition de l'Institut de la Recherche pour le Development (1st Edition). p31-44
- Sanfo S., S. Salack, M. D. MBoungou, I. A. Saley (2020) Les déterminants de l'utilisation de l'information pluviométrique (nord et sud-ouest du Burkina Faso) In: Sultan B., Bossa A. Y., Salack S., Sanon M. (2020) Risques climatiques et agriculture en Afrique de l'Ouest. Edition de l'Institut de la Recherche pour le Development (1st Edition), p35-54.

## Impact on development (Contribution to communities' livelihood)

- i. Energy Supply for Healthcare Facilities (EnerSHelf): Increasing Ghana's weather/Climate observation network, off-grid mini-PV power plant to tow rural Hospitals and the project also achieved an increase in the access of electricity to rural communities
- ii. Improving Rainfall Information and Rainwater Usage for Adapted Agricultural Production under High Climate Variability (AgRIAN): Increasing the observation & forecasting of extreme rainfall events in Burkina Faso using Microwave Link networks. Installation and capacity building of rural Burkina Faso communities in rainwater harvesting & reuse, optimize the use of flood plain farming.
- iii. The West African Biodiversity & Ecosystem Services (WABES): Regional West African experts in the fields of biodiversity and ecosystem services exchanged experiences on IPBES developments with their colleagues at international level (external speakers) during annual workshops. Thirty students (two from each of the ECOWAS member countries) have benefitted from the full scholarship SPIBES MSc programme offered by WABES. These biodiversity and ecosystem services pool of experts are trained and will be able to support their national governments at the interface between science and policy after graduation
- iv. Upscaling site-specific climate-smart agriculture and land use practices to enhance regional production systems in West-Africa (UPSCALERS): A Web App to deliver agroclimatic information services to a network of 200+ farmers & extension intermediaries across Burkina Faso, Ghana, Niger & Mali (i.e. The AgInfo package) developed, installed 8 biodigesters and 36 compost pits to support crop-livestock circular bioeconomy of 120 farmers Burkina Faso, Ghana, Niger, supporting the African Union research-Innovation congress in the participative observations/modelling with farmers, extension intermediaries for the Africa We Want Agenda 2063.
- v. Climate information for Integrated Renewable Electricity (CIREG): Off-grid renewable solutions and mixes of solar, hydro & wind powers in West Africa
- vi. Green-Builders- Green Builders project (Green-Builders): Green Builder offers Multistakeholder Platforms (MSPs) consolidated relationship among 500 stakeholders (Municipalities, Plant nurseries owners, market gardeners, waste collector, waste composter). It provides different possibilities for addressing and solving the issues related to waste management in cities across Burkina Faso and Ghana.
- vii. Disaster Risk Reduction Practice Research and Capacity Building Support to ECOWAS (DRR): Enhanced Regional Capacity to Disaster Risk Reduction and Management. Additionally, early warning systems are established to prevent

major natural hazards and comprehensive preparedness and contingency plans for the region.

- viii. Capacity building in support of weather, water and climate services in Mali and Niger: critical human capacity gaps and training needs for the modernization of the national hydro meteorological services in Mali and Niger identified. Guidance notes for developing concepts of operations based on global best practices developed. Training curriculum developed.
- ix. AGRICA: Generate Climate Risk Profiles of Burkina Faso and Niger in which climate impact assessment, focusing on the evolving trends for temperature and precipitation, future water availability for agricultural production, future crop yields and the suitability of land for crop (and in specific countries, livestock) production, under different climate change scenarios.
- x. WASCAL Data Repository and Portal (WASREP): Provision/dissemination of surface observations data to provide ground evidence of climate change and support the scientific guidance paving the way to better adaptation and mitigation actions. WASCAL High Performance Computer (WAS-HPC): Acquisition and setup of a High-Performance Computing system at CoC to provide West African Scientists with regional access to high performing computation and simulation facilities and tools for the sake of running regional mitigation and adaptation models and scenario.
- xi. Operational delivery of “1-week & 2-week lead time forecasts” of pluviometric extremes (i.e. False onset for cropping seasons, heavy rain events, soil waterlogging to a network of 120+ farmers based in Northern Ghana & Burkina Faso (FSP-AGRICORA).
- xii. 400 Nursery plants is produced by plant nurseries owners and disseminate throughout the cities of Ouagadougou and Tamale (Green Builders project)
- xiii. Adaptation strategies on the feasibility, social acceptance and uptake of adaptation measures among farmers and stakeholders (AGRICA)
- xiv. On-going installation of a hybrid Hydropower-solar power generation in Gbandidi (Togo) to provide electricity to the local community business centers.
- xv. Regional data sharing and dissemination service with 600+ metadata records of datasets published online for download (directly or upon request) or citation/dissemination.

