

UNIVERSITE CADI AYYAD
FACULTE DES SCIENCES
SEMLALIA - MARRAKECH

**Proposal to Be a Host Institution for the
African Climate Change Fellowship Program**

1. Proposing Host Institution

• Name of institution

University of Cadi Ayyad, Semlalia Faculty of sciences, Department of Biology
Laboratoire d'Hydrobiologie, Ecotoxicologie et Assainissement (LHEA)

• City and country of location

Marrakech, Morocco

• Type of institution

University

• Primary mission of institution

Research and education (<http://www.ucam.ac.ma>)

• Main thematic area(s) of work

Global ecology, Water, agriculture, health, biodiversity, development...

• Working language(s) of the institution

French, (- English)

2. Proposal Leader

• Name: Mohammed MESSOULI

• Title: professor

• Mailing Address: UCAM- FS Semlalia, Département de Biologie BP 2390 Marrakech Morocco

• Telephone Number : + 212 24 43 46 49

• E-mail address: messouli@ucam.ac.ma and messouli@gmail.com

3. Collaborating Institutions

Institution 1/ NGO, Centre de Développement de la Région de Tensift (CDRT),

- City and country of location: Marrakech Morocco
- Primary mission of the institution sustainable development (<http://www.ucam.ac.ma/cdrt>)
- Secondary missions of the institution : education, capacity building, social activities,,
- Main thematic areas of work : *Environment, Adaptation, livelihood, Air quality...*
- Working languages of the institution: French and English
- Name and title of principal contact person: Ahmed CHEHBOUNI
- E-mail address of principal contact person: chehbouni@ucam.ac.ma

Institution 2 / Agence du Bassin du Haouz Tensift (ABHT)

- City and country of location: Marrakech Morocco
- Primary mission of the institution: Maintenance of climatological and hydrological network, dam reservoir management, hydrological and hydrogeological research and modelling, integrated water resource management.
- Secondary missions of the institution Implementation of technical, hydrological and human development projects
- Main thematic areas of work : *water at watershed level*
- Working languages of the institution: French
- Name and title of principal contact person
- E-mail address of principal contact person

Institution 3 / Division Régionale des Eaux et Forêts de la Région de Marrakech (DREF)

- City and country of location: Marrakech Morocco
- Primary mission of the institution: Develop and implement government policy in the fields of conservation and sustainable development of forest resources and implementation, monitoring and evaluation of government policy in the fight against desertification;
- Secondary missions of the institution : development and implementation of government policy on rural development, promote cooperation and partnership with various government departments or other relevant agencies, local partners and bilateral regional and international organizations, professionals, non-governmental organizations;
- Main thematic areas of work : *water and forestry*
- Working languages of the institution: French
- Name and title of principal contact person Abdelmoumen FAKHER EL ABIARI
- E-mail address of principal contact person : elabiari@yahoo.fr

4. Fellowship Experiences to be Offered

We invite applications from outstanding individuals for one post-doctoral and one or two PhD positions to support core interdisciplinary research teams at our institution. We apply computer models to analyse the interactions between climate change, the terrestrial water cycle, agricultural production, trade and land use changes on the global and regional scales. Emerging issues include the role of agriculture for climate change adaptation and mitigation, especially in arid and semi-arid areas, and the increasing demand for bio-energy.

The following areas of research related to the climate\water resources interface may be identified: detecting changes in atmospheric and hydrological variables by means of measurable indicators, including paleohydrological data; assessing sensitivity of land surface processes to climate characteristics; analyzing implications of climate change on regional water supply and demand; assessing the impact of climate change on physical, chemical and biological processes in water bodies. There is a possibility of applying a range of approaches, from simple empirical relationships to complex conceptual models based on simplified representation of the processes involved in the hydrological cycle.

The new dimensions of ecohydrological research will be applied to provide a new tool for improving water resources, environmental quality, ecosystem services and socio-economic development. This will be focused on multidimensional feedbacks between water, biota and society.

Key considerations:

- All training activity will be proactive: learning by doing, through practice, according to the capacities of users;
- Guided by demand that is responding to the needs of users, institutions and localities;
- Integrated approach in the form and content of the training, so as to assure the building of capacities and support for ongoing processes.

Fellows will work as part of a multi-disciplinary team through the institutions and will be based in two different watersheds: the Tensift river watershed, near Marrakech, in the north of the High-Atlas Mountain and in the MAB Biosphere Reserve in Tafilalet oases (southern Atlas)

The successful applicant will draw together ideas from across disciplines (such as resilience theory, system dynamics, risk management, adaptive governance, ecology and economics) to formulate new adaptation approaches to climate change. This will include application of ecosystem models to help explore the effectiveness and limits of adaptation options.

During the first two-week introduction to the fellowship, fellows will receive tuition, advice and guidance in groups and individually from appointed tutors and LHEA specialists in vulnerability and adaptation. During this period, plans and project methodologies together with timeframes, finance, communication and work schedules will be agreed and contracts signed between LHEA and individual fellows.

