



# Research, innovation and technology transfer in the agri-food sector in the Western Balkan countries/territories: Phase II

North Macedonia

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# Introduction

- The basic environment for research, innovation and technology in North Macedonia is slightly improving, but much work lays ahead for the agri-food sector in order to reach the technological developments in the EU Member States
- Better understanding and improving of the gaps and opportunities in the transfer of research, innovation and technology in the national agri-food sector is necessary so to learn more about its agri-food research capacities, advisory and extension services and its agri-business sector
- The acquired knowledge will provide a groundwork for evaluating the possible extent of innovation and knowledge transfer in agri-food sector, that would contribute in tailoring the IPARD or/and Horizon Europe programmes to the national agenda for agri-food sector development

# Methodology

## 1. Interviews

- **Semi-structured questionnaire:** Composed according to the theoretical framework for AKIS (SKAR AKIS, 2012; 2016; 2019) and Innovation Spiral (Zaalmink *et al.*, 2008)
- **Pre-interview process:** Interviewees contacted prior to the interview to explain them the purpose of the project and schedule the interviewing
- **Interview process:** Mostly telephone interviews during December 2020, except one respondent with face-to-face interview and home-filling of the questionnaires by the national experts
- **Sample size:** 6 respondents (representatives from MAFWE, NFF, NEA, AI, FASF)
- **Data analysis:** Descriptive analysis based on the proposed theoretical framework)

## 2. Case study

- **Case data collection:** Started with the interview process and desk research
- **Case selection:** National experts selected four cases, and upon studying these cases, the project's consortium team selected the case 'Aquaponica' for further elaboration
- **Case elaboration:** Several internet sources were reviewed to collect the necessary data – FITR's documents, media, fan pages and internet pages; case elaborated following the theoretical framework of Innovation Spiral (Zaalmink *et al.*, 2008)

## 3. Focus group discussion

- **Focus group meeting:** Organised on March 19 2021 so to present and discuss four case studies (MK, SRB, EU – Rondeel and Herdsman)
- **Participants:** Prof. Kasimis (overview of cross-country results), representatives of MAFWE, NEA, NFF and AI (discussants), national experts (moderators), SWG (technical support)



# Interview results

## KEY FUNCTION 1: ADVISE, EDUCATION AND RESEARCH

### 1. Advise

- NEA is the formal advisory service, but broad advisory and information sharing network within AKIS is missing
- Need to complete the public discussion on proposed Agriculture Advisory Law (since 2018)
- Missing human capacities of NEA, and need for further promotion and development of NEA
- Possibilities to introduce new advisory structures, such as private advisors, to be explored

### 2. Education

- Missing contemporary study programmes in collaboration with all AKIS members (stakeholders) that will be tailored to the country's needs; more practical studies and internship programmes; vocational studies (when creating curricula, it should be considered that the demand on the labour market is limited since the country is very small)
- Too many education institutions with similar educational programs that are competitive between each other

### 3. Research

- 5 strategies that target the agri-food research development, but their implementation is weak
- Missing contemporary, straightforward and up-to-date database on domestic research; missing funding for professional development of domestic researchers; missing collaboration between research institutions, and between them and other stakeholders (i.e. demonstration farms)
- Research investments in the country need to be increased in line with the market demand.
- Innovative projects in targeted agricultural sub-sectors require institutional and financial support

# Interview results

## KEY FUNCTION 2: KNOWLEDGE DIFFUSION THROUGH NETWORKS

1. Level of cooperation and interaction between different stakeholders with respect to knowledge exchange for RITT
  - Missing formal network for active collaboration of all stakeholders in the agri-food sector with possibilities for online networking through different tools and platforms
  - Missing stimulation system is necessary to motivate the stakeholders to take active role in the network
2. The extent and role of technology and innovation adoption from abroad in different phases of the process of transferring R&D into practice
  - The innovation process is generally a weak segment in the national agri-food sector, and the most of domestic innovations rely on inventions created abroad (either adopting the whole innovation from abroad or getting inspiration from innovations developed abroad)
  - The funds available from the Fund for Innovation and Technology Development (FITR) are rarely issued in the agriculture sector
3. Specific connections/collaborations between domestic and international institutions
  - NEA, MAFWE, NFF: Members of formal networks from WB and EU region
  - FASF, AI: Informal networking, mostly on individual basis, with WB and EU education and research institutions

