XXXVIII IAH Congress

Groundwater Quality Sustainability
Krakow, 12–17 September 2010

Extended Abstracts

Editors:
Andrzej Zuber
Jarosław Kania
Ewa Kmiecik

University of Silesia Press 2010

abstract id: **289**

topic: **1**
Groundwater quality sustainability

1.4
Groundwater quality and agriculture

title: **Monitoring influences of the groundwater level and quantity on soils fertility of the irrigating lands of the Tajikistan**

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keywords: mineralization, fertility, agriculture, semi-arid

Mineralization and chemical compound of underground and pressure waters of irrigating lands of Tajikistan are subject to regime changes which are not always caught with sufficient clearness. On seasons of year more appreciable changes are in this respect observed on the strongly salted grounds and salt marshes. For them in the hot period of year underground waters cover small-ground with sharply raised mineralization are spent on total evaporation from a soil cover increasing temporarily stocks of salts in soil-ground of a zone of aeration and on a surface of ground. On change of it from bedding thickness of pebbles there come waters in less mineralization. To next vegetation period at the expense of atmospheric precipitation there is happened washing back underground waters and increase of mineralization of the upper layer the lasts. Thus the essential change in chemical compound of underground waters does not occur, in both cases water is usual chloride sodium. At the less mineralization of water in an initial condition there are observed the changes in chemical compound, mainly on ions, sulfate, chlorine, magnesium and sodium. Because of infiltration losses and accumulation of drainage water in the agro-landscape, the total water supply, both from irrigated lands and from zones of accumulation of overflow waters, is increased. On these low territories, a large quantity of water with low and medium mineralization and also fertilizers, leached by drainage waters, are accumulated. All of this degrades the ecological situation. It causes natural and anthropogenic desertification and active degradation of soils. Water logging is another degradation process, widely occurring on irrigated soils. Irrigation causes a rise of groundwater and increases hydromorphism of soils. It occurs in its strongest form in above flood terraces of the rivers, low places, along channels, in zones of water logging and steadily high groundwater level (0.5–1.5 m), zones of oozing out groundwater on slopes. Usually, the process of water logging in arid conditions is combined with a process of salinization. It increases its negative effect on properties of irrigated soils. It degrades their water -, air - and salinity regimes. In particular, active water logging is shown in accumulation zones of drainage waters, including those outside massive irrigation. Water logging is actively is shown on mountain plains, where the irrigation of higher fields results in water logging of lower territories. In the mountain valley conditions of Tajikistan, water logging of soils is occurring, but without any salinization. The process of desertification is related to the drainage of a territory and the disturbance of a water regime of soils, because of moisture deficit. Frequently, this is a result of regulation of water flow. Desertification occurs when the groundwater level lowers and when underground and surface water is reduced. The regulation of a fluvial flow changes a water regime of the flood land soils and deltas, which results in desertification of the earlier hydromorphic soils. There is also loss of forests and other unfavorable consequences occur. It would be interesting to study the effect of application of some water stocking soil conditioners on the water use efficiency for non-irrigated reforestation, irrigated agriculture and horticulture on these degraded and decertified lands. The processes of water erosion, occurring on irrigated soils, are particularly dangerous on high mountain valleys. A plough up of these territories, to use them in irrigated agriculture, results in active water erosion and disturbance of soil properties. Leaching of salty rocks and irrigation of high plains will activate not only erosion but also salinization of lower soils, because of dissolution of salts in groundwater and water logging of lower territories. The development of grey-brown-stony soils in the lower mountain part of the Gafurov-Kanibadam massif of the Sogd area (50–60 th.ha) has caused the rise of groundwater and salinization of soils on lower fields and, as a result of this, new and additional improvement measures are needed. Nowadays, this process occurs in the Chkalov site of the Gafurov region (10 th. ha).Such a technology of cultivation re-

sults in degradation of stony and sandy soils, because of leaching of oozy fragments and nutrients. The main factors, restricting fertility of irrigated lands in the Republic of Tajikistan, are the presence of 22% sandy and stony soils, 16% saline soils, of which 8–10% is subject to wind and water erosion and 10–12% are located on squandered land and subjected to other geodynamic processes. Thus, 50–60% of irrigated lands have unfavorable features, restricting their effective fertility. The second-term salinization is a more perceptible process on irrigated land, which inevitably occurs under hydromorphic and semi-hydromorphic conditions, when the groundwater level rises above a critical level (2.5–3.0 m at mineralization of water 3–5 g/l). Modern salt–accumulation is observed practically always on natural hydromorphic landscapes. Nevertheless, when planning irrigation systems on the common part of irrigated lands, including on initially automorphic soils an irrigational, hydromorphic (semi–hydromorphic) regime was planned and originated. A rise of the groundwater level up to 2.5–3.0 m was expected and, as a result of irrigation, hydromorphic conditions, salt accumulation has taken place.

International Association of Hydrogeologists

AGH University of Science and Technology

2-vol. set + CD
ISSN 0208-6336
ISBN 978-83-226-1979-0