This is followed by 5 to 12 months development of individual projects that speak to the central theme of the fellowship located at the institution of origin of each selected fellow. Capacities will be enhanced through 'learning-by-doing,' technical assistance and training;

2 to 4 final weeks at the end of the fellowship, at LHEA in Marrakech to work individually with fellows to finalise and evaluate their projects.

Objectives, methodology and experiences that could be offered to visiting Fellows, include

- Provide analytical knowledge to understand and practically use the overwhelming scientific data and documentation;
- Facilitate exchange of ideas, leading to practical response plans (at national or regional policy levels) to climate change and especially for the purpose of protecting biodiversity and managing wetlands in this context;
- Create a lasting forum for capacity-building and information exchange.
- Support the sharing of scientific facts and policies on Climate change, vulnerability and mitigation;
- extend the knowledge and understanding of the fellows selected in the fields of identification and assessment of vulnerability and identification, assessment of capability and planning for adaptation;
- identify, articulate, plan and execute a piece of action research on the above theme in a limited time-frame using an agreed methodology;
- by so doing, develop the knowledge and skills of the home institution of the selected fellows in the stated themes;
- produce research projects, together with working papers that will be of contemporary practical value to the home country/organisation of the fellow as well as to the fellow in his/her future career development and could form the basis of concrete proposals for action;
- address the outflow of skills and knowledge on vulnerability and adaptation to non-African institutions and organisations.

The post-doctoral and PhD fellows will work in close partnership with our PhD students and collaborating institutions to:

- 1) develop the underpinning science that enables adaptation assessments in the Tensift Watershed and in presaharan oases systems.
- 2) draw from different bodies of theory to develop a sound conceptual approach to assessing adaptation options.
- 3) apply existing ecosystem models to reliably simulate ecological, production and economic impacts of future climate and atmospheric changes.
- 4) explore the effectiveness and limitations of adaptation options to determine the residual vulnerability to the risks of climate change.

5. Administrative and Cost Issues

• How many visiting Fellows would you be interested and capable to host at one time?

2 or 3

• Are there specific dates on which visiting Fellows should begin their Fellowships (e.g. beginning of a school term or fiscal year)?

No

• What is your best estimate of the cost per month that a visiting Fellow would incur for housing, meals and other incidentals?

1500 USD per month

• What, if any, registration fees, administrative fees or direct costs would be charged by your institution to host a visiting Fellow?

design, publishing, Administrative services and equipment, telephone, postage printing...

• Are there any other requirements that a Fellow must meet to be hosted by your institution?

All-risk insurance is compulsory for fellow to be hosted by our Faculty (this can be obtained locally in Marrakech)

Qualifications and skills

- A proven ability to produce high-quality research in a relevant area.
- Clear and concise communication of results in both written and spoken form.
- Potential to be effective in multidisciplinary research teams.
- High level of analytical capability.
- Ability to communicate complex information clearly.
- Experience in research in Water sector.
- be able to demonstrate experience and an established interest in the theme;
- be good in French and fluent in English;
- Experience of climate-related research or ability to acquire this rapidly.

6. Qualifications of Host Institution

• **Institutional Capacity:**

Our institution conducts research that seeks solutions to the challenges posed by climate change. Water is a major focus for the Institute, and research in Civil and Environmental Engineering includes improved hydrological modelling and data assimilation within Global and Regional Climate Models, development of stochastic disaggregation tools to improve modelling of climate change scenarios, and assessment of climate change impacts on flood, droughts and water quality.

Other research groups in the university look into environmental issues relating to construction, energy production, waste minimization and re-use and resource management, including the interdisciplinary BP Urban Energy Systems project. Mechanical and chemical engineers are also working to develop carbon capture technology to manage emissions from the use of fossil fuels.

The concept of “participatory action research” is central to our approach and is applied at the level of individual projects. Project-level capacity is further reinforced through a series of education and training and knowledge-sharing activities that link individual project partners, and extend learning to the wider regional and international community. The aim is to see researchers, local stakeholder groups, and organizations strengthened and capable of informing policies that will benefit vulnerable groups by providing solid, locally tested knowledge.

A number of interviews will be held with relevant stakeholders and consultants who operate in these regions in order to capture the current measures adopted to ensure an adequate supply of water in times of drought. This will be done in person, so fellows will spend most of their time on field visits.

Participatory action research engages research users from the beginning to the end, from defining the problem to carrying out and monitoring the research. Depending on the context, the users may be small-scale farmers, local officials, or other individuals or institutions that directly benefit from the shared enquiry. They set the context for the research, bringing an understanding of the many climate-related impacts they experience or expect, and identifying the resources available to respond. Capacity building is inherent, in that it is an active process of “learning by doing” whereby the skills and knowledge of all participants are increased. It is also inherently a development process, in that the research involves the direct testing of adaptation solutions. Implementation is thus built into the research.

