

## Detecting Potential Vegetation Establishment Area using Remote sensed data in the Aral Sea

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**Abstract:** The Aral Sea was once the fourth-largest lake in the world. Since the 1960s, Because of the expansion of irrigation agriculture water has been tremendously depleted from those two inflow rivers of the Aral Sea, which is the main reason for its depletion This study aims to detect which area is suitable for vegetation to be established. In macro scale, satellite imagery can be used to distinguish which area is highly potential to establish vegetation and suitable for afforestation. To find potential vegetation establishment area, vegetation and soil related indicators (NDVI, TGSi, SSI, and NMDI) in 2017 and 2018 were calculated. The distribution of other indicators' value in each area (NDVI-high, NDVI-middle, and NDVI-low) was analyzed based on correlation analysis, MRA and ANOVA. As results, NDVI had a positive correlation with TGSi and NMDI, whereas there was a negative correlation with SSI. Also, the result of ANOVA showed that the distribution of each indicators in NDVI-high, NDVI-middle, and NDVI-low were well separated. Based on these results, the three ranges for each indicator were drawn, and using these ranges the classification of 2018 images was conducted. Finally, potential vegetation establishment map was developed by overlaying all indicators. This study is meaningful because it used various indicators to monitor and evaluate status of land and it takes into account the specificity of the area. Also, this study has cost and time efficiency to detecting the potential area for vegetation establishment using only satellite images in a vast area. In addition, it provides information of where to put the effort when the actual afforestation project is carried out, and it is expected to be utilized if the methodology is supplemented, more indicators are added, and field survey or field data are used additionally.

**Keywords:** The Aral Sea, vegetation establishment, afforestation, desertification, satellite image, decision making