Panel Discussion

- Topic: Central Asia Regional Information Network (CARIN)
  - Regional and National Priorities for LCLUC Research
- Moderator: Dr. Olga Krankinan
- Rapporteur: Dr. Jiaguo Qi

- Discussion Outline
  - Introductory comments and charge to the panel - Olga
  - Comments from the panel – (3 min)
    - priorities for regional collaboration in research and training
    - ideas for future steps to develop

  - General Discussion
  - Proposal from Dr. Bolot Moldobekov
  - Concluding remarks

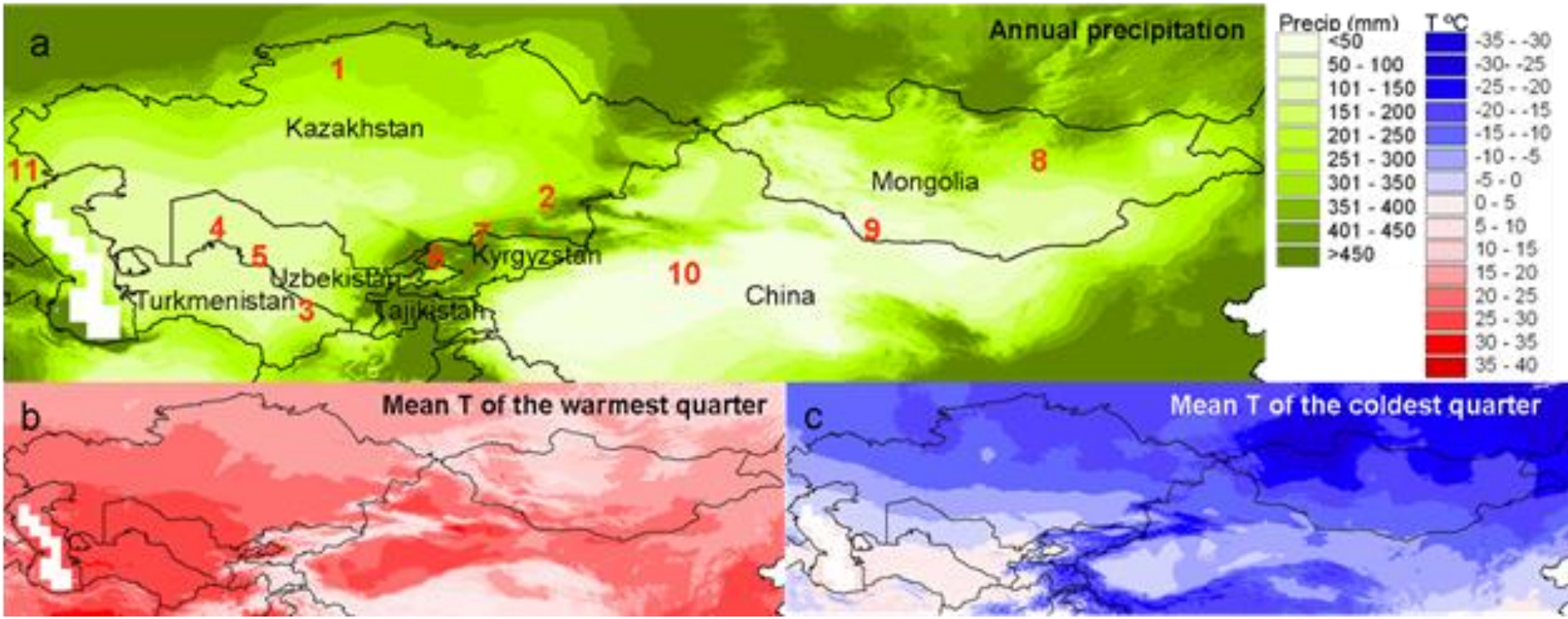
Network Activities

- Regional Workshops are the main activity
- GOFC-GOLD Regional Network Data Initiative, other training and capacity building
- Network Projects

CARIN Project Proposal (2010)

- **Objectives**
  - Consistent region-wide detection, quantification, and characterization of land cover/land-use change (LCLUC) across Central Asia
  - Analysis of key LCLUC processes in the context of differences in political systems, historic legacies, cultural traditions, and economic conditions.
- **Tasks**
  - Develop a MODIS-based regional map of land cover as of circa 2001
  - Characterize inter-annual/seasonal variability and directional change between 2001 and 2012:
    - changes in cultivated land (rain-fed and irrigated);
    - pasture use, degradation, and recovery;
    - woody vegetation cover and condition;
    - changes in inland water bodies;
    - extent and seasonality of fire;
    - trends in vegetation cover and productivity
  - Establish a coordinated set of 11 test sites
    - Sample regionally important LCLUC features and processes,
    - Have high quality ground data

GOFC-GOLD


a
Annual precipitation
Kazakhstan
Mongolia
China
Kyrgyzstan
Uzbekistan
Turkmenistan
Tajikistan
1
2
3
4
5
6
7
8
9
10
11
Precip (mm)
<50
50 - 100
101 - 150
151 - 200
201 - 250
251 - 300
301 - 350
351 - 400
401 - 450
>450
T °C
-35 - -30
-30- -25
-25 - -20
-20 - -15
-15 - -10
-10 - -5
-5 - 0
0 - 5
5 - 10
10 - 15
15 - 20
20 - 25
25 - 30
30 - 35
35 - 40
b
Mean T of the warmest quarter
c
Mean T of the coldest quarter

KAZAKHSTAN

1. Large scale change of environment:

A) **Natural:**

- transgression of steppe herbaceous vegetation into semi-desert zone;
- monitoring of water objects (LANDSAT - 30 year's data);
- monitoring of high altitude snow-ice objects (temporally snow-fields, glaciers);

B) **Anthropogenic :**

- agriculture land use change, agriculture practice changes, forecast of future;
- Irrigated agriculture land (Aral sea region, Balkhash lake), monitoring of water objects, trans boundary basic, agriculture practice.

C) Climate change and many years tendencies (30-50 years 5-10 years).

2. Logistic moments.

A) It needs foreign projects for Central Asia territory.

B) It needs international projects (including local countries).

C) It needs special suggestions from LCLUC or NASA to Kazakhstan government about co-funding bilateral or international projects. These can be new projects or expanding of current NASA (or international) projects,

Boundary between semi-desert vegetation and fire scar
(fire of 2006 year)

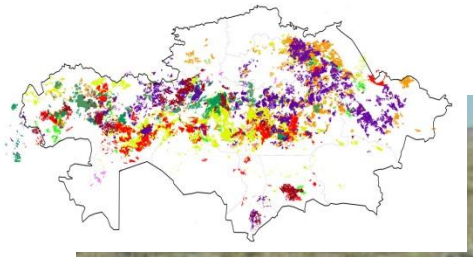


Foto of lake Balkhash coast (July 2010)