## APPROVED AUTOMATIC HYDRO SENSOR FOR INSTALLATION

**Five (05) Cabo Verde**

**Five (05) Ghana**

**Three (03) the Gambia**

**Nine (09) Mali**

**Four (04) Niger**

**Four (04) Nigeria**

**Seven (07) Togo**

Figure 9: Publications for 2020, 2021 and 2022 by scientists at the Competence centre



## AUTOMATIC WEATHER STATION

- Five (5) Automatic Weather Stations installed in Abengourou Daloa Séguéla Kong Mbengé in Cote D'Ivoire
- Six (06) Automatic Weather Station installed in Ghana
- Three (03) Automatic Weather Station installed in The Gambia (NJAU SUTUKOBA BAKADAGI) Five (03) Automatic Weather stations installed in Kangaba, Yanfolia, Niono, Baroueli, and Bamako
- Five (05) Automatic Weather Stations installed in Chical, Matankari, Goudoummaria, Dogon, Kiria, Sedoukou in Niger
- Six (06) Automatic Weather Station installed in Zaria Duste Yelwa, Akure, Osogbo, Oshodi-Lagos) in Nigeria
- Five (05) Automatic Weather Stations installed in Diourbel, Linguere, Podor, Kaolack, Kounghoul)
- Five (05) Automatic Weather Stations installed in Bafilo, Sotouboua, Kpalime, GDMN in Togo

### a. Human capital development

- Formulation of Generic topics to align with the Priority Research themes of WASCAL, ensure regional relevance, state of art and problem-solving topics for the graduate schools students

- Teaching and mentoring of students in the graduate schools
- Assisting GSPs in their data needs (reanalysis, Long term climatology and in situ ground-based data) for their project

## **b. Research and innovation**

- Current and future risks of urban and rural flooding in West Africa – An integrated analysis and ecosystem-based solutions
- Capacity building in support of weather, water and climate services in Mali and Niger
- UPSCALERS: Upscaling Site-Specific Climate-smart Agriculture and Land use practices to Enhance Regional Production Systems in West-Africa
- Various projects are executed in Niger (UPSCALLARS, AGRICA, DRR, CREWS, )
- Disaster Risk Reduction Practice Research and Capacity Building Support to ECOWAS
- MITRA\_WA: Migration and Translocality in West Africa
- MIGRAWA: Rural-urban and cross-border MIGRAtion in West-Africa – an integrated assessment framework of drivers, processes, and sustainable Responses
- LANDSURF: Land surface processes as a determinant of climate change in Africa – scenarios, high-resolution modeling and development of a stakeholder data portal.
- CONCERT-West Africa: Greenhouse gas emissions and mitigation options under climate and land use change in West Africa: A concerted regional modeling and observation assessment,
- CIREG: Climate Information for Integrated Renewable Electricity Generation
- Disaster Risk Reduction Practice Research and Capacity Building Support to ECOWAS
- FLURIFLOOD: Current and future risks of urban and rural flooding in West Africa – An integrated analysis and ecosystem-based solutions”
- Disaster Risk Reduction Practice Research and Capacity Building Support to ECOWAS



# Providing world class **climate** and **environmental** services

 @wascal channel

     
@wascalclimate

[www.wascal.org](http://www.wascal.org)



