



## **From grass to grape – land use change and soil structure**

Marie Eden and Jörg Völkel

Technische Universität München, TUM, School of Life Sciences Weihenstephan, Geomorphology and Soil Science, Freising, Germany (marie.eden@tum.de)

In 1997 a ~0.5 ha vineyard was established on land formerly used as pasture; located in Namibia between the Naukluft and Tsaris mountains, some 50 to 60 km east of the Namib Sand Sea. Fossil water from springs along a geological fault provide the basis for this endeavour. In September 2013 the cultivated area has been enlarged by another 3 ha.

In August 2014 soil samples were taken from the differently-aged vineyards and two adjacent spots outside the cropped areas. Additionally soil samples were taken from a neighbouring farm, which is irregularly used as pasture. The two locations are approximately 6.5 km apart. Undisturbed cores were extracted along with bulk soil samples to determine a suite of physical and chemical parameters. These parameters include texture, bulk density, water retention, air permeability, soil organic carbon (SOC), nitrogen (N), pH, electrical conductivity, and cation exchange capacity.

The soil of the older vineyard showed the highest values of SOC (%) compared to both, the younger vineyard and pasture soils. Also N (%) levels were higher in the old vineyard soil. These differences are ascribed to the effects of land use change. Cultivating wine for 17 years and the associated farming practices influenced the soil properties. The young vineyard in comparison has not (yet) exerted a similar impact onto the soil as the land use change took place less than a year prior to sampling. The young vineyard reflects to some extent the initial conditions of the old vineyard, this can be used to predict the future impact of farming for this soil. Pasture is the predominant type of land use in this area. In order to compare one type of land use with another, the pasture soils from the neighbouring farm can be used. Contents of SOC and N are within a similar range for soils from the young vineyard and the pasture, which indicates that the recent land use change has not yet manifested itself in these parameters. However the old vineyard differs from the pasture. SOC being the most important indicator in terms of soil quality, it shows the improved quality of the old vineyard soil. Additional indicators of soil quality will be determined and compared.