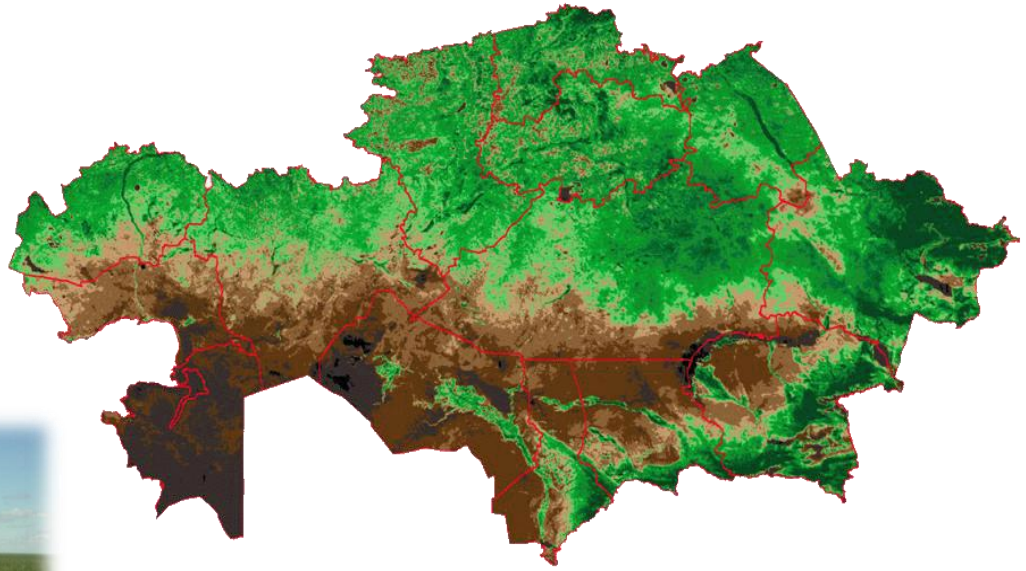






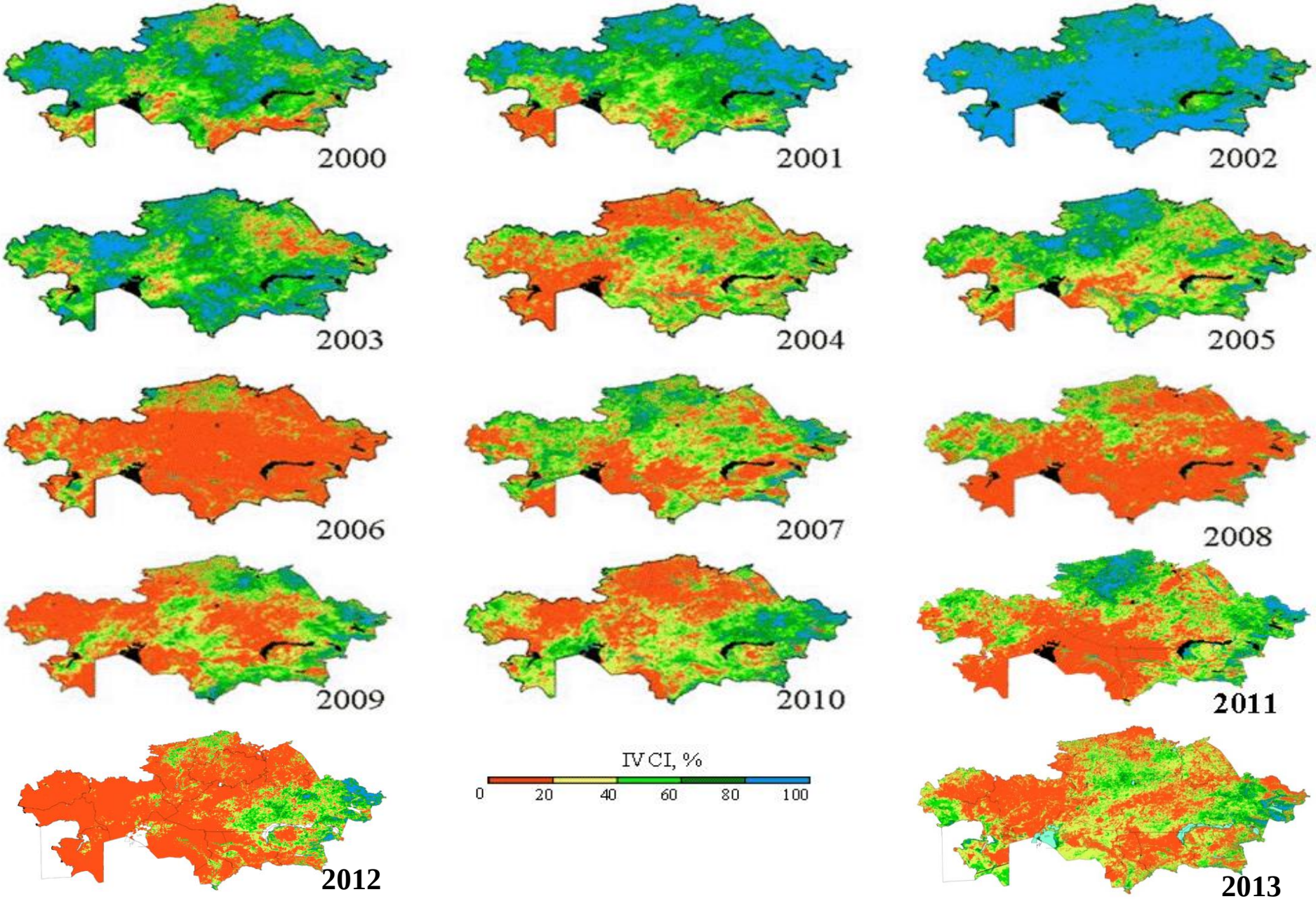
NATIONAL SPACE AGENCY OF KAZAKHSTAN
NATIONAL SPACE RESEARCH AND TECHNOLOGIES CENTRE
«SULTANGAZINS SPACE RESEARCH INSTITUTE »

Regional and National Priorities for LCLUC Research in KAZAKHSTAN

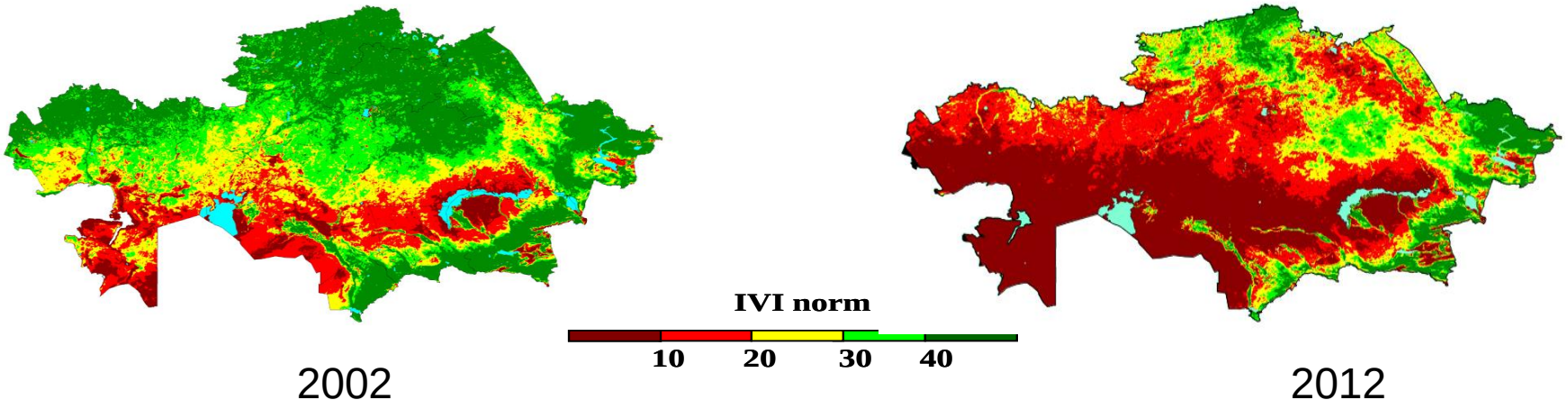


International LCLUC Regional Science Meeting in Central Asia
Tashkent, Uzbekistan
11/11/2013 - 11/13/2013

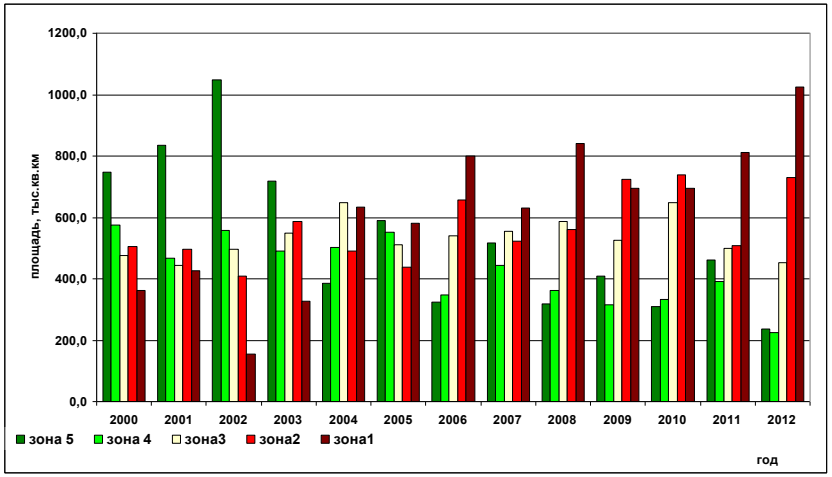
Dynamics of distribution of an integrated vegetative condition index on territory of Kazakhstan for the period of 2000-2013



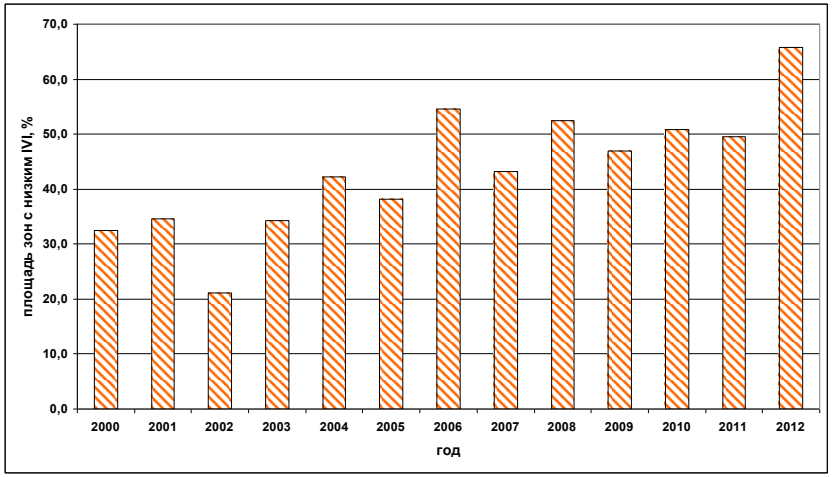
Zoning of territory of Kazakhstan (A), dynamic of all zones areas (B) and low productive (C)



