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Integration of science and innovation into regional priorities for enhancing agrifood system transformation: Progress in implementing the action plan in Europe and Central Asia

I. Introduction

1. Science and innovation are an essential part of finding solutions to complex problems, such as addressing agricultural productivity and sustainability concerns while increasing farmers' incomes and improving nutrition. Both are driving forces for formulating effective evidence-based policies, greening and accelerating the agrifood system transformation, building resilience, optimizing value chains, and ensuring food security and nutrition while leaving no one behind.

2. The FAO Strategic Framework[1] identifies science and innovation as having an extensive transformative capability and underlines, in particular, the potential of emerging technologies. Nevertheless, it also recognizes that science and innovation can present substantial risks, such as reinforcing inequality and market concentration or contributing to the degradation of natural resources.

3. To strengthen the use of science and innovation in FAO's technical and programmatic interventions and normative guidance, the FAO Science and Innovation Strategy[2] (referred to in this text as the "FAO Strategy") was endorsed in 2022. It acknowledges the centrality of science, technology and innovation for agrifood systems transformation.

4. The FAO Strategy includes a number of guiding principles that aim to ensure that FAO harnesses science and innovation in alignment with the Sustainable Development Goals, including the five interdependent principles that underscore the 2030 Agenda for Sustainable Development: people, planet, prosperity, peace and partnership. The scope of the FAO Strategy covers all sectors and areas of agrifood systems; natural, social and economic sciences; all types of innovations, including technological (digital

[1] Paragraphs 36–38 of the FAO Strategic Framework focus on innovative technologies and approaches. For more information, please visit https://www.fao.org/3/cb7099en/cb7099en.pdf.
[2] The FAO Science and Innovation Strategy is available online at http://www.fao.org/3/cc2273en/cc2273en.pdf.

and non-digital), social, policy, financial and institutional; systemic approaches (such as sustainability science) and interdisciplinary approaches (including the knowledge of Indigenous Peoples and small-scale producers).

5. FAO aims to synthesize scientific knowledge to learn and draw lessons and strengthen science-policy interfaces to enable evidence-based decision-making and greater policy coherence. It provides support to Members to harness innovation, ranging from digital tools and data science to a diversity of social, policy, financial and institutional innovations that are crucial to triggering the agrifood system transformation.

6. In the Europe and Central Asia region, science and innovation play an indispensable role in generating and promoting innovative technologies to produce more food with fewer resources in a changing climate and to accelerate agrifood systems transformation to ensure food security and nutrition.

7. Following the outcomes of the Regional Science and Innovation Consultation held in 2021, the action plan for the implementation of the FAO Science and Innovation Strategy in Europe and Central Asia (2022–2025) is embodied in the global action plan for the FAO Strategy to enhance the capacities of science, technology and innovation across the four regional priorities:

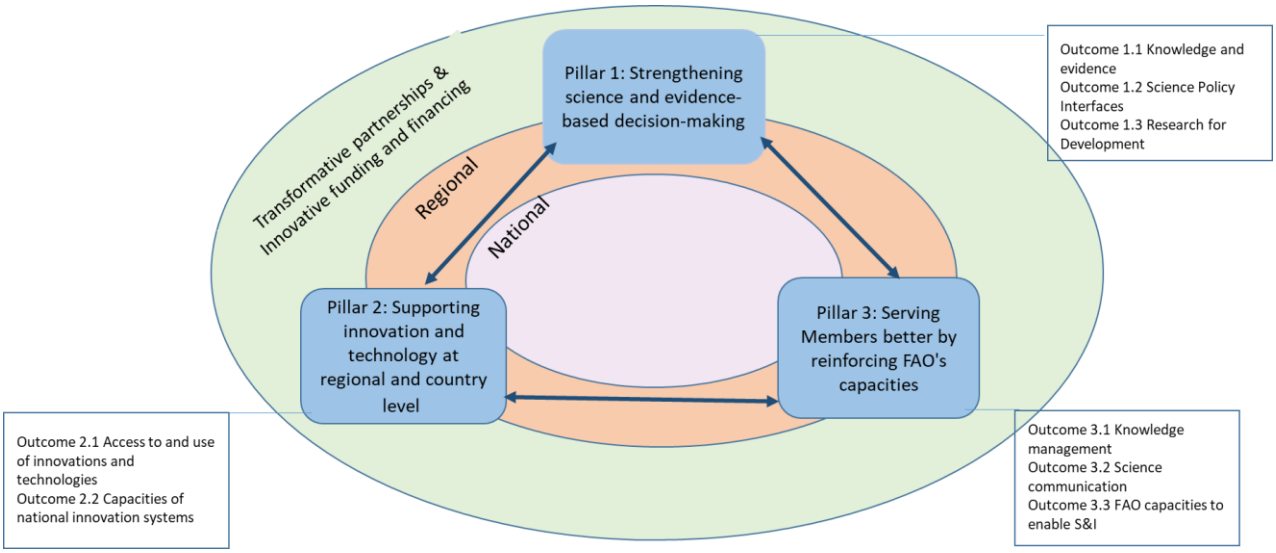
> Priority 1: Formulating effective policies, promoting innovation and digitalization, and facilitating rural livelihoods for smallholders, women and youth.
>
> Priority 2: Food systems transformation promoting nutrition-sensitive value chains and healthy diets through the alignment of trade, food safety and sanitary and phytosanitary policies, facilitating One Health.
>
> Priority 3: Promoting sustainable natural resources management and facilitating resilience in agriculture, forestry and other land use sectors, including mitigating and adapting to climate change.
>
> Priority 4: Addressing food insecurity and reducing all forms of malnutrition.

