



**the partnership  
for water sustainability in bc**

Waterbucket eNews on March 11, 2025  
<https://waterbucket.ca/wscblog/>

# **Living Water Smart in British Columbia:**

**Food security is at the  
intersection of land, water,  
agriculture, and climate**

## Note to Reader:

Waterbucket eNews<sup>1</sup> celebrates the leadership of individuals and organizations who are guided by the vision for [Living Water Smart in British Columbia](#)<sup>2</sup>.

The edition published on March 11, 2025 featured Dr. Kushank Bajaj of the University of British Columbia and the Partnership's Ted van der Gulik. US President Donald Trump's economic war against Canada has shone the spotlight on British Columbia's food security vulnerabilities.

The umbrella for Partnership initiatives and programs is the [Water Sustainability Action Plan for British Columbia](#)<sup>3</sup>. In turn, the Action Plan is nested within [Living Water Smart, British Columbia's Water Plan](#).



Cover Image Credit: photo by Ted van der Gulik

<sup>1</sup> <https://waterbucket.ca/wscblog/>

<sup>2</sup> [https://waterbucket.ca/wcp/wp-content/uploads/sites/6/2017/11/livingwatersmart\\_book.pdf](https://waterbucket.ca/wcp/wp-content/uploads/sites/6/2017/11/livingwatersmart_book.pdf)

<sup>3</sup> <https://www.waterbucket.ca/cfa/sites/wbccfa/documents/media/81.pdf>

## One-Minute Takeaway

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*"We got lucky with the timing for the launch of the Canada Food Flows interactive portal. Overnight, food security is a national priority due to Trump's threats."*

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Kushank Bajaj, PhD, researcher working on sustainable food systems and climate change at the Land Use and Global Environment Lab (University of British Columbia) and with United Nations Food and Agriculture Organization (at the Rome headquarters)

"Once you start understanding where your food comes from, and what you are eating, it opens conversations into all kinds of water and land issues."

"Almost always, Canada's own exposure to weather extremes are lower than the other places we depend on...especially the USA"

Kushank Bajaj, Data Scientist



Donald Trump's threats have put food security on the front burner in BC. What is at stake for British Columbia? How much does our province rely on imported fruits and vegetables, particularly from the United States?

[Canada Food Flows](#), an online and interactive portal developed at the University of British Columbia, provides answers. "Our food systems need to be transformed. Our supply chains are vulnerable," says Kushank Bajaj, co-creator of the Canada Food Flows tool.



"When we look at trade and food coming into a country, we always look at the national level. This is the first time it has been done at a provincial scale. And we know where food is coming from within the USA."

"Like Google maps for your dinner plate, the portal shows where 34 popular fruits and vegetables regularly consumed by Canadians come from. Imports from the USA dominate key fresh foods."

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## Beyond Borders: Assessing Climate Risks in Globalized Food Systems

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*"Knowing that Canada is heavily reliant on other places for fruits and vegetables was one way to delve into actual risk assessment. After that, it was a question of how do we make the research more useful for people. That is the story behind the story of why we developed the knowledge mobilization platform which is the Canada Food Flows portal."*

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"I started working on fruits and vegetables in Canada and understanding the flow of fruits and vegetables for a few reasons. First, we were looking at it from a climate change risk perspective," continues Kushank Bajaj.



**"Look not just at domestic production and risks to Canada's production from climate change but also look at risks to the entire supply chain."**

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## Food security is at the intersection of land, water, agriculture, and climate

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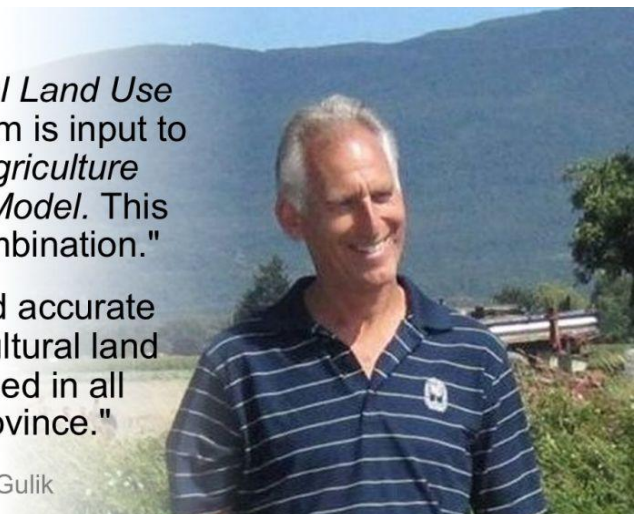
"If you are importing food, you are importing water. It is that simple. Also, our agricultural land in BC really is not as secure as everyone thinks. You can see all kinds of activities that do not support food production that are going on within the Agricultural Land Reserve," states Ted van der Gulik.

Ted van der Gulik is President of the Partnership for Water Sustainability, and former Senior Engineer in the Ministry of Agriculture.

**"BC's *Agricultural Land Use Inventory* program is input to the Province's *Agriculture Water Demand Model*. This is a powerful combination."**

**"These tools yield accurate data about agricultural land use and water need in all regions of the province."**

Ted van der Gulik



## Editor's Perspective by Kim A Stephens

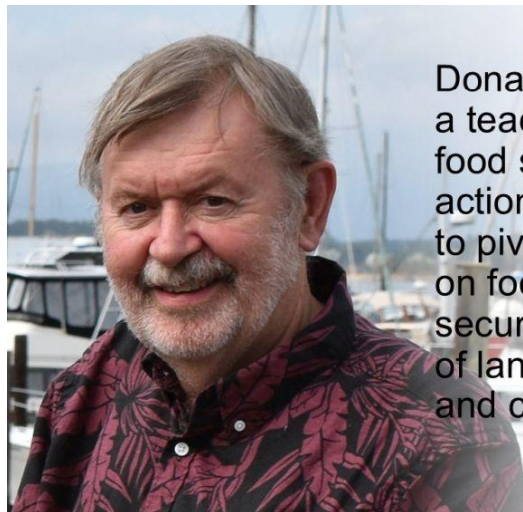
### Food Security in British Columbia

Ted van der Gulik and I had a conversation with Kushank Bajaj because we perceive his research work as aligning with the mission of the Partnership. It is always about connecting dots when we have conversations such as this.

