Soil and Water:
Towards a Larger-Scale Perspective of their Relations
Prof. Millan Millan, Summarised by Helena Laughton

Prof. Millán Millán is Emeritus Director of the Centro de Estudios Ambientales del Mediterráneo (CEAM), Valencia, Spain. He is a cooperation partner of Tamera and participated in the third International Water Symposium in Tamera in 2013. In this editorial for the European Commission's paper 'Science and Environmental Policy', he draws together the findings of a number of recent studies which shed light on the link between water management and soil quality. The studies demonstrate a need for holistic water management to restore the climate and regenerate agricultural practice. His commentary provides a scientific underpinning for the proposals in the Global Ecology Institute's recent text, 'The New Water Paradigm'.

The main conclusions of the paper are that land use changes in Europe have altered crucial relations between soils and water cycles, creating badlands and desertification; that such changes in one region can affect larger scale microclimates, causing drought and flooding; and that these issues should be addressed at appropriate scales. The soil-vegetation-water cycle, and its flow or blockage, govern meteorological processes at all scales, both up- and downwind. But many policies ignore these cycles and/or some of their consequences. In all areas there is a gap between the need for intervention and the policies implemented.

The Western seaboard of Europe, above the European-Continental-Water Divide, is relatively water abundant, and precipitation there is largely provided by large weather systems from the Atlantic Ocean. On the other side is the Mediterranean Catchment Basin, where much precipitation is caused within the catchment area and thus 'recycled' in smaller water cycles. The studies summarised arise from both sides of the divide, and from both water-rich and water-scarce areas.

'Land use changes in the Mediterranean may be triggering large weather shifts' disaggregates different types of precipitation and meterological events in the area, and analyses their causes and links to land use change. These land uses changes are linked to climatic changes as far afield as Central-Eastern Europe and Atlantic Europe.

'Who should pay for best management practices to reduce soil erosion?', finds that adaptive policies in France arise from both local and external drivers (i.e. farmers and authorities), and that subsidies may be a necessary motivational mechanism.

'Integrating animal and crop production can reduce nutrient leaching from agricultural fields' describes the potential of Ecological Recycling Agriculture in Finland.

'Artificial wetlands on farmland help prevent soil loss and recapture agricultural by-products', 'More than one-third of soils studied in Southwest England are highly degraded' and 'Flood risk from modern agricultural practices can be mitigated with interventions' describe best practices for climate change adaptation in the water-abundant areas of Europe.

'New data on soil erosion by water reveals Mediterranean at highest flood risk', 'Research into root systems: key to long-term crop management', 'Rejuvenating arid badlands: from barren slopes to living forest in 80 years', 'No-tillage management of olive groves can improve soil structure while maintaining yield', and 'Straw covering on soil can increase crop yields and improve the efficiency of water use' address ecological challenges and best practices in the water-scarce Mediterranean area.

The solutions and phenomena described in the studies are not just tools for climate change adaptation. They describe ways to restore both local weather systems and climates on a large scale. Knowledge of the direct links between soil-surface properties and water cycles enables us to recover lost water cycles and precipitation patterns. Proper understanding of these scientific findings, and their integration into policies, should help both governmental authorities and grassroots change makers to effectively manage water and protect soils and climatic conditions for future generations.

For more information:

www.tamera.org/index.php?id=1259

www.tamera.org/project-groups/autonomy-ecology/global-ecology-institute

Editorial available for download here:
http://ec.europa.eu/environment/integration/research/newsalert/pdf/soil_and_water_larger_scale_perspective_52si_en.pdf