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<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><i>C. King</i></p> </div> <div style="text-align: center;">  <p><i>S. Mahé</i></p> </div> <div style="text-align: center;">  <p><i>C. Marlin</i></p> </div> <div style="text-align: center;">  <p><i>G Rayé</i></p> </div> </div>	

### Context of “INSPIRATION-ANR-SOLS” Event genesis

To inform the French Soil research community about H2020 INSPIRATION and to compare research ideas issued from a bottom-up approach at European level with funded research and the research perspectives of the French scientific community,

This may feed the Action Plan of French National Research Agency and specific call from Ministries, with some relevant research outcomes from INSPIRATION.



**Mrs. King, what was your motivation to co-organise the “ANR-INSPIRATION-SOL” event in January, 16&17, 2017?**

Since 2006, more than 170 projects have been supported by the French National Research Agency (ANR) on soil, water and sediment management and sustainable use on the territory. This has been possible through very diverse thematic and non-thematic research calls. Since 2014, these research themes are included mainly in the societal challenges 1 (sober resource management and adaptation to climate change) and 5 (food security and demographic challenge) of the Agency's action plan. All in All, between 2005 and 2014, more than € 90 million of financial support from ANR has been allocated for the funding of research projects dedicated to these themes. In mobilizing the in kind research fund from the research projects, the French financial effort allocated to these research questions is three or four times higher in total estimated cost.

The objective of these two days was to better place the French research position on these themes with this twofold vision, the analysis of the research projects already financed by the ANR and the needs of R&D at the European level, as emerging from INSPIRATION's project through bottom-up consultations. These needs will be translated into a Strategic Research Agenda (SRA). It was also an excellent opportunity to bring it to the attention of the French scientific community and to help them to position themselves in the European landscape.

**Mr. Rayé, what was MEEM's motivation to be involved in the “ANR-INSPIRATION-SOL” event?**

The Ministry of the Environment of Energy and the Sea (MEEM) has financed the GESSOL research program for nearly 20 years, which has led to important advances in understanding soils' functioning, in identifying the threats to this non-renewable resource and allowed its integration into public policies. Beyond this research program, MEEM's Research and Innovation Directorate is particularly involved in the "soil" theme. It was important to have an overview of the state of soil research in France and to situate needs in the European context.

**Mr. Mahé and Mrs. MARlin, what was MENESR's motivation to be involved in the “ANR-INSPIRATION-SOL” event?**

Soil is a fragile, precious natural resource that provides ecosystem services critical for life and for agroecosystems which deliver feed, fiber, food and fuel for humanity. More broadly, soil occupies a central role in the “Critical Zone” (defined as the Earth's near-surface layer from the top of the trees to the bottom of the groundwater). Research conducted on the critical zone, including the soil, is therefore of utmost importance, especially within the context of global climate change, increasing urbanization and demography, degradation, or even depletion of most natural resources and erosion of biodiversity.



As the Ministry in charge of Higher Education and Research (MENESR), we supervise different public research organisms that conduct transdisciplinary studies on soil and critical zone (e.g. universities, CNRS –Centre National de la Recherche Scientifique– essentially two institutes (INSU, InEE), INRA, IRD, CIRAD, Irstea, BRGM -,...)-. All these organisms are grouped into 5 national research Alliances amongst which the French national alliance for research on the environment (AllEnvi) was established in 2010 by the Ministry to coordinate available competences, knowledge and technologies in order to address environmental issues. Four other research alliances were also created (Athena for Humanities and Social Sciences; Ancre for Energy, Allistène for Digital Sciences and Technologies and Aviesan for Life Sciences and Health). For Allenvi, the research topics relative to soil are essential since they are addressed in 12 of the 13 thematic groups (agroecology and soil, food & feed, animal in their environment, biodiversity, plant biology, climate, water, environmental assessment and life cycles, ecotechnology and sustainable chemistry, environmental, natural and ecotoxic risk, territories and natural resources, city and mobility).

The MENESR is responsible to liven up and to organize a National Research Strategy (SNR, published in 2015), a French 5-year inter-ministerial strategy. In the strategy document, the research priorities are organized through ten societal challenges elaborated in regard to the European Framework Program "Horizon 2020". The SNR *"strives to take up scientific, technological, environmental and societal challenges through the promotion of high-quality basic research"*. As a cross-cutting issue associated to environmental, societal and economical challenges, soil is of major concern for two societal challenges (SC1 *"Sustainable management of natural resources and adaptation to climate change"* and SC5 *"Food safety and demography challenge"*) linked with two major long-term threats to its sustainability: food security and global change (including climate change). The SNR points out research needs in the following topics relative to soil (functioning of the critical zone and research observatories, multifunctionality of agricultural and forest soils and global change, integrated approaches and soil governance in urban and peri-urban areas, innovative approaches - restoration and compensation, chemical contamination of soils, which challenge?).

As the SNR is consistent, for the greater part, with the "Horizon 2020" European research and innovation program and also with the other national strategies (health national strategies, energy research, sustainable development,..), the MENESR supports the organization of events that aim at developing SNR research topics, at favoring the establishment of synergies between research teams on original topics and at helping to better structure research communities for participating to major European or international initiatives. The ANR-INSPIRATION-SOL days were fruitful for a broad French soil scientific community from different disciplines and from many research organisms and universities allowing to exchange scientific experience and to better structure the research needs concerning soil and critical zone.