*Canada Food Flows* research by Dr. Kushank Bajaj has grabbed media attention. He has shone the spotlight on the vulnerability of BC's food supply in a way that nobody has done before. It is a “teachable moment” because the public is reachable.



From my editor's perspective, the story behind the story is about the insights that Kushank and Ted shared with each other; and how interweaving their two perspectives results in a compelling storyline. And a call to action!



Donald Trump's threats are a teachable moment for food security. The call for action by British Columbians to pivot away from reliance on food imports is that food security is at the intersection of land, water, agriculture, and climate.

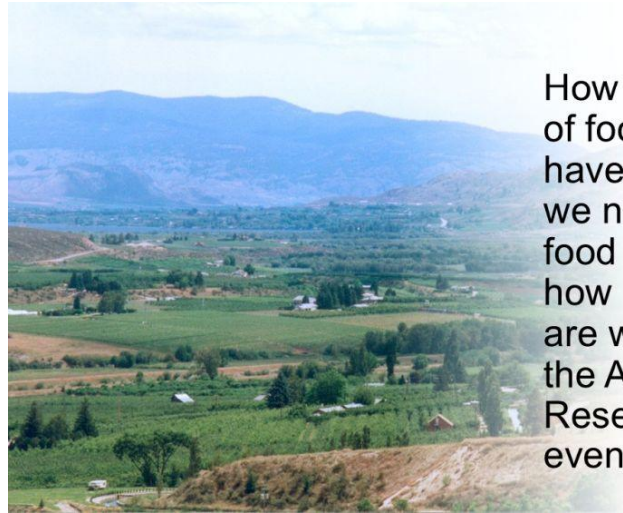
Kim Stephens

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## Land use, water need, food security and risk reduction in an era of uncertainty

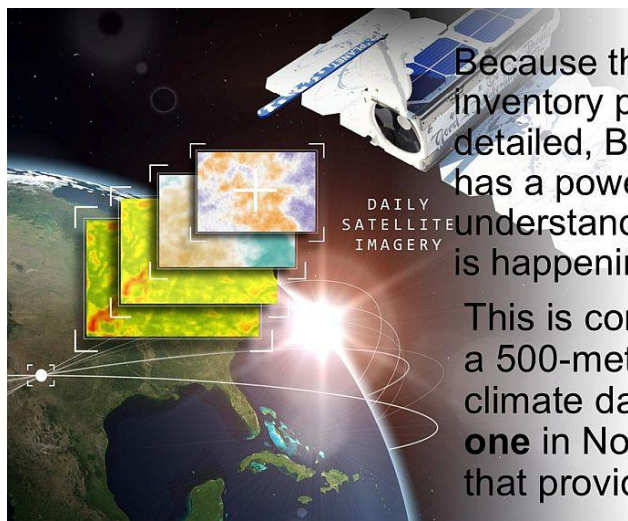
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The [Canada Food Flows](#) portal is the hook but the real story is about two powerful tools that our provincial government has in its arsenal to support a pivot away from reliance on US food imports.



How many hectares of food lands do we have? How many do we need to irrigate for food security? And how many hectares are we losing within the Agricultural Land Reserve and without even knowing it?

To provide reliable answers to those questions, the provincial government can draw upon the [Agriculture Water Demand Model](#) and the [Agricultural Land Use Inventory program](#). These powerful tools yields accurate data about land use and water need in an era when climate change creates uncertainty and risks.



Because the land use inventory program is so detailed, British Columbia has a powerful capability for understanding exactly what is happening on the land.

This is complemented by a 500-metre gridded climate data set - **the only one** in North America - that provides daily data.

## Acceleration of the global hydrologic cycle means that BC has crossed into a new climate regime

In 1973, a strategic political decision was made to create the Agricultural Land Reserve. So, most of the Fraser Valley was protected as farmland. But even so, the integrity of land within the ALR has been compromised in recent decades.



And so, here we are in 2025 when one would think we should be sitting pretty, and yet our food security is compromised by our vulnerabilities.

Risks are compounded when we do not get it right in managing both our land and water when the climate is changing.

A decade ago, we crossed an invisible hydrologic threshold into a new climate regime. The critical summer season has doubled...from mostly rain-free weather for up to 3-months to full-on droughts for up to 6-months...right when we need a reliable supply of water to grow food. We can expect deeper, more persistent drought punctuated by flooding.

## How will British Columbians meet the moment?



In this era of uncertainty and risk, our moment is called. So, now what will we do?

How will knowing what we should know guide our actions? How will British Columbians meet the moment to achieve food security?

## STORY BEHIND THE STORY:

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# Food security is at the intersection of land, water, agriculture, and climate

*- a conversation with Kushank Bajaj and Ted van der Gulik*

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## The story behind the story is structured in three parts

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In Part One, Dr. Kushank Bajaj explains what motivated and inspired him to do his PhD thesis and how it culminated in the Canada Food Flows portal.

In Part Two, Ted van der Gulik reveals how his passion for water and agriculture resulted in British Columbia's Agriculture Water Demand Model. And how the companion Agricultural Land Use Inventory program is foundational to enhanced water resource management.