The Finance Department has played a pivotal role in the administration, management, and control of resources from the dead go of WASCAL. The department responsibility spans from overseeing all the assets, liabilities, and investments of the organization. The introduction of the WASCAL financial policy and procedure manual, which was adopted by the board in 2013, provided the bases for effective financial management system for the organization. The WASCAL Financial Policy and Procedure Manual provides the policies and procedures for financial transactions which must be followed by all staff of the organization. It also provides the guidelines that WASCAL will use to administer these policies and the correct procedures to follow for effective and efficient financial management of its financial administration. The department is tasked with the responsibility of fund raising, monitoring the daily financial items like accounts, WASCALS's Budget, revenue, expenditure, and cash flow. The information derived from all these elements is critical to the analysis, evaluation, and creation of a blueprint needed in the dynamic steering of WASCAL relevance to its stakeholders. The policy includes key underlining component such as the.

<b>Finance Authorization Policy</b>	<b>Bank account policy</b>
<b>Petty cash policy</b>	<b>Procurement policy</b>

The financial Management of WASCAL between the period 2012 to February 2016 was partly handle by University of Born in collaboration with AGRA during when they hosted WASCAL as a project until 2013.

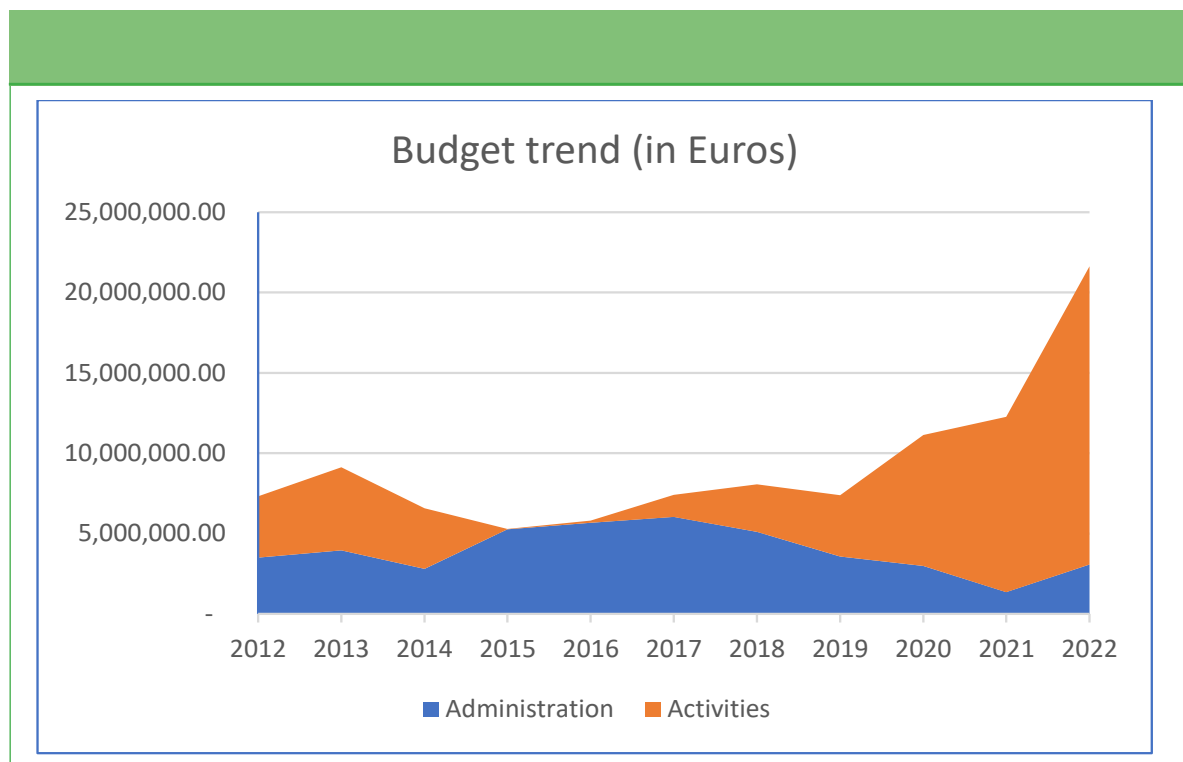
The total funds received by WASCAL from 2010 to 2021 amounted to 80,378,899 €.

