



Afro-Mediterranean Soils:  
Constraints and Potentialities

DECEMBER 18<sup>TH</sup> & 19<sup>TH</sup>, 2015  
MARRAKECH - MOROCCO

## 1st Afro-Mediterranean Soils Conference: “Constraints and Potentialities for Durable Management”

Fondation OCP and INRA Morocco in partnership with the FAO

18-19. December 2015, Palmeraie Golf Palace, Marrakech

The first International Conference on Afro-Mediterranean Soils: Constraints and Potentialities (and last international conference closing the International Year of Soil) has been a revealing and a stimulating experience. The Conference held in Marrakech during 18-19 December 2015 included most important issues related to soil and soil uses with a pan-African perspective providing an excellent updated of most important problems related to intrinsic African soil constraints but also a very enriching overview of promising approaches for the adequate soil/land management. Soil information and modelling, soil carbon sequestration, soil fertility and crop management, soil restoration and soil health, agro-ecosystem services and climate change were some of the topics addressed. The presentations and the discussions showed an alive soil science community dedicated to provide scientific and applied knowledge for the challenges and opportunities of today transition scenarios. The Conference also shows the commitments and willingness into contributing to ameliorate social and economic difficulties, many of them related to problems of climate change. In this relevant context the organization of UNFCCC COP22 in Marrakech next year deserve a thoughtful analysis and planning.

The Conference was opened by Pr. Mohamed Badraoui, Director of INRA Morocco, Mr. Amine Mounir Alaoui Executive Vice-President of Fondation OCP and Mr. Michael George Hage the Representative of FAO in Morocco. Mr. Yosr Tazzi was acting as moderator along the whole Conference.

The Conference was organized in seven Scientific Sessions with keynote presentations and Workshops with oral and poster presentations. The first session was focussed on Carbon management & sequestration and Climate –Smart Agriculture. The Keynotes speakers were: Rattan Lal, Ohio State University (OSU) with a video presentation on Soil Carbon Sequestration and Management to Mitigate Climate Change; Rainer Baritz of FAO, Rome with Carbon Soil Information under Climate Change; Rachid Mrabet of INRA, Morocco with Conservation agriculture (CA) as a climate-smart approach for coercing sustainability in Mediterranean basin and Joseph G. Mureithi of KALRO-ACT/Kenya with Enhancing access to conservation agriculture Knowledge & Information and Partnerships: Experiences of the African Conservation Tillage Network (ACT)

The second Session was dedicated to Soil erosion and conservation measures. It included a keynote presentation by José Luis Rubio of ESNB, ESSC, WASWAC and CIDE-CSIC,

Valencia, Spain on Challenges and opportunities for soil conservation under climate change scenarios.

The Third Session was on Soil information and modelling, with two keynote presentations: Rachid Moussadek of INRA- Morocco on Soil Information System in Africa and NENA: an opportunity for improving soil management and climate change adaptation and Erik Braudeau of Texas A&M University – USA with A new paradigm in soil science allowing for modelling the 'green water' dynamics in soil.

The Forth Session was on Soil in Africa: Quality and land degradation monitoring, with three keynote presentations as follows: Mamadou Traore of African Soil Science Society - University Polytechnique de Bobo Dioulasso - Burkina Fasso with Soil resources in Africa; Baghdad Bouamer of IAV Hassam II- Morocco with Soil decontamination and Imad eldine Babiker of Agricultura/ Research Corporation (ARC) Khartoum,Sudan with Climate smart vertisols soils and water management in rainfed dry lands farming

Session fifth was on Soil Fertility management and crop fertilization, with two keynote presentations: Bouabid Rachid of Soil Fertility Map Project Consortium, ENA-Meknes-Morocco, with Fertimap: a web-based soil information system for the management of soil fertility and crop productivity in Morocco and Tasse Hezekiel of Ethiopian Agricultural Transformation Agency-Ethiopia with Ethiopia soil fertility project

The seventh Session was dedicated to Conclusions, recommendations and closing declaration. In the final part of this report it is included the text of the Recommendations that emerged from the Conference.

The following is an interesting overview of the Conference elaborated by Rainer Baritz, FAO Rome, which highlights some relevant outputs.