*As Ted shared the story of his journey in developing and applying the model, Kushank was gobsmacked.*

**“Wow,” he said, “the level of detail in the Land Use Inventory is amazing. As a data scientist, I can say that this is powerful.”**

In Part Three, Kushank Bajaj and Ted van der Gulik share their perspectives on WHAT NEXT for food and water security, respectively. "British Columbia is water-rich but only at certain times of the year," states Ted van der Gulik.



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## PART ONE: **Kushank Bajaj provides context for Canada's vulnerability as a net food importer**

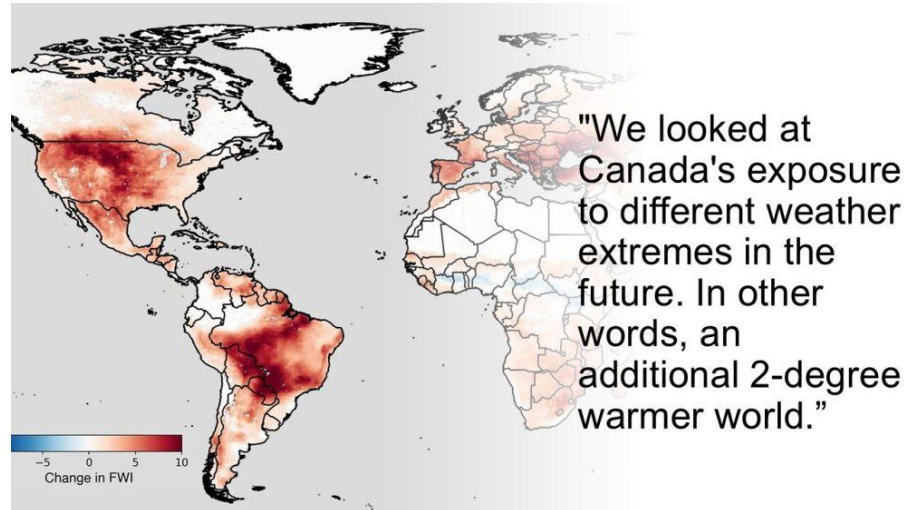
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"My research highlights how climate change could impact B.C.'s food supply. In my PhD work, we used the Canada Food Flows to look at two things," states Kushank Bajaj.

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*"BC and other western provinces source much of their fruit and vegetables from California and Mexico, two regions at high risk of climate-change-induced drought. Eastern provinces, on the other hand, often have a much more diverse supply."*

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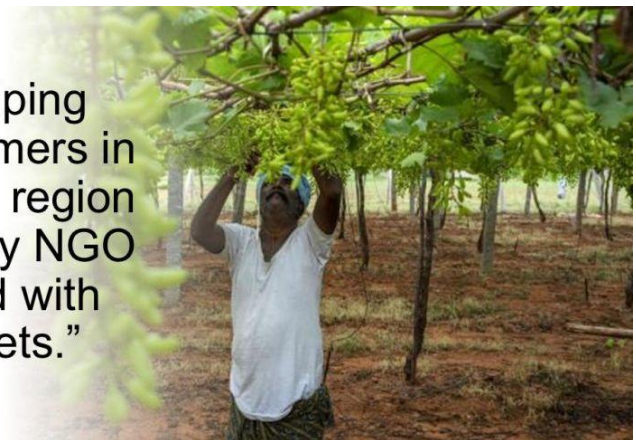


"And we asked, what is the exposure of different provinces in different fruit and vegetable supply chains? Almost always Canada's exposure within our borders to weather extremes are lower, relatively speaking, than the risks in the international regions we depend upon. And that makes us extremely vulnerable as a net food importer."

### **Who is Kushank Bajaj and what inspired his research?**

"I am a data scientist. I started my career as a geologist / earth scientist in India where I worked for a small not-for-profit grassroots organization."

"We were helping empower farmers in the semi-arid region of India. In my NGO role, I worked with lots of data sets."



"I worked with data sets such as: satellite and water level data, economic data, and agriculture practices. Then I worked as an earth scientist with the Ministry of Earth Sciences for a few years before coming to UBC to do my PhD."

"At UBC, my thesis advisor was Professor Navin Ramankutty. I lucked out. It was dumb luck. It was so great to have him as a supervisor."

Navin Ramankutty is a Professor in the School of Public Policy and Global Affairs at UBC and Canada Research Chair (T1, Sustainable Global Food Systems)



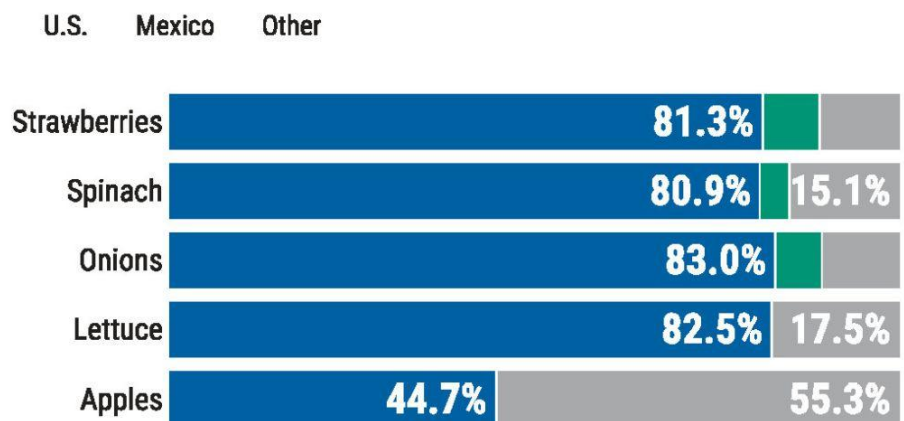
"My initial idea was to return to India and support farmers in India. But COVID happened and I was exposed to so much broader research as part of the Institute for Resources, Environment and Sustainability at UBC. This is an interdisciplinary division working on social problems."