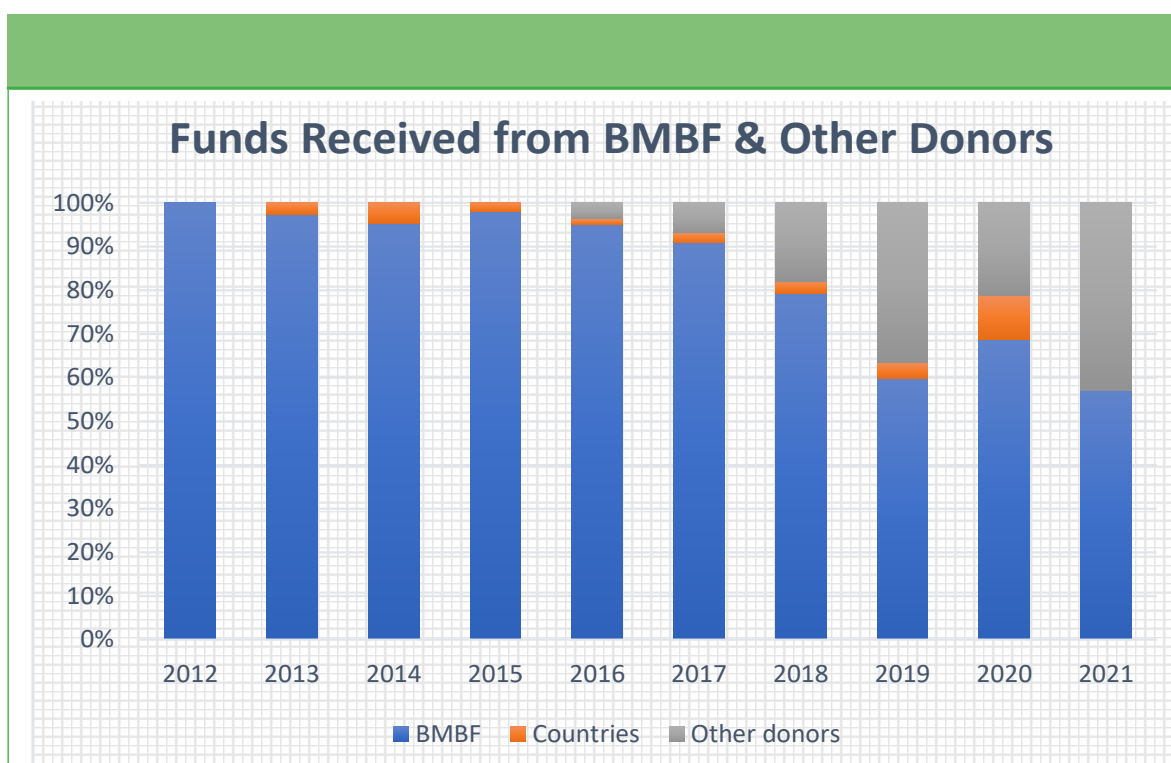
Out of these funds a total of 25,019,936 € was funded through ZEF as part of BMBF the pre phase period for the implementation of activities relating to the batch 1 & 2 of the graduate studies program, scientific equipment for the observatory network, construction of the Headquarters in Accra, vehicles for effective running of activities at the centers, office equipment and operational cost including staff cost.

KFW on the other hand received 22,657,334.33€ for the period 2013 to 2018 for continues implementation of WASCAL activities. The batch 4 and 5 were funded through the PT-DLR project management agency with a budget amount of 10,637,358€ and 13,163,384€ respectively.

Other project activities at the Competence Center and the Renewable energies projects for the period under review amounted to 6,689,415€