II. Action plan for the implementation of the science and innovation strategy in Europe and Central Asia

8. The action plan provides a common framework for FAO action in Europe and Central Asia at the country and regional levels while working towards the overall goal of ensuring progress on agrifood systems transformation. It aligns with the FAO Strategy on Climate Change and the FAO Strategy on Mainstreaming Biodiversity across Agricultural Sectors and will be implemented in a coordinated manner with their respective action plans, as well as with the Regional Gender Equality Action Plan for Europe and Central Asia.

9. The action plan follows the structure of the FAO Strategy with three pillars, nine outcomes and two enablers (transformative partnerships and innovative funding and financing). Under each of the outcomes and enablers, the action plan introduces several outputs to be achieved through regional and country-level actions rooted in the key areas of work, reflecting FAO's priorities for supporting Members in harnessing science and innovation, as shown in Figure 1.

Figure 1. Action plan for the implementation of the FAO Science and Innovation Strategy in Europe and Central Asia

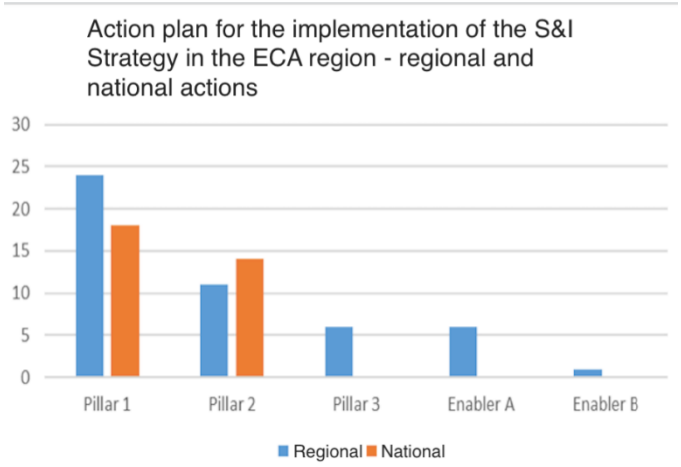


10. The ECA action plan has 80 actions at regional and national levels, including enablers, as shown in Figure 2:

- Fifty-eight percent of the actions are in Pillar 1 on strengthening science and evidence-based decision-making, with most of the actions at the regional level.
- Thirty-four percent of the actions are in Pillar 2 on supporting innovation and technology, with most of the actions at the country level.
- Eight percent of the actions are in Pillar 3 related to serving Members better.

11. As a living document covering four years (2022 to 2025), the action plan will be updated as needed to reflect arising needs, opportunities and challenges.

Figure 2: Regional and national actions



12. The action plan is a dynamic tool to enable the transformative potential of science, technology and innovation while strengthening institutions, governance and regulatory frameworks and reinvigorating partnerships.

