

The Integrated Information System on Water Resources: The Italian Experience from Official Statistics

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Assessing the state of water resources and changes in water availability may be carried out, at various temporal and spatial scales, by either remote sensing/in-field monitoring strategies or statistical collection of quantitative data from water service/system holders. Statistical surveys on water resources may be census or sampling surveys. In this contribution, we present the Italian experience with water resource statistics provided by the Italian National Institute of Statistics (ISTAT). ISTAT has carried out surveys on water statistics since 1951 with the aim of describing the state of urban water services and water resources in Italy. The survey chronology (1951, 1963, 1975, 1987, 1993, 1999, 2005) allowed to develop an informative basis whose progressive updating depends on new water country/EU directives and increasing information demand from institutional and private stakeholders. After the edition carried out in 1999, contents and production process have been deeply renewed. As the result of a preliminary study conducted by ISTAT, also with the advice of an experts Committee, the survey has become a "system of surveys" composed by seven different sub-surveys. A new census survey is being carried out in 2009 in order to acquire detailed information on water quantity/use at the municipality scale (data referred to 2008). Four different questionnaires were sent to the water management companies identified by a preliminary survey: each management company received for each typology as many questionnaires as managed plants. The four questionnaires collect information on (i) water abstracted, (ii) water supply systems, (iii) sewerage systems, and (iv) wastewater treatment plants. In every questionnaire, it is required to fill out information on individual managed plants. The new survey is arranged through CAWI (Computer Assisted Web Interviewing) solutions for data capturing. A dedicated web site is prepared to offer respondents technical assistance and (personalised) spreadsheets for easy and rapid reply to data collection. Open source tools were used in order to acquire and load the data received by water management companies. Moreover, the survey benefits of a procedure of data integration from various other statistical sources, including specific regional registers conducted by Environmental Protection Agencies on water quantity/quality and administrative sources from regional administrations and national research institutes (e.g. the National Research Council). Survey results will be available in 2010 through a GIS-based data warehouse on the institutional web portal from ISTAT (www.acqua.istat.it). Results include several indicators depicting state and changes in water resources in Italy at a very detailed level. A new survey will be scheduled in 2013, thus obtaining a very long time series on water resource data.

Carbon fluxes in the apple orchard

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The rising interest for carbon (C) budget on a global scale depends on the effects of the increasing atmospheric carbon dioxide (CO₂) on global warming. Natural ecosystems, exploiting the capacity of green plants to absorb CO₂, normally accumulate C in the biomass and/or in the soil. Agricultural systems can be either a source or a sink for atmospheric C, depending on the balance between C inputs, through photosynthesis, and losses, through respiration and product removals. This contribution describes a Research Project funded by the "Autonomous Province of Bolzano" where C fluxes are studied at different scales of the apple orchard system. The experimental site is located in the Etsch Valley (South Tyrol), within a large flat area cultivated only with apple trees. Net ecosystem productivity (NEP) and energy balance are studied through the eddy covariance approach. Total soil respiration is measured by automatic soil respiration chambers and its heterotrophic component (Rh) is determined in soil parcels where roots have been excluded. Net primary productivity (NPP) is calculated from NEP and Rh data and by quantifying newly formed aerial and root biomass; root growth and turnover are studied using "minirhizotrones" and digitalized root images. The results of this project will allow to assess indexes of ecological and productive functionality of orchard systems and to estimate atmospheric carbon fixation potential of apple plantings in South Tyrol, where an area of about 18.000 ha is intensively cultivated with this species.