



Food and Agriculture Organization
of the United Nations

The Central Asia Climate Smart Agriculture workshop

- Summary report -
Bishkek, Kyrgyzstan 12-14 July 2016



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Acronyms

BEFM	Bio-Economic Farm Model
CABI-CH	Centre for Agriculture and Biosciences International in Switzerland
CAC	Central Asia and the Caucasus
CACAARI	Central Asia and the Caucasus Association of Agricultural Research Institutions
CACILM II	Central Asian Countries Initiative for Land Management II
CAREC	Central Asia Regional Economic Cooperation Programme
CC	Climate change
CCA	Climate Change Adaptation
CEU	Central European University
CGIAR	Consultative Group of International Agricultural Research (Centers)
CIP	Climate Interactive Platform
CSA	Climate Smart Agriculture
DRR	Disaster Risk Reduction
EASP	Eurasian Soil Partnership
EBRD	European Bank for Reconstruction and Development
EPIC	Economics and Policy Innovations for Climate-Smart Agriculture
FATIMA	Farming Tools for external nutrient Inputs and water Management
FAO	Food and Agriculture Organization of the United Nations
GACSA	Global Alliance for Climate-Smart Agriculture
GEF	Global Environment Facility
GIS	Geographical Information Systems
GLOF	Glacier Lake Outburst Floods
GLEAM	Global Livestock Environmental Assessment Model
Goskompriroda	State Committee for Nature Protection of Republic of Uzbekistan
IAMO	Leibniz Institute of Agricultural Development in Transition Economics
ICAM	Integrated Coastal Area Management
ICARDA	International Center for Agricultural Research in the Dry Areas
IESD	Institute of Energy and Sustainable Development
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IGZ	Leibniz Institute of Vegetable and Ornamental Crops
IMPACT	International Model for Policy Analysis of Agricultural Commodities & Trade
KAZFOAM	Kazakhstan Federation of Organic Agriculture Movements
KazNau	Kazakhstan National Agrarian University
MAWR	Ministry of Agriculture and Water Resources (Uzbekistan)
MOSAICC	Modelling System for Agricultural Impacts of Climate Change
NAP	National Adaptation Plan
OECD	Organisation for Economic Co-operation and Development
PPCR	Pilot Programme for Climate Resilience
SAFA	Sustainability Assessment of Food and Agriculture systems
SCS	State Customs Service (Kyrgyzstan)
SDG	Sustainable Development Goal
SGP	Small Grants Programme (GEF)
SLM	Sustainable Land Management
TAAS	Tajik Academy of Agricultural Sciences
TAU	Tajik Agrarian University
TSU	Tajik State University
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UzGIP	Uzbek Design and Research Institute
UzSPC	Uzbek Scientific Production Center of Agriculture
WB	World Bank
WFP	United Nations World Food Programme

Executive summary

Climate change will alter agricultural production conditions and affect food security in Central Asia. Its effects are already being felt through the adverse impacts of events hydro-meteorological hazards, including droughts and river and flash floods, which are damaging and destroying agricultural equipment and causing losses in the crops, livestock, fisheries and forestry subsectors. Many small-scale farmers are among the hardest hit as they often have limited assets and access to resources, knowledge, use of technologies and financial services required for adapting their production systems.

The Central Asian region is also facing various environmental challenges, including land degradation, deforestation, desertification, salinization, as a result of the exploitation of its natural resources, including the intensive cultivation of cotton and wheat, which has adversely impacted its biodiversity and quality of air, water and soil. Addressing ecosystem degradation and loss is essential as healthy and diverse systems are more productive, provide higher agricultural yields and are more resilient to natural hazards. In addition, to the increasing food demands from growing populations, there is also a need to transition to more sustainable agricultural systems, where more food can be produced with greater resource efficiency.

Climate Smart Agriculture (CSA) offers the countries in Central Asia an integrative approach to address the interrelated challenges of food security, development and climate change. It addresses these challenges simultaneously, holistically and in an integrated way through coordination between different stakeholders and sectors, thereby capitalizing on potential synergies, reducing trade-offs and optimizing the use of natural resources and ecosystem services.

Within the context of designing and planning comprehensive interventions, thereby avoiding trade-offs and capturing synergies, the Food and Agriculture Organization of the United Nations (FAO) in collaboration with Central Asia and the Caucasus Association of Agricultural Research (CACAAARI), Central Asia Regional Economic Cooperation Program (CAREC), Central European University (CEU) Global Alliance for Climate-Smart Agriculture (GACSA) and the International Center for Agricultural Research in the Dry Areas (ICARDA), organized the Central Asia CSA conference in Bishkek, Kyrgyzstan from 12-14 July 2016.

The objectives of the workshop were to raise awareness and build capacity to undertake CSA approaches as well as to determine collective priority interventions at national and regional levels. This included the identification of the needed knowledge, tools and technical support and to link these to ongoing and new projects, such as the Second Phase of the Central Asian Countries Initiative for Land Management (CACILM-II) and FAO's Economics and Policy Innovations for Climate-Smart Agriculture (EPIC) programme. The workshop brought together various regional and national delegates, from ministries, universities and research institutes, international organizations and donors engaged in the five Central Asian countries.

Throughout the three-day workshop, presentations and discussions were held on the challenges and constraints, which Central Asian countries are facing in the area of sustainable agricultural development and the impact of climate change on the sector. Participants debated in smaller groups on how a national CSA programme can help to address these challenges and what it should entail in terms of objectives, priority interventions and institutions and stakeholders to be involved, capacity needs, data requirements to support CSA policies and programmes and government, donor and regional finance mechanisms to support the implementation of a CSA approach.

Participants also provided recommendations on a regional approach to CSA, amongst which the development of a regional CSA strategy and action plan was mentioned, which would guide the establishment of a regional CSA programme for Central Asia. The following highlighted recommendations were mentioned, including the need to:

- **Create an evidence database** to support the implementation of CSA policies and programmes. It will include all relevant data, composing e.g. climate and geographical data, socio-economic data at household level, prices and market data, agricultural sector data, greenhouse gas emissions etc.;
- **Undertake a cross-country synthesis of gaps and challenges** to get a complete overview of the differences and commonalities of countries across the region as well as to enable setting baselines;

- **Conduct needs assessments for CSA** to identify needs, but also stakeholder benefits from applying a CSA approach;
- **Establish a Monitoring and Evaluation (M&E) system for CSA**, which is based on identified baselines/standards, selection of relevant indicators and criteria;
- **Mainstream the CSA approach into other relevant and existing national policies, plans and strategies** related to e.g. climate change, food security and agriculture strategies, sustainable development, adapted to local context. Harmonize CSA strategies at all levels. Effective coordination is thereby essential;
- **Develop a regional strategy and action plan**, which would serve as a guideline for the development of national CSA strategies. Central Asian countries and regional priorities need to be considered as well as government ownership as a driving force for the development of such a strategy. The principles of participation and inclusiveness are key. The development of an action plan, includes the setting up a M&E system with defined baseline and targeted indicators. It was suggested to create a working group to develop the regional strategy and action plan, where national and international organisations would form a multiple stakeholder group and be technically supported and guided by FAO;
- **Coordinate the implementation of the regional CSA strategy** with existing global and regional CSA platforms;
- **Develop a extension advisory services system at the regional level** to build capacities among farmers and other agricultural players to adequately manage climate risks and adopt context-appropriate agricultural practices, technologies and systems;
- **Raise awareness on CSA among all relevant stakeholders and create a single regional knowledge platform**, which includes CSA, Eurasian Soil Partnership (EASP) and CACILM, to enable exchange of knowledge and research on relevant practices and technologies that can be applied throughout the region to help farmers reduce the adverse impacts of climate change on the agriculture sector and food system. It should also be accessible to policy makers and other stakeholders;
- **Enhance finance to ensure the sustainability of the programme**, such as through the creation of relevant mechanisms as well as **link with existing climate and agricultural finance** and thereby creating linkages to other regional initiatives and programmes will help to enhance synergies, reduce overlaps and potential trade-offs.

Participants considered the presentations and small group discussions highly relevant and useful, which led to various recommendations for a way forward for the implementation of a CSA approach at both national and regional levels with dialogues continuing beyond this workshop

Section I: Background information, framing the context

Introduction to Climate Smart Agriculture

Sustainably increase production to meet population growth

By 2050, the world population is estimated to increase by a third to 9.6 billion people. Most of the increase will occur in developing countries and approximately 66 percent of the population will reside in urban areas.¹ If current income and consumption growth trends continue, FAO estimates that agricultural production will have to increase by 60 percent by 2050 to satisfy the expected demands for food and feed.² For example, annual cereal production will need to increase from 2.1 billion to around 3 billion tonnes as well as annual meat production from over 200 to 470 million tonnes.³ Given that land, water and other natural resources are limited and often already highly degraded, global food security can only be ensured if agricultural systems sustainably produce more food with greater resource efficiency.

Climate change challenges

Climate change will pose an additional challenge as it will predominantly have adverse impacts on the agriculture sector. Current climatic changes are already negatively affecting the sector and food security due to the increased frequency and severity of extreme weather events, such as floods, storms and droughts as well as the increased unpredictability of weather patterns. Many small-scale farmers, pastoralists, foresters and fisher folk are among the hardest hit as they often have limited assets and access to resources, knowledge, use of technologies and financial services required for adapting their production systems.

Need for new integrated approaches

Enhancing food security while contributing to mitigate climate change and preserving the natural resource base and vital ecosystem services requires the transition to agricultural production systems that are more productive, use inputs more efficiently, have less variability and greater stability in their outputs, and are more resilient to risks, shocks and long-term climate variability. More productive and more resilient agriculture requires a major shift in the way land, water, soil nutrients and genetic resources are managed to ensure that these resources are used more efficiently and sustainably.

Defining the CSA concept

The concept of Climate Smart Agriculture (CSA) was developed by the Food and Agriculture Organization of the United Nations (FAO) in 2010. It was introduced in a background paper for The Hague Conference on Food Security and Climate Change.⁴ Since then, the concept has received increased ownership from governments, regional and international agencies, private sector and civil society. Global and regional alliances have been established, including the Global Alliance for CSA (GACSA) and the Africa CSA Alliance, which facilitate the exchange of knowledge and information as well as collaboration among its members.

CSA fundamentals: an integrative approach

Climate smart agriculture is an integrative approach, which has multiple objectives to address the complex interrelated challenges of food security, development and climate change. CSA addresses these challenges simultaneously, holistically and in an integrated manner, which helps to avoid counterproductive policies, legislative or financing. It identifies and assesses the interactions between different sectors and the needs of different stakeholders involved. In this regard, coordination across the subsectors (e.g. crops, livestock, forestry and fisheries) as well as other sectors, such as energy and water, is essential to capitalize on potential synergies, reduce trade-offs and optimize the use of natural resources and ecosystem services.

¹ United Nations. 2014. The World Population Situation in 2014. A Concise Report. New York.

² Alexandratos, N. and J. Bruinsma. 2012. World agriculture towards 2030/2050: the 2012 revision. ESA working paper No. 12-03. Rome, FAO.

³ FAO. 2009. How to Feed the World in 2050. Rome, FAO.

⁴ FAO. 2010. Climate Smart Agriculture: Policies, Practices and Financing for Food Security, Adaptation and Mitigation.

CSA brings together practices, policies and institutions that are not necessarily new, but are used in the context of climatic changes, which are unfamiliar to farmers, herders and fishers. What is also new is the fact that the multiple challenges faced by agriculture and food systems are addressed simultaneously and holistically, which helps avoid counterproductive policies, legislation or financing.

Responsive to national and local conditions

CSA's integrative approach recognizes national and local characteristics and takes country's capacities, priorities and needs into account. It is not an agricultural practice or system per se that can be universally applied, but aims to identify optimal and appropriate solutions for the local economic, environmental and social conditions and circumstances. It is applied across different time durations (short and long term), scales (from farm to landscape), levels (from local to global), across sectors and along whole food value chains.

CSA's 3 objectives

CSA aims to achieve the following three objectives:

Objective 1 – Sustainably increasing agricultural productivity and incomes:

- Increase productivity taking into consideration the save and grow principles (more with less) and FAO principles of sustainability (FAO, 1997). Sustainable intensification also has significant mitigation potential (see objective 3);
- Equitable increase of incomes, in particular the livelihood and incomes of smallholder farmers, who can substantially gain from productivity increases as this will be reflected in higher returns and thus incomes;
- A gender sensitive enabling environment that is seen as essential for achieving productivity increases;
- Evaluates food security and ensures nutrition sensitive interventions.

Objective 2 – Adapting and building resilience of agricultural and food systems to climate change:

- Adapting and enhancing the resilience of both agro-ecological and social systems to shocks, especially those related to climate change;
- Developing integrated climate change adaptation (CCA) and disaster risk reduction (DRR) approaches;
- Provision of needed safety-nets and safeguards especially to small holders;
- It takes into consideration, the provision of timely weather information and extension support to identify viable responses to changing conditions as well as reducing risk exposure through early warning systems.

Objective 3 – Reducing greenhouse gas emissions from agriculture where possible:

- Assess potential co-benefit reductions of GHG and the reduction of other environmental impacts. CSA considers climate change mitigation as a potential secondary co-benefit, especially in low income, agricultural-based populations;
- Reduce GHG emissions per unit of food through intensification, resource efficiency and reduction in losses and waste;
- Enhancing carbon sinks through increasing carbon sequestration in soils and vegetation;
- Linking agricultural systems to other sectors, such as energy to reduce overall GHG emissions of communities (e.g. energy production from agricultural residues and waste).

Implementation of CSA

There has been a rapid uptake of the term CSA by the international community, national entities and local institutions. However, implementing this approach is challenging, partly due to a lack of tools and experience. Climate-smart interventions are highly location-specific and knowledge-intensive. Considerable efforts are required to develop the knowledge and capacities to make CSA a reality. In large part, these are the same efforts required for

achieving sustainable agricultural development, which have been advocated over past decades, yet still insufficiently realized on the ground. CSA offers an opportunity to revitalize these efforts, overcome adoption barriers, while also adjusting them to the new realities of climate change. Organizations, educational establishments and other entities have started to fill these gaps, but information is still fragmented. FAO and its partners are working to develop an integrated methodology to assist stakeholders at different levels to develop, implement and upscale CSA approaches.

Putting CSA into practice - four types of action

For CSA to be effectively applied across agricultural systems, landscapes and value chains, four major types of action can be undertaken, including:

1. Expanding the evidence base and assessment tools to identify agricultural growth strategies for food security, which integrates adaptation and mitigation;
2. Building policy frameworks and consensus to support implementation;
3. Strengthening national and local institutions to enable farmers to adequately manage climate risks and adopt context-appropriate agricultural practices, technologies and systems;
4. Enhancing financing options to support implementation through linking climate and agricultural finance.

Expanding the evidence base

The availability of baseline data on the past and future impacts of climate variability and change on agriculture and livelihoods is essential as it allows assessment of the vulnerability of communities. This evidence base needs to be multi-disciplinary and cross-sectoral. CSA options need to be evaluated in terms of their effectiveness in achieving food security and climate change adaptation and mitigation goals as well as other development objectives.

Therefore, assessment, monitoring and evaluation are integral parts of CSA planning and implementation. FAO has established various tools and assessment methods. FAO assessment tools include: Modelling System for Agricultural Impacts of Climate Change (MOSAICC), Global Livestock Environmental Assessment Model (GLEAM), Sustainability Assessment of Food and Agriculture Systems (SAFA).

Supporting enabling environment

Developing the required policy, financial and enabling environment helps provide farmers, pastoralists, fisher folk and foresters, the knowledge and access to resources and services for transitioning towards systems that are more profitable, environmentally sustainable and climate change resilient. It is important that climate smart agriculture is mainstreamed as well as aligned with core government policies and planning frameworks, financial investments and institutional arrangements, because in order for CSA to be effective it must contribute to broader economic growth, poverty reduction and sustainable development goals.

Strengthening national and local institutions

It is important that countries are supported to strengthen their national and local institutions to plan, implement and finance CSA. This combined with the enabling policy environment, will result in effective and coherent actions across different levels. Strengthening local institutions is particularly needed in order to empower, enable and motivate farmers as well as to promote collective action, provide access to information, finance and productive assets. Ensuring that women are able to participate equitably is key in the CSA approach.

Enhancing finance options

Investments are needed, which allow agricultural systems to transition to climate smart agricultural systems. Linking climate finance to agricultural investments for food security and sustainable development is a key element of CSA. It represents a significant additional source of finance to the agricultural sector, which faces a considerable funding gap. Therefore, working with financing sources to develop mechanisms and procedures that support the capacity of developing countries to measure, report and credit mitigation co-benefits through their agricultural development and adaptation activities is an important enabling measure that has a prominent role in the CSA approach. FAO and its partners support countries to access these climate finance funds for the implementation of CSA projects.

Key issues to consider for CSA approaches

1. Addresses the complex interrelated challenges of food security, development and climate change, and identifies integrated options that create synergies and benefits and reduce trade-offs;

2. Recognizes that these options will be shaped by specific country contexts and capacities and by the particular social, economic, and environmental situation where it will be applied;
3. Assesses the interactions between sectors and the needs of different stakeholders involved;
4. Identifies barriers to adoption, especially among farmers, and provides appropriate solutions in terms of policies, strategies, actions and incentives;
5. Seeks to create enabling environments through a greater alignment of policies, financial investments and institutional arrangements;
6. Strives to achieve multiple objectives with the understanding that priorities need to be set and collective decisions made on different benefits and trade-offs;
7. Should prioritize the strengthening of livelihoods, especially those of smallholders, by improving access to services, knowledge, resources (including genetic resources), financial products and markets;
8. Addresses adaptation and builds resilience to shocks, especially those related to climate change, as the magnitude of the impacts of climate change has major implications for agricultural and rural development;
9. Considers climate change mitigation as a potential secondary co-benefit, especially in low-income, agricultural based populations;
10. Seeks to identify opportunities to access climate-related financing and integrate it with traditional sources of agricultural investment finance.

Background - Central Asia region

The Central Asia region of almost 4 million square kilometers, is a vast area about the size of Europe and home to almost 67 million people across the five landlocked countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.⁵ The region is characterized by grassy plains and steppes, sandy deserts and mountains, some with peaks of over 7,000 meters. The landscape differs per country, with flat or rolling sand deserts covering large parts of Kazakhstan, Turkmenistan and Uzbekistan, while around 90 percent of Kyrgyzstan and Tajikistan is mountainous.

Central Asia is endowed with rich natural resources, including oil and gas and various metals and minerals. Kazakhstan's most important export commodities are oil and gas products and metals, while Turkmenistan's economy is also largely driven by the energy sector as the country possess among the largest natural gas reserves in the world. In particular for Kyrgyzstan, Tajikistan and Uzbekistan, agriculture is still playing an important role, especially for those residing in rural areas. In all countries, except Kazakhstan, over half of the population is residing in rural areas, for whom the sector provides a major source of food and income for their livelihoods, as shown in Table 1.

Table 1. Overview of Central Asian countries' agriculture value added, population in rural areas, labour force in agriculture and level of food insecurity, 2014

	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Agricultural value added (% of GDP)	5	17	27 ⁶	15 ⁷	19
Population in rural areas (%)	47	64	73	50	64
Labour force in agriculture (% share of total employment) ⁸	12	19	24	28	19

Source: World Bank, 2014

⁵ This is an aggregate figure based on World Bank 2014 data.

⁶ World Bank, 2013 data

⁷ World Bank, 2012 data

⁸ FAOSTAT 2015 data

Important agricultural commodities in these countries include cotton, wheat, tobacco, fruits and vegetables. The cultivation of cotton originates from the USSR period, when the centrally planned model of collectivized and specialized agriculture, transformed these countries into monoculture economies. From 1960 until the early 1980s, total irrigated area of the five republics expanded by 60 percent or some 3 million hectares, dedicated mostly to cotton.⁹

This irrigation-based cotton monoculture resulted in negative economic and environmental consequences. For example, the rapidly expanding irrigation projects reduced the river flow that reached the Aral Sea. By 1990, the volume of the Aral Sea had fallen to less than a third of its 1960s volume and the surface area had declined by 45 percent, while the salinity content nearly tripled.¹⁰ Salinization is the major cause of declining crop yields. In order to reverse this, people started to increase application of chemical fertilizers, which led to increased pollution of air, soil and water.

Other sustainable agricultural issues, include desertification as well as degradation of much of the pastureland, due to e.g. deforestation, inefficient agricultural activities and overgrazing, in turn adversely affects agriculture and livestock productivity. Addressing degradation and loss of these ecosystems is essential as healthy and diverse systems are more productive, provide higher agricultural yields and are also more resilient to natural hazards.

Climate change is expected to lead to rising temperatures and depending on the country, some increases as well as reductions with regard to precipitation in the Central Asian region. These climatic changes may lead to adverse impacts on crops, such as winter wheat as well as forage production and livestock productivity. The melting of glaciers is a crucial water source for irrigated agriculture as well as for hydropower production. As a result, the risk of Glacier Lake Outburst Floods (GLOFs) will also increase as well as the number and severity of other natural hazards, such as storms and droughts throughout the region, which will lead to extensive agricultural damages and losses. Reducing risks to agricultural production and incomes through building resilience to climate change will be key.

Rational of the CSA workshop and objectives

Although relatively new, Climate Smart Agriculture (CSA) is attracting increasing interest and attention in various parts of the world including in Central Asia. FAO and its partners have a number of on-going and forthcoming projects, which deal with different aspects of the Climate Smart Agriculture (CSA) approach. Given the importance of developing and planning well integrated interventions, which capture synergies and avoid trade-offs, FAO in collaboration with CACAARI, CAREC, CEU, GACSA and ICARDA, organized the Central Asia CSA conference in Bishkek, Kyrgyzstan from 12-14 July 2016.

The objectives of the workshop were to raise awareness and build capacity to undertake CSA approaches as well as to determine collective priority interventions at national and regional levels. This included the identification of the needed knowledge, tools and technical support and to link these to ongoing and new projects, such as the Second Phase of the Central Asian Countries Initiative for Land Management (CACILM-II) and FAO's Economics and Policy Innovations for Climate-Smart Agriculture (EPIC) programme.

The workshop brought together various regional and national delegates, from ministries, universities and research and extension institutes, international organizations and donors engaged in the five Central Asian countries. (see Annex 1 Agenda; Annex 2 List of participants and Annex 3 Participant profiles)

Online survey 'Central Asia activities on Climate Smart Agriculture'

Prior to the workshop, an online survey 'Central Asia activities on Climate Smart Agriculture' was conducted from 30 May until 17 June 2016, which was a joint activity of the Regional Office for Europe and Central Asia and four divisions of FAO, including the climate and environment, agricultural development economics, partnerships and capacity development divisions.

The objective of the survey was to take stock of the challenges posed by climate change to the agriculture sector in the Central Asian countries. It also aimed to collect available information and data to provide an informative picture

⁹ FAO, 1995. The state of food and agriculture 1995. Rome

¹⁰ Ibid.

of the context and how CSA could help to address these challenges through identifying potential activities and interventions aimed at transitioning towards suitable CSA options, which can simultaneously address the challenges of climate change and food security.

The survey was filled in by 131 respondents from 28 countries and a summary of the survey results can be found in Annex 5.

Workshop proceedings

Day 1 Session 1: Opening session

The opening session was moderated by Dorjee Kinlay, FAO Representative to Kyrgyzstan and included an opening speech and several opening remarks.

[Kerimaliyev Janybek, Deputy Minister of the Ministry of Agriculture of the Kyrgyz Republic](#), formally opened the workshop. In his remark he mentioned the importance of climate smart agriculture within the context of climate change, which will alter agricultural production conditions and affect food security in Central Asia. Its effects are already being felt through the adverse impacts of hydro-meteorological hazards, including droughts and river and flash floods, which are damaging and destroying agricultural equipment and causing losses in the crops, livestock, fisheries and forestry subsectors. Kyrgyzstan has experienced three dry spells during the last 5 years, which significantly decreased grain yields. In particular, the smallholder farmers, herders, fishers and foresters, which are heavily depend on the agriculture sector for their food and livelihoods are highly vulnerable to these climatic changes.

The region is also facing various environmental challenges, including land degradation, deforestation, desertification, salinization, as a result of the exploitation of its natural resources, including the intensive cultivation of cotton and wheat, which has adversely impacted its biodiversity and quality of air, water and soil. Addressing ecosystem degradation and loss is essential as healthy and diverse systems are more productive, provide higher agricultural yields and are more resilient to natural hazards. Reducing risks to agricultural production and incomes through building resilience to climate change will be key. Climate Smart Agriculture (CSA) offers the countries in Central Asia an integrative approach to address the interrelated challenges of food security, development and climate change. It addresses these challenges simultaneously, holistically and in an integrated way through coordination between different stakeholders and sectors, thereby capitalizing on potential synergies, reducing trade-offs and optimizing the use of natural resources and ecosystem services.

This conference will help to facilitate discussions on addressing the region's common needs and requirements and finding ways to develop country and regional CSA strategies to jointly collaborate and cooperate among the different sectors and stakeholders. It also offers an excellent opportunity, where awareness is raised on the expected impacts of climate change on agriculture and food security in the region. It will provide a platform where country's capacities, priorities and needs are taken into account and optimal and appropriate solutions for the local economic, environmental and social conditions are identified and shared. Mr. Janybek stated that the Kyrgyz government supports CSA policies and wished everyone fruitful discussions and a successful workshop in advance.

[Ram Sharma, Head of CGIAR Program Facilitation Unit and Regional Coordinator for Central Asia and the Caucasus, International Center for Agricultural Research in the Dry Areas \(ICARDA\)](#), provided a short introduction of the research center's work in the region. ICARDA is one of the 8 agricultural research centers of the Consultative Group on International Agricultural Research (CGIAR) and has been operating in Central Asia since 1995. He outlined some of the questions to be addressed during the workshop, including:

- Which CSA practices and technologies are suitable to be implemented in the region?
- Which policy interventions are required and what are the capacity development needs to support the adoption of the CSA practices and technologies?
- Which type of investments are needed?

Meder Seitkasymov, Head of the Central Asia Regional Economic Cooperation (CAREC) office in Kyrgyzstan, presented the various areas in which CAREC works, including climate change and energy. He highlighted the commitment of the Central Asian countries to contribute to the Sustainable Development Goals (SDGs). Environment and food security as well as sustainable development were mentioned as regional priorities with CSA viewed as an important tool to help address these challenges.

Alisher Tashmatov, Executive Secretary of the Central Asia and Caucasus Association of Agricultural Research Institutions (CACAARI), presented CACAARI's role in the region. The organization acts as a neutral forum, where stakeholders of agricultural research for development can discuss and debate critical issues related to the agriculture of the future.

Reuben Sessa, Climate Change and Energy Coordinator for Europe and Central Asia of the Food and Agriculture Organization of the United Nations (FAO), provided an overview of the workshop structure and the objectives of the workshop. The outputs from the workshop will be shared with relevant governmental agencies, research institutions and other stakeholders.

Day 1. Session 2: CSA fundamentals from concept to reality

This session focused on increasing the understanding of CSA, why it was created and how it is implemented. Speakers showcased the methodologies and tools used to identify context specific interventions and create the needed enabling environment to overcome barriers and allow, especially farmers to transition to CSA farming systems. Finally, the session showed how governments and international processes are supporting the adoption of the concept and what regional activities are already happening in Central Asia.

Presentations

'CSA beginnings, creation and overview'

Presented by **Reuben Sessa, Climate Change and Energy Coordinator for Europe and Central Asia, FAO**

The CSA concept was introduced by FAO in a background paper for Food Security and Climate Change conference held in The Hague in 2010. Climate smart agriculture is an integrative approach, which addresses the complex interrelated challenges of food security, development and climate change. It addresses these challenges simultaneously, holistically and in an integrated manner to avoid counterproductive policies, legislative or financing. A country's capacities, priorities and needs are taken into account in order to identify optimal and appropriate solutions for local economic, environmental and social conditions. CSA aims to sustainably increase agricultural productivity and incomes, adapt and build resilience of agricultural and food systems to climate change and reduce greenhouse gas emissions from agriculture where possible. This presentation provides an overview of the origins of the CSA approach, examples of good practices as well as current global and regional CSA initiatives.

The presentation can be found [here](#).

'Informed decision making for CSA adoption: methodologies and data requirements'

Presented by **Aslihan Arslan, ESA Division – EPIC, FAO**

The Economics and Policy Innovations for Climate-Smart Agriculture (EPIC) programme aims to identify and harmonize CSA policies, analysing impacts, effects, costs and benefits as well as incentives and barriers to adoption of CSA practices. The EPIC programme connects field research to policy making and financial investments in agriculture. This presentation outlines the operationalization of the CSA approach at country level, which involves building an evidence base through adequately assessing the situation and understanding the enabling environment, and describes the methodologies and data requirements for CSA.

The presentation can be found [here](#).

‘Creating an enabling environment for adoption of CSA transitions, policy and financial interventions’,
Presented by **Astrid Agostini, NRC Division, FAO**

Developing the required policy, financial and enabling environment helps provide small holder farmers the knowledge and access to resources and services for transitioning towards systems that are more profitable, environmentally sustainable and climate change resilient. The implementation of CSA requires such an enabling environment, which involves, among others, the existence of climate and sectoral plans and policies, which include CSA and agriculture as well as institutions that have mandates, incentives and planning, budgeting, monitoring and coordination capacities.

The presentation can be found [here](#).

‘Improving livelihoods through climate smart agriculture in Central Asia’,
Presented by **Manon Pascale Cassara, Water Resources Consultant and Focal Point for Regional Water, Energy, Climate activities in Central Asia, World Bank**

Central Asia is already experiencing the impacts of a changing climate, with warmer temperatures; glacier melt; increased variability in water resources; and frequent and costly weather-related hazards. Rural population is on the front line, considering that the poorest populations are mostly rural: From 60 to 75% of the “Bottom 40%”. All these impacts will exacerbate pre-existing conditions. The World Bank is acting both nationally and regionally for increased climate resilience. For instance, in Tajikistan, the Environmental Land Management and Rural Livelihoods Project (ELMARL) aims at enabling rural people to increase their productive assets in ways that improve natural resource management and resilience to climate change in selected climate vulnerable sites. Covering three different types of eco-regions, the project consists in developing finance mechanisms (grant facility) for rural communities as well as capacity building actions. In Central Asia, the Climate Adaptation and Mitigation Program for the Aral Sea Basin (CAMP4ASB) aims at supporting stakeholders at all levels to (i) strengthen the knowledge and information base on climate change risks (Climate Knowledge Services component) and (ii) provide financing and technical assistance to rural communities for climate-smart investments in sectoral areas considered as priorities by Central Asian countries (Climate Investment Facility).

The presentation can be found [here](#).

‘Upscaling CSA through the Global Alliance for Climate Smart Agriculture (GACSA),’
Presented by **Federica Matteoli, FAO on behalf of GACSA**

The Global Alliance for Climate Smart Agriculture (GACSA) is a voluntary alliance of partners committed to incorporating diverse CSA approaches across all climates, at all scales and levels. It facilitates and supports the exchange and sharing of knowledge and information among its members. GACSA’s work is led by a Strategic Committee, which is supported by a Facilitation Unit. There are three action groups around knowledge, investment and enabling environment. These actions groups support the work of the GACSA members and regularly report to the Strategic Committee. An annual forum is organized for the GACSA members, partners and interested parties to share knowledge, monitor and evaluate progress and develop solutions to address food security and climate change challenges.

The presentation can be found [here](#).

‘CACILM-II: meeting the needs through a regional CSA programme for Central Asia’,
Presented by **Guchgeldiyev Oleg, CACILM-II Project Task Manager, FAO**

The objective of the CACILM II programme is to enhance the integrated management of natural resources in the drought-prone and saline agricultural production landscapes of Central Asia and Turkey. It consists of 3 components: i) encourage regional co-operation and partnership, ii) ensure sustainability in the political, legal and institutional mechanisms for Integrated Coastal Area Management (ICAM) and iii) expand the adoption of climatically-optimized agricultural practices. CACILM-II focuses on 3 agro-systems: irrigation farming, rainfed agriculture (forestry) and pastures. The programme suggests several expansion measures to be implemented at regional, national and local levels, which include e.g. increasing the capacity of local and national organizations, exchanging experience and

knowledge between countries (South-south), creating favorable conditions to ensure the integration of CSA and effectively collaborating with existing programs.

The presentation can be found [here](#).

**‘Climate change adaptation programme of the Kyrgyz republic’,
Presented by Ekaterina Sakhvaeva, Information and Analytical Center Department of Water Management,
Ministry of Agriculture and Melioration of Kyrgyzstan**

The agriculture sector in Kyrgyzstan agriculture is expected to experience reduced yields due to impacts of climate change. In addition, it is likely that the area of deserts and semi-deserts will expand from 15 percent in 2000 to between 23.3 percent and 49.7 percent by 2100. The aim of the climate change adaptation programme is to assess the vulnerability of the agriculture and water resources sectors to climate change and develop climate change adaptation measures for these sectors. It intends to reduce the impact of climate change on crop and livestock production and food security and develop a model according to the three pillars of climate smart agriculture. Several adaptation measures have already been implemented for crop production, such as the development of modern resource-saving technologies for crop cultivation and soil protection, the introduction of drought-, pest- and salinity-resistant species, efficient use of irrigation water, optimal crop rotation and development and implementation of an early warning system for meteorological data for farmers to use. In addition, there are several implemented adaptation measures for livestock production and water resources.