# Interview results

## KEY FUNCTION 3: DEVELOPMENT OF AN AKIS VISION

### STRENGTHS

- Existence of formal institutions and bodies.
- Existing strategies and legal structure.
- Existence of informal networks since the country is small.
- Relatively good coverage of NEA for disbursement of know-how.
- Tradition in agriculture and processing.
- Good cooperation between producer's organization and researchers and educators.
- Good regional cooperation.
- Existing staff with experience.
- Existence of Multi-sectorial Actors.

### WEAKNESSES

- Weak enforcement of law; Weak performance of Governmental institutions in terms of unity, and Inactive policy makers.
- Lack of finance.
- Lack of research staff, experts and their competences in certain fields.
- Inactive business sector in regard to cooperation with other stakeholders.
- Weak understanding of the common challenges and priorities for improvement; Informal AKIS system; Weak infrastructure to support the AKIS system functioning.
- Not well structured and lack of communication between the ministries; Unregulated authority of the faculties and institutes, and other institutions that often compete with their activities and are not complementary; Absence of inter-sectorial coordination.
- Weak technical equipment; Lack of innovative approaches to work.

# SWOT

# Interview results

## KEY FUNCTION 3: DEVELOPMENT OF AN AKIS VISION

### OPPORTUNITIES

- NATO and EU accession may offer political, social and economic stability.
- Available EU funds, such as IPARD, Horizon, etc. and other foreign support.
- Internet (easy access to information and a space to create a research network – platform).
- Available EU funds, such as IPARD, Horizon, etc. and other foreign support.
- NATO and EU accession may offer political, social and economic stability.
- The possibilities to develop niche markets.
- Small country.

### THREATS

- Political and economic instability and lack of political will to enhance research and innovation process in the country; Corruption; Political unwillingness to strategically support innovation and technology development in the agri-food sector and to create market opportunities; Inefficiency in implementation of the key strategic documents so far.
- The ‘brain drain’ of young people; Depopulation of the rural areas and low motivation and interest for involvement of young people in agriculture (young people are the largest driving force for innovations).
- Small-scale and dispersed agriculture (too many beneficiaries of advises and support, less productivity and efficiency);
- Continuous decrease of competitiveness and productivity.
- Slow adaptation speed of AKIS and RITT to new developments and challenges.
- Large competition from the other international institutions in other EU and non-EU countries.
- Poverty in rural areas and most of the urban areas.
- Not protected Intellectual Property rights (legal uncertainty over the patent rights).

# SWOT

# Interview results

## KEY FUNCTION 4: ENTREPRENEURAL ACTIVITIES AND EXPERIMENTS

1. The role of the private sector/businesses in transferring technology and innovation in the agri-food sector
  - Private sector is leader in innovations in the country, which is market-driven, but it is far less innovative than the European private sector
  - Large companies mainly adopt innovations from abroad, and small ones are not motivated to innovate due to the high risk
  - Legal constraints for public-private cooperation and demanding tender procedures
  - Voucher scheme by FITR to support public-private partnership in the process of invention
2. Up-take and use of green and clean technologies and innovation for sustainable and environmentally friendly agri-food in the private sector via RITT
  - Driven by donors, but projects rarely are sustainable after the termination
  - Slight progress in the area of renewable energy sources and photovoltaic stations in remote areas, but still the implementation system is complicated due to regulative imposed by EVN; increased number of eco-vehicles supported by FITR; use of ICT in agriculture (early monitoring and prevention system for decrease on the use of pesticides etc.)
  - Green Climate Fund with the support of FAO: The objective of the Fund is to strengthen the country's capacities to access climate finance, to raise awareness, develop capacities and engage all relevant stakeholders at national and local level for climate adaptation and mitigation