A

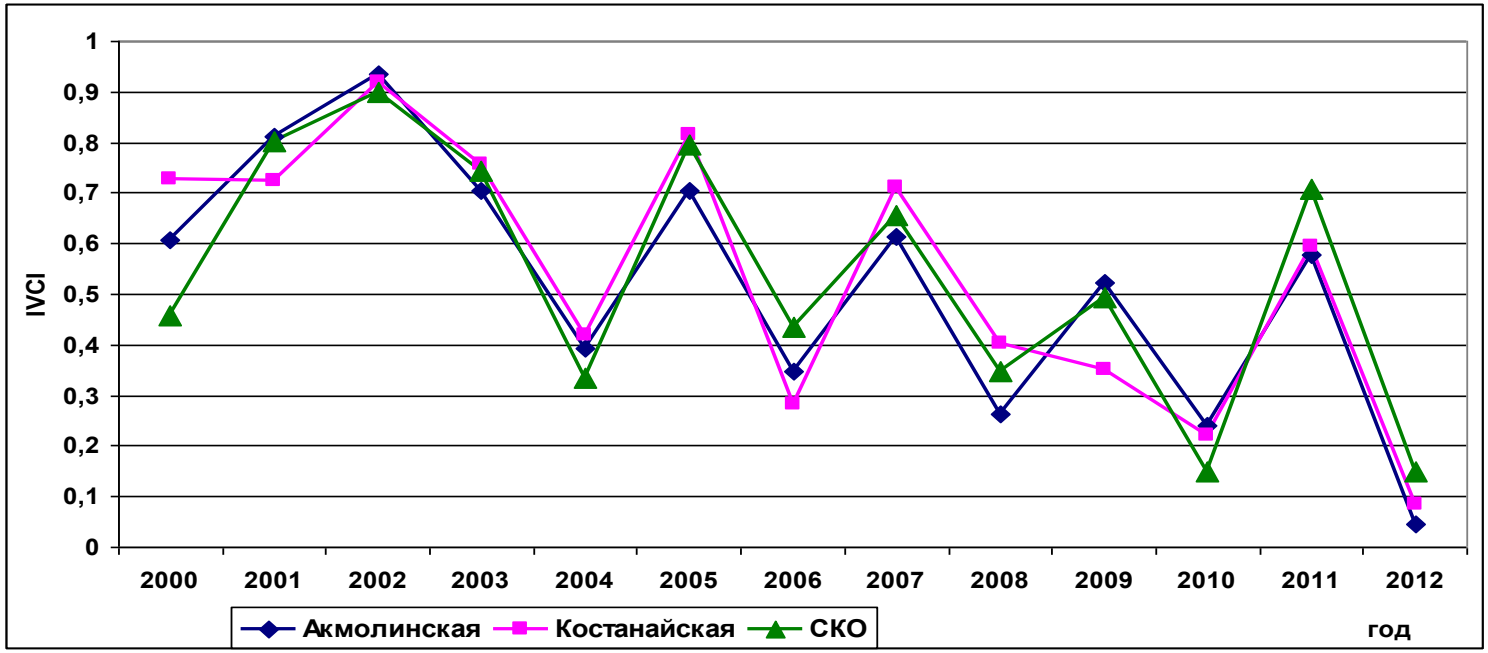


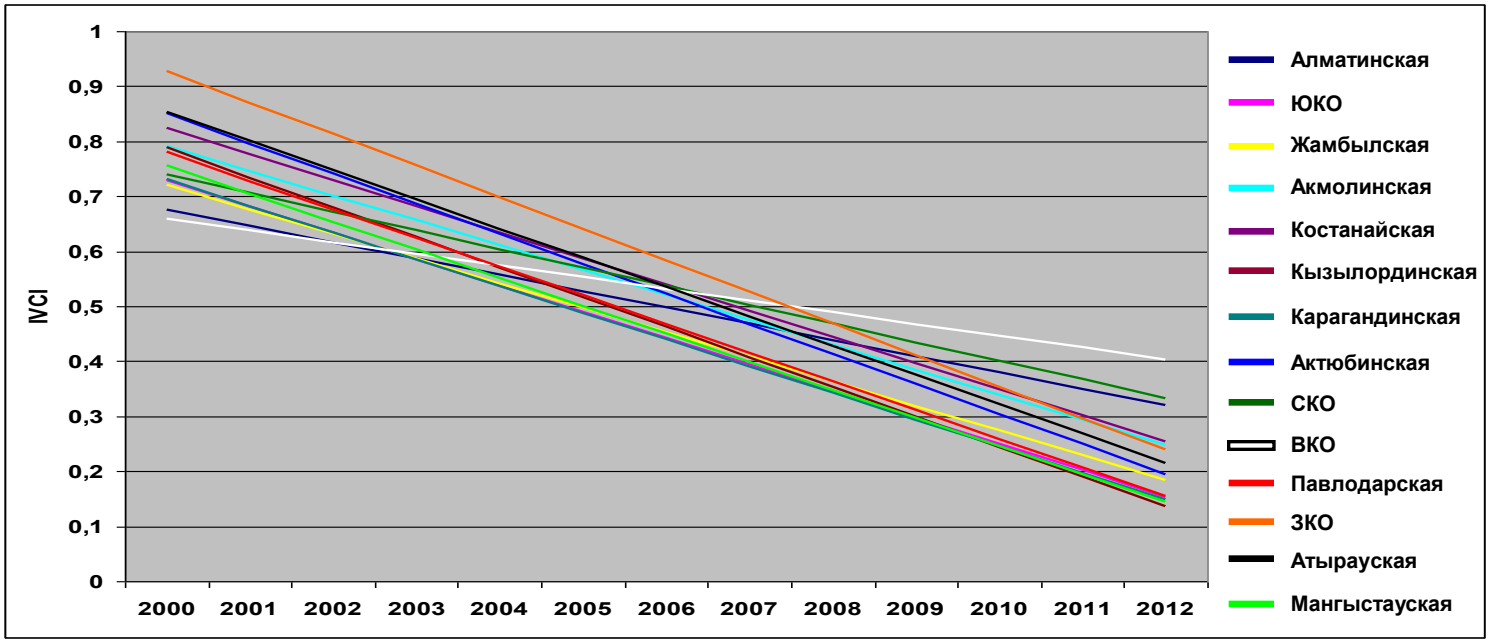
B



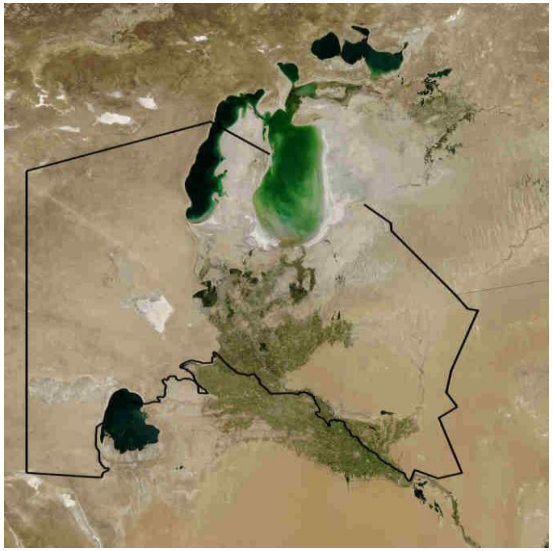
C

Динамика IVCI по областям Казахстана за период 2000-2012





Вспышки саранчовых



Regional and National Priorities for LCLUC Research in KAZAKHSTAN

- **Space monitoring of crop production and early warning of droughts;**
- **Space monitoring of pasture and LCLUC mapping;**
- **Space monitoring of water sources (glaciers, snow, precipitation) and use on irrigated lands;**
- **Development of new based on space imageries technology for pets and plant transboundary disease monitoring.**

TAJIK AGRARIAN UNIVERSITY

COMPARATIVE ASSESSMENT OF SOIL EROSION RATE USING REMOTE SENSING AND GIS IN HILL OF CENTRAL TAJIKISTAN

BY: HASAN SAFAROV

& MIRASIL MIRZOEV

LAND MANAGEMENT DEPARTMENT

TASHKENT 2013

EROSION CONSEQUENCES IN TAJIKISTAN

n	Land category	Area, thousand|ha
1	Arable land (irrigating)	512,4
2	Arable land (no-irrigating)	227,5
3	Longtime Plantings	102,9
4	Accumulated area	26,1
5	Pasture	3692,6
6	Haymaking	23,5
7	Farmstead area	173,2
8	Forest	326,3
9	The other	8686,9
10	Total:	14283,8

Decreasing arable land P|C

1970-0,15 ha
1999-0,12 ha
2010-0,08 ha

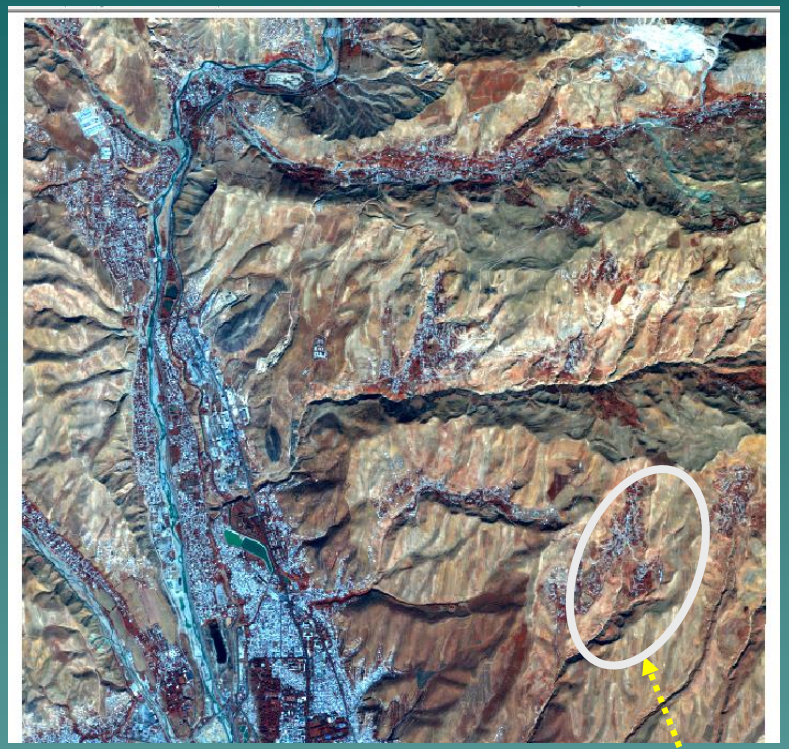
OBJECT & TASKS

- To conduct a quantity assessment of soil erosion rate in existing land use system in small watersheds.

