5. Recommendations to improve Mediterranean AKIS

1. Facilitating multi-stakeholder interaction and cooperation

- Better understanding the roles played by the various stakeholders in R&I systems, the way they interact through formal or informal relationships and/or institutional arrangements, the rules they follow, how decisions are taken and how changes in the overall R&I systems take place, taking into account the specificity of the contexts (Key notions: openness, participation, accountability, effectiveness and coherence).

- Developing multi-stakeholder collaborative settings and instruments (formal and informal, at all scales) connecting value chain actors (i.e. farmers, researchers, students, educators, farm extension services, agribusinesses, consumers, NGOs, administration, government/policy-makers, civil society, etc.) and building trust between them: multi-stakeholder platforms, clusters, incubators, thematic networks, hubs of networks, Joint Research Units, Joint Technological Units, Technology Transfer Centres, Innovation Centres, Competency Centres, etc.

- Training the stakeholders on multi-stakeholder collaboration/co-innovation and encouraging new actors/profiles such as innovation facilitators and brokers: training on inter-personal communication, inter-relational skills and participatory approaches to better understand stakeholders' needs/perceptions, convince them of the utility of a given project, engage them in project design and implementation, to transfer effectively research outputs to users and ensure their adoption/use.

2. Fostering a balanced cooperation between public research and private business

- Encouraging a more meaningful role of the private sector in R&I, e.g. through its involvement in the scientific committees of R&D institutions, the definition of practice-oriented research strategies/programmes, the mobility of researchers and entrepreneurs from the academia/research framework to the business fabric and vice-versa.

- Supporting the participation of private actors in the implementation of the research activities through specific funding mechanisms (e.g. "multi-stakeholder calls"), ensuring clear selection, monitoring and evaluation processes and clear rules for the management of intellectual property.

- Balancing the short-term interest for private goods/services of the private sector versus long-term public governmental R&D strategy and medium to long-term impacts of research projects (production of public goods and services): sharing the benefits of knowledge and ensuring their fair allocation along the value chain.

3. Strengthening the governance & capacity of Mediterranean agricultural research

a) Programme level

- Developing long-term transnational research strategies and programmes, involving farmers' representatives and other private actors (e.g. SMEs) from different sectors, in addition to research/academia representatives.

- Strengthening the role of the EU and joint co-funded programmes to support innovative research and public-private partnerships/cooperation.

- Fostering the involvement of ministries/policy-makers (education, research, industry, etc.), universities, technical centres, etc., as key drivers of change, addressing the issues of competence sharing/overlapping between central and regional authorities.

- Promoting the development of a Mediterranean R&I Network (data/knowledge exchange, co-innovation, etc.), e.g. supporting structures of interface: technology transfer centres, innovation centres, innovation authority, etc., and networks of these entities.

- Encouraging long-term institutional co-operation among research and higher education organisations to promote institutional changes conducive to a better interaction with the various actors of innovation.

b) Project level

- Defining better the meaning of innovative research and capturing the innovation potential of research projects using relevant standards/criteria (e.g. readiness, market potential, identifying client's needs and translating them into the right research questions, designing a prototype, evaluating client's satisfaction, etc.) and identifying R&I outputs that can be valorised by researchers and other beneficiaries (patents, papers, models, protocols, etc.).

- Conditioning project funding by the formal involvement of public and/or private stakeholders (e.g. farmers, NGOs, industry, technology transfer centres/offices) and fitting funding rules and eligibility to encourage public-private innovative calls/projects.

- Adapting the management of intellectual property/data confidentiality to public-private collaborative research (open use vs confidentiality of data/publications).

- Supporting the communication and dissemination of R&I outputs to all the stakeholders (including the society at large) to ensure the adoption of innovation.

c) Researcher level

- Encouraging scientists to take part in multi-stakeholder innovative research through suitable incentives and reward systems: career evolution (e.g. change of position, improved salary, recognition); financial incentives (e.g. rewards/recognition linked to productivity and innovative results); possibility for some activities/outputs other than publications and patents to be valorised/recognised (e.g. science communication, contribution to social organisation improvement, contribution to natural resources conservation and agriculture sustainability).

