Contribution of Moroccan higher education and research institutions to KM in agricultural sector

SKIM PROJECT LEARNING ROUTES MOROCCO’ EXPERIENCE

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Higher education and research system in Morocco in Agriculture

NARS

KM in Agricultural institutions

• IAV & ENA
• INRA
• ONCA

Main SKIM activities involving Moroccan institutions

SKIM support to Moroccan institutions

Presentation of the LR and objectives

Morocco learning routes
Moroccan Agricultural HE & Research System (NARS)

- Ministry of Agriculture and Fisheries (MAPMDREF)
- Ministry of Higher education and research (MENFPESRS)
- Private sector

Research Institutes:
- INRA (10 regional Research Units)
- INRH (6 regional research structures)

Higher Education and research institutes-engineering schools:
- IAV (Agriculture, Veterinary, Rural Engineering, food industry, horticulture, topography ...)
- ENAM (Agriculture)
- ENFI (forestry)

12 public universities:

Interministeriel permanent Committee on Scientific Research and Technological Development

High Council for education, training and scientific research

CNRST

Private Universities:
- IUR
- UMVI

Private research:
- Domaines
- Food industries
- Multinationals companies

Hassan II Academy on Science and technology
Universities : Training in agriculture and related fields

Accredited programs in relation with agriculture, food industry, water, environment, biodiversity...

University Hassan II Casablanca
University Abdelmalek Essaâdi Tetouan
University Ibn Tofail Kénitra
University Sidi Mohamed Ben Abdelhah Fes
University Moulay Ismail Meknes
University Mohammed V Rabat
University Sultan Moulay Slimane Beni Mellal
University Hassan 1er Settat
University Chouaib Doukkali El Jadida
Université Cadi Ayyad
University Mohamed 1st Oujda
University Ibnou Zohr Agadir

Sources : SZ analysis, 2020, extracted 2017-2020 accredited programs from Universities website, data retrieved on 18.11.20,

2019-2020 Universities data :
- 391 591 new registered students
- 921 944 total enrolled étudiants
- 19 154 researchers
**Agricultural HE & R institutions**

**IAV Hassan II**
- Creation: 1966
- Students: 2033 (311 PHD)
- Professors: 220
- 2 campuses (Rabat & Agadir)

**ENA Meknes**
- Creation: 1942
- Students: 540
- Professors: 60
- 1 campus (Meknes)

**ENFI Sale**
- Creation: 1968
- Students: 1 campus (Sale)

**INRA**
- Creation: 1914 (1980)
- Researchers: 184
- Regional Centers: 10

**INRH**
- Creation: 1946
- Researchers: 10
- Regional Centers: 10

**Vocational training:**
- 51 institutions
- 2600 graduated/year
- Diplôme: skilled worker, technicien, specialized technicien

**Higher Education & research institutions**

**Research institutions**

A. NARS
Contribution of HE & R institutions to research scientific publication

SCOPUS papers in the field of agriculture and veterinary sciences 2000-2020

2019 : a total of 763 publications (180 agri institutions) (24%)

Extracted data from SCOPUS database on 23.05.20 (SZ)
PATENTS IN AGRICULTURE WITH MA ORIGIN

- University: 89%
- Agri HER: 11%


Contribution of HE & R institutions to innovation

- AGRI_Food industry: 38%
- Biowaste: 5%
- Fertilizers and soil: 8%
- Equipment and machinery: 8%
- Irrigation: 4%
- Livestock and facilities: 5%
- Phytopharmacy: 22%
- Phytopathology: 5%
- others: 5%
National & international research Collaborations

KM in Moroccan Higher institutions

- IAV & ENA
- INRA
- ONCA
KM at Higher education and research institutions: IAV Hassan II & ENA

Creation
- Research activities
- Practical internship
- PHD school
- Studies, surveys

Sharing
- Publications in international & national journals
- Patents
- Books
- Technical guidelines
- Seminar and workshops
- Websites
- Social media

Using
- Training
- Research & innovation
- Technology transfer
- Vocational training
- Extension
- Policy briefs

Managing
- Center of agronomic documentation
- 3 scientific journals by IAV
- 1 scientific journal by ENA

Ambition
- KM strategy
- KM process
- Digitalisation
IAV journal REMAV: 44% of articles are submitted by authors of foreign origin, and REMAV references are cited 227 times by articles published in Scopus.
Documentation centers and e-learning platforms

IAV Hassan II:
- A national agricultural documentation center.
- 9000 thesis (3 000 thesis on internal platform, around 20 000 Training reports and more than 70 Books edited by IAV.
- Online access to several international databases such as AGORA
- An Integrated Library Management System (ILMS) help keep track of IAV documents inventory and loans.
- A production center for e-learning and multimedia tutorials.

ENAM:
- Training and support center for rural development which aims at producing of audiovisual media on educational materials and new innovations.
- Library
Facilities supporting innovation and technologies transfer

**ENAM**: Olive agropole, laboratory for diagnostic and control of crops pests and stored goods (PHYTOCONSEIL), laboratory for soil, plant and water analysis (FERTICONSEIL), Pedagogical Farm, etc.