### **Underlining the Conference**

165 participants from 18 countries met in Marrakesh to discuss the very critical condition of soils, especially in Africa. The final communique highlights the crucial role soils play for the social and economic security of 40-80 % of the African people being dependent on mostly small-scale agriculture. While the growth rate of the world population averages 34 % world-wide, it reaches up to 120% in some African areas. At the same time yields are reduced by an average of -8 %, reaching alarming extremes of up to -40 % in some areas. At the same time, more than 50 % of the land area is degraded, due to water and wind erosion, but also nutrient losses, salinization and soil organic matter losses on agricultural land are important causes as well. Even if these conditions were not considered, the majority of African soils would be difficult to manage due to its natural conditions: low nutrient storage capacity and low nutrient levels. Most of sub-Saharan Africa has naturally acid soils. Soil organic matter, the most important mediator to supply nutrients to crop roots, often has naturally low concentrations.

**The conference revealed alarming facts about the condition of soils in Africa, high pressures from land use and hazards such as erosion and soil organic matter loss.**

Only 8% of the African land area is suitable for agriculture, probably with a potential to increase if degraded lands would be restored. However, reliable data about soil degradation, soil fertility and its potential improvement through sustainable soil management are lacking. Knowledge is also lacking about the carbon sequestration potential of African soils: sufficient organic matter levels in soils are crucial for their functioning, and eventually help improving

the resilience of farmers to climate change. Conference participants exchanged various technical reasons for this dramatic situation, but also solutions.

For example, various inventories and scientific studies are being conducted to explore the current yield gaps, which refers to the mismatch between potential and actual yields. Farmers are lacking reliable advice and new knowledge considering the diversity of soil and local management conditions. Absence of planning instruments and knowledge exchange, but also insufficient technical equipment are some of the main reasons. Reliable data and advice from laboratories - taken for granted in many developed countries – is lacking in many African countries, even if the sampling and analysis is sponsored or co-financed by government programs.

**Reliable and updated information about soils and its sustainable management is not available.**

At the same time, soil institutions in research, government as well as higher education suffer from personal reductions and lack of funding. However, very promising large-scale soil programmes are conducted with specific purposes related to the closing of the yield gap through wise-spread of conservation agriculture and decision support for efficient fertilization. In Morocco, the Fertimap project covers 6.8 Mio ha cropland with some 26,000 soil samples taken. The results will be made available through a web-based soil information system offering decision support to farmers. Similarly, in Ethiopia, EthioSIS covers almost the entire country with some 53,000 sampling points. 6,000 extension specialists ensure that the information collected is reaching out and supporting the farmers. The experiences collected through these soil programmes demonstrate the magnitude of effort necessary to successfully guide and support farmers.

**Soils can only be sustainably managed and restored if sufficient data reveal insights into the soil condition and its reactive potential for improving the nutritional status.**

South-south cooperation is seen as an important means to utilize existing resources available and to transfer knowledge and capacity to areas where it is still lacking. Also, the regional soil partnerships for North Africa and the Near East as well as for Sub-Saharan Africa, which are regional bodies of the Global Soil Partnership, can be good means to intensify cooperation within the African region but also with the global community of soil experts from government institutions, research and education. The African Soil Science Society also founded regional networks in order to better address and advice on the challenges regarding sustainable soil management and soil restoration. One of the urgent needs for information is about the current state of soils. It is not well known where soil degradation and its restoration offers new opportunities for agriculture, and to which degree soils strongly exposed to hazards such as erosion and nutrient loss must be protected. Landscape and agricultural management planning need to consider the sustainable use of soils. However, reliable and high-resolution soil data are mostly lacking.

The report about the Status of the World Soil Resources, launched at the 2015 World Soil Day at FAO Headquarters in Rome, has especially looked at regional issues. The lack of basic information about soils and the threats endangering them, especially in the African continent, is alarming.

**Morocco will be hosting the 22<sup>nd</sup> Conference of the Parties (COP) of the UN Framework Convention on Climate Change (UNFCCC) at Marrakech from November 8<sup>th</sup> to 18<sup>th</sup>, 2016.**

Recently, the international community has begun to discuss agriculture and climate change, especially in the context of adaptation and mitigation. The importance of small-holder farmers for regional food security, and the risk from climate change, are aspects addressed in the discussion. At this point, no clear strategy has been found to address agricultural issues, including soils, during UNFCCC negotiations. During COP21 in Paris, soils and sustainable soil management have received attention through the 4per1000 initiative, which also became included into the Lima-Paris Action Agenda. The next COP will be on the African continent, in Marrakesh. For the alarming situation of Africa's most endangered natural resources – water and soils – this will be a challenge and opportunity to halt the continued degradation of these resources, to improve information about its condition, and to manage it sustainably.

