

Norwegian Support to the Land Sector in Kyrgyzstan: Preparing Geographic Information for Statistics and Sustainable Development Goals

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Key words: Official development assistance, sustainable development goals, development cooperation, geographic information, orthophoto

SUMMARY

Norway is one of the countries committed to grant at least 1% of their gross national income to development assistance. With funds provided by the Norwegian Government, Kartverket (the Norwegian Mapping Authority) has supported the State Registration Service of Kyrgyzstan with development of the land sector since 2013.

With a grant of 1,4 million USD, the project implemented during 2013-2016 delivered tangible results: Completed the network for accurate positioning services; finalized the conversion of paper maps into digital format; and developed specifications for a new system for registration of property rights and cadastre.

Since December 2017, a new project with a grant of 2,5 million USD has been started with the cooperation of Kartverket, the State Registration Service, Statistics Norway and the National Statistic Committee of Kyrgyzstan. The project aim is to deliver up-to-date geographic information for statistics, to support national elections and the national population and housing census of 2020; as well as reporting on the 2030 Sustainable Development Goals and land administration decision-making. The Kyrgyz Government gives a high political priority to the Norwegian funded projects.

Aerial photography will be performed in 2019, with three areas of main economic interest selected. Chui region, Fergana valley and the coastline of Issyk-Kul Lake will be photographed with a GSD of 20 cm and the greater Bishkek with a GSD of 10 cm.

The data will form a basis for establishment of the National Spatial Data Infrastructure in Kyrgyzstan, and will be publicly available on the Internet via a geoportal that will be developed in the project. The data will be used for preparation of statistics, implementation and reporting on the sustainable development goals, improvements to the cadaster, general area planning and decision-making.

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1. NORWEGIAN DEVELOPMENT ASSISTANCE

Almost two decades ago, the Millennium development goals were put in place and since that time, Norway has been one of the few countries committed to grant at least 1% of their gross national income (GNI) to development assistance. In 2017, Norwegian development assistance corresponded to approximately 1 per cent of GNI in 2017¹.

The foreign and development policy of the Norwegian Government is designed to promote economic development, democratization and implementation of human rights, good governance and measures that can lift people out of poverty for good². Norway is fully committed to the Agenda 2030 and the Sustainable Development Goals.

The Norwegian Ministry of Foreign Affairs yearly distribute ca. 4 billion USD as grants to Norwegian and foreign recipients. For the last 20 – 25 years, the Ministry has been running a grant program in former Soviet Union republics and former socialist countries in Western Balkan.

Founded in 1773, Kartverket (Norwegian Mapping Authority) is the national mapping authority under the Norwegian Ministry of Local Government and Modernization. It bears nationwide responsibility for geographical information, operates the national cadastre, property registry and undertakes all property registration in Norway. Kartverket also plays an important role as the national coordinator of geographic data, which involves establishing and coordinating work with the national geographical infrastructure in Norway. In this capacity, Kartverket works closely with local municipalities and with other public sector suppliers and users of geographical information.

Kartverket has a wide range of international activities and commitments. With support from the Ministry of Foreign Affairs, Kartverket is an active party of the Norwegian official development assistance related to land administration, geographic information and property rights.

2. SECURING OWNERSHIP TO LAND IN KYRGYZSTAN

Norway has supported the State Registration Service of Kyrgyzstan with development of the land sector since 2013.

¹ <https://norad.no/en/front/about-norad/news/2018/norwegian-development-aid-in-2017/>

² <https://www.regjeringen.no/en/topics/foreign-affairs/development-cooperation/id1159/>

After an invitation from our Kyrgyz partner - the State Registration Service of Kyrgyzstan, the authors of this article Elena Busch and Helge Onsrud visited Kyrgyzstan to investigate the possibilities of project cooperation.

Kyrgyzstan (Figure 1) is a landlocked country in Central Asia bordering Kazakhstan, China, Tajikistan and Uzbekistan, with a total territory of ca. 200 000 sq.km. It lies between latitudes 39° and 44° N, and longitudes 69° and 81° E. The mountains cover almost 90% of the country.

