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**Dissertation for obtaining a master's degree in civil
engineering**

**Determining the optimal location of water intake and the
agricultural pattern impacts on the water distribution system of the
agricultural area of Hirmand 2, the 46000 Hectares farms of Sistan
region**

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Abstract:

Today, optimal use of water as the most important national capital and preventing its wastage is an inevitable necessity. In the agricultural sector, which accounts for the largest amount of water consumption in all countries, implementing water supply projects with as little water loss as possible, increasing irrigation efficiency, growing plants with low water consumption can lead to optimal water consumption and sustainable development of the society. To reduce the effect of these challenges, the government of the Islamic Republic of Iran has implemented the water supply, transfer, and distribution plan for the agricultural lands of Sistan region under pressure, known as the ۴۶,۰۰۰ hectare Sistan project, in sixteen districts. In this research, first of all, the status of the water supply sub-network of Hirmand-۲ agricultural district (out of the sixteen target areas in the scope of the plan) was investigated in the form of a local visit from an executive point of view. Then, the water supply sub-network of Hirmand Do agricultural area was simulated using EPANET software. Monitoring of the network implementation shows that ۴۰٪ of the five-hectare ponds and ۲۰٪ of the twenty-hectare ponds deviate not only from the design location but also from the location specified in the Ezbilt map. Some ponds are left unused, some of them lack water control facilities. The evaluation of its efficiency in terms of the amount of water allocation to users showed that allocating water to users at the same time is long and inefficient. Therefore, in order to solve this challenge, it is necessary to divide both the flow rate of the redesigned ponds and the irrigation period into at least two sub-periods. However, with a flow rate of ۱۹ liters per second and in the time model mode, all ponds are in a favorable condition and in addition to providing the desired flow rate, the pressure and speed of the water in the pipe are also within the standard range. Investigating the impact of the cultivation pattern showed that due to the low water use in cumin cultivation, this product is more economical than wheat and grapes both in terms of economic efficiency and water consumption.