### **How could INSPIRATION SRA could be implemented and funded by your organization?**

Some part of the future INSPIRATION' SRA may correspond to already existing topics, others may be inserted with the approval of the scientific committee of ANR (named CPSD1), and other may be identified as having no interest for ANR. Indeed, INSPIRATION's recommendations could be forwarded



to the ANR Committee CPSD1 via three ways: the ad hoc experts *intuita personae* or institutional ministries representatives sitting in this committee (ministries of research and ecology) and/or representatives of ALLEVI, ALLISTEN and ANCRE alliances.

Within the framework of INSPIRATION, the MEEM, sitting at the ANR CPSD, will ensure that the projects go in the direction of better soil sustainable management by examining the coherence of the proposals with the public policies in progress.

As a public body under the authority of the Ministry of research for providing funds for project-based research - for both basic and applied research -, the National Research Agency (ANR) elaborates a work program (WP) in agreement with the Social Challengers identified in the National Research Strategy. The WP is discussed on the basis of research priorities defined by the national thematic research Alliances – Allenvi, Allistene, Ancre, Athena, Aviesan – as well as by the CNRS and the relevant ministries (Higher Education and Research, Agriculture, Ecology, Health, Industry, Defense, Foreign affairs, Culture, National education). The WP of ANR, supervised by the Ministry of Research, is partly reviewed each year. Therefore, the research priorities identified by in the INSPIRATION SRA can be integrated into the ANR WP for funding, if these priorities are consistent with the SNR, the research alliance priorities or with the priorities defined by one or several expert working group(s) set up by the ANR for each societal challenge. The INSPIRATION priorities established in the frame of the SRA may also be taken into account in specific calls funded by research organisms, including European technical cooperation projects (EraNet, JPI, EJP...).

### Can you give us examples of French structuring initiatives in line with INSPIRATION topics?

An example is the insertion in the terms of reference of the ANR's annual generic call for targeted research efforts consistent with European expectations. Thus, *the focus of climate and environmental challenge 1 on climate and environmental requires strong European and international momentum. This coordination takes place in the framework of the European (JPIs Climate, Oceans, Water, FACCE / Agriculture, Urban Europe) and international programs (Belmont Forum, involving post-industrialized countries and emerging countries) in conjunction in France with the Mirror Groups set up by the Ministry of Research, involving the relevant ministries, alliances and agencies. Currently, the implementation of this coordination is based on 3 complementary instruments: i) multilateral projects involving at least 3 countries (specific JPIs or Belmont Forum calls); (ii) multilateral projects involving co-financing from the European Commission (ERA-NET specific call); (iii) international alignment of national projects through networking on targeted themes (generic Thematic Annual Programming call). In particular, the latter focuses on research questions on carbon sequestration in soils.*

All these instruments can be used to address issues that will be included in the INSPIRATION's SRA. The research projects, to be selected in 2017 at the ANR on this theme, will be inserted in a thematic network of European countries which mobilized themselves \*. The call will be led by JPI FACCE.



(\* Spain, Finland, France, Ireland, The Netherlands, Norway and United Kingdom; in addition, projects from Germany and Italy will also join the cluster. <https://www.facceipi.com/Research-Themes-and-Achievements/Sustainable-intensification-of-agriculture/TAP-Soil>)

As one of the most important natural non-renewable resource developed over a longer period of time and the support for life, soil from local to global scale is an area of interest shared between numerous stakeholders. At international level, the Ministry of research participates to international structures like IPCC (Intergovernmental Panel on Climate Change), IPBES (Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services) and the Future Earth program. At European level, we actively supports initiatives in which the compartment “soil” is directly or indirectly studied, like in the JPIs (e.g. Climate, Water, FACCE, Urban Europe,...) and the associated Eranet co-funds as well as other initiatives like PRIMA (Partnership for Research and Innovation in the Mediterranean Area, Article 185). The latter aims at investigating the agricultural sector in the Mediterranean area that suffers from severe water shortages and decreasing crop yields. At national scale, we are involved in inter-ministerial plans amongst which soil research is concerned (Plans Chlordecone, endocrine disrupters, Ecophyto-2018...). Our ministry also monitors a national roadmap of research infrastructures. A number of them are labeled by the European roadmap ESFRI (European Strategy Forum on Research Infrastructures). Several infrastructures, either national or both national and European, concerns the superficial component of the Earth system (e.g. the critical zone observatory Ozcar, the “Réseau des zones ateliers” RZA, ECOTRONS, ANAEE which conduct experimentation on continental ecosystems and agrosystems, ICOS that aims at quantifying and understanding the greenhouse gas balance of Europe and neighboring regions,...).

There are also other initiatives such as the development of a Soil Conservatory set up at INRA in Orléans (France) to prepare, manage, store and distribute soil samples from various national and European soil inventory and monitoring programs. Also, since December, 2016 we participate to the new national inter-ministerial network on soil set-up by the Ministry of Agriculture (RNEST for “Réseau National d’Expertise Scientifique et Technique sur les sols”).