# Interview results

## KEY FUNCTION 5: MARKET FORMATION

1. External factors affecting the enhancing RITT in the agri-food sector
  - Positive influence: EU accession; Negative influence: Economic and political situation; Positive and negative influence: COVID pandemic
  - Evaluation: No formal ways to evaluate these factors, at least in formal and regular manner
2. Demand-side factors for the transfer of technology and innovation
  - Demand is only partially driven on private requests; Public demands are elaborated on an ad-hoc basis since appropriate system does not exist
  - RITT demand-driven factors are mainly done on individual basis and are not part of the strategic goals of the country
3. Supply-side factors for the transfer of technology and innovation
  - Supply-side factors have a significant role and in most instances these factors are market driven
4. Relevant domains of technology and innovation which have potential in the agri-food sector
  - Mechanisation; IT and robotics; Green agriculture and architecture; Integrated production; Waste, water and land management; Marketing and export
5. Comparative advantage of the country in relation to other countries/regions
  - Innovations to support traditional food and its recipes



# Interview results

## KEY FUNCTION 6: CREATION OF LEGITIMACY

1. Incentives/disincentives present in the system
  - Limited access to credits and monetary resources
  - No market incentives so to support generation and transfer of innovations and technology
  - Regulatory framework exists, however the implementation of those is weak
2. IPARD programme's role in speeding up innovation
  - More oriented on basic mechanization such as tractors, and not so much on implementing new technologies nor generating innovations
  - At some extent, IPARD have helped in application of some new technologies in the agri-food industry and improving of the market efficiency by restructuring and upgrading the sector
  - IPARD should stimulate innovations and technology transfer by supporting collaboration between the agri-food sector and the research community, but first the necessary infrastructure should be provided by the Government
3. Constraints and opportunities for the transfer of green and clean technologies
  - Government plans set of measures for waste management and land re-cultivation, however there is a lack of financial sources and inactive policy makers
  - Possible areas of development: Bio-fuel from different residues, solar energy, organic production etc.

# Interview results

## KEY FUNCTION 7: RESOURCE MOBILISATION

1. The governance arrangements for transferring research and development into practical applications
  - Weak and missing governance arrangements
  - MAFWE is the most responsible for setting the policy and regulating the advisory services; MON is responsible for the developing the research and education; Ministry of Education is setting the Law for internship
2. Modes of governance for transferring research and development into practical applications
  - The regulatory environment is not supporting the transfer of research and development into practice since there are many Ministries involved in the process that are not coordinated,
  - No strong political will to support research and development processes
3. Level of governance arrangements for transferring research and development into practical applications
  - Lack of proper coordination and communication between state institutions at national level, even weaker at regional level
  - The private sector is organised in the following arrangements for transferring research and development into practical application: federations, associations, clusters and chambers of commerce
4. The role of IPARD and other programmes in promoting innovations and technology transfer
  - IPARD is the most important and stable instrument, other EU programs are not constant

# Interview results

## SPIRAL OF INNOVATION

- Lack of inspiration and weak capacity for planning, along with lack of finance, are obstacle for starting a project with sound idea
- Even when initial ideas and inspiration are present, it has been emphasized that innovation still underperforms in the development, realization and embedding of the innovation phases, which are perhaps the weakest parts in the spiral
- It is also necessary to connect all the phases and find means to motivate AKIS actors for a more active involvement in research and innovation
- The initial idea, inspiration and planning should be two-folded (bottom-up: coming from the producers and processors, and top-down: coming from the Government to the related stakeholders/actors)
- RITT in the agri-food sector in North Macedonia should be also further stimulated by supporting young people during their high-school education, and preferably in primary and pre-school education