It is one of the poorest republics in the former Soviet Union. There are not many natural resources in the country, apart from land for farming and grazing. Gold and other minerals can be found, but this industry is little developed.

There are around 5,6 million inhabitants from different ethnic backgrounds in Kyrgyzstan. Bishkek in the north is the capital and largest city, with ca. 1 million inhabitants. There is a considerable Uzbek minority living in Kyrgyzstan, and until recently, the conflict level has been quite high. This makes the need for clear and secure rights in land even greater.

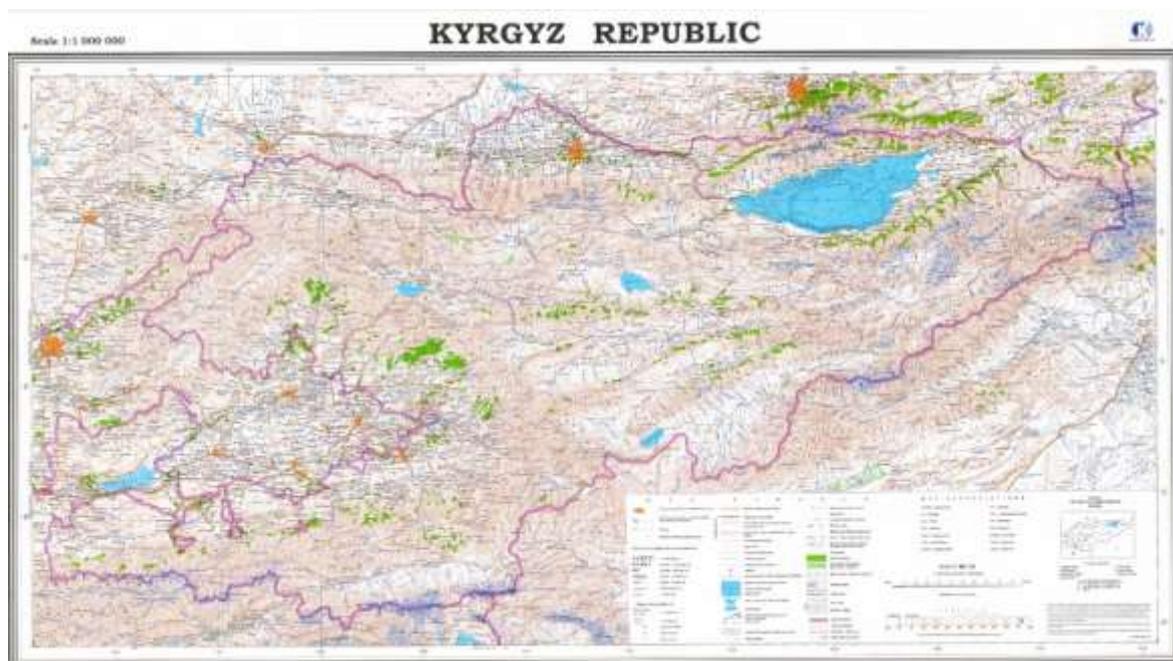


Figure 1: Kyrgyz Republic, source Goskartografia, Kyrgyzstan

Since the establishment of an independent state, the Government of Kyrgyz Republic has put a lot of effort into privatization of land and buildings, being a prerequisite for social and economic development of a country. Security of ownership, which can only be ensured with functioning registers and reliable maps, receives much attention in the country, where farming is the largest resource for income. Clear documentation of the boundaries of private parcels, land left for common use as pastures, rights to registration and related services, as well as ownership and transactions, are very important for confidence in a government.

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More than 3 million private properties have been established, and the market in private properties is rapidly expanding, which also expands the demand in reliable information about properties. To meet this demand, a satisfactory registration system has to be in place, especially to service external users in public and private sectors with complete and up-to-date property information.

The World Bank has provided significant support to the property sector in Kyrgyzstan. The methodology for documenting privatized parcels has been developed and tested, ensuring that 80 % of the privatized properties have been well documented.

When the World Bank project in Kyrgyzstan came to the end in 2012, it remained to upgrade the maps for 20% of the privatized properties to bring the clarity to boundaries and to link information about ownership with the reality on the ground. The developed methodology provided a good platform for the surveying and mapping of the remaining properties.

