



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

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Introduction remarks

- Introduction of new technologies and innovations in agricultural production depend on the work of several ministries at both the federal (entity) and cantonal levels.
- At federal level it is: Federal Ministry of Education and Science and the Federal Ministry for Encouraging Development, Entrepreneurship and Crafts
- Real activities have cantons that have their own laws on administration and ministries
- There is no Strategy for the development of Science at the federal level , (there is just proposal that never adopted because of proposal 1% of GDP for implementation)
- The budget of the Federal Ministry of Education and Science for the field of science in the last few years is around 1.3 million Euros (about 0.1% of the total annual budget, or 0.01% of total GDP)
- According to inventory of all relevant agri-food research/education capacities in FBiH exist:
 - Research institutions (4)
 - Faculties (5)
 - Advisory and Extension Services (10 cantonal services as a part of MA)
 - Business incubators (11)
 - Clusters (5 clusters under IFAD project)
 - Secondary agricultural schools (11)

Methodology (1)

- Interview of AKIS actors (8)
 - Federal Agricultural Institute (1)
 - Advisory and extension services (1)
 - Chamber of Commerce of FBiH /Department for agriculture (1)
 - FMAWMF (1) and FMES (1)
 - Academia/Faculty of agriculture and food sciences (2)
 - National expert (1)
- Questionnaire
 - Key function 1: Advice, education and research
 - Key function 2: Knowledge diffusion through networks
 - Key function 3: Development of an AKIS vision
 - Key function 4: Entrepreneurial activities and experiments
 - Key function 5: Market formation
 - Key function 6: Creation of legitimacy
 - Key function 7: Resource mobilization

Methodology (2)

■ Case studies

- Proposed 4 case studies from Federation of BiH, selected 1 one (Cultivation of blueberries on infertile/degraded soils using plant pots)
- Content of case study:
 - General description of case study
 - Approach and characteristics of RITT (the mechanism of collaboration and interaction between actors/entities),
 - SWOT analysis
 - Lessons learned on RITT

■ Focus group meeting

- On line meeting (ZOOM, 12/03/2021 and 18/04/2021)
- Presentations of interview results and conclusions based on the AKIS' 7 key functions framework and elaboration of 2 EU and 2 WBC cases of success factors and barriers in RITT
- Discussion on:
 - Opportunities to improve cooperation and interaction between different entities of the agri-food research, development and knowledge-based system in the WBC
 - The most relevant domain/fields of technology and innovation potential in the agri-food sector where the respective WBC has comparative advantage
 - Opportunities to improve green and clean technology and innovation transfer in the agri-food sector
 - Closing session on policy recommendations to enhance RITT in the WBC



Key function 1: Advice, education and research

- Role of advisory service in enhancing RITT
 - Agricultural advisors in cantons and municipalities have to be engaged exclusively in advisory work, full time,
 - Existing advisory services need to be strengthened both in terms of staff (number of experts - employees) and materially (through equipment including IT),
 - Central advisory service at the level of FMAWMF need to introduce trainings for advisors aimed to improving and applying research, innovation and technology transfer to agricultural holdings,
 - Advisors should be financially stimulated if they directly participate in research projects, introduction of innovations and technology transfer.
- Role of research in enhancing RITT
 - It is necessary to change the paradigm of "*scientiae pro scientiae*" to "*ad applicationem scientia*"
 - Significant financial support from the authorities is required, and there is still not enough understanding among decision makers.
 - Political will at the BH' state level is needed to finally make IPARD funds available and, thus, provide the necessary funds for the improvement, among other things, of RITT in the agricultural sector.
- Role of education in enhancing RITT
 - To ensure significantly higher participation of practical (demonstrative) education in secondary and higher education in the field of agriculture and food technologies;
 - The education system should offer to pupils and students a range of research and development programs and projects in which they can participate;
 - The education system should encourage and reward pupils and students who are involved in research and innovative projects

Key function 2: Knowledge diffusion through networks

- Cooperation and interaction between agricultural advisory services, research community, enterprises (economy) and policy makers in RITT and the effects of their interaction and synergy practically does not exist.
- Sporadic cases of cooperation exist as result of funding either from domestic sources or through international projects, and usually end after the end of project activities (there is no sustainability).
- There are several examples of cooperation of domestic (Federation of BiH) institutions with foreign countries.
 - FMAWMF, through the Ministry of Agriculture of Germany with German research institutions
 - FMAWMF was included in the SWG where there were innovative projects related to both institutional development and improvement of agricultural policy
 - The Federal Institute of Agriculture has cooperation with Croatia, Italy, Poland and Serbia through a twinning light project of cross-border cooperation
 - Federal Chamber of Commerce emphasized the importance of cooperation with international governmental and non-governmental organizations (USAID, SIDA, TIKa, UNDP) and individually with governments such as USA, Turkey, Czech Republic and EU bodies.

Key function 3: Development of an AKIS vision

- The Agricultural Knowledge and Information System (AKIS) in the FBiH is quite underdeveloped, which is reflected primarily in the weak connection and interaction of all actors in the agricultural sector.
- AKIS in the FBiH cannot be considered a formalized system (there is no clear legislation and regulatory obligations of some of its actors like NGO)
- Some of the interaction between different AKIS actors in the Federation of BiH can be described as follows:
 - There is a medium level of interaction between processors and farmers due to the strong interest of processors in raw material quality, but, nevertheless, domestic processors often prefer to import rather than to work on improving the knowledge and technology of farmers,
 - The interaction of farmers with the agricultural advisory service is very low, but there is the greatest potential for fast and strong progress among these two actors,
 - Interaction of the education system and research institutions is very low, but there is space for improvement in by mean of changing approach both by educational and scientific research institutions.

