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Assessing drought vulnerability and risk in Sinaloa, Mexico

A.C. Ravelo¹, J.C. Douriet Cárdenas²

¹CREAN-CONICET, Córdoba, Argentina; ²OCDE-CONAGUA, Sinaloa, México

Drought is a natural disaster originated by a long term deficiency in rainfall and it is an anomaly occurring in most climates even on those with normally high precipitation. In Sinaloa, drought occurrence and its geographic and time variability represent a severe restriction to social and economic development and jeopardize the sustainability of the ecosystems. A drought risk map for Sinaloa state was developed using a geographic information system (GIS). Different vulnerabilities to drought were accounted for among them those derived from structural factors (availability of superficial and ground irrigation, individual income, etc.) and dynamic factors (occurrence and severity of droughts, amount of water in dams, etc.). The system is versatile and it allows the addition of new variables leading directly or indirectly to drought vulnerability. The development of the evaluation system for extreme risk of drought (SERES) was accomplished in a GIS environment in several steps which final product is a map of the geographic distribution of drought risks in a relative scale of 0 (no risk) to 100 (highest risk). The SERES program generates monthly risk maps automatically for drought analysis in river basin or counties. It allows to identify those areas with higher vulnerability and risk so adaptation, mitigation and resiliency mechanisms can be set in place. Considering the extreme drought registered in 2011/2012, a risk map for October 2012 was generated which allowed to identify counties with higher drought vulnerability factors and risk levels. Accordingly, based on that information drought contingency plans were established and reports were provided to the local government for decision-making.

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Integrating Water cycle management: building capability, capacity and impact in Education and Business (I-WEB)

L. Lundy¹, B. Meyer², A. Kakabayev³, G. Minzhanova⁴, D. Fatta-Kassinos⁵, J. Capilla Roma⁶,

H. Gareick¹, R. Nurdillayeva⁷, T. Shakirova⁸

¹Middlessex University, The Burroughs, Hendon, London, NW4 4BT; ²University of Leipzig, 26 Ritenstraße,

Leipzig 04109, Germany; ³Sh. Ualibekhanov Kokshevan State University, Abai str., 76, 020000 Kokshevan,

Kazakhstan; ⁴Al Farabi Kazakh National University, Al Farabi Avenue, Almaty 050040, Kazakhstan; ⁵NIREAS-

International Water Research Center, School of Engineering, University of Cyprus, 1 Panepistimiou Avenue,

2109 Nicosia, Cyprus; ⁶Research Institute of Water and Environmental Engineering – IAWA, Universidad

Politécnica de Valencia, Camino de Vera s/nr. E-46071 Valencia, Spain; ⁷Ahmed Yasawi International Kazakh-

Turkish University, 29, B. Satturkhanov Avenue, Turkestan, 161200, Kazakhstan; ⁸The Regional Environmental

Centre for Central Asia, CAREC, 40, Orbita-1, Almaty 050043, Kazakhstan

Several reports have identified scarce reserves of renewable water within Kazakhstan and water scarcity has been highlighted as potentially limiting its potential to sustainably develop its natural resources and economy. Acute water shortages are included in the Kazakh Government's list of 21st century global challenges and implementing integrated approaches to water management is a regional priority. With only one of Kazakhstan's eight major river basins falling entirely within its national borders (see Figure 1), the sustainable use of the majority of its water resources is only possible if Kazakhstan and its neighbouring countries (Russia, China, Kyrgyzstan and Uzbekistan; the upstream sources of the major rivers entering Kazakhstan) co-develop and implement integrated water cycle management (IWC/M) plans.

In common with all Central Asian countries, Kazakhstan has undergone major political, economic and social transformations following independence in 1992. Whilst under Soviet times the water sector was the 2nd biggest receiver of state funding, the global economic crisis and limited national funding substantially reduced the levels of finance directed towards the water sector. In combination with changes in funding, a prevalence of inefficient water management infrastructure, agricultural reforms and industrial developments has led to increased competition for water resources. Within the context of an inconsistently applied and hence chaotic water management approach, Kazakh water professionals are often required to focus on delivering practical solutions rather than institutional capacity building. Current water management practices are hence typically 'siloed' on a sector-by-sector basis, contributing to a range of impacts, from droughts to land degradation and floods, further exacerbating reported effects of climate change.

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