# Focus group results

SUMMARY OUTCOMES ON THE CASE STUDIES (2 WB + 2 EU)

## 1. MK case

- Initiated and established only when supported by external founding (in this case, FITR) and sustainable only upon duration of the project
- Missing inclusion of all relevant actors and segments in the project
- Use successful cases as positive examples and inspiration to other farmers
- Risks: if this case is accepted by the rural farmers and if the supply overreaches the demand, at some point, since the country is very small
- This innovation is not eligible under IPARD => FITR, so far, is the only institution to financially support innovations in the agri-food sector (IT improvements are hit, instead of more concrete projects for solving real, practical problems in the agriculture)

## 2. SRB case

- More developed system and network for development of innovations than MK

## 3. EU cases

- Impressive innovations that require are a solid network of actors and a huge funds to support the innovation process



# Recommendations (1)

- To **create a sustainable advisory system** with clearly defined roles (competencies, rights, obligations) of all stakeholders/actors in the system
- To **integrate all stakeholders/actors in the system** and enable environment for easier communication and information sharing
  - To **build collaboration** networks and multi-actor partnerships, cooperation, capacities and knowledge
  - To **coordinate responsible institutions** in supporting innovations
  - To **develop new models of cooperation** between the higher education institutions and other stakeholders in AKIS
  - To **develop a system of good practise exchange** for inspiring innovations
  - To have a **greater support for joint participation in research projects**, innovations development and technology transfer between all stakeholders/actors, to **increase the networking and cooperation** of the national institutions with their twinning regional institutions, etc.)
- To **strengthen and profiling the current advisors' role** in the interactive and innovative processes
  - To provide **institutional support to the national advisory service** to strengthen its capacities
  - Further assistance and investment in **human capacity building** of the current extension services both in number and in improving the advisors' know-how - continuous training and upgrade
  - To involve **active participation of the existing advisory services in the research and education**, especially when it comes to the sustainability of small farms and the agricultural sector etc.

# Recommendations (2)

- To introduce **certification of the advisors** and **identifying the advisory service providers**
- To **establish firm collaboration between the national and international education and research institutions** in order to share knowledge and experiences and be aware on the stage of progress in the country
- To **form a working group at the MAFWE** for innovations development in the agri-food sector, as a platform to discuss the settings to support the innovations
- To **develop proper governmental policies and measures**, but also **create solid grounds (infrastructure)** to support the AKIS operations and role in RITT
  - To **introduce and define well programs and instruments for farmers** which would be oriented on implementing new technologies and generating innovations
  - To **strengthen the support in structural measures**, predominantly in infrastructural projects that should ease the innovation processes
  - To **simplify administrative procedures and availability of shared databases** between institutions and solving property rights issues
  - To **complete** the process of public discussion of the proposed **Agriculture Advisory Law** - in procedure from 2018 onwards etc.)

# Recommendations (3)

- Government initiatives to **implement national policies, sustainable strategies and plans**, local action through municipal pilot projects, and strengthening public counselling and consultation;
- To **enable stable economic and financial infrastructure** to support business activities and investment in the agri-food sector. For instance:
  - To **create a special fund for Research and Innovation** through the MON and MAFWE to support innovations and technology transfer through Government funds, and a **special programme in agriculture** under the Fund for Innovations and Technology Development (FITR) to support innovations
  - To **introduce innovative finance models** that involve different chain actors, including the national development bank and private banking institutions etc.
- To introduce **appropriate educational programs in both formal and non-formal education** for raising the level of awareness and knowledge on the research and innovation in the agricultural sector involving the private and advisory sector
- To **introduce regular assessment and monitoring** the effects on the innovations and technology development in the agri-food sector
- To **create competitive advantages for the agri-food sector** in order to exploit the benefits of the natural resources in the country in sustainable manner, with a focus on developing niche markets (traditional food and recipes), linking the niche markets with rural and agro-tourism (gastro tourism), organic production, smart villages, etc.

# Thank you for your attention!

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