The presentation can be found [here](#).

Discussions

Question to Reuben Sessa, FAO

Could you elaborate on the importance of managing the income reduction of farmers during the initial stage of CSA implementation?

Answer: During the transition phase, a decrease in income may be observed. It is very important to be aware that this may happen as well as providing incentives, such as those related to financing to support them. As there is a risk that farmers might switch back to conventional practices, when they are experiencing a reduction in income as they cannot afford this.

Comment to Ekaterina Sakhvaeva, Ministry of Agriculture and Melioration of Kyrgyzstan

Among our experts there is no yet a clear understanding of the threat posed by climate change in our region as temperatures are expected to increase slowly. Within this context, research on soil humidity is often lacking, whereas it is an important indicator that affects crop and pasture productivity.

Answer: We absolutely agree that soil humidity is one of the main components for acquiring higher yields, which is not studied sufficiently. Our research has shown that the process of desertification will likely continue in the near future as well as soil porosity, which concerns us.

Question to Ekaterina Sakhvaeva, Ministry of Agriculture and Melioration of Kyrgyzstan

Can you elaborate on the sectoral strategy, who has developed it and does it have a detailed action plan with an outlined scope, timeline and concrete activities?

Answer: This intra-sectoral strategy was developed by the Ministry of Agriculture with involvement from the various departments. With regard to the action plan, it was developed within the context of the existing state programmes, which I agree should be the frame in which these measures should be developed.

Question to Reuben Sessa, FAO

Could you elaborate more on Climate Smart Agriculture and its definition?

Answer: The CSA approach is an integrative approach, which has multiple objectives to address the complex interrelated challenges of food security, development and climate change. CSA addresses these challenges simultaneously, holistically and in an integrated manner. It looks at a whole series of parameters, including social, economic and environmental conditions, which need to be considered in order to select the appropriate interventions. For Central Asia, for example, water issues may be critical, but at the end of the day may not be the

highest priority if all relevant issues are included and considered. Applying the CSA approach allows to identify priorities and come up with appropriate location and context-specific solutions.

Comment by Aslihan Arslan, FAO

The difference between CA and CSA, is that while CA is a set of practices, which you have to apply, CSA is a complex set of different practices and interventions across different sectors, such as livestock and crop production

Comment by Reuben Sessa, FAO

CSA is context and location specific, which means that by assessing the environment, social and economic components of various countries there will be different scenarios for different areas. This workshop is aimed at starting the initial identification and evaluation of the CSA criteria for Central Asia with its specific contexts.

Question to Federica Matteoli, FAO

Can you provide more details about how to become a member of Global Alliance for Climate Smart Agriculture (GASCA)?

Answer: If your organisation wants to become a member, send an email to the GACSA facilitation unit. This unit will ask some details about your organisation and if it will participate in certain action groups etc. If you are not applying on behalf of an organization, it is still possible to join the GACSA. You can indicate that you will take part in one of the action groups as an expert.

Question to Oleg Guchgeldiyev, FAO

Dryland farming is important for Kazakhstan and it seems that it is currently not included in the activities of the Central Asia Countries Initiative for Land Management (CACILM) II project. Are there any envisioned project activities in this area?

Answer: Given the funding limitations of this project, USD 10 million for 5 countries for 5 years, we identified through national consultations in each country, a list of priority activities and selected the shared ones. As a result, 3 main activity areas were selected to be implemented in all 5 countries. Dryland farming is currently not on the list, but we are willing to cooperate with other initiatives to address this issue.

Question to Reuben Sessa, FAO

Is there any cost-benefit analysis, which gives an insight into the average duration for farmers who adopt a CSA practice to become economically viable for them? Do you have more information about existing safety nets for the vulnerable and subsistence farmers to support them during the transition phase?

Answer from Aslihan Arslan, FAO: The graph that was presented was not intended to imply that there is always a negative income flow during the transition to CSA. With the introduction of any new technology, there is always a transition phase. Until the farmer learns about a new technology, there is always a risk that their income may not increase. The graph that was shown was an example of what can happen during the initial stage of the adoption of a new practice, but it does not necessarily occur for all CSA interventions.

For instance, in Zambia, where conservation agriculture was intensively promoted for more than 20 years by various stakeholders, some disadoption was observed. One of the components of CA is legumes intercropping and at first the lack of markets for legumes was not addressed, whereas at present FAO together with its government is trying to tackle this.

Answer from Astrid Agostini, FAO: Financial support and social protection can also help bridge this gap between the initial income drop and the start of higher returns for farmers and thus can address disadoption.

Question to Federica Matteoli, FAO

In Kyrgyzstan there are various platforms at national and regional level, such as the climate change discussion platform. Is it possible that these platforms could somehow be linked to the GACSA platform?

Answer: It is very important to provide your suggestions and your inputs with regard to the GACSA, in particular, because we are trying to develop an alliance in the region and we are helping FAO with this. As GACSA is a network, you can receive assistance and support for the creation and establishment of projects, programmes and collaborations. GACSA also requires your support and assistance in identifying what the gaps and needs are for developing information products and documents on CSA.

Suggestion from Dinara Abdzhamilova, World Food Programme

The monitoring of soil quality is conducted once in 10-15 years and on a very small scale. If farmers were taught how to monitor their soil quality, it would expand existing statistics. At national level, there is the challenge of soil quality measurements not being systematically and consistently collected, which should also be addressed.

Answer from Ekaterina Sakhvaeva, the Ministry of Agriculture and Melioration of Kyrgyzstan

It is an important question as it is an institutional related issue in the countries. For example, the inspection of environmental security, which should manage and control land use, is not monitoring the soil quality as it is not part of their responsibility. In addition, conducting this research for the whole republic would be very complex and costly.

Answer from Oleg Guchgeldiyev: In our project, the monitoring of soil degradation and soil quality are one of the main project priorities which includes a capacity building component. This experience is extensively present in the countries. For example, experience regarding remote sensing in Kazakhstan. However, the challenge is to identify if countries are already sharing this information.

Question to Aslihan Arslan, FAO

Taking into account future climate projects for both adaptation and mitigation is critical for ensuring that CSA will help countries becoming resilient to future conditions. How is this taken into account?

Answer: What I presented is what we do within our team with regard to economics and policy innovations for CSA. We do not have the expertise for medium term and long term climate change projections, but we work with other colleagues on this. We analyse the impact of climate shocks on productivity and food security. With the projections from our colleagues we do simulations of what may happen in the future.

Comment from Kuralay Karibayeva, National GEF Project Preparation Grant Consultant

It was mentioned that CSA is a new approach, but I would like to remind everyone that it is not a new approach. It is an approach that we have been using for the last 30 years, due to the clear link between land management and climate change. We should aim for mobilizing more resources so that we can eventually upscale national activities at the regional level. In this way, we will be able to effectively address national as well as regional challenges and priorities. Important questions to tackle include: how to manage these activities effectively? Which global as well as regional lessons learned can we use to improve the management of projects and programs? How to acquire the financial resources and technological know-how? I hope we can work together as partners to aim to effectively and efficiently support the Central Asian countries to transition to climate smart agriculture.

Day 1. Session 3: Understanding Central Asia's social, economic and environmental context

This session consisted of nine presentations, which outlined the social, economic and environmental context of the Central Asian region.

Presentations

'Agricultural sector risk assessment study in Central Asia. Kazakhstan, Kyrgyz Republic and Tajikistan' **Presented by Talimjan Urazov, Senior Agricultural Specialist, World Bank**

The agriculture sector is exposed to various types of risks. Managing risk is an important part of farming. Climate change is increasing production risks in the short to medium-term, due to the increase in the frequency and severity of natural hazards, such as droughts and floods, and in the longer-term as a result of accelerated glacial melt and reduced precipitation, which will adversely impact water availability for irrigation. The modernization and commercialization of agricultural production and processing, which is critical for sector growth, also raises the sector's exposure to price risk at a time of high volatility on the international markets for agricultural commodities. The conclusions drawn from this study led to a series of recommendations on ways to improve risk management, based on three "solution areas": (i) agriculture productivity improvement, (ii) agricultural diversification, and (iii) improved livestock productivity.

The presentation can be found [here](#).

‘Agricultural transformation and food security under climate change in Central Asia’,
Presented by **Kamiljon Akrmov, Research Fellow and Leader of the Central Asia Program, IFPRI**

This presentation provides a brief summary of ongoing IFPRI research project on climate change and agricultural transformation in Central Asia. In particular, it provides empirical evidence of the impact of climate change on agricultural performance in the region using econometric models, assesses the impact of climate change on crop yields using biophysical and bio-economic crop models, and evaluates the effects of future climate change scenarios on agriculture and food security using economy-wide models. The main findings of the study suggest that an adverse impact of variations in temperature and precipitation on agricultural performance is heterogeneous across countries: smaller and less wealthy countries appear more affected than relatively larger and wealthier countries. The magnitude of institutional and organizational changes in agriculture seem significantly muted to the impact of climate change. Crop model simulations suggest that climate change creates additional opportunities for winter crops and challenges for spring crops. Both International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) model simulations indicate that rising temperatures will negatively affect, while increasing precipitation positively affect wheat yields in Kazakhstan. IMPACT simulations also suggest positive effects of climate factors on fruit and vegetable production areas and harvests in the region.

The presentation can be found [here](#).

‘Impacts of climate change on farm income security in Central Asia: An integrated modelling approach’
Presented by **Ihtiyor Bobojonov, Leibniz Institute of Agricultural Development in Transition Economies, IAMO**

Increased risk due to global warming has already become embedded in agricultural decision-making in Central Asia and uncertainties are projected to increase even further. Agro-ecology and economies of Central Asia are heterogeneous and very little is known about the impact of climate change at the sub-national levels. The bio-economic farm model (BEFM) is used for ex-ante assessment of climate change impacts at sub-national levels in Central Asia. The BEFM is calibrated to 10 farming systems in Central Asia based on the household survey and crop growth experiment data. The production uncertainties and the adaptation options of agricultural producers to changing environments are considered as paramount in the simulations.

Very large differences in climate change impacts across the studied farming systems were found. The positive income gains in large-scale commercial farms in the northern regions of Kazakhstan and negative impact in small-scale farms in arid zones of Tajikistan are likely to occur. Producers in Kyrgyzstan may expect higher revenues, but also higher income volatilities in the future. Agricultural producers in Uzbekistan may benefit in the near future, but may lose their income in the distant future. The negative impacts could be further aggravated in the arid zones of Central Asia if water availability for irrigation declines due to climate change and water demand increases in the upstream regions. The scenario simulations show that market liberalization and improved commodity exchange between the countries have very good potential to cope with the negative consequences of climate change.

The presentation can be found [here](#).

‘The life in Kyrgyzstan study: Panel data for socio-economic and agricultural development’
Presented by **Prof. Tillman Bruck, Team leader – Development Economics, IGGZ-Leibniz Institute of Vegetable and Ornamental Crops**

The ‘Life in Kyrgyzstan’ study is a research-based, open access, longitudinal survey of households and individuals in Kyrgyzstan. It follows the same 3000 households and 8000 individuals over time in all seven Kyrgyz regions (*oblasts*) and the two cities of Bishkek and Osh. The surveyed households also operate around 1500 micro enterprises. The surveys gather data from representative national and regional samples of the population and include data from all adult household members with regard to e.g. household demographics, assets, expenditure, migration, employment, agricultural markets, shocks, social networks, subjective well-being and various other topics. Some of these topics are addressed in each round while other topics are only addressed in selected rounds. The survey was first

conducted in the fall of 2010 and it has been repeated three times in 2011, 2012 and 2014. A new round will be collected in October 2016.

The presentation can be found [here](#).

'Farming Tools for external nutrient Inputs and water Management' (FATIMA)

Presented by **Dilek Kahraman, Director of UTAEM, Project Regional Manager, Turkey**

FATIMA addresses effective and efficient monitoring and management of agricultural resources to achieve optimum crop yield and quality in a sustainable environment. It covers both ends of the scale relevant for food production, viz., precision farming and the perspective of a sustainable agriculture within the context of integrated agri-environmental management. It aims to develop innovative and new farm capacities that help the intensive farm sector optimally manage and use their external inputs (e.g. nutrients, water), with the vision to bridge sustainable crop production with fair economic competitiveness. FATIMA addresses and works with user communities (e.g. farmers, managers, decision makers in the farm and agribusiness sector) at scales ranging from farm, over irrigation scheme or aquifer, to river-basins. It will provide them with maps of fertilizer and water requirements (to feed into precision farming machinery), crop water consumption and a range of further products for sustainable cropping management supported with innovative water-energy footprint frameworks. FATIMA will be implemented and demonstrated in 7 pilot areas representative of key European intensive crop production systems in the Austria, Czech Republic, France, Greece, Italy, Spain and Turkey.

The presentation can be found [here](#).

'Building resilience to climate change through sustainable land management in Tajikistan',

Presented by **Sharipov Khukumat, Agricultural specialist, Committee of Environmental Protection under the Government of the Republic of Tajikistan**

The government of Tajikistan aims to reduce the vulnerability of its agriculture sector to climate change. The country is facing various socio-economic and environmental conditions and challenges. A summary of related activities to CSA was provided. In addition, the applied methods, tools and standards of the study as well as identified gaps in the collected data were presented. There still remains a need for adequate monitoring to achieve the objectives of CSA, particularly in addressing the issues related to climate change and food security.

The presentation can be found [here](#).

'Overview of IWMI's research in Central Asia and future prospects for collaboration',

Presented by **Zafar Gafurov, International Water Management Institute, Central Asia – IWMI-Tashkent**

One of the main challenges of climate change will be the availability of water for the agriculture sector. Within this context, current research is focused on studying the climate change phenomena, identifying different adaptation strategies and potential innovative water management technologies applicable to the sector. Modern technologies, such as Geographical Information Systems (GIS) and remote sensing, are being widely used to conduct research activities. The research outcomes will help decision making entities take the necessary measures to increase water and agricultural productivity in the region.

The presentation can be found [here](#).

'Status and perspectives of rural advisory services systems in Central Asia'

Presented by **Alisher Tashmatov, CACAARI and Botir Dosov, ICARDA, CACAARI, CAC-FRAS**

The importance of the Climate Smart Agriculture (CSA) approach for modern agricultural research and extension is extremely significant due to the ongoing and forthcoming projects, which focus on sustainability, agricultural productivity and the well-being of farmers. As a regional forum for Central Asia

and the Caucasus (CAC), the Central Asia and the Caucasus Association of Agricultural Research Institutes (CACAARI) would like to highlight and deliver the importance of CSA among its stakeholders, develop CSA national programmes, baselines and priorities for each country in the region. Additionally, examining the 'current gaps' that research, development and extension should be tackling can surely provide the necessary support in terms of receiving information and knowledge of international processes and mechanisms, which as a result can effectively influence the integration of CSA approach in Central Asia. The presentation outlines the main types of rural advisory services in Central Asia, including the various challenges that these services are facing. Approaches to promote and invest in knowledge in the agriculture sector are discussed, such as the promotion of examples of existing e-platforms, which provide agricultural knowledge and services in Central Asia.

The presentation can be found [here](#).

'Plantwise: An approach for extension delivery at scale'

Presented by Luca Heeb, Plantwise Programme Support Officer, CABI-CH Europe

Widespread uptake of CSA practices heavily depends on well-performing (public or private) extension and advisory systems. However, these advisory services in many developing countries are often chronically understaffed, have limited operational funds, and weak linkages to other actors, such as research. The Plantwise programme, which is implemented in 34 countries in Africa, Asia and the Americas, is an example that illustrates how complementary extension approaches can contribute to putting CSA research into use and address climate change mitigation and adaptation based on their reach and impact potential. It also shows that extension approaches with two-way information flows are particularly valuable for climate change adaptation as real-time agricultural information is collected and climate change effects are detected at a local scale, which can be used by decision makers to take informed decisions to emerging threats to agriculture and food security.

The presentation can be found [here](#).

After the presentations, the participants actively engaged in various discussions. An overview of some of the questions raised and comments provided included:

- What are some of the assessment mechanisms to measure scarcity of water resources, which influences irrigation?
- How to get access to data that is collected by extension service providers and what are potential ways of cooperation with them?
- Which approaches and recommendations exist for farmers with regard to CSA?
- What are the indicators to measure and evaluate the differences in yield between irrigated and arable lands?
- Farmers are in need of information relevant to agriculture and in order to provide such information to them, it is recommended to use a strategic approach to address their needs. For example, to develop online services through which farmers are able to receive information based on their requests and needs.

Day 1. Session 4: Breakout I - Developing a CSA national programme, setting the baselines & priorities

This session allowed participants to start the process of developing a national CSA approach. CSA is context specific and needs to be undertaken through an evidence based and methodological approach to ensure that the optimal agricultural and landscape interventions are identified. The CSA approach also supports the adoption of identified interventions by creating the needed capacity, institutional, policy and legislative frameworks. Breakout I allowed participants to set the different baselines, identify current and potential future shocks (especially related to climate) and set priorities for operationalizing CSA in each country.

Before the session started the following presentation was conducted to share the results of the online survey on CSA activities in Central Asia.

Presentations

‘Summary of the survey “Central Asia activities on climate smart agriculture”

Presented by **Federica Matteoli, Natural Resource Officer, FAO**

The online survey ‘Central Asia activities on Climate Smart Agriculture’ was conducted from 30 May until 17 June 2016, which was a joint activity of the Regional Office for Europe and Central Asia and four divisions of FAO, including the climate and environment, agricultural development economics, partnerships and capacity development divisions. The aim of the survey was to take stock of the challenges posed by climate change to the agriculture sector in Central Asian countries. It also aimed to collect available information and data to provide an informative picture of the context and of how CSA could help to address these key challenges. The survey was filled in by 131 respondents from 28 countries. A summary of the survey results was presented, with detailed results per question outlined in Annex 5.

The presentation can be found [here](#).

During this session, the participants were divided into smaller groups, which each covered a Central Asian country (see Annex 4 Division of participants in working groups). Each group discussed several questions per country. The results from the group work are outlined as follows:

Kazakhstan

Topic 1 to discuss:

What are the main challenges posed by climate change in the agricultural subsectors in Kazakhstan?

For priority number: 1 – the most important; 5 – the least important

Priority number	<u>Main challenges in the crop sector</u>	<u>Vulnerable agro-ecological areas/socio-economic groups</u>
1	Reduced crop (yield) production: all crops	Steppe, semi-desert zones / small-scale producers; steppe zone / grain producers; desert / livestock breeders
2	Increased impact of natural hazards on crop production and agricultural infrastructure: flooding, strong rains, late spring and early autumn frosts	All zones / small agricultural producers
3	Reduced water resources due to water scarcity and droughts	South Kazakhstan
4	Increased growth of weeds, pests and fungi	All zones
5	Soils – erosion and nutrient depletion	Wind erosion / Steppe, semi-desert and desert zones
	<u>Livestock production sector</u>	
1	Increased spread of livestock diseases & parasites	All zones
2	Reduced availability of drinking water and forage for livestock due to water scarcity and droughts	Steppe, semi-desert and desert zones
3	Livestock health and welfare – due to heat stress, reduced fertility and milk production	Steppe, semi-desert and desert zones
	<u>Forestry sector</u>	
1	Increased impact of natural hazards, such as droughts, wild fires, flooding and storms	Semi-desert and desert zones
2	Reduced growth and productivity of forests	Semi-desert and desert zones
3	Increased insect outbreaks to weaken and kill trees, which result in reduced storage of CO ₂	Desert mountain foot zones

	<i>Fisheries and aquaculture sector</i>	
1	Impact of natural hazards on inland water fish stocks and habitats	Caspian, Aral and Balkhash basins
2	Timing of reproduction and migration of fish species due to changes in temperature and seasons	Ural-Caspian basin and the Ili-Balkhash basin
3	Increased salinity of inland water resources due to temperature increase	Small Aral basin
4	Increased outbreaks of fish diseases due to warmer water	-

Topic 2 to discuss:

What are the most important agricultural and rural development intervention priorities required to address the challenges identified in question one?

<i>a. Most important agricultural and rural development intervention priorities</i>	<i>b. Existing zones with interventions</i>	<i>c. Areas that need interventions</i>
Sustainable crop diversification, including drought- and salt- and stress-tolerant	Steppe, semi-desert and desert zones	Almaty and Akmolin districts
Water/irrigation management	South Kazakhstan	Gambul district and south Kazakhstan
Ecosystem services & eco-based adaptation	All zones	Almaty and Kyzylorda districts
Sustainable intensification	All zones	
Soil erosion prevention	Central Kazakhstan	
Sustainable agroforestry	Desert mountain foot zones	AO
Genetic resources conservation	Desert mountain foot and mountain zones	AO
Soil-preserving resources and technologies	Steppe, desert zones	Almaty and Akmolin districts
Organic farming	Kustanay district	All zones
Education and capacity building of all stakeholders	All zones	All zones

Topic 3 to discuss: Data and analysis relevant to CSA in Kazakhstan

3.1. What are the existing sources of socio-economic data at household/community level that can be used to analyze the interactions between climate shocks/variability, agricultural production, food security and adaptation?

State Agencies on Statistics; KazHydroMet

3.2. What are the existing sources of data on environmental/natural resources (e.g. soil type, water availability, altitude) that can be used in analyzing the interactions between environmental constraints, household behavior and climate change?

Agroclimatic guides by region; WB; CYMMIT; FAO; UNDP; UNEP

3.3. Do you know of any existing/ongoing analyses that use the above sources of data? Please provide details of the organization that has undertaken/is undertaking the study.

Institute of Geography; Institute of Space Research; Institute of Ecology and Sustainable Development

3.4. a) What are the most reliable sources of rainfall and temperature data? What is the geographical and time coverage of national weather stations? Institutions that are in charge of this data?

KazHydroMet

b) Are there any downscaled climate analyses for medium to long term at sub-national level?

KazHydroMet

c) Are there any existing programs to disseminate climate information to farmers/herders/foresters/fishers to support informed decision making? Please provide details.

GEF/SGP; UNDP

3.5. a) What are the sources of most reliable data on GHG emissions from agricultural sectors?

Ministry of Energy

b) Are there existing site-specific analyses of mitigation potential from agricultural sectors? Who has done it? Please provide details.

No

3.6. a) What are the sources of sub-national institutional data (e.g. banks, credit institutions, extension agents, safety nets, weather insurance)?

None

b) Are there any analyses on the performance of institutions and their impacts on agricultural household decisions and livelihoods?

None

3.7. What are the sources of sub-national market data on agricultural input/output prices, value chains, producer organizations?

KazAgroMarketing

Kyrgyzstan

Topic 1 to discuss:

What are the main challenges posed by climate change in the agricultural subsectors in Kyrgyzstan?

For priority number: 5 points = maximum priority

Priority number	Main challenges in the <u>crop sector</u>	Vulnerable agro-ecological areas/socio-economic groups
1	Increased impact of natural hazards on crop production and agricultural infrastructure	4 points (landslides, mudflows) arable land, pastures, villages
2	Reduced water resources due to water scarcity and drought	4 points, arable land and pastures (esp. South and Naryn district, Issyk-Kul) / rural residents
3	Soils – erosion and nutrient depletion	Max 5 points, arable land, pastures, forests / rural residents
	<u>Livestock production sector</u>	
1	Increased spread of livestock diseases & parasites	4 points, rural residents
2	Reduced availability of drinking water and forage for livestock due to water scarcity and droughts	5 points, rural residents

	<u>Forestry sector</u>	
1	Increased impact of natural hazards, such as droughts, wild fires, flooding and storms	3 points
2	Increased insect outbreaks to weaken and kill trees, which result in reduced storage of CO2	3 points, forest users

Topic 2 to discuss: Most important agricultural and rural development intervention priorities

What are the most important agricultural and rural development intervention priorities required to address the challenges identified in question one?

	a. Most important agricultural and rural development intervention priorities	b. Existing zones with interventions	c. Areas that need interventions
1	Water/irrigation management	Arable land (AWP)	
2	Ecosystem services & eco-based adaptation	Pastures, forests (GIZ, UNDP, REC)	Arable land, pastures, water / pilots, knowledge, potential...
3	Soil erosion prevention	Pastures (pasture management plans); forests (projects FAO, GIZ...)	Irrigated arable land, forests, pastures
7	Capacity building among farmers in climate change adaptation	Arable land (rural advisory services, BIO KG)	Pastures
8	Introduction of soil- and water-saving technologies	Arable land	Pastures
9	Organic farming	Biocotton; Green villages; Organic aimag / International organisations. Arable land and forests	Pastures
10	Promotion of green production	Forests, arable land (forest fruits, biocotton...)	Livestock produce, seeds
11	Value chain for organic products	Forests and arable land (walnut, potatoes, apples, appricots, quinoa) / Agrolead, TES center, GIZ, WFP	Livestock

Topic 3 to discuss: Data and analysis relevant to CSA in Kyrgyzstan

3.1. What are the existing sources of socio-economic data at household/community level that can be used to analyze the interactions between climate shocks/variability, agricultural production, food security and adaptation?

National Statistical Committee, project data

3.2. What are the existing sources of data on environmental/natural resources (e.g. soil type, water availability, altitude) that can be used in analyzing the interactions between environmental constraints, household behavior and climate change?

HYDROMET, National Statistical Committee, sectoral institutes

3.3. Do you know of any existing/ongoing **analyses** that use the above sources of data? Please provide details of the organization that has undertaken/is undertaking the study.

National Communication on Climate Change, environment protection, UNEP and WB projects

3.4. a) What are the most reliable sources of **rainfall and temperature data**? What is the geographical and time coverage of national weather stations? Institutions that are in charge of this data?

HYDROMET, 46 meteorological stations,...Central-Asian Institute for Applied Biosciences...paid data

c) Are there any downscaled climate analyses for medium to long term at sub-national level?

Project reports, programme reports

b) Are there any existing programs to disseminate climate information to farmers/herders/foresters/fishers to support informed decision making? Please provide details.

Extention Services System, Public Fund CAMP alattoo, promoting increase of agricultural production

3.5. a) What are the sources of most reliable data on GHG emissions from agricultural sectors?

Ministry of agriculture, State Agency of Environmental Protection, theoretical reports

b) Are there existing site-specific analyses of mitigation potential from agricultural sectors? Who has done it? Please provide details.

No

3.6. a) What are the sources of sub-national institutional data (e.g. banks, credit institutions, extension agents, safety nets, weather insurance)?

None

b) Are there any analyses on the performance of institutions and their impacts on agricultural household decisions and livelihoods?

None

3.7. What are the sources of sub-national market data on agricultural input/output prices, value chains, producer organizations?

National Statistical Committee (monthly bulletin on district level), Ministry of agriculture, information portals

Tajikistan

Topic 1 to discuss:

What are the main challenges posed by climate change in the agricultural subsectors in Tajikistan?

For priority number: 1 – the most important, 5 – the least important

Priority number	Main challenges in the <u>crop sector</u>	Vulnerable agro-ecological areas/socio-economic groups
3	Reduced crop (yield) production	Drought: Yes, especially in non-irrigated arable area - cereals, legumes; In pasture zone - pasture productivity decreases significantly due to the lack of moisture
2	Increased impact of natural hazards on crop production and agricultural infrastructure	In the case of floods and landslides agricultural lands and infrastructure are being damaged: soil becomes infertile, LEP can be demolished

4	Reduced water resources due to water scarcity and droughts	Drying up of small rivers and small glaciers, irrigation conflicts at village level
5	Increased growth of weeds, pests and fungi	Increase of pests and diseases with increasing temperature and humidity (fungal diseases of cereals); an increase in weeds due to extenuation of crops
1	Soils – erosion and nutrient depletion	Due to irrational use of arable land and pastures, the soil becomes exposed; in the case of drought - wind erosion; in the case of a wet year - water erosion
		It is necessary to expand the area under forests, forage crops (especially beans) to reduce the risk of soil erosion
	Many problems with pesticides, their inventory haven't been updated for a long time	
	Outdated laboratory equipment , methodologies and salinisation maps	
	Poor extention services for helping farmers	
	Lack of climatic and statistic data on the level of households (apart from sociological)	No climate data at the village level; on the land size of households
	<u>Soils – erosion and nutrient depletion</u>	
2	Increased spread of livestock diseases & parasites	Due to the temperature rise, the number of parasites and pests increases by several generations
1	Reduced availability of drinking water and forage for livestock due to water scarcity and droughts	In summer, in case of drought – there is a problem with watering for livestock; in winter - a problem with the feed, especially if followed by a prolonged cold spring
3	Decreased livestock health and welfare – due to heat stress, reduced fertility and milk production	Yes, they may be subjected to thermal stress; during droughts - lack of feed - leads to famine, especially in winter; during this small cattle is more mobile and can be driven away to the mountains for summer pasture and other cattle is more vulnerable (less mobile)
	<u>Forestry sector</u>	
2	Increased impact of natural hazards, such as droughts, wild fires, flooding and storms	Is not damaged that much, because it's mainly floodplain forests
1	Reduced growth and productivity of forests	
3	Increased insect outbreaks to weaken and kill trees, which result in reduced storage of CO2	Forests occupy 3%. Yes, insects and pests cause a lot of damage at elevated temperatures
	<u>Fisheries and aquaculture sector</u>	
1	Impact of natural hazards on inland water fish stocks and habitats	Many natural disasters cause turbidity, which affects habitat and feeding of river fish
3	Change in timing of reproduction and migration of fish species due to changes in temperature and seasons	No, it's not affected, since inflowing river water is usually cold, and pond fish farming is regulated
2	Increased salinity of inland water resources due to temperature increase	Almost doesnt happen
4	Increased outbreaks of fish diseases due to warmer water	Yes, the temperature rise can cause outbreaks of fish diseases in pond fish farming

Topic 2 to discuss:

What are the most important agricultural and rural development intervention priorities required to address the challenges identified in question one?

	a. Most important agricultural and rural development intervention priorities	b. Existing zones with interventions	c. Areas that need interventions
1	Crop diversification	There are 11 agro-climatic zones, different in climate. Before there was only cotton cultivated in the valley, now there are also legumes, melons, vegetables, agro-forestry and forage. In the mid-mountains there was only tobacco, now – flax, chickpeas, safflower and forage. Diversification happens mostly under governmental projects (Ministry of Agriculture), but also with the support of international projects, which supply seeds and technologies. Although agricultural system remains unchanged.	Innovation happens under agricultural reform – there is a programme There should be more adapted varieties of major crops and fodder (drought-resistant and salt-tolerant). Seed selection should be improved.
2	Water/irrigation management	It is necessary to repair sprinklers and to clean drainage system annually	Lack of equipment and technique
3	Ecosystem services & eco-based adaptation	Further establishment of the system of vertical (seasonal) livestock transhumance; raising awareness about ecosystem services and their assessment	Seasonal pasture rotation; introduction of best practices CSA and SLM
4	Sustainable intensification	Introduction of new technologies in crop sector, livestock breeding, and mechanisation of agriculture	Usage of mini agricultural machines, capable of operating on slopes; modernization of development of vaccines for cattle; introduction of green economy; SLM and CSA
5	Soil erosion prevention	In irrigated zone – for avoiding secondary salinisation - drainage cleaning, bio-drainage; in mid-mountainous zone – forest planting and other anti-erosion measures; in rainfed zone – application of anti-erosion machinery (plowing across the slope, increase the rate of seed sowing, timely sowing, etc.); in pasture zone – pasture rotation	Strengthening machinery-tractor system: excavators, tractors
6	Agro-forestry	It is necessary to increase the area under orchards, forests, in order to stabilize slopes and effectively use land on the slopes	Agroforestry and forestry are necessary - to have feed, firewood, fruits

7	Alternative source of electricity production	Electricity in the winter is supplied in a small amount. Therefore, it is necessary to develop alternative sources of energy (yet expensive)	Awareness raising, help in purchasing
8	Registration of pesticides – list of permitted pesticides hasn't been updated since 2004	List of permitted pesticides requires updating	Inventory of old stocks on farms, liquidation; creation of the appropriate safety system for the population
9	Updating of map information on natural resources (soil, vegetation, soil erosion, salinization of soils ...) with the use of GIS and RS	Salinization and erosion maps are obsolete, it is necessary to update them using GIS technology	Broad implementation of GIS and RS
	It is necessary to increase the capacity in the field of agriculture at all levels, in the field of CC, CSA, SLM	Further training of researchers; raising awareness among farmers, decision-makers, etc.	Modern equipment of laboratories - to monitor degradation processes (salinization, erosion, soil compaction and depletion...)
	Climatic data	Not available to everyone and exist only on the level of districts and regions	Automatic Weather Stations are needed
	Seed selection and nursery for seedlings	A large initiative on agroforestry and tree planting was developed in the country	It is necessary to increase the number of nurseries and high-quality varieties of seedlings (drought- and salt-tolerant)
	Increasing the number of companies providing extension services and increasing their capacity	Assistance in establishing a network of extension services centers - both state (in TAU, TAAS) and non-state; increasing their capacity	Increasing capacity (change of structure, content, ease of access to technology and innovative practices databases); upgrading equipment for laboratories to assess the content of organic matter, NPK soil properties, especially in research institutes and universities
	Ensuring food security	Cultivation of crops, highly resistant to diseases, droughts and salinization is very important	New resistant varieties

Topic 3 to discuss: Data and analysis relevant to CSA in Tajikistan

3.1. What are the existing sources of **socio-economic data** at household/community level that can be used to analyze the interactions between climate shocks/variability, agricultural production, food security and adaptation?