Other priority areas for action research are addressing the impacts of climate change on human health, especially waterborne diseases.

• **Project Experience:**

See annex

• **Publications Record:**

A variety of publications, PhD theses and reports have been produced over the last 4 years, including ethnological, hydrogeological, meteorological, botanical, remote sensing, land use and water economical aspects. Relevant citations are given in cv’s team

• **Experience Hosting Fellows:** Please indicate if your institution has hosted the following types of Fellows in the past:

- Post-doctoral fellows : 5
- Doctoral fellows: 3
- Policy fellows: 2
- Teaching fellows : 14

7. Qualifications of Collaborating Institutions

• **Institutional Capacity:**

The capital role of collaborating institution consists in providing fellows by historical information. Such a data are necessary to make prevision and built models under different scenarios that are helpful to establish appropriate mitigation plan and understand adaptation measures

Collaborating institutions are highly qualified to help fellows to give meaning to this data:

- ✓ Translate the problems into information
- ✓ Turn the preoccupations into awareness
- ✓ Transform knowledge into action!

Collaborating institutions possess sound competencies for managing major projects (in particular, hydro-agricultural projects), including under direct contracts with an external donor.

The construction of rural infrastructure and the exploitation of agricultural land have long been priorities for the “ABHT” and “Eaux et Forêts” (Collaborating instiyutions) in view of the imperatives of increasing agricultural production and creating income sources for rural populations. New development needs are currently being felt in both regions. They have to do primarily with: i) protecting the sustainability of fragile ecosystems and a precious heritage of landscapes and technical structures (valleys under development, oases, *khattaras*) that bear witness to the rural populations’ ingeniousness and ability to adapt to a difficult environment; ii) promoting rural populations and combating the poverty and exclusion that place economic and social development in these regions in jeopardy.

Water management in Morocco, like everywhere else, is tied to the management of other natural resources, and must address the needs of its three major users: agriculture, industry, and the household sector. Both ABHT and EAUX ET FORETS will be very helpful to achieve and answer some questions such as:

- How Does Vegetation Respond to Hydrological Change?
- Strategy for Achieving an Arid/Semiarid Ecohydrology Vision
- to develop a framework wherein ecologists and hydrologists proactively collaborate on complex environmental problems and challenges.

• **Relationship with Host Institution:**

The University of Marrakech (UCAM) has been capable of starting up partnership dynamics for project implementation and collaborative research in cooperation with many institutions and ministry departments, states and local associations. This creates opportunities for local development managed by local actors, and the University aims to promote joint research and policy recommendations in the development of different regions of the country, in various sectors. The linkages between researchers, decision makers and communities help to ensure that the research is driven by the demands of research users, rather than the available supply of research organizations.

Institutions also support joint study programs organized by UCAM professors, while hosting international academic conferences attended by leading researchers from around the world.

UCAM/ Institution partnerships especially act as a facilitator by creating opportunities for knowledge to be shared and translated into forms that can be applied to practices or policies that will benefit communities most affected by climate variability and change. Knowledge sharing is at the heart of participatory action research and is therefore core to every UCAM-Institution-supported project, each of which aims to test and validate a combination of local and scientific knowledge.

8. Supervisor / Mentor Team

Host Institution

- Name Mohammed MESSOULI
- Title Professor
- Institutional affiliation: University Cadi Ayyad
- Areas of expertise Biodiversity Ecosystem services Adaptation and Mitigation
- Number and types of fellows supervised : 3 Biodiversity-BioSustainability, Karst water functioning, Impact of latrine on groundwater pollution: EcoHealth

- Name Mohammed YACOUBI-KHEBIZA
- Title professor
- Institutional affiliation: University Cadi Ayyad
- Areas of expertise Global ecology interaction Groundwater/Surface water
- Number and types of fellows supervised : 2 groundwater ecology hyporheic milieu , Impact of latrine on groundwater pollution: EcoHealth

- Name Laila MANDI
- Title Professor
- Institutional affiliation: University Cadi Ayyad
- Areas of expertise wastewater treatment by aquatic plants
- Number and types of fellows supervised : 6

- Name Naaila OUAZZANI
- Title Professor
- Institutional affiliation: University Cadi Ayyad
- Areas of expertise wastewater treatment and reuse in agriculture
- Number and types of fellows supervised : 3

Collaborating Institution

- Name Ahmed Chehbouni
- Title professor
- Institutional affiliation CDRT
- Areas of expertise: civil engineering

- Number and types of fellows supervised (integrated in cv)

- Name Abdelmoumen Fakher El Abiari
- Title Dr
- Institutional affiliation Directions Régionales des Eaux et Forêts (**DREF**)
- Areas of expertise Pisciculture
- Number and types of fellows supervised : Many field campaigns and activities in favor of farmers and stakeholders (fish farming, forestry, aromatic plants...)

9. Interest in Applicant Review

Our institution can participate, if necessary, in the review of proposals from those applicants that express interest in basing their fellowship experience at our institution.