



Project IUCLAND

Workshop on “Soil Degradation: Erosion, Salinization and Waterlogging ground water in Kyrgyzstan”

Kyrgyz State Technical University named after I. Razzakov,
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Summary of lectures

Land degradation in Kyrgyzstan

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Describes the physical characteristics of the territory:

Kyrgyzstan is located in the North–East of Central Asia, occupying most of the Tien-Shan and Northern chains of Pamir-Alai. At three sides has borders: from the North, West and South - Kazakhstan, Uzbekistan, Tajikistan, and East and South – East - with China. The population of the Republic in 2016 is 6 million people. Kyrgyzstan – a country of high mountains, the average altitude of its territory is 2750 m and the highest is 7439 m. More than 94 % of the Republic lies above 1000 m above sea level. In intermountain basins and valleys located in Talas, Chui, Issyk-Kul, Naryn, Alai, etc. regions at altitudes from 500 to 3800 m.

The climate of Kyrgyzstan is characterized by continentality, aridity, sunshine duration by altitudinal zones and large spatial differences.

The territory of Kyrgyzstan is highly branched hydrographic network. In seven major river basins there are more than 28 thousand rivers and streams and more than 3000 lakes which constitute 3.4 % of the territory.

On the territory of the Republic there are deserts, steppes, meadows, forests, bushes, swamps, mountain tundra and other vegetation types.

The characteristic of land use on Kyrgyzstan, where the main natural resources are land and water which constitute the basis of environmental management.

The territory of the Kyrgyz Republic is about 20 million hectares; from total land for agricultural production used 10.8 million ha (54 %). The main part of agricultural land is represented by grazing - 9.2 million ha (46 %). The share of arable land accounted for only 1.4 million hectares (12.9 %) including irrigated 1,066 million hectares (9.8 %). Is the soil cover of the Republic, occupying 16 million hectares or 80% of its area, divided into two large groups: 1) Intermontane soils "syrt" highlands, which have the following soil type: grey soil of Turan on Southern Kyrgyzstan (400-1400 m above the sea level); ordinary Gray soils on Northern part (low-carbonate) are distributed at altitudes of 700-1000 m above sea level; Mountain-valley gray-brown desert stony soil confined within 1620-1800 m; Mountain-valley light-brown soil 1620-1900 m above sea level; Mountain-valley chestnut soils 1000-2600 m above sea level; Mountain-valley chestnut prominent soil.

2) Soil of the mountain slopes have the following soil type: Mountainous brown soils formed at elevations of 1600-2200 m above sea level; Mountain black soils are confined to the slopes of the Talas ridges (2500-2700 m above sea level); Mountain forest black-brown soils under nut-fruit forest (1400-2100 m above sea level); Mountain meadow-steppe sub-Alpine soils are common on slopes of ridges in the range of 2800-3100 m above sea level; Alpine tundra prominent soils are found at the altitude of 3700-4000 m.

Gives are causes of land degradation. According abandonment of the agricultural sector has failed thousands hectares of land and hundreds kilometers of irrigation networks. Continuous use of the land, widespread grazing and environmental problems of the industry have led to pollution, salinity, waterlogged.

The erosion of soil depends also steepness of slopes, methods engineering, irrigate methods and drought.

The process of alkalinity and its influence on the ecological condition of irrigated soils in conditions of Kyrgyzstan

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Considered a soil cover of Kyrgyzstan that characterized by great variety and complexity, due to the complexity of Natural factors and their combinations holding large differences between individual regions. Gives soil and meliorative state of lands differentiating are high complexity. In irrigated areas of Kyrgyzstan, particularly in the areas of Naryn and Chui valleys common soils with a high

content that absorbing sodium in the surface horizons and slightly alkaline or alkaline (pH of more than 8.4), and differentiation on eluvial and illuvial profile.

The high content of absorbed sodium in saline and alkaline soils causes inhibition or destruction in agricultural and forest crops, as well as physical-chemical, chemical and physical properties of soils.

A classification of sodic soils based on the content of sodium cations in the soil-absorbing complex.

The causes of the accumulation of sodium cations in irrigated soils and their influence on the growth and development of crops.

Create the introduction of the doses of gypsum, based on the content of the sodium cations.

In connection with this, the report examines the impact of processes salinization on the ecological factor of the irrigated soils of studied regions. Proposed are Measures to improve the ecological condition on irrigated lands of the Chui valley and Kulinak array of Naryn region.

Influence of the groundwater regime in the ecological status of hydromorphic soils of the Chui valley and the ways of their regulation

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The report discusses features of the formation of hydromorphic soils in conditions of Chui valley. In hydromorphic soils of the lack of drainage systems lead to the development of undesirable processes of secondary salinization. The main cause of secondary soil salinization is a mode of ground waters and conditions of its formation.

Excessive concentration of salts provides an osmotic effect, which prevents you from normal water plants and toxic, causing poisoning. In particular, the poisoning occurs due to a violation of nitrogen metabolism and accumulation of products of protein breakdown. Strong salinity inhibits the synthesis of protein, inhibits the growth processes. Soil salinization depressing effect on soil micro-organisms (including those groups whose livelihoods are essential to higher plants). In hot and dry climate with predominance in the soil of the rising current of water salinity are very common on large areas (a large part of the territories of steppe, semidesert and desert zones). Here the main source of salinity is the inflow of salts from the groundwater. All this dictates the necessity of studying

and carrying out of complex actions on improving the ecological condition of reclamation disadvantaged land.

The Chui valley. Decompensation of water-salt balance and increase its receipt of articles shows the development on irrigated array of secondary salinization and progressive salt accumulation. The most controllable element in water-salt balance is the amount of the outflow of groundwater, which can be amplified to the required size by means of artificial drainage and leaching. Secondary salinization is due to the accumulation of salts in the soil, emerging in the result of artificial changes in the water regime in irrigation conditions. On the arrays, are subject to secondary salinization occurs.

To remove excess water and salts, maintaining the groundwater level, eliminating secondary salinization should construction on irrigated lands, a network of horizontal and vertical drains.

Physical assessment of land degradation in Kyrgyzstan

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It gives practical method for the determination of the landscape on the rangelands and the territory of mining mineral deposits.

Analysis the composition and structure of plant communities to distribution of plants-indicators or indicative of certain characteristics in certain types of plants which possible to set of soil type, the degree of its hydro morphological condition, development of processes of waterlogging, erosion etc.

Soil acidity affects the absorption of various mineral nutrients. Each organism exists at a certain pH environment, so some plants can be indicators of the soil. Having defined these plants, we can determine the pH of the soil.

Analyzed a Northern Kyrgyzstan which has are territories, relatively more degraded compared to the Southern regions of the country. The main threat to the natural environment is man and his activities.

On the basis of Transection will be offer the method of determination of degraded areas established on changes of landscape types.

Made Assessment of types by a method of foreign methods, offered by professor J. Keighery.

Provides a comparison of specific location and their distinguish feature.

Based on the types of condition plots, it is proposed to establish the degree of change and degradation of the used areas.

Investigating of Land Degradation using Remote Sensing data and GIS techniques

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Land degradation is a major environmental and social issue for the coming decades. Thus, the observation and early detection of degradation is a primary objective for a number of scientific and policy organizations, with remote sensing methods being a candidate choice for the development of monitoring systems.

In this lecture, we will discuss the statistical and ecological frameworks of assessing land degradation using Remote Sensing data and exist modern GIS techniques. One of the key issues are availability and quality of Remote Sensing data for Kyrgyz Republic area in this study. Therefore, during discussion will consider some suggestions from partners and solutions.