- Developing suitable research methodologies geared towards multi-stakeholder R&I.

Authors: Fabrice Gouriveau, Florence Jacquet, Sahin Anil, Bernard Hubert, Pascal Bergeret.

Reference: ARIMNet2, 2017. Recommendations to improve Mediterranean Agricultural Knowledge and Innovation Systems (AKIS). Outcomes of the ARIMNet2 International Conference on AKIS in the Mediterranean (12-13 October 2016, Antalya, Turkey)

INRA SCIENCE & IMPACT
Institut National de la Recherche Agronomique (INRA)
2 Place Pierre Viala, 34060 Monpellier, France

www.arimnet2.net

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Coordination of Agricultural Research in the Mediterranean Area

Recommendations to improve Mediterranean Agricultural Knowledge and Innovation Systems (AKIS)

Outcomes of the ARIMNet2 International Conference on Agricultural Knowledge and Innovation Systems (AKIS) in the Mediterranean (12-13 October 2016, Antalya, Turkey)

ARIMNet2 (2014-2017) has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 618127

1. ARIMNet2 and Mediterranean AKIS

ARIMNet2 (Coordination of Agricultural Research in the Mediterranean; 2014-2017) is an ERA-NET project funded by the European Union's Seventh Framework Programme for research, technological development and demonstration, involving 24 partners (funding agencies and research organisations) from 15 Mediterranean countries which share values, priorities and objectives. It deepens the work done in ARIMNet (2008-2013), the first Euro-Mediterranean ERA-NET targeting agriculture.

The objective of ARIMNet2 is to boost the coordination of agricultural Research and Innovation (R&I) in the Mediterranean area so as to enhance the sustainability of agricultural practices, the contribution of food systems to food security and socio-economic development, and the conservation of natural resources.

ARIMNet2 identifies common scientific priorities (Integrated Strategic Research Agenda), supports transnational collaborative research projects through co-funded joint calls (2015, 2016 and 2017) and implements joint training/networking activities (e.g. Young Researchers Seminar, Conference on Mediterranean Agricultural Knowledge and Innovation Systems - AKIS).

After almost 10 years of a fruitful cooperation, ARIMNet-ARIMNet2 partners have learnt to work effectively together and have developed mutual trust and a strong commitment to continue their joint activities in a long-term perspective to meet current and future challenges. They have already co-funded 31 research projects (over 15 M€) and new projects will be funded through the Young Researchers Joint Call launched in June 2017.

Owing to their objective to improve the Research-Innovation link, it was considered strategic for ARIMNet2 partners to promote a reflexion among stakeholders on AKIS in the Mediterranean area with the aim to improve the actions implemented inside ARIMNet2 and to prepare other initiatives of transnational research programmes.

The AKIS concept stresses that innovation in agriculture is not a linear process but results from multiple and interacting sources of knowledge, and that it has implications for research and extension policies aimed at fostering innovation. It implies the development of interaction and learning among scientific and entrepreneurial actors in the public and private sector to produce technical changes and innovations. In the EU, it constitutes the background for the current European agricultural innovation policy: EIP-Agri (European Innovation Partnership for Agricultural Productivity and Sustainability).

AKIS can be considered as "a set of agricultural organizations and/or persons, and the links and interactions between them, engaged in the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilization of knowledge and information, with the purpose of working synergistically to support decision making, problem solving and innovation in agriculture" (Röling and Engel, 1991).

Röling N.G. & Engel P.G.H. (1991). The development of the concept of Agricultural Knowledge and Information Systems (AKIS): Implications for extension. In: W.M. Rivera & D.J. Gustafson (Eds.), Agricultural extension: Worldwide institutional evolution and forces for change, pp. 125-139. Elsevier, Amsterdam.

2. AKIS Stakeholder Conference

The AKIS Stakeholder Conference was held in Antalya (Turkey) on 12-13 October 2016 to share ideas and experience, in line with the objective to analyse and enhance Agricultural Knowledge and Innovation Systems (AKIS) in order to improve the effects of research policies on innovation.