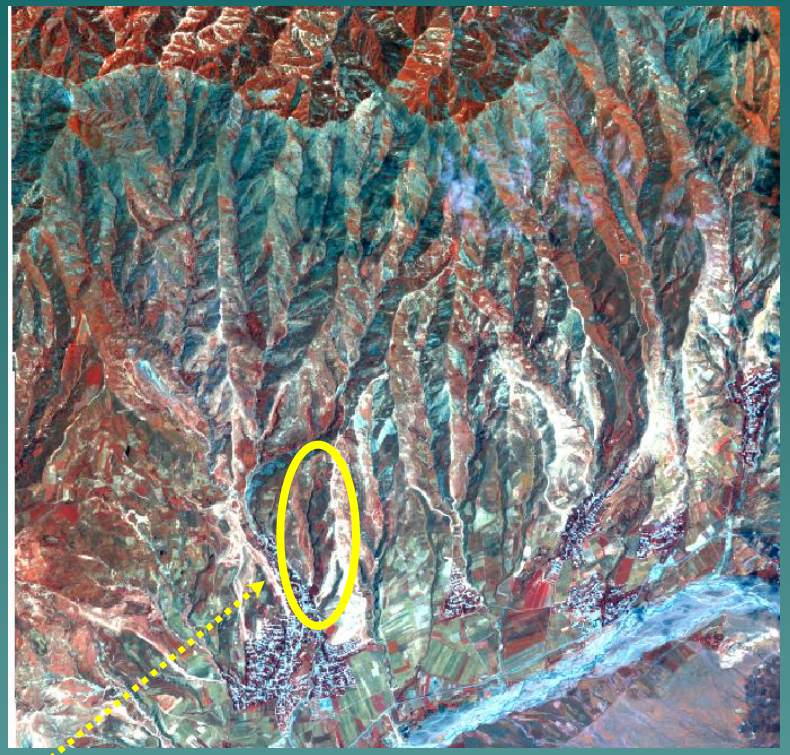
- To identify an intensive erosion processes in the watersheds (geomorphologic approach)

- To generate erosion map using remotely sensed data

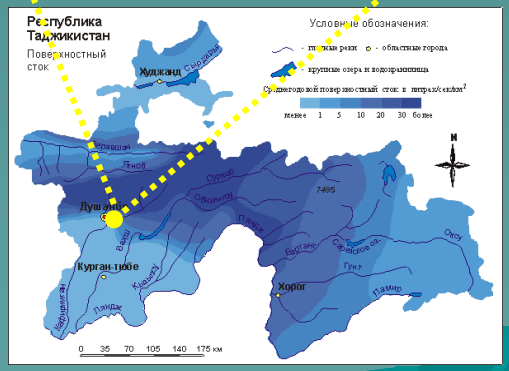
STUDY AREA



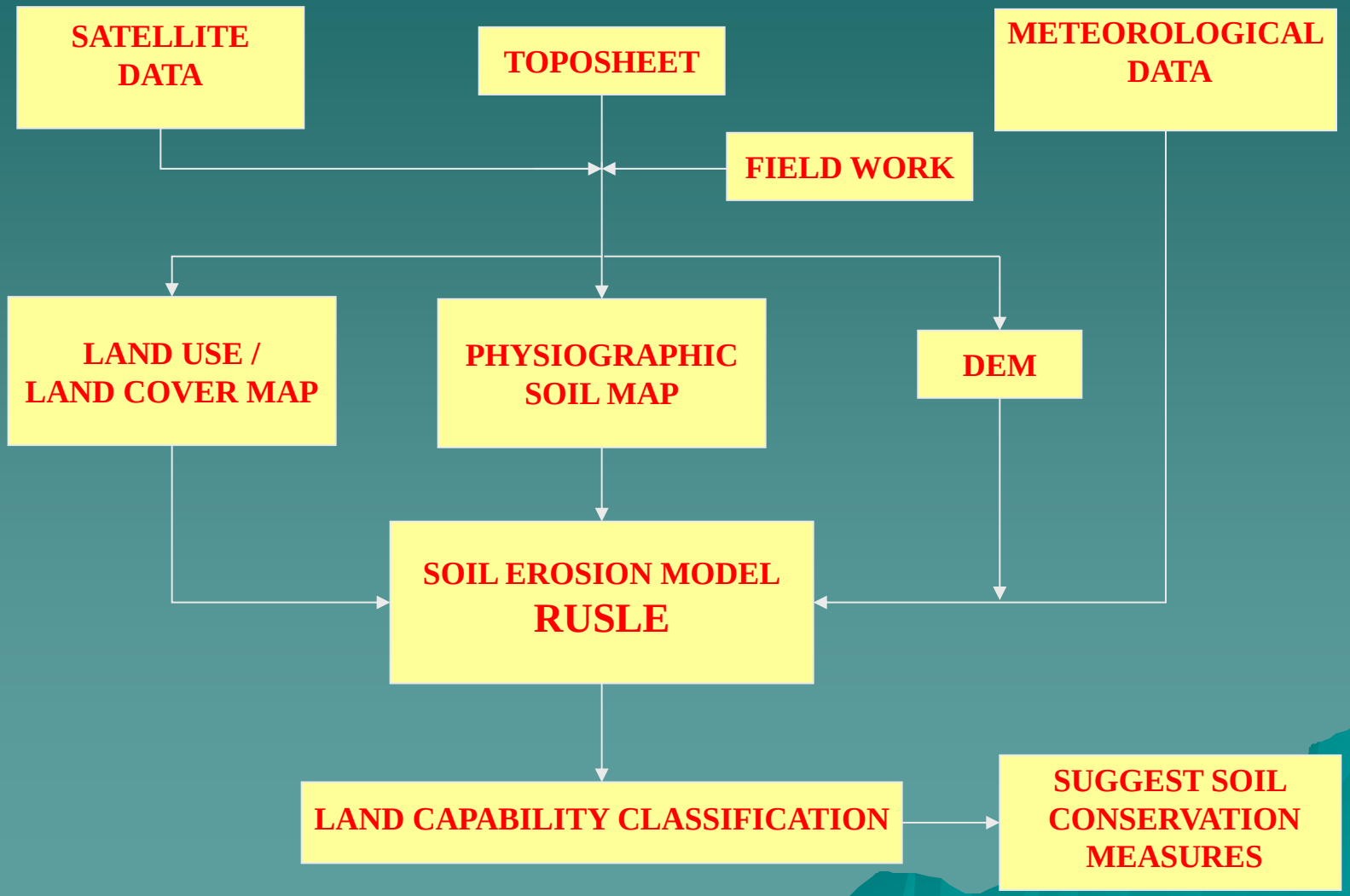
KIBLAI WATERSHED
RUDAKI DISTRICT
DUSHANBE
WV-2 2010