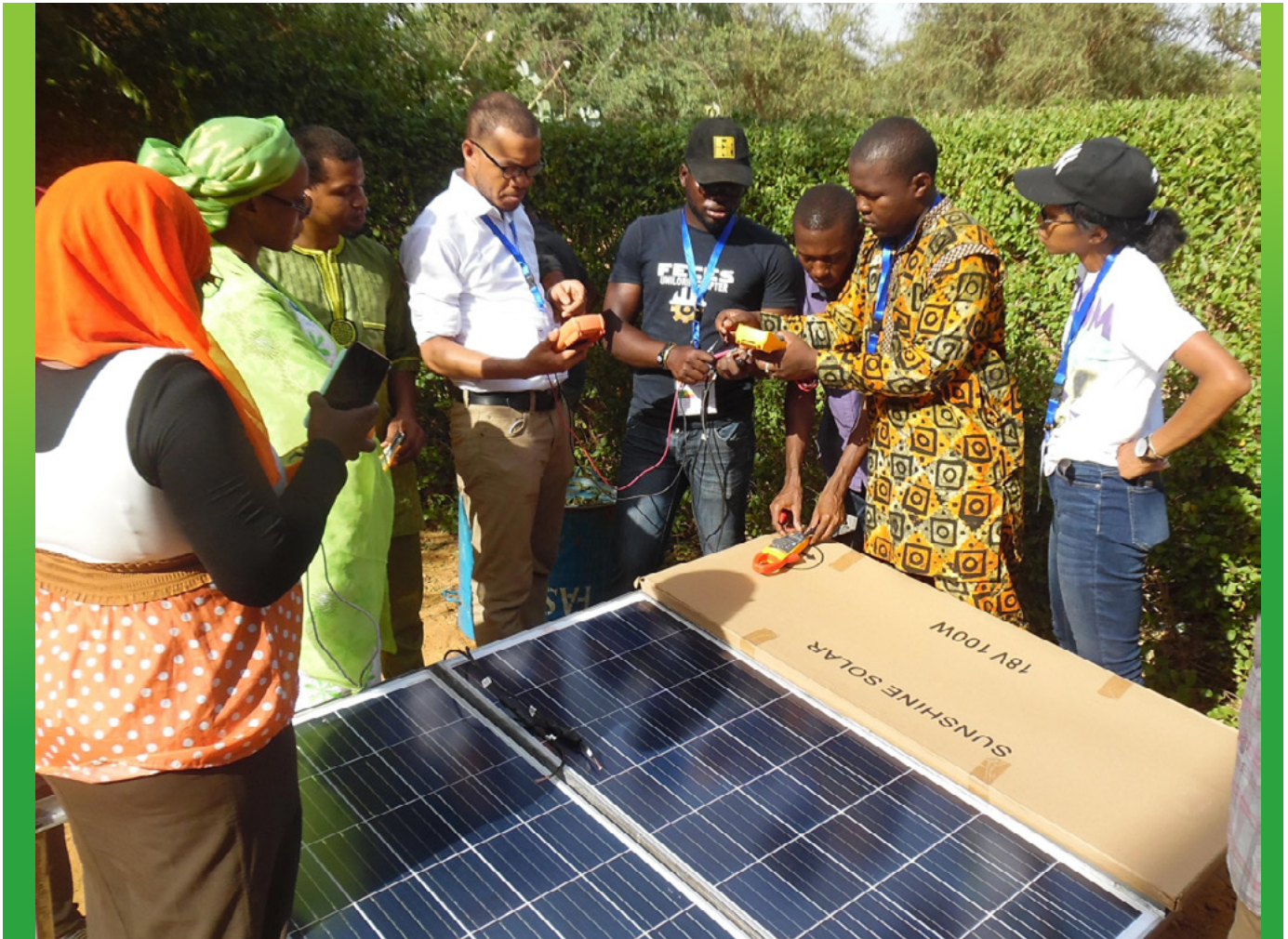
The Fig below shows the trend of funding from all WASCAL activities from 2010 to 2021.





This Fig also shows the sources of funding for WASCAL activities from 2012 to 2021

In affirmation to the standard accounting practices of WASCAL as an international organization has performed its statutory Audit from 2014 to 2020 through KPMG an internationally accredited Audit firm for compliance and conformity to international accounting reporting standards.



