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# The consequences of ground-water level lowering on the socio-economic conditions of the population at the Darab central plain, Iran

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## 1. Problem Statement

Due to the ground-water overuse, the ground-water table of the Darab watershed has decreased, on average, by 1.18 meter p.a. between 1993 and 2006.

Dependency on agriculture, lack of alternative employment possibilities, and population growth result in high priority of irrigation farming, yet at the expense of future generation in term of water availability. Due to ground-water level lowering, drinking and irrigation water shortage has occurred in the region, and can be observed in an increasing number of villages.



Figure 1: Greening of the dry lands in Darab Central Plain, using ground-water resources

## 2. Objective

The research will find the consequences of ground-water level lowering on the socio-economic conditions in the Darab central plain.

## 3. Methodology

- Quantitative descriptive analysis
- Microsoft Excel for data analysis and Arc-GIS for data processing.

## 4. Data Base

Secondary data for population, cultivation area and ground-water level, collected from governmental organizations of Iran, Fars province and Darab county, were used for the analysis, provided by:

- Ministry of Jihad-Agriculture
- Fars Province Jihad-Agriculture Organization
- Iran Minister of Interior
- Water resource management organization

## 5. Research Area

The villages are located in Darab county. Darab county is located in arid and semi arid zone of Iran:

- Annual average precipitation rate: 248 mm (during 1996-2006).
- In average 90% of income in Darab county is due to agriculture activities.



Map 1: Research area – "Darab County of Iran"

## 6. Results

- Ground-water level has decreased in all the sample villages between 1996 and 2006 (see Fig. 2).

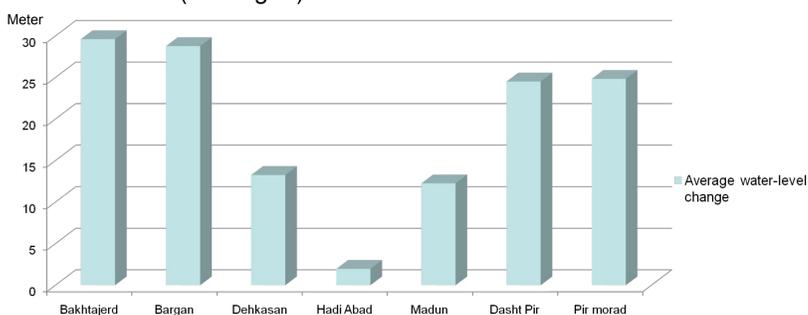


Figure 2: Average ground-water level change between 1996 and 2006

- The land available for crop cultivation has increased in all the seven villages by 2007, however the area under crop cultivation has decreased in most of the cases. (see Fig. 3)
- Barghan village is in a flourishing phase. The area under crop cultivation has increased and the ground-water level has dropped simultaneously. (see Fig. 3)
- Dehkasan village seems to have already passed the flourishing time as the land available for crop cultivation is no more cultivated. (see Fig. 3)

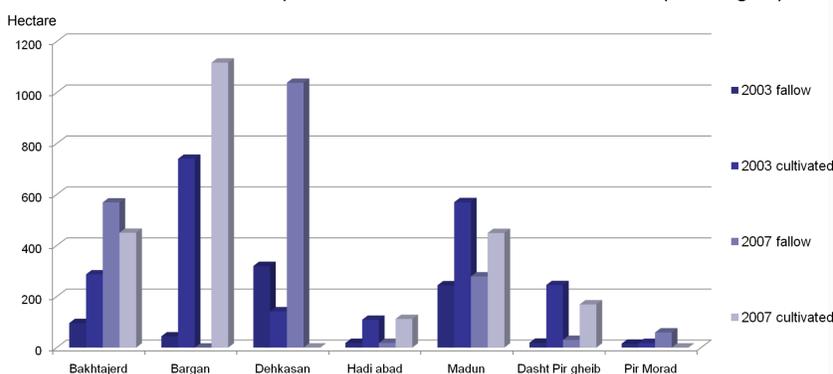


Figure 3: The share of cultivated and fallow land in 2003 and 2007

- Villages with higher level of ground-water loss have experienced lower population growth between 1996 and 2006 (see Fig. 4).

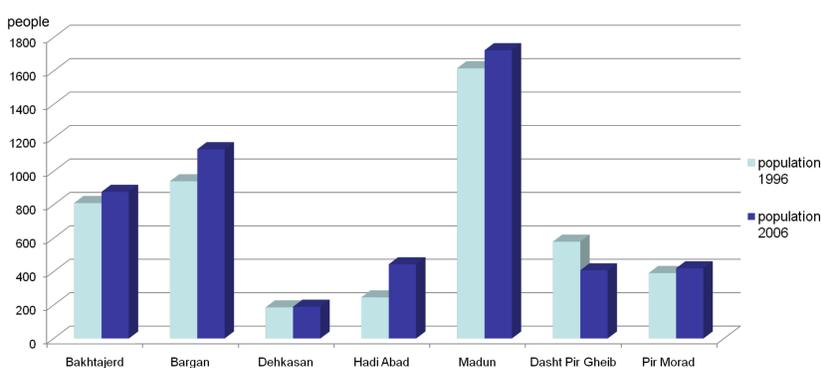


Figure 4: The number of population for different villages in 1996 and 2006

- Population, ground-water level and cultivation status of villages is demonstrated in table 1.

Village	ground-water lowering in 2006 compared to 1996	cultivation size in 2003	The potential cultivation capacity in 2007 comparing to 2003	The land condition in 2007 comparing 2003 (cultivated/fallow)	population size in 1996	population size in 2006 comparing 1996	the village relative stand
Bakhtajerd	high	medium	increased	Changing from cultivated to fallow land	medium	increase	5
Bargan	high	high	increased	high cultivated land	medium	increase	6
Dehkasan	medium	medium	increased	high fallow land	low	Slight increase	3
Hadi abad	low	low	increased with lower rate	no change	low	High increase	7
Madun	medium	high	decrease	fallow land increased and cultivated land decreased	high	increase	4
Dasht Pir gheib	high	medium	no change	fallow land increased and cultivated land decreased	low	Slight decrease	1
Pir Morad	high	low	increased	high fallow land	low	Slight decrease	2

Table 1: The relative socio-environmental condition of the villages, 1 stands for worst situation

## 7. Conclusion

Villages can be grouped in five stages depending on the level of ground-water depletion:

- First stage: Population increases highly (Hadi Abad village).
- Second stage (flourishing period): Consequences of ground-water lowering is not realizable. Extension of cultivated area, population growing and ground-water lowering (Bargan village).
- Third stage: Cultivated area converts to fallow land. Production decreases (Madun and Bakhtajerd villages).
- Forth stage: Farming is impossible (Dehkasan village).
- Fifth stage: Population decreases (Dasht Pir Gheib and Pir Morad villages).