In the wake of this trip, Kartverket submitted a project application, which was accepted by the Norwegian Ministry of Foreign Affairs.

With a grant of ca. USD 1,4 million, the project “Securing Ownership to Land” jointly implemented by the Norwegian Mapping Authority and the State Registration Service of Kyrgyzstan, was aimed at the improvement of registration and information services to all groups of users requesting property registration and information.

The Norwegian funded project was built upon important achievements of the earlier projects, especially of the first cadastre project funded by the World Bank.

When the project started in 2013, the property registration system was fragmented into several systems for maps and textual information respectively. Official data was produced and kept locally at each registration office. Textual information about ownership and other rights was frequently copied to a central database, but it was not linked with maps showing boundaries.

Building on the above achievements, the Norwegian project was focused on

- specification of improvements to property registration system KLIS (Kyrgyz Land Information System),
- surveying and mapping the remaining 20% of privatized properties, and
- extension of KYRPOS – the network of continuously operating reference stations.

2.1 Specification of improvements to the Kyrgyz Land Information System

The Kyrgyz Land Information System was seen as a central database with textual information connected to the maps, and making it possible for local registration offices and external users to communicate with the database via Internet using web-services. It is clear that a centralized system solution provides for security and integrity of stored data, and ensures better

transparency by giving access to information via Internet. It facilitates exchange of data with other public institutions, such as the tax authority, the population and business registers etc. In Kyrgyzstan, the database is largely used in elections for compiling voters' lists.

A similar system was successfully implemented in Armenia with the support from Norway. The solution for Armenia is up and running, using open source, free software, thus avoiding heavy license costs. This is particularly important for ensuring sustainability in a country with limited access to funds. Telecommunication networks can now support a centralized register solution also in Kyrgyzstan.

The task of the project was however limited to design the KLIS system architecture, to develop the database model and system requirement specifications. Based on these documents, the system development is now ongoing with the funds provided by KOICA – Korea International Cooperation Agency.

2.2 Surveying and mapping of privatized properties

One of the project goals was to ensure that all privatized properties were well documented in the central register, providing security of ownership to all, and better services to users of property information.

The methodology for this has been established and well tested in the World Bank “Second Land and Real Estate Registration Project” in 2010 – 2012. Technical approach was to scan paper maps and to digitize cadastral index map contents from scanned images into several map layers.

Two local surveying companies were engaged in the geo-referencing of cadastral index maps for seven local registration offices. The surveying companies were asked to do field surveying, locate the points on the ground that coincide with points on the cadastral index maps, and determine their coordinates. The result of the geo-referencing work with both raster and vector maps is shown on Figure 2.



Figure 2: Raster and vector maps after geo-referencing

The data was subject to internal quality control of the vector maps, including a check of the linkage between land parcels, parcel identifiers and street addresses. Next step was geo – referencing of parcels in built – up areas by field GPS/GNSS surveys of block corners, street intersections, and similar objects that could be clearly recognized on maps.

2.3 Extension of the KYRPOS – network

The World Bank funded the establishment of twelve reference stations for efficient use of satellite technology (CORS) for surveying, especially for property units boundaries.

In the Norwegian project, the KYRPOS – network was extended with ten more stations and upgraded the control centre facility with new software. Figure X shows locations of 23 KYRPOS continuously operational reference stations, including one privately owned station in Bishkek.

In the areas not covered with the permanent stations services, like Toktogul, Naryn and At-Bashi, a temporary base station solution is usually used. This method is suitable for mountainous areas of the country with not active property market. Surveyors use one set of GNSS receiver, which includes base station with transmitter and receiver with radio modem.



Figure 3: KYRPOS reference stations

The Institute of Geodesy of *Technische Universität Darmstadt* (PSGD) has carried out the data evaluation and determination of International Terrestrial Reference Frame 2008 (ITRF2008) coordinates for KYRPOS.

In addition, all local registration offices received satellite-surveying instruments. Now they can benefit from higher efficiency and improved geodetic accuracy in their work. This capacity building has already demonstrated improvements in servicing clients by reducing the average time needed for cadastral registration.