- On households level – there is information on livestock sector, social data, but not on climatic changes;
- increasing potential of farmer's and local khukumats – can't plan work on place;
- information on climate change is available only on the level of districts, but not everywhere. It is not accessible to everyone.

3.2. What are the existing sources of data on environmental/natural resources (e.g. soil type, water availability, altitude) that can be used in analyzing the interactions between environmental constraints, household behavior and climate change?

Committee of Land Management (needs to be updated); issued 2 atlases of natural resources - 1 - 1968 ; 2 - 1983 on the basis of satellite images; there is information on the Internet.

3.3. *Do you know of any existing/ongoing analyses that use the above sources of data? Please provide details of the organization that has undertaken/is undertaking the study.*

Many projects have used these data , the most recent - CACILM – 1, CACILM - 2 (IFAD \ ICARDA), but nothing was given back to local institutions (electronic maps were not sent); mapping data stops as soon as the project finishes.

3.4. *a) What are the most reliable sources of rainfall and temperature data? What is the geographical and time coverage of national weather stations? Institutions that are in charge of this data?*

HYDROMET

c) Are there any downscaled climate analyses for medium to long term at sub-national level?

Project PPCR WB

b) Are there any existing programs to disseminate climate information to farmers/herders/foresters/fishers to support informed decision making? Please provide details.

No.

3.5. *a) What are the sources of most reliable data on GHG emissions from agricultural sectors?*

Project PPCR WB

b) Are there existing site-specific analyses of mitigation potential from agricultural sectors? Who has done it? Please provide details.

Project PPCR WB

3.6. *a) What are the sources of sub-national institutional data (e.g. banks, credit institutions, extension agents, safety nets, weather insurance)?*

The system is poorly developed and almost inaccessible to farmers

b) Are there any analyses on the performance of institutions and their impacts on agricultural household decisions and livelihoods?

More likely no, then yes

3.7. *What are the sources of sub-national market data on agricultural input/output prices, value chains, producer organizations?*

Statistical Committee (much is available on their site - www. stat.tj also the issue bulletins and digests).

Turkmenistan

Topic 1 to discuss:

What are the main challenges posed by climate change in the agricultural subsectors in Turkmenistan?

For priority number: 1 – the most important, 5 – the least important

Priority number	<i>Main challenges in the crop sector</i>	<i>Vulnerable agro-ecological areas/ socio-economic groups</i>
1	Reduced crop (yield) production	Wheat and cotton

2	Reduced water resources due to water scarcity and droughts	Nothern Turkmenistan
3	Increased growth of weeds, pests and fungi	Weeds, diseases of wheat; all zones
4	Soils – erosion and nutrient depletion	Soil salinisation, Засоление почвы, deflation; all zones
	<u>Livestock production sector</u>	
1	Reduced availability of drinking water and forage for livestock due to water scarcity and droughts	Reduced pasture productivity and food availability (-1.5%), lack of pasture irrigation (Central Karakum)
	<u>Forestry sector</u>	
1	Increased insect outbreaks to weaken and kill trees, which result in reduced storage of CO2	Pests (locusts, two new species of pests)
	<u>Fisheries and aquaculture sector</u>	
1	Shrinking of aquatory habitat of fish (drying out)	River Kushka, river Murghab, river Tedjen; Kopetdag watercourse

Topic 2 to discuss:

What are the most important agricultural and rural development intervention priorities required to address the challenges identified in question one?

	<i>a. Most important agricultural and rural development intervention priorities</i>	<i>b. Existing zones with interventions</i>	<i>c. Areas that need interventions</i>
1	Crop diversification Drought resistance, resistant to disease - Wheat - winter-hardy, salt-resistant, drought-resistant	Started in Akhal and Mary Velayat	In northern districts
	- pearl millet	- Salinised soils	In northern districts
2	Introduction of crop rotation in wheat and cotton cultivation	wheat and cotton fields	wheat and cotton fields
	Introduction of improved varieties of wheat (zoning)	All zones	All zones
3	Water/irrigation management		
	Use of traditional technologies: wells (18-20 m); headers (pools); sardob (wells)	Central Karakum	Desert pastures
	Protection of watersheds of mountain rivers	Foothill and mountain areas	Foothill and mountain areas
	Sowing in rows	Akhal, Mary	Dashogooze, Lebap
	No-till	none	Northern Turkmenistan
	Ecosystem services & eco-based adaptation		
4	Introduction of methods of improving pasture productivity: radical and superficial improvement	Central Karakum, delta of the Murghab river	Central Karakum
	Improved pasture management (seasonal, annual)	Central Karakum	Central Karakum
5	Pests and diseases		
	Cotton (biological methods)	All zones	All zones
	Locust (mechanical methods)	Foothill zones	Foothill zones
7	Growing pistachios and almonds (agroforestry)	Mountain and foothill areas	Mountain and foothill areas
8	Support for the development of horticulture, rocker sowing (rainfed conditions)	Mountain and foothill areas	Mountain and foothill areas

Uzbekistan

Topic 1 to discuss:

What are the main challenges posed by climate change in the agricultural subsectors in Uzbekistan?

For priority number: 5 points = maximum priority

Priority number	<u>Main challenges in the crop sector</u>	<u>Vulnerable agro-ecological areas/socio-economic groups</u>
4	Increased growth of weeds, pests and fungi	
4	Soils – erosion and nutrient depletion	- Arable land, - pastures, - forests vulnerable group - rural population
3	Increased impact of natural hazards on crop production and agricultural infrastructure	
2	Reduced crop (yield) production	Irrigated and rainfed lands - The most vulnerable crops - wheat, cotton and rice; wheat - a strategic crop for food security - High soil salinity; - Water scarcity and droughts; - Land degradation; - Plant diseases; The most vulnerable type of agriculture - rainfed farming
1	Reduced water resources due to water scarcity and droughts	- Irrigated agriculture; - pastures; - fisheries; - increased salinity and degradation
	<u>Livestock production sector</u>	
5	Increased spread of livestock diseases & parasites	- Poor pasture management; reduction of fodder for livestock
2	Reduced availability of drinking water and forage for livestock due to water scarcity and droughts	
3	Livestock health and welfare – due to heat stress, reduced fertility and milk production	
	<u>Forestry sector</u>	
5	Increased impact of natural hazards, such as droughts, wild fires, flooding and storms	Desert forests
2	Reduced growth and productivity of forests	
3	Increased insect outbreaks to weaken and kill trees, which result in reduced storage of CO ₂	
	<u>Fisheries and aquaculture sector</u>	
4	Increased outbreaks of fish diseases due to warmer water	
3	Increased salinity of inland water resources due to temperature increase	
2	Change of timing of reproduction and migration of fish species due to changes in temperature and seasons	
1	Impact of natural hazards on inland water fish stocks and habitats	Droughts and water shortages in the lower reaches of the estuary leading to instability of lakes and increase in water temperature in them

Topic 2 to discuss:

What are the most important agricultural and rural development intervention priorities required to address the challenges identified in question one?

	a. Most important agricultural and rural development intervention priorities	b. Existing zones with interventions	c. Areas that need interventions
1	Crop diversification	Only irrigated lands	Forage production, marginal lands
2	Water/irrigation management	Irrigated cropland	Water catchment zones, including small and waterharvesting; desert pastures
3	Ecosystem services & eco-based adaptation	Wetlands, mountain forests, lakes	Desert ecosystems (forests)
4	Sustainable intensification	Irrigated lands (limited)	Scientific research; infrastructure improvement; Management and Planning System
5	Soil erosion prevention	Mountain areas (partially) Irrigated cropland (partly) Desert pastures (partially)	Mountain areas; irrigated cropland; desert pastures; access to technology and seed material; seed multiplication nurseries; development of organic farming; soil protection technology
6	Agroforestry	Irrigated and rainfed lands	Upscaling; changing the terms of the land lease; incentives
7	Institutionalization of the rural advisory services; improving knowledge dissemination system		Create the system of rural advisory services
8	Drought and salinity management (adaptation to drought and salinity)	Introduction of drought-resistant and salt-tolerant crops; innovative water saving technologies	
9	Information supply for climate risk assessment on the local level		

Topic 3 to discuss: Data and analysis relevant to CSA in Uzbekistan

3.1. What are the existing sources of socio-economic data at household/community level that can be used to analyze the interactions between climate shocks/variability, agricultural production, food security and adaptation?

State Committee on Statistics; Center for economic research

3.2. What are the existing sources of data on environmental/natural resources (e.g. soil type, water availability, altitude) that can be used in analyzing the interactions between environmental constraints, household behavior and climate change?

State Committee on Environment; State Committee on Statistics; Ministry of agriculture and water resources; UzHydroMet; Geodesy Cadastre; satellite data

3.3. *Do you know of any existing/ongoing analyses that use the above sources of data? Please provide details of the organization that has undertaken/is undertaking the study.*

UzHydroMet – forecasts, inventory of GHGs, climate risks assessment;
Geodesy Cadastre - soil maps, evaluation of site quality and state of lands; Scientific institutions;
ICARDA, IWMI etc.

3.4. *a) What are the most reliable sources of rainfall and temperature data? What is the geographical and time coverage of national weather stations? Institutions that are in charge of this data?*

UzHydroMet

b) Are there any downscaled climate analyses available for medium to long term at sub-national level?

Yes

c) Are there any existing programs to disseminate climate information to farmers/herders/foresters/fishers to support informed decision making? Please provide details.

Partially yes

3.5. *a) What are the sources of most reliable data on GHG emissions from agricultural sectors?*

National Inventory

b) Are there existing site-specific analyses of mitigation potential from agricultural sectors? Who has done it? Please provide details.

General Directorate of Forestry at the Ministry of agriculture and water resources

3.6. *a) What are the sources of sub-national institutional data (e.g. banks, credit institutions, extension agents, safety nets, weather insurance)?*

Ministry of Economy, State Committee on Statistics

b) Are there any analyses on the performance of institutions and their impacts on agricultural household decisions and livelihoods?

Partially yes (NCSA – National capacity self-assessment)

3.7. *What are the sources of sub-national market data on agricultural input/output prices, value chains, producer organizations?*

State Committee on Statistics, Ministry of Economy

Day 2. Session 5: Relevant CSA agricultural and landscape interventions for Central Asia

Presenters from international institutions and national actors provided examples of agricultural systems and practices as well as landscape interventions, which have been identified to address specific challenges in the Central Asia region. This session also highlighted major research areas being coordinated across the region, including specific work on climate change adaptation, for example, the development of climate resilient varieties of crops, vegetables and fruits.

Presentations

‘Knowledge management for sustainable land management in CACILM II’

Presented by **Akmal Akramkhanov, Project Coordinator, ICARDA**

Extensive use of inappropriate and unsustainable agricultural practices followed by an inadequate assessment and monitoring of land degradation across Central Asian countries, have led to extensive economic, social and environmental issues and challenges in this region. In close partnership and support from national governments and international organizations, the CACILM II project is aimed at combating land degradation and improving rural livelihoods across the region. This presentation outlines the activities related to knowledge for sustainable land management of the CACILM II project, such as awareness raising and dissemination of knowledge and information. Through similarity analysis sustainable land management (SLM) technologies and approaches were identified based on four target agro-ecosystems: irrigated, mountain, rain-fed and rangelands. To address specific issues within certain technologies, a package for each agro-ecosystem was established, which consisted of core and other technologies. The selected relevant data sets on land degradation, water availability, precipitation, digital elevation data and others were compiled from available online data sources and further processed and analyzed. The developed similarity maps will be used to identify target areas to disseminate the SLM packages in the four agro-ecosystems.

The presentation can be found [here](#).

‘Ecosystem-based Adaptation in Central Asia – An innovative approach to help people adapt to climate change’

Presented by **Paul Schumacher, Advisor, GIZ, Kyrgyzstan**

The regional project on ecosystem-based adaptation (EbA) in high mountainous regions of Central Asia (CA), implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, and commissioned by the International Climate Initiative (IKI) from the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) has started in June 2015. The EbA concept aims to help people adapt to the adverse impacts of climate change by using services provided by nature (CBD 2009). With this concept, a sustainable and climate sensitive use of natural resources is promoted to sustain and enhance the livelihood of the population depending on those resources.

The presentation can be found [here](#).

‘World Bank and International Fund for Agricultural Development inputs to pasture management improvement in the Kyrgyz Republic’

Presented by **Mairambek Tairov, APIU Director, Ministry of Agriculture and Melioration of the Kyrgyzstan**

The total area of pastures occupies over 86 percent of the total agricultural land in Kyrgyzstan. More than 70 percent of the over 7 million animals are fed with natural forage grassland and therefore the role of pastures is highly important. Extreme weather conditions, such as droughts, heat and heavy rainfall are already adversely impacting the livestock sector. Climate change is expected to have a negative impact on the sector. The project implemented by the World Bank and the International Fund for Agricultural Development aims to increase livestock productivity and support local communities adapt to climate change. Project activities include, among others, the identification of climate change adaptation measures and technologies, the establishment of an Early Warning System (EWS) and building capacities and knowledge on the impacts of climate change.

The presentation can be found [here](#).

'Remote sensing based assessment of the dynamics of crop productivity and spatial production pattern across the Fergana Valley, Central Asia'

Presented by **Fabian Löw and Chandrashekhar Biradar, ICARDA**

Agricultural production systems are a vital lifeline for many rural farming communities in Central Asia. Shrinking natural resource base, increased land degradation and severe irrigation water scarcity render current crop production and practices unsustainable. Hence, there is considerable scope for improving productivity through bridging the yield gaps and introducing sustainable land management practices. Climate change could put additional pressure on the production systems in the future by decreasing the major source of irrigation water, namely glaciers. Therefore, there is an urgent need to develop spatial decision systems, which provide accurate and timely information on agricultural production that would facilitate the development of target specific and appropriate climate resilient intervention packages.

Satellite remote sensing approaches along with climate and in-situ observations will accelerate interventions and decision making by understanding the dynamics of the crop production and patterns at space and time. The overarching goal of this study is to develop and demonstrate the potential of geo-informatics applications at the farm level by taking Fergana Valley as a case study. A systemic quantification of crop productivity and production dynamics has been conducted at the field-level to assess the spatial and temporal variations in crop types, cropping intensity, assessment of potential crop yields gaps and land degradation. Open access to remote sensing based technology provide a unique perspective with uniform and holistic view of the production systems, which enhance the ability to identify opportunities for better farm management practices and for improving system-wide productivity, while reducing negative environmental impacts. This will eventually lead to the development of an interactive digital-agriculture monitoring platform (in progress) that contributes to sustainable and resilient agro-ecosystems.

The presentation can be found [here](#).

'Assessment of wheat yield gap in Central Asia: Case studies from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan'

Presented by **Bogachan Benli, Senior Irrigation and Water Management Specialist, ICARDA**

Wheat is by far the most important grain cultivated and consumed in Central Asia. It is therefore an important crop for food security in this region. As a result of increased population growth and food demands, sustainable intensification of wheat production is important. However, there is a large potential to increase wheat yields in the Central Asian region through improved management practices along with improved varieties, improved nitrogen application, optimum irrigation, early sowing days together with supplementary irrigation. This can close the wide yield gaps between farmers yields and potential yields. The study demonstrates 18 cases from different agro-climatic zones, including rainfed and irrigated fields with different salinity levels.

The presentation can be found [here](#).

'Climate resilient wheat varieties introduced through international collaboration for enhanced food security in Central Asia'

Presented by **Ram Sharma, ICARDA**

Climate change is expected to influence wheat productivity in Central Asia that could affect food security. New wheat varieties adapted to the existing and emerging biotic and abiotic stresses will be required in the region. ICARDA, CIMMYT, and IWWIP (International Winter Wheat Improvement Program, a joint initiative of the Government of Turkey, CIMMYT and ICARDA) annually introduce improved germplasm of wheat suitable to address the constraints of wheat production. This presentation outlines the recent achievements in identifying climate resilient wheat varieties, tolerant to yellow rust, salinity, heat, drought and frost. These stresses are expected to intensify under climate change undermining wheat production and food security in the region. There is a continuous threat of wheat yellow rust in Central Asia reflected through six epidemics since 2009. In recent years, many high

yielding, yellow rust resistant winter wheat varieties have been identified through international collaboration. These include, 'Gozgon', 'Bunyodkor', 'Yaksart', 'Barhayot', 'Faravon', 'Hazrati Bashir', and Shams in Uzbekistan, and 'Alex', 'Ormon' and 'Sadokat' and 'Chumon' in Tajikistan. Similarly, 'Davlatle' in Turkmenistan, and 'Amydarya' and 'Aral' in Uzbekistan have been released as tolerant to salinity, frost, heat and drought. There are additional varieties in the pipeline, which are tolerant to multiple stresses.

The presentation can be found [here](#).

'The International Maize and Wheat Improvement Center's (CIMMYT) experience with conservation agriculture' Presented by **Aziz Karimov, CIMMYT**

The International Maize and Wheat Improvement Center's (CIMMYT) studies the sustainable development of wheat and maize farming, thereby striving to sustainably increasing the productivity of these crop systems. Decreased wheat yields and increased outbreaks of insect pests and diseases are expected as a result of climate change in the region. CIMMYT has extensively promoted conservation agriculture (CA) for wheat production. Its CA activities have been successfully implemented in Kazakhstan from the 2000s onwards. Since 2008, farmers who are adopting CA-based technologies receive governmental subsidies.

The presentation can be found [here](#).

'Mobilizing greater crop and land potentials: Replacing the faltering regime' Presented by **Amir Kassam, Professor in the School of Agriculture, University of Reading, UK**

Conservation agriculture is a recognized climate-smart agriculture production system. It is capable of adapting agriculture to climate change, thereby making agriculture resilient and able to cope with climate change. This can help to achieve the goals of sustainable food security and sustainable land management. Conservation agriculture also contributes to climate change mitigation through decrease in fuel use on farms, sequestering carbon in the soil, reducing GHG emissions of CO₂, N₂O and CH₄, and also has a lower carbon and environmental footprint overall. In 2013, 157 million hectares of annual cropland world-wide were being farmed under conservation agriculture and the rate of annual increase in the spread of conservation agriculture globally is some 10 million hectares. This presentation discusses the appropriateness of conventional tillage-based agriculture and conservation agriculture in mobilizing crop and land potential. Conservation agriculture is considered as being able to sustainably mobilize greater crop and land potentials with increased efficiency and resilience.

The presentation can be found [here](#).

Interactive session on conservation agriculture

The interactive session on conservation agriculture was facilitated by Hafiz Muminjanov, FAO Sub-regional Office for Central Asia. The panelists were Sandra Corsi, FAO; Amir Kassam, University of Reading, UK; Aziz Nurbekov, ICARDA and Aziz Karimov, CIMMYT. During this session, Amir Kassam introduced the concept of conservation agriculture, while Sandra Corsi addressed the additionality of conservation agriculture for climate change adaptation and mitigation. Aziz Nurbekov focused on land degradation and Aziz Karimov presented the relevance of conservation agriculture for food security in Kazakhstan.

The interactive session on conservation agriculture was followed by questions and answers. Comments and concerns were expressed with regard to the following issues: e.g.

i) Weed control in conservation agriculture

Prevention is key for sustainable weed control in Conservation Agriculture. It requires a combination of good agronomic management (e.g. good and timely crop establishment, seeding of the next crop following soon after the termination of the cover crop whenever possible) and the appropriate choice of cover crops as allies. This choice need to be made in consideration of the potential of the cover crops for biomass production and the composition of the biomass, linked to the speed at which the residue decomposes.

ii) Herbicides resistance in Australian conservation agriculture systems

It was suggested that herbicide resistance may have been raised, due to the fact that Australian cropping systems are dominated by intensive cereal production in the absence of systematic crop rotations.

iii) Compatibility of conservation agriculture with hard-setting soils

Conservation agriculture cannot be adopted without adequate planning and preparation, at least on one year in advance. Before transitioning to conservation agriculture, the compacted layers of compacted soils need to be removed through subsoiling. Furthermore, it is also important implementing conservation agriculture, to adequately identify the most suitable crop rotation based agronomic purposes and economic benefits.

It was furthermore suggested to test the crop rotation and management on a small portion of the farm before converting 100 percent of the land, which will reduce and manage risks.

iv) The extent of soil carbon sequestration through conservation agriculture

It takes time for soil to take up carbon, in particular after different soil management practices have been applied. The amount of time it takes for soil to sequester carbon, varies depending on characteristics, such as climate, soil type and vegetation. Through changing the management of agricultural lands from high soil disturbance practices to low disturbance and by adopting effective nitrogen management practices so that the nitrogen balance remains positive, agriculture can contribute to terrestrial carbon sequestration.

Day 2. Session 6: Breakout II: Developing a CSA national programme: setting the priorities & work packages

This session continued the work from session 4 and based on the baselines and priorities established continued on the development of a draft CSA national framework document, e.g. by establishing objectives, targets and list of potential stakeholders and institutions who would be involved in the implementation.

Presentations

'Funding opportunities to make CSA a reality', Presented by **Astrid Agostini, FAO**

Public international climate finance flows have steadily increased, especially since 2010. Predominantly grants, in particular bilateral and dedicated multilateral funds. Agriculture receives the majority of the climate finance, although forestry receives the greatest share. At present, climate change adaptation finance exceeds mitigation, although forestry mitigation dominates. Various multilateral climate funds will likely expect to support CSA, including e.g. the Green Climate Fund (GCF), Global Environment Facility (GEF), Lead Developed Countries Fund (LDCF), Special Climate Change Fund (SCCF) and Adaptation Fund (AF).

The presentation can be found [here](#).

The country breakout session 2 used the results of breakout session 1 to formulate the CSA framework interventions and strategies and identify possible stakeholders to be involved. The following was reported back from the countries:

Kazakhstan

1. What do you consider are the main objectives that the CSA national programme should achieve?

- Increasing awareness and knowledge;
- Access to technology for the introduction of CSA;
- Obtaining stable yields and productivity of livestock;

- Stable livelihoods and incomes for agricultural producers;
- Development of incentive system and insurance for CSA
- Development of a CSA technology package (e.g. soil conservation, organic farming, water-saving, soil protecting technology, etc.), its demonstration and implementation at the local level;
- Long-term weather forecasts for disaster risk reduction and rapid alert system for the producers.

2. What do you consider are the main barriers to be addressed for the needed transitions to a CSA approach? What could be the possible enabling environment interventions to overcome these barriers?

Barriers:

- Low level of knowledge and awareness, including that of decision-makers;
- Lack of a legal framework;
- The weak technological base and low levels of farming;
- Lack of coordination between sectors and levels, e.g. local, district, regional, scientific, etc.;
- Lack of demonstration plots for distribution of CSA technology;
- The lack of information about CSA technologies among scientists, farmers and decision-makers.

Interventions to overcome barriers:

- Promoting CSA extensively and implementing educational programmes;
- Creating extension services and the introduction of new technologies;
- Development of legal acts and improvement of the regulatory framework;
- Attracting investments and developing state sectoral programmes;
- Creating a coordination system for the implementation of CSA;
- Enhancing permanent information and training programmes for all levels of government;
- Identify pilot areas in all climatic zones of Kazakhstan for the replication of best practices.

3. What are the ongoing programmes that are relevant for CSA? Which institutions and stakeholders could potentially contribute to the CSA approach and objectives that you are proposing?

- Agribusiness 2020; GEF / SGP; UNDP programmes on sustainable land management.
- FAO; CIMMYT; ICARDA; IESD; KAZFOAM CACLIM-II; Kazakhstan National Agrarian University (KazNAU); GEF / SGP; UNDP; UNEP; World Bank.

4. Based on the results of breakout session 1, please discuss the main gaps in analysis and data to establish an evidence base to support CSA policies and programmes in Kyrgyzstan.

5. Given that the “lack of knowledge sharing and capacity building to transfer knowledge to farmers, extension services and other related entities” was identified as one of the main constraints for CSA transitions, please discuss the most important improvements needed to ensure that the knowledge/evidence base created is shared and used effectively.

- Transfer of knowledge to farmers: the publication of printed and video products, manuals and methodologies;
- Development of a national strategy for extension services;
- Ministry of Agriculture should provide the best technology replication through exchange visits of farmers implementing CSA;

- At the national level create a call centre to provide farmers with information;
- Distribution of vast information to producers about meteorological conditions, sowing dates and disaster probability.

6. How would you measure the success of your CSA programme and ensure that the different targets (and pillars of CSA) are achieved?

Indicators:

- Number of demonstration plots;
- Number of trained farmers;
- Number of demonstrative technologies;
- Number of replicated technologies;
- Areas under CSA technologies;
- Number of legal documents on CSA;
- Number of publications;
- Increase in crop yields;
- Soil and water quality in the area of application of CSA technologies.

7. What are important government, donor or regional finance mechanisms or incentives to be considered to support the implementation of a CSA approach?

Governmental programs; Green Climate Fund; FAO; Global Environment Facility (GEF) / Small Grants Programme (SGP); United Nations Development Programme (UNDP); World Bank (WB).

Kyrgyzstan

1. What do you consider are the main objectives that the CSA national programme should achieve?

- Reduction of land degradation;
- Monitoring of the state land areas using GIS technology;
- Development of a national policy on SLM and CSA with an emphasis on incentive mechanisms for farmers (resource users);
- Integration of national strategies and programmes on climate change and SLM/CSA;
- Creation of an effective coordination mechanism;
- Strengthening the capacity of rural advice services (consultants), improving the coordination between different institutions, such as Ministry of Agriculture and Water Resources (MAWR), State Customs Service (SCS);
- Improvement of legislation of the Kyrgyz Republic for SLM/CSA;
- Strengthening of databases (e.g. statistics, climate data, project data);
- Promotion of organic agriculture and green products;
- Strengthening of a climate interactive platform (CIP);
- Support the creation of agricultural cooperatives and water user associations (WUA) networks;
- Climate-related insurance;

At the local level:

- Planning for CSA management at district and water basin level: the creation of local institutions on the basis of pasture committees and WUAs;

- The introduction of an integrated water basin management approach using the approach of ecosystem services at different levels;
- Evaluation of the climate change risks at the district level;
- Mitigation of conflicts over natural resources;
- Introduction and dissemination of best adaptation practices;
- Increased production of feed;
- Reducing the risk of natural disasters, e.g improved planning, rescue teams;
- Local risk assessment of climate change, local monitoring of land, a local cost-benefit analysis of adaptation practices.

2. What do you consider are the main barriers to make the needed transitions to a CSA approach? What could be the possible enabling environment interventions to overcome these barriers?

Barriers:

- Lack of access to reliable data (climate, statistical, mapping), especially at the district level;
- Lack of scientific and applied research;
- Low priority at governmental level (i.e. no adopted strategy for CSA/SLM), not adapted legislation;
- Lack of effective coordination mechanism;
- Weak capacity of professionals at all levels;
- Inadequate institutional capacity;
- Lack of an early warning system for farmers about the adverse weather events;
- Lack of inter-sectoral coordination.

Interventions to overcome barriers:

- Open databases;
- Grant programme for research, mainstreaming with the state programme of scientific research;
- Development of strategies and action plans, National Adaptation Plans (NAPs);
- Creation of a coordination committee;
- Trainings, new tools and approaches, technical equipment
- Increase of current capacities;
- Strengthening of hydro-meteorology institutes and system, distribution mechanisms;
- Cross-sectoral coordination mechanisms.

3. What are the ongoing programmes that are relevant for CSA? Which institutions and stakeholders could potentially contribute to the CSA approach and objectives that you are proposing?

- CACILM II project;
- World Bank projects, such as:
 - project for the improvement of management of pastures and livestock;
 - 3d project for rural investments 2015-2020;
 - National Water Resources Management project. Phase 1. 2015-2017;
 - An integrated forest ecosystem management project (under development);
 - Climatic regional program CAMP4;
- GIZ's programme on Sustainable Management of Natural Resources in Central Asia;
- "Soros-Kyrgyzstan" fund and its "Natural Resources Management" programme;

- USAID’s project “Agro horizon, 2014-2018. Increasing small farmers' income through the development of small businesses”;
- EBRD’s project “increase the capacity of national institutions for mitigation and adaptation to climate change”;
- “System of distribution of agricultural information” programme by South Korea;
- State system of courses for farmers through the lyceums with support from WFP and the government.
- Aga Khan Foundation;
- Helvetas watershed management and BioCotton;
- ICARDA;
- UNDP
- WFP

4. Based on the results of breakout session 1, please discuss the main gaps in analysis and data to establish an evidence base to support CSA policies and programmes in Kyrgyzstan.

- Imperfect methodology for collecting primary data, i.e. inaccuracy of data;
- Lack of analytical processing;
- Data is expensive and inaccessible (GIPROZEM, Gidromed).

5. Given that the “lack of knowledge sharing and capacity building to transfer knowledge to farmers, extension services and other related entities” was identified as one of the main constraints for CSA transitions, please discuss the most important improvements needed to ensure that the knowledge/evidence base created is shared and used effectively.

- Database on existing trainings;
- Database of trainers and consultants;
- Dissemination of information on existing databases, including hard copies;
- Establishment of a Central Asian Institute of Agricultural Consultants.

6. How would you measure the success of your CSA programme and ensure that the different targets (and pillars of CSA) are achieved?

- Development of indicators according to the objectives;
- Monitoring and evaluation.

7. What are important government, donor or regional finance mechanisms or incentives to be considered to support the implementation of a CSA approach?

- Grants
- State incentives
- Green crediting
- Involvement of the private sector

Tajikistan

1. What do you consider are the main objectives that the CSA national programme should achieve?

- There is no CSA national programme in the Republic of Tajikistan, as a result it is necessary to adopt one first;
- Development of rural advisory and consulting services;

At the farmer level:

- Plant protection;
- Capacity building;
- Alternative energy sources, e.g. solar panels, small hydro-stations;
- Financial assistance;
- Market research system (i.e. consultant services); research which crops are worth cultivating; which crops have a high market demand;
- Direct access to markets - establish this market system, without intermediaries, to give farmers a choice whether selling themselves or through intermediaries;

At the landscape level:

- Introduction of integrated watershed management, the use of PVA technologies;
- Rehabilitation of pastures as there is severe degradation of pasture due to the large of number of cattle, increasing agroforestry areas, orchards and vineyards with forage crops in between the rows;
- Provision of social protection in case of drought, flood, etc., through state support as well as from other states and international organizations;
- Raising awareness of public and specialists in the field;
- Provision of advisory services, from state and non-state advisory centres.

2. What do you consider the main barriers to make the needed transitions to a CSA approach? What could be the possible enabling environment interventions to overcome these barriers?

Barriers:

- Imperfect legal system;
- Lack of institutional capacity;
- Lack of cross-sectoral coordination in the field of SLM and CSA
- No access to high-quality seeds, it is necessary to increase the capacity for seed selection
- Lack of access to meteorological data, low capacity of experts' meteorologists
- There are no available (free) advisory centres for farmers.

Interventions to overcome barriers:

- There is a need for a national platform with all information related to CSA, with regard to e.g. exhibitions, farm schools, seed prices, prices of agricultural products and any projects working in the field of SLM and CSA.

3. What are the ongoing programmes that are relevant for CSA? Which institutions and stakeholders could potentially contribute to the CSA approach and objectives that you are proposing?

- Norway's Forests, Aga Khan Foundation; FAO - Conservation agriculture; Pilot Programme for Climate Resilience (PPCR); ELMAR; Ministry of Agriculture (Tajik Academy of Agricultural Sciences (TAAS), Tajik Agrarian University (TAU); Hydromet;
- The European Bank for Reconstruction and Development (EBRD) in partnership with the Pilot Program for Climate Resilience (PPCR) of the Climate Investment Funds launched a new climate financing facility 'CLIMADAPT'. This fund will offer loans to private businesses, farmers and households via local Financial Institutions to assist and support them in coping and reducing the adverse impacts of climate change;
- GIZ's project 'Adaptation to climate change through sustainable forest management, 2013-2018;
- Advisory services – cooperatives;
- From the state through provision of advice to the local authorities, jamoat experts via the Ministry of Agriculture;
- Pasture management.

4. Based on the results of breakout session 1, please discuss the main gaps in analysis and data to establish an evidence base to support CSA policies and programmes in Tajikistan.

