



Tropentag, September 19-21, 2012, Göttingen -  
Kassel/Witzenhausen

“Resilience of agricultural systems against crises”

## Effects of Climate Variability on some Main Compounds of Milk in Iran

MOHAMMAD REZA MARAMI MILANI<sup>1</sup>, ANDREAS HENSE<sup>2</sup>, ELHAM RAHMANI<sup>2</sup>, ANGELIKA  
PLOEGER<sup>1</sup>

<sup>1</sup>*University of Kassel, Dept. of Organic Food Quality and Food Culture, Germany*

<sup>2</sup>*University of Bonn, Meteorology Institute, Germany*

### Abstract

Climate change is attributed directly or indirectly to human activity. It will affect animal welfare, food production and human health through its short-term and long-term impacts on all components of global and local food systems (FAO framework, 2008). In general, the projected climate change is foreseen to have a negative impact on food security, especially in developing countries.

In Iran the change and variability of climate elements in every agro-ecological regions are different. Temperature variations are commonly used to detect and quantify possible changes in climate. To assess the influence of temperature variability upon main compounds of milk the paper addresses the following points:

1) Statistical investigation of variability in milk compounds in different areas of Iran based on the observed variability of local temperatures. 2) Construction of a statistical downscaling model to relate large-scale temperature from reanalysis projects to milk compounds variability.

The aim of this research is zoning of potentially positive and negative effects of climate change on the milk components in different regions of Iran. This would allow finding an optimum scenario for minimizing negative effects of climate change on the milk components, such as changing the feed rationing of cows or changes in milk processing.

To treat the research question milk yield, fat and protein content data from individual cows (>250 cows per station) on a daily basis were gathered for whole Iran for the period 2002–2010. The data is adjusted for the period of times that cow use the natural pasture for feeding (springs & summers). Climatic data of near surface temperature was taken from stations as well as from the NASA MERRA reanalysis for the same area and period. The first result on the preliminary milk data analysis in Northwest of Iran reveals a monomodal probability density of the milk compounds. Then the simple monthly average of the individual daily data was performed. The results of a correlation analysis between the monthly mean values of milk compounds and the regression modeling between milk data set and temperature will be presented based on the NASA reanalysis MERRA to construct a downscaling model for future use.

**Keywords:** Climate change, Iran, milk compounds, NASA MERRA reanalysis