2.4 Using UAV-technology for data collection and preparation of maps

In 2016, there were very limited capacities for airborne data collection in Kyrgyzstan, both in private and public sectors. No private company could offer data collection from airplanes. The existing maps in Kyrgyzstan needed updating to show the changes occurred in the rapidly growing capital – the city of Bishkek and other settlements, new roads and pipeline, changes in terrain etc. The orthophotos in use today in Kyrgyzstan have a resolution of 20 – 40 cm. They were collected in 2002 with an analog film camera and then scanned into normal color. These orthophotos have varying quality and only cover parts of the cities Bishkek and Osh, and are not sufficient for cadastral works. The situation with large – scale topographic maps is even worse.

The Norwegian Mapping Authority was asked to evaluate the potential benefits of using UAV technology for aerial photographing of smaller areas and projects in need of up – to – date orthophotos. The relevance of using UAVs for data collection in Kyrgyzstan in respect to needs for data and with consideration for the capabilities of the State Registration Service to do such data collection and processing in a sustainable way was evaluated. The conclusion was that there is a need for “mapping – on – demand” in Kyrgyzstan and the authority is in position to use the technology efficiently.

A fast wing and a fixed wing drone were procured. The staff was trained in performing aerial photographing and data processing using Trimble Business Center (TBC) software.

Ten areas were flown during summer 2016 and the results were presented at the workshop “New technologies for data acquisition” in Batumi, Georgia on 8 – 9 September 2016.

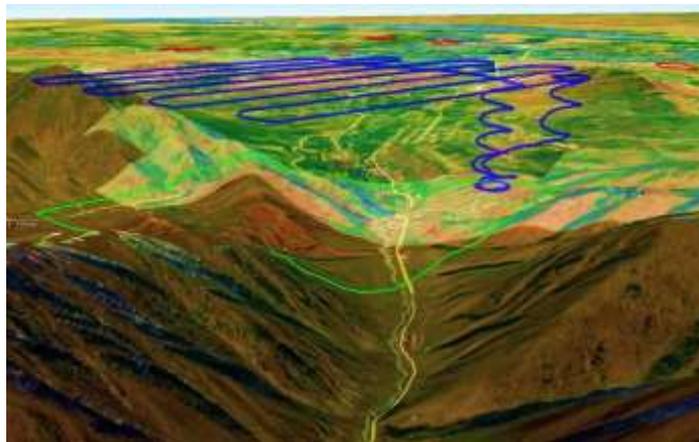


Figure 4: Pilot project area in Koi-Tash flown with a fast – wing drone Trimble UX5, in 2016.

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Figure 4 shows an example of Koi-Tash, which is one of the pilot project areas flown with Trimble UX5 in the summer of 2016. The data was processed with TBC software the day after data was captured and Figures 5 and 6 show final products – orthophoto, 3D point cloud and digital terrain model (DTM).



Figure 5: Orthophoto produced with TBC.

