

## **Investigation of the capabilities of remote sensing (RS), GIS and GPS technologies for orchard area estimation and mapping.**

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Reliable and timely information plays very important role on the progress of the agricultural sustainable development polices and prevention of environmental crisis.

Recent developments in aerospace technologies and geographic information systems have resulted in considerable improvements in the *availability of accurate and timely information*. Because of the lack of effective methods for estimation of orchard areas in Iran, this information has been extracted through digital image processing methods and visual interpretation of satellite images of the Hamadan province region.

Results of this research show that about 54492.5 (hec) of the study area is covered by orchards which is about 2.8 percent of the whole Hamadan province.

Evaluation of the accuracy of results based on two methods including overall accuracy (OA) and KAPPA index of agreement (KIA), showed that OA and KIA respectively are 93 and 90 percent.

Reasonably more accurate results have been obtained after field check and applying the required correction.

Therefore it is concluded that, RS, GIS and GPS techniques show higher potential for orchard area estimation and mapping than the traditional and non - reliable questionnaire - based methods.

phosphate and animal manure, because of their surface application. In order to evaluate grapes nutritional problems, an experiment was carried out in 1998 in five regions, amply: Malayer (Hamadan), Esmailabad (Gazven), Malekkandi (East Azarbayjan), Uremia, and Shahrood, testing five treatments as follows: T<sub>1</sub> (farmers conventional method), T<sub>2</sub> (foliar autumn for fruit-set), T<sub>3</sub> (using all of the grapes nutrient tequirements both macro and micronutrients, as well as magnesium and organic fertilizers placed in ditches), T<sub>4</sub> (foliar application of maacro and micronutrients), and T<sub>5</sub> (a combination of T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>). Each treatment was used on four grape trees with three replications per treatment. Soil samples were collected from 0-30 cm depth and analyzed for physical and chemical properties along with irrigation waters by using standars procedures. The fertilizer levels were based on these soil and water tests. During the growing season, leaves were sampled and analyzed. The grape yield were measured for each treatment and the raisins were, likewise, sampled and analyzed for each treatment. The results showed that, in the first year, the balanced fertilization program increased the yield up to 80% with improved quality of grapes as well as of the raisins. In the second year, a 70% yield increase was obtained in Malayer, despite the fact that no fertilizer was used in the second study year. The experimental results point to the fact that in the past, imbalance fertilization of apples, citrus, and grapes has been the major production obstacle. Using a balanced fertilization especially potassium sulphate, magnesium sulphate, zinc sulphate, manganese sulphate, and iron sulphate on the basis of soil and plant analysis sata not only will increase the yield, but also will impove fruit quality.

for control plots and 36.6, 34.5, 40.7, and 45.4 Tons/ha for T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> respectively. Despite management problems, the yield response to different treatments were significant so that the least increase was 22% obtained at Chenaran, and the most increase was 50% at Semyrom.

The average yield from 230000 hectares under citrus production in the country is only 16.6 tons/ha or a total of 3.5 million tons with average quality, as compared to a much high a yield and quality citrus in the developed countries. In the Forth Development Plan, the objective for citrus production is to improve the quality and the yield up to 30 tons/ha, therefore, it is essential to realize the nutritional problems of citrus in the four major climatic conditions of the country, that is Dezful, jahrom, jiroft, and Mazandaran. A balanced fertilization program was the best method of yield improvement because no attention has been given to this fact in the past, either in Dezful, jahrom, jiroft, or Mazandaran, which has consequently resulted in the yield decreases. An experiment was carried out at jahrom and jiroft citrus orchards, using DRIS procedure for citrus trees in 300 leaf samples in Jiroft and testing ten fertilizer treatments in Jahrom. It was seen that fertilizers containing potassium, iron zinc, and manganese resulted in yield increases, however, the boron level in citrus leaves were rather high, 120 mg/kg in jahrom and 300 mg/kg in Jiroft, mainly due to high boron concentration in irrigation water. On the other hand, the concentrations of potassium and zinc were very low in both regions, and the yield response to organic mterial, potassium and zinc at Dezful citrus orchards was great, while in Mazandaran, potassium and magnesium resulted in citrus yield increase. As for grape production, imbalanced use of fertilizers is one of the most important factors in growing grapes. In the past, the major fertilizers used in the vineyards, have been urea, ammonium phosphate, and some animal manure which were used with very little efficiency espicially ammonium