**NASA DEVELOP National Program**

****ICIMOD-Nepal/Pakistan

**Fall 2014**

**Pakistan Disaster**

*Impact Assessment of Attabad Lake Disaster on Agriculture and Associated Food Security in Gilgit Baltistan*

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**Applied Sciences National Applications Addressed:**

Disaster

**Study Area:**

Longitude: 360 20’12.62”

Latitude: 740 52’ 3.12”

The study area of project, “Attabad region” is a small village in district Hunza-Nagar, of Gilgit Baltistan, 109km Northeast of Gilgit City and 20km upstream from Karimabad. This region is situated in the lofty and breathtaking mountainous region towards the North of Pakistan. It has steep mountains all around and almost vulnerable to rock fall.

**Study Period:**

June, 2009-Nov, 2014

**Partners/Collaborators**

Partner 1: ICIMOD

Partner 2: Karakorum International University (KIU)

**80-100 Word Blurb**

NASA National DEVELOP program fall 2014 in collaboration with ICIMOD and KIU performed a case study of the Attabad area focusing on agriculture and the food security situation of the region for the purpose of bridging the gaps of remotely sensed data and field data for Earth observation to assess the impacts of natural hazards on land cover pattern and associated food security. This project was proven to be fruitful for the government sectors, as well as private Non-Governmental Organizations (NGOs) and researchers, to enhancing understanding of the geology and environment of the region in order to cope with the occurrence of natural disaster and agricultural issues in the future for peaceful, prosperous and sustainable life.

**Community Concerns**

* Gilgit Baltistan suffers from major natural disasters. Frequent landslides and floods result in the deaths of numerous people and the destruction of property.
* The Attabad landslide resulted in the formation of Attabad Lake, killed 20 people, displaced 6000 people from upstream villages, stranded a further 25,000 people and inundated over 12 miles of Karakoram Highway.
* The Attabad Lake mostly affects the agricultural sector and livestock in the region, which are the primary source of income.
* Assist the concerned government authority to alert the general public about the risk and to take further necessary preparedness so as to overcome probable disasters.

**Current Management Practices & Policies**

The National Disaster Management Commission (NDMC), headed by the Prime Minister of Pakistan, is a national policy making body for managing disasters. The National Disaster Management Authority (NDMA) is an arm of NDMC for managing Disaster Risk Management activities. The Provincial Disaster Management Authorities (PDMAs) are responsible for coordinating with District Disaster Management Authorities (DDMAs) for Disaster Risk Management in the provinces and regions.

To strengthen the disaster risk management system in Pakistan, the NDMA with assistance of the Japan International Cooperation Agency (JICA), initiated work on a national disaster management plan comprised of Human Recourse Development Plan on Disaster Management, National Multi-Hazard Early Warning Plan and Guidelines for Community-Based Disaster Risk Management (CBDRM).

The Government of Gilgit-Baltistan and Frontier Work Organization have tried to make sure to broaden the spillway of Attabad Lake by cutting it. This method costs the agency millions of Rupees. Agha khan Rural Support Program, Agha Khan Development Network, Karakoram Areas Development Organization etc., and Pakistan Army evacuated people using helicopters and measured water in and out into the lake. An awareness campaign was launched by the government of Gilgit Baltistan to disseminate information via local newspaper. As per statistics Pakistani Rs 360.5 million spent by the Government of GB and federal government by providing services like food, aviation, cash grants and technical studies. There will be transportation related challenges in restoring Karakoram Highway and draining the Attabad Lake.

**Abstract**

The project assessed the impact of the Attabad lake landslide disaster on agricultural land cover patterns and associated food security in Gilgit Baltistan, Pakistan. Essentially, this involved agricultural land cover maps, change detection maps, GIS based analysis of Landsat Imagery and statistical analysis of Questionnaires survey to depict the impact of the disaster on livelihood of people. This research also aimed to describe and analyze the changed food security situation that affected the local population due to the landslide.

NASA Earth observation platforms like Landsat TM Imagery, GDEM from ASTER and Google Earth Imagery are resourceful for preparing land cover, change and slope maps. The project would supplement the concerned government authority, the risk & hazard management endeavor as well as private NGOs, INGOs and researchers to understand the geology and environment of the region to cope with the situation of natural disaster & agricultural issues in the future.

**Decision Support Tools**

* Land cover maps–Agricultural land cover maps before and after the Attabad Lake Disaster to depict the impact due to the disaster
* Field Survey – Questionnaires, Images, Interview and Video
* Graphs and Charts – Statistical analysis that enable to understand the potential impacts of the disaster on food security, transportation, education, livelihood etc.
* Dataset- GIS and Remote sensing datasets about Attabad region to be used by other stakeholders.

**Benefit to End-User:**

* KIU is located in Gilgit Baltistan. Therefore, the university could play a significant role in raising awareness in the region on issues related to natural hazard (i.e. Attabad lake disaster) and food security.
* After completion of project, KIU as a research and academic institute could use the results of the project for further research.
* The project assists with the risk and disaster management - like we can bring awareness in means of a volunteer teams in those disastrous hit or vulnerable areas to avoid from loss of lives in the future from such disaster.
* The project will allow the end-users, in particular the government, to mitigate and make decisions related to food security of future hazards like; landslides, earthquakes, floods etc.
* It will help new researchers conduct research for similar disasters
* Future researchers will be able to conduct similar research on natural disasters like landslides referring this project.

**Earth Observations & Parameters**

Landsat 5, Thematic Mapper (TM) -Mapping of changes in agricultural land cover changes before and after the landslides

ASTER- Digital Elevation Model, Slope Map

**Future Applicable NASA Missions**

Satellite - Parameter

Ex. LDCM - Land cover

*\*\* These are missions not launched yet, not current missions you haven’t used*

**Ancillary Datasets Utilized**

Field Survey– Data and Information from Organizations working like FOCUS Humanitarian Assistance and government of Gilgit Baltistan.

GIS data –Administrative boundary of Pakistan

Google Earth – More detailed mapping of agricultural land cover

**Software Utilized**

Ecognition - Classification

ArcGIS - Raster Manipulation/Analysis, Image Enhancement & Map Creation of Landsat ETM+

ArcGIS online – Digitization of houses in Attabad region

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