### Assessing Climate Risks in Globalized Food Systems

"Knowing that Canada is heavily reliant on other places for fruits and vegetables was one way to delve into the actual climate change risk assessment. Looking at risks meant looking at the entire supply chain, not just domestic production."

### U.S. imports dominate key fresh foods

Percentage of select fruits and vegetables sold in B.C. by importing country.



"After that, it was a question of how do we make the research more useful for people. So, we developed the Canada Food Flows portal as an online knowledge mobilization platform."

## Canada may be a breadbasket but nutritional security overshadows caloric security in importance

"My bigger motivation for looking beyond Canada's borders resulted from my participation in a consultation session held in Ottawa in 2021. The consultation included policymakers, the Minister of Agriculture, and super powerful people within the agriculture food space."

"I recall the consultation topic was something like... how Canada is going to sustainably feed the world because Canada is a breadbasket."

"The whole conversation was dominated by cereals and meat...which makes sense because Canada is a net exporter."

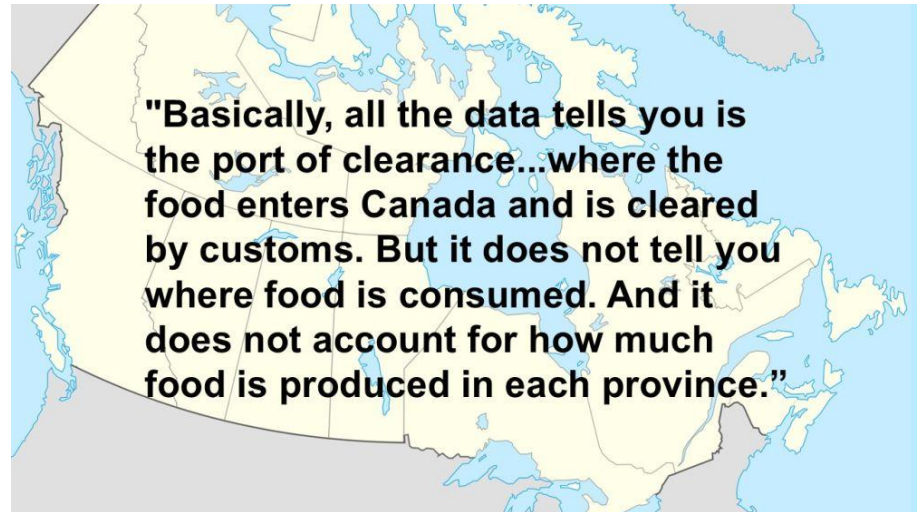
"But I thought that they were missing a really key part here. If you want to have a conversation around nutritional security, and not just caloric security, we need to think about other commodities. And Canada is also reliant on other places."

"Those two things, **climate risk and nutritional security**, made Navin and me start thinking about looking at Canada's fruit and vegetable supply. And that is why my thesis is titled Beyond Borders: Assessing Climate Risks in Globalized Food Systems."

"When we started looking into it, we found that here was no harmonized data that could be used to better understand what was happening with the food chain. So, we had to figure out how we would do this."



“There was some bilateral trade data which is disaggregated by US state. This basically tells us what kinds of food come from different US states and every other country in the world. But there were lots of challenges in using that data.”



“So, our research objective was to identify how reliant are different Canadian provinces on different regions in the world; and look at it over time. It started as developing a dataset because we knew we could use it to understand lots of different things. But we chose to focus on climate risks.”

### **Going beyond the research to mobilize the knowledge**

“The foregoing is the research side of things. When I started my PhD, I was convinced that I just wanted to publish research papers. And I also wanted to do something that would be more useful or relatable to people who are farmers.”

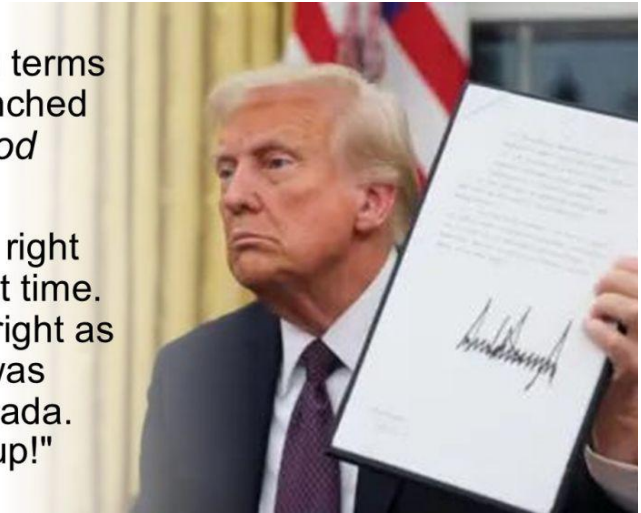


"How could we ensure that the knowledge does not die in the research paper because only a handful of people ever read about the project? The is the story behind the story of why we developed the knowledge mobilization platform which is the Canada Food Flows portal."

"When I developed the first prototype, it did not have as much functionality as we would have liked. So, a friend who was an app developer helped me develop the portal. We did not have a lot of funding to do it. It was a kind of side of the desk project."

"We got lucky in terms of when we launched the *Canada Food Flows* portal."

"We were in the right place at the right time. We launched it right as Donald Trump was threatening Canada. The story blew up!"



