

40th STUDENT CONFERENCE (E2)  
Student Conference I (1)

Author: Mr. Zhanat Maksut  
Kazakhstan, zhanat.ali@gmail.com

ESTIMATION OF VEGETATION INDEX BASED ON NDVI AND RED EDGE FOR STEPPE ZONE

**Abstract**

Comparative analysis was done in the work to estimate vegetation using NDVI and Red Edge. The objective of this study is to evaluate NDVI and Red Edge for estimating index from multispectral satellite data and to check it in farmers' fields.

NDVI is the acronym for normalized difference vegetation index. It is a simple quantitative indicator of photosynthetic active biomass. Formula using two satellite channels  $(\text{Channel 1} - \text{Channel 2}) / (\text{Channel 1} + \text{Channel 2})$ . One of the most widely distributed vegetation index to solve different type of goals, which use quantitative assessment of vegetation cover.

The principle behind NDVI is that Channel 1 is in the red-light region of the electromagnetic spectrum where chlorophyll causes considerable absorption of incoming sunlight, whereas Channel 2 is in the near-infrared region of the spectrum where a plant's spongy mesophyll leaf structure creates considerable reflectance (1).

The main disadvantage of the NDVI is the inherent non-linearity of ratio-based indices and the influence of additive noise effects, such as atmospheric path radiances (2). The NDVI also exhibits scaling problems, saturated NDVI signals over high biomass conditions, and is very sensitive to canopy background variations, with NDVI degradation particularly strong with higher canopy background brightness (bright soils).

A. Gitelson and M. Merzlyak (3) use Red Edge channel (680-700 nm) instead Red channel. Red edge indices have been shown to be more sensitive to nitrogen status and are promising alternatives. This index may be complementary to the NDVI (4).

1. Advances in environmental remote sensing: F.M. Danson and S.E. Plummer, 1995. Wiley, Chichester, U.K. Hardcover

Here is a description of getting NDVI and Red Edge value, in the article. Calibrated value of vegetation was taken with spectroscan from leaves and was averaged by one hectare.

1. Tucker, C.J. 1979. Red and photographic infrared linear combinations for monitoring vegetation. *Remote Sensing of the Environment* 8:127-150.
1. Zuzana Maskova, Frantisek Zemek, Jan Kvet 2007. Normalized difference vegetation index (NDVI) in the management of mountain meadows
1. Gitelson, A. Merzlyak, M. and H. Lichtenthaler. 1996. Detection of red edge position and chlorophyll content by reflectance measurements near 700 nm. *J. Plant Physiol.*, 148, 501-508.