13. In this context, the main actions of Pillar 1 include:

- Collect and analyse data, knowledge and practices on the bioeconomy and sustainable management of agricultural inputs.
- Establish a national animal identification, registration and traceability system in Georgia and North Macedonia.
- Publish the 2022 *Regional Overview of Food Security and Nutrition*.
- Foster intersectoral and multidisciplinary work to anticipate, prevent, detect and control plant or animal pests and diseases and to address risks, including the use of the FAO Outbreak Costing Tool (OutCosT).
- Establish and promote the Regional Technical Platforms on green agriculture, digital villages and land degradation neutrality.
- Develop analysis of the socioeconomic impacts of food self-sufficiency policies in Central Asia and Türkiye.
- Promote joint research projects and capacity development actions on green agriculture and food system transformation with universities, research centres and non-governmental organizations.
- Enhance interstate dialogue, multicountry collaboration and information sharing to promote investment for the scaling up of integrated natural resources management in the countries of Central Asia.
- Empower national research institutes and education entities in the Republic of Moldova to become reliable partners of smallholder farms in providing extension services and knowledge sharing.

14. The component of actions to support innovation and technology at the regional and country levels (Pillar 2) include actions to:

- Create and promote a regional catalogue of innovative green agricultural practices.
- Improve agricultural extension and advisory services by providing innovative services and training through farmer field schools and partnering with research and educational institutions in Georgia and Kyrgyzstan.
- Support the democratization of technological solutions and the development of digital capacities for small-scale and family farmers through the Digital Villages Initiative.
- Develop and promote technological innovations, such as bioremediation technology for soils contaminated with obsolete pesticides in Kyrgyzstan and a deep ripper in Uzbekistan, with a new device (tube) to improve soil structure, drainage condition and crop production and reduce soil salinity.
- Support the development and piloting of an optimal irrigation model in Azerbaijan by applying AquaCrop software.
- Disseminate information and analysis of digital initiatives and good practices involving the use of information and communications technologies that are advancing the agrifood sector in the region through the AgriD open database.

15. To serve Members better, the main actions under Pillar 3 focus on:

- conducting studies and presenting the findings in a coherent and inclusive way, including through journal/conference publications, to inform a wide range of stakeholders;
- enhancing the capacity of the FAO Regional Office for Europe and Central Asia as a broker for actionable knowledge and evidence that builds on science and the traditional knowledge of farmers and Indigenous Peoples; and
- Strengthening the capacity of the FAO Regional Office for Europe and Central Asia to facilitate science-policy interfaces and inform policymaking by providing independent, comprehensive and evidence-based analysis and advice through a transparent and inclusive process.

16. The action plan also includes action enablers to strengthen transformative partnerships and multisectoral collaboration with research organizations, academia, non-governmental organizations and related directorate generals of the European Commission, as well as collaboration with relevant United Nations entities, including the United Nations Inter-Agency Issue-based Coalitions and the United Nations Regional Digital Transformation Group.

III. Progress made on the implementation of the regional action plan

17. Within a year of implementation of the action plan, under **Pillar 1**, the following progress has been made:

- To respond to countries' needs for information, evidence, analysis and advice on reshaping policy support on food security and nutrition in the region, the 2022 *Regional Overview of Food Security and Nutrition* was published.
- Additionally, in five countries, work was supported to enhance agrifood systems knowledge and evidence and build the capacity of the antimicrobial resistance network of the main animal health and food safety laboratories involved in the detection of antimicrobial resistance with the FAO Assessment Tool for Laboratories and antimicrobial resistance surveillance systems, including training on applying a new tool enabling countries to assess the financial burden of animal disease outbreaks and their control measures (OutCosT).
- To enhance understanding and raise awareness on the importance and role of bioeconomy activities, a document on promoting bioeconomy through agriculture practice in Eastern Europe and Central Asia was prepared to be published by the end of 2023.
- The existing priority areas in green agriculture research, regional science and innovation gaps and pathways to improve the integration of science and innovation into the greening of agrifood systems in the region were analysed to guide stakeholders in addressing gaps and defining strategies for greening agriculture. A virtual meeting of country representatives, researchers and experts was held to discuss the high-quality scientific evidence on the effectiveness and application of green practices and its science and innovation aspects in Europe and Central Asia.
- Similarly, to increase the sharing of knowledge, science, evidence and experience, the event "Greening our Future" was held in October 2022 within the framework of the FAO Science and Innovation Forum to present how youth can help capitalize on existing science and innovation tools and practices in making agriculture more sustainable. The event was considered a first step in establishing regional multistakeholder partnerships on green agriculture and strengthening science-policy interfaces.