- Climatic data does not cover the entire territory of the republic and is not appropriate for agriculture;
- Information from the financial accounting system at household level as currently accounting of income and expenditures of small households is not conducted by the Statistics Committee. At present, the statistics committee works at household level only with regard to land area and crops grown/productivity, but not regarding income. Statistics committees have requested the government to start the collection of this information from 2017 onwards;
- Market information with regard to e.g. product prices and demand for certain crops;
- Identify, which areas in Tajikistan are more prone to drought, salinity, frost through hydrometeorology institutes and institutes of Tajik Academy of Agricultural Sciences (TAAS);
- Identify the most vulnerable areas and those prone to the outbreaks of plant and animal diseases through involvement of Ministry of Agriculture and its affiliated companies.

5. Given that the “lack of knowledge sharing and capacity building to transfer knowledge to farmers, extension services and other related entities” was identified as one of the main constraints for CSA transitions, please discuss the most important improvements needed to ensure that the knowledge/evidence base created is shared and used effectively.

- It is necessary to integrate CSA and SLM into the curriculum and of the Tajik Agrarian University (TAU) and Tajik State University (TSU);
- Increase the number of centres of public advisory services, as available advisory services are not free or increase the capacity of local experts at the level of district and jamoat so as to work with farmers on a daily basis.

6. How would you measure the success of your CSA programme and ensure that the different targets (and pillars of CSA) are achieved?

- Well-being of farmers;
- Crop yields obtained;
- Increase of areas where CSA practices and technologies are implemented e.g. drought-resistant, salt-tolerant crops;
- Statistics collected by the Ministry of Emergency Situations, Committee on Land;
- Available data on the web site - www.stat.tj as it provides annual updates of data on harvests, yields, the areas occupied by crops.

7. What are important government, donor or regional finance mechanisms or incentives to be considered to support the implementation of a CSA approach?

- The government should improve the legislative mechanisms to encourage farmers who use CSA;
- Donors should assist in capacity building in all areas related to agriculture, technically and through exchange of experience in the region, among others, on water resources management at the regional level, regional climate risk management.

Turkmenistan

1. What do you consider are the main objectives that the CSA national programme should achieve?

- Enhancing sustainable crop yields in drought conditions;
- Increasing the efficient use of water resources
 - Introduction of the concept of "river basin management" in the Water Code;
 - Introduction of basin management at the local level.
- Development and implementation of horticulture development programme in Turkmenistan in drought conditions
 - Introduction of valuable crops (e.g. pistachio, almonds);
- Improvement of legislation in the area of agricultural financing regarding land and water relations.

At the farmer's level

- Increasing farmers' incomes by diversifying crops
 - Introduction of a system of economic incentives for land preservation
- Increasing resistance to diseases;
- Increasing the capacity and knowledge of farmers in horticulture management.

2. What do you consider the main barriers to make the needed transitions to a CSA approach? What could be the possible enabling environment interventions to overcome these barriers?

Barriers:

- Imperfect legislation as there is a need to add e.g. CSA, water basin, water use associations, agricultural services;
- Low institutional capacity for monitoring of the state of land resources;
- Imperfect and unstable system of extension services at the local, national and regional level;
- Lack of reliable water resources monitoring system, e.g. measuring appliances at the local, regional level.

3. What are the ongoing programmes that are relevant for CSA? Which institutions and stakeholders could potentially contribute to the CSA approach and objectives that you are proposing?

- ‘National Climate Change Strategy, 2012’;
- State Forestry Strategy and Action Program until 2020.
- Ministry of Agriculture and Water Resources of Turkmenistan;
- Agricultural institutes;
- NGOs;
- International organizations, e.g. GIZ, UNDP, Organisation for Economic Co-operation and Development (OECD);
- International research organizations.

4. Based on the results of breakout session 1, please discuss the main gaps in analysis and data to establish an evidence base to support CSA policies and programmes in Turkmenistan.

- Lack of information and data on the state and availability of water and land resources.

5. Given that the “lack of knowledge sharing and capacity building to transfer knowledge to farmers, extension services and other related entities” was identified as one of the main constraints for CSA transitions, please discuss the most important improvements needed to ensure that the knowledge/evidence base created is shared and used effectively.

6. How would you measure the success of your CSA programme and ensure that the different targets (and pillars of CSA) are achieved?

- Public hearings, feedback with focus group

7. What are important government, donor or regional finance mechanisms or incentives to be considered to support the implementation of a CSA approach?

- Economic incentives for farmers

Uzbekistan

1. What do you consider are the main objectives that the CSA national programme should achieve?

- Use/implementation of CSA technologies, which should ensure the stability and sustainability of incomes;
- Diversification of production with fruits and vegetables;
- Increasing productivity;
- Improvement of soil quality;
- Minimization of risks, e.g. economic and environmental;
- Reduction of the vulnerability of agriculture to climate change;
- Saving water;
- Ensuring sustainable ecosystem services.

2. What do you consider the main barriers to make the needed transitions to a CSA approach? What could be the possible enabling environment interventions to overcome these barriers?

Barriers:

- Lack of farmers' access to knowledge and technologies as well as lack of awareness on CSA technologies;
- Lack of access to financial resources e.g. micro-credit;
- Insufficiently developed network of rural advisory/consulting services;
- A weak incentive system;
- Lack of funding for agricultural research;
- Limited access to input/output markets.

Interventions to overcome barriers:

- Development of a system of rural advisory services;
- Strengthening the links between producers and consumers of knowledge;
- Enhancing the capacity of farmers;
- Improvement of legislation in the area of crediting and provision of advisory services, i.e. regulations on the extension services;
- Improving the efficiency of extension services and control;
- Extension of existing incentive schemes on CSA technologies;
- Increase of financial incentives for research institutes' employees;
- Increasing investment in research, material and technical base and increasing scientific potential;
- Increase the share of funding for climate research;
- Development of markets;
- Development of relations among market actors;
- Strengthening the development of the value chain: e.g. post-harvest technologies with regard to storage, processing, transportation, standardization and certification,
- Strengthening interinstitutional cooperation between different organizations, initiatives and programs in CSA, etc.

3. What are the ongoing programmes that are relevant for CSA? Which institutions and stakeholders could potentially contribute to the CSA approach and objectives that you are proposing?

- CACILM II programme;
 - State Programme of Land Reclamation 2013-2017;
 - ADB project on Innovations for Agricultural Modernization, 2014-2016;
 - The State Programme of Action for Environmental Protection, 2013-2017;
 - IFAD's Dairy Value Chains Development Programme, 2016-2022;
 - GEF Small Grants Programme in Uzbekistan, 2008-2018;
 - Adaptation Fund – UNDP's project 'Developing climate resilience of farming communities in the drought prone parts of Uzbekistan, 2014-2020'.
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- The Ministry of Agriculture and Water Resources;
 - Uzbek Scientific Production Centre of Agriculture (UzNPTsSKH);
 - Centre of Hydrometeorological Service (Uzhydromet);
 - State Committee for Nature Protection of the Republic of Uzbekistan (Goskompriroda)
 - The national agricultural research system;
 - ICARDA;
 - Uzbek Design and Research Institute (UZGIP).

4. Based on the results of breakout session 1, please discuss the main gaps in analysis and data to establish an evidence base to support CSA policies and programmes in Uzbekistan.

- State of land, i.e. quality;
- State of pastures and livestock;
- Risk analysis, including climatic risks;
- Lack of forecasting data;
- Data on the economic evaluation of ecosystem services;
- Validated baseline data.

5. Given that the “lack of knowledge sharing and capacity building to transfer knowledge to farmers, extension services and other related entities” was identified as one of the main constraints for CSA transitions, please discuss the most important improvements needed to ensure that the knowledge/evidence base created is shared and used effectively.

- Introduction of e-agriculture, as a national strategy approach of broad and systemic deployment and implementation of ICT in agri-food system, taking into account local context of Agricultural Innovation System.

6. How would you measure the success of your CSA programme and ensure that the different targets (and pillars of CSA) are achieved?

- Establishment of a M&E system and mechanism;
- Set the baseline and outcome indicators;
- Development of standards, selection of indicators and criteria.

7. What are important government, donor or regional finance mechanisms or incentives to be considered to support the implementation of a CSA approach?

- Asian Development Bank
- CGIAR
- Eurasian centre
- Environmental Protection Fund
- GEF
- GIZ
- Green Climate Fund
- IFAD
- Islamic Development Bank
- Private financing
- Melioration Fund
- Reconstruction and Development Fund
- SCO Banks
- USAID
- World Bank

Day 3. Session 1: CSA knowledge, research and capacity building

The third day of the workshop consisted of two breakout sessions, which were organized in parallel. The first session focused on knowledge and capacity building, including extension, to address the challenges of climate change. The second session was dedicated to the Climate Smart Agriculture (CSA) implementation in Central Asian region.

The first session, attended by the representatives of the five Central Asian countries and Turkey, focused on knowledge and capacity building was moderated by Federica Matteoli (FAO and GACSA Knowledge Action Group), Ram Chandra Sharma (ICARDA) and Alisher Tashmatov (CACAARI). This session allowed further elaboration on the current requirements with regard to capacity and knowledge to allow, especially farmers, to address the challenges of climate change. In particular, the session looked at 'current gaps', which research, development and extension should be tackling in a concerted effort, thereby identifying suitable practices and interventions which could be up scaled. A discussion on how Central Asia efforts can be better linked to international processes and mechanisms was also held.

Following these discussions, participants were divided into smaller breakout groups to debate the following two main questions:

1. What are the knowledge, research and extension services needs to support the implementation of a feasible and operational CSA strategy in the countries?
2. What can knowledge and research institutions do to support the implementation of a feasible and operational CSA strategy in the countries?

At the end of each breakout group discussion, the leaders from each group presented the key findings.

Outcomes from the breakout groups by country

Kazakhstan

1. What are the knowledge, research and extension services needs to support the implementation of a feasible and operational CSA strategy in Kazakhstan?

Gaps and challenges:

- Collect information on current studies in CSA in the Republic of Kazakhstan;
- Analyse and harmonize policy documents for CSA;
- Learn from international experience on CSA and adapt it to the socio-economic, environmental and climate conditions of Kazakhstan;
- Adapt the results from international experience and successful CSA practices to farmers' context and needs.

Responsible institutions and individuals:

- Kazagro innovation (science research institutions), NGOs (PU "Farmer Kazakhstan", Kaz FOAM), GEF/PMG, UNDP, FAO, GIZ;
- Government, parliament, Ministry of Agriculture, Ministry of Energy, NGO on ecology, farmers;
- Policy officers, regional and international organizations, experts;
- Extension service providers, NGO, farmers.

Ecological zones:

- All ecologic-climate zones of Kazakhstan.

Measures:

- Organization of research, including conducting surveys, collecting information, analysing technology and implementing positive experience);
- Collection of normative-legal documentations, including undertaking analyses of necessary amendments for legal support of the CSA process. In addition, the development of recommendations, programs and strategies etc.;
- Exchange visits, access to databases, cooperation with other countries;
- Creation of info graphics, video-books, brochures and others.

2. What can knowledge and research institutions do to support the implementation of a feasible and operational CSA strategy in Kazakhstan?

Gaps and challenges:

- Collect technologies, which help to increase agricultural productivity within the context of climate change and adapt it to farmers' context and needs;
- Presentation of findings and results into a database for CSA;
- Creation of demonstrated fields for implementation of CSA technology;
- Exchange visits.

Responsible institutions and individuals:

- Agricultural research institutes;
- Extension service providers;
- NGOs;
- Farmers;
- Experts.

Measures

- Learning from international experience about CSA technologies, organizing informative platforms with the aim to exchange information and share knowledge;
- Process of research results according to FAO's requirements and included in a database;
- Allocation of resources, e.g. land, machinery etc.;
- Financial support provided by FAO.

Kyrgyzstan

1. What are the knowledge, research and extension services needs to support the implementation of a feasible and operational CSA strategy in Kyrgyzstan?

Gaps and challenges:

- Organization of applied research;
- Involvement of advisory services and farmers to work together on the development of joint technologies initiatives;
- Improvement of the selection of agricultural crops resistant to stress, disease, pests, etc.;
- Improvement of the selection of livestock animals
- Strengthening the capacities of the research institutes at agricultural universities;
- Lack of studies and research analyses on the impacts of climate change on agriculture;
- Forest management certification.

Responsible institutions and individuals (relevant stakeholders):

- Association of resource users;
- Universities;
- Association of farmers;
- Research institutions.

Measures:

- Creation of a platform;
- SMS notification to share certain issues, challenges and constraints;
- Collection of recommendations;
- Conduct pilot studies on e.g. cereals, legumes;
- Crop diversification;
- Spread of information;
- Development of training modules;
- Enhancement of qualifications of relevant experts;
- Informing farmers on a timely basis;
- Creation of a unified database on climate change;
- Training of relevant specialists.

2. What can knowledge and research institutions do to support the implementation of a feasible and operational CSA strategy in Kyrgyzstan?

Gaps and challenges:

- Creation of a platform;
- Improve exchange of knowledge and information;
- Conduct pilot studies;
- Crop diversification;
- Development of new scientific-based technologies;
- Development of training modules;
- Professional development of agricultural specialists, which have been involved in the work of the advisory service providers;
- Creation of a database on climate change and conduction of research analysis.

Responsible institutions and individuals:

- Rural Advisory Service (RAS) providers;
- Training, Advisory and Innovation Centre (TAIC);
- Research institutions;
- Associations;
- Kyrgyz Hydromet;
- Consulting service providers;
- Local agricultural service providers.

Measures:

- Organization of annual conferences;
- Preparation of booklets;
- Creation of websites, including regular updating of existing websites;
- Organization of farmers' field schools;
- Organization of demonstration sites;
- Approval of state programs;
- Publication of newsletters on agro-meteorology.

Turkey

The country group brainstormed on the following two main questions:

1. What are the knowledge, research and extension services needs to support the implementation of a feasible and operational CSA strategy in Turkey?

The group's identified gaps:

- Limited awareness or knowledge on climate change throughout society;
- Limited available mechanisms for knowledge sharing among researchers and institutions;
- Limited human resources and capacity to conduct research on climate change;
- Limited extension activities;
- Limited knowledge with regard to data collection and recording.

The group's suggested the institution and individuals to be in charge of:

- Research institutes (public) of agricultural faculties of universities
- Ministry of Food Agriculture Livestock, NGO's, farmer unions & associations
- Private sector
- Researchers

The group's recommendations:

- Increase media sources, training and workshops

- To create a platform (network) to share knowledge and experiences
- Organize trainings
- Dissemination of research results through field days and other activities
- Preparation of advisory guide related to climate change studies for the researchers

2. What can knowledge and research institutions do to support the implementation of a feasible and operational CSA strategy in Turkey?

Gaps and challenges:

- Preparation of advisory guide related to climate change studies for the researchers
- To create a group on social media through sources like Facebook, Twitter, LinkedIn
- To make short films, spots
- To create a platform on CSA with different subgroups, such as plant protection, plant production, animal husbandry, water and soil resources, socio economic etc.
- To organize 1 day trainings to show practices to farmers, women and young people
- Prepared a guide, which will advise the researchers on data collection (This proposed activity may not be related to climate change directly, but additional data collection may help other researchers for future research and studies.)

The following institutions, individuals and mechanisms were identified:

- NGO, FAO, research institutes, experts
- Internet, TV
- National and regional platforms,
- Local trainings
- International advisory guides

Turkmenistan

1. What are the knowledge, research and extension services needs to support the implementation of a feasible and operational CSA strategy in Turkmenistan?

Gaps and challenges:

- Integration of necessary amendments into normative-legal documents (land and water caudexes)
- Enhancement of scientific and educational capacity
- Distribution of information

Responsible institutions and individuals:

- Ministry of Agriculture and Water Resources of Turkmenistan and all its structural divisions
- State Committee of Turkmenistan for Environmental Protection and Land Resources

Ecological zones:

- Central Karakum, mountainous areas of Kopetdaga

Measures

- Global, regional and national experience based on the modern technologies
- Database of scientists, specialists, experts, working on this issue

Financial support:

- Partly from public budget, project and international investments

2. What can knowledge and research institutions do to support the implement of feasible and operational CSA strategy in Turkmenistan?

Gaps and challenges:

- State initiative for research works
- Monitoring, assessment, identification of problems and finding solutions

Responsible institutions and individuals:

- Local government authorities
- Farmers union
- Scientific-research institute of agriculture

Ecological zones:

- All Turkmenistan with exception of Balcan's area

Measures

- Close cooperation with scientists in the region

Financial support:

- Based on the feasibility study
- From public budget, investment and project financing

Uzbekistan

1. What are the knowledge, research and extension services needs to support the implementation of a feasible and operational CSA strategy in Uzbekistan?

Gaps and challenges:

- Not systemized Specific knowledge on CSA
- Not clear or not specified national strategy on CSA; or not specified CSA goals and objectives in National Agricultural Development Strategy/Framework
- Unspecified and not systemized knowledge available locally and globally
- Inadequate Innovations in the field of CSA
- Low scale of innovation
- Low coordination and collaboration between different institutions and sectors

Responsible institutions and individuals:

- Government (Ministry of agriculture)
- Research institutes
- Farmers Council
- International research organizations
- National Agricultural Research System
- Rural Advisory services
- UzGidromet0

Measures:

- Raise awareness among broad range of stakeholders
- Need to align CSA with country priorities
- Strengthening institutions
- Increase the capacity and involve more young professional to CSA
- Enhance Interoperability of databases and information & knowledge platforms
- Improve the access of different stakeholders to information and knowledge on CSA
- Strengthening linkages between innovation system actors
- Establishing rural advisory service system

2. What can knowledge and research institutions do to support the implementation of a feasible and operational CSA strategy in Uzbekistan?

Gaps and challenges:

- CSA practices are demonstrated to limited scale and stakeholders
- Low of awareness about CSA (conferences, workshops etc.)
- Gap in knowledge and research on CSA
- Low capacity of science in the field of CSA
- Low adaptation of innovations of CSA for conditions of Uzbekistan
- Low interaction and potential of local institutions

Responsible institutions and individuals:

- Government (Ministry of agriculture)
- Research institutes
- Farmers Council

- International research organizations
- National Agricultural Research System
- Rural Advisory services
- UzGidromet0

Measures

- Analysis of value chains before introduction of new technologies (namely value-e chain of legumes)
- Establishing of innovative platform for CSA practices
- Strengthening innovative capacity of actors of innovations, value chains etc.
- Knowledge and information dissemination
- Establishing of rural extension services system
- Mobile apps for farmers
- Enhance the capacity of value chain specialists
- Capacity building of farmers
- Increasing of funding for research on climate change and adaptation of CSA technologies appropriate for Uzbekistan
- Development of linkages between actors of market
- Pay more attention to researches and extension on CSA technologies appropriate for Uzbekistan

Discussions

Comment from Ram Sharma, ICARDA

ICARDA has worked in this region for the last 30 years and has identified several crops which are suitable to cultivate both in Uzbekistan and Tajikistan. The same applies to chickpeas, lentil, winter wheat, which are suitable for certain parts of Kazakhstan and also suitable for Uzbekistan. Through exchanging information and knowledge, we are getting a better understanding of the commonalities.

Answer from the Kazakhstan group: I absolutely agree with you that we should really dedicate more efforts to search for common approaches, interests and opportunities. It is therefore important to request, for instance, FAO to support the establishment of demonstration plots to test and validate good practice option. For example, demonstrating water saving technologies in Kazakhstan and selected agricultural crops adapted to climate change in Uzbekistan etc. Exchange visits could be organised to share knowledge and information on the testing of these practices and technologies in these demonstration plots.

Suggestion by Ram Sharma, ICARDA

We are already communicating and have joint projects with FAO in the region. ICARDA already has a developed network so instead of creating new facilities, which will require additional funding, you could use existing ones.

Comment from Federica Matteoli, FAO: I agree that we should start from what we already have. There are institutions that already work in the areas of climate smart agriculture and climate change and involving governments is also essential.

Question to all the participants from Federica Matteoli, FAO

If you could only choose one activity, which you think is fundamental in your country to develop a CSA strategy, what would you choose?

Uzbekistan:

Strengthening innovative capacity

Turkmenistan:

Supporting a training process to expand information about CSA, distribute materials about CSA technologies

Kazakhstan:

Increasing awareness at all levels of society about climate change and the necessity to adapt to future changes;

creating a mobile group of experts who would be able to travel around the country and disseminate this knowledge and experience.

Kyrgyzstan:

Establishing a database on CSA.

General conclusions and recommendations from this session

1. Cross country synthesis of gaps and challenges should be implemented;
2. FAO in Central Asia should create linkages to other regional initiatives and FAO programmes in the region.
3. The regional CSA Strategy should be developed considering Central Asian countries and regional priorities. Central Asian counterparts should be actively engaged in this process, whilst FAO should play a leading role in providing technical facilitation;
4. Raising awareness on CSA as well as establishing an information campaign and advocacy should be permanently in place to ensure the willingness and commitments of the national governments and other stakeholders. The clear linkage and impact of CSA to the SDGs should be demonstrated and collectively agreed at national level;
5. Consultations with regard to the formulation of the vision of CSA should be conducted and agreed to ensure a clear pathway;
6. Funding is of utmost importance and relevant mechanisms should be created to ensure the sustainability of the programme;
7. The CSA is built as a collective action and multi-stakeholders process, and therefore principles of participation and inclusiveness should be included already from the initial stage of strategy development.
8. The development and endorsement of the CSA strategy at regional and national levels should be followed by developing an action plan, setting up a monitoring and evaluation system with defining baseline and targeted indicators.

Day 3. Session 2: CSA implementation in Central Asia

This session focused on the upcoming FAO projects, including Save and Grow, Climate-Smart Agriculture and CACILM II. It was moderated by Dorjee Kinlay (FAOKG), Ram Sharma (ICARDA), Alisher Tashmatov (CACAARI) and Meder Seitkasymov (CAREC). The presenters provided an overview of the two projects.

The Save and Grow approach focuses on nature's contributions to crop growth, such as soil organic matter, water flow regulation, pollination and bio-control of insect pests and diseases. It offers a holistic approach through relevant, adoptable and adaptable ecosystem-based practices, which can support small holder farmer to achieve higher productivity, profitability and resource use efficiency, while enhancing natural capital. It often combines traditional knowledge with modern technologies and promotes the use of conservation agriculture, which increases yields while restoring soil health. It controls insect pests by protecting their natural enemies rather than by applying pesticides to crops and uses precision irrigation to deliver the appropriate amount of water when and where it is needed. Save and Grow is fully consistent with the principles of climate-smart agriculture as it builds resilience to climate change and reduces greenhouse gas emissions through increased carbon sequestration.

FAO's Save and Grow project aims to develop a national strategy as well as possibly scaling it up to the regional level. The focus on the project will be on pastoral areas as well as on wheat production, thereby aiming to analyse the profitability of crops. A critical factor for successful implementation of the project is defining the appropriate target group.

The Central Asian Countries Initiative for Land Management (CACILM) II project aims to scale up sustainable practices, which are able to reduce the adverse impacts of salinity and drought. The project, with a budget of around USD 11 million, is implemented in 6 countries in Central Asia, including Turkey, over a period of 5 years. The 3 project components identified through a participatory and bottom-up approach include:

- i) encouraging regional cooperation and partnerships, including governments, national and international organizations;
- ii) mainstreaming sustainability in policies and institutions;

- iii) expanding the adoption of CSA practices, such as saline prone and drought resistant practices and technologies and strengthening the capacities of relevant stakeholders.

Some overarching issues have also been identified, such as monitoring of drought. A regional workshop is being planned at the end of September 2016.

Following the two project introductions, a general followed, which focused on the synergies of the project. Participants then broke out into 3 working groups (Kyrgyzstan, Tajikistan, regional CSA approach) and debated the following two questions:

1. What are the key institutions to implement CSA at the national and local level;
2. What are the specific gaps and obstacles for coordination at local level to support CSA.

Outcomes from the breakout groups by country

Kyrgyzstan

- A national strategy for sustainable development until 2017, includes general strategies and does not contain policies relevant to climate change impacts on agriculture. In addition, it lacks certain terminology as CSA is a new term, there is a need to increase understanding at both the national and local levels;
- Program on adaptation to climate change in agriculture developed by the Ministry of Agriculture in 2015 under the Program on priorities for climate change in agricultural sector to 2017 is not well implemented, due to e.g. lack of finance, road maps and awareness of relevant projects in the agricultural sector;
- Weak coordination among ministries, agencies, donor organizations, farmers and specialists on horizontal and vertical levels;
- Lack of awareness of state bodies on the key results and outputs from various agricultural projects;
- Lack of mechanisms on the implementation of best practices, which can be adapted to the work of ministries at the national level;
- The identified partners include e.g. farmers; local governmental authorities; water user associations, pasture committees and others; national level public authorities (government, ministries, agencies), agrarian university; extension service providers; NGOs; micro-finance institutions, e.g. Ayil Bank, Bai Tushum; cooperatives, self-help groups, community seeds funds, private business entities, international donors.

Priorities:

- Reduction of poverty;
- Mitigation of risks from climate change impact and consequences of natural hazards;
- Introduction and adaptation of the best regional and international practices on CSA in Kyrgyzstan;
- Prevention of land degradation;
- Ensuring food security;
- Support to the introduction and development of organic farming.

Tajikistan

- Laws and policies exist, but one of the main obstacles of CSA implementation is the lack of by-laws;
- There is a need to provide climate related information to farmers as well as the need to build up the capacities of farmers, extension agents, on e.g. mapping of i.e. soils;
- Priority to be given to rain fed systems, in particular pastures in order to increase productivity (food and fodder production) and release stress from winter pastures (most representative of the region);
- Capacity development at regional level, the sharing of information, improvement of knowledge on legislations and best practices are among the identified priorities areas to be implemented;
- The following partners were identified, e.g. NGOs, Tajik Agrarian University, agricultural research institutes, farmers' association, seed companies.

Recommendations for a regional CSA approach

Part of session 2 'CSA implementation in Central Asia' on the third and final day of the CSA workshop was a discussion on identifying the needs for a regional approach to CSA. The participants provided several recommendations, amongst which the development of a regional CSA strategy and action plan was mentioned, which would guide the establishment of a regional CSA programme for Central Asia. The following highlighted recommendations were mentioned, including the need to:

- **Create an evidence database** to support the implementation of CSA policies and programmes. It will include all relevant data, composing e.g. climate and geographical data, socio-economic data at household level, prices and market data, agricultural sector data, greenhouse gas emissions etc.;
- **Undertake a cross-country synthesis of gaps and challenges** to get a complete overview of the differences and commonalities of countries across the region as well as to enable setting baselines;
- **Conduct needs assessments for CSA** to identify needs, but also stakeholder benefits from applying a CSA approach;
- **Establish a Monitoring and Evaluation (M&E) system for CSA**, which is based on identified baselines/standards, selection of relevant indicators and criteria;
- **Mainstream the CSA approach into other relevant and existing national policies, plans and strategies** related to e.g. climate change, food security and agriculture strategies, sustainable development, adapted to the local context. Harmonize CSA strategies at all levels. Effective coordination is thereby essential;
- **Develop a regional strategy and action plan**, which would serve as a guideline for the development of national CSA strategies. Central Asian countries and regional priorities need to be considered as well as government ownership as a driving force for the development of such a strategy. The principles of participation and inclusiveness are key. The development of an action plan, includes the setting up a M&E system with defined baseline and targeted indicators. It was suggested to create a working group to develop the regional strategy and action plan, where national and international organisations would form a multiple stakeholder group and be technically supported and guided by FAO;
- **Coordinate the implementation of the regional CSA strategy** with existing global and regional CSA platforms;
- **Develop an extension advisory services system at the regional level** to build capacities among farmers and other agricultural players to adequately manage climate risks and adopt context-appropriate agricultural practices, technologies and systems;
- **Raise awareness on CSA among all relevant stakeholders and create a single regional knowledge platform**, which includes CSA, Eurasian Soil Partnership (EASP) and CACILM, to enable exchange of knowledge and research on relevant practices and technologies that can be applied throughout the region to help farmers reduce the adverse impacts of climate change on the agriculture sector and food system. It should also be accessible to policy makers and other stakeholders;
- **Enhance finance to ensure the sustainability of the programme**, such as through the creation of relevant mechanisms as well as **link with existing climate and agricultural finance** and thereby creating linkages to other regional initiatives and programmes will help to enhance synergies, reduce overlaps and potential trade-offs.

Annex 1 Agenda

Day 1 : Tuesday 12 July

8:00 – 9:00 Registration

Session 1: Opening Session

9:00	Welcome by Kerimaliev Janybek - Deputy Minister of Agriculture, Food Industry and Melioration Kyrgyz Republic
9:10	Dorjee Kinlay, FAO Representative to Kyrgyzstan
9:20	Ram Chandra, ICARDA
9:25	Meder Seitkasymov, CAREC
9:30	Alisher Tashmatov, CACAARI

Session 2: CSA fundamentals from concept to reality

9:35	CSA beginnings, creation and overview. Presented by Reuben Sessa, Climate Change and Energy Coordinator for Europe and Central Asia, FAO.
9:50	Informed decision making for CSA adoption: methodologies and data requirements. Presented by Aslihan Arslan, ESA Division–EPIC, FAO.
10:05	Creating an enabling environment for adoption of CSA transitions, policy and financial interventions. Presented by Astrid Agostini, NRC Division, FAO.
10:20	Improving Livelihoods through climate smart agriculture in Central Asia. Presented by Manon Pascale Cassara, Water Resources Consultant and Focal Point for Regional Water, Energy, Climate activities in Central Asia, World Bank
10:35	COFFEE
11:00	Upscaling CSA through the Global Alliance for Climate Smart Agriculture (GACSA). Presented by Federica Matteoli, FAO on behalf of GACSA Facilitation unit.
11:15	CACILM-II: meeting the needs through a regional CSA programme for Central Asia. Presented by Guchgeldiyev Oleg, CACILM-II Project Task Manager, FAO.
11:30	Climate change Adaptation Program of the Kyrgyz Republic. Presented by Ekaterina Sakhvaeva, Information and Analytical Center Department of Water Management, Ministry of Agriculture and Melioration of the Kyrgyz Republic.
11:45	Open discussion with participants (Q&A)
12:15	LUNCH

Session 3: Understanding the Central Asia environment, social and economic context

13:30	Agricultural Sector Risk Assessment Study in the Central Asia. Kazakhstan, Kyrgyz Republic and Tajikistan. Presented by Talimjan Urazov, Senior Agricultural Specialist, World Bank.
13:40	Agricultural transformation and food security under climate change in Central Asia. Presented by Kamiljon Akramov, Research Fellow and Leader of the Central Asia Program, IFPRI
13:50	Impacts of climate change on farm income security in Central Asia: An integrated modelling approach. Presented by Ihtiyor Bobojonov, Leibniz Institute of Agricultural Development in Transition Economies, IAMO
14:00	The Life in Kyrgyzstan Study: Panel Data for Socio-Economic and Agricultural Development. Presented by Prof. Tilman Brück, Team Leader - Development Economics, IGZ - Leibniz Institute of Vegetable and Ornamental Crops
14:10	FARming Tools for external nutrient Inputs and water Management (FATIMA). Presented by Dilek Kahraman, Director of UTAEM, Project Regional Manager, Turkey
14:20	Building resilience to climate change through sustainable land management in Tajikistan. Presented by Sharipov Khukumat, Agricultural specialist, Committee of Environmental Protection under the Government of the Republic of Tajikistan.
14:30	Overview of IWMI's research in Central Asia and future prospects for collaboration.