The conference gathered 75 participants from 16 countries, with diverse and complementary profiles, including farmers, agri-business entrepreneurs, funders, policy-makers, researchers, NGOs, etc.

During two days, the participants brainstormed and discussed ways to improve transnational agricultural R&I. They came up with concrete recommendations to impact future collaborative R&I programmes and initiatives on Mediterranean agriculture.

The objectives of the conference were to:

- Share opinions and encourage mutual learning on the diversity of AKIS in the Mediterranean;
- Foster exchanges and networking among Euro-Mediterranean actors on innovation processes and policies;
- Draw on conference exchanges and build recommendations for future actions on R&I coordination in the Mediterranean.

The format of the conference was as follows:

- Keynote speakers introduced the AKIS concept and its relevance for the Mediterranean area;
- Several stakeholders shared their experience and ideas on the link between research, innovation and practice, and offered recommendations to fill the gaps and improve Mediterranean AKIS;
- Group discussions addressed three main themes:

  1) Platform/Cluster between firms and academia: interest in developing platforms for innovation;

  2) Extension services and interactive innovation models: how to improve the interactions among research and extension organisations, farmers, entrepreneurs and other centres of knowledge;

  3) Innovation potential of the research projects: how to increase the innovation potential of research projects and of the funding instruments aimed at supporting them.

- Two round tables were organised: the first gathered farmers, agribusinesses and NGO representatives, and the second representatives of ministries, research organisations and funding agencies.

More information on this conference is available on the ARIMNet2 website at www.arimnet2.net.

3. Keynotes speeches highlights

Three keynote speakers, Michel Petit (Professor at CIHEAM-IAMM), Pascal Bergeret (Director of CIHEAM-IAMM) and Mohamed Aziz Darghouth (Former President of IRESA) introduced the AKIS concept and its relevance for the Mediterranean area, setting the tone of the conference.

Michel Petit presented a **"Historical perspective on AKIS and its relevance for the Mediterranean region".** His overview of past agricultural innovation paradigms and modes of action helps to understand the origins of the AKIS paradigm and its role in the promotion of agricultural innovation. Past paradigms referred to the adoption logistics curve and typology of adopters (early adopters, followers, etc.). The Transfer of Technology (TOT) paradigm has been dominant for a long time to explain the role and dynamics of technical progress (adoption process, structural change, gain in productivity, etc.). However, in the 2000s the World Bank suggested that in order to achieve better results, the TOT paradigm must be overcome and a specific institutional engineering set up for an effective innovation system, i.e. "an institutional setting, often network-based, fostering interaction and learning among scientific and entrepreneurial actors in the public and private sector in response to changing economic and technical conditions" (World Bank, 2007).

In this perspective, AKIS constitute a framework to deal with the multiplicity of actors, views and expectations, the diversity of approaches used and the complexity and multidimensional character of the issues to be addressed. The conclusion of Michel Petit puts emphasis on the need for long-term institutional co-operation among research and higher education organisations around the Mediterranean as a way to increase the impact of research on innovation by mutual institutional strengthening and co-innovation.

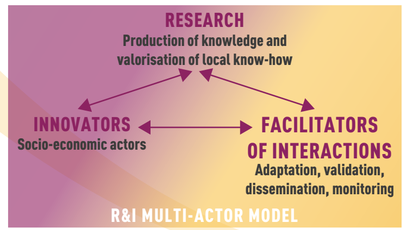
Then, Pascal Bergeret gave a presentation entitled **"AKIS in Europe – Main achievements and future work"** on behalf of Adrien Guichaoua (ACTA, France) and Andrés Montero (INIA, Spain) from the Standing Committee for Agricultural Research (SCAR) Strategic Working Group (SWG) on AKIS. The SCAR brings together representatives of Member States and Associated and Candidate Countries that advise the European Commission and Member States on the coordination of agricultural research. In 2009, the 2nd SCAR Foresight Exercise shed a rather crude light on the current state of agricultural knowledge systems in Europe, qualifying it as "currently unable to absorb and internalise the fundamental structural and systemic shifts that have occurred"; it gave strong recommendations for improving these systems: giving incentives for research, development and innovation; stimulating knowledge exchange, adoption of innovation and technical application in the production process; supporting the activities of facilitators, innovation brokers and tutoring paths for farmers to implement innovations; valuing the input and knowledge of farmers. The reflections of the SCAR AKIS SWG contributed largely to the creation of the European Innovation Partnership (EIP) on Agriculture and to the definition of its instruments which mark the convergence between the Common Agricultural Policy (CAP 2nd pillar) and Horizon 2020 (Operational Groups, Multi-actor Projects, Thematic Networks).

