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# Cost Analysis of Water Transport for Climate Change Impact Assessment

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It is expected that climate change will have a strong impact on water resources worldwide. Many studies exist that couple the output of global climate models with hydrological models to assess the impact of climate change on physical water availability. However, the water resources topology of many regions and especially that of cities can be very complex. Changes in physical water availability do therefore not translate easily into impacts on water resources for cities. This is especially the case for cities with a complex water supply topology, for instance because of geographical barriers, strong gradients in precipitation patterns, or competing water uses. In this study we explore the use of cost maps to enable the inclusion of water supply topologies in climate change impact studies. We use the city of Lima as a case study. Lima is the second largest desert city in the world. Although Peru as a whole has no water shortage, extreme gradients exist. Most of the economic activities including the city of Lima are located in the coastal desert. This region is geographically disconnected from the wet Amazon basin because of the Andes mountain range. Hence, water supply is precarious, provided by a complex combination of high mountain ecosystems including wetlands and glaciers, as well as groundwater aquifers depending on recharge from the mountains. We investigate the feasibility and costs of different water abstraction scenarios and the impact of climate change using cost functions for different resources. The option of building inter basins tunnels across the Andes is compared to the costs of desalinating seawater from the Pacific Ocean under different climate change scenarios and population growth scenarios. This approach yields recommendations for the most cost-effective options for the future.