BODOMO WATERSHED
FAIZABAD DISTRICT
WV-2 2010

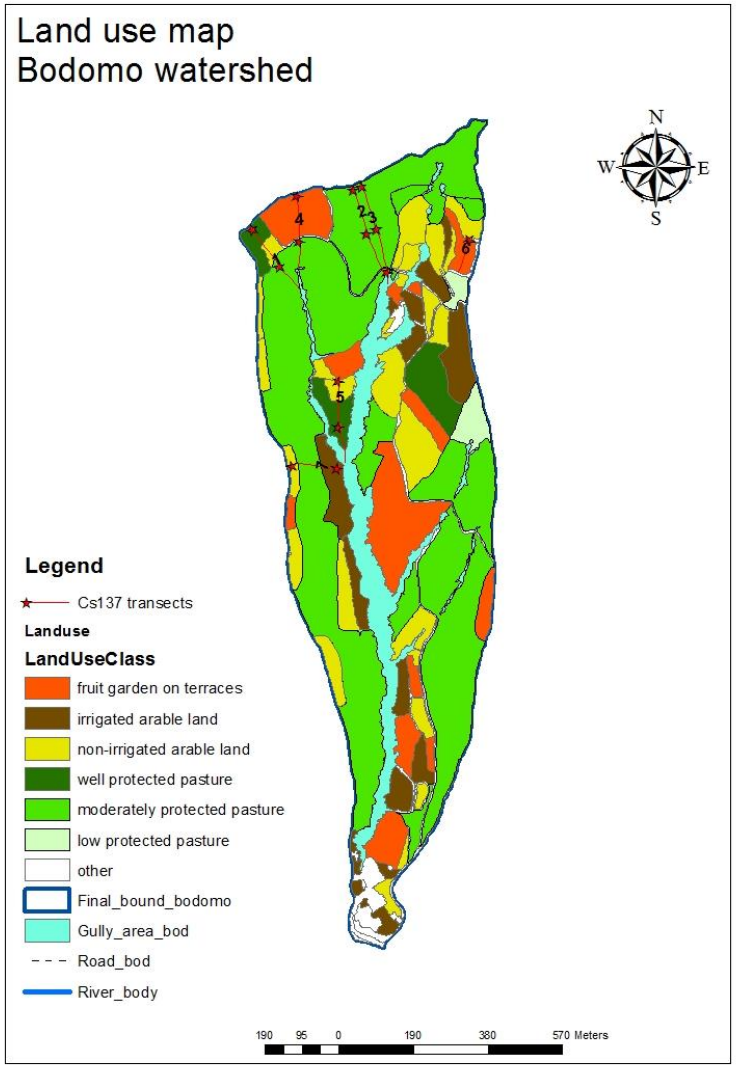


METHODOLOGY

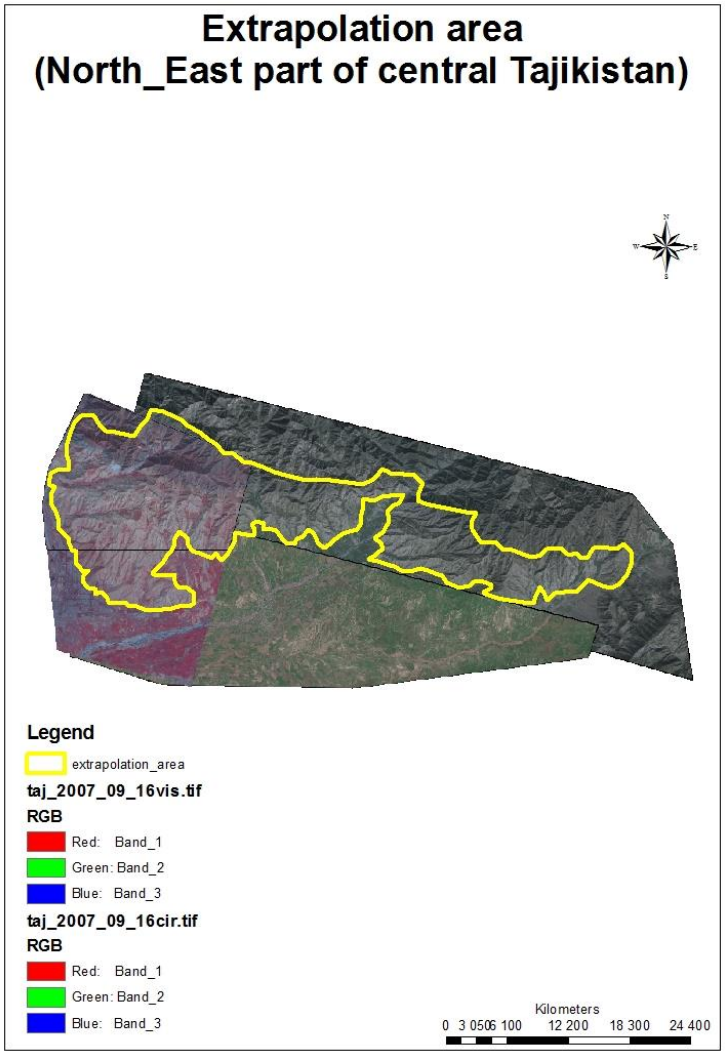


GIS-APPROACHES

Land use map



Extrapolation



Expected results

Generation

PASTURE MAMAGEMENT →

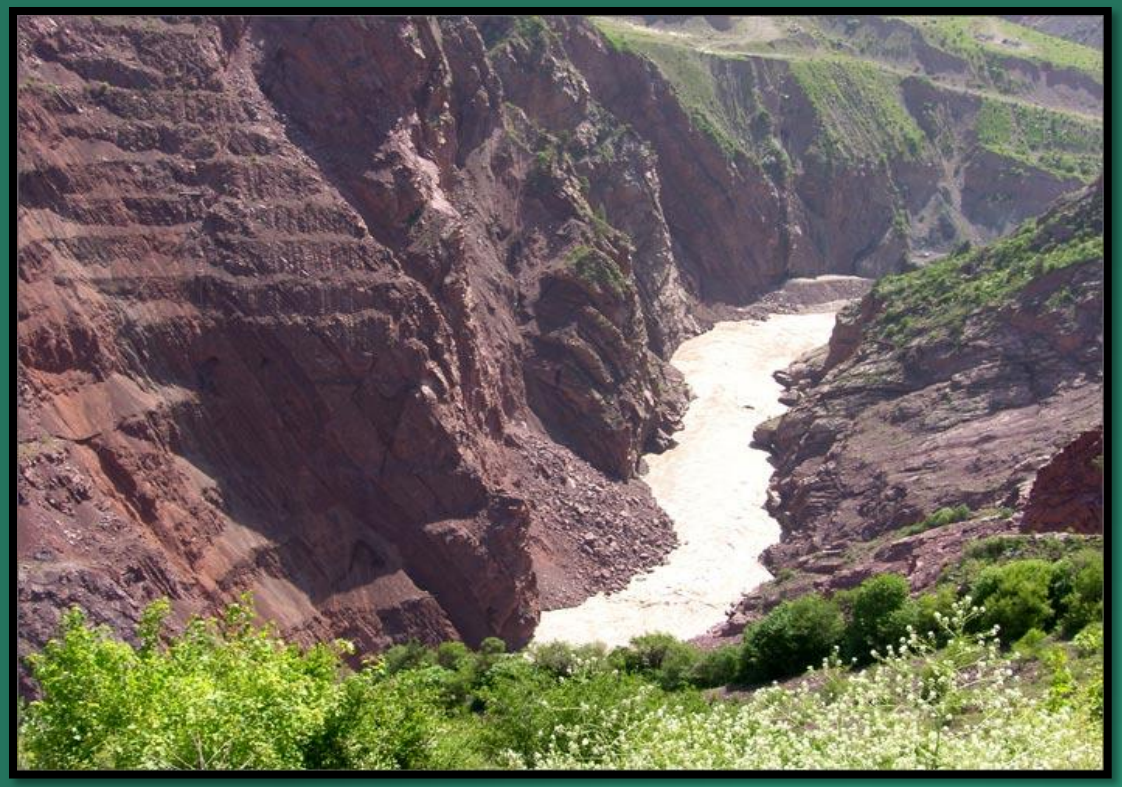
TILLAGE →

IRRIGATION →

ICREASE THE TERRASE AND FRUIT GARDEN →


Thank you for your attention

Hydraulic Dams and Water Resources in Central Asia



Temirbek Bobushev

American University in Central Asia

- The problem of water management is a fairly young
- Moscow was determined the centralized distribution of water resources between the countries of Central Asia.

The main consumption of water complexes of Central Asia goes to hydropower and irrigation.

Hydropower and Agriculture

- The competition for water between agriculture and energy sectors is not new.
- Focus of the research – the optimal allocation of water between competing uses and under varying constraints.

Effective management of water resources

- Despite the efforts of CA countries the problem of water use still remains unsolved

- It is known, there are no unsolvable problems, there are some unpleasant solutions

International cooperation

- International cooperation in the management of water resources can include both the development and implementation of joint research projects in Central Asia.
- A number of projects proposed by researchers from the AUCA, Kyrgyz Republic, and Michigan State University, USA.

International cooperation

CARIN project – *Central Asia Regional Information Network*

- Create a database on water resources of CA
- Use of GIS techniques for monitoring changes in the state of the countries' nature, including CA water resources
- Create ground-based information centers for the concentration of information on the state of water resources and for the subsequent use of water users, both on the local and regional levels.

International cooperation

CARAN project – *Central Asia Regional Agricultural Network*

- The essence of the project - the creation of a network of agrarian Central Asian countries. In other words, by holding the agro- ecological zoning of CA to offer new solutions for agricultural specialization of CA.
- The CARAN should help the countries of Central Asia will provide a gradual transition to a new specialization, which would be adequate climate, land and water resources of Central Asia, i.e. would have developed under the concept of climate-smart agricultural production in Central Asia

Thank you for Attention

University of Hohenheim
Germany

UNESCO chair-
Life Sciences, Armenia

Development of Measures for a Sustainable Shore Management of Lake Sevan (Armenia) on base of Shore Vegetation as Bioindicators by Application of Remote Sensing and GIS techniques (SEMIS)

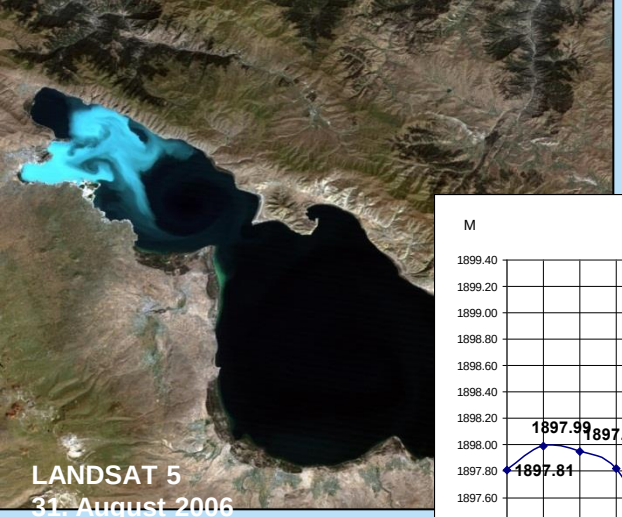
(funded by VW-Foundation)