"UBC did an official launch and the engagement numbers are incredible...for example, over 100,000 people viewed the portal over the two days prior to this interview. The fact that we have been able to reach so many people has truly been fulfilling," concludes Kushank Bajaj.

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## **PART TWO: Ted van der Gulik provides an overview of water security realities within BC**

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*"I worked for the Ministry of Agriculture for 35 years. My perspective is water," Ted van Gulik emphasizes, "And I grew up on a farm. So, I also bring that perspective."*

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**At the Ministry of Agriculture, Ted van der Gulik worked with teams that developed and delivered agricultural programs, including: the environmental farm planning program, water supply expansion program, and the Growing Forward program.**

In his career, Ted van der Gulik has been honoured with two Premier's Awards of Excellence. And he is one of only 22 individuals tapped for membership in the British Columbia Public Service Hall of Excellence.

In 1997, he was appointed to the cross-sector provincial working group which was led by the Ministry of Environment and developed A Water Conservation Strategy for British Columbia, released in 1998.

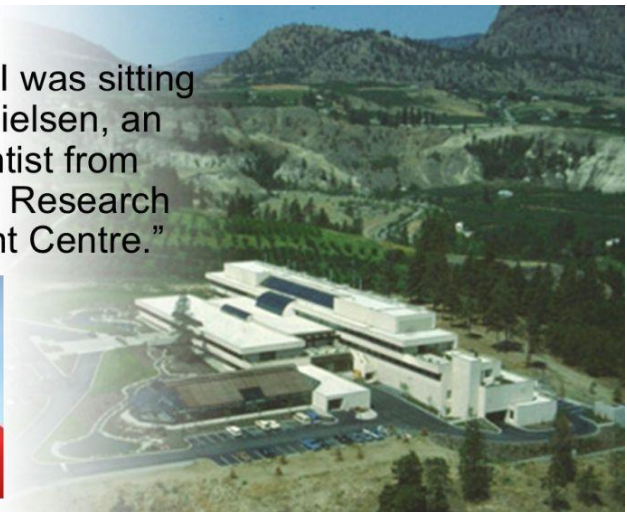
The Strategy laid the groundwork for the Water Sustainability Action Plan for British Columbia. In turn, the Action Plan was the springboard to Living Water Smart, British Columbia's Water Plan.

## **Genesis of the Agricultural Water Demand Model for British Columbia**

"In 2003, I was at a meeting in Kelowna after the drought and forest fires. It was a teachable year. The local governments in the room were talking about how are we going to grow our communities. The question came up, where are going to get the water for domestic use and all the other urban uses."

"Somebody suggested that municipalities could just take water from agriculture because agriculture has lots of water...which it does not. Nevertheless, that statement reflected the prevailing view in the room."

"At the meeting, I was sitting next to Denise Nielsen, an agricultural scientist from the Summerland Research and Development Centre."



"I said to Denise, we don't even know how much water we are using, we don't know how much we need, we don't know how much there is. How can people suggest that taking water from agriculture is the solution for urban water supply? And Denise said, then we should build a tool."

## Power of BC's Agricultural Water Demand Model for climate change risk reduction

"My conversation with Denise Neilsen was the beginning of our collaboration to develop British Columbia's Agriculture Water Demand Model tool. We had an idea and we made it happen."

"In 2006, the Ministry of Agriculture initiated planning for the *Agriculture Water Demand Model* in response to the need to secure water to BC's agricultural land."

"Initial implementation in 2009 was in the Okanagan region. It has since been expanded to cover the entire province."

"The Province, and more specifically the Ministry of Agriculture, owns both the model and the land use inventories. Having these tools allows the Province to determine very accurately how much water agriculture is using in a given year and what it could use under a climate change scenario."

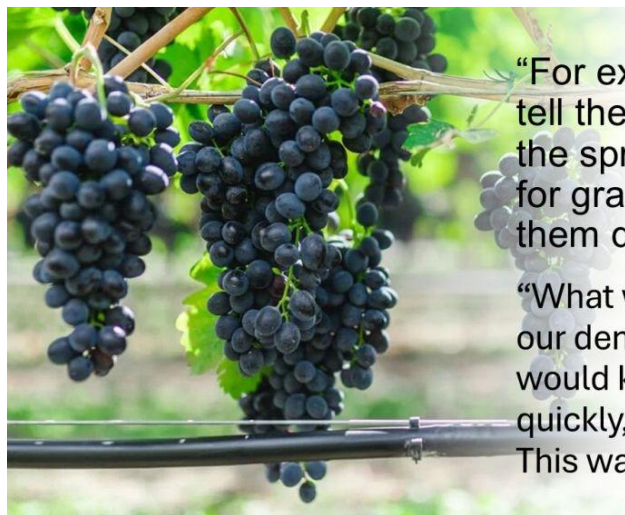
"This means that the Province has the capability to align water allocation and water use during the critical period from mid-summer through early fall when water supply is usually short and demand is at a maximum."

"A GIS system is used to identify separate polygons for both crops and irrigation systems within each property. The Province started the program in the Okanagan and then went province-wide with it."

### Validation, province-wide application, and updating of the Agricultural Water Demand Model

"We had daily climate data on a 500-metre grid for each year from 1961 through 2010. We could run the model for every year of record. We ran it and tested it against places like the Southeast Kelowna Irrigation District which is metered. The Agricultural Water Demand Model mimicked actual water use very closely."