**IAV Hassan II**: university veterinary hospital center, laboratories of soil, plant, food analysis, equine clinic, etc.
INRA has a portfolio of 232 varieties in the official register, of which 154 varieties are held by seed companies, i.e. 57.3%. Between 2009 and 2019, 31 new varieties were added to the Official Catalog, mostly cereals and legumes. New varieties are also protected for citrus and olive. With regard to crops with endemic and high added value, INRA has created six (6) varieties of argan tree and eight varieties of cactus for the regeneration of plantations ravaged by the cochineal.
Knowledge products


- Scientific books,
- reports,
- technical leaflets,
- scientific papers,
- communications,
- documentation about procedures, etc.
Knowledge sharing

Thematic websites

- Soil fertility map in Morocco (GIS Website)
  An innovative fertilization consultancy
- Climate Change Assessment (GIS Website)
  An integrated package of models which allows users to assess the impact of change on agriculture.
- CGMS (Crop Growth Monitoring System) (GIS Website):
  Weather monitoring, Crop growth modelling and Statistical methods.
KM at Extension institution: ONCA

School fields
Consulting Caravan
Study tour
ONCA extension channels and tools

- ONCA Website;
- Technical brochures, guides and Dalil elfallah- Flipbook;
- Broadcasting spots (TV and radio);
- ARDNA platform;
- Interactive platforms: "knowledge base" and "face agri";
- Info center online;
- Social media, youtube, ONCA TV;
- Extension caravan
- Online trainings on the platform to 650 agricultural advisers and managers.

**Story telling:**
capitalize on the farmer experience and the context to capture *tacit knowledge* and transfer experiences and emotions through success stories and good agricultural practices. ONCA plans to produce 19 videos
Challenges to KM in Moroccan agricultural institutions

Although higher education and research institutions are making efforts in the area of KM, they are facing several challenges:

- Lack of vision and KM strategy at national level;
- Coordination between institutions is not formalized regarding KM (including with universities & private actors);
- Absence of initiative to capitalize on Tacit knowledge;
- Missing KM appropriate tool and process;
- Limited number of dedicated staff to manage knowledge
- Needs of training programs on KM and incentives
- Low attention is given to Copyright and Intellectual propriety;
- Unregular links with end-users;
- Low dedicated budget to implement KM.
The contribution of SKIM to Moroccan KM in agriculture

- Awareness and trainings on KM
- Best practice sharing (MEL tool/INRA)
- Strategy workshop on knowledge management in agricultural sector in Morocco (July 2021)

The Moroccan consortium of agricultural institutions namely IAV Hassan II, INRA, ENA and ONCA met to coordinate their vision and to plan future common actions aiming at improving their internal KM and KM impact at national level in the framework of the new green generation policy for agricultural development in Morocco.

- KM agreement between IAV, INRA, ENA and ONCA
Morocco Learning routes: innovation chain

CS1: Institutional arrangements KM

CS2: Promotion of Local Products: APIA

CS3: Bridging the gaps between academic research and practical farming

CS4: Genetic Resources Management

CS5: Community Engagement & Entrepreneurship

CS6: Cluster/aromatic and medicinal plants
What to learn through the CS?

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<tr>
<th>CS</th>
<th>Visit</th>
<th>Points to highlight?</th>
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</table>
| 1  | Institutional arrangements in knowledge management for Moroccan agricultural sector | - Difference of KM according to institution type?  
- Digital tools for KM?  
- How to collaborate to improve KM at national level? |
| 2  | Successful Operation of APIA, A National Company for the Promotion of Local Products: Notably Honey and Cosmetics products | - How to succeed a new business at local level?  
- From local to international?  
- What is the strategy of APIA in terms of product innovation?  
- what is the flow process of KM in a big company such Apia?  
- is there links with academic actors? |
| 3  | Bridging the gaps between academic research and practical farming | - What are the successful factors for the farm growth?  
- Who is ensured the KM and links with universities and research centers?  
- How do you insure your visibility?  
- What is the process of adopting new technologies or farming processes? |
| 4  | Genetic Resources Management Strategy for Sustainable Agricultural Development in Morocco | - What is the Moroccan strategy for genetic conservation?  
- How is managed the bank gene center?  
- How is valorized the genetic collection stored in this bank?  
- What links with international gene banks internationally? |
| 5  | Community Engagement and Entrepreneurship in agriculture: Scaling up a sustainable ecosystem | - How is community engagement operated within the university?  
- What are the key factors of success for the innovation strategy implementation?  
- What are the means to ensure Sustainability in agriculture within the university plans?  
- Startup experience in incubation? |
| 6  | Development of the value chain of the aromatic and medicinal plants in the Marrakech-Safi region | - What is a cluster and how does it work?  
- Links with cooperative and academic sector?  
- What is the main impact of the regional and national level?  
- What are the challenges to overcome for a cluster? |
Morocco learning routes CS meeting the SDGs

No poverty: Support to Cooperatives & Community engagement

Zero Hunger: New farming production

Quality of education: Agricultural Higher education system

Gender equality: Women cooperative

Climate action: Biodiversity conservation

Industry and innovation: Entrepreneurial activities

Decent work and economic growth: Valorisation of local product and local companies

Figure 1: Morocco learning routes meeting the UN SDGs
## Cross-table of Cases and Thematic Areas

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<tr>
<th>Case study</th>
<th>Institutional KM process</th>
<th>Natural Resource Management</th>
<th>Agriculture and livestock productivity</th>
<th>Gender and youth</th>
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