Key function 4: Entrepreneurial activities and experiments

- Economically stronger subjects of private sector, primarily in the food industry, have a certain role in technologies and innovations transfer, as they occasionally invest limited funds in new products development.
- Examples of public-private cooperation from the aspect of RITT are rare, often limited to basic service engagements or to informally seeking the advice of public sector researchers to solve a specific technological-production problem.
- The public sector is quite passive and should be far more active both in creating a supportive environment and in connecting key players in generating innovation and disseminating new technologies on farms.
- General awareness about the need for greater participation of green and clean technologies, and related innovations for sustainable and environmentally friendly agriculture and food production in the private sector through RITT is relatively low and mainly refers to the introduction of organic production.
- The public sector is aware of the need to preserve the environment and apply clean technologies for sustainable agricultural development, but there are not the necessary measures and adequate budgetary support for this purpose.
- Educational institutions (faculties) covering the field of agri-food sector adapt their curricula with a sustainable approach in food production either through the development of new modules or the introduction of new study programs.

Key function 5: Market formation

- External factors such as economic situation or the process of BiH's accession to the EU do not play a significant role in strengthening the RITT in the agri-food sector.
- Economic situation in FBiH does not allow larger budget allocations to support the development of the sector (investment support, dissemination of knowledge and introduction of new technologies, establishment and strengthening of necessary institutions), which significantly hinders the development of the agri-food sector.
- Due to the lack of political will, BiH does not use all possibilities offered by IPA (IPARD) funds, although existing projects still have a positive impact on improving investment and introducing innovations and new technologies in some farms and processing companies.
- The most relevant fields of technology and innovation that have potential in agri-food sector in the Federation of BiH are those in the domain of increasing productivity in practically all sectors of primary agricultural production

Key function 6: Creation of legitimacy

- There are a number of factors that can drive the generation and transfer of innovation and technology.
 - New competitive products can be a stimulus to invest in new technology.
 - Customer requirements and needs (new consumer habits) can be the basis for creating new products and approaches in marketing and distribution, while regulations related to state incentives for investment should prioritize innovative solutions or new products development.
- International community significantly contribute to RITT in BiH/FBiH (EU4 Agri and EU4 Business programs, international organizations like USAID, SIDA, IFAD, World Bank working in the agri-food sector, although their focus is more on production improvement and institutional strengthening and less on innovation and the transfer of new technologies.
- The most important obstacles for the transfer of green and clean technologies are:
 - High costs associated with the establishment and implementation of green and clean technologies,
 - Lack of legal framework with clear and strict environmental requirements standards and
 - Insufficiently developed awareness of the importance of research and development innovations in general in the field of green technologies.

Key function 7: Resource mobilization

- Governance arrangements for the transfer of research and development into practical application do not exist, or they are in very onset.
- There are no clear rules for the transfer of research and all actors involved are left to act independently, which leads to the lacks of synergy and systematic action in this field.
- The spiral of innovation
 - The realization phase as the biggest barrier (this phase requires financial resources) followed by the development phase and the planning phase.
 - The barrier exists at the very beginning of the process - the initial idea (due to conservative way of thinking – opinion of some participants)
 - No mechanisms have been built to enable the dissemination of innovations and new technologies.
 - There are no state (entity) support measures, like institutional activities that would prefer the introduction of innovations in practice on a large number of farms. Therefore, there is not an appropriate environment for the development and implementation of innovation spiral.

Recommendations (1)

- Agricultural advisory services as crucial institutions in the transfer of new technologies to farmers need to be significantly changed and more functional, both organizationally and in terms of staff and equipment. The main task of this service is transfer of knowledge to farmers, not the administration of agricultural policy and the implementation of direct payments. The current organization of these services imposes the need for changes that must be radical and involve the coordination of both levels of government - federal and cantonal.
- Raising awareness about the importance of research, innovation and new technologies for the development of society itself and for the survival and development of the economy
- Increase budgetary transfers and create programs for scientific research in scientific and research institutions by creating adequate agricultural policy measures (development and research measures) at both levels of government (federal and cantonal)
- Networking and better coordination between all participants within AKIS is necessary,
- Significant activities aimed to improve legislation supporting RITT are needed (formalization of AKIS, Law on Agricultural Advisory Services, etc.)

Recommendations (2)

- Networking and greater cooperation with international scientific research and educational institutions and involvement in their projects is a way to raise the level of knowledge of domestic institutions. This is especially refers to huge research projects like Horizon 2020.
- Green and clean technologies have become a priority in EU strategic documents. BiH, as an export-oriented country towards the EU, will have to adapt to new standards as soon as possible, which imposes the intensification of the introduction of new practices and technologies related to sustainable agricultural production.
- Connecting with leading companies engaged in the production of inputs, but wholesale and retail chains too,
- Greater scope of research and monitoring of consumer needs and the introduction of innovation, development of new products and application of new technologies is a way to adapt the offer to market requirements.
- Further engagement in seeking and achieving political will at the level of the state of BiH to become eligible for IPARD funds that can be the basis for the improvement of RITT.



Focus group results and recommendations

- Discussion of 2 EU and 2 WBC case studies
 - EU case study – Teamwork for farm advice (Latvia)
 - EU case study – Herdsman+ (Scotland, England)
 - Montenegro case study – The Honey house
 - BiH /Federation BiH case study – Cultivation of blueberries on infertile/degraded soils using plant pots
- Some additional recommendations
 - Raising public awareness about the importance of RITT
 - More rational use of existing funds
 - Changing the current model of individual ministries financing into a model of inter-ministerial approach to financing research projects
 - Put more focus on technology transfer compared to research and innovation
 - Strengthening associations of agricultural producers who will clearly articulate the requirements for new technologies and knowledge



Thank you for your attention!

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