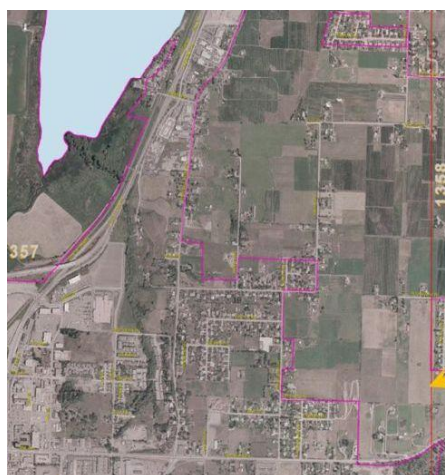
"So now the Ministry of Agriculture has a model that is very good in projecting where water use for agriculture is going to go, and what would happen if we changed to more efficient irrigation systems."



“For example, we could tell the tool to take all the sprinkler systems for grapes and make them drip irrigation.”

“What would that do to our demand? The model would kick out an answer quickly, within minutes. This was very powerful.”

"Two decades after Denise Neilsen and I had the initial conversation that led to the Agricultural Water Demand Model, the work continues. The model calculates the water demand for each polygon of land within each parcel, for all the growing days in the year, and then adds up all the polygons in a region to get a grand total."



“Under the Land Use Inventory program, the Province has surveyed every property. It is very detailed. We know exactly what is grown where, what is irrigated, what is not.”

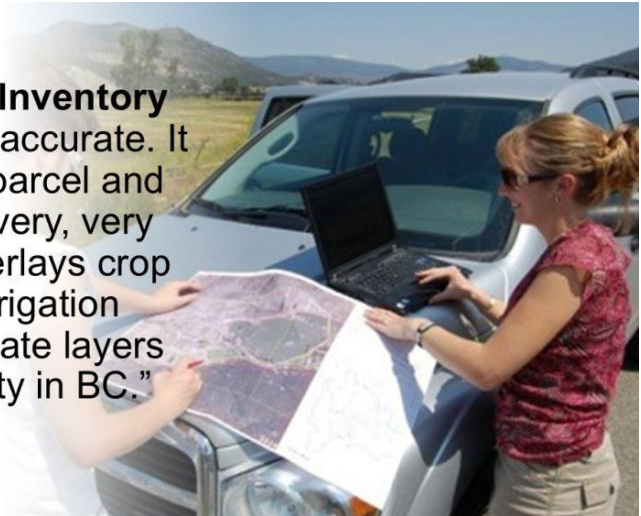
### **The Province can determine how much water a region needs for agriculture versus how much is available**

"The Ministry of Agriculture started with the Okanagan and has since applied the Agricultural Water Demand Model in every region of British Columbia. And the Partnership for Water Sustainability continues to do that work on behalf of the Province."



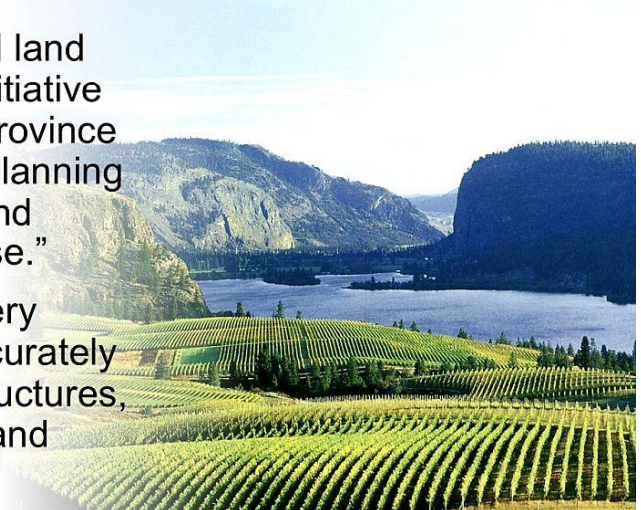
"Securing and delivering water to irrigate the food lands is half the equation for ensuring our food security, including what infrastructure we will require. The other half of the equation is about preserving the best farmland."

**"The Land Use Inventory** program is very accurate. It captures every parcel and every field. It is very, very detailed and overlays crop info with soils, irrigation system and climate layers for every property in BC."



"The agricultural land use inventory initiative is used by the province for agricultural planning as well as fire and drought response."

"The data are very detailed and accurately capture farm structures, facilities, crops and irrigation areas."



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*"Farm water demand is determined by spatially overlaying crops, soils, irrigation systems and climate data for every property in BC. This allows us to estimate the total water demand for a specific area."*

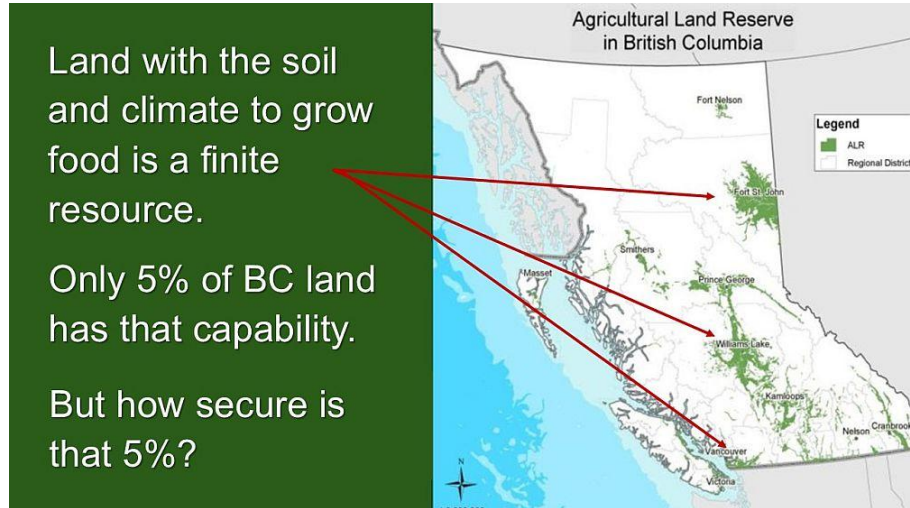
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"The Province is able to quantify *what we have versus what we need* with respect to land and water. Implementation is in all regions of the province."