	Presented by Zafar Gafurov, International Water Management Institute, Central Asia - IWMI-Tashkent
14:40	Status and perspectives of Rural Advisory Services Systems in Central Asia. Presented by Alisher Tashmatov, CACAARI and Botir Dosov, Regional Coordinator of the CAC Forum for Rural Advisory Service
14:50	Plantwise: An approach for extension delivery at scale. Presented by Luca Heeb, Plantwise Programme Support Officer, CABI-CH Europe
15:00	Coffee break

Session 4: Breakout I : Developing a CSA national programme, setting the baselines and priorities

15:15	Introduction to the scope of the session and the need to set the baselines for CSA country and regional approaches. Presented by Oleg Guchgeldiyev, FAO
15:25	Summary of the survey 'Central Asia activities on climate smart agriculture' Presented by Federica Matteoli, Natural Resources Officer, FAO
15:35	Presentation of country profiles documents and templates to be completed for reporting back, Presented by Alessandro Spairani, Climate Smart Agriculture and Climate Change Adaptation, FAO
15:45	Country breakout session 1: Setting the baselines: participants from countries review the country profiles that have been compiled and the results of the on-line survey and refine the key challenges, current programmes and other baseline parameters.
17:15	Reporting back from the country breakout session
18:15	Session close
19:30	Reception hosted by the Government of the Kyrgyz Republic (Summer Garden, Park Hotel)

Day 2 : Wednesday 13 July

Session 5: Relevant CSA agricultural and landscape interventions for Central Asia

09:00	Knowledge management for sustainable land management in CACILM II. Presented by Akmal Akramkhanov, Project Coordinator, ICARDA
09:15	Ecosystem-based Adaptation in Central Asia - An innovative approach to help people adapt to Climate Change. Presented by Paul Schumacher, Advisor, GIZ KG
09:30	WB and IFAD inputs to pasture management improvement in the Kyrgyz Republic. Presented by Mairambek Tairov, APIU Director, Ministry of Agriculture and Melioration of the Kyrgyz Republic
09:45	Geospatial science, technology and application in Agro-Ecosystem Research. Presented by Low Fabian and Chandrashekhar Biradar, ICARDA.
10:00	Assessment of wheat yield gap in Central Asia: Case studies from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Presented by Bogachan Benli, Senior Irrigation and Water Management Specialist, ICARDA.
10:15	Climate resilient wheat varieties introduced through international collaboration for enhanced food security in Central Asia. Presented by Ram Sharma, ICARDA.
10:30	Q&A
10:45	COFFEE
11:15	Interactive Session on Conservation Agriculture Moderator: Hafiz Muminjanov, Plant Production and Protection Officer, FAO <u>Panellists</u> Aziz Nurbekov, Agronomist, ICARDA Ayuplskakov, Kazakh National Agrarian University (KazNAU) Aziz Karimov, Agricultural Economist, CIMMYT Amir Kassam, Visiting Professor in the School of Agriculture, Policy and Development at the University of Reading, UK Sandra Corsi, CA Expert, FAO
12:15	LUNCH

Session 6: Breakout II: Developing a CSA national programme: setting the priorities and work packages

13:30	Funding opportunities to make CSA a reality, Astrid Agostini, FAO
13:45	Presentation of second part of the templates to be completed, Alessandro Spairani, Climate Smart Agriculture and Climate Change Adaptation, FAO
13:55	Country breakout session 2: using the results of breakout session 1 participants formulate CSA framework interventions and strategies and possible stakeholders to be involved. Countries can determine if they want FAO and other organizations to support follow-up and further development.
15:30	COFFEE
15:45	Breakout II Report back Moderators Reporting back from breakout groups (5 mins per group reporting back)
16:15	Plenary closing session Moderators: Dorjee Kinlay (FAOKG), Ram Sharma (ICARDA), Alisher Tashmatov (CACAARI), Meder Seitkasymov (CAREC) Plenary discussion Next steps Wrap up
16:45	Presentation of day 3 breakout sessions (Federica Matteoli, FAO and Aslihan Arslan, FAO).
17:00	Day 2 close

Day 3 : Thursday 14 July

Two separate parallel working sessions organized by the different workshop partners:

Working session 1: CSA knowledge, research and capacity building

Conveners: Federica Matteoli (FAO and GACSA Knowledge Action Group), Ram Chandra Sharma (ICARDA) and Alisher Tashmatov (CACAARI)

Working session 2: CSA implementation in Central Asia

Conveners: Aslihan Arslan, (FAO/EPIC), Oleg Guchgeldiyev (FAO/ CACILM-II), Sandra Corsi (FAO)

Annex 2 List of participants

	Name	Organisation
Kazakhstan		
1.	Karibayeva Kuralay	National GEF Project Preparation Grant Consultant
2.	Evgenyi Klimov	KazFOAM
3.	Gulnar Bekturova	Independent expert on adaptation to climate change and land degradation
4.	Iskakov Ayup	North Kazakhstan research institute for livestock and crops
Kyrgyzstan		
5.	Janybek Kerimaliev	Ministry of Agriculture
6.	Ekaterina Sakhvaeva	Ministry of Agriculture
7.	Mairambek Tairov	Ministry of Agriculture
8.	Elena Taranova	Ministry of Agriculture
9.	Dzhymparkul Bekkulova	State Agency for Environment Protection and Forestry (SAEPF)
10.	Baglan Salykmambetova	State Agency for Environment Protection and Forestry (SAEPF)
11.	Kanykei Orozbaeva	Government Statistics Unit
12.	Kubanychbek Kulov	Kyrgyz Research Irrigation Institute
13.	Zukhra Abaikhanova	Center on Climate Change
14.	Ermekek Baigabyshev	Kyrgyz Soil Society
15.	Almaz Dorombaev	Center of Agrobusiness competitiveness
16.	Abdimalik Egemberdiev	Association of Pasture Users
17.	Abdybek Asanaliev	Kyrgyz National Agrarian University
18.	Elena Prohorenko	Kyrgyz National Agrarian University
19.	Adil Nurbekov	Aarhus Center
20.	Kaseeva Gulnaz	AgroLead
21.	Azamat Isakov	Camp Ala-Too
22.	Kairat Moldoshev	Tabiat Life
23.	Meder Seitkasymov	CAREC
24.	Ysmaiyl Dairov	Regional Mountain Centre of Central Asia
25.	Aidaraliev Iskender	BIO KG
26.	Indira Baikaza Kyzy	TSARSI
27.	Nurzat Abdyrasulova	UNISON Group
28.	Zarina Abumuslimova	UNISON Group
29.	Talant Kerimbaev	IF in Kyrgyzstan
Tajikistan		
30.	Sharipov Khukumat	Committee of Environmental Protection under the Government of the Republic of Tajikistan
31.	Qosimov Khurshedjon	Department of Agency on Statistics
32.	Usmon Makhmadyorov	Soils Institute Academy of Agro Science
33.	Shavqat Juraev	Agriculture Development Specialist
34.	Marufqul Makhkamov	Food and Agriculture Organization of the United Nations (FAO)
35.	Munira Otambekova	Food and Agriculture Organization of the United Nations (FAO)
36.	Nekushoeva Gulniso	National PPG Consultant
Turkmenistan		
37.	Berkeli Ataev	Independent Expert on climate change
38.	Allekov Serdar	Nature Protection Society of Turkmenistan
39.	Veysov Sultan	National PPG Consultant
Uzbekistan		
40.	Botir Dosov	International Center for Agricultural Research in the Dry Areas (ICARDA)
41.	Zafar Gafurov	International Water Management Institute (IWMI)
42.	Shukhrat Muhamedjanov	Scientific-Information Center (SIC)
43.	Alisher Tashmatov	Central Asia and the Caucasus Association of Agricultural Research Institutions (CACAARI)
44.	Tatiana Khamzina	UZGIP Institute
45.	Raisa Taryannikova	Uzhydromet Center
46.	Mahmudov Hojiakbar	State Committee for Nature Protection of Uzbekistan
47.	Oleg Guchgeldiyev	Central Asian Countries Initiative for Land Management (CACILM II)
48.	Anna Shkineva	Central Asian Countries Initiative for Land Management (CACILM II)
International Organisations		
49.	Almaz Asipjanov	Asian Development Bank
50.	Luca Heeb	Centre for Advanced Biomedical Imaging

51.	Shahid Zia	Centre for Advanced Biomedical Imaging
52.	Anastasiya Tikhonova	Central European University
53.	Aziz Karimov	International Maize and Wheat Improvement Center (CIMMYT)
54.	Jyldyz Galieva	European Bank of Reconstruction and Development
55.	Astrid Agostini	Food and Agriculture Organization of the United Nations (FAO)
56.	Aslihan Arslan	Food and Agriculture Organization of the United Nations (FAO)
57.	Sandra Corsi	Food and Agriculture Organization of the United Nations (FAO)
58.	Federica Matteoli	Food and Agriculture Organization of the United Nations (FAO)
59.	Hafiz Muminjanov	Food and Agriculture Organization of the United Nations (FAO)
60.	Reuben Sessa	Food and Agriculture Organization of the United Nations (FAO)
61.	Alessandro Spairani	Food and Agriculture Organization of the United Nations (FAO)
62.	Eymen Toprak	Food and Agriculture Organization of the United Nations (FAO)
63.	Heino Hertel	Food and Agriculture Organization of the United Nations (FAO) Kyrgyzstan
64.	Dorjee Kinlay	Food and Agriculture Organization of the United Nations (FAO) Kyrgyzstan
65.	Marlen Tynaliev	Food and Agriculture Organization of the United Nations (FAO) Kyrgyzstan
66.	Paul Schumacher	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
67.	Maya Eralieva	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
68.	Tina Roner	HELVETAS
69.	Akmal Akramkhanov	International Center for Agricultural Research in the Dry Areas (ICARDA)
70.	Kamiljon Akramov	International Center for Agricultural Research in the Dry Areas (ICARDA)
71.	Bogachan Benli	International Center for Agricultural Research in the Dry Areas (ICARDA)
72.	Low Fabian	International Center for Agricultural Research in the Dry Areas (ICARDA)
73.	Andrew Noble	International Center for Agricultural Research in the Dry Areas (ICARDA)
74.	Aziz Nurbekov	International Center for Agricultural Research in the Dry Areas (ICARDA)
75.	Ram Sharma	International Center for Agricultural Research in the Dry Areas (ICARDA)
76.	Ihktiyor Bobojonov	Leibniz Institute of Vegetable and Ornamental Crops
77.	Tilman Brück	Leibniz Institute of Agricultural Development in Transition Economies
78.	Daniar Ibragimov	United Nations Development Program (UNDP)
79.	Amir Kassam	University of Reading, UK
80.	Dilek Kahraman	International Agricultural Research and Training Center (UTAEM)
81.	Manon Pascale Cassara	World Bank
82.	Kalyi Sulaimanova	World Bank
83.	Talimjan Urazov	World Bank
84.	Dinara Abdzhamilova	World Food Program
85.	Ram Saravanamuttu	World Food Program
86.	Tatiana Semenova	World Food Program

Annex 3 Participant profiles

1. Title	Mr. PhD.
2. Name of participant	Abadybek Asanaliev
3. Position of participant (e.g. climate change officer)	Scientist secretary of Kyrgyz National Agrarian University
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Training of Students; Planning of research; Organisation of research; Planning and providing meetings science Council; Training of farmers. Implementation of soil and water conservation technologies; Environmental impact monitoring.
5. E-mail of participant	asanaly61@mail.ru
6. Name and address of your institution?	Kyrgyz National Agrarian University
7. Web-link to home page of institution or relevant project sites.	www.knau.kg
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	Agricultural education and research. Biodiversity conservation. Soil and water conservation technology implementation.

1. Title	Dr.
2. Name of participant	Akmal Akramkhanov
3. Position of participant	Project manager
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Main work areas include natural resource management with a focus on knowledge management for sustainable land management, capacity development, conservation agriculture, soil salinity mapping and monitoring using GIS and recently systems research with modeling. Current responsibilities are project management and proposal development. Expertise is the blend of engineering and agriculture background to carry out a variety of assignments in natural resource management.
5. E-mail of participant	a.akramkhanov@cgiar.org
6. Name and address of your institution?	ICARDA, Osiyo street 6, Tashkent 100000, Uzbekistan
7. Web-link to home page of institution or relevant project sites.	www.cacilm.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	ICARDA's founding mandate is to promote agricultural development in the dry areas of developing countries. The center delivers new technologies to support sustainable growth in agriculture, to work with a wide range of partners to accelerate the dissemination of these technologies. Interventions include: <ul style="list-style-type: none"> • Water harvesting - supplemental irrigation and water-saving irrigation techniques; • Conservation agriculture methods to reduce production costs and improve sustainability; • Diversification of production systems to high-value crops – horticulture, herbal and medicinal plants; • Integrated crop/rangeland/livestock production systems, including non-traditional sources of livestock feed; • Empowerment of rural women – support and training for value-added products.

1. Title	Dr.
2. Name of participant	Alisher Tashmatov
3. Position of participant	CACAARI Executive Secretary

4. Please provide a short overview of your main work areas, responsibilities and expertise	Maintain regular liaison with national, regional and global Agricultural Research for Development (AR&D) organizations, including international agencies, farmer organizations, NGOs, universities and research institutes.
5. E-mail of participant	a.tashmatov@cgiar.org
6. Name and address of your institution?	Central Asia and the Caucasus Association of Agricultural Research Institutions (CACAARI). Address: Osiyo 6, Tashkent, 100000, Uzbekistan
7. Web-link to home page of institution or relevant project sites.	http://www.cacaari.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	CACAARI is a regional fora of the Global Forum on Agricultural Research (GFAR) for Central Asia and the Caucasus and its mission is to facilitate regional cooperation in agricultural research for development by providing a neutral platform where ideas and experiences can be shared. Moreover, the Association establishes and further develops a three-way communication mechanism - from regional to global stakeholders, from global to regional stakeholders and among various stakeholders on a national basis within CAC.

1. Title	Ms.
2. Name of participant	Anastasia Tikhonova
3. Position of participant	Phd student, Central European University
4. Please provide a short overview of your main work areas, responsibilities and expertise	Climate smart agriculture research in Central Asia
5. E-mail of participant	gardenia12@mail.ru
6. Name and address of your institution?	Central European University, Hungary, Budapest, Nador street 9
7. Web-link to home page of institution or relevant project sites.	ceu.hu
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	post-graduate education

1. Title	Dr.
2. Name of participant	Andrew Noble
3. Position of participant	Deputy Director Research, ICARDA
4. Please provide a short overview of your main work areas, responsibilities and expertise	Lead the science agenda in the Centre and manage the focus of the three research programs that make up the center through priority setting and the development of the strategic research agenda for ICARDA. Expertise is in the area of water resources, plantation forestry, agronomy with a particular focus on degraded soil systems and their rehabilitation.
5. E-mail of participant	a.noble@cgiar.org
6. Name and address of your institution?	International Center for Agricultural Research in the Dry Areas (ICARDA) 13, Khaled Abu Dalbouh Str. - Abdoun Al Shamali, Amman, Jordan.
7. Web-link to home page of institution or relevant project sites.	http://www.icarda.org/
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	The International Center for Agricultural Research in the Dry Areas (ICARDA) is the global agricultural research organization working with countries in the world's dry and marginal areas to deliver sustainable systems solutions that increase productivity, improve rural nutrition, and strengthen national food security. ICARDA's integrated approach, includes new crop varieties; agronomy; on-farm water productivity; natural resources management; rangeland

	and small ruminant production; and socio-economic and policy research to better target poverty issues and accelerate technology adoption. A member of CGIAR Consortium, ICARDA works closely with national agricultural research programs and other partners in more than 40 countries across North and Sub-Saharan Africa, and Central, South, and West Asia.
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1. Title	Ms.
2. Name of participant	Anna Shkineva
3. Position of participant	Group head of marketing and economic research
4. Please provide a short overview of your main work areas, responsibilities and expertise. (max: 100 words)	Work area – agricultural economics Main responsibilities: - development of the working plan for the whole group and control of its fulfillment, - coordination of subordinates' work, - financial and economic analysis of projects, -preparation or/and collection of the initial data for analysis (crop productivity, prices of agricultural products, depreciation charge rate etc.)
5. E-mail of participant	anya.shkineva@gmail.com
6. Name and address of your institution?	LLC "UzGIP", Navoi street, 44, Tashkent, Uzbekistan
7. Web-link to home page of institution or relevant project sites.	www.uzgip.com
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	The institute was established in 1929, it works out various water resources development projects for more than 80 years. Field of activities: Geological, hydro-geological, soil-ameliorative and agro-economic researches. Projects development: a) Design of irrigation dams and pump stations, main irrigation channels and collectors, reservoirs for irrigation; b) Management of water resources developments; c) Design of irrigation and drainage systems and structures, land leveling and irrigation techniques; d) Design of water supply systems of cities and rural settlements; e) Design of electric power supply systems and structures for water and agricultural projects; f) Design of roads and bridges; Financial and economic research and design consideration; Social evaluation of projects; Ecological analysis; Development of design recommendations on irrigation schedules; Reconstruction and rehabilitation of irrigational and drainage systems; Study of water balances of regional and inter-regional water sources.

1. Title	Prof.
2. Name of participant	Amir Kassam
3. Position of participant	Visiting Professor
4. Please provide a short overview of your main work areas, responsibilities and expertise	My main work area in education, research and development deals with sustainable agriculture intensification and sustainable land management with a particular focus on mobilizing greater land potentials for agriculture and ecosystem services. The work deals with ecological approaches to strengthen economic, social and environmental sustainability of agricultural land use systems for: improving food security and livelihoods, enhancing productivity, resilience and ecosystem services, increasing climate change adaptability and mitigation, and reversing agricultural land and environmental degradation.

5. E-mail of participant	amirkassam786@googlemail.com
6. Name and address of your institution?	School of Agriculture, Policy and Development, University of Reading, Earley Gate, Reading RG6 6AR, United Kingdom
7. Web-link to home page of institution or relevant project sites.	www.reading.ac.uk
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	Reading University hosts the Walker Institute for Climate Systems Research and has strong Agriculture and Meteorology Departments with international education, research and development activities.

1. Title	Dr.
2. Name of participant	Aslihan Arslan
3. Position of participant	Agricultural and Natural Resource Economist
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Policy-relevant micro-econometric analyses on climate change, agriculture and food security, barriers to technology adoption and inequality and poverty analysis
5. E-mail of participant	Aslihan.arslan@fao.org
6. Name and address of your institution?	FAO of the UN Viale delle Terme di Caracalla 00153, Rome, Italy
7. Web-link to home page of institution or relevant project sites.	http://www.fao.org/climatechange/epic
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	FAO-EPIC creates evidence base to support policies to identify and promote agricultural practices and livelihood strategies that can improve food security and adaptation climate change, while also contributing to mitigation of GHG where possible.

1. Title	Baygazy kyzy Indira
2. Name of participant	Baygazy kyzy Indira
3. Position of participant	Director of Public Association Centre of Activation of rural Development initiatives. "CUDRI"
4. Please provide a short overview of your main work areas, responsibilities and expertise	Work area is sustainable growth of vulnerable population of local villages and Social projects connected with agriculture and farming.
5. E-mail of participant	tsarsi@mail.ru
6. Name and address of your institution?	"CUDRI". Issyk-kul area, Village Bokonbaev, Street Karymshakova.
7. Web-link to home page of institution or relevant project sites.	Tsarsifacebook.com
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	Since 2003 year, "CUDRI" has been working with emergency issues in Issykkul and Naryn regions. Rehabilitations of channels. Conducting seminars about emergency issues for local people. Projects about green houses and dripping system.

1. Title	Mr.
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2. Name of participant	Berkeli Atayev
3. Position of participant	Environmental independent expert
4. Please provide a short overview of your main work areas, responsibilities and expertise	I lead the projects of our Society: "Organizing of mercury-containing waste recycling in Turkmenistan". Implemented many seminars in the country about how MCW can be harmful for human health and for ecology if improperly used. Conducted some trainings for Civil Society Organisations (CSOs) on the topic "Turkmenistan in the conditions of Global warming", working under the issue of launching an energy efficient greenhouse. At present, time Manager in Turkmenistan of the Development through regional cooperation (DRC) program; 4. Administrator in Turkmenistan on Civil Society Innovation Initiatives (CSII) HUB for CSOs among 7 countries – CA + Afghanistan and Mongolia.
5. E-mail of participant	b_atayev@mail.ru
6. Name and address of your institution?	Nature Preserving Society of Turkmenistan, 23/1, M. Kosayev Str., Ashgabat, 744000 Turkmenistan
7. Web-link to home page of institution or relevant project sites.	www.natureprotectionngo.ru
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	"Nature Protection Society of Turkmenistan" is one of the oldest, biggest NGOs in Turkmenistan, which was established in 1968. At present, Society has about 200 000 members. In 1978 on 14th of IUCN General Assembly in Ashgabat "Nature Protection Society of Turkmenistan" PO was accepted to the membership of this Union and until now it continues to be a member. The Society plays an important role in this process CC mitigation and adaptation like a forests planting and restoration. Together with the State Committee of Turkmenistan for Environmental Protection and Land Resources our Society annually conducts some thematically conferences, seminars, workshops and exhibitions dedicated to the celebration of: World Environment Day, National Independence and Neutrality Days, etc.

1. Title.	Dr.
2. Name of participant	Bogachan Benli
3. Position of participant	Senior Irrigation and Water Management Specialist
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Dr. Bogachan Benli is a Water Management scientist, with 21 years of experience in Pressurized Irrigation Systems, Supplementary Irrigation, Deficit Irrigation, Water Management, Modeling, Water Harvesting, Water and Sanitation, Adaptation to Climate Change, Irrigation Economics and Monitoring and Evaluation. He holds a Ph.D., in Drip Irrigation Systems from Natural Sciences Department of Ankara University. A post university degree on Agricultural Economics and Modeling from IAMM in Montpellier (France). He is presently a Senior Irrigation and Water Management Specialist at ICARDA's Nile Valley office in Cairo. He was a post-doc specialist between the years 2004-2007 at ICARDA HQ, and responsible for the Water Benchmarks project regional coordination, in some 10 countries of Middle East and North Africa. Following his tenure at ICARDA, he has joined at United Nations Development Program (UNDP), where he managed a Regional Water Partnership Programme called "Every Drop Matters" between the years 2007 and 2010 in the countries of East Europe and CIS region. Between the years 2010 and 2014, he managed the Global Program of "Inclusive Community Based Water Management and Adaptation to Climate Change Project for Catalyzing Achievement of the MDGs" in East Europe, CIS, Middle East and Asia Pacific Countries at UNDP. He has wide experience in Agricultural Water Management, Water & Sanitation and Adaptation to Climate Change in some 30 developing countries. He has authored and co-authored more than 9 peer-reviewed publications, 6 book chapters, 9 technical reports and 20 conference papers, etc. He is an active member of Turkish Scientific

	Council since 2006. His current research interests focus on Water Management and Modeling.
5. E-mail of participant	b.benli@cgiar.org bogachanbenli@gmail.com
6. Name and address of your institution?	ICARDA, 15 G. Radwan Inb-El Tabib Street, Giza, P.O Box 2416, Cairo Egypt.
7. Web-link to home page of institution or relevant project sites.	www.icarda.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	ICARDA assists the countries in developing the national research systems for sustainably increasing the productivity of crops and livestock through development, adoption and transfer of technologies; natural resource management, conservation strategies and socio-economic knowledge. ICARDA fosters cooperation among the countries in Central Asia and promotes their collaboration with the wider international community.

1. Title	Mr. Dr.
2. Name of participant	Botir Dosov
3. Position of participant	Innovation Platform Facilitator, CRP DS in CA
4. Please provide a short overview of your main work areas, responsibilities and expertise.	<u>Expertise:</u> Agricultural Innovation Systems; Socio-economic analysis; Gender and environmental analysis; Statistical analysis and modeling; Agricultural policy & Food Security; Agricultural Research for Development; Project administration, management and coordination; Monitoring and Evaluation; Institutional networks; Rural development; Facilitation public-private partnership, etc. <u>Work area:</u> - Baseline surveys in CA countries for assessment of potential environmental, economic and social impact of research and extension; - Cross country comparative characterization of environmental, agricultural and socio-economic context of the action sites in Central Asia; - Facilitate the linkages between ICT sector, Agricultural Research, Education and Extension systems, through creating a dialogue platform between public-private sectors, NGOs, farmers and other innovation actors; and many others.
5. E-mail of participant	dosov.b@gmail.com
6. Name and address of your institution?	Address: 6, Osiyo Street, P.O. Box 4375, Tashkent, 10000, Uzbekistan Tel: (+998 71) 2372130/69 Fax: (+998 71) 1207125
7. Web-link to home page of institution or relevant project sites.	www.cac-program.org ; www.cacaari.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	The Regional Program for Sustainable Agricultural Development in Central Asia and Caucasus assists the countries in developing national research systems for sustainably increasing the productivity of crops and livestock through development, adoption and transfer of technologies; natural resource management, conservation strategies and socio-economic knowledge. CGIAR Research Program on Dryland Systems (CRP DS) is the first large-scale research program to use an integrated agro-ecosystems approach to improve productivity and livelihoods in the dry areas. It aims to enhance food security for the rural poor and ensure environmental sustainability in dryland agro-ecosystems. Innovation Platform is as one of the key components of CRP DS in CA aimed at upscaling of programme impacts.

1. Title	Ms.
2. Name of participant	Dilek KAHRAMAN
3. Position of participant	Director

4. Please provide a short overview of your main work areas, responsibilities and expertise	International Agricultural Research and Training Center (UTAEM) is a research and training center working at national and international level. As the Director, I have been making contacts to organize trainings, workshops and coordinating technical and administrative activities. I am also Regional Manager of the FATIMA project (Horizon 2020) on precision agriculture. Our center, I am the focal point of Turkey, is one of the partners of the initiative on South - South and Triangular Cooperation for Agricultural Development and Enhanced Food Security (SSTC-ADFS) jointly supported by the International Fund for Agricultural Development (IFAD) and the United Nations Office for South-South Cooperation (UNOSSC).
5. E-mail of participant	dilek.kahraman@tarim.gov.tr
6. Name and address of your institution?	International Agricultural Research and Training Center (UTAEM) Camikebir mah. Cavus yolu No:9 Menemen, Izmir, Turkey
7. Web-link to home page of institution or relevant project sites.	http://arastirma.tarim.gov.tr/izmirutaem
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	UTAEM is a research and training centre, which focuses on international co-operation in land and water management. The objectives of the Centre are to identify the constraints that are actually limiting sustainable performance, to develop and test appropriate cost-effective responses to address the constraints, and to guide and accelerate the learning of individuals so that they realize their potential. UTAEM organizes international training courses on topics related to agriculture every year. The institute has been carrying out various projects on soil and water resources from basin to field scales.

1. Title	Ms.
2. Name of participant	Ekaterina Sahvaeva
3. Position of participant	Climate change expert, hydrologist
4. Please provide a short overview of your main work areas, responsibilities and expertise	Water resources and monitoring, quantitative evaluation, interstate water dividing, integrated water resource management, global climate change, basin planning, gender aspects of water resources control
5. E-mail of participant	Tadar51@mail.ru
6. Name and address of your institution?	Department of Water Economy and Amelioration
7. Web-link to home page of institution or relevant project sites.	www.water.kg
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	<ul style="list-style-type: none"> • Interstate relations; • Efficient use of water resources on the basis of limiting of water usage; • Collection of information about quantity of the taken away and used water throughout the Republic by water users (state statistics); • Preparation of the administration bills of base in the field of water economy etc.; • Database development for information system; • www.water.kg website operation support; • economical water use tools development, etc.

1. Title	Dr.
2. Name of participant	Fabian Löw
3. Position of participant	Consultant in Remote Sensing and Geographical Information Systems at the Geo-informatics Unit of the International Center for Agricultural Research in the Dry Areas (ICARDA) and Scientific Advisor at MapTailor.

4. Please provide a short overview of your main work areas, responsibilities and expertise.	Remote sensing for agricultural monitoring, environmental management, and the European Copernicus earth observation program in the context of risk and disaster management.
5. E-mail of participant	fabian.loew@gmx.de or fabian@maptailor.net
6. Name and address of your institution?	ICARDA
7. Web-link to home page of institution or relevant project sites.	ICARDA.CGIAR.ORG and http://geoagro.icarda.org/en/
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	ICARDA is the global agricultural research organization working with countries in the world's dry and marginal areas to deliver sustainable systems solutions that increase productivity, improve rural nutrition, and strengthen national food security. ICARDA's integrated approach, includes new crop varieties; agronomy; on-farm water productivity; natural resources management; rangeland and small ruminant production; and socioeconomic; policy research and Geo-informatics (to better target and accelerate adoption). A member of CGIAR Consortium, ICARDA works closely with national agricultural research programs and other partners in more than 40 countries across North and Sub-Saharan Africa, and Central, South, and West Asia.

1. Title	Dr.
2. Name of participant	Gulnar Bekturova
3. Position of participant	Expert in land degradation & climate change adaptation at the local community level
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Main work areas are Almaty, Zhambyl, Akmola, Kyzylorda and southern regions of Kazakhstan. The most important events: Participated as expert in UNDP projects: "Community Based Adaptation Project", 2007-2011, "Climate Risk Management in Kazakhstan", 2011, "Sustainable Land Management in Steppe and Semi-Arid Zones of Kazakhstan, 2014-2018. Participated to realize many demonstration projects in different communities on water and pasture management; arable land management; creation of forest belts and drip irrigation. Took part in an awareness-raising campaign held in 7 regions in Kazakhstan. Co-author and editor of the book "Traditional Land Use Knowledge in Central Asia", UNDP, 2007, 102 p; Author of 77 publications.
5. E-mail of participant	gbekturova@mail.ru
6. Name and address of your institution?	The Found "Farmer of Kazakhstan" (FFK), Almaty
7. Web-link to home page of institution or relevant project sites.	No
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	FFK is a non-governmental organization, created in 1996, which works in land degradation areas in the semi-arid and arid zones of Kazakhstan. FFK actions entail adjustments to existing and new natural resource management practices in the agricultural, water and livestock sectors. FFK conduct training and information dissemination activities at the local level. FFK helps potential applicants to write projects for participation grant's programs and helps them to implement projects. FFK realized more than 50 projects, created 11 rural NGOs and published 12 brochures.

1. Title	Mr.
2. Name of participant	Hukumatsho Sharipov
3. Position of participant	Agriculture consultant in ELMRLP project of CEOP

4. Please provide a short overview of your main work areas, responsibilities and expertise.	The overall Project Development Objective (PDO) and Global Environmental Objective (GEO) is to enable rural people to increase their productive assets in ways that improve natural resource management and resilience to climate change in selected climate vulnerable sites. The project approach includes extensive participatory processes and the disbursement of small grants. The project also seeks to address gender and social inclusion issues through its use of participatory processes and the monitoring and evaluation of project results. Plan also states that a primary challenge for the country is land degradation, including deterioration of pasturelands, arable and irrigated lands and forests. Project activities will be carried out primarily in the districts of Farkhor, Kulob, Khovaling, Baljuvan, Tavildara, Jirgatol, Rogun and Faizobod.
5. E-mail of participant	Sh.hukumatsh@mai.ru
6. Name and address of your institution?	Government of Tajikistan: Committee for Environmental Protection – Implementation Group Environmental Land Management and Rural Livelihoods Project; republic of Tajikistan, Dushanbe city, street Shamsi 5/1
7. Web-link to home page of institution or relevant project sites.	elmarl@list.ru
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	Privation land degradation, including deterioration of pasturelands, arable and irrigated lands and forests. To strengthen natural disaster risk management, weather forecasting, and climate change adaptation to reduce vulnerability and thus increase agricultural output, development planning. Description and analysis of production system in a project districts and villages and provide assistance in the oversight of project coordination between project components and partners.

1. Title	Dr.
2. Name of participant	Ihtiyor Bobojonov
3. Position of participant	Research Associate
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Dr. Bobojonov works on several projects related to the mobilization of agricultural market potentials in the Commonwealth of Independent States countries. He mainly carries out research on the impact of supply chain transformation on the welfare of agricultural producers. Furthermore, he investigates the role of agricultural insurance in agricultural sector development and analyzes possible options to improve the performance of insurance markets.
5. E-mail of participant	Bobojonov@iamo.de
6. Name and address of your institution?	Leibniz Institute of Agricultural Development in Transition Economies (IAMO)
7. Web-link to home page of institution or relevant project sites	www.iamo.de
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	The Leibniz Institute of Agricultural Development in Transition Economies (IAMO) analyses economic, social and political processes of change in the agricultural and food sector, and in rural areas. The geographic focus covers the enlarging EU, transition regions of Central, Eastern and South Eastern Europe, as well as Central and Eastern Asia.

1. Title	Dr.
2. Name of participant	Iskakov Ayup
3. Position of participant	Manager, crop scientist
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Breeding and biotechnology of crops, agro ecology.

5. E-mail of participant	Iskakov.ayup@mail.ru
6. Name and address of your institution?	North Kazakhstan research institute for livestock and crops
7. Web-link to home page of institution or relevant project sites.	www.sevniijik.kz
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	North Kazakhstan research institute for livestock and crops. Breeding and technology of crops, animal husbandry

1. Title	Mr.
2. Name of participant	Iskenderbek Aidaraliev
3. Position of participant	Director of Federation
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Coordinating of general working process in the Federation; Connection and cooperation with farmers and local authorities in rural areas; project management.
5. E-mail of participant	Aidaraliev.i@gmail.com
6. Name and address of your institution?	Federation of organic development "BIO-KG", 43/1 Grajdanskaya str., Bishkek, Kyrgyz Republic
7. Web-link to home page of institution or relevant project sites.	biokg.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	The Federation of organic development "BIO-KG" was established in 2012 as an "umbrella" organization. "BIO - KG" actively cooperates with farmers, with government agencies, especially the Ministry of Agriculture and the economy, as well as international and donor organizations. The range of issues that are the subject of cooperation is broad and includes environmental issues, "green economy", the efficient use of natural resources and export prospects of agricultural products.

