

Location	Yemen
Contractor	Ministry of Agriculture and Irrigation of the Republic of Yemen, financed by the WorldBank
Sub-contractors	HydroYemen, EuroConsult
Period	2009

Scope of the project

The Groundwater and Soil Conservation Project (GSCP) has been initiated to develop techniques to conserve groundwater in the agricultural sector of Yemen. GSCP has several projects to achieve water savings under field conditions. The absence of good field data poses a potential problem to prepare action plans and monitor the interventions. The main goal of the project is to use satellite imagery techniques to assist in monitoring the progress and performance of the overall GSCP.

Study approach

SEBAL in combination with satellite images was applied to determine the irrigated areas and the crop water consumption (actual evapotranspiration) at a resolution of 10 meters. The key agricultural water management statistics for pilot areas in coastal plains (Siham and Abiyan) and mountains (Dhamar and Rada) were computed.

Results

The crop ET of single season crops is with 734 mm significantly more than for rainfed crops (448 mm). While fields with two crops and perennial crops have even a higher ET per unit land (mm), the largest volume of water consumed (m³) occurs in the single

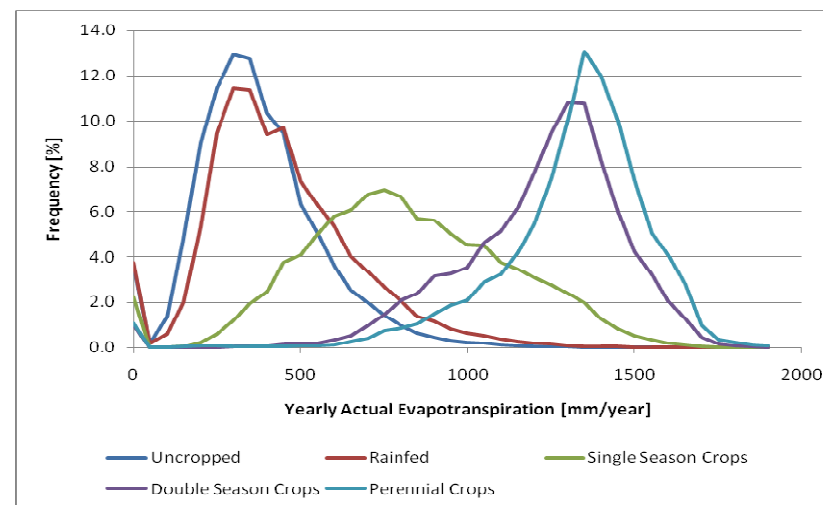
season crops. This can be explained by the fact that 76% of irrigated land consists of single season crops.

Water conservation is limited to the groundwater abstractions of perennial crops, including qat and banana. The total gross groundwater withdrawal in the four pilot areas is estimate to be 163.4 MCM/yr. The net withdrawal or Net Groundwater Use (NGU) is 94.4

MCM/yr because part of the water is non-consumed. It is expected that a total amount of 10.2 MCM can be saved (6.2 %) without changing the cropping system and acreage. This saving can be achieved by matching water demand with water supply, and introduction of deficit irrigation. Additional savings can be accomplished if the irrigated areas are reduced. Since reduction of crop ET in qat is not straightforward, qat areas should undergo a land retirement plan.

Conclusions

The remote sensing technique presented can be used to study recent years and to assess the savings in Net Groundwater Use achieved under the flag of GSCP. The technique could also be utilized by NWRA in other programs and projects.



Frequency distribution of annual actual evapotranspiration values for the year 2006 for different agricultural land use classes in Dhamar