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## Simulation of human development index in Khuzestan province with emphasis on healthy living and access to knowledge and comparison with Iran

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#### **EXTENDED ABSTRACT**

#### **INTRODUCTION**

Human Development Index is a composite one to measure three criteria of longevity, access to knowledge and appropriate level of welfare. Since 2011, education, the combination of mean study years for adults (25 years of age and elder) and expected years of studying, life expectancy and income per capita have been considered as components of Human Development Index. Human Development Index is in fact the geometrical mean of these three indexes. This index is annually calculated for countries by the United Nations but not for their states, provinces, cities and regions. Therefore, researchers themselves must calculate this index for provinces for certain purposes.

#### **METHODOLOGY**

Lack of such statistics is also a statistic deficit in Iran that has made regional and provincial researches limited and inaccurate. To remove this deficit in this research Khuzestan Human Development Indexes in the years 1996, 2006, 2011 and 2016 have been calculated using the latest formula. It needs to be mentioned that the simulation of Human Development Index is difficult and time consuming. Not paying attention to details can deviate the index. So in order to ensure the precision of calculations, the Human Development of the country has also been calculated and compared with the same index calculated by the United Nations for Iran in order to ensure the authenticity of Human Development Index in Khuzestan. The applied method was a simultaneous behavioral pattern which considers the changes in Human Development Index through components of the United Nations Human Development Index and also simultaneously predicts and includes it in Human Development Index. The estimation method is based on Stock and Watson (1993) Dynamic least squared method that is helpful for predicting variables.

## FINDINGS

According to results, Khuzestan Human Development Index for the period 1990-2019 can be simulated. The related results are presented in table 1.

**Table 1.** Simulation of Khuzestan Human Development Index  
Source: Research results

year	HDI	year	HDI	year	HDI
1990	0.54	2000	0.62	2010	0.7
1991	0.55	2001	0.63	2011	0.71
1992	0.57	2002	0.64	2012	0.73
1993	0.58	2003	0.64	2013	0.73
1994	0.59	2004	0.64	2014	0.73
1995	0.6	2005	0.65	2015	0.73
1996	0.6	2006	0.68	2016	0.74
1997	0.61	2007	0.68	2017	0.74
1998	0.61	2008	0.69	2018	0.74
1999	0.62	2009	0.7	2019	0.74

For further investigation of the results of simulation with real data, the results of calculating simulation assessment criteria have been shown in table 2. The results verify the validity of simulation.

**Table 2.** prediction error criteria

Source: Research results

r	RMSE
0.97	0.02

As table 10 shows, Khuzestan Human Development Index had a slow rising trend up until 2005 but from 2006, there seems to be a jump or structural failure in Human Development Index. However, during 2016-2018 the trend reached a plateau and it seems to have reached its stabilized level. Also, based on this simulation Khouzeestan Human Development Index was in an average level up until 2008 but since 2009 it has reached its high.

## CONCLUSION

To assess this hypothesis, in this research using the new formula Khuzestan Human Development Indexes for the years 1996, 2006, 2011 and 2016 were calculated. The results showed that the indexes of life expectancy and education in Khuzestan were in a worse situation than that of the country but the index of income (taking oil into account) was more than that of the country. The calculation of Khuzestan Human Development Index without oil showed a worse situation than that of the country.

Based on results, Khouzeestan Human Development Index reached from an average level in 1996 to a high level during 2006 to 2016. This is an acceptable growth. Also, Khuzestan Human Development Index without oil is lower than that of the national index and this represents the worse status of the province compared to the country.

The results of simulating Human Development Index show that up until 1389, there was a slight rising trend but from this year on there has been a jump or failure. Moreover, Khuzestan Human Development Index was in an average level up to 1385 but it has reached a high one since 2010.

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