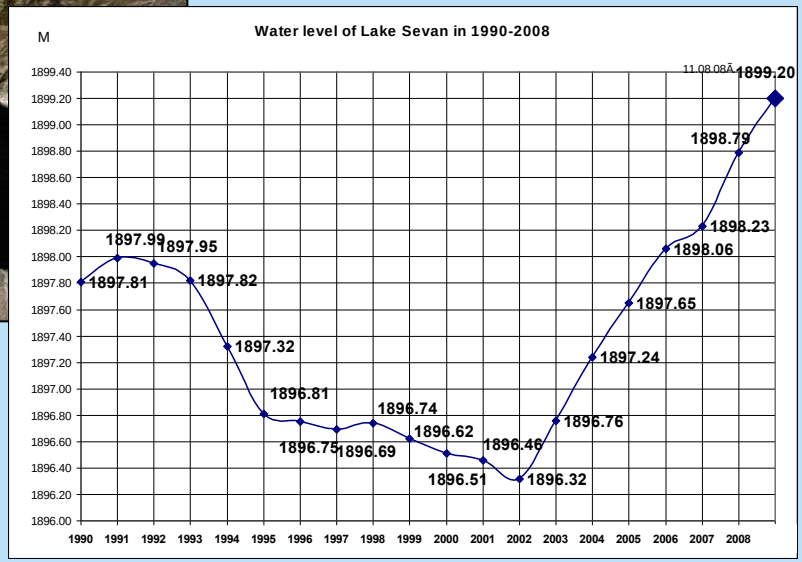
Lilit Vardanyan, Klaus Schmieder, Hovik Sayadyan,
Thomas K. Agyemang, Joerg Heblinski

Development of Measures for a Sustainable Shore Management of Lake Sevan (Armenia) on base of Shore Vegetation as Bioindicators by Application of Remote Sensing and GIS techniques (SEMIS)
(funded by VW-Foundation: Jan. 2006 – Dec. 2008)

semis
Sevan Management Information System

VolkswagenStiftung





The Sevan Problem

- Lowering of lake level by 20 m for water power and irrigation and uncontrolled pollution from agriculture, industry and municipalities

❖Lake Level: 1896 m above the Baltic Sea level

❖Surface Area: 1243 km²

❖Length: 75 km

❖ An average Width of 19 km

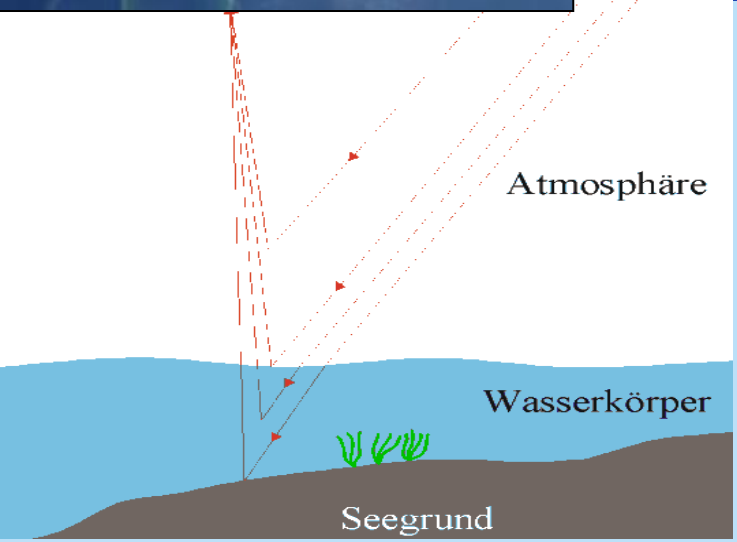
Lake Sevan (Armenia)

- one of the greatest freshwater high-mountain lakes of Eurasia (1898m above Baltic Sea)
- largest water body in the Transcaucasus Region (surface area of 1243km²)
- the biggest source of drinking water for Armenia and its adjoining countries

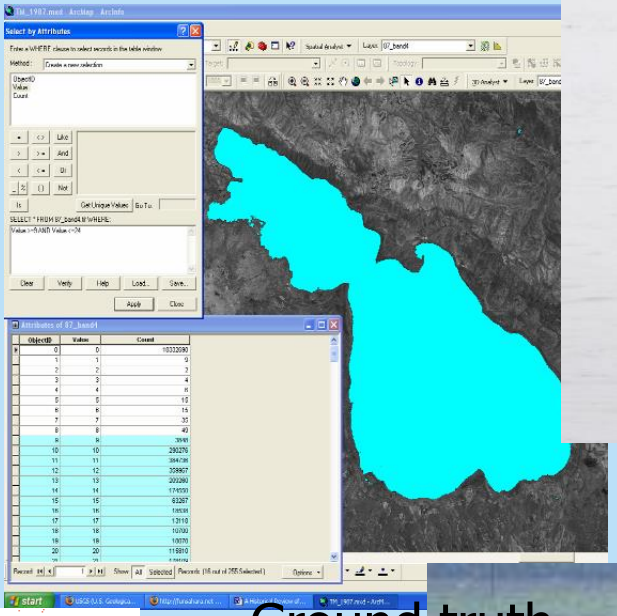
- **Development of automated classification algorithms for shore vegetation from multispectral satellite data**
- **Setup of a geographic information systems of shore vegetation structures of lake Sevan**
- **Development of assessment tools on base of classifications of shore vegetation structures**
- **Prediction of changes in shore vegetation due to water level fluctuations**
- **Importance of macrophytes in accumulation of toxic metals, and controlling the pollution.**

Methods of SEMIS project

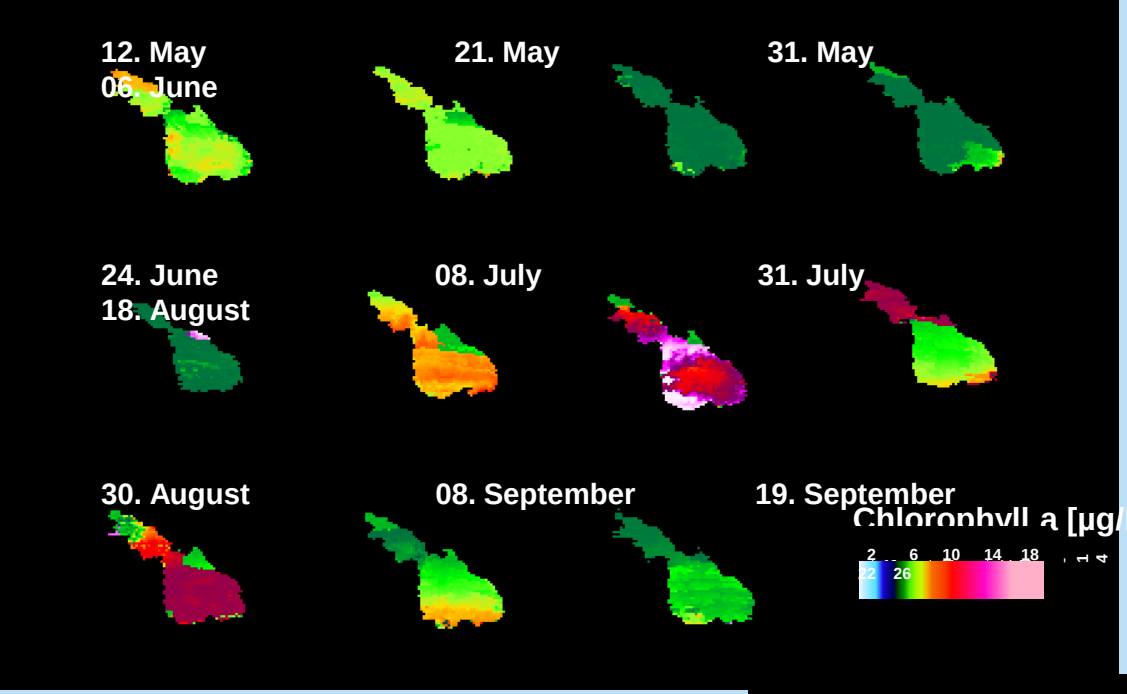
Remote sensing techniques



GIS-Analyses

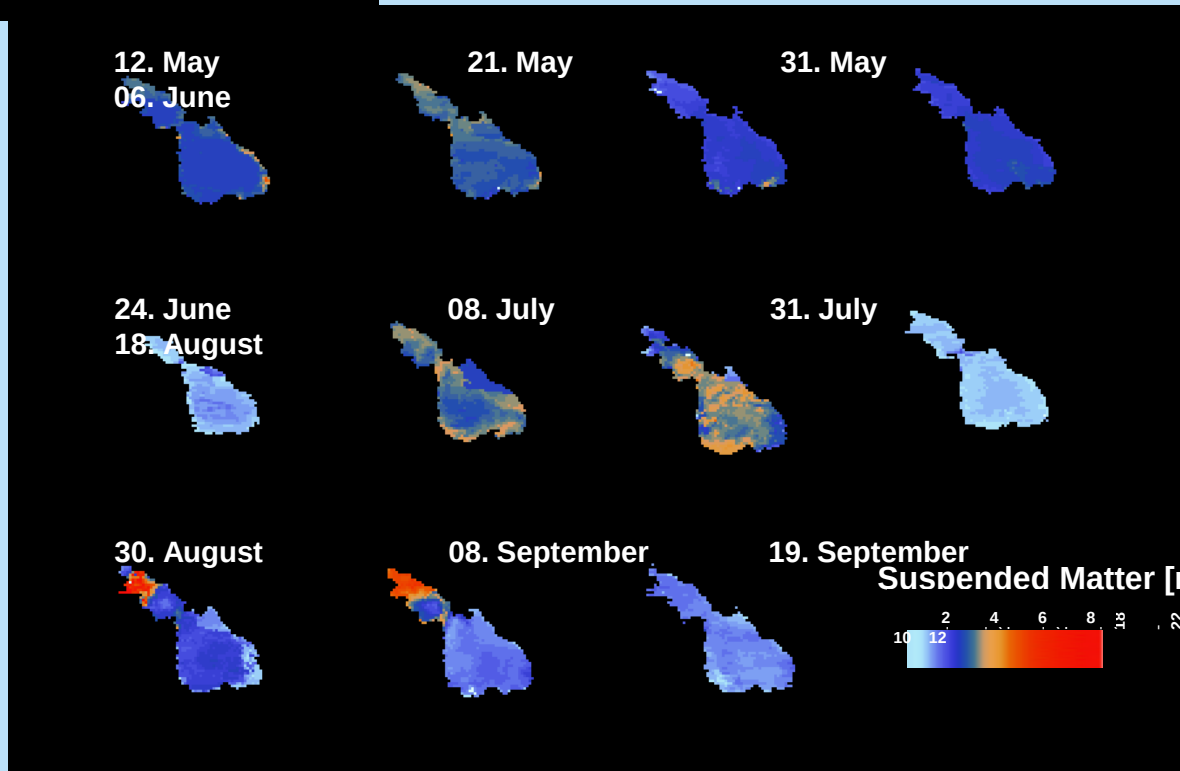


Ground truth

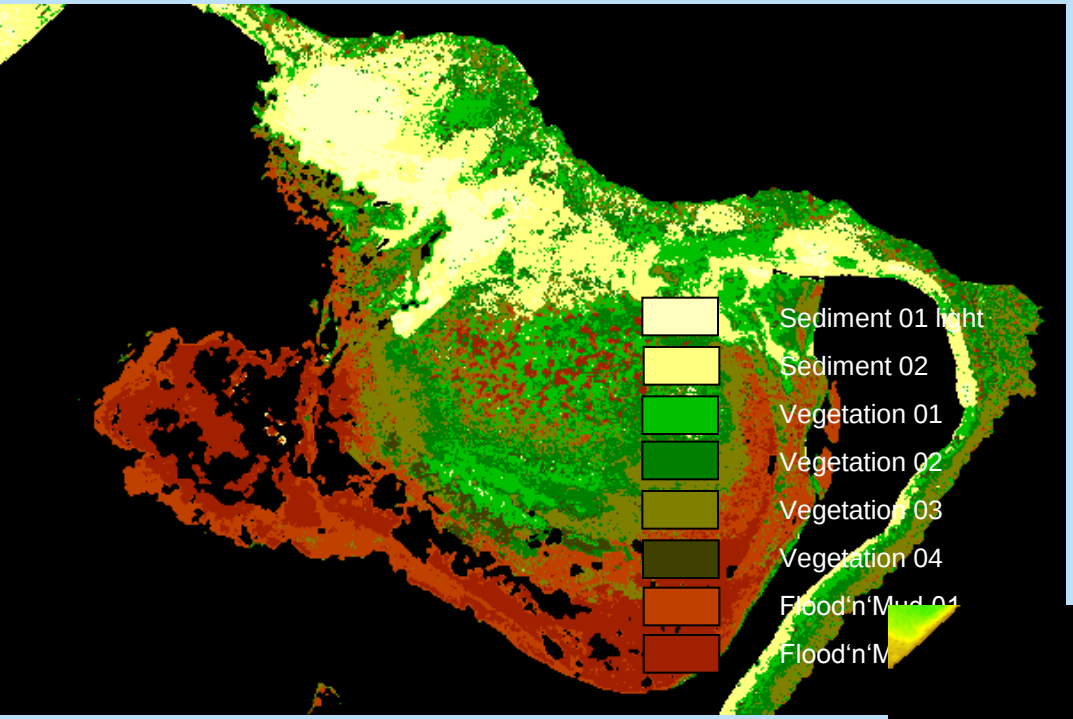


Time series of 2006 – Chlorophyll a

Time series of 2006 Suspended matter

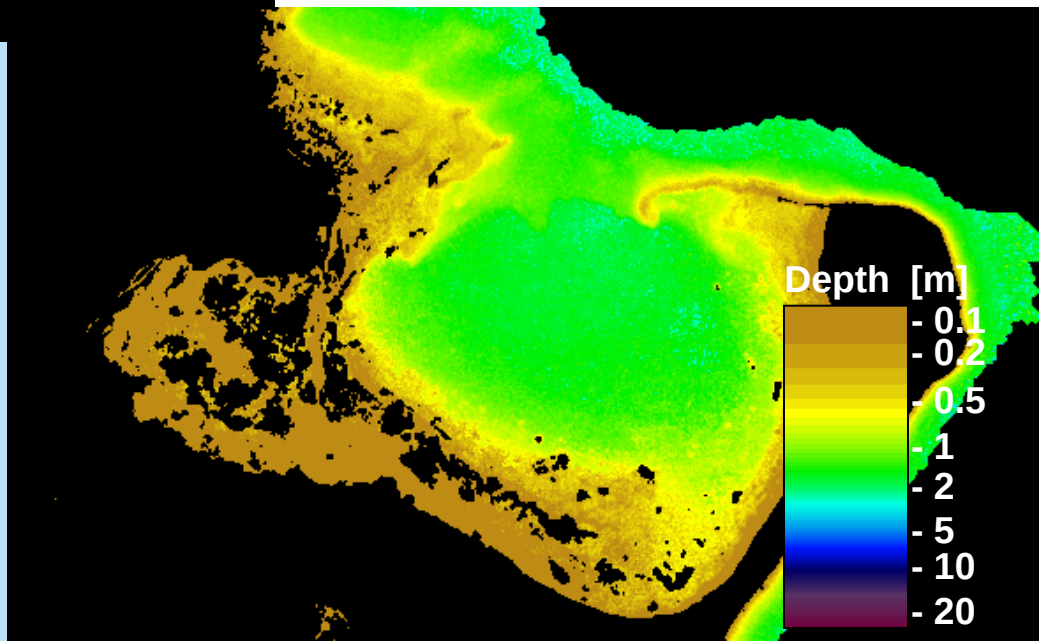


QuickBird 2007 Classification - ROI Hrazdan-Tsovasard



SPECIES	Veg_Type	Growth_Type
Agrostis stolonifera	Emersed	
Bolboschoenus maritimus	Emersed	
Carex disticha	Emersed	
Ceratophyllum demersum	Submersed	*Low*
Chara spp.	Submersed	*Low*
Cladophora spp.	Submersed	*High*
Cyperus spp.	Emersed	
Hippuris vulgaris	Submersed	*High*
Myriophyllum spicatum	Submersed	*High*
Phragmites australis	Emersed	
Persicaria amphibia	Emersed	
Potamogeton filiformis	Submersed	*High*
Potamogeton pectinatus	Submersed	*High*
Ranunculus circinatus	Submersed	*High*
Ranunculus spp.	Submersed	*High*
Schoenoplectus lacustris	Emersed	
Sparganium erectum	Emersed	
Sparganium ramosum	Emersed	
Thypha angustifolia	Emersed	
Thypha latifolia	Emersed	
Zannichellia palustris	Submersed	*Low*

Water depth retrieval QuickBird 2007 - ROI Hrazdan-Tsovasard



The SEMIS team

Questions and discussion

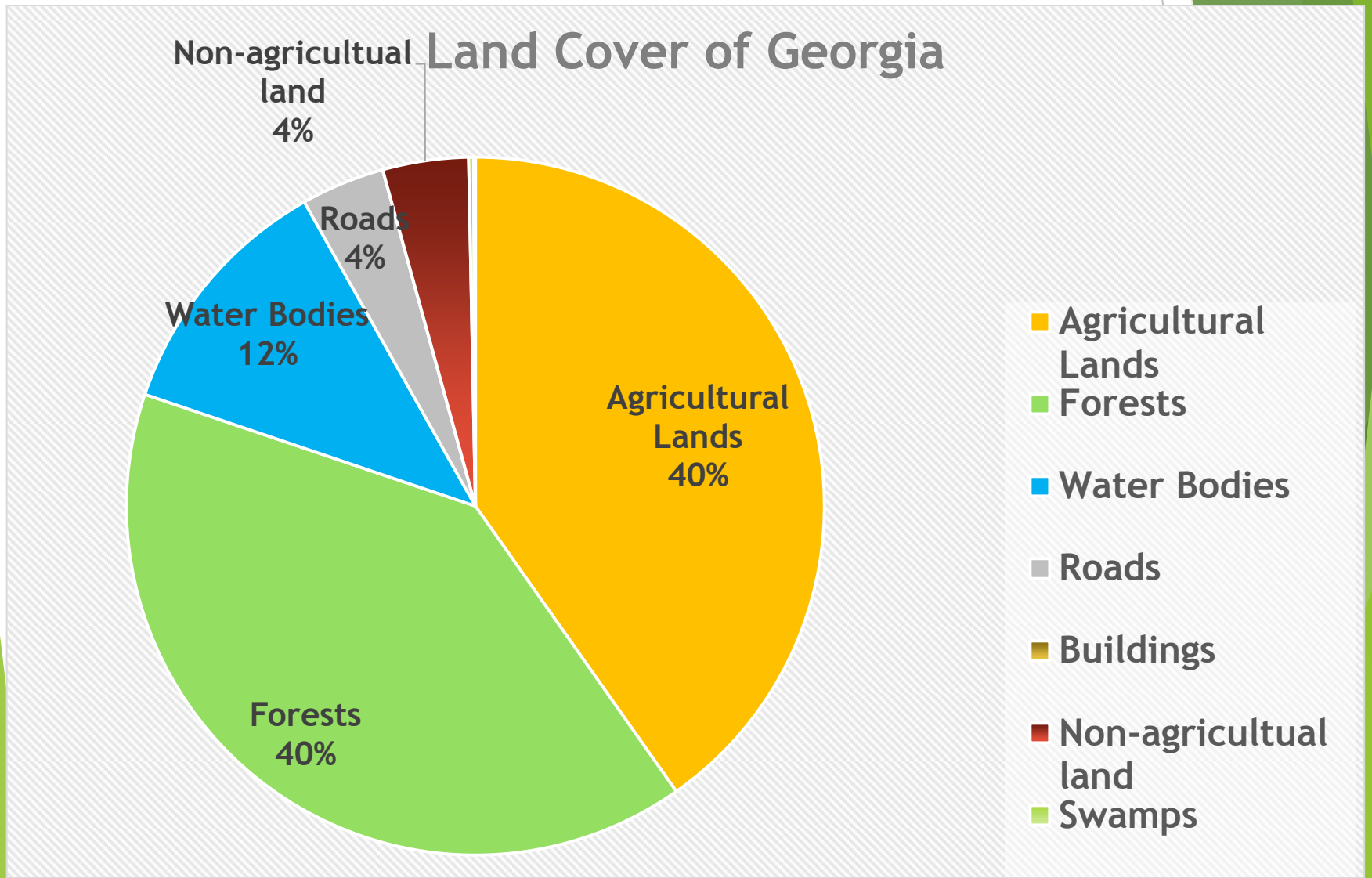
Land Cover and Land Use in Georgia

Giorgi Ghambashidze

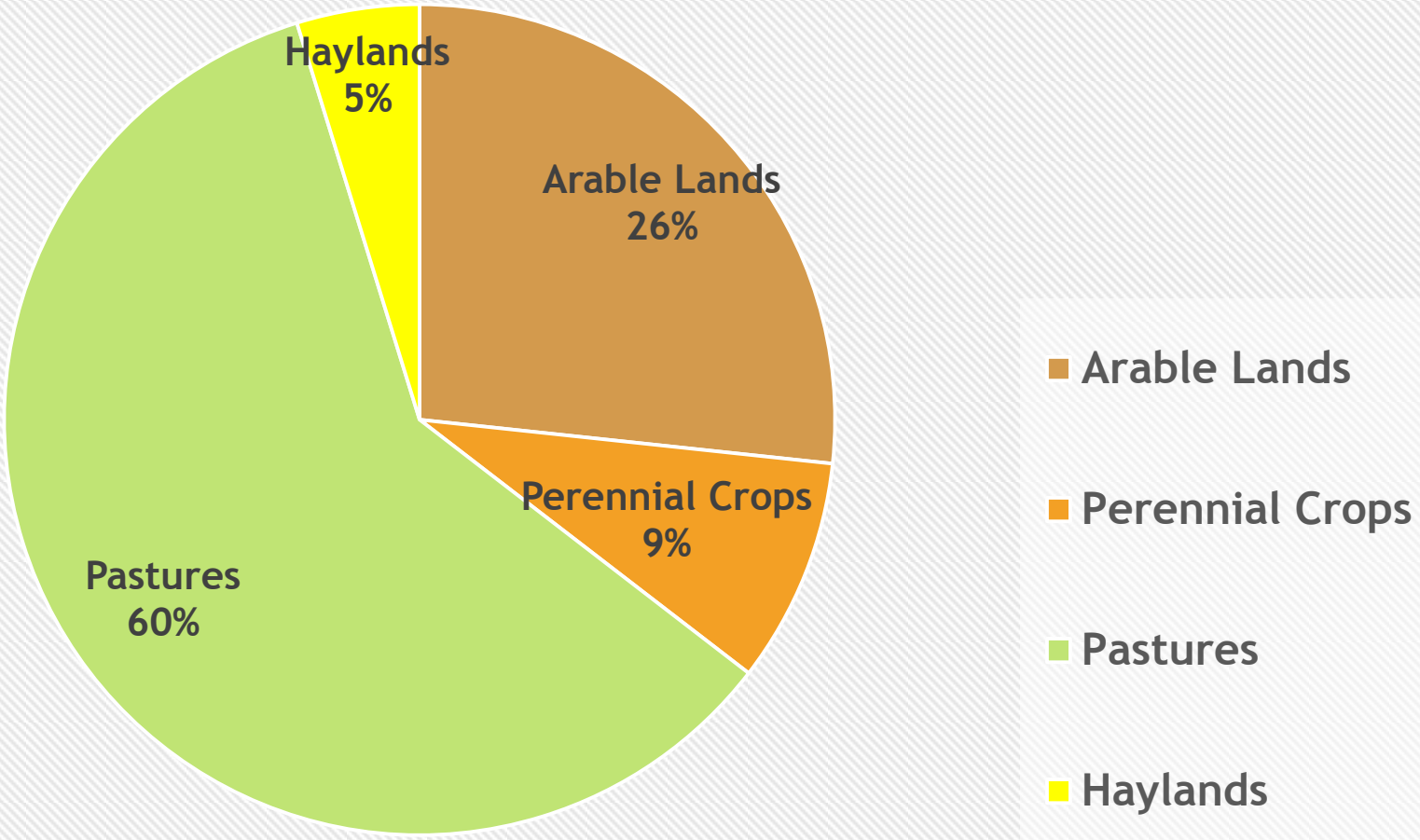
Agricultural University of Georgia

Tbilisi, Georgia

Georgia: Location


Land Cover of Georgia
Non-agricultual land 4%
Roads 4%
Water Bodies 12%
Agricultural Lands 40%
Forests 40%
Agricultural Lands
Forests
Water Bodies
Roads
Buildings
Non-agricultual land
Swamps

Agricultural Lands of Georgia



Distribution of Water resources

- Rivers - 26060
  - West Georgia – 70%;
  - East Georgia – 30%
- Reservoirs – 43
  - West Georgia – 81%;
  - East Georgia – 19%
- Lakes – 860
  - 0.24% of country territory
- Underground waters – 18000 mln. m^3

Land Cadaster & Land Information System Development

Project period: 2000-2004

Aerial survey: 2000-2001

Conducted by: “Ofek”

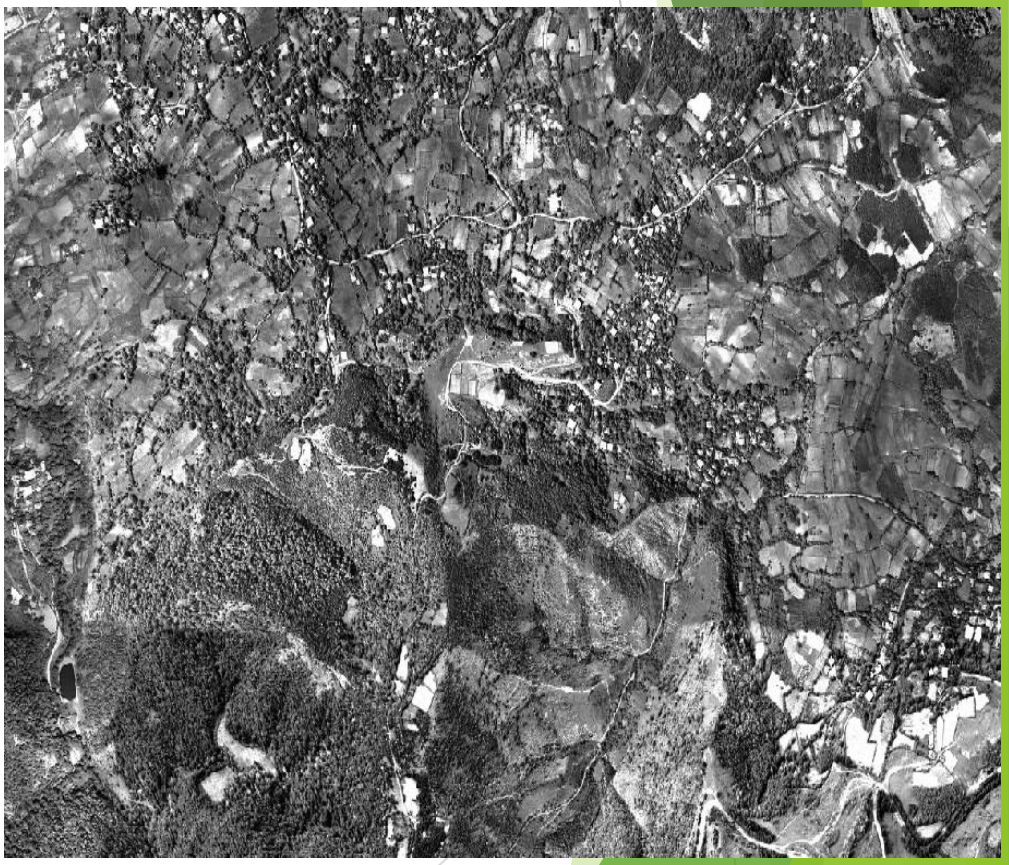
Camera type: Analogue

Colour: black & white

Scale: 1:50 000 & 1:12 000

Pixel size in cm: 50 & 10

Funded by: KfW & Government of Georgia



Land cadaster & land information system development

Project period: 2005-2010

Aerial survey: 2005-2007; 2010

Conducted by: Ltd “GeoGraphic”, Georgia

Camera type: Digital

Purpose: Forest inventory; Cadaster update for cities

Regions surveyed: Whole Georgia

Pixel size in cm: 15 & 60