- Additionally, the event "Digital Villages in Action" took place in May 2023. The webinar marked the launch of the FAO Digital Villages Initiative in eight countries across the region (Albania, Azerbaijan, Bosnia and Herzegovina, Georgia, Kyrgyzstan, Tajikistan, Türkiye and Uzbekistan). Furthermore, a regional thematic website[3] and the DVI Readiness Assessment Tool[4] were introduced as part of the event.

- Since its development in 2022, the DVI Readiness Assessment Tool has been tested in more than 30 villages throughout Albania, Bosnia and Herzegovina, Kosovo,[5] Kyrgyzstan, Türkiye and Uzbekistan. It is based on 17 criteria across three dimensions: digital ecosystem, leadership and governance, and strategic context, facilitating the analysis of the preparedness of potential villages to undergo a digital rural transformation process. The analysis of each criterion determines the level of maturity of the village to be transformed into digital.

- Moreover, the Regional Technical Platform on Green Agriculture was launched in 2022 as a knowledge repository that facilitates connections among expert networks on various technical areas of green agriculture within the region and with other regions, involving international, national and local development partners to build on good experiences and enhance regional and interregional collaboration. In 2023, the platform was operationalized further, with new thematic regional communities of practice and forums of discussions established.

- The country-level actions implemented include the launch in Uzbekistan of the web-based Food Price Monitoring and Analysis Tool to facilitate the dissemination and analysis of food price data and the establishment of the national animal identification, registration and traceability system in Georgia. In addition, the country is establishing its first digital villages in Ferghana Valley, with a comprehensive DVI road map for Novkent and Yuksalish villages. The rural communities are introducing high-quality – yet low-cost – internet of things devices based on open source for monitoring greenhouses, disseminating innovative agricultural practices via a "digital hub," and developing digital capacities through a set of trainings.

18. Under **Pillar 2**, aimed at supporting innovation and technology, at the regional level, the following progress has been made:

- A catalogue of innovative green agricultural practices is being built as a dynamic tool to scale up and out promising technologies, innovations and interventions. Currently, 40 regional- and country-level green innovation practices across agrifood systems were collected to be further shared with stakeholders throughout the region.

- A report on digital excellence in agriculture was published as the outcome of a regional contest on good practices advancing digital agriculture. Studies on innovative digital agricultural practices and their adaptability to smallholders, family farmers and rural women were conducted. Information and analysis of digital initiatives involving the use of information and communications technologies are being disseminated through the AgriD open database (the open launch of which is expected in October 2023). More detailed updates on the progress made on the Digital Transformation of Agriculture and Rural Areas regional and country actions can be found in information note ECA/43/23/INF/4.

[3] The Digital Villages Initiative website is available online at https://www.fao.org/digital-villages-initiative/europe/.
[4] The DVI Readiness Assessment Tool is available online at https://forms.office.com/e/a9hrpyTGix.
[5] References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

- At the country level, a feasibility study with recommendations for the development of a direct-to-consumer e-commerce platform for small and medium-sized farmers and returned migrants agri-entrepreneurs in the Republic of Moldova was published.
- In addition, the Agrokomek app provides digital advisory services to rural communities, tailored to local contexts and needs and with easy access to useful data, information and statistics. The Smart Milk portal provides guidance and tips on good farming practices, animal feed and food safety, from farm to table. Both are active in Kazakhstan and are to be scaled out in other Central Asian countries.
- The successful experiences of Azerbaijan, Georgia, Kyrgyzstan and Türkiye on integrated pest and pesticide management were promoted to encourage agricultural practices that are less dependent on pesticides. Trials were established demonstrating that pesticide application could be reduced in selected regions by 50–68 percent compared to conventional practices, depending on the crop culture and country.
- To reduce inequalities and promote the inclusion of women, youth and family farmers, a virtual youth consultation was held in 2022 to share the challenges, experiences, approaches and success stories on the application of digital technologies in agriculture by young farmers, entrepreneurs and researchers. Training for women smallholder farmers in Georgia allowed them to develop their capacities in creating new market linkages and partnerships. In Ukraine, the development of women-led business models using the ecological and economic potential of shelterbelts, self-forested and other uncultivated natural areas was supported, as well as the national gender profiles of agriculture and rural livelihoods published in Azerbaijan and the Republic of Moldova.

19. To reinforce FAO's capacities to support the realization of the FAO Strategy, a project is implemented within the framework of the **Pillar 3** to consolidate the internal capacities in science communication for policy purposes and in understanding, exploiting and enabling science, technology and innovation to address the priority regional challenges. Within the project, an e-library on science-policy interfaces is being assembled and a conceptual framework prepared to serve for additional gaps and needs analyses.

20. In terms of **enablers**:

- A cooperation with the Joint FAO/International Atomic Energy Agency Centre of Nuclear Techniques in Food and Agriculture is being explored to leverage research and development activities to develop technologies in response to practical needs. The road map for joint actions will consider innovative and evidence-based solutions to improve animal production and health, plant breeding and genetics, insect pest control, food safety and control, soil and water management and crop nutrition, disseminating the research and innovations to Members in the region.
- Moreover, to strengthen partnerships on green agriculture and food systems transformation with research and education institutions and non-governmental organizations, the regional academia round table was held in October 2022. It consolidated ties between FAO and academia, universities, research institutions and other regional partners and discussed the potential of data, technology and innovation to ensure more sustainable agrifood systems. It also recognized the important role academic and research institutions can play in achieving food security and improved nutrition for all.

IV. The work ahead

21. In response to regional and country needs, FAO will in the upcoming biennium continue to work with Members in a collective effort to implement the regional action plan, considering that science and innovation are the driving force for formulating effective evidence-based policies, accelerating agrifood systems transformation, building resilience, greening agrifood systems and ensuring food security and nutrition.

22. Particularly, the work at the regional level will focus on:

- facilitating the science-policy dialogue on soil bioremediation in Central Asia and piloting the use of the mechanisms for facilitating science and evidence integration into the policy process;
- promoting joint research, projects and capacity development actions on green agriculture and food system transformation with universities, research centres and non-governmental organizations;
- incentivizing the engagement of farmers, smallholders, rural and Indigenous Peoples in participatory processes of knowledge co-creation and knowledge sharing with experts, scientists and research and education institutes;
- continuing to promote the Regional Technical Platforms on green agriculture, digital villages, land degradation neutrality and the applied agricultural research and innovation technical platforms in Central Asia, regional networks and communities of practice;
- continuing to support Members in developing strategies, policies and programmes that aim to accelerate the uptake of technologies and innovation in agriculture;
- further supporting the democratization of innovations and technological solutions for small-scale and family farmers, mitigating barriers such as availability and affordability, especially to women, youth and other marginalized groups, including through the Digital Villages Initiative;[6] and
- further collecting and analysing good practices and digital solutions applied in agriculture and expanding the AgriD database.

23. To harness science and innovation to realize context-specific actions, the implementation of the action plan at country level will:

- strengthen the capacities of countries in Central Asia, the Caucasus and Türkiye in developing guidelines on biodiversity monitoring across the relevant sectors by using global good practices and indicator-based assessments data;
- support the capacities of national and local scientific bodies to generate, pilot, document and share knowledge and experiences on soil fertility, drought resilience, sustainable livestock and fodder production, and water-saving technologies;
- test, with farmers' participation, upscale and disseminate innovative techniques and best practices for combating salinization, drought risk management, soil reclamation, water saving, pest management and other integrated natural resources management techniques in selected production landscapes and land use systems across Central Asia;
- collect and analyse evidence through country gender assessments to enhance national capacities to support socially inclusive and sustainable agrifood systems and rural women's empowerment in Albania, Belarus, Georgia, Kazakhstan, Kosovo, Tajikistan, Türkiye, Uzbekistan;

[6] For more information on this initiative, please refer to the document ECA/43/23/INF/4.

- improve agricultural extension and advisory services by providing innovative services and training through farmer field schools and partnering with research and educational institutions; and
- hold the Regional Science and Innovation Week on October 1–5 2023, under the umbrella of the FAO Science and Innovation Forum, to facilitate the implementation of the regional action plan. Through this event, the FAO Regional Office for Europe and Central Asia is providing a platform for discussing and sharing experiences among governments, research institutions, civil society organizations and the private sector on the needs, gaps and opportunities to integrate science-policy interface mechanisms in accelerating the transformation to more sustainable, inclusive and resilient agrifood systems in the Europe and Central Asia region**.**

24. These activities are contributing to the improvement of science, research and innovation and to the translation of policies into effective action on the ground through reinforcing cooperation, partnerships and financing opportunities in order to address priority regional challenges to accelerate the transformation to more sustainable, inclusive and resilient agrifood systems.