World Bank (2007). Enhancing agricultural innovation: How to go beyond the strengthening of research systems. Washington, DC, 188 p.

The AKIS SCAR SWG is still working hard and currently concentrates on ways and means for: 1) Improving the integrated approach within European AKIS and the implementation of the EIP; 2) Learning and obtaining feedback from interactive project approaches (multi-actor projects, thematic networks, operational groups); 3) Better addressing the knowledge flows along the whole production/value/supply chain; and 4) Fostering the cross-fertilisation with other EIPs and sectors.

Finally, Mohamed Aziz Darghouth presented **"The agricultural development model and its relationship with the research-innovation system – The case of Tunisia".** He explained that the "green revolution" in Tunisia was based on embedded innovations relying on machineries and equipment and a combination of genetic material, pesticides and fertilisers. The R&I system was led by a "productivity-targeted" paradigm, teaching farmers new skills in a top-down approach. It produced effective results for large-scale farms and a significant increase in production and self-sufficiency for several commodities. However, this agricultural model is economically unsuitable for small-scale farming and has negative impacts on natural resources; moreover, the "modern" knowledge it promotes contradicts the traditional farmer's know-how. Currently, the Tunisian agricultural research sector is institutionally linked to extension services; however, the transfer of knowledge is largely based on a linear model. Even if institutions have been created to allow the involvement of stakeholders (such as platforms for the programming and evaluation of research activities that bring together Farmers Union's representatives, Development, Extension and Research), the lack of representativeness and capacities of the stakeholders and lack of clear implementation mechanisms for the participatory process limit their efficiency.

In such a context, IRESA is currently promoting a profound change in the system by arguing for a new paradigm for the Tunisian agriculture. It implies to distinguish between large-scale farming that can be encouraged in a better appropriation of the green revolution model (that includes sustainability) and small-scale farming for which specific affordable and locally adapted innovation models should be set up. In this context, the mandate and missions of IRESA evolve to develop strategies for R&I and higher education through a multi-actor approach, focused on employability, development of entrepreneurship, sustainable development and preservation of ecosystems. It sets new interactive value chains supporting innovation among producers of knowledge, facilitators of transfer and innovators, as well as new functions for animating AKIS interfaces and new institutional spaces for hosting and governing multi-actor initiatives.



4. Parallel sessions and round tables highlights

Three themes were discussed in parallel sessions (Platform/Cluster between firms and academia; Extension services and Interactive Innovation models; Innovation potential of the research projects), with the same objective, i.e. to facilitate agricultural innovation by an integrated approach along the value chain (from production to consumption) so as to yield greater social, economic and environmental benefits for Mediterranean societies while preserving the natural capital.

The questions discussed in each group were the following:

- How to enhance an innovative dynamics taking into account the specificities of the situations and building collaborative networks among researchers, farmers and their organisations, farming extension services, private companies, government agencies, civil society organisations?
- Which relevant stakeholders should be involved?
- Which kind of institutional arrangements (formal/informal) should be used to involve the stakeholders?
- Which management and implementation rules should be applied to facilitate balanced working conditions between stakeholders and yield fruitful outcomes?
- To achieve such goals, which are the weakest points to be strengthened and supported?

In addition to the parallel sessions, two round tables took place, involving farmers, agribusinesses and NGO representatives in the first, and representatives of ministries, research organisations and funding agencies in the second.

The key issues discussed and recommendations are summarised hereafter.