Assessment of the environmental water resources impacts of agricultural development in Malta

MSc Thesis, Cranfield University

Zuzana Vlacilova

In February 2016, I got a list with selection of topic for my MSc thesis at Cranfield University. The list was very long, however I liked only one topic from that list. This topic was about agricultural water resources in Malta and few weeks later I was selected to work on this project. This thesis aims to undertake a fundamentally important baseline study to assess the environmental water resource impacts of agricultural development based on collating published scientific and industry evidence, gathering and analysing historical water use data, GIS modelling, current and future water demands. The thesis is part of ongoing Fostering Water Agriculture Research and Innovation in Malta (FOWARIM) project linked to EU Horizon 2020. Thanks to Douglas Bomford Trust I got a lifetime opportunity to visit Malta for my research study to collect data, interview farmers and other engaged stakeholders and get familiar with the country. I took this opportunity and went to Malta for two weeks in June 2016.

Malta is among most densely populated countries, and also one of the most water stressed country in the world. The major challenge for the country is to meet high and rapidly increasing demand for freshwater. Due to geographical, semi-arid Mediterranean climate and high dense population, water is very scarce resource. The annual rainfall is of 550 mm and it is characterized for its seasonal variability and scarcity mainly during summer months, high intensity and short duration. The country also faces serious water pollution of its sources due to high nitrate as a result of fertilizers application, intensive livestock production, and leakages in sewage systems. Agricultural development of Malta is constrained by the geographical and natural characteristic of the country. The major agricultural issues nowadays are water scarcity, costs of the land and high labour costs. Increased agricultural water demand and irrigation have negatively affected the viability and sustainability of aquifers.

Malta's College of Arts, Science and Technology (MCAST) became my alma mater for two weeks' time during my stay in Malta. The director of Agricultural Institute Mr. Malcolm Borg helped me to plan my meetings with various stakeholders and consulted with me current water resources situation in Malta. The main aim of my stay in Malta was to interview farmers about their irrigation agricultural practices and their willingness to adapt to climate change. I have managed to interview 27 farmers with the help of Agricultural and Rural Payments Agency. The main challenge with farmers' interviews was the fact that most of the Maltese farmers do not speak English and I needed help with

translation. Maltese farmers were very friendly and when we overcame the language barrier, they tried to answer all of my questions. The main outcome of the interviews are that farmers do realise there are agricultural water shortages and most of them harvest rainwater to help to conserve water supply, also most of the farmers irrigate on time basis not on the water requirements of the crop. However, they are not aware of how much water they use and they need for irrigation which leads to over irrigation and higher evapotranspiration. Farmers are aware of the influence of clime change on their agricultural practices. The main comments of the farmers were shortages of rainfall during the winter in 2015, droughts, wind, crop diseases resulting in application of more fertilisers and problems with water salinity. Interviews with the Qrendi Local Council, Malta Water Association, Sustainable Energy and Water Conservation Unit, and MCAST showed different opinions how well is agricultural water sector managed. Malta is facing strong fragmentations of opinions of what should be the next step to save Malta's water resources as it is very sensitive political theme. Malta should review its National Water Plan without any political interests and should help farmers to better understand how their agricultural practices influence scarce water resources and what can be done to mitigate the damages in the future.

From the left: David Fernandez Lopez, Zuzana Vlacilova, Malcolm Borg (MCAST), and John Galea (MCAST)