Finally it follows the Recommendations that emerged of the Conference that was preliminary elaborated by an ad-hoc group under the leadership of the President of the Scientific Committee of the Conference Rachid Mrabet who presented the text to the participants of the Conference at the final Plenary Session for discussion and approval

### **Recommendations**

In response to declaration by the U.N. for 2015 as International Year of Soil (2015-IYS), OCP Foundation, INRA and FAO were pleased to have organized this international conference on Afro-Mediterranean soils and by the high quality contribution from national and international institutions and associations. The conference considers the challenges of soil degradation in participating countries and traits it has on food security for future generation.

The conference was an ultimate space of important exchange of experiences and a platform for knowledge and lessons sharing and brokering. The invitation and presence of high-level experts in various sciences and domains of soils from eighteen countries have given to the conference a large scale and magnitude in developing new ideas and opportunities for further durable development in Africa and the Mediterranean basin.

The participation of high percent of young researchers and students (with gender balance) greatly guaranties the future involvement of research to sustainability of soils.

The conference itemized the crucial roles of soils in social, environmental and economical as well as food security challenges for the future of wellbeing of African societies.

The conference highlighted and underlined the urgent need to deepen the south-south cooperation and enrich the exchange and sharing of technologies, resources, experiences and knowledge.

The debate and profound discussion on workshops helped the participants to get acknowledge by the important traits to soils, crops, pastures and forestry including global warming. Several management systems were addressed and science-based options were discussed in order to regenerate soil fertility and revitalize the environment.

The importance of soils in policy and decision-making was also reviewed through needs for strong information systems, reinforcement of capacity building of all stakeholders (universities, research institutions, private laboratories, extensions services etc.) and to foster soil protection legislation and policies.

The conference recognizes the importance and the implication of the COP-22 to be organized by the government of Morocco in November 2016 and recommends the creation of task force

or an advisory group to prepare a road map to COP-22 for issues related to the priorities and challenges affecting African soils and climate change.

The conference proposes to further inspiration from Global Soil Partner (GSP) initiative through the implementation of World Soil Charter that addresses soil degradation, competition for resources, effects on soil productivity, environment and economy.

The scientists and academics assembled at the conference identified that soil research status in Africa should be ameliorated further through rising the volume of research and the incorporation of new innovative tools and integrative solutions for soil restoration and improvement and to upgrade scientific/research platforms while using state of the art innovations, equipment and methods (i.e. isotopic techniques for soil erosion and water productivity studies, precision techniques, monitoring tools, soil information and mapping technologies etc.).

Sparse soil information in Africa requires carrying an extensive soil survey and digital mapping for better management of lands and therefore satisfies the increasingly diverse expectations of Afro-Mediterranean societies from soils.

Fostering soil carbon sequestration and management in agricultural, pastoral and forested lands is vital for combatting and mitigating climate change and providing needed agro-ecological goods and services. Prof. Rattan Lal stated that “With a great success, as exemplified by the “4 pour mille” proposal at COP-21, it is important that the International Union of Soil Science (IUSS) and national societies celebrate “Decade of the Soil” from 2015 to 2024 ».

Integrated nutrient management, conservation agriculture and soil/water conservation need additional consideration, testing and adoptions by farmers and stakeholders through adequate approaches of dissemination and mass adoption.

Research centers should enforce their synergies in order to better improve soil research and scientific infrastructures. In this regards, the 3 organizing institutions commit to follow up on the recommendations and organize more conferences and support projects on soils. These recommendations will be shared with all participants and their institutions.

**Report by:**

José Luis Rubio

Centro de Investigaciones sobre Desertificación- CIDE  
(CSIC, Universitat de Valencia, Generalitat Valenciana)

Carretera Moncada-Naquera Km 4,5

Apartado Oficial

46113 Moncada

Valencia

Spain

**E-mail:** [jose.l.rubio@uv.es](mailto:jose.l.rubio@uv.es)

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