Dedicated to **combating  
climate change and  
improving livelihoods  
in West Africa**

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10  
YEARS  
WASCAL

In recounting the achievements of WASCAL over the 10 year period, there is also the need to recognize the contributions of various staff who have supported WASCAL at the various stages of its development

## WASCAL AT THE PILOT PHASE

WASCAL started as a pilot project in 2010 after the end of the GLOWA project. The GLOWA project was operational in both Ghana and Burkina Faso. The GLOWA project was funded by the German Federal Ministry of Education (BMBF). At the end of the GLOWA, the existing staff were migrated from IWMI to AGRA where the inception of WASCAL was originally created

## PERSONNEL MANAGEMENT AT THE PILOT PHASE

At the pilot phase, WASCAL signed Memoranda of Understanding with some organisations to support in the management of its personnel in Ghana and Burkina Faso, the Headquarters and Competence Centre respectively. More so since WASCAL was not registered as a company in the two countries.

In Ghana, where the WASCAL Headquarters is situated, a Memorandum of Understanding was signed between the Alliance for a Green Revolution in Africa (AGRA) and the International Water Management Institute (IWMI) for the management of its staff working at the headquarters. AGRA handled personnel issues relating to the Ghana local staff (Ghanaian nationals), whilst IWMI dealt with those concerning the expatriate staff, mainly the Executive Director at the time. Similarly, in Ouagadougou, a memorandum of understanding was signed with the Volta Basin Authority for personnel management support.

After the signing of WASCAL constitution in 2012 in Lome, which gave WASCAL the grounding to register as a company limited by guarantee in the two countries of operation, namely, Ghana and Burkina Faso, a lot more people joined WASCAL from that period.

## Restructuring of WASCAL

Restructuring exercise was carried out at certain stages in the life of the organisation. There was an initial restructuring exercise in 2017 and then in 2019. In the process some positions were scrapped.. Some of the staff were assigned to projects).

### Staff Strength

The current staff strength stands at 42 – Headquarters 19 and Competence Centre 23.



### Project Coordination Activities

WASCAL manages several projects through its Competence Centre in Ouagadougou. The projects include CIREG, UPSCALLERS, WABES-IKI, Global Card, AGRICA, ECOWAS projects, I-Change, Ramses, etc. The human resource section provides personnel management functions for these projects.

### The Capacity Building Department

The Graduate Studies Programme is one of the components of WASCAL funded by BMBF. The GSP aims at engaging representatives of some of the best West African universities and encourages them to establish graduate research programs in the areas of climate change by working together with universities in Germany. Each graduate research program is based at one of the participating campuses (Lead University) and addresses one of the main topics agreed upon.

WASCAL has at least six permanent staff at each of the centres established in the 11 member countries. The personnel at the graduate schools universities are managed by the lead universities.

### Personnel management functions to sister organisations

Just as AGRA supported WASCAL during the pilot phase, WASCAL is reciprocating by providing personnel management support to AGRA for the management of its personnel in Ouagadougou.

# Administration and Communication

The WASCAL Administrative Department has evolved through its 10 years of existence under the leadership of two different directors and an acting director. The Department which was formerly paired with the Finance Department was then referred to as the Finance and Administration Department. Its first Director was Mr. Rainer D. Pruess from 2012-2015. He was succeeded by Mrs. Agnes Oti-Mensah from 2017-2019. In-between the substantial occupancy Mr. Daniel Ofori successfully assumed the interim position of this office.

On the recommendations of the Governing Board during its 16th Extraordinary Session in Mindelo, Cabo Verde the Finance and Administration Department was decoupled. Mr. Daniel Ofori was appointed to head the Finance Department and Mrs. Harriet A. Baffoe heading the Administration component.

## MILESTONES

### Governance Structure of WASCAL

The WASCAL Governance Bodies are the authority mandated by Article 3 of the WASCAL Constitution to approve policies and steer the overall direction of the organization with the support of the Executive Director.

WASCAL has at the apex of its governance structure, the Ministerial Council followed by The Governing Board and The Scientific Advisory Committee (The SAC). The Governing Board has a mandate to set up sub committees to deliberate together with the executive management to review, , and recommend courses of action to a particular subject matter then report to the Governing Board for final decision.

## Ministerial Council

The WASCAL Council of Ministers is led by the Chairman of the Council who is mandated to serve for a period of two years. The Council has been chaired by three different member countries since its inauguration on February 12, 2012.

It holds its ordinary sessions every two years. After the maiden session was held in Lomé, Togo on 12 February 2012, the council has held three subsequent meetings and elected the following member countries to chair the Council.