1. Title	Mrs Jyldyz Galieva
2. Name of participant	Jyldyz Galieva
3. Position of participant	Senior banker, Associate director
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Finance and Technology Transfer Centre for Climate Change (FINTECC) programme is part of a global drive towards climate technology transfer for developing countries and countries in transition. FINTECC is a programme that helps companies in participating EBRD countries of operations to implement innovative climate technologies. The programme offers technical assistance provided by the EBRD and international consultants, as well as incentive grants for companies to introduce eligible technologies. Grants are available to the companies as a complement to EBRD financing. http://www.ebrd.com/fintecc
5. E-mail of participant	galievaj@ebrd.com
6. Name and address of your institution?	EBRD Resident Office in Kyrgyz Republic, 21, Erkindik Avenue, Business Centre Orion, 4rth floor, Bishkek, Kyrgyz republic
7. Web-link to home page of institution or relevant project sites.	http://www.ebrd.com/kyrgyz-republic.html www.ebrd.com http://www.ebrd.com/fintecc
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related	http://www.ebrd.com/fintecc http://www.kyrseff.kg

to sustainable agricultural production, rural development and climate change.	
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1. Title	Dr.
2. Name of participant	Kamiljon Akramov
3. Position of participant	Research Fellow
4. Please provide a short overview of your main work areas, responsibilities and expertise	I am a Research Fellow and Leader of the Central Asia Program at IFPRI. The Central Asia program comprises of comprehensive research and capacity strengthening components. I conduct research on economic growth, governance, aid effectiveness, structural transformation and agriculture-nutrition linkages in transition and developing countries.
5. E-mail of participant	k.akramov@cgiar.org
6. Name and address of your institution?	International Food Policy Research Institution (IFPRI) 2033 K Street, NW, Washington, DC 20006, USA
7. Web-link to home page of institution or relevant project sites	www.ifpri.org ; www.resakss-asia.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change	IFPRI's vision is a world free of hunger and malnutrition. Its mission is to provide research-based policy solutions that sustainably reduce poverty and end hunger and malnutrition. Research at IFPRI focuses on six strategic areas: ensuring sustainable food production, promoting healthy food systems, improving markets and trade, transforming agriculture, building resilience, and strengthening institutions and governance. In addition, IFPRI's research on gender cuts across all six areas, because understanding the relationships between women and men can illuminate the pathway to sustainable and inclusive economic development. Beyond research, IFPRI's work includes partnerships, communications and capacity strengthening.

1. Title	Mr.
2. Name of participant	Khurshed Qasimov
3. Position of participant	Chief of Summary-Economical Analysis and International Relations Department of Agency on Statistics under the President of the Republic of Tajikistan
4. Please provide a short overview of your main work areas, responsibilities and expertise	My main duties are compiling data on external and internal sectors; preparing and analyzing monthly preliminary macro-economic statistics for the Government of Tajikistan and other relevant ministries, analyzing a country's economic situation; preparing socio-economic reports based on analyzing the socioeconomic situation of the regions of the Republic of Tajikistan; preparing, producing and dissemination of monthly, quarterly and yearly reports of economic and social situation of the Republic of Tajikistan; dissemination of information through the Agency's statistics website (press-releases, publications, work with database in website), preparing yearly bulletin of "Yearbook of Tajikistan", "Tajikistan in figures" and "Tajikistan and CIS countries" in three languages, communication with international organizations, compiling data for UN Bulletin every month, analyzing of agriculture, environment and other related sectors, etc.
5. E-mail of participant	kosimov@stat.tj
6. Name and address of your institution?	Tajikistan, 734025, Dushanbe city, Bokhtar 17 street
7. Web-link to home page of institution or relevant project sites	www.stat.tj
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related	The Agency on Statistics under the President of the Republic of Tajikistan is the central statistical office of the country. The Agency on Statistics is administratively autonomous and its head serves as the country's chief statistician who reports to the President and

to sustainable agricultural production, rural development and climate change.	government. The Statistical Agency is responsible for population censuses, household surveys, demographic statistics and a wide range of economic statistics involving establishment and enterprise surveys, as well as prices, international trade, the national accounts, government finance, agricultural, labor and social statistics. In the case of social statistics, the Agency on Statistics compiles the data from administrative records of corresponding Ministries. It is the organization that is responsible for implementation, analysis, measurement and reporting about the MDGs and SDGs indicators to the Government of the Republic of Tajikistan. With regard to the agriculture sector, the Agency on Statistics publishes quarterly the publications "Food Security and Poverty" in three languages and "Agriculture of Republic of Tajikistan".
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1. Title	Dr.
2. Name of participant	Kuralay Karibayeva
3. Position of participant	Director
4. Please provide a short overview of your main work areas, responsibilities and expertise.	<p>Experience working with international organizations: UNDP, UNEP, FAO, GIZ, OSCE, UNESCO, the World Bank, ADB, TACIS.</p> <ul style="list-style-type: none"> • Head of section of the International Biological Program "Man and the Biosphere" by the complex characteristics of the sandy grasslands of Kazakhstan. • Co-Director of the International Programme on the Environment "Ecology, management and productivity of pastures." • Management of national working groups in the preparation of the deployed version of the National Plan of Action for the Protection of the Environment (NEAP), the National Plan of Action to Combat Desertification (1999), the First (1999) and Second (2002) of the national reports on the fight Desertification in Kazakhstan. • Head of Unit of the International Programme "Support for grazing in Central Asia." Creation of GIS RK together with the University of California USA; • Head of the Working Group for the preparation of the National Strategy for Keeping BR Convention to Combat Desertification; Chief editor of the National Report on Conservation and Sustainable Use of Biological Diversity of the Republic of Kazakhstan.
5. E-mail of participant	kkaribayeva@mail.ru iesd@list.ru
6. Name and address of your institution?	Institute of Ecology and Sustainable Development 40, Mk-n Orbita-1, 050043, Almaty, Kazakhstan Tel.: +7 727 2654326, +7 7772130111
7. Web-link to home page of institution or relevant project sites	
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	<p>The Institute of Ecology and Sustainable Development, a research, educational non-profit institution operating under the laws of the Republic of Kazakhstan. The Institute aims to ensure the sustainable development of ecological and economic spheres of the republic, rational use and reproduction of natural resources of Kazakhstan on the basis of a national environmental strategy.</p> <p>The Research Institute focuses on e.g.:</p> <ul style="list-style-type: none"> • Formation of greening concepts of nature in the country; • Creation of an information scientific and practical database for the management of natural systems; • Development of environmental monitoring systems for industrial and agricultural areas of the country, as well as crisis areas; • Development of criteria for assessment of the situation in the regions of Kazakhstan; • Environmental Information Systems for situation assessment and prediction of the state of environmental transformation. <p>Various interests of the Institute, include issues related to the development strategy of integrated environmental and economic</p>

	development of the territories, including the ecological model of economic development of the regions of Kazakhstan and models of ecological stabilization in crisis regions.
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1. Title	Mr.
2. Name of participant	Luca Heeb
3. Position of participant	Plantwise Programme Support Officer & ICM Advisor
4. Please provide a short overview of your main work areas, responsibilities and expertise.	<p>I studied at the Swiss College of Agriculture where I graduated with a BSc in International Agriculture and an MSc in Life Sciences with a specialization in sustainable production systems. During my career, I have worked on different projects at the intercept between agricultural development and research, first based in Bangladesh, subsequently in Azerbaijan and Ghana. In both South Asia and the Caucasus, I worked in the project management units for agricultural development projects involved in both operational and coordination activities of cross-sectoral projects, which require a sound knowledge of development concepts.</p> <p>I joined CABI in 2014 as a member of the Integrated Crop Management (ICM) team and as a support officer for the Plantwise programme. Within my activities in the Plantwise programme, I support its global coordination, contribute to monitoring and evaluation activities and support the implementation of the Plantwise activities in target countries. As a member of the ICM team, I support the implementation of ICM projects and provide specialist advice and technical knowledge.</p>
5. E-mail of participant	l.heeb@cabi.org
6. Name and address of your institution?	CABI Europe-Switzerland
7. Web-link to home page of institution or relevant project sites	www.cabi.org ; www.plantwise.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change	<p>CABI (Centre for Agriculture and Biosciences International) is an international not-for-profit organization that improves people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment. Our approach involves putting information, skills and tools into people's hands. CABI's 48 member countries guide and influence our work, which is delivered by scientific staff based in our global network of centres.</p> <p>For contribution to agriculture production, rural development and CC as part of the GACSA webinars, see the following links: http://www.fao.org/gacsa/webinars/en/ or directly in YouTube: https://www.youtube.com/watch?v=MHoE-U3P6f4&list=PLzp5NgJ2-dK6DqAa-irbkbwPvMQaQ2NTn</p>

1. Title	Ms.
2. Name of participant	Manon Cassara
3. Position of participant	Water Resources Management Consultant
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Provide expertise in the areas of transboundary water resources management, climate change and institutional / policy inherent aspects. Provide advisory support for stakeholder engagement activities and projects development strategy.
5. E-mail of participant	mcassara@worldbank.org
6. Name and address of your institution?	World Bank Regional Office for Central Asia – Almaty – Kazakhstan
7. Web-link to home page of institution or relevant project sites.	http://www.worldbank.org/eca/

1. Title	Mr.
2. Name of participant	Marlen Tynaliev
3. Position of participant	Consultant on Food Security

4. Please provide a short overview of your main work areas, responsibilities and expertise	For the last six years, I worked in agriculture and rural development in Kyrgyzstan. I participated in the successful implementation of several agricultural development projects, such as “Agribusiness and Management”, “Agricultural Productivity Assistance” and “Support to Community Seed Funds” in Kyrgyzstan. During this period, I was able to work in various operational and managerial positions, which helped me better understand and learn the agricultural sector from the inside and demonstrate my skills in planning and organizing, analytical/research work, leadership and management. My area of interest and professional skills related to food security, value chain development, agribusiness, regional sustainable economic and agricultural development, trade and market research and analyses.
5. E-mail of participant	marlen.tynaliev@fao.org
6. Name and address of your institution?	FAO Representation in the KR, Akhunbaeva str. 201, 720044, Bishkek, Kyrgyzstan
7. Web-link to home page of institution or relevant project sites.	http://coin.fao.org/cms/do/en/office.html?officeCode=FEKYR
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change	Achieving food security for all is at the heart of FAO's efforts – to make sure people have regular access to enough high-quality food to lead active, healthy lives. FAO's mandate is to raise levels of nutrition, improve agricultural productivity, better the lives of rural populations and contribute to the growth of the world economy.

1. Title	Mr.
2. Name of participant	Marufqul Mahkamov
3. Position of participant	FAO Tajikistan, National Consultant
4. Please provide a short overview of your main work areas, responsibilities and expertise	Mr. Mahkamov is implementing the project “Support to promote and implement integrated pest management (IPM) strategies for priority arable crops and fruits in Tajikistan” (TCP/TAJ/3502). The aim of this project is to test and adapt integrated pest management (IPM) technologies to the local conditions for specific regions, for fruit and arable crops. To promote (IPM) technologies to the farmers through trainings to the farmers and extension specialists.
5. E-mail of participant	mmaruf85@gail.com
6. Name and address of your institution?	FAO Tajikistan, Tajikistan Dushanbe, Rudaki 44.
7. Web-link to home page of institution or relevant project sites	FAOTJ@fao.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change	To share the results of the project and to discuss further potentials for wider promotion in the farmers’ fields.
1. Title	Ms.
2. Name of participant	Nekushoeva Gulniso
3. Position of participant	Senior Scientific Researcher of “Soil Genesis, classification and mapping” Department.
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Our Department is responsible for studying the genesis, geographic distribution of soils in Tajikistan, agro climatic zoning of soils; classification of soil, soil mapping; monitoring of soil degradation processes (soil erosion, salinization etc.), land use changes. Moreover, I am collecting and describing (using WOCAT questioner) the best SLM (soil and water conservation) technologies, whose introduction helps farmers to prevent degradation, enhance food security and adaptation to the consequences of climate change in Tajikistan.

5. E-mail of participant	gulniso@mail.ru
6. Name and address of your institution?	Soil Science Research Institute of Tajik Agrarian Academy of Science (TAAS) 734025, Rudaki av. 21a, Dushanbe, Tajikistan
7. Web-link to home page of institution or relevant project sites.	khokshinos@mail.ru
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	<ul style="list-style-type: none"> - Establishment of the methods of fertility reproduction and sustainable land management and improvement of soil fertility. - Increasing productivity of rain-fed eroded soils; - Establishment of conservation land use systems for slope lands (SWC technologies for the crops cultivation). - Establishment of technologies to improve the fertility of the stony and sandy soils. - Reclamation of saline, low permeable and waterlogged soils of the Republic.

1. Title	Ms.
2. Name of participant	Nurzat Abdyrasulova
3. Position of participant	President; Unison Group
4. Please provide a short overview of your main work areas, responsibilities and expertise.	<p>Master's degree in Management of Water and Energy Resources; Master's degree in Environmental Management.</p> <p>Areas of expertise: energy sector and environmental issues in Kyrgyzstan (energy sector management, sustainable energy, climate change, etc.)</p> <p>Author of analytical reports and reviews (e.g. "The Electricity Governance in Kyrgyzstan in 2009 - 2015: institutional and practical analyze", 2016), pamphlets (e.g. "Climate Change in Kyrgyzstan", Brochure, 2011) and articles on environment and energy issues.</p> <p>Extensive international experience; implementation of national, regional and local projects in Russia, Kazakhstan, Armenia and Tajikistan.</p> <p>Participation in several international conferences, such as the international UN meetings on climate change.</p>
5. E-mail of participant	nurzat.abdyrasulova@unison.kg
6. Name and address of your institution?	Unison Group 145 Abdymomunova Street
7. Web-link to home page of institution or relevant project sites.	www.unison.kg http://energy.unison.kg/ru
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	<p>Areas of work:</p> <ul style="list-style-type: none"> - Climate change (introduction of CC-related issues into national policies; practical projects; awareness-raising, etc.); - Sustainable energy (improving legislation on energy efficiency of buildings; innovational financial mechanisms to support EE improvement; RES market development analysis, etc.); - Good governance (supporting transparency and accountability to increase public trust; promoting public participation in decision making processes in the energy sector; consumers' rights protection, etc.). <p>Several large-scale info campaigns were held (public lectures, trainings, e.g. "Ushubo II: Stay warm, Kyrgyzstan!" that covered over 575 villages and towns around the country in 2015).</p>

1. Title	Ms.
2. Name of participant	Otambekova Munira
3. Position of participant	FAO, Seed specialist
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Directly participating in implementation of FAO program and projects on adoption and promotion of Conservation Agriculture, development of organic farming, improving livelihood of rural

	population by increasing access to high quality seed and developing nuts production, etc.
5. E-mail of participant	munira.otambekova@gmail.com
6. Name and address of your institution?	Office of FAO in Tajikistan 44,Rudaki Avenue, Tajikistan
7. Web-link to home page of institution or relevant project sites.	www.fao.org

1. Title	Mr.
2. Name of participant	Paul Schumacher
3. Position of participant	Advisor
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Paul works for the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in Kyrgyzstan. He is Advisor for the Regional Project "Ecosystem-based Adaptation to Climate Change in high mountainous regions of Central Asia", which is part of the International Climate Initiative. Paul did a Bachelor of Science in Geography and a Master of Science in Global Change Ecology, an interdisciplinary Master program, linking natural science perspectives on global change with social science approaches. He was working already for GIZ in Tajikistan and in Bonn in the Sectorial Project on Combating Desertification. Paul has research and work experience in the field of ecosystem services, land use management and climate change and ecosystem-based adaptation to climate change in particular.
5. E-mail of participant	paul.schumacher@giz.de
6. Name and address of your institution?	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH 22, Erkindik Blvd, 720040 Bishkek, Kyrgyz Republic
7. Web-link to home page of institution or relevant project sites.	http://www.naturalresources-centralasia.org/
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	For several years, GIZ has been developing new, regionally adapted approaches for the participatory and sustainable management of natural resources, and has been implementing projects in Central Asia that range from direct support to communities, to the promotion of cross-border cooperation and regional partnerships. In all fields of our activities we take into consideration climatic changes in the region, and we support efforts by our partners to adapt both new and existing management methods.

1. Title	Prof.
2. Name of participant	Ram Sharma
3. Position of participant	Regional Coordinator
4. Please provide a short overview of your main work areas, responsibilities and expertise	Managerial task: Lead the Consortium of CGIAR Research Program for Central Asia and the Caucasus (CAC) ensuring the development and implementation of the regional research agenda, implementation of the research for development continuum by building needed partnerships along impact pathways to enhance the uptake of research outputs, and coordinate the necessary strategic, policy and administrative support Scientific task: Coordinate ICARDA's collaborative research in the CAC region on crop germplasm exchange and improvement, provide needed scientific backstopping, capacity building of the researchers, and development of new cultivars of cereals and legumes suitable to the climate and farming systems in the region.
5. E-mail of participant	r.c.sharma@cgiar.org
6. Name and address of your institution?	ICARDA, Regional Office for Central Asia and the Caucasus, 6 Osiyo Street, Tashkent 100000, Uzbekistan
7. Web-link to home page of institution or relevant project sites	www.icarda.cgiar.org/cac www.cac-program.org

8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change	The Regional Program for Sustainable Agricultural Development in Central Asia and Caucasus operates since 1998 as a consortium of eight National Agricultural Research Organizations, eight Centers of the Consultative Group for International Agricultural Research (CGIAR consortium members) and three additional advanced research institutions (non-CGIAR consortium members). The Program assists the countries in developing the national research systems for sustainably increasing the productivity of crops and livestock through development, adoption and transfer of technologies; natural resource management, conservation strategies and socio-economic knowledge. It fosters cooperation among the countries in the Region and promotes their collaboration with the wider international community.
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1. Title	Dr.
2. Name of participant	Shahid Zia
3. Position of participant	Managing Director
4. Please provide a short overview of your main work areas, responsibilities and expertise	Working on: 1. Climate change adaptation and mitigation at the farm and community level; 2. Food security in a changing climate; 3. E-agriculture solutions; 4. Agricultural value chains
5. E-mail of participant	Shahid_LSF@yahoo.com
6. Name and address of your institution?	Rural Business Development Centre 31, Street 128 G-13/4 Islamabad Pakistan
7. Web-link to home page of institution or relevant project sites.	www.rbdc.com.pk
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	1. Research on agricultural value chains; 2. Capacity building of farmers in organic food production and CSA; 3. E-Agricultural services; 4. Value chains development

1. Title	Mr.
2. Name of participant	Shavqat Juraev
3. Position of participant	Agriculture Development Specialist
4. Please provide a short overview of your main work areas, responsibilities and expertise	I am working under the FAO project and implementing Conservation Agriculture and Integrated Pest Management projects in Tajikistan in Sarob Cooperative for 2 years. I am working in the agricultural development area for more than 20 years as an agricultural development expert
5. E-mail of participant	shavqat.juraev@gmail.com
6. Name and address of your institution?	Non-Commercial Cooperative «Sarob» 127 Rudaki Avenue, Dushanbe, Tajikistan
7. Web-link to home page of institution or relevant project sites	www.sarob.net
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change	Cooperative Sarob is a consulting organization that provides agricultural support to farmers in Tajikistan. Our goal is to facilitate comprehensive agricultural development by farmers through improving their specific knowledge and experience, providing increased access to agricultural inputs, and expanding market opportunities. In order to achieve this goal, Sarob provides the following services to its members: Theoretical and practical training (Including decision making processes and crop production); Implementation of new technologies through the organisation of field demonstrations and tests of agricultural

	<p>machinery and equipment; Organized study tours; Development and printing of agricultural crop production materials; Improvement in the level of knowledge about, and access to, agricultural inputs; Creation of linkages among suppliers of agricultural inputs; Creation of linkages between buyers and processors of agricultural products.</p>
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1. Title	Mr.
2. Name of participant	Serdar Allekov
3. Position of participant	Chairman of board “Nature Preserving Society of Turkmenistan” NGO
4. Please provide a short overview of your main work areas, responsibilities and expertise	<p>Managing all Society’s activities, including e.g. approving work plan, staff list, chairing on all meetings, conferences, etc.</p> <p>Representing the organization on national and international events, on behalf of the Society implementing any negotiations to any legal entities and physicians. Development of strategy on furthering the Society’s operations. Coordination national and regional projects, responsible for realization of any National programs, strategies, laws expressed on environmental improvement. Integrating and adaptation of good practices, new technologies, cutting edge equipment, innovations for national program of nature protection.</p> <p>Total coordination in Turkmenistan of: Aarhus Convention implementation; Development through regional cooperation (DRC) program; Civil Society Innovation Initiatives (CSil) HUB for CSOs among 7 countries – CA + Afghanistan and Mongolia.</p>
5. E-mail of participant	egf2002@mail.ru
6. Name and address of your institution?	Nature Preserving Society of Turkmenistan, 23/1, M. Kosayev Str., Ashgabat, 744000 Turkmenistan
7. Web-link to home page of institution or relevant project sites	www.natureprotectionngo.ru
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change	<p>“Nature Protection Society of Turkmenistan” is one of the oldest, biggest NGOs in Turkmenistan, which was established in 1968. At present, Society has about 200 000 members.</p> <p>In 1978 on the 14th of IUCN General Assembly in Ashgabat “Nature Protection Society of Turkmenistan” PO was accepted to the membership of this Union and until now continue to be a member. The Society plays an important role in this process CC mitigation and adaptation like a forests planting and restoration.</p> <p>Together with the State Committee of Turkmenistan for Environmental Protection and Land Resources our Society annually conducts some thematically conferences, seminars, workshops and exhibitions dedicated to the celebration of: World Environment Day, National Independence and Neutrality Days, etc.</p>

1. Title	Mr.
2. Name of participant	Sultan Kerimovich Veysov
3. Position of participant	National Consultant (Natural Resources Management and Climate Change) “Integrated natural resources management in drought-prone and salt-affected agricultural production landscapes in Central Asia and Turkey (CACILM-2)” – Project preparation Grant (PPG)
4. Please provide a short overview of your main work areas, responsibilities and expertise	<p>The main purpose and objectives of a national expert on sustainable land management was to restore, maintain and enhance the productive functions of land in the pilot regions of the project to improve the economic and social well-being of local communities to climate change and support capacity-building efforts at the local and national level. Developed adaptation master plan for all the three pilot regions. Fully responsible for the development and implementation of adaptation measures in the pilot region of Karakum, which provided methodological and technical assistance for the construction of new and repair of wells (15 and 13), the restoration of dew mound (4) and the construction of new dew</p>

	mound (11). In Bahardok village 10 hectares of shifting sands were secured, which significantly improved the state of desert pastures and the microclimate around the village.
5. E-mail of participant	wsultan@mail.ru
6. Name and address of your institution?	National Institute of Deserts, Flora and Fauna 744000, Ashgabat, Bitarap Turkmenistan street, 15
7. Web-link to home page of institution or relevant project sites	www.natureprotection.gov.tm
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change	Our institute is leading on the implementation of the basic conventions: Combating desertification, Biodiversity and Climate Change, CACILM and all of their constituent projects.

1. Title	Mr.
2. Name of participant	Talimjan Urazov
3. Position of participant	Senior Agricultural Specialist
4. Please provide a short overview of your main work areas, responsibilities and expertise	Operational functions related to the preparation and supervision of the investment projects in agricultural, water and environmental sector; Preparation of analytical sector studies in various area of agricultural and water policy, budget and others; Close work with external / internal audience to discuss outstanding issues and negotiate mutually accepted solution options.
5. E-mail of participant	turazov@worldbank.org
6. Name and address of your institution?	World Bank Kazakhstan Country Office Samal 12, Astana Tower, Astana, Kazakhstan
7. Web-link to home page of institution or relevant project sites.	www.worldbank.org.kz
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change. (max:	The World Bank Group has set two goals for the world to achieve by 2030: (i) End extreme poverty by decreasing the percentage of people living on less than \$1.90 a day to no more than 3% and (ii) Promote shared prosperity by fostering the income growth of the bottom 40% for every country. The World Bank is a vital source of financial and technical assistance to developing countries around the world. The World Bank supports agriculture development around the globe by providing financing to farmers' community and technical assistance to transfer advance technology.

1. Title	Tatyana Khamzina – Chief specialist of Soil Reclamation and Irrigation Department. UZGIP Institute
2. Name of participant	Tatyana Khamzina - national consultant on agricultural adaptation to climate change. Project "Uzbekistan: Preparation of the Third National Communication to the UNFCCC"
3. Position of participant	Specialist on adapting agriculture to climate change
4. Please provide a short overview of your main work areas, responsibilities and expertise. (max: 100 words)	Basic qualifications: reclamation and irrigated agriculture, water and land use, water use and crop water requirements, and others. Since 2002 carry out assess of institutional and capacity building needs based on legal, policy and institutional frames; review of agriculture and water sectors policy reform and legislative base; conduct of environmental impact assessment and development of the environmental management, mitigation and monitoring plans, and institutional settings, as well as provide analysis of land degradation trends and climate change risks and social survey, including stakeholder and gender analysis, etc.
5. E-mail of participant	Tatyana_khamzina@mail.ru

6. Name and address of your institution?	OOO UZGIP 44, Navoi str., Tashkent, Uzbekistan
7. Web-link to home page of institution or relevant project sites.	-
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	The Design and Research Institute UZGIP (formerly Sredazgiprovdokhlopok, Uzgipromeliovodkhoz) works on climate change adaptation through e.g. the reconstruction of irrigation and drainage infrastructure, complex reconstruction and land reclamation, improvement and conservation of wetlands of the Aral region as well as implements measures to improve the efficiency of water use in irrigation.

1. Title	Prof.
2. Name of participant	Tilman Brück
3. Position of participant	Team Leader
4. Please provide a short overview of your main work areas, responsibilities and expertise	Tilman Brück is Team Leader – Development Economics at IGZ – Leibniz Institute of Vegetable and Ornamental Crops near Berlin in Germany and Visiting Professor at the London School of Economics (LSE). His research interests focus on the economics of household behaviour and well-being in developing and transition economies, including in fragile and conflict-affected areas and in humanitarian emergencies. At IGZ, Professor Brück leads work on the behaviour and well-being of very poor and disadvantaged farmers in low income countries and how they can improve their nutrition and welfare with horticultural production. He obtained his doctorate in economics from Oxford University.
5. E-mail of participant	brueck@igzev.de
6. Name and address of your institution?	IGZ - Leibniz Institute of Vegetable and Ornamental Crops Theodor-Echtermeyer-Str. 1 14979 Großbeeren, Germany
7. Web-link to home page of institution or relevant project sites.	www.igzev.de www.lifeinkyrgyzstan.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change.	IGZ analyses the scientific base of sustainable horticultural products and value chains. Bridging basic and applied research, IGZ is investigating plant-environment interactions under physiological, molecular biological, metabolic, ecological and economic aspects. Horticultural activity offers a unique opportunity to strengthen both income and food security for smallholder farmers. Small scale vegetable production by women can also help re-dress traditional gender norms. Combining biological and economic knowledge can then help to build horticultural production systems, which make a sustainable contribution to socio-economic development. The development economics team at IGZ, headed by Prof Brück, studies these important issues based on empirical evidence.

1. Title	Mr.
2. Name of participant	Yevgeniy Klimov
3. Position of participant (e.g. climate change officer)	Chairman
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Founder and head of the organization
5. E-mail of participant	fiec@mail.ru
6. Name and address of your institution?	Kazakhstan federation of organic agriculture -KAZFOAM
7. Web-link to home page of institution or relevant project sites.	https://www.facebook.com/Kazfoam-150363428492785/?fref=ts
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please	KAZFOAM has occupied as the only umbrella organization of the organic Kazakhstan, uniting an enormous diversity of stakeholders contributing to the organic vision.

mention any particular work related to sustainable agricultural production, rural development and climate change.	
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1. Title	Mr.
2. Name of participant	Ysmaiyl Dairov
3. Position of participant	Executive Director
4. Please provide a short overview of your main work areas, responsibilities and expertise.	Environmental protection and sustainable development of mountain ecosystems and communities of Central Asia, cooperation between and with Central Asian countries and donor communities
5. E-mail of participant	ismaild@mail.ru
6. Name and address of your institution?	Regional Mountain Centre of Central Asia, 228, Toktogula str., Bishkek, Kyrgyzstan
7. Web-link to home page of institution or relevant project sites.	Ecoportal.kz
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible, please mention any particular work related to sustainable agricultural production, rural development and climate change.	International organization

1. Title	Mr.
2. Name of participant	Zafar Gafurov
3. Position of participant	Research officer on RS/GIS and Climate change
4. Please provide a short overview of your main work areas, responsibilities and expertise	Specialist on Remote Sensing and GIS, climate change and resource management in Central Asia with certificates on climate change in international training courses and a degree in Photogrammetry and Geo-informatics in Stuttgart, Germany, which particularly focused on spatial data analyses and image processing as well as issues concerning climate change related research studies. My research interests are connected to analysis of remote sensing datasets, mapping, natural resources management and climate change adaptation strategies for sustainable development of land and water resource management in Central Asia. Currently I am working at the International Water Management Institute (IWMI) Central Asia office in Tashkent.
5. E-mail of participant	z.gafurov@cgiar.org
6. Name and address of your institution?	International Water Management Institute IWMI- Central Asia sub regional office. C/o PFU CGIAR/ICARDA-CAC Flat No. 120, Building No. 6, Osiyo Street Tashkent 100000, Uzbekistan Phone: +998-71 2370445
7. Web-link to home page of institution or relevant project sites	www.iwmi.org
8. Please provide a short overview of the mandate and responsibilities of your institutions. If possible please mention any particular work related to sustainable agricultural production, rural development and climate change	The International Water Management Institute (IWMI) is a non-profit, scientific research organization focusing on the sustainable use of water and land resources in developing countries. The International Water Management Institute (IWMI) is a non-profit, scientific research organization focusing on the sustainable use of water and land resources in developing countries. The IWMI is a: <ul style="list-style-type: none"> • think tank driving innovative research and ideas for solutions; • provider of science-based products and tools; and • facilitator of learning, strengthening capacity and achieving uptake of research findings.

Annex 4 Participants in group working sessions

Participants	Day 1	Day 2
Country		
Kazakhstan	Kuralay Karibaeva Gulkur Suleymanova Khafiz Mumidgianov Gulnar Bekturova Talimgian Urazov Ayup Iskakov Jevgeniy Klimov Amir Kassam	
Kyrgyzstan	Sultan Sarygulov Nodira Kerimalieva Elena Taranova Ermek Baibabyshev Ysmaiyl Dairov Zarina Abumuslimova Sabyr kzy Guizara Tatiana Semenova Kalyi Suynaliyeva Tobias Gerhard Gulnaz Kaseeva Dinara Abzhamilova Gulsayra Akhdasheva Indira kzy Baygazy Onurbek Manbetov Kaly-Nur Nurlantbekov Mayrambek Tairov G. Mursibekova	Sultan Sarygulov Nodira Kerimalieva Elena Taranova Kubanychbek Kulov Ermek Baibabyshev Ysmaiyl Dairov Zarina Abumuslimova Sabyr kzy Guizara Aida Gareeva Omane Abshomlae Anarbay Abdykalykov Maya Gabitova Tatiana Semenova Kalyi Suynaliyeva
Tajikistan	Sandra Corsi Shavkat Dzguraev Usmon Makhmaderov Khurshed Kosimov Gulniso Nekushoeva Munira Otambekova Maruf Makhkamov Khukumatullo Sharipov Luca Heeb Aslihan Arslan Tina Roner	Tina Roner Luca Heeb Maruf Makhkamov Shavkat Dzguraev Usmon Makhmaderov Khurshed Kosimov Munira Otambekova Gulniso Nekushoeva Khukumatullo Sharipov
Turkmenistan	Berkeli Atayev Serdar Allekov Sultan Veysov Oleg Guchgeldiyev Alisher Toshmatov Manon Cassara and others	Berkeli Atayev Serdar Allekov Sultan Veysov Oleg Guchgeldiyev Alisher Toshmatov Manon Cassara and others
Uzbekistan	Anastasia Tikhonova Anna Shkineva Zafar Gafurov Botir Dosov Manon Cassara Raisa Taryannikova Tatyana Khamrina Hojiakbar Mahmudov Bogachan Benli Akmal Akramkhanov Ram Sharma Ihtiyor Bobojonov Makhsad Bauentdinov	Anastasia Tikhonova Anna Shkineva Zafar Gafurov Botir Dosov Manon Cassara Raisa Taryannikova Tatyana Khamrina Hojiakbar Mahmudov Bogachan Benli Akmal Akramkhanov Ihtiyor Bobojonov Makhsad Bauentdinov Eymen Torpak

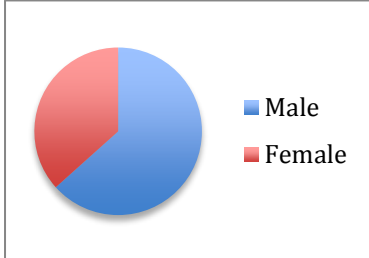
Turkey	-	Eymen Torpak Dilek Kahramon Ilkay Dellal
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Annex 5 Summary of the online survey 'Central Asia activities on CSA'

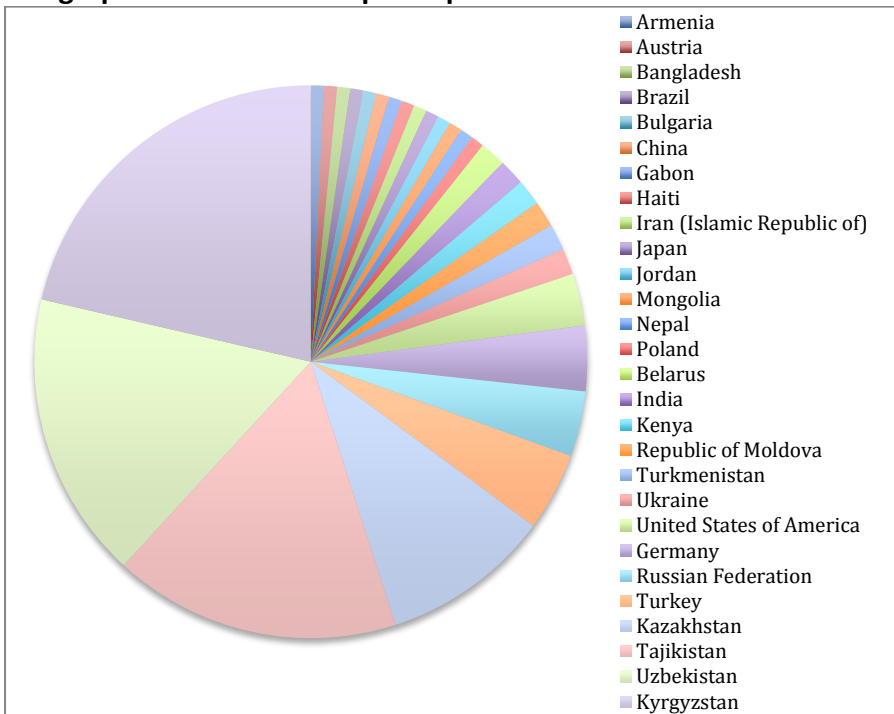
This summary is based on the aggregated data of the Russian and English versions of the summary.