## The ALR saved the land for farming but...

"All things considered, our land really is not that secure. Sure, land in the ALR is supposed to be held for agricultural use. But it is being used for a whole range of other purposes."



"The Fraser Valley can grow a lot of the food that we need...vegetables, dairy and poultry. The fertile Fraser Valley is the best farmland in the province. And it is also some of the best farmland in Canada."

"But we are slowly losing our land base for growing food. It is not just because land is coming out of the Agricultural Land Reserve. Rather, it is also about what is happening on the land within the ALR. Farmland is being lost to non-agricultural uses."

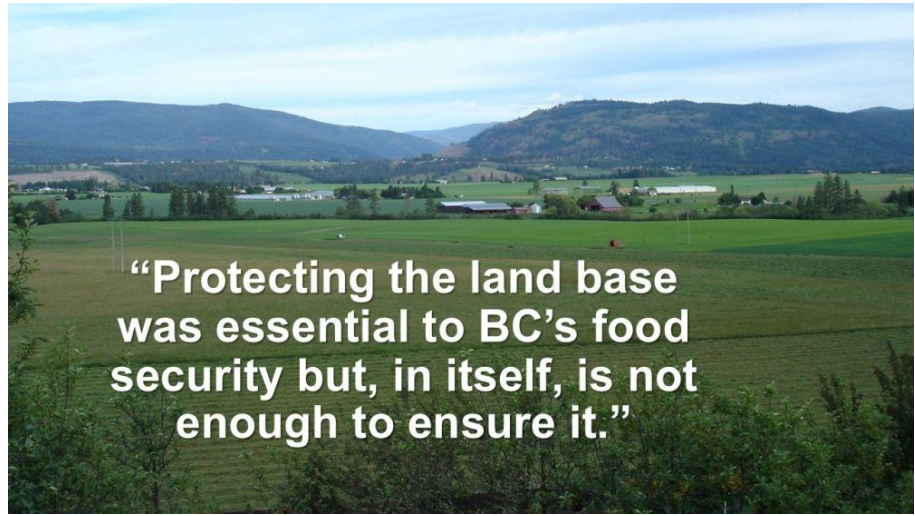
## In summary, Ted van der Gulik concludes that...

"We see there are all these internal problems with our food security and food supply, never mind what Kushank is talking about for food imports and vulnerabilities of external supply chains."



"These are the things that government has to struggle with. In the months and years ahead, it will require extremely good and knowledgeable leadership to make the right decisions and get tough to do the right things."

"In 1973, British Columbia had the incredible foresight to legally protect the very limited amount of land we have that can grow food. And now we need to do the same with water through an Agriculture Water Reserve."

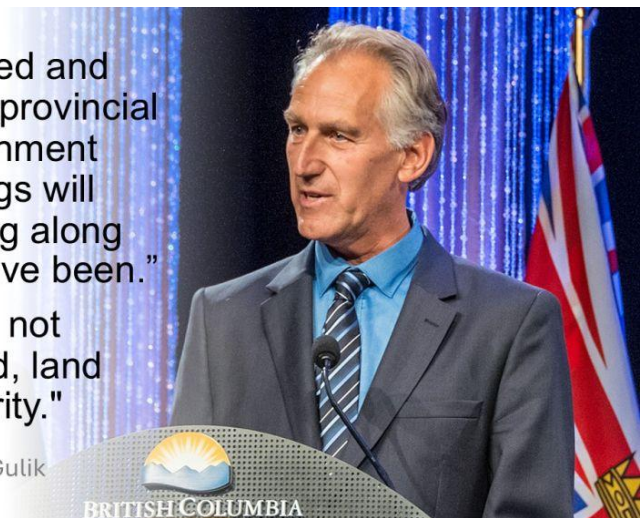


"The Water Sustainability Act includes language for Agricultural Water Reserves. The agricultural land use inventories and agricultural water demand model will be integral to developing an agricultural water reserve in any area of the province."

"Without informed and knowledgeable provincial and local government leadership, things will just keep moving along the way they have been."

"And that would not be good for food, land and water security."

Ted van der Gulik



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## PART THREE: **What next for land, water and food security in British Columbia?**

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“The problem is not globalisation, but the concentration and our obsession with increasing efficiencies in our food systems. The increase in efficiency and concentration can sometimes come at the cost of resilience. Further, our diets are increasingly getting homogenized,” observes Kushank Bajaj.



“Now people have different expectations because they have become accustomed to having whatever food they want, whenever they want it, year-round. These habits and diets may be hard to change,” muses Kushank Bajaj.



“British Columbia is a major producer of cranberries for export. So, we could replace orange juice with cranberry juice.”

“This is one example of how we could switch from an import to a local product. And that would be a good thing to do.”

Ted van der Gulik

### **Keep building partnerships to do meaningful work**

"Ideally, we would like to expand Canada Food Flows in a few different ways on both the back-end data and applications side of the portal. We want to expand beyond fruits and vegetables to look at all commodities. And include exports going out of Canada," continues Kushank Bajaj.



“Try and see if we can do a seasonality component which would give us some sense of how much demand for different fruits and vegetables there is within Canada by province and where that food comes from.”

"On a personal note, I want to do more meaningful work which is on the ground meaningful. So, I want to keep building partnerships in BC and doing the kind of work I do in Canada."

"Now with what I have learned from Ted van der Gulik about the Agricultural Land Use Inventory program, it would be exciting to do that in a way that aligns with the work of the Partnership for Water Sustainability," says Kushank Bajaj in summarizing how he envisions a path forward might possibly look like.

