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Digital land (soil) mapping for modeling of water requirement

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Water planning and distribution for irrigation from irrigation system is based on hydro-module zoning. Hydro-module zoning (HMZ) is division of a territory into taxonomic units according to climatic data, soil characteristics in combination with hydrogeological and other natural and irrigation-farming properties of the territory. The existing hydro-module zoning does not consider great changes in natural-climatic and particularly soil conditions for the last twenty years; first of all, it concerns changes in the reclamation condition of lands, groundwater table, salinity. Modern methods for calculating water requirement, irrigation depths, rates and dates based on computer models in GIS environment are applied.

Hydro-module zones borders and irrigation regimes for irrigated lands in the South Fergana Canal (SFC) command area, Uzbekistan, were corrected. Irrigation rates per HMZ were calculated for a number of major crops using FAO method (CROPWAT program).

Cartographic information was processed using programs on MapBasic in MapINFO environment. To convert cartographic data into digital format, ArcINFO and MapINFO systems were applied. ArcINFO was used since it was available and there was staff trained in ArcINFO who is capable to input cartographic information and represent it in invariant format of Shape-files. MapINFO system was used because it contains advanced programming system MapBSIC, which is necessary to solve tasks of Shape-files overlaying.

A great deal of initial and intermediate data and calculation results determined expediency of application of database capabilities. In this case, ACCESS-2000 database

was applied. Within ACCESS and using VBA, a program block was developed for calculating parameters of hydro-modules such as total available soil moisture, infiltration coefficient, and **a** and **b** parameters in the Kharchenko equation (updated by M.G. Khorst under FAO classification) to estimate contribution from groundwater.

The work made it possible to offer practical users a map of hydro-module zones, tables of irrigation dates, depths and rates recommended according to mean values (climate, sowing dates and so on), and an adapted program for computation of water requirement that enables to correct irrigation regime for the current situation.