

## **Final Report**

### **Technical Forum International Green Week 2009 16 January 2009**

#### **Climate Change and its implication in Central Asia - Its impact on agriculture and rural sector -**

##### **Background**

Agriculture is one of the most vulnerable sectors to the impacts of climate change not only in Central Asia but worldwide. Despite the enormous progress of scientific knowledge and technological developments in recent decades, weather is still the major factor in agricultural productivity.

It is acknowledged that the impacts of climate change are highly location specific. In Central Asia, water and agricultural sectors are likely to be the most sensitive to the negative effects of global warming. The major factors related to climate change affecting agricultural productivity in Central Asia: increasing temperature, and carbon dioxide in the atmosphere, changes of precipitation, surface water access and extreme weather conditions. Temperature will rise in average- even if Greenhouse Gas (GHG) emissions are stabilized at current levels - and the water coverage as well as surface runoff will also alter in the region. However rising concentration of carbon in the atmosphere could benefit certain crop yields (e.g. maize and sorghum), it can not compensate the negative impacts of more intense droughts and floods. Central Asia significantly contributes to global warming by generating large volume of GHG emissions, and agricultural sector is among the major contributors.

Agriculture is a significant sector of the economy in the Central Asian countries, with around 60% of the population living in rural areas, occupying more than 40% of the total labor force, and agriculture accounting for approximately 25% of GDP on average. Kazakhstan is the only exception with agriculture accounting for only 8% of GDP (but still around 33% of total employment). Currently the two most significant crops in Central Asia are cotton and wheat.

It is foreseen that due to global warming, agricultural productivity in Central Asia might suffer severe losses because of high temperature, severe drought, flood conditions, and soil degradation, which may endanger food security and agriculturally-based livelihood systems in the region. Climate change poses serious threats to the region's rural population, which can lead to accelerated rural-urban migration, increased urban unemployment and consequently, social and political tensions.

FAO organized within the framework of the International Green Week a panel discussion to provide further information to an interested audience in this context. Participants at the panel were Mr Rattan Lal, Professor, Soil Science of Ohio State University, USA, Mr Renat Perelet Research Leader of Russian Academy of Sciences, Moscow, Russia, Marja-Liisa Tapio-Bistrom Senior Officer at FAO Headquarters, Rome, Italy and Ilhom Rajabov Director of Climate Change & Ozone Center, Dushanbee, Tajikistan.

The discussion was moderated by Raimund Jehle, FAO.

##### **Water scarcity and soil degradation**

Glaciers were one of the major fresh water resources in Central Asia. About 75 percent of the river run-off in the region comes from rivers which drain these glaciers. Glaciers in Central

Asia are melting faster in recent years than reported before. It was predicted that by 2050 ice cover in Tajikistan would decrease by 20 percent. As a result of rapid melting of glaciers, glacial runoffs, mudflows, landslides and land degradation have increased. Besides these short term impacts, the fast receding of glaciers would cause serious problems for irrigation schemes and water supply in the region.

Water quality had drastically deteriorated over the past decades. The main reason for this has been the discharge of heavily polluted water through drainage systems. Since the 1960s, mineralization of water in certain parts of Central Asia had doubled, and water had also become unacceptable for drinking.

The Central Asian countries were undergoing radical economic transitions, which have great impacts on agriculture. Central Asia's water resources were overcommitted to agriculture and were transferred unsustainably from several river systems in the region. In Central Asia over 95% of the total water use is for irrigated agriculture.

Excessive water use and exaggerated, non-selective use of fertilizers and agrochemicals led to salinization of soils.

As a consequence of inappropriate cropping and pasture systems and irrigation schemes, considerable areas turned into arid or semi-arid areas falling out of agricultural production.

As a result of vanishing glaciers, inadequate irrigation schemes and inappropriate cropping systems and land/soil management, agriculture sector of Central Asian economies will face serious difficulties, if timely adaptation measures are not implemented; hence water and soil/land management policies and their harmonisation are crucial in the region.

