

EFFECTIVENESS OF IMAGE CHARACTERISTICS IN THE IDENTIFICATION OF ARCHAEOLOGICAL FEATURES FROM HIGH RESOLUTION SATELLITE IMAGERY: CASE STUDY IN BANGLADESH

Md. Saifuzzaman₁
S. Dara Shamsuddin₂

₁Assistant Professor, Department of Geography and Environment, Jahangirnagar University, Savar, Dhaka, Bangladesh, email: saifuzzamanbd@yahoo.com

₂Professor, Department of Geography and Environment, Jahangirnagar University, Savar, Dhaka, Bangladesh, email: shamsuddin.dara@gmail.com

Abstract: The study used Remote Sensing and GIS analytical tools and approaches rigorously for examining their effectiveness for archaeological investigation, both at regional and local scale. The research focused on the possibility of using remotely sensed images for regional archaeological survey on a standalone basis, and for using the same images for planning and executing detail ground archaeological survey. Specifically, the study compared and evaluated the significance of spectral characteristics and pixel resolution of Very High Spatial Resolution Satellite Systems (VHSRS) of WorldView-2 for automatic extraction of ancient features of an archaeological site. The evaluation of the spectral characteristics is based on a band-by-band comparison. Pixel and object-based classification techniques are compared with visual analyses to assess the effectiveness of different image characteristics. The specific objectives of the study are to utilize high resolution remote sensing data, method and techniques to identify possible archaeological sites with emphasis on spectral signatures of the local terrain. Besides, attempt is made to examine the relative advantages of various sensors to discriminate the targeted archaeological features and to identify and measure the site specific archaeological features, such as a moat, fortification wall, ponds, and others; so that reconstruction of past geographical environment of the study site namely Bhitargarh is possible with a level of confidence.

Both field and lab methods using GIS-RS analytical programs are utilized. Addition of 4 new spectral bands can deliver an increase in classification accuracy of 20-30% over analyses that employ the traditional four bands. On the basis of data sources to fulfil the objectives of a research work, the methodologies of the research work are divided into two parts- one is to collect primary data using appropriate methods and techniques. In order to collect primary data, the study followed several processes such as collection of space-borne satellite images, field visit and observation, taking thematic photographs and note, GPS survey for GCP collection and ground truthing. The other method is data processing and analysis including data gathering from the field through GPS survey and ground survey, digitizing and various types of image processing i.e. visual and digital image processing, visual spectral and classification comparison and analysis; field and other GIS data analysis and interpretation and results and discussion with focus on the effectiveness of archaeological feature identification. The multiple band combination and visual interpretation method and techniques are found very suitable compared to the individual band for identification of moat, earthen wall and water features.

Keywords: Archaeology, Extraction, Environmental Condition & Resolution