“FLOATING ON THE WATER’S SURFACE”

A joint Innovative Technology trial by the Mekorot Group and Top-It-Up Ltd – a trial of a modular cover made up of floating balls – has yielded results which enable a significant reduction of water evaporation in reservoirs whilst preserving its quality. An important step in safeguarding the water economy in Israel. The product, and its inventor Zeev Birger, won the 2014 Prime Minister’s Prize for Innovation.

“Mekorot” through its ‘WaTech’ Division began a joint collaboration, with Top-It-Up Ltd in 2011, to use floating balls for prevention of evaporation in open water reservoirs whilst preserving water quality, combined with the need for minimal maintenance. This joint co-operation is just a part of the activities of Mekorot in the development of advanced water technologies.

Top-It-Up Ltd developed an innovative concept based on light-weight balls which, together, form a modular floating cover that can be used in water reservoirs (including saline water which derives from the Negev) intended for irrigation of agricultural crops. The cover was developed to serve the operational requirements of the Mekorot Group with the aim of providing a universal, multi-purpose, solution at minimum cost. Zeev Birger, of Top-It-Up Ltd, won for his invention the 2014 Prime Minister’s Prize for Innovation in May of this year.

The size of the ball, its construction and the materials used in its production were chosen to suit Israel’s climate. The Top-Up Balls are made of a light plastic, are hollow inside, and when placed on the reservoir’s surface submerge to half their height by filling with the reservoir’s water. In parallel, the balls arrange themselves into a uniform cover over the surface of the whole reservoir.

The advantage of this method is that the cover, formed this way and due to the sun’s rays, cools the water in summer, insulates it in winter and stabilises changes in water temperatures during the course of a day. In contrast to this, other cover methods heat the water.

AN EFFICIENT AND ELEGANT SOLUTION

The first field trial began in the summer of 2012 in the Ze’elim reservoir, which supplies water for agricultural use. The purpose of the trial was to test whether the balls arrange themselves uniformly on the reservoir surface, succeed in remaining stable and withstand the strong winds which exist in the northern Negev region.

“Mekorot”s water engineers realised, very quickly, that one is talking of an elegant and efficient solution and that the trial proved that the physical qualities characterising the balls are suitable for covering irrigation reservoirs. In addition, it was found that their presence does not interfere with shoals of fish, inhabiting the reservoirs, from performing their function of cleaning the water of algae.

IMPROVEMENT OF WATER QUALITY AND SAVING IN COSTS

The Mekorot group operates, by means of its WaTech Centre, three centres of research and development that carry out studies of applications in the fields of water and of wastewater. An R&D Centre for wastewater is situated at Shafdan; An R&D Centre for the development of membrane technologies, at the Savcha site, which will shortly be expanded into the grounds of the new water desalination plant in Ashdod; and, an R&D Centre for research into upper water quality in the central filtering plant at the “Eshkol Site”.

In September 2013 the second field trial with Top-It-Up began at the R&D Centre situated at the “Eshkol site”. The purpose of this trial was to test the influence of the cover on water quality in reservoirs. The background to setting up this research is the fact that raw drinking water reservoirs and wastewater reservoirs are exposed to sunlight and wind. This exposure causes water temperature to rise, water evaporation and to lowering of water quality which expresses itself in the flowering of algae and an increase in zooplankton. In total, a rise in organic load.

At the “Eshkol site”, a new research platform has been installed, suitable for large scale tests, enabling the setting up of a variety of trials of innovative water technologies.

The trial was performed in two pools, identical in volume and shape, of an area of 1,300m^2 and a depth of 1.5 metres.

In November 2013 one of the pools was covered with the Top-Up cover and the second pool remained exposed. Following approximately 4 months of measurements the cover proved to be very efficient in prevention of water evaporation, the suppression of biological development in the trial pool, in comparison to the control reservoir without balls.

In addition, the trial in Ze’elim proved efficient in prevention of access to water-foul and birds to the reservoir thus, minimising the predation of fish and pollution by birds. As a consequence, covering reservoirs is expected to produce a significant saving of water, of costs of treating water and improvement in quality of delivered water. In any event, the trial will also continue during the summer in order to test the effect of the cover on evaporation and water quality at much higher temperatures.

In the light of the knowledge, the technical experience, and abilities of the Mekorot group, which has been accumulated over a period of 77 years of activity, the company established in 2004 the WaTech Division - an enterprise centre in the area of water technology. This, with the aim of advancing knowledge and locating innovative water technologies to suit the needs of the group, and demands and directions of the various and changing water markets.

The trial of the floating balls is one of many being performed at “Mekorot” sites in co-operation with Israeli and foreign start-up companies, and co-operation between research crews of “Mekorot” and leading academic institutions in Israel and the world. Amongst them “The Technion” in Haifa, “Tel-Aviv University”, “Ben-Gurion University” in the Negev, “The Hebrew University” in Jerusalem and other research bodies.

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