## Food security is still within our grasp

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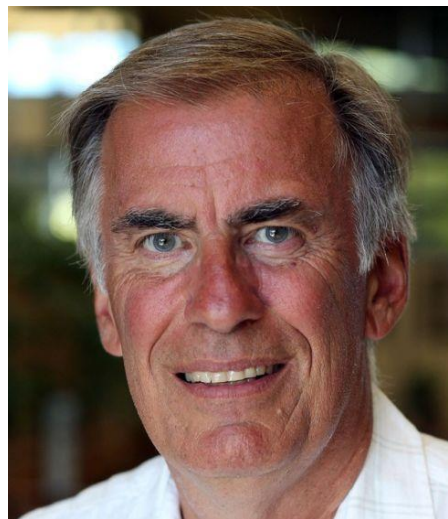
*"Collectively what we need in British Columbia is a mind-set change to affect an attitude shift," emphasizes Ted van der Gulik. "People need to care about what is done to land and water so that they can be protected for the benefit of everyone."*

*"Without a shift in thinking, sustainable water management may never be achieved in British Columbia. We need to secure water for First Nations, environmental flow needs, food security, domestic and other needs."*

*"Embracing an attitude change will be very difficult and something that cannot be led by one entity alone. Getting everyone on the same page will require building trust between all sectors and accepting what mainstream science is telling us. Where and how do we start, that is the big unknown," concludes Ted van der Gulik.*

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**"Before government can fix the land and water security problem, everyone has to recognize and agree that there is a problem that needs fixing."**



**"When the solution will require time and/or money, you should follow two simple rules."**

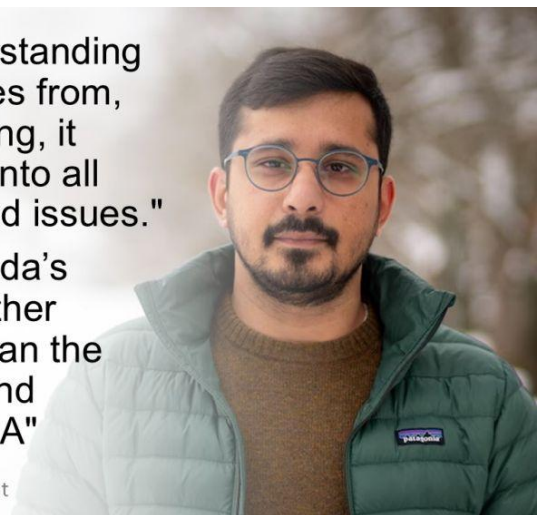
**"One, you cannot solve a problem in advance of public awareness; and two, you cannot propose a solution in advance of political debate."**

Frank Leonard – quote from the inaugural edition of the Asset Management BC Newsletter, Fall 2010

**"Once you start understanding where your food comes from, and what you are eating, it opens conversations into all kinds of water and land issues."**

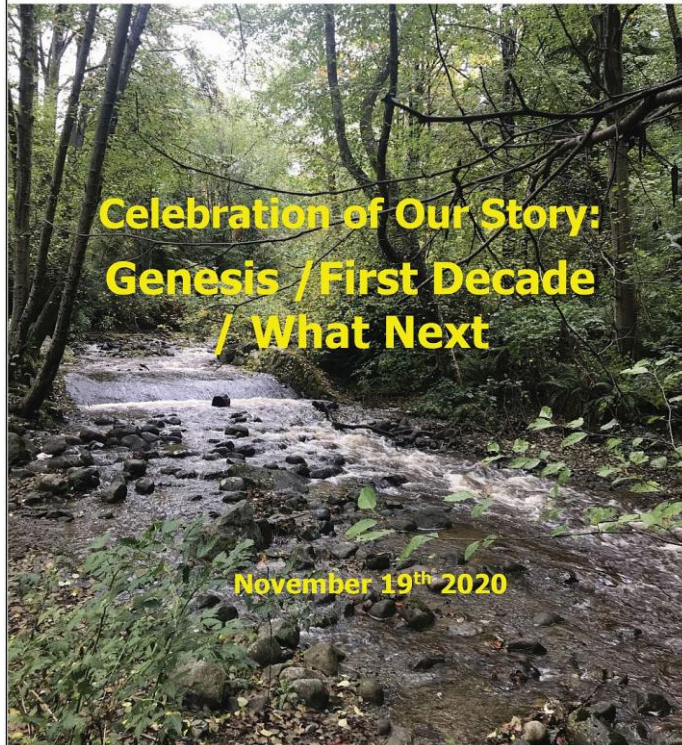
**"Almost always, Canada's own exposure to weather extremes are lower than the other places we depend on...especially the USA"**

Kushank Bajaj, Data Scientist





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TO LEARN MORE, VISIT:

<https://waterbucket.ca/about-us/>

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## About the Partnership for Water Sustainability in British Columbia

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Incorporation of the Partnership for Water Sustainability in British Columbia as a not-for-profit society on November 19, 2010 was a milestone moment. Incorporation signified a bold leap forward.

Over two decades, the Partnership had evolved from a technical committee in the 1990s, to a “water roundtable” in the first decade of the 2000s, and then to a legal entity. The Partnership has its roots in government – local, provincial, federal.

The Partnership has a primary goal, to **build bridges of understanding** and pass the baton from the past to the present and future. To achieve the goal, the Partnership is growing a network in the local government setting. This network embraces collaborative leadership and **inter-generational collaboration**.

The Partnership believes that when each generation is receptive to accepting the inter-generational baton and embracing the wisdom that goes with it, the decisions of successive generations will benefit from and build upon the experience of those who went before them.

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