Togo – From February 2012 – July 2015 - Lomé, February 12, 2012

Benin – From July 2015 – July 2019 - Berlin, July 9, 2015

Niger – From July 2019 – July 2021 – Accra, July 30, 2019

Mali – From July 2021 – to date - Ouagadougou, July 22, 2021

## Governing Board

The WASCAL Governing Board which was first constituted by its inaugural ten-member countries, with Germany as its main funder and ECOWAS as an Ex-Officio Member held its first session on May 30-31, 2012. In 2019, the membership of WASCAL increased to eleven member countries with the adherence of Cabo Verde in November 2018.

In compliance with its constitutional mandate, the Governing Board has held a total of 25 Governing Board Meetings amongst which there have been 12 Ordinary Sessions and 13 Extraordinary Sessions.

The late Professor Emeritus Modibo Haidara from Mali was elected as the 1st Governing Board Chairman at its 1st Governing Board Meeting which was held in May 2012. Subsequently the WASCAL Governing Board membership has been renewed two times with Mr. Peter Justice Dery, from Ghana as Chair from April 2015- January 2021 followed by Prof. Mouhamadou Hassirou as its current Board Chairman after being elected to chair the Board on 3rd February 2021.

## The Scientific Advisory Committee

The Scientific Advisory Committee was constituted on June 5, 2015, with nine members drawn from various scientific fields. Its first chairman was Prof. Jimmy Omoniyi Adegoke. He was succeeded by Dr. Arona Diedhiou as its chairman. Following the renewal of The SAC membership, Prof. Brice Sinsin was elected as its current chairman.

**The following are the current ad hoc subcommittee of the Board.**

- **Constitutional Committee**
- **Audit Committee**
- **Fund Raising Committee**
- **CoC Committee**

## **Administrative System and Process**

With the main objective of reviewing the efficiency of WASCAL's administrative processes which has been in use for a decade, new processes aimed at streamlining all administrative processes across WASCAL is underway. The expected outcome of this reform is the automation of all procurement processes by.

## **COMMUNICATION**

One key milestone was the giant step to establish the Public Relations Division within the headquarters. By the end of 2015, a Public Relations Manager had been hired in principle, who assumed duty in January 2016.

The highlights of 2015/16 and also the result of an intense process of conceptualizing, organizing and designing, were the following;

- In July 2015 WASCAL reviewed its website with a new design, a reworked structure and many new features. The new website reflects WASCAL's main programmes and puts a stronger emphasis on WASCAL's output and outreach activities.
- Production of annual reports
- For a huge institution like WASCAL that is operating in 11 countries and comprising a network of even more institutions, internal communication is important to share information and get people to buy-in the vision and mission of the organisation. One medium to introduce new colleagues, exchange research experiences, share first results and publications, is the Internal WASCAL Newsletter, which was published four times in 2015 and 2016 respectively.
- In 2016, WASCAL website was transferred to the Public Relations Division in Accra following the end of contract with ZEF.

## Key Target

The PR builds and sustains the visibility of WASCAL, and position it as one of Africa's leading institutions in combatting climate change and improving livelihoods through the provision of climate services.

## Projects Communication

Provided communication support by building strong visibility for various projects under Climate Change and renewable energy across all WASCAL member countries.

- WASCAL strategic communication plan drafted
- Development and production of Quarterly newsletters.
- WASCAL Stakeholder details updated on Public Relations Database.
- Frequently updated WASCAL digital platforms (website and social media.)
- Story development and publication of various WASCAL events
- Media engagement
- Live coverage of WASCAL / SASSCAL side event at COP23 in Bonn and COP 25 in Madrid.
- Managed and coordinated Pro-report.
- Provision of strong visibility at key WASCAL events
- Conceptualized and produced a Corporate Brand Guideline.
- Developed and managed global stakeholders, providing them with tailor made communication needs and deepening partnerships

## Online communication

More than 500 stories with about 10,000 followers across Instagram, facebook, youtube and twitter

## Media Relations

Over 100 stories in more than 50 media outlets across West Africa and Europe

## Event Communication

- Visibility workshops
- WASCAL Effect
- WASCAL Scholar Open Days

## Stakeholder Management

Over 600 global stakeholders in constant communication and information through various online and off line strategies

## Reports

- Successful coordination and submission of Nine (9) KFW reports.
- Annual executive management reports and Mid-Term reports produced.
- Four Quarterly newsletters produced yearly and Two (2) board news (in 2017).
- Communication and Fundraising strategies produced and adopted in 2018.
- Brand manual produced and adopted in 2019
- Documents translated from and into English and French.

