Evaporation Control using Covers

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It has been estimated that over the summer months up to 50% of the water stored in small farm dams may be lost to evaporation. Reducing this loss using dam covers therefore has the potential to significantly increase agricultural water use efficiency in Australia. A research project to investigate the performance of various different types of cover was commissioned by Queensland Natural Resources and Mines. This project has now been completed with useful knowledge gained as to the typical performances of various cover products. An outcome of the project has been increased public awareness of the potential for evaporation reduction on water storages. Significant interest has been shown by landholders, agencies and consultancy companies in this regard.

The project involved the development of a novel experimental method to measure and record water depth to an accuracy of ±1mm using highly sensitive pressure transducers. Pressure Sensitive Transducer (PST) units were placed at a constant 30cm height above the dam floor by a float-weight mechanism. The units were connected to dataloggers and the data was compared to weather station derived Penman-Monteith based estimates of evaporation. This enabled evaporation losses to be separated from seepage.

The PST methodology confirmed that evaporation losses in small farm dams was typically 4-7mm/day in summer rising to 10mm/day when air temperatures exceeded 40° C. As a matter of interest, the analysis also revealed that Australian summer night-time evaporation due to heat advection effects could be as much as 10-20% of the total daily evaporation.

The PST analysis technique applied to covered dams revealed evaporation reduction performance figures of approximately 75% for shadecloth covered dams, up to 95% with dams covered with a properly functioning floating cover, and approximately 15 to 30% with dams covered with a cetyl alcohol based chemical monolayer. Improving the performance of monolayers with improved application technology is currently the focus of evaporation research efforts at NCEA.

The NCEA evaporation research team comprises Director Erik Schmidt, Ian Craig, Andrew Green and Michael Scobie. The project was funded by the Queensland Department of Natural Resources and Mines (NRM) through the Rural Water Use Efficiency Initiative (RWUEI). The project depended upon the cooperation of product suppliers including NetPro (shadecloth), Nalco (WaterSavr), Evaporation Control Systems (E-VapCap), Raftex, Ciba Speciality Chemicals, and site owners Moonrocks (St George), Cubbie Station (Dirranbandi), Renato Andreatta (Stanthorpe) and Peak Downs Shire Council (Capella).

More information including full report and executive summary can be found at www.ncea.org.au/Irrigation/Evaporation/