

Strategic Young Researcher Overseas Visit Program for Accelerating Brain Circulation

Dispatch Report

Year: July-August 2013

Fieldwork Location: International Center for Agricultural Research in the Dry Areas/Uzbekistan

Name: Osamu Kozan

- Research background

In order to prevent environmental destruction related with biomass usage and hydrological changes in the world, an international institutional approach is essential. Water is necessary for all living organisms and access to a good water source is vital to people's lives wherever they live. The Republic of Uzbekistan is a doubly landlocked country, centrally situated in the heart of Central Asia (CA) within the Aral Sea Basin. Almost 80% of the land area of the country is comprised of desert and semi-desert, including the Kyzylkum, the largest desert in CA.

As a whole, the territory of the country, located in the arid zone of Asia, is highly susceptible to land degradation, desertification, and climate change. It is estimated that more than 52% of the arable land and 73% of the rangeland is presently undergoing accelerated land degradation. There is broad international agreement that Uzbekistan is one of the most vulnerable area to climate change due to the high sensitivity of its arid arable land, high population density and increasing food insecurity in CA. The average rate of temperature increase since 1950 in Uzbekistan is 0.29°C per decade, which is more than twice the world average. I started meteorological observation to estimate the impact of global warming in this area in collaboration with the International Center for Biosaline Agriculture (ICBA) of Dubai since 2006.

- Research purpose and aim

Pastureland represents 22 million ha in Uzbekistan or about 50% of the total area of the country. It is mostly desert land that has been degraded over time due to overgrazing, wood over-harvesting and unsustainable agricultural practices. The result is an increasing instability of desert ecosystems and poverty for populations living in these areas. Owing to its geographical and climatic characteristics, Uzbekistan is highly susceptible to environmental degradation, in particular its arid ecosystems. The most serious problems threatening the natural resources are incremental soil and water salinization, soil erosion, overgrazing and deforestation, loss of biodiversity, and the reduction in productive potential of arable land and pastures. Because these problems are related with the land ownership system and economic conditions, I feel that a strictly natural scientific approach will not be sufficient to improve the situation.

- Results and achievements by fieldwork

I made research arrangements with Prof. Kristina Toderich to discuss sustainable farmland use under highly salinized conditions in the ICBA branch office, which is located in the International Center for Agricultural Research in the Dry Areas (ICARDA) Tashkent Office. Next, I moved to the Kyzyl ke sek ICBA experimental farmland and maintained meteorological station. These meteorological data are used for water management in

the experimental farm and for the impact assessment of global warming. On August 17, I moved from Bishkek to Dushanbe, Tajikistan, to attend the High-Level International Conference on Water Cooperation 2013 and discuss the regional situation with researchers and strategists from CA countries.

I visited research institutions in Uzbekistan and Kyrgyz, and participated in the international conference in Tajikistan. It was my first visit in three years and I was able to meet and talk with many friends. Rangelands of CA were once productive, with quite diverse plant communities, and well adapted to sustain grazing pressure from wild and domestic animals. I will provide useful information for local communities in rangeland using our meteorological observations and vegetation survey data that we have been gathering since 2008.

- Implications and impacts on future research

During the Soviet era, local pastoral communities lost their skillful shepherds and a vast body of traditional knowledge that had accumulated over centuries, if not millennia, in CA. Sadly, it is impossible to restore this unique knowledge and experience at present. However, the present-day availability of Remote Sensing data with high spatial and temporal resolution enables monitoring and assessment the current condition of rangeland vegetation and its long-term changes caused by anthropogenic and ecological disturbances. Using vegetation indices derived from satellite data, the information of seasonal and annual changes of vegetation cover and the trends of degradation processes will be available for local people.