



THE HAROD VALLEY CASE STUDY

AYYEKA'S SMART NETWORK TECHNOLOGY SUPPORTS COMPARATIVE RESEARCH ON EROSION PREVENTION IN THE HAROD VALLEY

THE CHALLENGE

SOIL EROSION PLAGUES AGRICULTURE IN HAROD VALLEY

Located in Israel's northern region, the Harod Valley extends over some 40 square kilometers, a majority of which are intensively cultivated. Land degradation, especially extensive soil erosion in the surrounding hillslopes, is a serious problem for farmers in this region, resulting in substantial economic losses. In recent decades, a joint effort of the Israel Ministry of Agriculture & Rural Development and the Lower Jordan River Drainage Authority has advanced the implementation of various soil conservation measures by farmers, however, their efficiency was not systematically assessed at the watershed scale. Therefore, in 2015, the Department of Soil Conservation and Drainage at the Ministry of Agriculture and Rural Development, the Southern Jordan River and Drainage Authority and Ben Gurion University of the Negev initiated a study comparing two small, adjacent agricultural watersheds. The aim of the study was to compare the concentration of suspended sediment and the total sediment yield at the outlet of two watersheds, one where soil conservation practices were implemented and one where they were not.

THE PROJECT

GAUGING THE EFFECTIVENESS OF EROSION PREVENTION IN THE HAROD VALLEY

For the purposes of this study, the researchers, in collaboration with Yamma and Ayyeka, set up monitoring stations. A smart network was envisioned to provide remote, real-time and reliable data that would allow researchers to monitor the extent of soil erosion represented by water and sediment yields. The main requirements were cost effectiveness (CAPEX and OPEX); energy-efficiency, reliability, and user-friendly systems. Moreover, the system had to interface with automatic sampling functions, and be flexible enough to support the various sensors that would collect and transmit the data. An additional challenge was to provide a strong, sturdy, and durable infrastructure that could be concealed in open areas and protected from the natural elements, such as floods, and from vandalism.



THE SOLUTION

REMOTE, REAL TIME AND RELIABLE MONITORING OF EROSION

Three suitable sites for deployment of monitoring stations were identified, one situated on the Harod River and two on its tributaries. With Ayyeka's technology and know-how, Yamma staff was able to set up the smart network to suit the research needs, moving to the deployment phase in a relatively short time; the system was fully operational in 2015.

Ayyeka's integrated solution includes high-end sensors that deliver data (including SMS or e-mail alerts) from the field all year round: pressure and radar sensors monitor water levels and a turbidity sensor enables assessment of sediment concentration. The automatic sampler, a critical research tool needed for turbidity sensor calibration on site, smoothly communicates with the Ayyeka Wavelet. Stage monitoring and water velocity measurements allow calculation of water discharge and total sediment yield.

Furthermore, Ayyeka's kits are user-friendly and simple to maintain. Students responsible for the field research can carry out the regular maintenance work on site (collecting the samples, cleaning and calibration of the sensors, changing batteries) alongside their overall field research activities. The molded polycarbonate enclosure with IP 68 / NEMA 6P waterproofing rating, an important feature of Ayyeka's units, eliminates the problem of detection or damage, while ensuring full operation for many years to come.

An additional benefit of Ayyeka's technology and its smart network is the critical data provided by Ayyeka's Wavelet units to the Lower Jordan River Drainage Authority, The Harod Cooperative Water Association Water Authorities and farmers, who seek to monitor water levels as well as flood levels as part of their regular operation.



Ayyeka provides cyber-secure, plug-and-play, remote monitoring solutions designed for various markets. Ayyeka has an installed base in challenging locations and earned a reputation for excellent customer service. Bringing together a state-of-the-art hardware and cloud-based software package, Ayyeka's solutions are leading the infrastructure monitoring sector into the future.