



Food and Agriculture Organization
of the United Nations



PILOT PROJECT : Monitoring of Rice crop using satellite Remote Sensing and GIS technologies in northern and eastern Afghanistan

INTRODUCTION

Afghanistan has a total 652,860 sq. km of land area with 379,100 Sq. km classified as agriculture land (World Bank data 2013):

- 12% arable
- 3% forests and woodland:
- 46% permanent pastures:
- 39% others

Agriculture is contributing to 23% of the national GDP. The main food security crops of Afghanistan are wheat, rice and coarse grains.

The food production of country is generally in deficit. This requires the establishment of an efficient food program along with a strong monitoring mechanism. Adoption

of new strategies for agriculture monitoring, rural land use planning and land management is urgently necessary to reduce hunger and poverty among rural population of Afghanistan and to ensure sustainable food and feed production for future generations. The availability of reliable information on natural resources and agriculture allows for the monitoring and analysis.

The Pilot Project area includes:

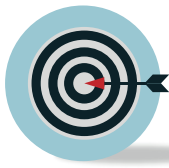
- 3 main rice growing provinces (Baghlan, Kunduz, Takhar);
- 5 districts Sholgara (Balk), Kishim (Badakhshan), Behsud (Nangarhar), Kama (Nangarhar) and Shinwar (Nagahar).

The pilot project covers a study area of nearly 41000 Sq. Km (4.1 Million Ha) of which 4500 Sq. Km (0.45 million Ha) are agricultural land.



OUTCOME

Strengthening of the national capacity on rice monitoring and analysis by use of innovative geospatial technology, based on Sentinel 1, Sentinel 2, and SPOT imagery for sustainable development of food security in the country.



OBJECTIVES

1. To test relevant agriculture methodologies based on new high resolution geospatial products such as Sentinel 1, Sentinel 2 and SPOT imagery with focus on rice monitoring.
2. Rice crop area estimation and Rice crop mask development.

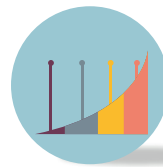
IMAGES CLASSIFICATION

2015 Rice crop monitoring was carried out through image classification of Landsat data. The purpose of the study was to standardize image classification techniques for subsequent implementation in 2016.

Landsat Multi-date spectral composite images were analyzed and rice crop signature was extracted. Supervised and object based image classification techniques were used to classify rice crop areas. The crop layer was extracted and transformed into a vector layer for further refinement to filter wetland vegetation and other non-rice features.

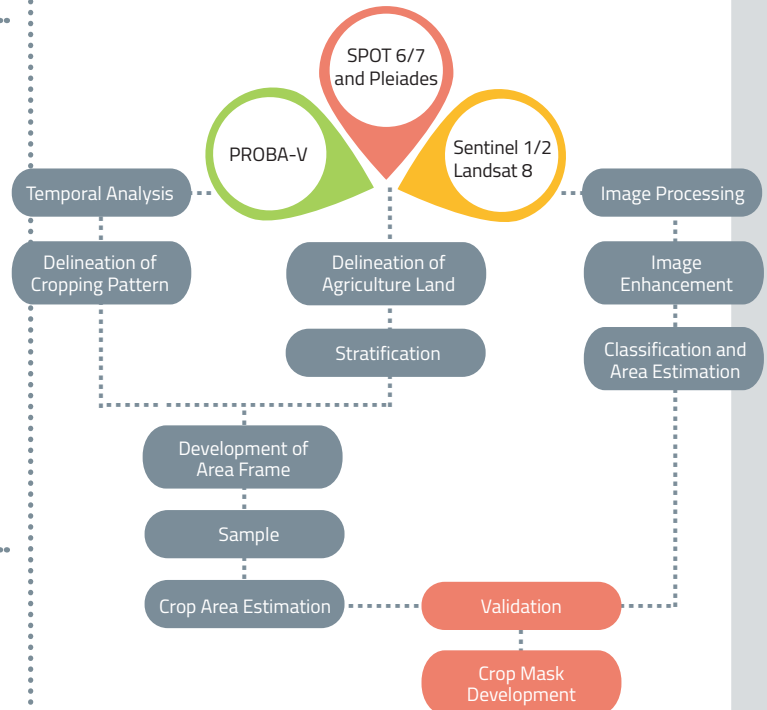
2016 Sentinel 2 is being used as an evolution to improve the quality and periodicity of rice monitoring. Sentinel 1 data were used to identify the rice fields in 2015. **Sentinel-2 and SPOT-5** 10m resolution imagery is being used for the development of Area Frame 2016. Agricultural land is being divided into Primary Sampling Units (PSU) based on the physical boundaries.

Pleiades satellite imagery is being acquired to extract crop information for the selected segments. The high resolution imagery is being used to assess accuracy of image classification.



METHODOLOGY

1. Satellite image classification. Satellite data of 2015 was used to standardize the image classification technique.
2. Satellite based area frame sampling technique.



Google Earth Engine is being used through customized scripting to acquire MODIS, Landsat and Sentinel derived products and ancillary other datasets.