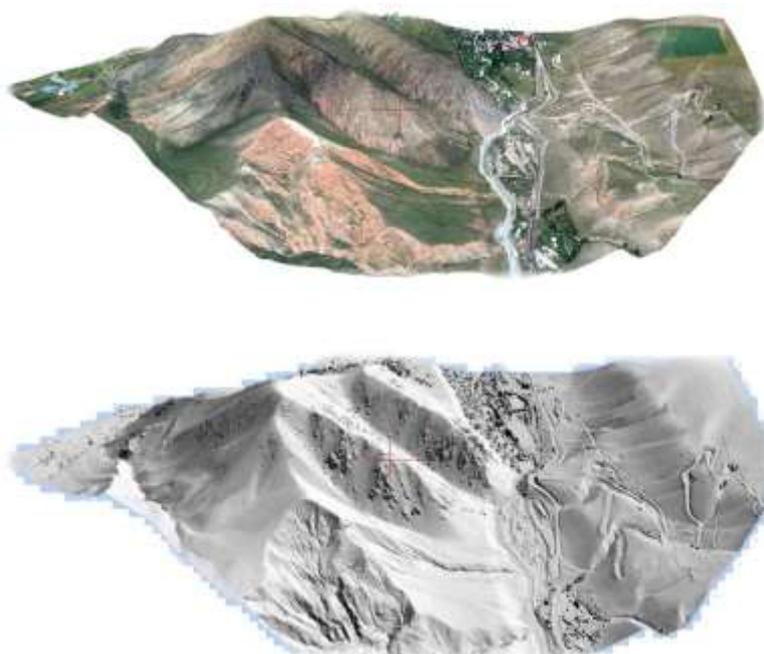


Figure 6: 3D point cloud and DTM

Kartverket has engaged a Norwegian company Geomatikk Survey to supervise the pilot project and compile a report. The report stated clearly that use of UAV technology would never substitute, but rather supplement classical aerial photography. The trial flights in Kyrgyzstan showed that the UAV platform was a good and efficient alternative for smaller project areas

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and mapping corridors, typically 5 – 15 sq.km, where the data is needed urgently and can be produced and delivered fast.

2.5 Assessing the project results

With a grant of 1,4 million USD, the project implemented during 2013 – 2016 delivered tangible results: Completed the network for accurate positioning services; finalized the conversion of paper maps into digital format; and developed specifications for a new system for registration of property rights and cadastre.

By the end of the project, good working relations, mutual trust and understanding were established between cooperation partners, and the Kyrgyz partner wanted the cooperation to continue.

The Kyrgyz political leadership gratefully appreciated the project results. In January 2019, the delegation from the Ministry of Foreign Affairs of Kyrgyzstan visited Norway. Mr. Chingiz Aidarbekov, Minister of Foreign Affairs of Kyrgyzstan handed over a letter addressed to the Norwegian Ministry of Foreign Affairs and Kartverket, where the Government of Kyrgyzstan expressed great thanks to the Norwegian Government and Kartverket for assistance with the implementation of the project in Kyrgyzstan.

The State Registration Service asked to continue support to the land sector, especially with production of new nationwide orthophoto and large – scale maps. One of the priorities of the Kyrgyz Government is to establish national spatial data infrastructure, and new geographic data is much needed to form the basis of Kyrgyz NSDI.

3. MAPS AND STATISTICS FOR SUSTAINABLE DEVELOPMENT GOALS

In 2017, a new project proposal was submitted for funding, promoting institutional cooperation between Norwegian and Kyrgyz governmental agencies. This time, two Norwegian and two Kyrgyz institutions work together: Kartverket and the State Registration Service of Kyrgyzstan cooperate with Statistics Norway and National Statistic Committee of Kyrgyzstan.

The main goal of the project is to prepare geographic information for production of statistical data supporting national elections and the national population and housing census of 2020; as well as reporting on the 2030 Sustainable Development Goals and land administration decision-making.

The current project is given a high political priority by the Kyrgyz Government. It is considered as a component to a well – coordinated and integrated effort on strengthening the capabilities of Kyrgyz governmental institutions to provide maps and statistical data for sustainable development. The coordinated efforts shall also facilitate use of the various registers at the State Registration Service for production of statistics.

The project envisages technical assistance and knowledge transfer from Kartverket with making geographic information available for public in general and statistical purposes in particular.

The core activity of the project is aerial photography of three selected areas of main economic interest: The Fergana Valley, Issyk – Kul Lake and Chui region including the capital Bishkek, with Ground Sample Distance (GSD) of 20 cm. In addition, the greater Bishkek will be photographed with GSD of 10 cm. Aerial photography will be done in spring 2019. One of the priorities is to perform photographing before leaves appear on trees. It is especially important for urban areas where the imagery will be used for production of large – scale digital maps and for cadastral surveying and property registration.

The total project area for aerial photographing with GSD of 20 cm will amount to 23000 sq.km and 366 sq.km with GSD 10 cm. Due to favorable price offer made by the contractor – a Romanian company “Primul Meridian” it will be possible to cover a larger area than was initially planned and thus produce more orthophoto and maps.