Number of respondents: 131 from 28 countries
 Period: 30 May to 17 June 2016
 Available languages: Russian and English

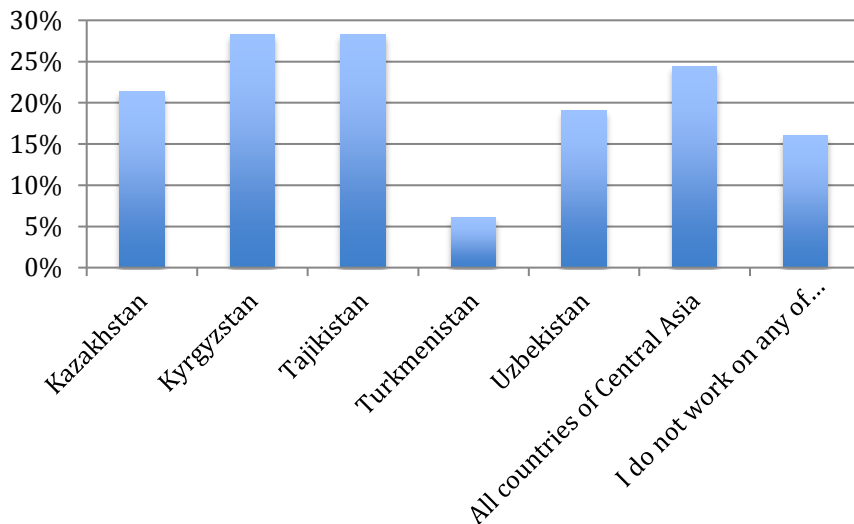
Gender distribution of participants



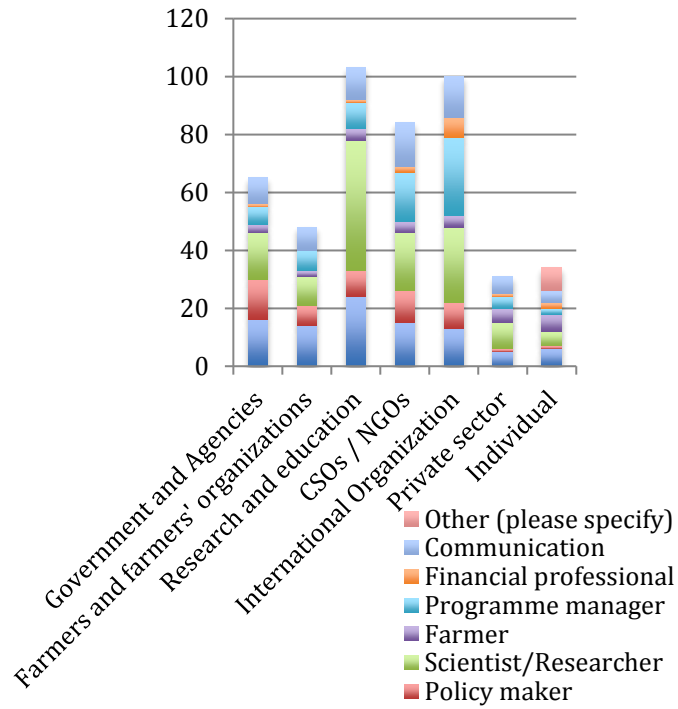
Geographic distribution of participants



Question 4: What is your work related country? (Choose all answers that apply)



Question 5: Please specify the type of institution you work for (column) and type of work you do (row)

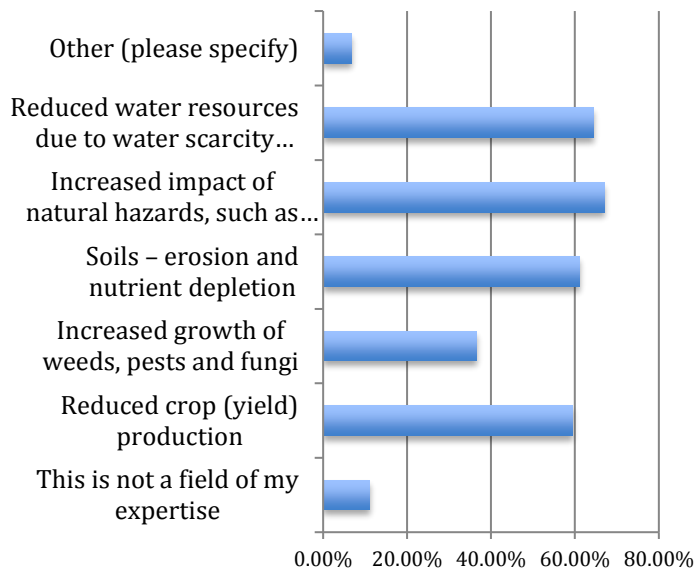


- Forestry engineer

Other:

- Technical assistance
- Management
- Development institution
- University of Tehran/ and sustainable agriculture and environment
- Environmental protection, NGO
- Design and consulting
- Assistant
- Environmental protection expert
- Promoting public access to environmental information and protection of the rights of citizens to a healthy environment
- Project activities
- Project expert

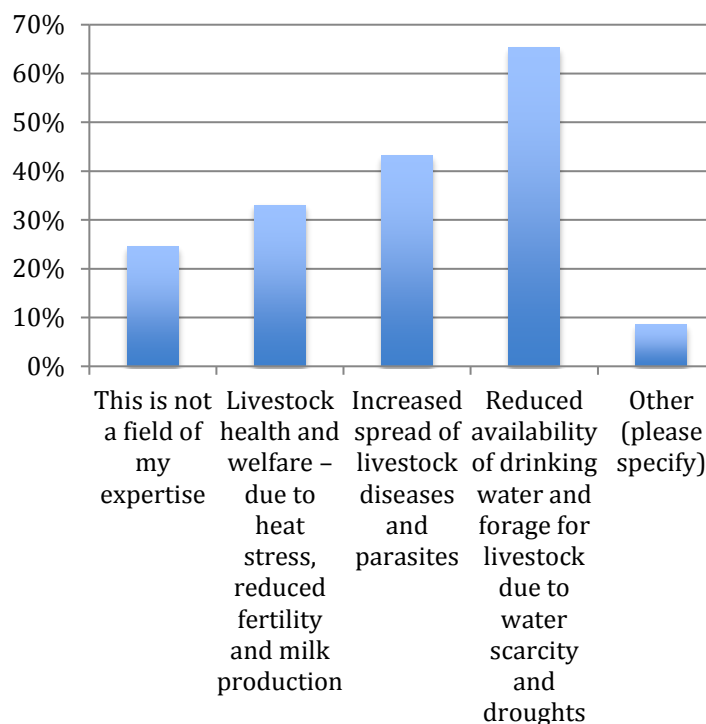
Question 6: Please indicate the top challenges posed by climate change in the crop production sector in your country (Choose all answers that apply)



- Land degradation and yield gaps
- Erratic harvest
- Loss of biodiversity; increased salinity
- Mono-culture of cash crops for export
- Diversification of the agricultural sector of the country
- Introduction of water-saving and resource-saving technologies of cultivation of agricultural crops; change in the range of cultivated agricultural crops to arid crops, introduction of wild crops.
- Use of natural lands for burial, heptyl, etc.
- Poorly organized extension services in all countries of the region

Other:

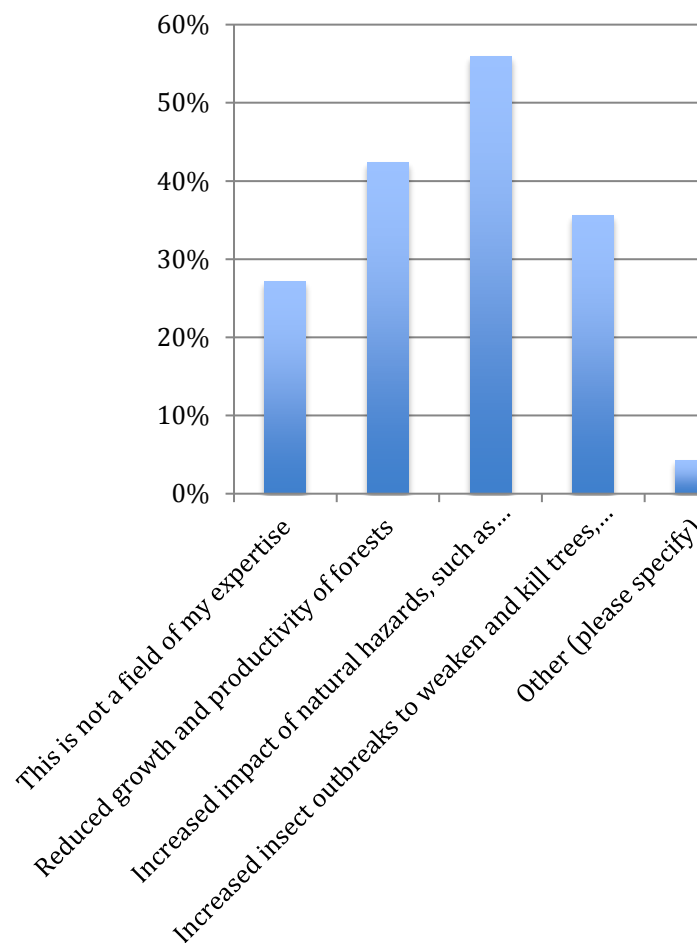
Question 7: Please indicate the top challenges posed by climate change in the livestock production sector in your country (Choose all answers that apply)



Other:

- "Overpopulation" (too much livestock for too little resources)
- Decrease in rangeland and pastures
- Market price collapse when there is mass selling and resulting indebtedness
- Lack of collaboration in management
- The answer refers to high mountain areas
- Desertification and therefore lack of pastures
- Less feed
- One of the most important tasks is to ensure livestock with feed, both with regard to terms (i.e. without interruption), quantity and quality, according to the zoo technical standards
- Lack of pasture maintenance
- Grassland farming technologies

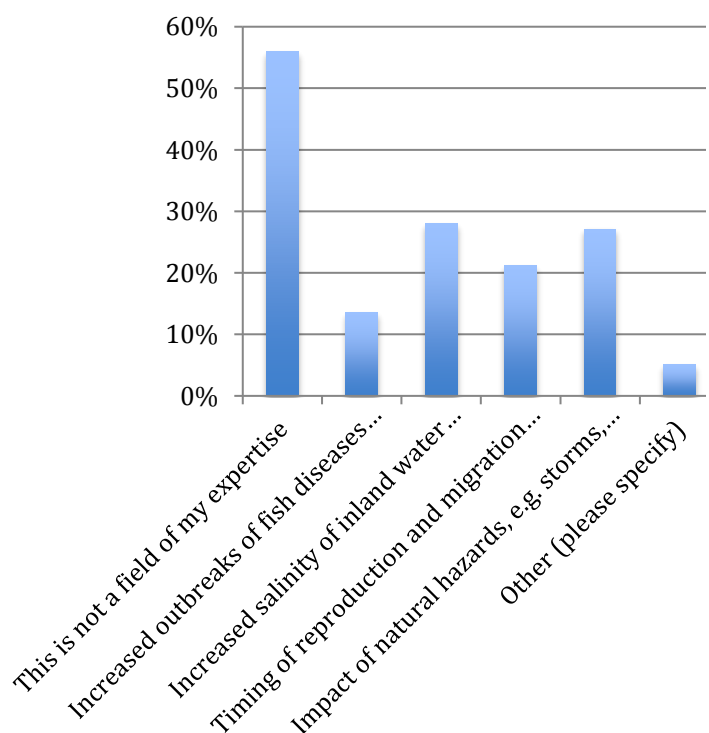
Question 8: Please indicate the top challenges posed by climate change in the forestry sector in your country (Choose all answers that apply)



Other:

- Urbanisation
- Increase in deforestation in abnormal cold weather
- Anthropogenic effect: felling of trees, incompetent construction planning, lack of approach to preservation of green planting
- Deforestation
- It is necessary to regenerate forestry, therefore, there should be a universal remote forest health monitoring in the dynamics of development.

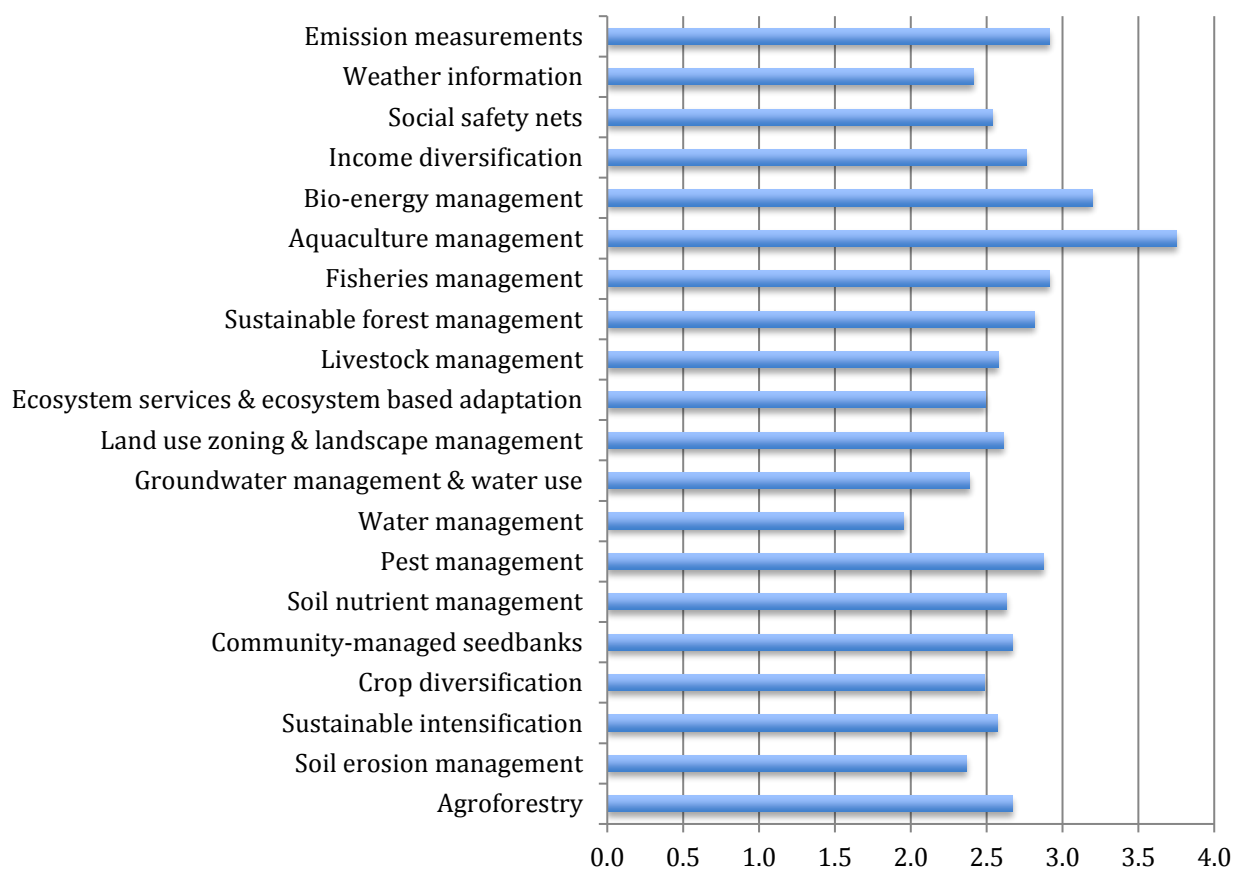
Question 9: Please indicate the top challenges posed by climate change in the fisheries and aquaculture sector in your country (Choose all answers that apply)



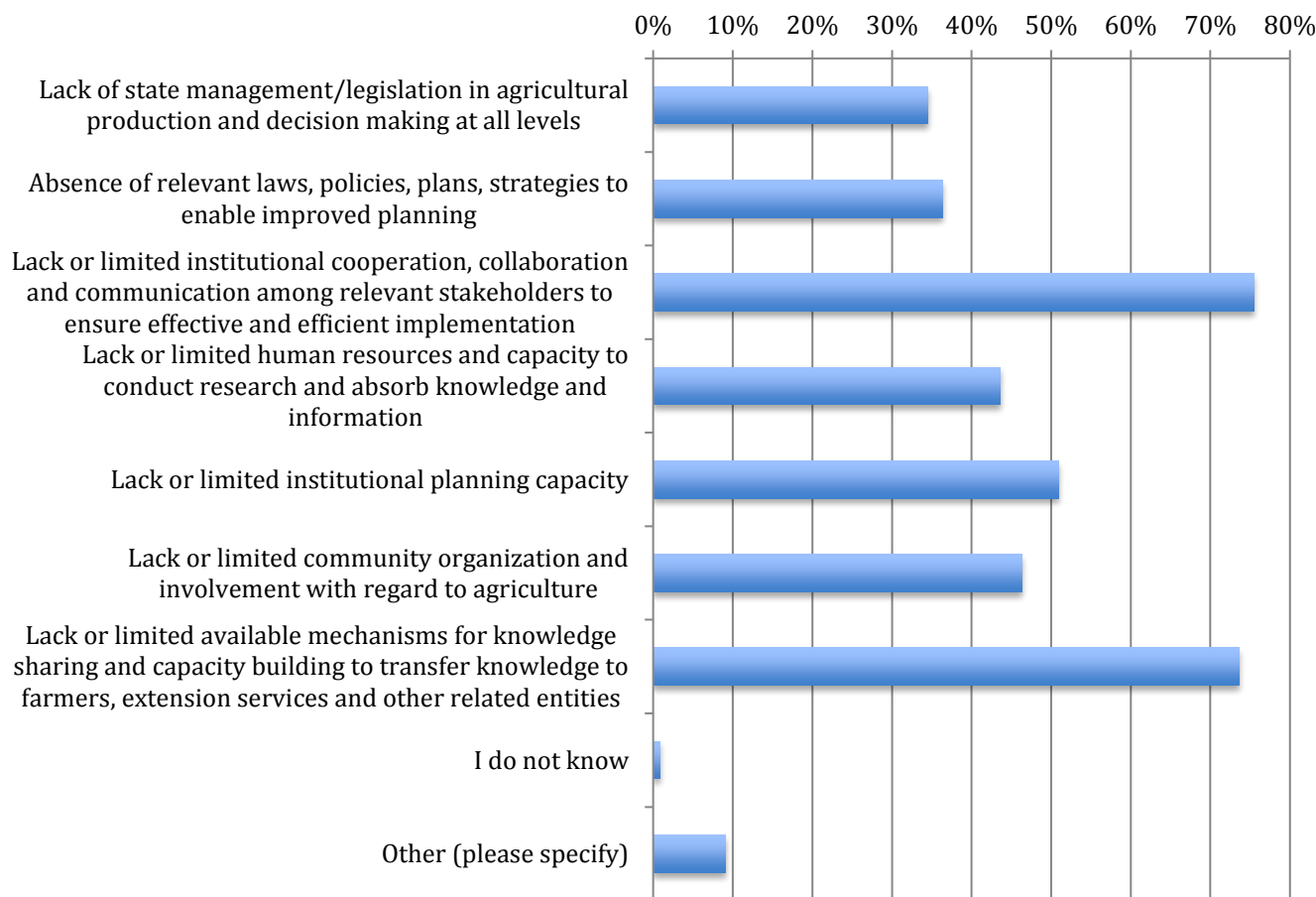
Other:

- Low/no water in streams and lakes
- Reduced river flow; dried up basins
- I am not an expert in agriculture, but I believe that climate change will leave its mark on this industry as well
- Waste pollution from industry, settlements, etc.
- Poaching capture of fish
- Fighting poaching in reservoirs and the need to seriously engage in pond and cage culture fishery

Question 10: Based on the top challenges for your country in Q6-Q9, please define 4 agricultural and rural development intervention priorities, needed to address climate change (Please rank your choices, where 1 - the most important, 4 - the least important)



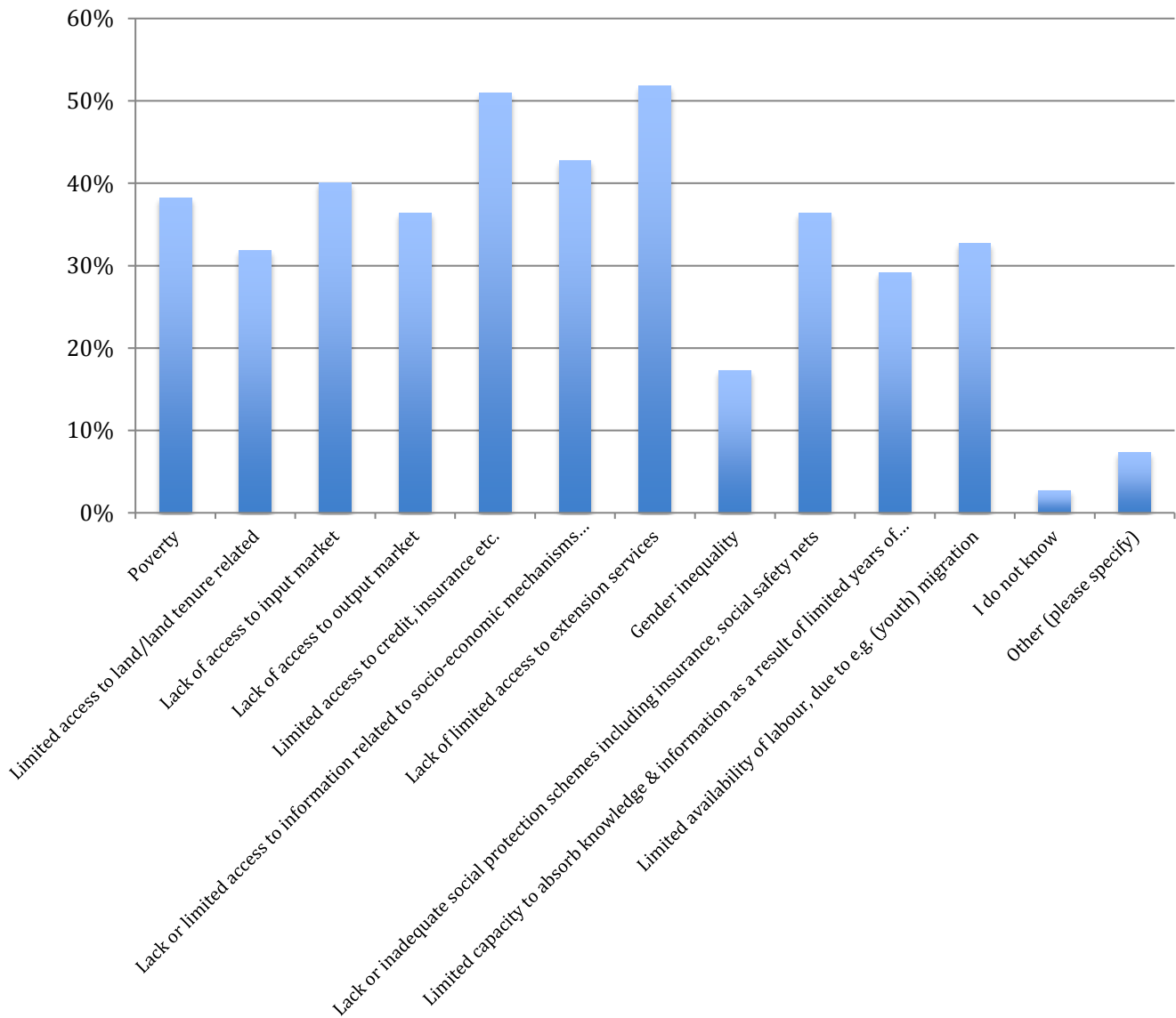
Question 11: What do you consider as the main policy and institutional constraints for transitioning to more sustainable, resilient and efficient production systems? (Choose all answers that apply)



Other:

- Lack of funding
- Poor implementation of laws and policies
- Populist policies disregarding environmental realities and focusing on short term gains
- Policy promotion of export agriculture and livestock raising
- In all ME, West Asian, Central Asian countries there are some laws and regulations written, but the problem is lack of or insufficient enforcement procedures/activities.
- Limited bottom-up decision-making by farmers and producers
- None of the above. In my opinion it is excessive state management in agricultural production
- Consumer mentality
- Strict centralization during planning: top-down planning, that excludes farmers from this process; underdeveloped private business
- Lack of modern processing system

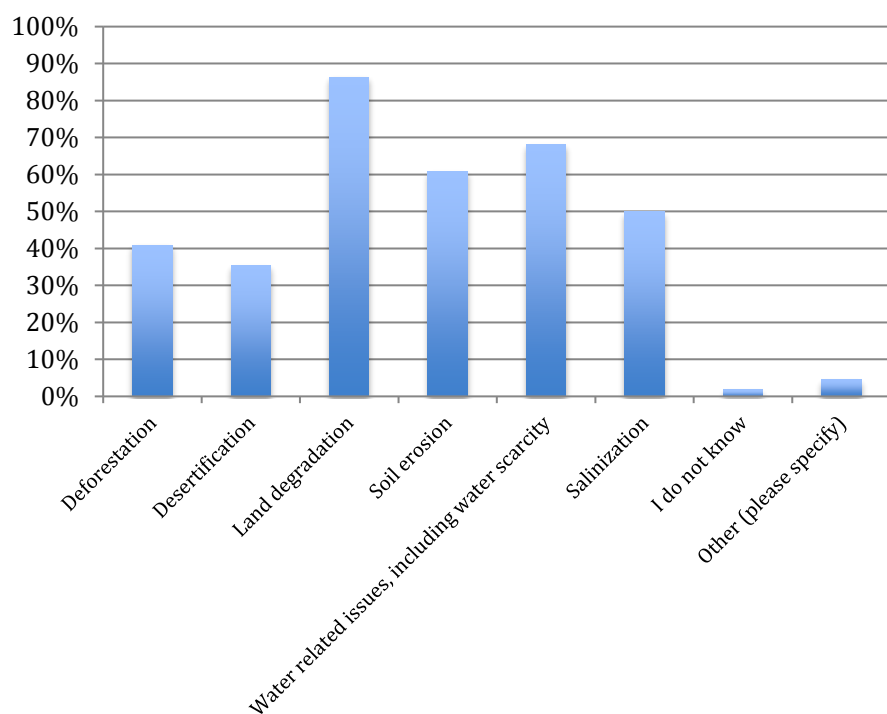
Question 12: What do you consider as the main socio-economic constraints for transitioning to more sustainable, resilient and efficient production systems? (Choose all answers that apply)



Other:

- Lack of system thinking
- Weak technical capacity of extension agencies
- Cultural inertia and the willingness to adapt/change
- Lack of technical production knowledge and motivation to produce
- Corporations greed/advertisement to sell their products to farmers and the lack of government control in this regard
- Limited awareness of existing systems, which are more sustainable
- Lack of orderly interactive system, aimed at result regarding rational use water and land resources
- People look for an easier way to make money

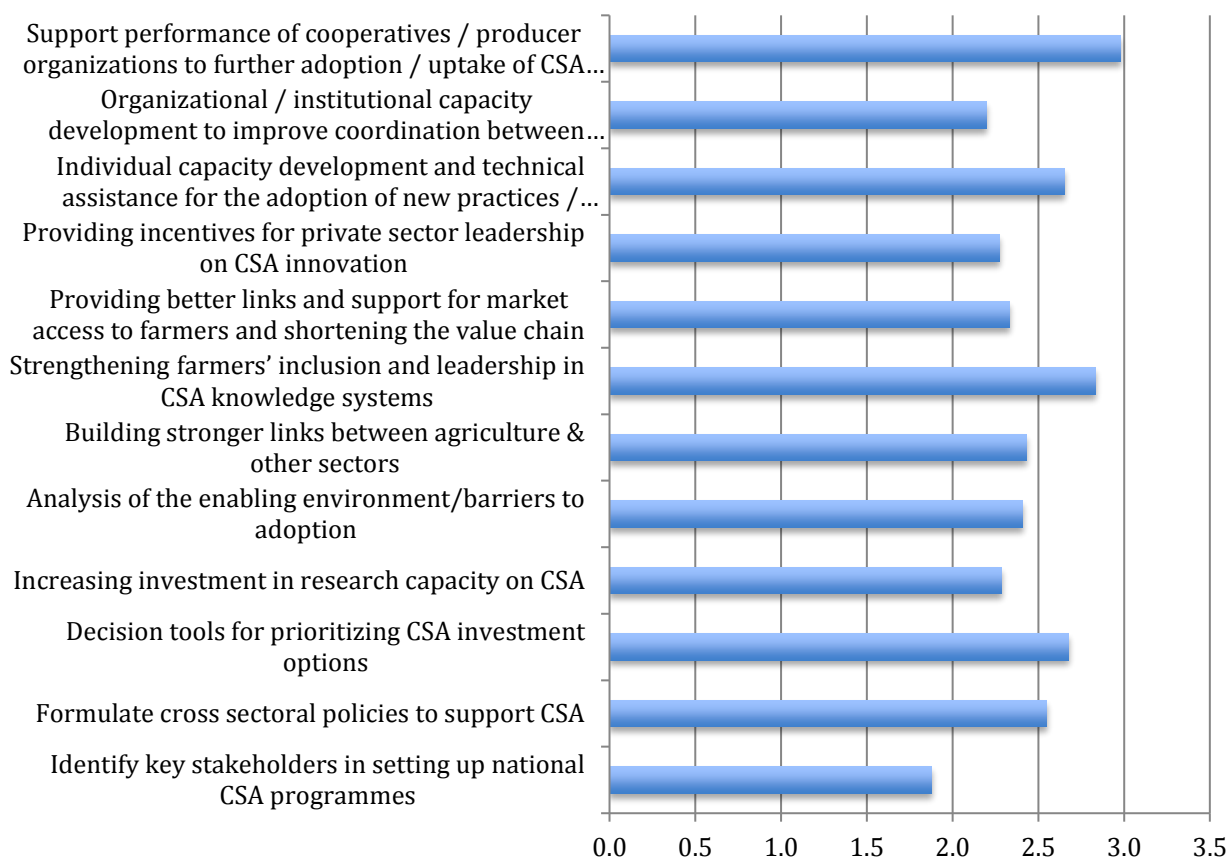
Question 13: What do you consider as the main environmental constraints for transitioning to more sustainable, resilient and efficient production systems? (Choose all answers that apply)



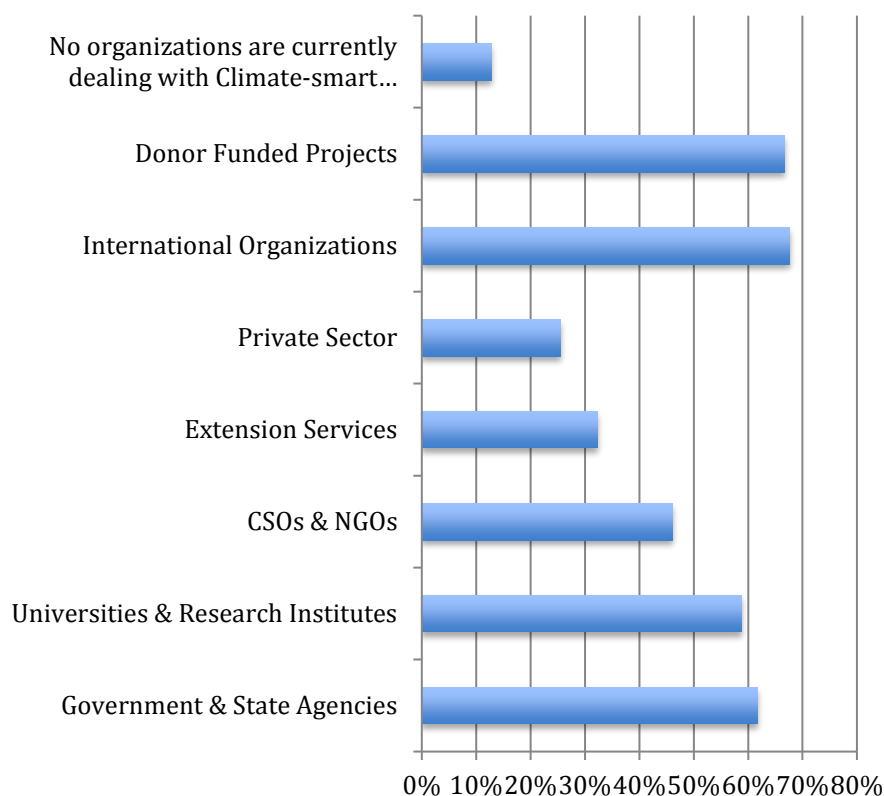
Other:

- What is listed here are not environmental constraints, they are the result of human activities on the environment. Environmental constraints should include things that are beyond human control, i.e. weather events, natural disasters etc.
- Recently we discussed in the second session of the United Nations Environmental Assembly (UNEA2) in May 2016 in Nairobi: crop poisoning due to climate change. Also besides salination, some soils are becoming too toxic so that no crop will grow on it, so we have to consider less input of chemicals for a better CSA
- Maintaining biodiversity
- There are no constraints

Question 14: Based on the main constraints in Q11-Q13, please select 4 policy and institutional support mechanisms needed to overcome barriers and allow for rural development transitions (Please rank your choices, where 1 - the most important and 4 - the least).



