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A Case Study:

Estimation of crop and irrigation water requirement by remote sensing and CIS: Kaithal District, Haryana, India

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ABSTRACT

The paper focuses on analyzing the irrigation water requirement of wheat crop for *Rabi* season from 1999 to 2003 in Kaithal district of Haryana state, India. Area under wheat cultivation has been determined using Landsat ETM+ image by applying artificial neural network (ANN) classification technique. Potential evapotranspiration has been estimated using Hargreaves model. Potential evapotranspiration and crop coefficient for wheat was used for estimating crop water requirement. Effective rainfall was determined using India Meteorological Department gridded rainfall data. Effective rainfall and crop water requirement was used for determining irrigation water requirement. By assuming 35% losses, net irrigation water requirement was estimated. Multiplying the wheat cropped area and net irrigation water requirement the volume of water required for wheat during the *Rabi* season was estimated.

Key words : Irrigation water requirement, Remote sensing, Artificial neutral network, ANN

Experts' estimates that demand for food crops will double during the next 50 years, with limited land and water resources, farmers need to increase their output from existing cultivated areas to satisfy the food demand of increasing population. Irrigation systems will be essential to enhance crop productivity in order to meet future food needs and ensure food security. However, the irrigation sector must be revitalized to unlock its potential, by introducing innovative management practices and changing the way it is governed. Developments in irrigation are often instrumental in achieving high rates of agricultural goals but proper water management must be given due weightage in order to effectively manage water resources. Better management of existing irrigated areas is required for growing the extra food to fulfill the demand of increasing population. Irrigation contributed in number of ways. It enables farmers to increase yields and cropping intensities, stabilize production by providing a buffer against the vagaries of weather, and create employments in rural areas. Rural poverty in intensively irrigated areas, such as states of Punjab and Haryana in India, became much lower than in predominantly rain fed states such as Orissa and Madhya Pradesh.

Study area:

Kaithal district came in to being as a result of bifurcation of Kurukshetra district. Total area of the district is 2.28 lac.hect. There are 276 villages having a cultivable area of 2.02 lac.hect and cultivated area being 2.01 lac. ha, 0.97 lac ha land is irrigated by canals. Area under forest is 3000 ha, barren and uncultivable land is 2000 ha 0.97 lac ha land is irrigated by canals and 1.01 lac ha by canals. The cropping intensity of the district is 182% approximate, which varies year to year (Fig. 1). (www.kaital.nic.in)

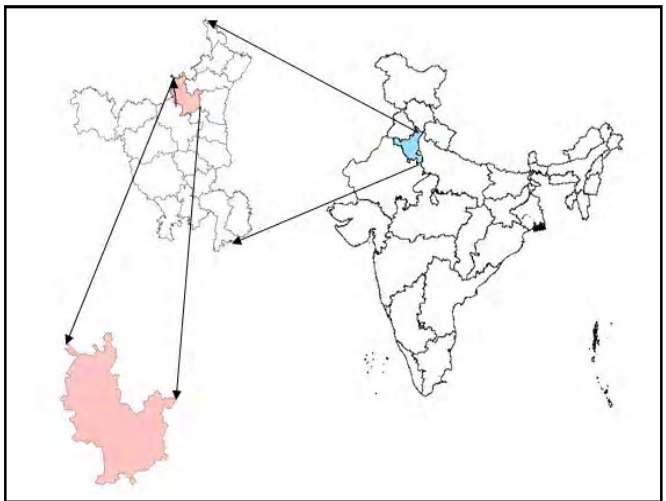

Fig. 1 : Study area

The climate varies from hot to very hot in May-June but in July-August it is found to be humid to sub humid. There are very shivering cold waves in winter as witnessed during the last seven-eight years. The average rain fall of the district is 500-600 mm per year. In summer very dusty winds blow at no. of times causing irritating heat.