Chui region (Figure 7) is situated in the northern part of the country bordering Kazakhstan. The aerial photography with GSD 20 cm will cover ca. 5120 sq.km and capture ca. 2000 images, without crossing over the state border.

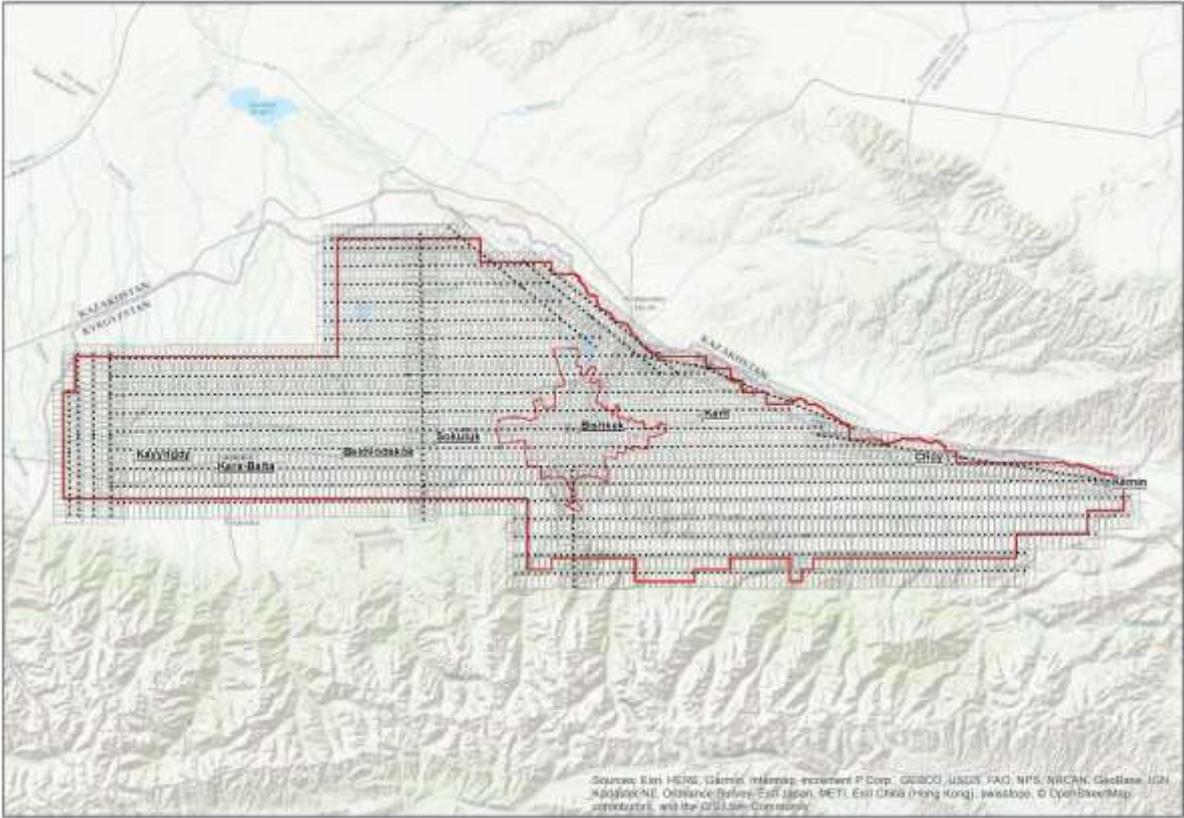


Figure 7: Project area Chui region including the city of Bishkek

The Fergana Valley (Figure 8) part is a very important agricultural area for the country with active land marked and growing number of transactions. The aerial photography with GSD 20 cm will cover 13270 sq.km and deliver ca. 4850 images.