## Visibility

- Website relaunched with added features and upgraded to interactive and well managed website with activities (stories, theses, books, etc...) published since July 2019.
- Social media handles (Facebook, Instagram, Twitter, LinkedIn, YouTube, WASCAL TV, and WhatsApp) created in 2017 and well managed.
- Showcasing of WASCAL at events including WASCAL Climate Week, Alumni homecoming, COPs, three (3) Ministerial Council Meetings, WASCAL Science Symposium.

## Videography & Documentary

Documentaries on WASCAL, Waste-2-Energy animation, and short videos on the WASCAL channels (YouTube / TV).

- WASCALCHANNEL

## Communication Materials

- Frequently asked questions (FAQs)
- Policy briefs (for capacity building and CIREG project)
- Synopses of Abstracts of master's Theses
- Book of Abstract
- Annual reports 2010 – 2020
- Financial reports (2018 and 2020)
- Regional Climate Change Series: Floods
- Factsheets for WASCAL, GSPs, CoC, renewable energy,
- Newsletters
- Corporate gifts



WASCAL continues to respond effectively to the needs and challenges facing the resilience of West Africa to Climate Change and land use. Important milestones have been achieved and need to be consolidated and expanded towards more impacts in the region and in the countries. This requires proactive approach that we are undertaking.

The new programmes approved by the Board and ready to be deployed from 2021 onwards are indicators of the good governance and performance of the institution. They are joint achievements, with string commitment of the main funder. With these new developments and the solid governance and management structures, we foresee the very bright future for WASCAL.

The implementation of the fifth batch will significantly increase the number of graduates with more technologies available to tackle the climate related issues. The selection of 60 students made possible the GSP expansion. WASCAL has two offers of scholarships for the West African students covering all 15 West African Region with 16 Graduate schools composed of 10 PhD programmes and 6 Masters programmes.

## PARTNERSHIPS

- International Water Management Institute (IWMI)
- Centre for Ecology & Hydrology (UKCEH)
- AFSTOR Energy (AFSTOR)
- OIKO for sustainable Environment (OIKO)
- The International Union for Conservation of Nature IUCN
- Ecowas bank for investment and development (EBID)
- The National Center for Research and Training on Malaria (CNRFP)
- The Climate Service Center Germany (GERICS)

## PARTNERSHIP ON RESEARCH

IUCN, CILSS, AGRHYMET, ICRISAT, NOUNA, WAHO, WHO, AFSTOR.  
ECOWAS, CCAFS, African Climate Policy Center (ACPC)/Africa Union,  
AFRIALLIANCE, ACMAD, FAO, IFPRI, IWMI, AGRA, IITA, Volta Basin Authority  
(VBA), FARA, CORAF, Volta Basin Authority (VBA) and other 6 River Basin in West  
Africa, GFCS, IRD, CIRAD, ESOKO, GIZ, INERA, CILSS, UEMOA, 2iE, PIK, GIZ.



Providing relevant climate  
services for West African  
governments, regional  
economic bodies and other  
stakeholders **to give climate  
change related decision  
making at all levels**

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Department of Water Resources  
Ministry of Water, Energy and Power  
Republic of Benin













Supervising Editor: Dr. Moumini Savadogo  
Editor: Nii Commey  
Assistant Editor: Peace Ahovi  
Layout & Design: Communication  
and Public Relations Division, WASCAL  
T : +233 302 777 137

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WASCAL HEADQUARTERS  
West African Science Service Centre on Climate Change  
and Adapted Land Use  
WASCAL, CSIR Office Complex, Agostino Road, Airport  
Residential Area,  
PMB CT 504, Cantonments-Accra, Ghana