## **Adaptation and Mitigation**

Adapting agricultural systems to climate change is top priority and for this purpose urgent measures have to be implemented. These actions have to be carried out simultaneously and at all decision levels.

Implementing developed and sustainable irrigation schemes would be highly important. Better climate information systems and early warning/agro meteorological networks, which would be easily available for farmers, have to be operated on regional level.

Redesigning production structure with crop diversification and using crop varieties, which were well adapted to the new conditions, could also be key elements. In addition, more diverse agricultural production can also reduce the risk of food insecurity in the region.

Besides adaptation, the importance of mitigation of climate change was equal. Central Asia has a huge potential in carbon sequestrating. This capacity has been underestimated and so far underused. With adequate soil, land management and agricultural techniques Central Asia's land resources can act as a carbon sink. To take full advantage of this potential, alternative agricultural systems, like *conservation farming* should be promoted.

It was mentioned that the role of biofuels, regarding carbon sequestration, in climate change mitigation is controversial. Those lands, which are converted to biofuel crop production, might not act as a carbon sink any more, whereas the carbon input into the soil is lower than the output, resulted from carbon release to the atmosphere when biofuels are used.

However, other climate change mitigating resorts/opportunities have to take into consideration. Most notably: slowing deforestation, increasing reforestation, improving livestock and manure management, and rehabilitating degraded pasture lands resulted from overgrazing. Discouragement of those conventional, gratuitous and at the same time soil deteriorating agricultural procedures/activities, like widespread post harvest burning of crop residues in the field, are also recommended.

## **Finance of adaptation and mitigation**

The cost of implementing new irrigation schemes, improving early warning systems and redesigning agricultural procedures is extremely high. Although the commitment of Central Asian governments in adapting to climate change and mitigate its impact is crucial, it was foreseeable that these countries were unable to generate financial resources to change the current agricultural model without external help. Substantial investment and subsidies are required from national and international organizations and monetary funds. As the region would have a huge potential in carbon sequestration, carbon emission trading might also be an option in Central Asia. Introduction of carbon taxes and adequate pricing of natural resources, like water, could be key elements of the financing not only in Central Asia but throughout the world. These financial resources shall be rearranged and allocated to adapt agricultural production to climate change. Other financial transactions, which have not been exploited so far, such as *debt-for-nature swaps*, can offer new income opportunities. In addition, technical cooperation programmes financed by international organisations or donor countries were also essential in this region.

## **FAO's role**

FAO, through its multidisciplinary expertise in agriculture, could provide a broad scale of services and support to the Central Asian countries, regarding adaptation and mitigation. Particularly, providing technical cooperation programmes, contributing in contingency planning and giving support to prepare regional adaptation action plans.

More specifically, providing assistance in:

- identifying hot-spots;
- establishing/creating hazard maps;
- improve national preparedness for climate change;
- building and strengthening institutional capacity;
- decision-making to improve resource management;
- integrating farm communities in adaptation methods.

## **Conclusion**

Immediate actions should be taken in order to adopt agricultural systems to climate change and mitigate its negative impacts in Central Asia. Water scarcity and soil degradation/deterioration are likely to be the most serious problems related to agricultural production in the region. Adaptation to the altering environmental conditions and mitigate the negative impacts of climate change requires deep structural changes in the sector. The Central Asian countries have a great potential for carbon sequestration in their soils. However, the conventional agricultural production systems applied facilitate carbon emission from the soils. It would be important to initiate new, sustainable agricultural systems which support carbon sequestration of soils such as conservation agriculture or “no-till” practices. The Central Asian countries have to change their conventional agricultural systems to more sustainable and less polluting forms.

Whereas the Central Asian countries are lack of sufficient financial resources, which could be allocated for adaptation their agricultural systems, external resources also have to be involved in the process. Integrating all stakeholders – farmers, farming communities, public sector, policy makers - is also a crucial factor.

FAO has a great responsibility in mitigating the negative impacts of climate change, and preparing the Central Asian countries to the possible unfavourable conditions. In order to fulfill its mandate, further strong inputs have to be addressed in the region.