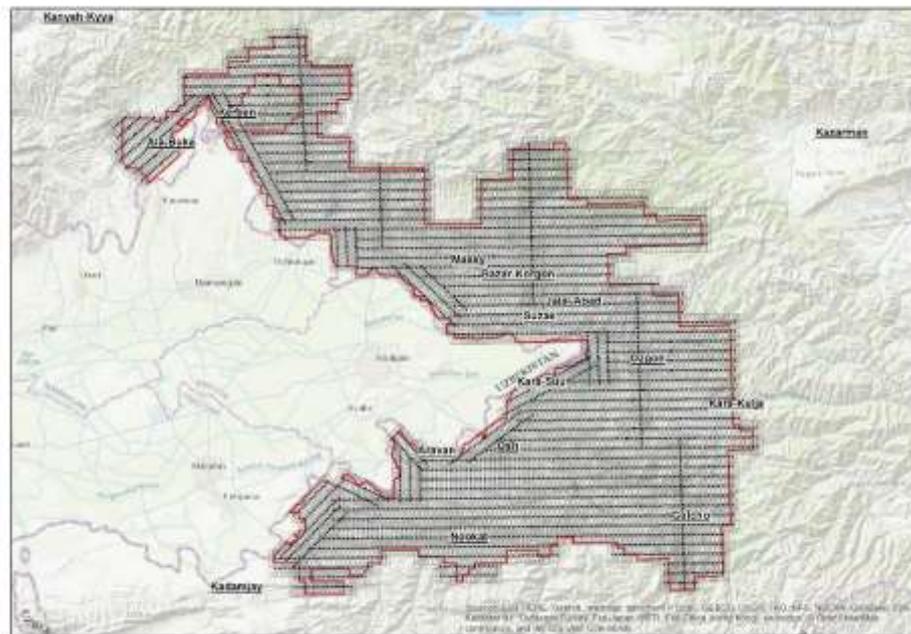


Figure 8: The Fergana valley

Issyk-Kul Lake has a rapidly growing recreation and tourist business and very active land marked. The coastline (Figure 9) with a total area of 4660 sq.km will be photographed and deliver ca. 2500 images.

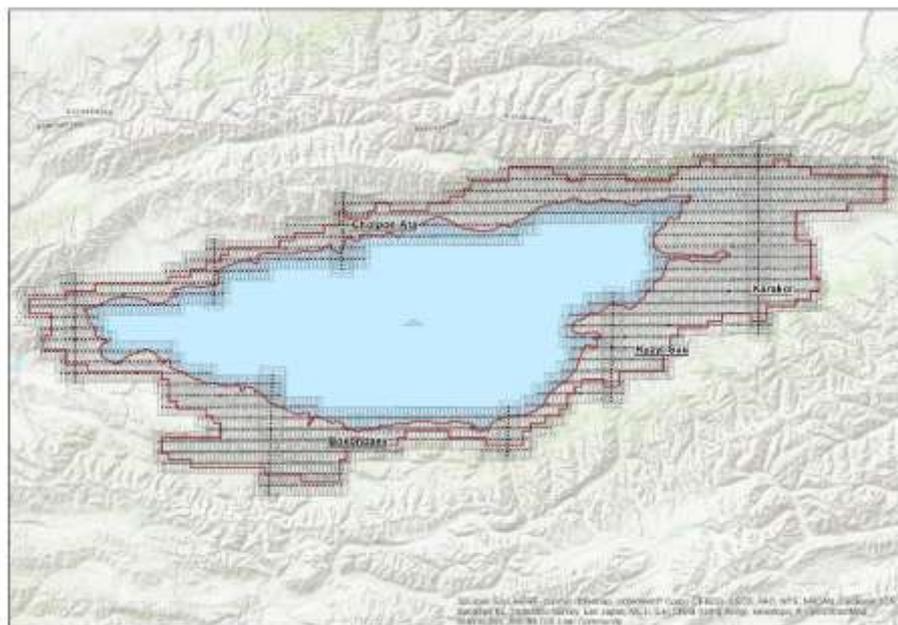


Figure 9: Issyk – Kul Lake coastline

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- Bureau member of UNECE Working party on Land Administration since 2017
- Member of the Norwegian Society of Graduate Technical and Scientific Professionals

Mr. Helge ONSRUD

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- Chairman of FIG Commission 3 1995-98
- Chairman of UNECE Working party on Land Administration 1996 -99
- Honorary member of FIG

Mr. Almaz ABDIEV

- Director of GIS Centre at the Department of Cadaster and Registration of Kyrgyzstan
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