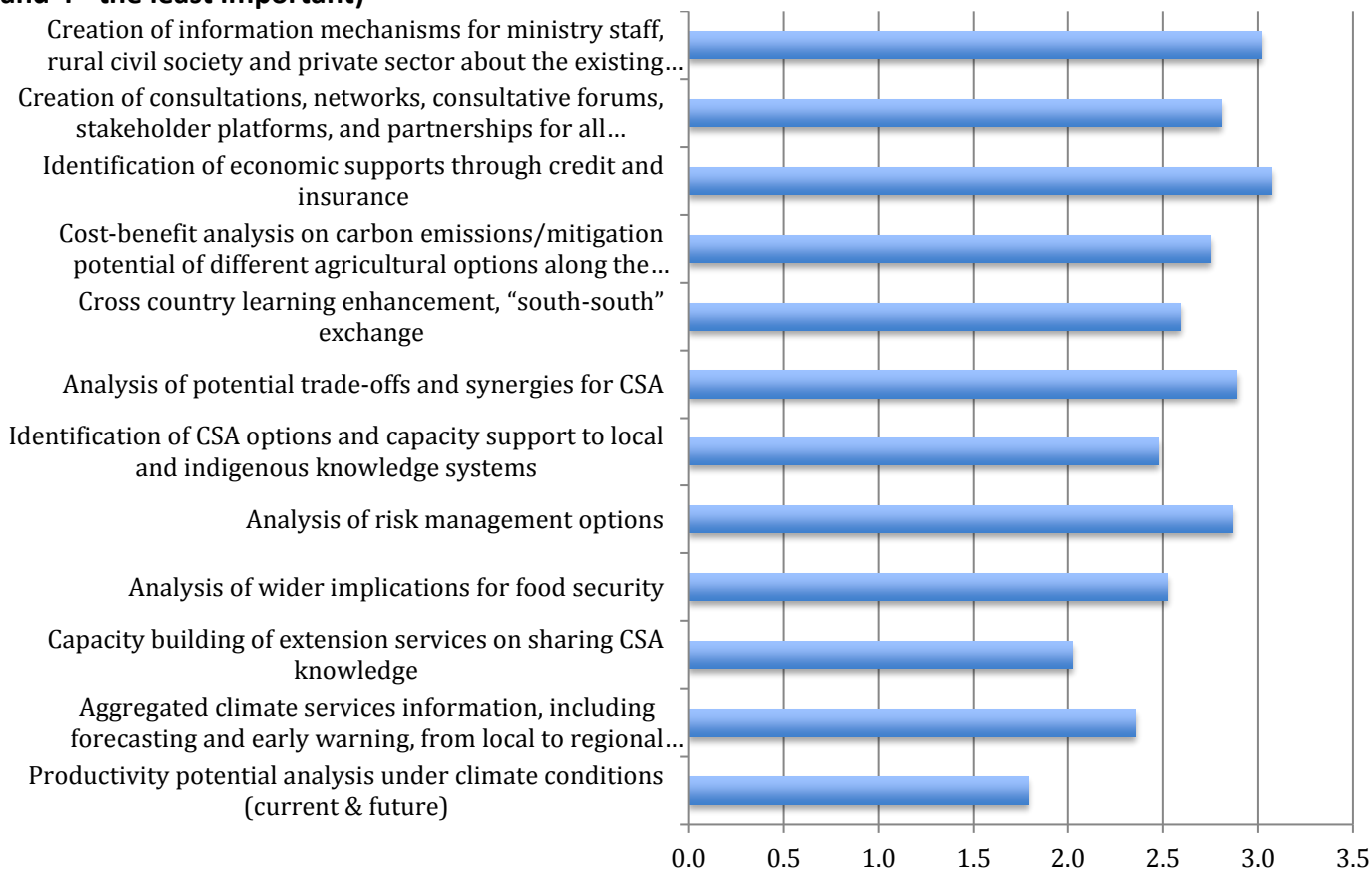
Question 15: Please select stakeholders who you consider as currently playing an important role in your country in the fields of Climate smart agriculture (Choose all answers that apply)



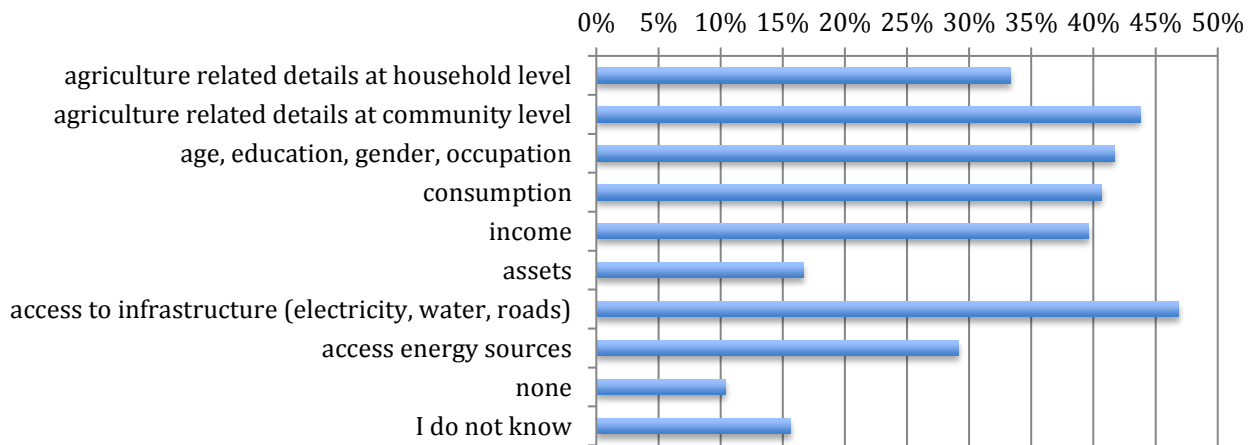
Names of the organizations:

- Precision agriculture and advisory
- ICARDA; CRIDA; ICRISAT
- FAO Mongolia under Technical Cooperation Programme; UNDP
- Bugday Ecologic Association
- Individual farmers
- Doga Koruma Merkezi, www.dkm.org.tr
- FAO; Sustainable agriculture and environment; Ministry of agriculture and the rural cooperation organization
- www.ursu.uz; www.krass.uz
- TAAS; TAU; IE; ELMARL
- UNDP; GIZ; Agrolead; CAMP Alatoo
- Center for Environmental Solutions, www.ecoidea.by

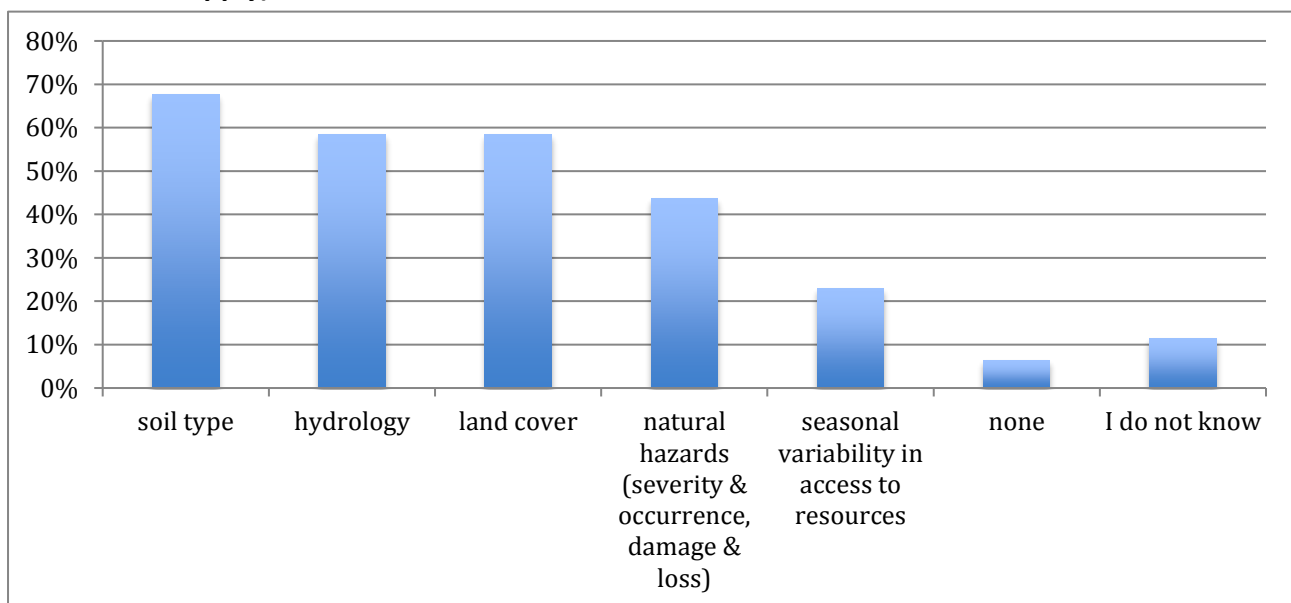
Question 16: What do you consider as the 4 most important knowledge sharing and capacity building improvements that need to be made in your country? (Please rank your choices, where 1 - most important and 4 - the least important)



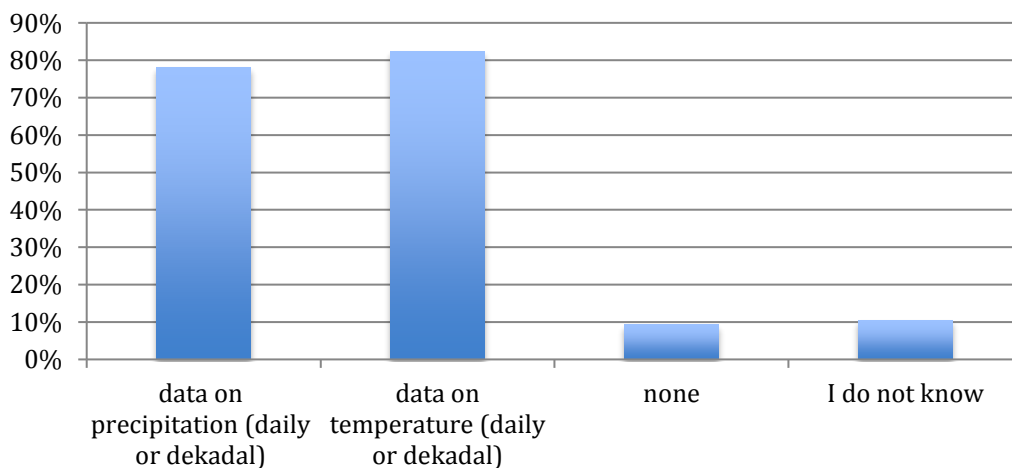
Question 17: Please specify which types of socio-economic data are available in your country? (Choose all answers that apply)



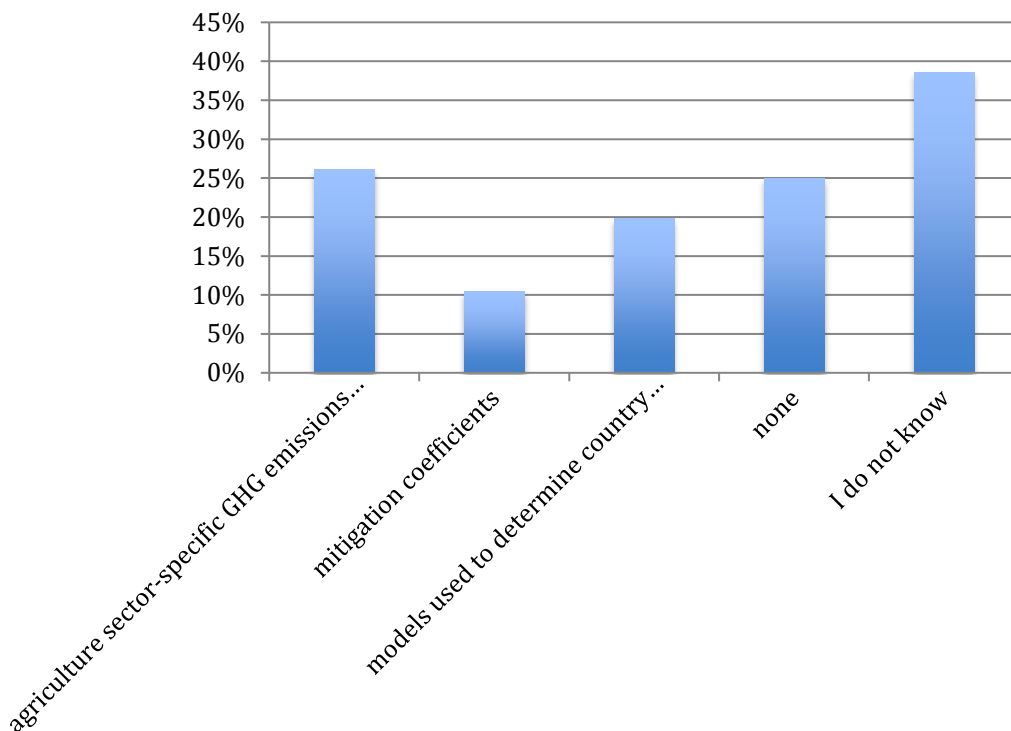
Question 18: Please specify which types of environmental data is available in your country? (Choose all answers that apply)



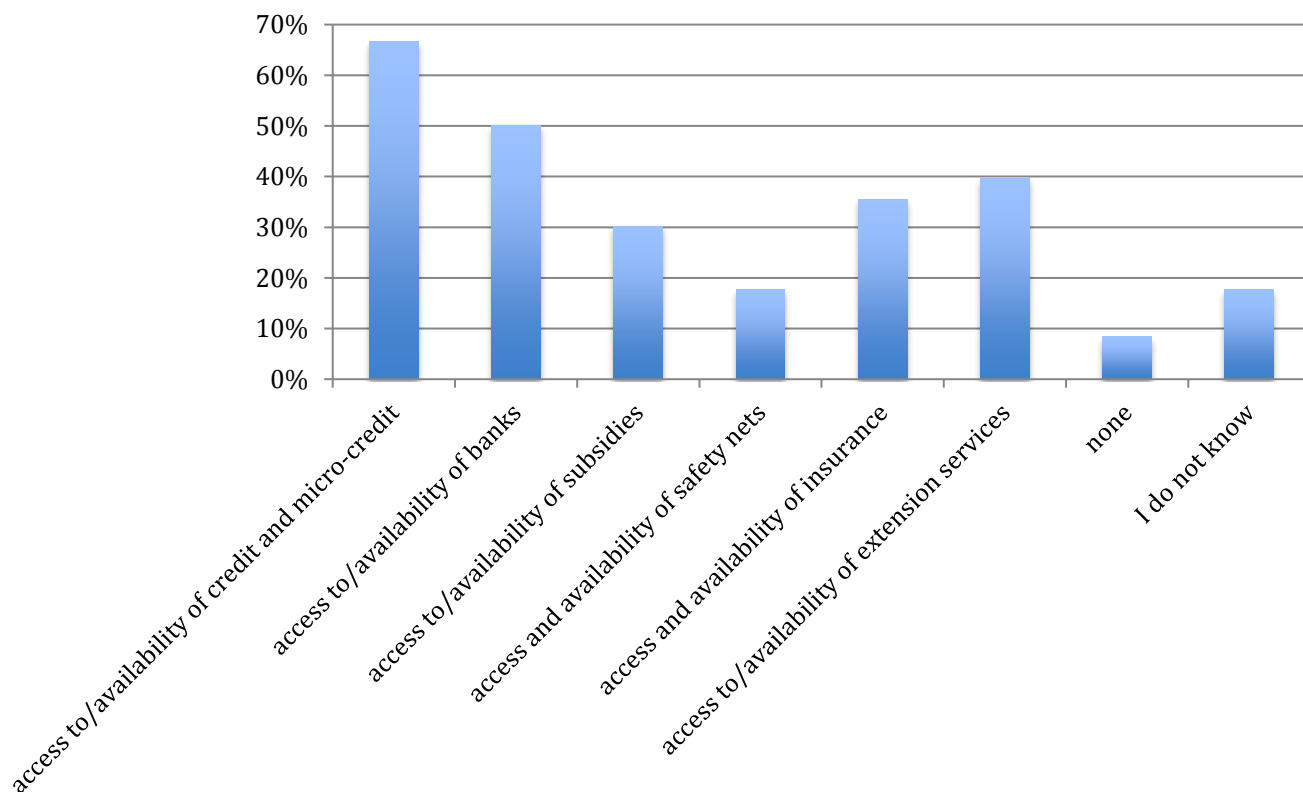
Question 19: Please specify which types of climate related data are available in your country? (Choose all answers that apply)



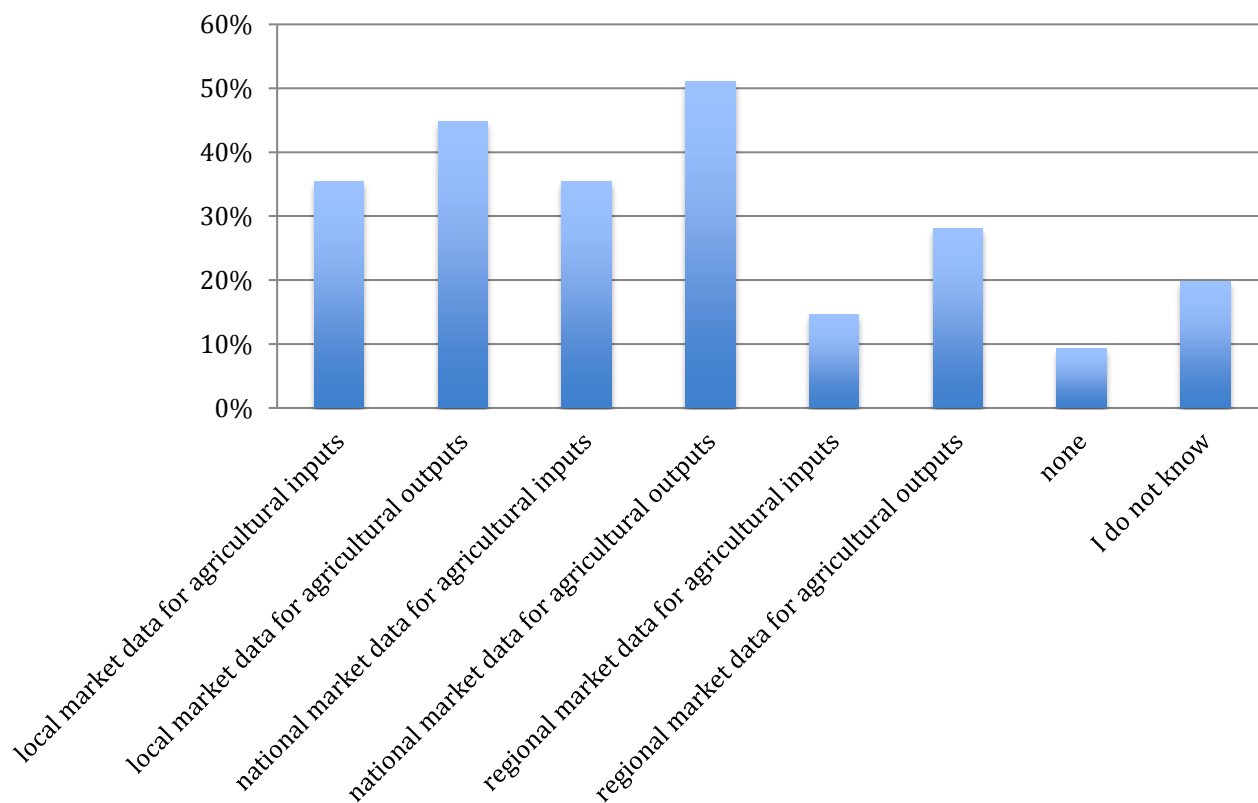
Question 20: Please specify which types of climate change mitigation data are available in your country? (Choose all answers that apply)



Question 21: Please specify which types of institutions and access to services data are available in your country? (Choose all answers that apply)



**Question 22: Please specify which types of prices, market and logistics data are available in your country?
(Choose all answers that apply)**



Question 23: Country specific policies, plans and strategies

Kazakhstan			
Climate change mitigation and adaptation	Disaster risk reduction and management	Agriculture	Food security
First National Communication to UNFCCC (1998)	Law for providing management of natural and technological disasters (1993)	Law on agricultural cooperatives (2015)	Kazakhstan 2050: State program of industrial innovative development for 2015-2019 years.
Second National Communication to UNFCCC (2009)	Law on Emergency Situations of a Natural and Technological Character (1996)	Law on organic production (2016)	State program of the infrastructure development "Nurly Zhol" for 2015 - 2019
Third to Sixth National Communication to UNCCC (2013)	Civil defense law (1997)	Agrobusiness 2020	Law on Food Safety and Quality
National Strategy of Sustainable Development, includes addressing climate change adaptation and mitigation	Presidential decree 'on measures aimed to prevent disasters' (2004)	Law on agricultural cooperatives	
State Water Resources Management Program in Kazakhstan	Comprehensive Kazakhstan Natural Disaster Preparedness Plan	Law on the production of organic products	
the Concept of Transition of Kazakhstan to Sustainable Development for 2006-2024 years	Strategic Plan 2009-2011, includes DRR priorities/issues	Law on state's regulation of development of agricultural and rural areas	
Environmental Code	Forest Code, Water Code, Land Code	The strategic plan for development of the Republic of Kazakhstan until the year 2020	
The law on supporting the use of renewable energy sources			

Kyrgyzstan			
Climate change mitigation and adaptation	Disaster risk reduction and management	Agriculture	Food security
Initial National Communication to UNFCCC (2003)	Decree 'on protection of population and territory from natural and man-made emergency' (2000)	Law on effectuation of the land code of the Kyrgyz Republic (1999)	Law on food security
Second National Communication to UNFCCC (2009)	Action Plan on Complex Security of Population and Territory of Kyrgyz Republic in Disastrous Situations until 2020	Law on pastures (2009)	The Concept of Food Security of the Kyrgyz Republic for 2009-2019
National Strategy and Climate Change Adaptation plan (in development since 2009)	Government regulation "On approval of the acts in the field of compulsory insurance of dwellings against fire and natural disasters"	Government strategy for development of agriculture	National Strategy for Sustainable Development 2013-2017, which includes food security and nutrition
	Government regulation "On approval of the Concept and Strategy of complex safety of the population and territory of the Kyrgyz Republic in emergency and crisis situations until 2020"	The Law on the Development of Agriculture of the Kyrgyz Republic	Technical regulation on "safety of fresh fruits and vegetables"

		Laws on Land, on the Water, on pastures, on veterinary	National Programme on Food Security and Nutrition in Kyrgyzstan 2015-2017.
		Adaptation Programme of Agriculture and Water Resources to Climate Change in the 2016-2020	
		Law on the protection of soil fertility of agricultural land	

Tajikistan			
Climate change mitigation and adaptation	Disaster risk reduction and management	Agriculture	Food security
Tajikistan's Strategy on Mitigation of Negative Consequences of Climate Change (2003)	Decree no. 400 'on the establishment of the Committee for Emergency Situations and Civil Defense' (1994)	Law on croplands optimization (2008)	Food Security Program until 2015
National Action Plan for Climate Change Mitigation (2003)	National Strategy of Tajikistan on Disaster Risk Management for the period 2010-2015	National law on productivity of the soil	Law on grains
National Plan of Actions of Tajikistan in Climate Change Survey (Oprunenco and Lafiti 2010)	Disaster Preparedness Plan (ongoing?)	National strategy on conservation agriculture	The National Poverty Reduction Plan
Initial National Communication to UNFCCC (2002)	Law on environmental protection-2011	Strategy for Bailing out the Agriculture Complex of Tajikistan from Crisis until 2005	Law on food safety-2010
Second National Communication to UNFCCC (2008)	The National Action Plan for Environmental Protection -2006	The Republic of Tajikistan Government Resolution dated August 1, 2012 №383 "On approval of the Agriculture Reform Programme of the Republic of Tajikistan for 2012-2020"	Law on grain- 2006
Third National Communication to UNFCCC (2014)		Law on dekhkan-farms, Law on land, law on pastures	
National Action Program to Combat Desertification - 2001;		Land Code, 1996 (additions and amendments (1997, 1999, 2001, 2004, 2006, 2008). The Water Code of 2000, additions and changes (2006, 2008, 2009). On Dehkan (farming) farm 2009	
		Law on "Land Management" (2001); "Land Assessment" (2001)	
		Law on "plant protection" (2012); Law of the Republic of Tajikistan "On the Protection of Plant Varieties" (2010)	
		Law on "aquaculture, fishing and protection of fish resources" (2013)	
		Law "On the production and safe handling of pesticides and agrochemicals" (2003)	

		Law of the Republic of Tajikistan "On Liability for damage of crops and damage to crops, mulberry and other plants and thickets of shrubs" (2007)	
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Turkmenistan			
Climate change mitigation and adaptation	Disaster risk reduction and management	Agriculture	Food security
First National Communication to UNFCCC (2006)		Law on soil	
Second National Communication to UNFCCC (2010)		Land Code of Turkmenistan, The code of Turkmenistan "About water"	
Third National Communication to UNFCCC (2015)		Law on protection of environment	
National Climate Change Strategy (2012)		Land Code of Turkmenistan, The code of Turkmenistan "About water", The forest code of Turkmenistan	
The air code of Turkmenistan of January 10, 2012 No. 255-IV		Law on Fisheries and Conservation of Aquatic Biological Resources	
Law of Turkmenistan No. 53-IV "On protection of ozone layer"		The law of Turkmenistan of August 18, 2015 "About pastures"	

Uzbekistan			
Climate change mitigation and adaptation	Disaster risk reduction and management	Agriculture	Food security
First National Communication to UNFCCC (1999)		Land Code	Law on food security and quality
Second National Communication to UNFCCC (2008)		Law on protection of environment	
Program on Adaptation to Climate Change		Law on Protected Natural Areas ", " On water and water use ", " On protection and use of fauna", "On protection and use of flora " "On the forest"	
Law on air protection			

Question 24: What funding, incentives and other support mechanisms are available to support agricultural productivity, rural development and climate change in your country?

Through government:

- Government funds; state subsidy programs; state budget; public funding
- Various subsidies, among others for the implementation of drip irrigation; KazAgro, KazAgroFinance, credit corporation of Kazakhstan, microcredit organizations;
- National program on land improvement
- Rural Development Fund, Ministry of Agriculture; IPARD Fund, Ministry of Agriculture; Regional Development Fund, Ministry of Development; GAP Rural Development Fund, Ministry of Development
- Government of Mongolia: numerous subsidies to producers on livestock and crops. None on climate change.
- The Ministry of Education and Science of the Republic of Kazakhstan; the Ministry of Agriculture of Kazakhstan
- Subsidies from the Ministry of Agriculture
- Preferential loans, subsidies, risk insurance by the Ministry, the government and local authorities

Via donors, international organizations:

- Donor funded projects; grants and grant support from donor organizations
- Public and international donors funding (UNDP, GEF, World Bank, Asian Development Bank, GIZ, REC, IFAS, FAO, etc.)
- PPCR (Worldbank, ADB); GIZ; EU
- DST funds; MoES & CC; NABARD; NCAF; GIZ
- UN and other donor organizations and funds,
- Donor-funded projects that support rural development
- Via conducting research on salt and heat stress new wheat varieties, ICARDA
- International organizations, such as UNDP, GM, GEF, etc.
- Only donors funding (FAO, UNDP, GIZ)

Via private sector:

- Crop insurance, subsidizing planting of pulses and oilseeds through the crop diversification program
- Commercial banks and microfinance institutions should be reorganized into investment financial institutions
- Subsidies and cheaper loans through financial institutes
- Bank loans for the development of agricultural producers
- Preferential loans
- Private investment

Other remarks:

- No prospects
- Differs per country

Question 25: If you have any other suggestions/comments, pls. let us know:

- Policy level interventions are required to make CSA practices a reality.
- It is still restricted to papers or to a few agricultural universities and research organizations, but it needs to have wider publicity and made applicable at the grass root level with various types of interventions in the form of demonstration projects, incentives and subsidies and so on.
- No plough/zero tillage certification; No stubble crop/crop residue burning certifications
- Climate Smart Farmer certification (CSF) workshops
- What I can recommend for CSA in this region: In the Middle East, Western Asia and Central Asia, there is more social awareness about the threat of climate change. However, still most of the authorities in these countries either do not believe about problems like climate change or are highly involved in politics, turmoil etc. that they forget to establish and implement mitigation plans. In this respect it is the role of international agencies in particular the UN, including FAO, to investigate, plan and assist these countries. One of the issues is the lack of relations and communications between the agricultural, environmental and social experts and ordinary people, in particular farmers. Another issue is continuing increase in youth migration from rural toward urban areas, which result in various problems. In this beautiful region of the world we need comprehensive planning to ensure that synergies between different sectors are created for the establishment of sound CSA. Fundamental aspects, like agroecology, agroforestry, IPM should be created and supported as the basis for CSA. Moreover, sustainable forestry can contribute to CSA. In my work, I am involved in the planting of neem trees in the Persian Gulf area, where all these issues are taken into consideration.
- Support schemes (e.g. institutional, socio-economic, capacity-building) are needed to use the potential of tree planting on agricultural lands. Awareness campaigns on climate change related issues and benefits of CSA as well as promotion and incentives for CSA should be supported by the government at all levels.
- Will climate smart agriculture impact the most vulnerable communities in Asia?
- Question 24 requires more clarification. There are public funds, which are state programs and part of the system. Probably the upcoming meeting in Bishkek should consult and advocate for establishing such a fund and consortium, consisting of various organizations, which provide such funding. It should be considered to be established at the highest level.
- It is necessary to develop a cap and trade programme aimed at controlling and reducing greenhouse gas emissions, which is accepted internationally and includes the adoption of a law on grazing land management.
- This is a topical subject and clear preventive and adapting actions are required.
- It is necessary to work with analytical groups, legal entities and provide subsidies and support to enhance not only the administrative capacity in partner countries.
- It is necessary to shape public climate change policy and to take preventive measures to mitigate the effects of climate change in Kyrgyzstan. To establish agreed integrated and preventive measures in Central Asian countries aimed at climate change mitigation, which is very important for these countries. There is an overt and hidden confrontation in the region, the struggle for leadership in the region. The situation in Central Asia is quite difficult, due to various reasons, including governance issues, underdevelopment, lack of finance, lack of resources, especially for water and land, unemployment, migration, human and drug trafficking among others.

- Loans are given at high interest rates of 26-36 percent, which makes them inaccessible to every farmer. Moreover, each farmer who uses loans at such high interest rates will become a debtor of the bank for many years.
- Assistance from donors is required to support the productivity of agriculture, rural development and climate change issues.
- Public authorities in Kyrgyzstan recognize the impact of climate change on agriculture and carry out work at legislative level. Practical measures are not being considered and implemented.
- In the Central Asian countries, especially in Uzbekistan and Kazakhstan, a number of projects were implemented by various international organizations over the last decade; These states supported several initiatives under the treaty, but at the same time legislative issues remained problematic, although some were able to define goals and objectives, adopt adequate policies, identify decision-making strategy and establish action plans. Awareness and capacity building in the region are of great importance for local farmers. Agricultural activities in Central Asian countries will contain directions for forestry and water management, but are likely to change in the future. Depending on whether the government is interested in ensuring food security, sustainable natural resources management and diversification of production with as the main objective to establish the appropriate conditions to help mitigate the risks of climate change.
- Information exchange is quite important, but not sufficient as agricultural producers need access to resources (pilot livestock, seeds, etc.) in order to try out new methods.
- Training and promotion of new methods and products for the domestic and foreign market is required.

Workshop partners:

