Project Update: January 2014
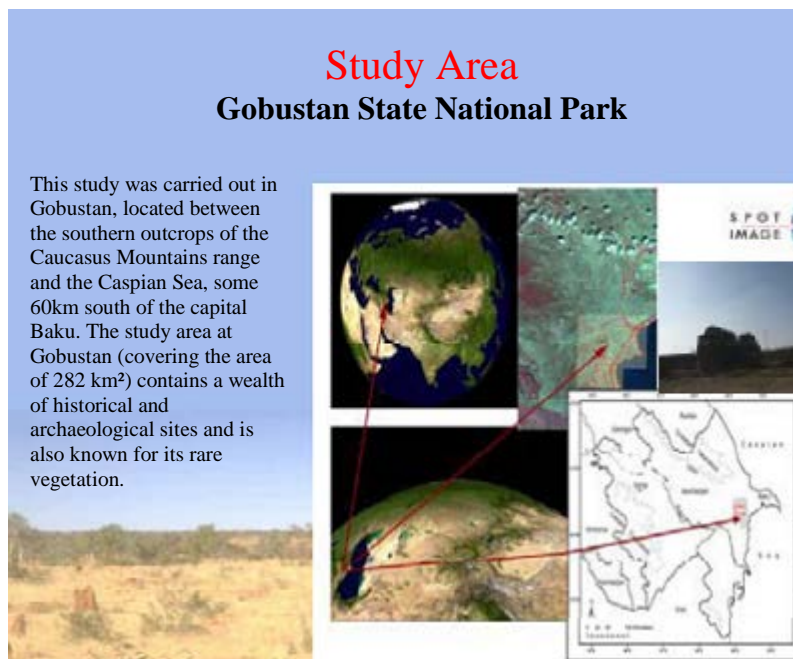
RARE PLANT CONSERVATION IN AZERBAIJAN: MONITORING THREATS AND EDUCATION OF LOCAL COMMUNITY

At the foot of the Caucasus Mountains, 60km from the capital Baku, the *Gobustan State National Park* is a nationally important desert/semi-desert located west and south-west of Baku. The desert and semi-desert plant communities in the *Gobustan* area represent the most ecologically important habitats but climate change increasingly affecting this local vegetation.

With funding from 2nd RSG (2013) and Planet Action initiative (2013) Azerbaijani scientists continue a project on spatial monitoring of rare vegetation distribution and monitoring of threats to rare plants in *Gobustan State National Park*, Azerbaijan.

The project that runs from 2013-2014 includes monitoring of existing threats to rare vegetation (Climate Change, Oil & gas exploration, etc.) as well as the processing of remote sensing data to produce "measured" vegetation indicators.

Locating Plant Heritage

Study Area
Gobustan State National Park

This study was carried out in Gobustan, located between the southern outcrops of the Caucasus Mountains range and the Caspian Sea, some 60km south of the capital Baku. The study area at Gobustan (covering the area of 282 km²) contains a wealth of historical and archaeological sites and is also known for its rare vegetation.

In 1966 the Gobustan nature reserve became a national park to preserve some 600,000 rock art engravings. In 2007 it became a UNESCO World Heritage site. Today, the park's managers are looking to protect the communities of rare plants in this semi-arid region from the effects of climate change.

This project is being carried out by scientists from Institute of botany of Azerbaijan, Azerbaijan National Academy of Sciences and specialists in geographic Information Systems and Remote Sensing.

Project Leader: Yelena M Gambarova
Project Mentor: Adil Y Gambarova
Project Members: Rustam B Rustamov & Maral H Zeynalova
Local Project Experts: Vagif Sefikhanly & Urfan Kerimly

Project Objective

The overarching project goal is to conserve rare plants in Azerbaijan by facilitating the availability of quality science for making conservation decisions.

1. Monitoring of threats to rare plants and analysis of the results;
2. Build capacity for government and protected-area staff members to use Remote Sensing and Geographic Information System (RS/GIS) tools for conservation planning and monitoring;
3. Increase access to data by managers, community members, and decision makers on the ground to make effective conservation decisions.

Activities

a) Monitoring of threats to rare plant

The methodological approach of this project included training in the field of identification and census methods and the use of standardised monitoring methods. Remote sensing and monitoring using satellite images can provide important information for rare vegetation distribution.

Threats to be monitored for each rare species are identified in the conceptual model. The Field Survey were conducted in accordance with preliminary data on the spread of rare plants and potential threats in the study area. Since GPS devices provided the location for ground reference, data during fieldwork and the sample plots will be accurately linked to satellite images.

