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## The role of Agricultural Innovation Systems in Central Asia and Caucasus countries and China towards more sustainable food security and nutrition

### 1. Preamble

This online discussion ran on the regional platform of the FAO Global Forum on Food Security and Nutrition (<http://www.fao.org/fsnforum/eca/en/AIS-CAC-China>) from the 6<sup>th</sup> of May until the 9<sup>th</sup> of June 2015. The e-discussion was initiated by the Central Asia and the Caucasus Association of Agricultural Research Institutions (CACAARI) in close collaboration with the Northwest Agriculture & Forest University (NAFU) from China.

The main objective of this online discussion was to offer stakeholders an opportunity to share their experience, knowledge and regional good practices through a constructive dialogue, and to contribute to a) identifying challenges, opportunities and collective actions towards strengthening Agricultural Innovation Systems (AIS) in countries of Central Asia and Caucasus (CAC) and China; b) identifying roles of various stakeholders; c) gathering insights and views on consistent actions needed to enhance the capacities of existing regional platforms to promote communication and collaboration on agricultural innovations; (d) promoting regional cooperation (through initiatives such as “One Road One Belt”) for improved policies to enhance market liberalization, environmental sustainability, and regional development.

Due to poor linkages among various agricultural actors in CAC countries and China, many farmers, especially women farmers, are encountering difficulties in accessing advanced knowledge and information on agricultural technologies and emerging markets. This deprives them of innovation-based opportunities to improve their productivity, their profitability, and their livelihoods. Besides, increasing food prices and poorly managed natural resources are primarily a threat to smallholders and vulnerable population groups.

To address these problems, many countries have established Rural Advisory Service (RAS) systems, which however are not yet playing a big enough role in assisting farmers. RAS systems differ substantially from country to country: some are largely a government domain or donor-driven, while others include the private sector and Non-governmental Organizations. Notwithstanding these differences, the common challenge that most of these countries are facing is that of making RAS systems more efficient and sustainable.

An integrated, innovative approach towards more sustainable food security and nutrition system is required to strengthen cooperation among various stakeholders, to adapt new technologies, to develop natural resource management strategies, and to strengthen institutions involved in Agricultural Innovation Systems.

## 2. Overall outputs and outcomes

- Initially targeted at the countries of Central Asia and Caucasus and China, the e-discussion grew into a cross-regional multistakeholder dialogue, supported by the rich experience of 48 experts as well as evidence from 18 countries. There was strong interest in the topic and a desire to exchange views with colleagues within and outside the participants' countries, having a chance to communicate in Chinese, English and Russian. This made the e-discussion extremely interactive and fruitful, with 83 comprehensive contributions. The geographical scope of interest in the discussion was even wider, with visits to the discussion's web page coming from 73 countries across different regions and including both developed and developing economies. This was complemented by a near-perfect gender and age balance among the participants who took part in the discussion. The wide outreach of the e-discussion was achieved thanks to the FSN Forum community of experts, the networks of regional partners (i.e. CACAARI, CGIAR-CAC, YPARD, GFAR, GFRAS, and FAO-REU), and FAO social media channels.
- The results of the online discussion call for creating and promoting equal opportunities for participation and transparency among all stakeholders in the planning and implementation of agricultural research and innovation for development.

## 3. Key issues

Thanks to the very interactive and well-facilitated discussion, the participants fairly covered all issues proposed for this topic and more.

3.1. What are the **major challenges** faced by Agricultural Innovation Systems in CAC countries and China to increase their role in improving food security and nutrition?

- Participants highlighted the challenges that AIS is facing in the region, which can be grouped into the following issues: socio-economic, institutional and management, research and technological, environmental, production and marketing (value chain), and policy.
- The discussion highlighted the lack of coordination between different AIS actors and sectors across countries. The linkages among the key stakeholders (such as the public and private sector, or academic and civil societies) within the national agricultural research system in CAC countries and China are very weak, which is evident in the poor planning, poor resource and labour distribution, defragmentation, and duplication of interventions in the agricultural sector. Existing interdepartmental and intersectoral barriers also hinder AIS programmes from planning to implementation. In addition, insufficient linkages constrain the application of innovation approaches for improvement of food security and well-being of population. Functional linkages among agricultural education, research and rural advisory services also remain weak. Having high-quality staffs, the majority of resources have been directed at agricultural universities in teaching and researching.
- Moreover, AIS in the CAC countries and China is constrained by additional problems, such as lack of consideration of incentives at both individual and organizational level, weak research capability, insufficient training for agricultural producers and farmers, and a shortage of skilled professionals. In some countries the process of transferring innovations, "know-how", and new technologies is constrained by complicated regulatory and institutional frameworks and barriers.

The participants agreed that AIS could play a crucial role in achieving more sustainable food security and nutrition in CAC countries and China through an innovative infrastructure that

enables interaction between academia and producers. However, currently AIS is not contributing at its fullest capacity.

3.2. What should be the **priority areas** for Agricultural Innovation Systems to effectively support farmers in improving their livelihood?

The following further measures for strengthening Agricultural Innovation Systems at the national and regional level were suggested by participants:

- Framing national policies, legislation, regulations, and institutions for Agricultural Innovation Systems (AIS) in an integrated approach;
- Operationalizing AIS at the national and local level;
- Implementing a unifying information system and big-data management in AIS;
- Identifying farming technology and techniques which are suitable for local-level climatic, socio-economic, and cultural environments;
- Supporting agricultural actors along food chains in the application of new technologies;
- Promoting new, high-yield plant varieties resistant to disease and tolerant of drought, salinity, and frost, as well as promoting new high-productivity animal breeds with a strong immunity to disease;
- Supporting modernization and diversification processes in agriculture;
- Strengthening the role of gender and increasing the involvement of youth and low-income populations in agricultural innovation and human capital development, including health, nutrition, education, and skills;
- Providing support in mitigation and adaptation to climate change;
- Improving data management.

3.3. What **actions** are needed to enhance agricultural research extension services and make them conducive to ensuring food security and improving nutrition?

Proposals of participants for actions were summarized and grouped as follows:

- *Strengthening human and institutional capacity of AIS actors is required for boosting relevant agricultural knowledge and technologies and their application:*
  - a) Academia should be proactive and lead the implementation of training programmes (including short- and medium-term farm training courses); design the curriculum of methods for participatory training; design and implement field experiments; conduct impact assessments; and support graduate student research, workshops, farmer field schools, distance learning, and other means;
  - b) Universities should support farmers and rural small and medium enterprises (SME) in improving their skills, understanding, and innovative capacity to practice sustainable agricultural intensification and market-oriented activities.
- *Enhancing linkages between research, education, and extension through interactive, dynamic and flexible processes, along with better contact between institutions.* This will help bring knowledge, technologies, and services to rural and agricultural populations, and also improve their capacity to innovate.

- *Establishing an agricultural innovation institution.* This could serve as a platform of knowledge formation and technology transfer where different actors of AIS can benefit from knowledge sharing, coordination and innovation.
- *Improving access to finances,* in order to obtain adequate funding for improvement of material and technical capacities.
- *Marketing the products and services provided by agricultural research, education and extension institutions.* This will help attract both public and private investors.
- *Establishing a unified information system.* ICT is a useful tool for the development, transfer, application and dissemination of agricultural information and knowledge to increase agricultural productivity and income. However, there is still a communication gap between agricultural research, academia, and rural areas. Eventually, massive changes such as fast growth in ICT, urbanization, and climate change will require our knowledge and innovation systems to be far more responsive, flexible, and forward thinking than before.
- *Empowering women and youth in agricultural innovations should be considered in the development agenda.* The participation of women and young people in agricultural innovations is indispensable, given their crucial role in household livelihoods and in the socio-economic and cultural environment.

3.4. What is the current and what should be the future **role** of agricultural research and education organizations (academia) in RAS systems? What should the partnership modalities be between academia and other stakeholders such as public organizations, farmer organizations, and rural communities? What are the existing innovative institutions? And what are the major constraints?

**Academia:** Agricultural research and education institutions play an essential role in AIS, but institutionalizing them with other RAS providers is challenging. Although agricultural research and education institutions have a variety of natural benefits in AIS – such as: (a) identifying key research and capacity issues that are critical to FSN and well-being; (b) defining interventions to increase the efficiency and sustainability of agricultural production and the use of natural resources; (c) developing and implementing options to manage risk and production variability; (d) promoting the use of indigenous knowledge, creativity and ingenuity in conservation and sustainable use of natural resources; (e) improving the productivity and profitability of agricultural production through sustainable intensification, diversification, value-added products, and market linkages; (f) identifying the areas that are important to the livelihoods of vulnerable populations, women, and children; (g) addressing the challenges faced by marginal farmers; and (h) developing new models of participatory and inclusive development interventions and partnerships. However, they are constrained by fragmented sectors of conflicting interests and a lack of coordination within the AIS system. Besides their role in AIS, agricultural research and education institutions have become primary stakeholders in voicing the needs of the poor and vulnerable, and in providing them with the means and capabilities to benefit from these innovations.

Additionally, academia's role in capacity building is paramount. For example, agricultural universities deliver formal and systematic courses and training programmes to extension staff who eventually facilitate participatory learning with farmers, especially those vulnerable and disadvantaged groups such as women and youth, for changes and innovation. In both the CAC countries and China, it's becoming crucial to deliver training to a new generation of agricultural specialists, scientists and service providers who can work with smallholders at the local level. Agricultural

universities are important not only because they develop human resources, but also because they serve as a source of knowledge and technology. In transition countries where the political views on RAS are volatile, the formation and accumulation of knowledge is relatively better maintained and secured in universities through an established curriculum, training lectures, and set-up networks.

**Government:** The public sector is playing a central role in developing AIS in CAC countries and China. Nevertheless, in many transition economies, government interventions need to be enhanced, including the operationalization and institutionalization of national RAS systems.

To address an important socio-economic challenge such as food security and better nutrition, “the regulatory role of the government in innovative development objectively comes to the forefront; it will ensure positive results only in case of a balanced long-term development strategy”.

Information and communication technologies can help to build up linkages among public and private sectors in new and exciting partnerships that deliver real change.

#### 4. Next steps

- The outputs of this e-discussion will: (i) feed into a side event at the 6th Annual Meeting of the Global Forum for Rural Advisory Services in September 2015; (ii) support the establishment of a window for future collaborations between countries of Central Asia and Caucasus (CAC) and China under the “One Belt One Road” initiative; (iii) help better understand the current role of Agricultural Innovation Systems in CAC countries and China; and (iv) contribute to the overall inclusive dialogue on Food Security and Nutrition issues in Europe and Central Asia.

Given emerging issues, such as population growth and climate change, the development of innovation systems in CAC countries and China is considered to be a necessary condition for enhancing agricultural productivity. Comprehensive measures towards fostering innovation in the agricultural sector should include participatory agricultural research and extension systems by strengthening linkages to farmers and other actors in the sector. This is considered an important factor in connecting farmers in CAC countries and China, and in providing opportunities for better access to markets and income diversification that ultimately will benefit food security and improve nutrition.

The suggested “*Seven steps towards enhancing RAS/extension systems in Central Asia & the Caucasus and China*” raised positive feedback from the participants. The CACAARI Secretariat has advised to promote and facilitate the process. These steps will be further enriched with the outputs of this discussion and together will feed into face-to-face consultations on the Roadmap to enhance RAS systems in CAC countries and China, to be organized as a side event at the 6<sup>th</sup> Annual Meeting of the Global Forum for Rural Advisory Services.

The results of this online discussion will contribute to further discussion and planning during the third Global Conference on Agricultural Research for Development process in 2015 and 2016. They will also influence the direction, activities and resourcing of international research, as well as highlight the need for strengthening and investment in national Agricultural Innovation Systems and for effective measures that will create real change in farmers’ lives in the region.

This online discussion revealed many priority areas that can be considered as entry points to be addressed with the China initiative “One Road One Belt”, which provides substantial opportunities to enhance cooperation between CAC countries and China. Those opportunities related to RAS

emerge through regional development programmes (such as rural infrastructure investment and "demonstration parks" of agricultural technology), private investment (in agrochemical inputs, agro-food supply chains, and land markets), and academic collaborations.

## **5. Beyond the topic**

The dialogue among experts also went much further beyond the topic, creating a window for further interactions.

Due to insufficient investments, agricultural research systems are not able to realize their full potential for contributing adequately to AIS. The average share of expenditures on agricultural research in the gross agricultural output is 0.1 percent in CAC region, while the average value of investments in agricultural research as a percentage of agricultural GDP in developing and developed countries is 0.58 percent and 2.4 percent, respectively. Although the investments in RAS may vary from country to country, we can assume their value to be very low. Therefore, further discussion is needed on how to increase investment in R&D and RAS in the regions in order to fulfil its potential to improve food security and nutrition and to increase livelihoods.