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Climate change and its impact on water infrastructure: the case of Alcala de Henares (Spain) and Mexico City (Mexico)

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Climate change and its possible impacts on precipitation are still a matter of controversy due to lack of data as well as models which are considered reliable. Even though the science of climate change has advanced significantly in recent years, many uncertainties still prevail, ranging from reliable prediction of extreme river flow events to downscaling of rainfall to smaller planning areas. That is, present knowledge is still insufficient to understand and accurately predict how global changes, climate change one of them, may affect precipitation and streamflows over specific geographical units.

In terms of planning and investment in urban areas, where more than 50 percent of the population live at present, freshwater supply and flood risk management have to be considered on long-term basis. This includes development of water infrastructure for drinking water supply and drainage as well as flood control which responds to the needs of the growing populations and their economies.

Impacts of climate change are slow over time and take place over thousands of years. However, their study is relatively recent, mostly in terms of impacts on the hydrological cycle and therefore in terms of run-off. In the case of urban centres, the rationale is that governments will have to adapt the water infrastructure according to the expected changes and thus have to plan for them. For example, in the case of Mexico City, the way the drainage system was designed 100 years ago is very different from the way it would be done at present and the way it would be planned in about 50 years time.
In the case of the city of Alcalá de Henares in the region of Madrid, the analysis of precipitations has shown a slight tendency towards a wet period from the decade of the 60′s. Due to this tendency, the calculations for the design of water infrastructures have remained virtually unchanged. In the case of this specific city, there is no indication that there will be dramatic or rapid changes in terms of precipitation in the coming years.
In the case of Mexico City, studies regarding precipitation have shown a trend toward a wetter period from the decade of the 50's. Nevertheless, there are no evidences that there will be a drastic change in terms of precipitation patterns.
In these two specific cities, studies carried out show that adaptation measures that emerged long time ago have been satisfactory. Nevertheless, these measures have been the result of many other changes (urban change, population growth, etc), and not only climate change. In any case, floods affect almost every city in the world and they will not disappear due to its complex nature. Adaptation measures should thus take into consideration multiple aspects such as broader policy areas, institutional frameworks, management practices, human resources, etc., which affect the whole spectrum of water uses in terms of quantity and quality as well as availability and demands for all uses and users.