The Field work were supported interpretation of satellite images and delineation of the general land cover and land use types. District boundary maps, survey maps and satellite images, vector polygons such as geographical areas of archaeological and historic site (Gobustan State Reserve) will be graphical components of Design Application. After receiving information about the threats to rare vegetation, the next step will be an assessment of these threats based on the processing of satellite images. It will be included: Spatial representation of sources of threats; past & present distribution maps and classification remotely sensed data.

b) Capacity building and in-depth training

We have provided training for students, Azerbaijani teachers in Geospatial Analysis and Remote Sensing for Conservation. We have provided training for managers that will provide hands-on experience for the collection of data, GIS analysis of the data, and map-making using the latest ESRI and ERDAS software.
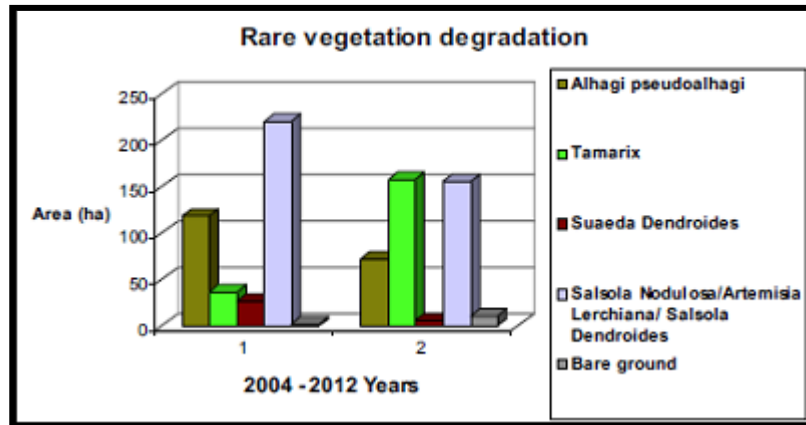

Project results

For this study, out of various change detection techniques, spectral change analysis method with special emphasis on vegetation indices was selected. The NDVI (*Normalised Difference Vegetation Index*) was used for natural vegetation cover change detection in this study because of its acceptable accuracy and ability to detect the green vegetation. As a result, it was found that integrated use of remotely sensed images with different resolutions also with support of available ground data and statistical analysis is reliable approach to detect the impact of rare vegetation degradation.
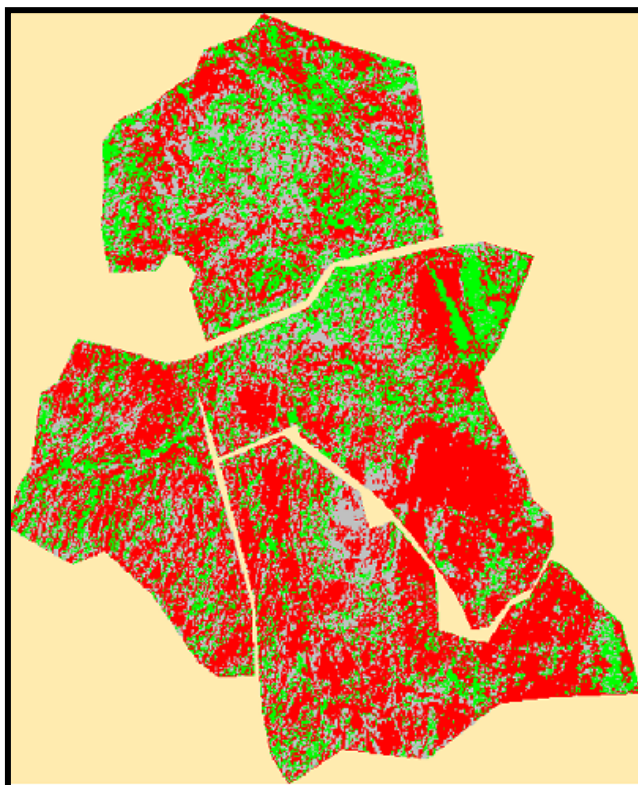
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Sliced map of difference of NDVI values in 2004 and 2012 (Percent). Red=highly decreased NDVI values in 2012, yellow – some decreased NDVI values in 2012, grey= no change NDVI values in 2012, green - increased NDVI value in 2012

The results indicates that major changes in the study area from 2004-2012 years involved decrease in vegetation cover types including *Alhagi pseudoalhagi* (-11.5%), *Salsola Nodulosa/artemisia Lerchiana/Salsola Dendroides* communities (-18.6%) and *Suaeda Dendroideds* (-5.245) and increase in *Tamarix* (+30.4%) and *Bare ground* (+2.1%).

Lessons learned

Through this project, it was provided spatial information on the position and condition of rare vegetation communities within the proposed study area using SPOT 5 images. The results indicate that major changes in the study area from 2004-2012 involved decrease in vegetation cover types. Using the accurate spatial information, this project helps to identify areas where further survey work is required and to develop mitigation measures to reduce the impact rate of the natural and anthropogenic factors on environment. The project has been initiated by various institutions of civil society in Azerbaijan as a result of common concern about irreversible disappearance of rare vegetation in droughty zone of Azerbaijan.

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Yelena Gambarova is leader of the project team. The project *"Rare plant conservation in Azerbaijan: Monitoring threats and education of local community"* is funded by the Rufford Small Grants Foundation and Planet Action Initiative.

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Learn more about the program at http://www.rufford.org/rsg/projects/yelena_gambarova and http://www.planet-action.org/web/85-project-detail.php?projectID=16251