

Study explores next 100 years of water supply in Alberta

August 25 2016, by Olga Ivanova

Zahidul Islam has a pretty good idea of what the climate in Alberta is going to be like in the next 100 years. More important, he knows what to do about stresses on our water resources.

Higher temperatures will mean reduced [water](#) flow in the South Saskatchewan River Basin—a vital resource serving the Prairies. Compounding this is the fact that, over the next century, demand for water will increase.

Islam and his PhD supervisor, civil engineering professor Thian Yew Gan, have just published a research paper addressing what the next 100 years could hold for the South Saskatchewan River basin. The study, published in the *Journal of Water Resources Planning and Management*, was part of Islam's PhD thesis.

The study looks into the combined effects of climate change and active climate anomalies on the water supply and demand over the 21st century to update and complement the existing water management plan. To evaluate the impact of the current and future changes in the global weather patterns on Alberta's climate, Islam and Gan referred to models produced by the Intergovernmental Panel on Climate Change, an international think tank and a research hub on climate issues. The study showed that under all scenarios, the amount of surface water in Alberta will be decreasing.

The research was then complemented with the data on El Niño, a climate

anomaly associated with warm and dry climate, and La Niña, bringing more rain and lower temperatures.

"We found that in an El Niño year, it will be more challenging than under the climate change conditions alone to manage water resources," said Islam, who now works for the Government of Alberta's Environment and Parks. "But if there is an opposite thing, a La Niña year coupled with the climate change, things will be little less challenging in terms of water resources management."

The study shows that on an average, the annual streamflow will be decreasing by six per cent with every Celsius degree of increase in temperature over the century—the dynamics opposite the province's irrigation needs.

"As we are expecting higher temperatures, more water will evaporate even before flowing into the river. So, eventually, we are predicting lower water inflows in the summertime," said Islam.

Contrary to the receding amount of surface water in the province during the summer, the irrigation needs—accounting for 75 per cent of the South Saskatchewan River Basin's allocated water—will continue to soar. One of the areas taking the biggest hit from the [surface water](#) shortage in the province in the next 100 years will be agriculture. Water has historically been a challenge for farms in the southern half of the province. The development of irrigation has made farming possible—as long as water levels are secure.

"The two sides of the story are: you are expecting less water in the summer, and at the same time, more demand. So if you are a water manager, what are you going to do?" asked Islam.

The answer, he says, is multi-faceted. "There are two things that we talk

about in climate change: one thing is mitigation, and another is adaptation."

Mitigation efforts are aimed at reducing greenhouse gas emissions to the atmosphere. This involves investing in renewable energy and cutting down on fossil fuels. Adaptation, on the other hand, is addressing the current impact of [climate change](#) on [water resources](#) and optimizing water use.

"We have to come up with a technology that minimizes the loss of water," he said.

"We could also come up with some kind of an early-warning system that a drought is coming so that we could plan things better," said Gan. "Also, we could educate farmers and major water users on different ways of economizing water. Finally, irrigation technology improvement to reduce water waste would help."

Provided by University of Alberta

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